# elcometer®

## inspection equipment

Software

Physical Test Equipment

Coating Inspection

Appearance

Concrete Inspection

ElcoMaster™

Dispersion

Density

Washability

Film Application

Climatic Testing

Dry Film Thickness

Wet Film Thickness

DOI

Gloss

Haze

ElcoCalc™

Elasticity & Deformation

Fineness of Grind

Viscosity

Abrasion

Salt Contamination

Material Thickness

Surface Profile

Opacity

Colour

Covermeters

Adhesion Testing

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Drying Time

Hardness

Pinhole & Porosity

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Rspec

Industrial Metal Detection

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# elcometer®

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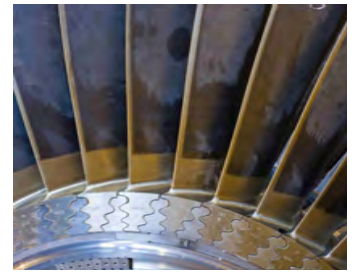*Mandrel bend & variable impact testers*

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**elcometer**®

With a range of products specifically developed to meet the needs of the coatings industry, Elcometer is well positioned to provide you with the solution to your inspection requirements - whatever and wherever they might be.








For more than sixty five years Elcometer has been a world leader in the design, manufacture and supply of inspection equipment to the coatings, concrete and metal detection industry.

Ever since the first Elcometer gauge was manufactured in 1947, our philosophy has been to provide industry leading, innovative, high quality products; supported by a best-in-class customer experience at a competitive price. By concentrating on these core values, Elcometer has grown into a global network with representation in over 70 countries.

## Our Values

- Pride; We are proud of where we work and the work we do
- Ownership; We take responsibility for what we do and how we do it
- Ethics; We treat our customers, suppliers and colleagues fairly and with respect
- Achievement; We believe that just enough is not enough
- Focus; We know that if it is not acceptable to us it is not acceptable to our customers
- Initiative; We are encouraged to identify opportunities for improvement and offer solutions

## Quality is part of our culture

Elcometer's commitment to quality is reflected in our ISO 9001 Quality and ISO 14001 Environmental certifications.

It is the Company philosophy to integrate quality into all aspects of the product - whether it be the initial product design, the manufacture of our product or in our commitment to our customers.

Elcometer is committed to reducing its impact on the environment, including product manufacture, packaging, catalogue production and our waste management. All our products are lead and mercury free and, where required, CE and RoHS compliant.

## Service and Support

Elcometer has over 150 Distributors around the world, all comprehensively trained on our products, providing a full after sales service and support within your region.

With the widest range of own manufactured products, Elcometer can provide a complete solution to all your inspection requirements.

## Training

Elcometer offers first class training on all its products to all our customers either at your facility or at our state of the art training facility in Manchester, England. For more information please contact Elcometer.

## Fit for Purpose

All Elcometer products are designed to comply with National and International Standards. We have a team of experts working with Standards bodies around the world, ensuring we have products fit for purpose, exceeding the demands of our customers.

In this catalogue, we have identified the latest National and International Standards - those in Orange are current and those in Grey have been superseded but are still recognised in some industries.

We continuously review our products against current and new Standards. For the most up to date list of Standards, visit our online catalogue which provides the latest information on all new, current and superseded Standards which our products can be used in accordance with.

## Product Innovation

Elcometer continues to be a leader in product innovation for the Inspection Industries in both hardware and software design with a team of specialists dedicated to product development.

We are committed to continuously push the boundaries through our new product development programmes.

# Product Index

# Data Management Software

Coating inspection regimes require data to be collected on many of the parameters of **the coating process: surface profile, surface cleanliness, climatic conditions, film thickness** and adhesion. All of these inspections generate a large amount of data.

Elcometer have designed a series of data management software packages that will link directly with the data collection devices (gauges) and instantly produce professional reports, offering full traceability of the inspection proving compliance to the relevant standard being followed.

Our free software package, ElcoMaster™ is the most flexible data management software on the market. Designed to meet the demanding needs of the quality inspector whilst offering the ultimate flexibility for managing data into 'projects' for ease of use.

Producing professional reports is easily achieved using the standard report templates within the software package or by using the customisation options to produce customer specific reports.

Making full use of data transfer technology - Bluetooth® and Cloud applications, Elcometer provides fast and efficient means of transferring and sharing data and allows fully comprehensive project reports to be generated.

Any document (even hand written notes) can be scanned, converted to .pdf and then stored in the project file within ElcoMaster™.

For those users wanting to transfer data into other software applications ElcoMaster™ can be configured to export data directly, there is no need to use the data management aspect of the software.

As with our gauges this software is dynamic in that Elcometer are always adding new features as our customers require them.

Updates to the software are freely available over the internet and it is also possible to upgrade our inspection gauges when they are connected to ElcoMaster™.

ElcoMaster™ is the complete solution.

# Data Management Software

**ElcoMaster™**
data management software

## Data Management Software

ElcoMaster™ is a fast, easy to use software and mobile app for all your data management, reporting and quality assurance needs.

It's not just taking measurements but what you do with the collected data that matters.

What ElcoMaster™ can do:

- Import and combine measurements via Bluetooth® or USB from a full range of Elcometer gauges, including;
  - Surface Profile
  - Salt Contamination
  - Climatic Conditions
  - Oven Data Logging
  - Coating Thickness
  - Corrosion Thickness
  - Adhesion Testing
  - Gloss Measurements
- No need to learn different software for different gauges, all Elcometer products use the same expert platform
- Store data in a simple file tree, by project and by inspection type
- Easy on screen analysis with histograms, statistics, measurements, limits, notes, diagrams and photographs
- Export data direct to Microsoft Excel. csv. txt. Cqatk formats etc to save time and prevent keying in errors.

**Easy to connect**
Using ElcoMaster's™ gauge wizard, connecting a gauge & downloading data (via Bluetooth® or USB) is fast and easy
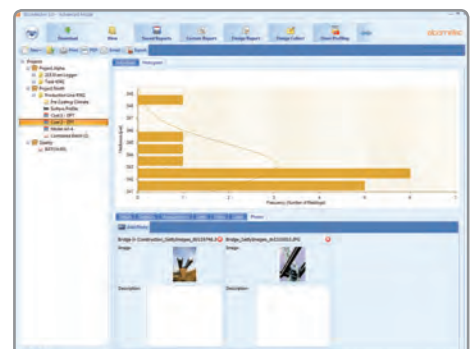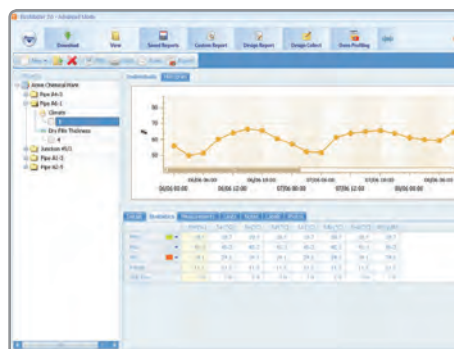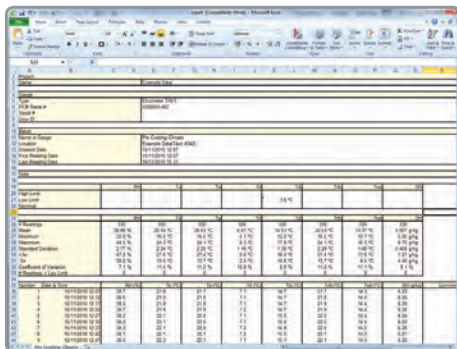
ElcoMaster™ exports data direct to Microsoft Excel. csv, txt, cqatk formats etc. to save time and prevent keying in errors.

Data can be stored in a simple file tree, by project and by inspection type.

Add photographs and notes to your reports.

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## ElcoMaster™
data management software

As inspectors can spend up to 30% of their work week producing reports, ElcoMaster™ saves time and money by producing professional bespoke reports in seconds - even when out on site.

**Export, print or send**
Export, print, .pdf or email directly from ElcoMaster™ at the click of a button

- Generates reports instantly using standard or pre-designed templates in seconds. No need for data manipulation simply connect the gauge, download data and drag & drop.

- Combine multiple inspection parameters (such as DFT, profile, climate, adhesion and gloss) together with images, notes and other project specific information in bespoke quality reports to set you apart from the competition.

- In many industries multiple sites/locations/ production lines are used to fabricate the product components which are brought together at the final assembly line. Different inspection parameters all need to be combined to approve the final product. Using Cloud technology ElcoMaster™ gives you real time quality control monitoring inspection projects in any location.

**USB**

**Bluetooth®**

**Import existing reports**
Scan your existing report into ElcoMaster™ and drag & drop all your data where you want it, then simply save and print

**Cloud**
Multi-site access through secure cloud computing

Email          Cloud

Using the Report Designer within ElcoMaster™, measurements can be quickly displayed on an image or drawing.
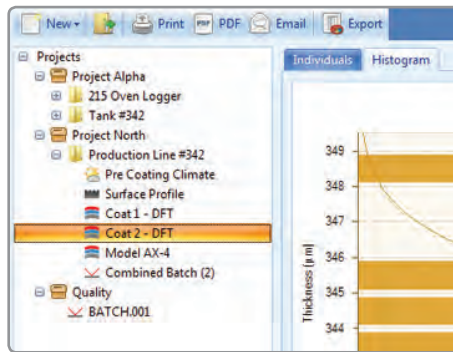
Combine multiple inspection parameters (DFT, climate, adhesion & gloss) into bespoke reports.

Generate .pdf reports combining all your inspection data and share via email or the cloud at the click of a button.

# Data Management Software

## ElcoMaster™ — Data Management Software

ElcoMaster™ Mobile App brings the office to where you are.

You can connect Elcometer Bluetooth® enabled inspection gauges directly to iPhone, iPad and iPods or Android™ mobile phones and tablets via ElcoMaster™ Mobile App.

When out in the field or on site, you can review data instantly using our free ElcoMaster™ Mobile App. Press 'Generate PDF' and watch the ElcoMaster™ App produce a professional report instantly. Email the report to your client seconds after you have finished inspecting or upload it via cloud technology so it can be accessed anywhere in the world.

With data transferred to mobile devices whilst out in the field, the Elcometer gauge does not have to be returned to the office for data download. Inspection work can continue without interruption.

ElcoMaster™ Mobile App shares many features of ElcoMaster™ for PC:
- Download batches from Elcometer Bluetooth® enabled gauges
- Add notes, photographs and diagrams
- Pdf.[1] and email reports
- Using the phone's GPS[2] feature, add this data to batch files
- Use collection batch measurement location points on photos or images to indicate to users where each measurement needs to be taken

[1] Available on iOS devices only

**Bluetooth®**

- Surface Profile
- Salt Contamination
- Climatic Conditions
- Coating Thickness
- Corrosion Thickness
- Adhesion Testing
- Gloss Measurements

ANDROID APP ON Google play

Download on the App Store

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**ElcoMaster™**
data management software

With data transferred to mobile communication devices the Elcometer gauge does not have to be returned to the office for data download. Inspection work can continue without interruption.

**Connect**
Connect gauge via Bluetooth® to phone to see live readings directly on the phone and save them into batches.

**Review**
Review average, maximum and minimum readings instantly.
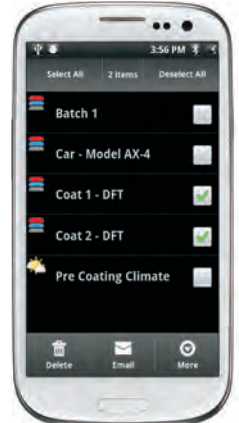
**Analyse**
Analyse data via sequential readings, statistics, charts & histograms or on images.

**Manage & Print**
Store all data; dry film thickness, surface profile, climate and manual reports in easy to manage folders.

**Photos & Notes**
Add photos, notes and comments.
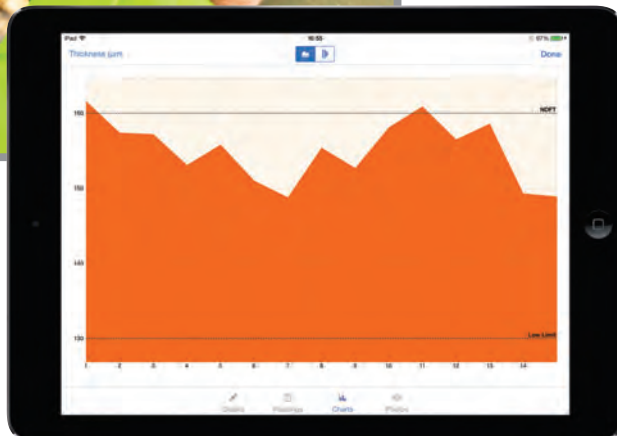
**Send**
Email inspection data from a mobile device to a PC for further analysis and reporting or transfer data via the Cloud.

Cloud

Email

**GPS**
Store GPS locations in batches and view location on Google Maps[2].

[2] Available on Android™ only

# Elcometer 215

## Oven Data Logger

ElcoMaster™ is the easy to use software solution designed specifically for the management and assessment of your temperature profile, allowing you to generate professional inspection reports in seconds. Features include:



**High Temperature Barrier Kit**
Thermal barrier & heat sinks for longer time at temperature



**Standard Thermal Barrier Kit**
With thermal barrier - ideal for single runs

**Oven Logger Set Up** - Create and store unique oven profile setups, name each of the 6 channels, set sampling rates, number of batch runs, start/stop triggers and transfer them to the gauge.

**Coating Parameters** - Set up a library of individual paint types incorporating min, mid & max cure temperatures as well as the maximum absolute and minimum cross link temperatures.

**Coating Datasheets** - Save a copy of the coating's data sheet as a permanent record.

**Product Probe Maps** - Simply drag and drop up to 6 probe ID markers on to your product photo or drawing to record exact probe placement for each production run.

**Customisable Templates** - Create your own comprehensive inspection profile - simply choose a relevant gauge setup, paint parameter and product probe map from your library and assign them to your logger data, providing instant, meaningful and professional reports.

**Elcometer Cure Value** - Using the industry accepted cure value calculation ElcoMaster™ provides instant Pass/Fail information by comparing the production run temperature to the coating supplier's cure requirements.

**Graphical Reporting** - Standard temperature profile graph, cure process and individual profile/cure graphs combined with the product probe map are available as standard.

**Combined Reports** - Fully customisable reports can be quickly generated - allowing oven profile reports to be combined with data from coating thickness, gloss & adhesion gauges.

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# Oven Data Logger

## Elcometer 215

| ElcoMaster™ Software Oven Profiling Key Features | |
|---|---|
| Oven Logger set up & programming | ∎ |
| Paint/Powder parameter library | ∎ |
| Product probe maps | ∎ |
| Fully customisable inspection templates | ∎ |
| Selectable probe/channel traces | ∎ |
| Statistical analysis by probe/channel<br>Max, Min, standard deviation, coefficient of variation | ∎ |
| Temperature profile, cure progress, histogram &<br>individual cure value graphs against product | ∎ |
| Time at temperature, time of peak difference | ∎ |
| Time above maximum absolute & minimum<br>cross link temperatures | ∎ |
| Fully customisable inspection reports | ∎ |
| Combined reports - coating thickness, gloss, adhesion,<br>profile, climate, surface cleanliness | ∎ |
| Report generator wizard & PDF generator | ∎ |
| Email or export data | ∎ |
| Import photo's, data sheets, critical data, inspection<br>notes, etc & include on inspection reports | ∎ |
| Cloud computing - allows for cross site collaboration,<br>including internal text messaging tool | ∎ |
| Overlay temperature profiles, review and compare<br>multiple oven profiles over time | ∎ |



Create and store unique oven profile setups and transfer them to the gauge.
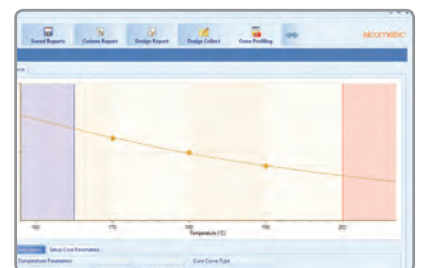


Set up a library of individual paint parameters.



Individual product probe maps record the exact probe placement for each component.



Standard temperature profile and cure process graphs can be viewed at any time.



Statistical analysis by probe/channel.

Data Management Software


ElcoMaster™
data management software

**How ElcoMaster™ Works**
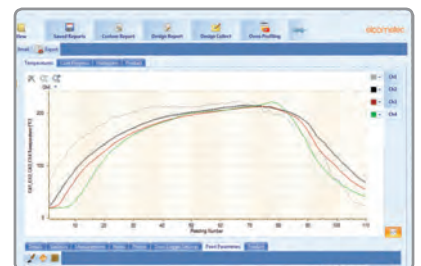
# The different ways ElcoMaster™ can help you do your job better

ElcoMaster™ has been designed to be a very intuitive method of developing professional reports, it is however extremely versatile. Here are just a few ways ElcoMaster™ can be used in day-to-day activities of a coating professional.

## 1. Gauge to PC to Excel



Transferring inspection data straight into Microsoft Excel via Bluetooth® or USB is simple and easy.

## 2. Gauge to PC data transfer into ElcoMaster™
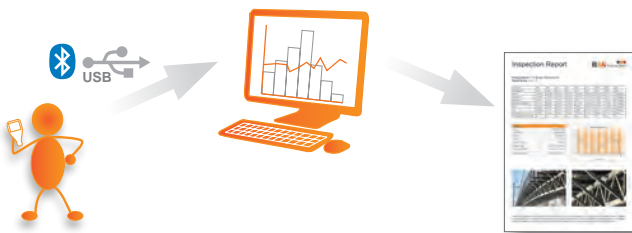


Using Bluetooth® or USB, ElcoMaster™ transfers inspection data in seconds, archiving data and generating reports at the click of a button.

## 3. ElcoMaster™ Mobile App for immediate data transfer from the site to the office


Email

Transfer inspection data straight to mobiles and tablets via Bluetooth® when on site for instant analysis, generate .pdf reports[1] and email them back to the office for storing, review and QA reporting.

## 4. Upload to a cloud for real time analysis anywhere
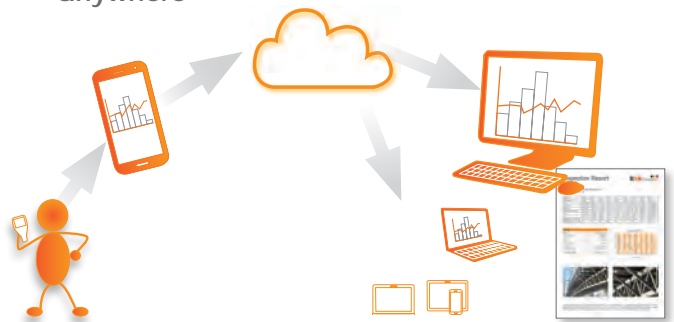


Using ElcoMaster™ Mobile App you can upload inspection data, photos, notes and GPS coordinates direct to a Cloud[2] account of your choice via 3G/4G or WiFi.

All data is instantly visible to other approved users of the account - through a secure log-in on any computer or mobile device anywhere in the world.

## 5. Seamlessly link multiple sites or production lines



ElcoMaster™ gives you real time quality control monitoring from multiple inspection projects in any location.
You can compare and combine inspection data from different production lines or different locations, to produce specific Project Inspection Reports quickly and easily.

[1] Available on iOS devices only          [2] Available on Android™ only

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# How ElcoMaster™ Works

**ElcoMaster™**
data management software

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**6. Real time collaboration for multi-site projects**



Sub Assembly
Inspection
Reports

Final Assembly
Inspection
Reports

A

B

C

Acceptance
of Inspection
Reports

Email
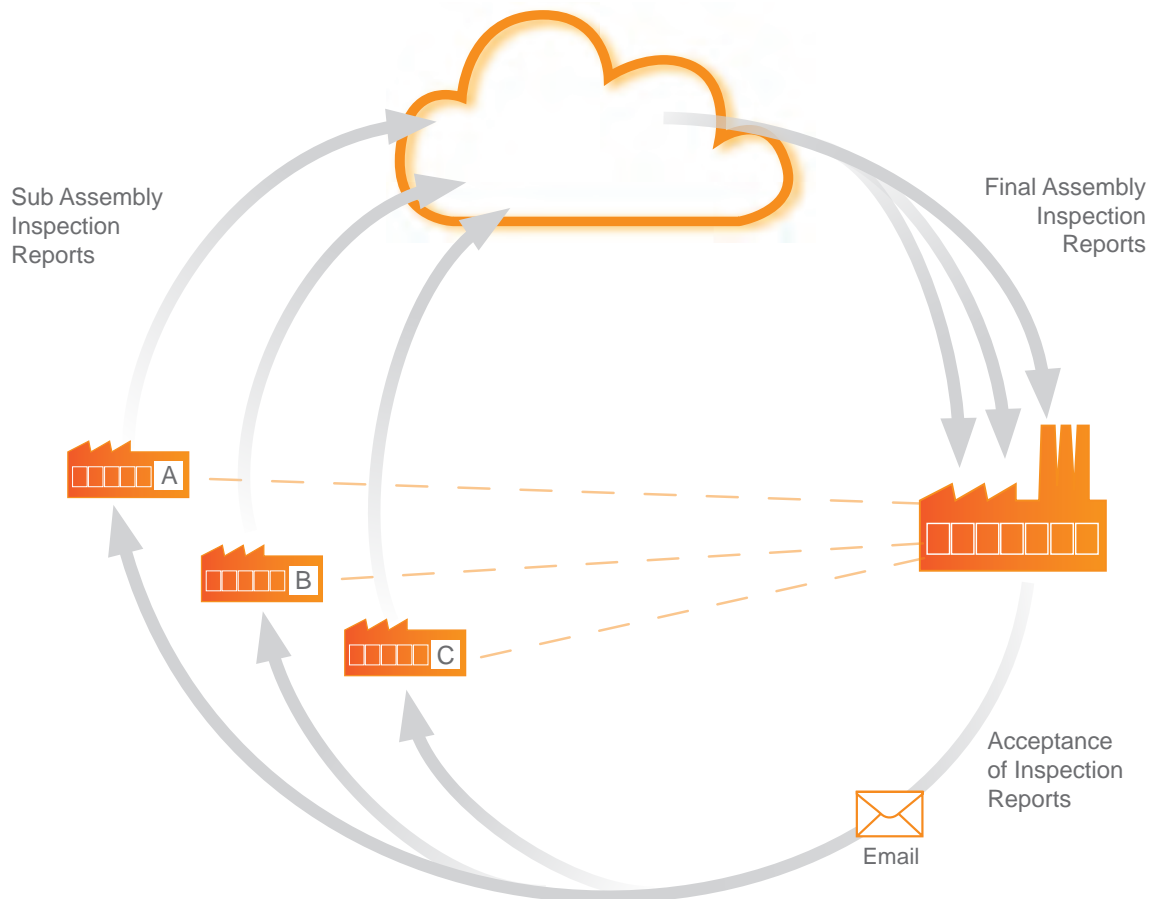
**Real time collaboration for multi-site projects**
When working with manufacturers of sub-assemblies across the globe ElcoMaster™ can collate all inspection data from each site, assembly line and project into one shared location. Contractors can then:

• Accept or reject parts before shipment from sub-assembly plants.
• Combine all data from sub assembly and final assembly inspection to generate Project Inspection Reports for quality management, both during the project and after completion of the project.
• Have real time in progress visibility across the whole project, no matter where the sub-assembly manufacturing is in the world.
• Have multi-site collaboration, real time dialogue and decision making to improve efficiency and quality throughout the production process.

**Real time communication**
Featuring instant messaging the ElcoMaster™ Mobile App lets you add messages to inspection data, projects and files, allowing you to immediately discuss key points with your colleagues, managers or clients, send work instructions and store messages within the project file.

**Your data - your choice - your control**
ElcoMaster™ allows you to decide which Cloud service provider to use. It is your data, it is secure as only approved users can have access, no third parties can see your data.
ElcoMaster™ Mobile App is compatible with a range of cloud service providers and FTP servers including:

works with Google Drive   FTP server   Dropbox

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# Data Management Software

**ElcoCalc™ Mobile App**

## Viscosity Cup Converter & SCM 400 Adjusted Measurement Calculator App

Fast and easy to use, ElcoCalc™ instantly converts viscosity cup flow time in seconds into Centistokes (cSt). In addition this software calculates the adjusted measurement for the Elcometer SCM 400 Salt Contamination Meter when used with Elcometer 130 High Purity Filter Papers in µg/cm².

### Viscosity Cup Converter

Select the Elcometer Cup Type and Number

Enter the flow time in seconds

Read the Viscosity in Centistokes (cSt.)

### SCM 400 Adjusted Measurement Calculator

Enter the SCM 400 measurement.

Option to enter temperature on site either in °C or °F.

Read the adjusted measurement.

**Elcometer 2350, 2351, 2352, 2353, 2354**
Viscosity Flow Cups

**Elcometer 2210**
Zahn Viscosity Dip Cups

**Elcometer 2434, 2435, 2436, 2437**
Frikmar Viscosity Dip Cups

**Elcometer 2310**
Shell Viscosity Dip Cups

**Adjusted measurements explained:**

If the Elcometer 130 High Purity Filter Papers are used with the Elcometer SCM 400 the reading should be corrected using the formula: $y = 0.95x - 0.4$ where y is the cleanliness value in µg/cm² and x is the Elcometer SCM 400 meter reading in µg/cm². Option to apply the temperature compensation of 1.7% per °C.

By using ElcoCalc™ it automatically calculates the correct reading.

**Elcometer SCM 400**
Salt Contamination Meter

**Elcometer 130**
Salt Contamination Meter with High Purity Filter Papers

ElcoCalc™ is free software that is available on Android™ and the App Store. Compatible with Android™ mobile devices running Android™ 2.1 or later and also iPod, iPhone and iPad running iOS 4.0 or later.

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# Surface Preparation

## Surface Profile & Surface Cleanliness

**Surface preparation is one of the most important factors in the successful application of a coating or surface treatment and is critical to the effective lifetime of the coating. For any coating to perform successfully it is essential that the substrate is prepared properly.**

Ensuring the correct surface preparation optimises the performance of the coating and material usage. Elcometer supply a range of products to meet each of the key industry standard surface preparation inspection methods, including;

**Surface condition**: Degree or percentage of rust, level of mill scale, etc can be visibly assessed using Pictorial Surface Standards. Weld beads can be assessed utilising a weld comparator and weld gauges measure a range of quality parameters.

**Blasting parameters**: A number of important parameters need to be monitored during the blasting or water jetting process, these include: air pressure (at the nozzle), nozzle diameter, blast media contamination & pH values in order to avoid recontamination of the substrate during blasting.

**Surface profile**: The degree of profile on the surface affects a coating's overall performance and determines aspects such as adhesion, coverage and overall volume of coatings used. If the profile is too large the amount of coating required increases, otherwise there is a danger that the peaks remain uncoated - allowing rust spots to occur. If the profile is too small there may be an insufficient key for adequate adhesion.

**Surface roughness**: These consist of a stylus attached to an arm which moves over the surface to record and measure the roughness over a specified distance, recording peak-to-valley average.

**Surface cleanliness**: Soluble salts & ion specific contamination (sulphates, chlorides, nitrates etc.) which are often invisible to the eye, together with amine blush (for amine cured epoxy coatings) can result in premature coating failure, resulting in high re-coating and maintenance costs. Elcometer has a range of test equipment for assessing surface cleanliness prior to applying a coating.

# Elcometer 128    Pictorial Surface Standards

Pictorial Surface Standards are high quality photographs which are used for comparison purposes to assess the visual appearance of a steel surface. Elcometer's range of Surface Standards cover most of those required for surface cleanliness.  These include:

## Technical Specification

| Part Number | Description |
| --- | --- |
| E128----1 | BS EN ISO 8501-1:2007/SIS 055900 - the original visual standard. It shows the degree of cleanliness of different levels of rusted steel cleaned by blasting, hand and power tools and flame, specified by  ASTM D2200 Method A |
| E128----3 | SSPC (Steel Structures Painting Council) VIS 1 - similar to the Swedish and British standards, but the pictures of the required final appearances match the written descriptions in the USA standards. VIS 1-89 includes photographs of surfaces cleaned using metallic and non-metallic abrasives. Specified by ASTM D2200 Method B |
| E128----5 | SSPC - VIS 3 - contains 44 photographs to supplement the written SSPC specifications for hand and power tool cleaning |
| E128----6 | SSPC - VIS 2 Standard method of evaluating the degree of rusting on painted steel surfaces |
| E128----7 | SSPC - VIS 4 Guide and reference photographs for steel surfaces prepared by waterjetting |
| E128----8 | SSPC - VIS 5 Guide and reference photographs for steel surfaces prepared by wet abrasive |
| E128----9 | BS EN ISO 8501-4:2006 - preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Initial surface conditions, preparation grades and flash rust grades in connection with high-pressure water jetting |

**STANDARDS:**

ASTM D 2200, IMO MSC.215(82),  IMO MSC.244(83), ISO 8501-1,  SS 55900, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000.

# Pit Gauge

The Elcometer 119 Pipe Pit Gauge is a pocket size gauge designed to identify the condition of a pipe.

The gauge is placed horizontally on the surface of the pipe and the stylus is positioned into the base of the corrosion pit.

The gauge shows the pit depth compared to the nominal pipe wall thickness. Imperial units only.
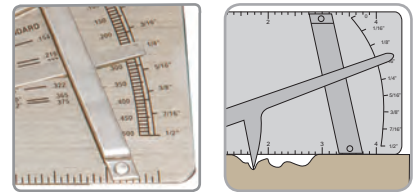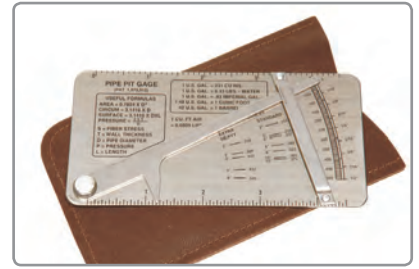
### Technical Specification

| Part Number | Description |
| --- | --- |
| E119----- | Elcometer 119 Pipe Pit Gauge |
| Range | 0 - 500mils (0 - 0.5") |
| Graduation | 10mils and 1/16" |
| Dimensions | 68 x 133 x 4mm (21 x 5.25 x 0.18") |
| Weight | 227g (8oz) |

# Weld Gauge

The Elcometer 147 Weld Gauge measures many aspects of welds in both Metric and Imperial units and includes:

- angle of preparation 0 to 60°
- misalignment (high - low)
- fillet weld throat size
- fillet weld length
- 2mm (0.79") edge roundness test

- excess weld metal (capping size)
- depth of undercut
- depth of pitting
- general linear measurements up to 60mm (2")

### Technical Specification

| Part Number | Description |
| --- | --- |
| H147----1 | Elcometer 147 Weld Gauge |
| Angle of Preparation Scale | 0 - 60° in 5° divisions |
| Misalignment Scale | 0 - 25mm in 1mm divisions and 0 - 1" in 1/16" divisions |
| Fillet Leg & Excess Weld Scale | 0 - 25mm in 1mm divisions and 0 - 1" in 1/16" divisions |
| Fillet Throat Scale | 0 - 20mm in 1mm divisions and 0 - 3/4" in 1/16" divisions |
| Undercut Scale | 0 - 4mm in 1mm divisions and 0 - 1/4" in 1/16" divisions |
| Dimensions | 100 x 68mm (3.9 x 2.7") |
| Weight | 154g (5.4oz) |
| Packing List | Elcometer 147 Weld Gauge and instruction card |

## Elcometer 999

**Weld Comparator**

The Elcometer Surface Weld Comparator provides for the first time, a means of comparing the quality of welds.

Made from durable T Grade ABS plastic, the comparator comprises of 14 different examples of actual welds, allowing a thorough evaluation to be completed.

Each Weld Gauge is supplied complete with a copy of the NACE SP0178-2007 Standard, providing detailed recommendations on design, fabrication and surface finish requirements. It includes generic and graphic descriptions of various degrees of surface finishing of welds that may be specified in preparation for the lining of tanks and vessels.

**STANDARDS:**
SP0178-2007, RP0178

### Technical Specification

| Part Number | Description |
| --- | --- |
| H99921527 | Elcometer Surface Weld Comparator |

## Elcometer 138/2

**pH Test Strips**

The Elcometer 138/2 pH Test Strips provide the user with a means for testing acidic or alkaline contaminants.

Day to day air particulate contaminants generated by modern industry generate particulates of hydrocarbons such as sulphur. Agricultural fertilizers generate nitrates. When they combine with moisture in the atmosphere they create sulphuric and nitrate acids, which if present on the substrate, breaks down the surface of any coating. Furthermore, any water used to clean the surface containing levels of pH will have a similar affect.

### Technical Specification

| Part Number | Description |
| --- | --- |
| T13820562 | 100 x pH Test Strips |

# pH Tester

In many industries, pH measurement is critical to the correct performance of processes. pH is the measure of acidity of a liquid.

The pH scale ranges from 0 to 14pH - where 0pH is acidic and 14pH is alkaline. pH is temperature dependent thus the temperature of the sample under test will affect the pH value recorded.

This simple, easy to use instrument measures both pH and temperature using a single sensor.

The Elcometer 148 sensor has automatic temperature compensation, ensuring like-for-like measurements can be taken for meaningful comparison of the results.

• Simultaneously displays pH and temperature

• Measurement hold / freeze function

• Record maximum and minimum readings over a series of tests

• ºC / ºF user switchable

• Waterproof to IP57 and floats on water

• Auto power off

The condition of the sensor is automatically monitored after each successive calibration and sensors can be easily replaced by the user as and when required.

**STANDARDS:**
ASTM E 70

## Technical Specification

| Part Number | Description | |
|---|---|---|
| H148----1 | Elcometer 148 pH Tester | |
| | pH | Temperature |
| Range | 0 to 14pH | 0 to 89ºC (32 to 192ºF) |
| Resolution | 0.01pH | 0.1ºC (0.1ºF) |
| Accuracy | ±0.03pH | ±0.5ºC (±1ºF) |
| Battery | 4 x AAA batteries | |
| Calibration | 3 point at 7pH, 4pH and 9pH | |
| Dimensions | 195 x 40 x 36mm (7.7 x 1.6 x 1.42") | |
| Weight | 150g (5.3oz) | |
| Packing List | Elcometer 148 pH Tester, pH/Temperature sensor, 4 x AAA batteries, wrist strap, 4pH calibration sachet, 7pH calibration sachet and operating instructions. | |

## Accessories

| | |
|---|---|
| T14821766 | pH/Temperature Sensor |
| T14821768-1 | 4pH Buffer Solution for Calibration: Capsules, Pack of 10 |
| T14821768-2 | 7pH Buffer Solution for Calibration: Capsules, Pack of 10 |
| T14821768-3 | 9pH Buffer Solution for Calibration: Capsules, Pack of 10 |
| T14821767-1 | 4.01pH Buffer Solution for Calibration: 100ml (3.38 fl oz) Bottle |
| T14821767-2 | 7pH Buffer Solution for Calibration: 100ml (3.38 fl oz) Bottle |
| T14821767-3 | 10.01pH Buffer Solution for Calibration: 100ml (3.38 fl oz) Bottle |

## Elcometer 134A

### Chloride Ion Test Kit for Abrasives

Chlorides deposited on a surface by contaminated abrasives during blasting can cause a coating to fail prematurely.

Contamination can build up, particularly if the blast media is recycled several times. Using the Elcometer 134A Chloride Ion Test in the field will accurately identify contamination and prevent costly surface-related failures.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E134----2 | Elcometer 134A Chloride Ion Test Kit for Abrasives (4 Tests per Kit) | | |
| Measuring Range | 1 - 60µg/cm² (1 - 60ppm) | Resolution | 1µg/cm² (1ppm) |
| Sample Time | 1.5 minutes (approx) | | |
| Storage Conditions | Not exceeding 25°C (77°F) | | |
| Dimensions | 185 x 125 x 110mm (7 x 5 x 4.5") | Weight | 367g (13oz) |
| Packing List | 4 x test kits, containing: abrasive sample container, mixing container with a pre-measured quantity of solution, titration tube, titration tube snapper, strap and operating instructions | | |

## Elcometer 134W

### Chloride Ion Test Kit for Water

The Elcometer 134W is used to monitor recycled water (after it has been applied) to establish effectiveness of salt removal, this test is ideal for testing the salt contamination in wash water and blast water.

If the chloride levels in the wash water are too high, this will promote premature corrosion, shortening the life of both steel and concrete structures.

This test can also be used when mixing concrete.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E134----3 | Elcometer 134W Chloride Ion Test Kit for Liquids (5 Tests per Kit) | | |
| Measuring Range | 10 - 2000µg/cm² (10 - 2000ppm) | Resolution | 10µg/cm² (10ppm) |
| Sample Time | 1.5 - 4 minutes (approx) | | |
| Storage Conditions | Not exceeding 25°C (77°F) | | |
| Dimensions | 185 x 125 x 110mm (7 x 5 x 4.5") | Weight | 208g (7oz) |
| Packing List | 5 x test kits each containing: sample container bottle with dropper in lid, titration tube, titration tube snapper and operating instructions | | |

## Needle Pressure Gauge

The Elcometer 102 Needle Pressure Gauge is designed to measure air pressure in blast and air hoses.  Pressure drop is responsible for decreased production rates, increased abrasive consumption and reduced anchor profile in abrasive blasting systems.



### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E102----A | Elcometer 102 Needle Pressure Gauge | | |
| Measuring Range | 0-160 psi | | |
| Dimensions | 130 x 55 x 26mm (5.12 x 2.16 x 1.02") | Weight | 184g (6.49oz) |
| Packing List | Elcometer 102 Needle Pressure Gauge, pressure gauge guard, spare hypodermic needle, protective pouch and operating instructions. | | |

## Blast Nozzle Gauge

The Elcometer 103 Blast Nozzle Gauge measures the orifice size of an abrasive blasting nozzle. This gauge is used to determine the nozzle orifice wear which leads to low nozzle pressure and decreased efficiency in the performance of the nozzle's venturi.  Nozzle orifice wear results in decreased productivity and increased abrasive media consumption.



### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E103----A | Elcometer 103 Blast Nozzle Gauge | | |
| T10323558 | Replacement Wax/Grease Pencil (Pack of 12) | | |
| Measuring Range | 1/4 - 5/5" (81-548 CFM) | | |
| Dimensions | 200 x 19mm (7.87 x 0.75") | Weight | 150g (0.67oz) |
| Packing List | Elcometer 103 Blast Nozzle Gauge, wax/grease pencil (inside gauge), protective pouch and operating instructions. | | |

### How to use a Needle Pressure Gauge
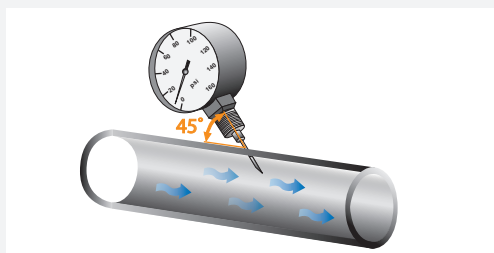


### How to use a Blast Nozzle Gauge
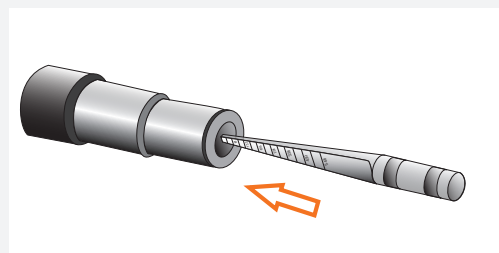
# Elcometer 224    **Digital Surface Profile Gauge**

**STANDARDS:**
ASTM D 4417-B, SANS 5772,
US Navy NSI 009-32,
US Navy PPI 63101-000

Stores up to 150,000 readings in up to 2,500 alpha numeric batches

Time and date stamped measurements

Accurate, immediate and repeatable results

User replaceable tough tungsten carbide tips

Integral & separate probe options for flat and convex* surfaces

Auto rotating display with tap awake feature

Dust and water resistant rugged design equivalent to IP64

2.4" colour screen provides enhanced reading visibility at all angles

Ergonomic design for comfort during continuous use

Integral or separate probes measure profiles up to 500µm (20mils) on flat or curved surfaces*

## Digital Surface Profile Gauge

<span style="color:orange">**Elcometer 224**</span>

Fast reading rate of 50+ readings per minute^

Review batch data or last 20 readings in a graph format
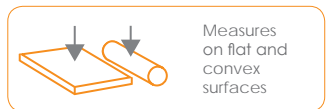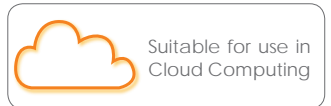
compatible with
ElcoMaster™

available with
**Bluetooth**®
wireless technology

Suitable for use in Cloud Computing

Measures on flat and convex surfaces

**Android**™

USB and Bluetooth® data output to ElcoMaster™ software, see page 1-2

Made for
**iPod** **iPhone** **iPad**

The Elcometer 224 provides the very latest in surface profile measuring technology for measuring profile on either flat or curved surfaces.   Fast, accurate and very user friendly, the Elcometer 224 is available with or without memory and Bluetooth®.

\* Patent applied for

^ Convex probe up to 25 readings per minute

**Elcometer 224**     **Digital Surface Profile Gauge**

# Designed with you in mind

## User Friendly

- Large buttons ideal for gloved hands
- Easy to use menus in multiple languages
- High contrast colour LCD with auto rotate
- High and low reading limit indicators
- Factory calibrated for immediate use

## Accurate

- Measurement capability to ±5%
- Can be used in accordance with National and International Standards
- Temperature stable measurements
- Statistics are calculated and displayed in real time
- Live and batch readings graph format for instant analysis

## Reliability

- Repeatable and reproducible measurements
- 2 year gauge warranty
- Supplied with fully traceable Test Certificates
- Batch & individual readings are date and time stamped

## Tough

- Sealed, heavy duty and impact resistant
- Dust and waterproof equivalent to IP64
- Suitable for use in harsh environments
- Scratch and solvent resistant display
- Durable gauge and probe construction

## Efficient

- Fast reading rate of 50+ per minute
- Integral and separate probe versions to suit your application
- Alpha numeric batch identification
- Compatible with ElcoMaster™ and ElcoMaster™ Mobile App
- Powersave mode with tap awake

## Powerful

- User replaceable tough tungsten carbide tip - can be used for up to 20,000 readings
- USB and Bluetooth® data output to iPhone* or Android™ devices
- Stores up to 150,000 readings in 2,500 batches
- Measures profiles up to 500μm (20 mils)

*Compatible with iPod, iPhone and iPad.

elcometer

# Digital Surface Profile Gauge

**Elcometer 224**

## Product Features

| | Model B | Model T |
|---|:---:|:---:|
| Fast, accurate reading rate; *50+ readings per minute^* | ■ | ■ |
| Repeatable & reproducible measurements | ■ | ■ |
| Easy to use menu structure; *in 30+ languages* | ■ | ■ |
| Tough, impact, waterproof & dust resistant; *equivalent to IP64* | ■ | ■ |
| Bright colour screen; *with permanent back light* | ■ | ■ |
| Scratch & solvent resistant display; *2.4" (6cm) TFT* | ■ | ■ |
| Large positive feedback buttons | ■ | ■ |
| Flat & convex surfaces* | ■ | ■ |
| USB power supply; *via PC* | ■ | ■ |
| Test certificate | ■ | ■ |
| 2 year gauge warranty[†] | ■ | ■ |
| Automatic rotating display; *0°, 90°, 180° & 270°* | ■ | ■ |
| Ambient light sensor; *with adjustable auto brightness* | ■ | ■ |
| Emergency light mode | ■ | ■ |
| Gauge software updates[1]; *via ElcoMaster™ software* | ■ | ■ |
| Data output | ■ | ■ |
|     USB; *to computer* | ■ | ■ |
|     Bluetooth®: *to computer, Android™ & iOS‡ devices* | | ■ |
| On screen statistics | ■ | ■ |
|     Number of readings, $\eta$; Mean (average), $\overline{x}$; Standard deviation, $\sigma$; Highest reading, *hi*; Lowest reading, *lo*; Coefficient of variation, *COV* | ■ | ■ |
|     High & low limits; *definable audible & visual alarms* | | ■ |
|     Number above high limit; | | ■ |
|     Number below low limit; | | ■ |
| ElcoMaster™ software & USB cable | | ■ |
| Date and time stamp *for each reading* | | ■ |
| Replaceable screen protectors | ■ | ■ |
| Protective case | ■ | ■ |
| Plastic transit case | □ | ■ |
| Measurement range | 0-500µm (20 mils) | 0-500µm (20 mils) |
| On-screen calibration instructions; *in 30+ languages* | ■ | ■ |
| Number of batches | | 2,500 |
| Gauge memory; *number of readings* | Last 5 | 150,000 |
| Delete last reading | ■[#] | ■ |
| Limits; *user definable audible & visual pass/fail warnings* | | ■ |
|     Gauge (g) or gauge & batch specific (gb) limits | | gb |
| Batch types; *normal, counted average* | | ■ |
| Review, clear & delete batches | | ■ |
| Copy batches and calibration settings | | ■ |
| Alpha-numeric batch names; *user definable on the gauge* | | ■ |
| Fixed batch size mode; *with batch linking* | | ■ |
| Trend graph; *last 20 readings* | | ■ |
| Review batch graph | | ■ |

■   Standard     □   Optional        ‡ Visit www.elcometer.com/sdk to find out how to integrate Elcometer's MFi certified products to your App.

[1] Internet connection required     [#] Up to the last 5 readings can be deleted     * Patent applied for     ^Up to 25 readings per minute for the convex probe

[†] The Elcometer 224 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com. Elcometer 224 probes are covered by a 1 year warranty.

## Elcometer 224      **Digital Surface Profile Gauge**

| Model Options | | | C |
|---|---|---|---|
| **Part Number** | | Description | Certificate |
| Integral Gauge | Separate Gauge^ | | |
| E224C-BI | E224C-BS | Elcometer 224 Model B Digital Surface Profile Gauge | ● |
| E224C-TI | E224C-TS | Elcometer 224 Model T Digital Surface Profile Gauge | ● |

### Technical Specification

| | | |
|---|---|---|
| Display information | 2.4" (6cm) QVGA colour TFT display, 320 x 240 pixels | |
| Battery type | 2 x AA batteries, rechargeable batteries can also be used | |
| Battery life | Approximately 24 hours of continuous use at 1 reading per second# | |
| Minimum Headroom | Integral: | 185mm (7.3") |
| | Separate: | See page 2-13 |
| Gauge dimensions (h x w x d) | Integral: | 168 x 73 x 37mm (5.61 x 2.87 x 1.46") |
| | Separate: | 141 x 73 x 37mm (5.55 x 2.87 x 1.46") |
| Gauge weight (including batteries) | Integral: | 218g (7.69oz) |
| | Separate: | 161g (5.68oz) |
| Measurement range | 0-500µm (0-20mils) | |
| Probe tip | Tungsten carbide tip 60° angle;  Tip Radius: 50µm (2mil) | |
| Operating temperature | -10 to 50°C (14 to 122°F)     Storage temperature          -10 to 60°C (14 to 140°F) | |
| Accuracy & Resolution | Accuracy*: ±5% or ±5µm (±0.2mil); Resolution: 1µm (0.1mil) | |
| Packing List† | Elcometer 224 gauge, glass zero tile†, 2 x calibration foils†, wrist harness, plastic transit case (T), protective case, screen protector, probe protection cap†, 2 x AA batteries, test certificate, operating instructions, USB cable (T) & ElcoMaster™ software (T) | |

## Elcometer      **Digital Inspection Kits**



These digital inspection kits have been specifically designed to undertake the three principal inspection requirements in the Protective and Industrial Coatings Industry – climate, surface profile and dry film thickness.  Ideal for 'paperless' quality assurance systems the kits come complete with ElcoMaster™ Data Management Software for professional reporting and analysis.

For more information see page 13-2.

### Technical Specification

| Part Number | Description |
|---|---|
| YKIT-DIGITAL-B | Elcometer Basic Digital Inspection Kit (F) |
| YKIT-DIGITAL-T | Elcometer Top Digital Inspection Kit (F) |
| YKIT-DIGITALFNF-B | Elcometer Basic Digital Inspection Kit (FNF) |
| YKIT-DIGITALFNF-T | Elcometer Top Digital Inspection Kit (FNF) |

* Whichever is the greater

# Using default settings & lithium batteries, alkaline or rechargeable batteries may differ.

† For separate gauges, the test foils, glass zero tile and probe protection cap are supplied with the separate probe.

● Test Certificate supplied as standard.

^ Probes are supplied separately, see page 2-13 for details

*elcometer*

# Digital Surface Profile Probes

## Elcometer 224
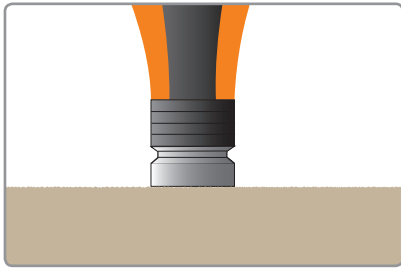


**Flat Surface Profile Probes**

Supplied with either standard cables or armoured metal reinforced heavy duty cables, Elcometer surface profile probes are supplied with a glass zero plate, calibration test foils; nominal values 125µm (5.0mils) & 508µm (20mils) and an Elcometer test certificate.



### Technical Specification     C

| Range: 0-500µm (0-20mils) | | Resolution: 1µm (0.1mil) | Accuracy: ±5% or ±5µm (±0.2mil) | |
|---|---|---|---|---|
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| Flat Surface: Standard | T224C500US | 125mm (4.92") | 25mm (1.0") | ● |
| Flat Surface: Armoured | T224C500UARM | 165mm (6.50") | 25mm (1.0") | ● |
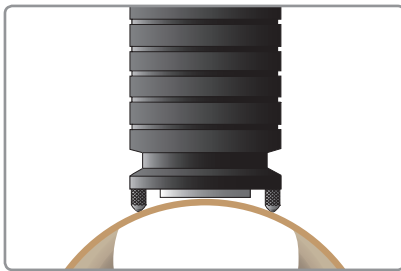


**Convex Surface Profile Probes**

Supplied with either standard cables or armoured metal reinforced heavy duty cables, Elcometer convex surface profile probes are supplied with a glass zero tile, calibration test foils (nominal values 125µm (5.0mils) & 508µm (20mils)) and an Elcometer test certificate.



### Technical Specification     C

| Range: 0-500µm (0-20mils) | | Resolution: 1µm (0.1mil) | Accuracy: ±5% or ±5µm (±0.2mil) | |
|---|---|---|---|---|
| Probe Design | Part Number | Minimum Headroom | Minimum Pipe Diameter | Certificate |
| Convex Surface: Standard* | T224C500UX | 135mm (5.31") | 75mm (3.0") | ● |
| Convex Surface: Armoured* | T224C500UXARM | 175mm (6.89") | 75mm (3.0") | ● |

### Accessories

| Part Number | | Description |
|---|---|---|
| Integral Gauge | Separate Gauge | |
| T22419793 | T22419793 | Probe Tip Protection Cap |
| T22420072 | T22420072 | Glass Zero Tile with Wallet |
| T22421882C | T22421882C | Certified Calibration Test Kit: 125µm & 500µm (5 & 20mils) Calibration Foils, Glass Zero Tile & Calibration Certificate |
| T99921325 | T99921325 | USB Cable |
| T99924797 | T99924797 | USB Bluetooth® Adaptor (V2.0+) - for PC's without Bluetooth® |
| T99922341 | T99922341 | Self Adhesive Screen Protectors (x10) |
| T22420053 | T22420053 | Replacement Tip (Pack of 2) with Fixing Tool |
| T22420095 | T22420095 | Replacement Tip (Pack of 5) |
| - | T45622371 | Benchtop Inspection Stand |

● Test Certificate supplied as standard.
Elcometer 224 probes are covered by a 1 year warranty

\* Patent applied for

## Elcometer 123

**Surface Profile Gauge**

The Elcometer 123 Surface Profile Gauge is an easy to use analogue gauge which measures the peak-to-valley height of a blast cleaned surface in a similar way to the Elcometer 223 and Elcometer 224.

• Metric and Imperial versions available

**STANDARDS:**
ASTM D 4417-B, SANS 5772,
US Navy NSI 009-32,
US Navy PPI 63101-000

| Technical Specification | | | | C |
|---|---|---|---|---|
| Part Number | Description | | | Certificate |
| E123A--M- | Elcometer 123 Surface Profile Gauge, Metric | | | ○ |
| E123A--E- | Elcometer 123 Surface Profile Gauge, Imperial | | | ○ |
| Range | 0 - 1000µm (0 - 40mils) | Scale | 2µm (0.1 mil) | |
| Dimensions | 105 x 55 x 25mm (4.1 x 2.2 x 1") | Weight | 335g (8oz) | |
| Packing List | Elcometer 123 Surface Profile Gauge, glass slide, 2mm allen key, carry case and operating instructions | | | |

**How to measure surface profile**
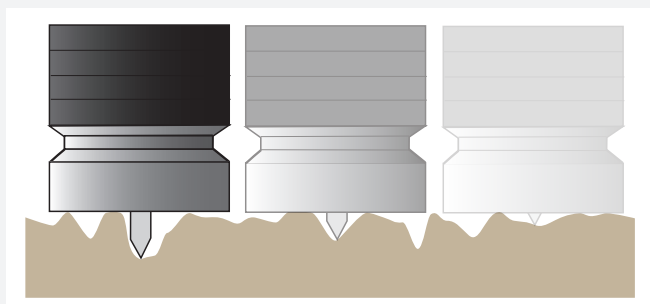
1. Calibrate on a glass zero tile.

2. Ensure probe is 90° to substrate to ensure accurate readings.

3. Take a minimum of 10 readings over an area to establish the average surface profile.

○ Optional Calibration Certificate available.

## Testex® Replica Tape

**Elcometer 122**

Elcometer 122 Testex® Tape consists of foam with a non-compressible backing. The foam side is rubbed into the surface providing a permanent mould of the peak-to-valley profile, which can then be measured using the Elcometer 124 Thickness Gauge.

Elcometer 122 Testex® Tape is available in four profile ranges. It is important that the tape grade chosen is reflective of the profile being measured.

- For profiles between 12 & 25µm (0.5 & 1.0mils): Coarse Minus Tape
- For profiles between 20 & 38µm (0.8 & 1.5mils): Coarse Tape
- For profiles between 38 & 64µm (1.5 & 2.5mils): Average of Coarse and X-Coarse Tape
- For profiles between 64 & 115µm (2.5 & 4.5mils): X-Coarse Tape
- For profiles greater than 115µm (4.5mils): X-Coarse Plus Tape

There are 50 tests in each roll.

**STANDARDS:**
ASTM D 4417-C, BS 7079-C5, ISO 8503-5, NACE RP0287, US Navy NSI 009-32, US Navy PPI 63101-000

### Technical Specification

| Description | Profile Range | | Part Number | | | |
|---|---|---|---|---|---|---|
| | Metric | Imperial | 1 Roll | Pack of 10 | Pack of 50 | Pack of 100 |
| Elcometer 122 Coarse Minus | 12 - 25µm | 0.5 - 1.0mils | E122----A1 | E122----A10 | E122----A50 | E122----A100 |
| Elcometer 122 Coarse | 20 - 64µm | 0.8 - 2.5mils | E122----B1 | E122----B10 | E122----B50 | E122----B100 |
| Elcometer 122 X-Coarse | 38 - 115µm | 1.5 - 4.5mils | E122----C1 | E122----C10 | E122----C50 | E122----C100 |
| Elcometer 122 X-Coarse Plus | 116 - 127µm | 4.6 - 5.0mils | E122----F1 | E122----F10 | E122----F50 | E122----F100 |

## Thickness Gauge

**Elcometer 124**

The Elcometer 124 Thickness Gauge is used to measure the peak-to-valley height of a surface profile moulded in the Elcometer 122 Testex® Replica Tape.

- Metric and Imperial versions available
- Quick and easy to use
- Anvil pressure as required in the Standards

**STANDARDS:**
ASTM D 4417-C, BS 7079-C5, ISO 8503-5, NACE RP0287, US Navy NSI 009-32, US Navy PPI 63101-000

### Technical Specification C

| Part Number | Description | Range | Dimensions | Weight | Scale Resolution | Certificate |
|---|---|---|---|---|---|---|
| E124---3M | Elcometer 124 Metric | 5mm | 125 x 95 x 25mm | 270g | 2µm | ○ |
| E124---3E | Elcometer 124 Imperial | 0.2" | 4.9 x 3.6 x 1.0" | 9.6oz | 0.1mil | ○ |

○ Optional Calibration Certificate available.

## Elcometer 125

## Surface Comparators

These extremely durable comparators allow the estimation of surface profile of either grit or shot blasted surfaces. Using the Elcometer 125 surface comparators as a reference the blasted profile can be compared to the four reference profile grades in each comparator. Profiles are recorded in microns.

• 4 Profile Values per Comparator

### Technical Specification

| Part Number | Description | Section Profiles |
|---|---|---|
| E125----1 | Elcometer Grit Surface Comparator | 25, 60, 100, 150µm |
| E125----2 | Elcometer Shot Surface Comparator | 25, 40, 70, 100µm |

## Elcometer 127

## Keane-Tator Surface Comparators & Magnifier

The Elcometer 127 range of Surface Comparators are available in sand, shot or grit surface profiles. Each comparator is supplied with 5 profile grades ranging from 0.5 - 5.5mils. Designed for use with the Elcometer 127 illuminated magnifier, each comparator has a hole in the centre allowing for clear visual comparisons to be made.

• 5 Profile Values per Comparator

### Technical Specification

| Part Number | Description | Section Profiles |
|---|---|---|
| E127----2 | Elcometer 127 Sand Surface Comparator | 0.5, 1, 2, 3, 4 mils |
| E127----3 | Elcometer 127 Grit Surface Comparator | 1.5, 2, 3, 4, 5 mils |
| E127----4 | Elcometer 127 Shot Surface Comparator | 2, 2.5, 3, 4, 5.5 mils |
| E127----1 | Illuminated magnifier (x 5) with integrated surface comparator holder | |

## Rubert & Rugotest Surface Comparators

**Elcometer 129**

The Elcometer 129 Surface Comparators are available in two models:

- Elcometer 129 Rubert - available in grit and shot versions
- Elcometer 129 Rugotest - shot and grit profiles on the same block

Roughness is displayed in both "classes" and "roughness averages" for easier identification. Available in Metric only.

- 6 Roughness Values per Comparator

**STANDARDS:**
AS 3894.5

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Technical Specification

| Part Number | Description | Section Profiles |
|---|---|---|
| E129----1 | Elcometer 129/1 Rubert Grit Surface Comparator | 0.4, 0.8, 1.6, 3.2, 6.3, and 12.5µm |
| E129----2 | Elcometer 129/2 Rubert Shot Surface Comparator | 0.4, 0.8, 1.6, 3.2, 6.3, and 12.5µm |
| E129----3 | Elcometer 129/3 Rugotest Shot & Grit Surface Comparator | N6, N7, N8, N9, N10 and N11 equivalent to 0.8, 1.6, 3.2, 6.3, 12.5, and 25µm roughness averages respectively |

# Elcometer 7061

## MarSurf PS1 Surface Roughness Tester

The Elcometer 7061 is a light weight and portable measuring solution for the range of surface roughness measurements required for compliance to International Standards.

The unit is also suitable for assessing surface roughness conditions in a wide range of general industrial applications; particularly where the sample is too large to bring to the laboratory.

Measurements of Surface Roughness are expressed in terms of Ra, Rz or Rt. These values include peak-to-valley profile measurement in combination with an assessment of the frequency of peaks within the sample area.

- Multilingual Display
- Integrated Calibration Standard

**STANDARDS:**
ASTM D7127, ASME B46, DIN 4768, EN 10049, ISO 4287, ISO 4287/1, JIS B 0601

## Technical Specification

| Part Number | Description | Certifcate |
|---|---|---|
| K7061M001 | Elcometer 7061 MarSurf PS1 Surface Roughness Tester | ● |
| Unit of Measurement | Metric, Imperial | |
| Stylus pick-up* | Inductive skidded stylus pick-up, 2µm (80µin) stylus tip, measuring force approx. 0.7 mN | |
| Parameters | Ra, Rq, Rz equiv. to Ry (JIS), Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPc, Rmr equiv. to Tp (JIS, ASME), RSm, R, Ar, Rx | |
| Measuring Range | 0-350µm (0-13.78mils)  Resolution  8nm-32nm (0.315-1.260mils) | |
| Filter | Phase-correct profile filter (Gaussian filter) according to DIN EN ISO 11562, special filter according to DIN EN ISO 13565-1, ls filter according to DIN EN ISO 3274 (can be disabled) | |
| Cutoff (lc) | 0.25mm, 0.8mm, 2.5mm; automatic (0.010", 0.030", 0.100") | |
| Traversing Length(Lt) | 1.75mm, 5.6mm, 17.5mm; automatic (0.069", 0.22", 0.69") | |
| Traversing Length(acc. to MOTIF) | 1mm, 2mm, 4mm, 8mm, 12mm, 16mm (0.040", 0.080", 0.160", 0.320", 0.480", 0.640") | |
| Evaluation Length (ln) | 1.25mm, 4.0mm, 12.50mm (0.050", 0.15", 0.50") | |
| Number (n) of Sampling Lengths | Selectable: 1 to 5 sampling lengths | |
| Memory Capacity | Max. 15 profiles, max. 20,000 results | |
| Battery | Rechargeable battery 100V to 264V power supply | |
| Dimensions | 140mm × 50mm × 70mm (5.51" × 1.97" × 2.76")  Weight  400g (0.88lbs) | |
| Packing List | Elcometer 7061 MarSurf PS1 base unit, drive unit, 1 x standard stylus pick-up, built-in battery, roughness standard integrated into casing, height adjustment accessory, stylus pick-up protection, universal charger / mains adapter, USB cable, carry case with shoulder strap and belt loop, calibration certificate and operating instructions | |

● Calibration Certificate supplied as standard.

* Other stylus pick-ups are available

## MarSurf PS1 Surface Roughness Tester

**Elcometer 7061**

### Accessories

| Part Number | Description |
|---|---|
| KT007061P001 | **Stylus pick-up Extension; 80mm (3.15")**, ideal for measuring points located deep within cylinders |
| KT007061P002 | **Stylus pick-up PHT 3-350**, for measurements in bores from 3mm (0.12") diameter |
| KT007061P003 | **Stylus pick-up PHT 11-100,** for measurements at recessed measuring points, e.g. in grooves from 2.5mm (0.10") wide and up to 7.5mm (0.30") deep |
| KT007061P004 | **Stylus pick-up PHTR 100,** for measurements on concave and convex surfaces |
| KT007061P005 | **Stylus pick-up PHTF 0.5-100**, for measurements on tooth flanks |
| KT007061P006 | **Stylus pick-up PT 150**, Dual-skid stylus pick-up for measurements on metal sheets and roller surfaces according to DIN EN 10049 (SEP) |
| KT007061P007 | **Stylus pick-up PHT 6-350** |
| KT007061P008 | **Stylus pick-up PHT 6-350, 5µm Probe Tip**, for measurements on flat planes, in bores from 6mm (0.24"), 17mm (0.67") deep and in grooves from 3mm (0.12") wide |
| KT007061P010 | Measuring Stand ST-D |
| KT007061P012 | Measuring Stand Mount - Required to fix the Elcometer 7061 to the measuring stand |
| KT007061P011 | End Face Vee-Block - For measuring on flat faces of cylindrical and planar components |
| KT007061P013 | Adaptor Set for Transverse Tracing; Comprising of Adaptor for Transverse Tracing and Vee-Block Holder with Vee-Block - For hand-held transverse tracing of cylindrical measuring objects |
| KT007061P016 | **MarSurf PS1 Explorer Evaluation Software** Available as an optional accessory PS1 Explorer Evaluation Software allows the Elcometer 7061 to be connected to a PC or laptop; using the USB cable supplied to document protocol profiles, results, statistics and to print out all your measurement results. |

### How to use a Surface Roughness Tester

Surface Roughness Testers consist of a stylus which is mechanically drawn across the surface recording an "image" of the surface roughness across a pre-defined sample length.

The measurement technique provides a number of measurement parameters including:
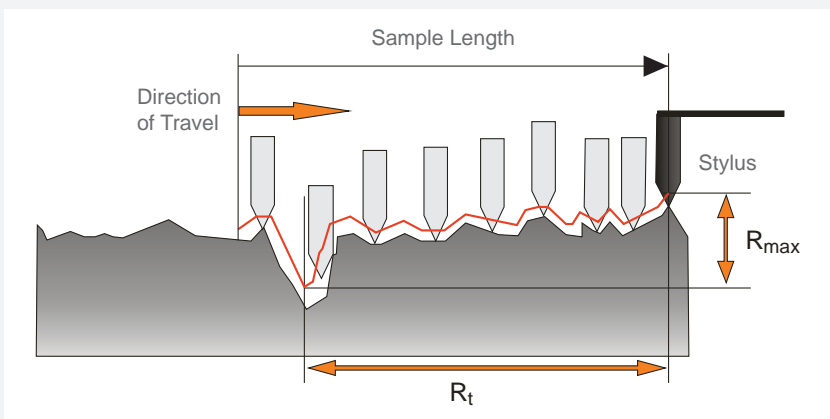


- **Rmax:** The greatest distance between the highest peak and lowest valley over the sampling length
- **Ra:** The average roughness over the sampling length
- **Rt:** The distance between the highest peak and the lowest valley within any given sampling length.
- **Rz:** The average distance between the highest peak and lowest valley over a number of sampling lengths

## Elcometer 130

**Salt Contamination Meter**

The Elcometer 130 quickly and accurately measures the level of soluble salts on surfaces nearly 5 times faster than Bresle equivalent test methods.

Large colour LCD screen displays readings in µg/cm², ppm, µS/cm, mS/cm, % salinity or mg/m²

**Android**™

new

On-screen run graph shows last 20 measurement values
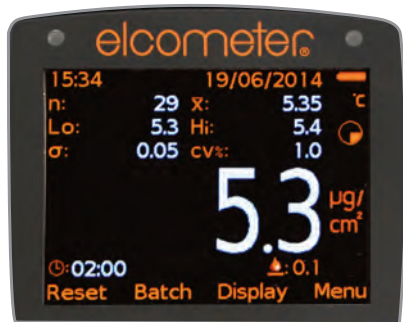
Offset calibration allows use of non-pure water

Fully portable hand-held, ergonomic design ideal for use in the field

Pressure plate ensures a constant and uniform pressure to paper

Automatic detection of paper size and automatic adjustment of reading value

Dust and water resistant rugged design equivalent to IP64

USB and Bluetooth® data output to ElcoMaster™ software, see page 1-2

## Salt Contamination Meter

**Elcometer 130**

compatible with
ElcoMaster™

available with
**Bluetooth**®
wireless technology

Suitable for use in
Cloud Computing

Measures
on flat and
convex
surfaces
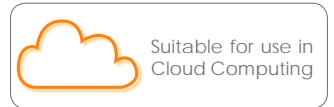
Automatic temperature
compensation ensures
accurate results

Fast reading rate allows
multiple tests to be
completed efficiently

Non-oxidising gold
plated contacts ensures
lifetime accuracy

Stores up to 150,000
readings in 2,500 alpha
numeric batches

new

WATER FOR LABORATORY USE

EEC LABEL
EEC No 232 – 658 – 1
UN No NR

| Code | Batch No | Quantity |
|---|---|---|
| 23.1040.66 | 8119/01Y | 250 ML |

**Elcometer 130**    **Salt Contamination Meter**

# Designed with you in mind

## User Friendly

- Large buttons ideal for gloved hands
- Easy to use menus in multiple languages
- High reading limit indicator
- Factory calibrated for immediate use

## Accurate

- Conductivity measurement to ±1%
- Can be used in accordance with National and International Standards
- Automatic temperature compensation ensures repeatable, accurate results
- Calibration verification tiles
- Trend and batch readings graph formats for instant on-screen analysis

## Reliable

- Repeatable and reproducible measurements
- 2 year gauge warranty
- Supplied with fully traceable Test Certificates
- Batch & individual readings are stored with date and time stamp, temperature and size of test paper

## Tough

- Heavy duty, impact resistant, dust and waterproof design equivalent to IP64
- Wipe clean sealed unit ideal for harsh environments
- Scratch and solvent resistant display

## Efficient

- Instant readings allows multiple tests to be completed efficiently
- Alpha numeric batch identification
- Compatible with ElcoMaster™ and ElcoMaster™ Mobile App
- Powersave mode with 'tap awake' feature
- Calibration offset allows the use of non-pure water up to 2µg/cm²

## Powerful

- Measuring range up to 50µg/cm² (3000ppm)
- USB and Bluetooth® data output
- Stores up to 150,000 readings in 2,500 batches
- Soluble salt and conductivity meter in one gauge

Calibration Verification Tiles available for verifying the accuracy of the gauge

Supplied in a robust carry case

elcometer®

## Salt Contamination Meter        Elcometer 130

| Product Features | ■ Standard | □ Optional |
|---|---|---|
| | Model S | Model T |
| Repeatable & reproducible measurements | ■ | ■ |
| Easy to use menu structure; *in 30+ languages* | ■ | ■ |
| Tough, impact, waterproof & dust resistant; *equivalent to IP64* | ■ | ■ |
| Bright colour screen; *with permanent back light* | ■ | ■ |
| Scratch & solvent resistant display; *2.4" (6cm) TFT* | ■ | ■ |
| 2 year gauge warranty* | ■ | ■ |
| USB power supply; *via PC* | ■ | ■ |
| Calibration certificate | ■ | ■ |
| Calibration verification mode *(with optional certified calibration tiles)* | ■ | ■ |
| Ambient light sensor; *with adjustable auto brightness* | ■ | ■ |
| Emergency light mode | ■ | ■ |
| Magnetic & tripod mounting points | ■ | ■ |
| Automatic paper size detection (full, half & quarter size) | ■ | ■ |
| Gauge software updates; *via ElcoMaster™ software* | ■ | ■ |
| Data output | USB | USB & Bluetooth® |
| On screen statistics | | ■ |
| Number of readings, $\eta$; Mean (average), $\bar{x}$; Standard deviation, $\sigma$; Highest reading, *hi*; Lowest reading, *lo*; Coefficient of variation, *COV*; Number of readings above high limit | | ■ |
| Gauge memory | | ■ |
| Number of readings | | 150,000 |
| Number of batches | | 2,500 |
| Measurement units & range    μg/cm² ppm μS/cm mS/cm % Salinity mg/m² | 0-25 | 0-50 0-3000 0-6000 0-6 0-0.3 0-500 |
| Measurement mode | | |
| Surface cleanliness | ■ | ■ |
| Conductivity | | ■ |
| Calibration offset mode | | ■ |
| Automatic temperature compensation | | ■ |
| ElcoMaster™ software & USB cable | □ | ■ |
| Individual reading stored with date, time, temperature and paper size | | ■ |
| Plastic transit case | ■ | ■ |
| Alpha-numeric batch names; *user definable on the gauge* | | ■ |
| Fixed batch size mode; *with batch linking* | | ■ |
| Delete last reading | | ■ |
| Limits; *user definable audible & visual pass/fail warnings* | | ■ |
| Review, copy, clear & delete batches & calibration settings | | ■ |
| Trend graph; *last 20 readings* | | ■ |
| Batch review graph | | ■ |
| Analogue bar graph | | ■ |

*The Elcometer 130 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com

## Elcometer 130      Salt Contamination Meter

### How to use a Salt Contamination Meter
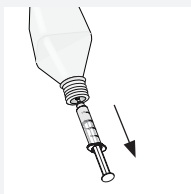
Fill the syringe with 1.6 ml of high purity water.

Note: Non-pure water (up to 2µg/cm²) can be automatically offset with the gauge.

Eject the 1.6ml on to a clean unused sample paper, taking care to retain all the water on the paper.

2m
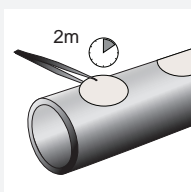
Place wetted paper on to the area under test, pressing firmly into contours and irregularities to remove any entrapped air. Start the timer on the gauge.

Whilst waiting for the sample time to elapse, additional tests can be prepared.
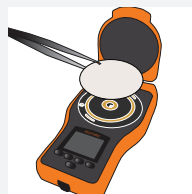
After 2 minutes, remove the paper from the surface and place it on to the gold-plated electrodes.

Close the lid, ensuring that the magnetic catch is fully engaged.

The reading will automatically be displayed and stored into memory together with paper size, temperature, date and time.

Half size or quarter size papers can be used for testing on small surfaces.

Paper size is automatically detected by the Elcometer 130 and the reading calculated automatically.

### Technical Specification      C

| Model S | Model T | Description | Certificate |
|---|---|---|---|
| E130-S | E130-T | Elcometer 130 Salt Contamination Meter | |
| E130-SC | E130-TC | Elcometer 130 Certified Salt Contamination Meter | ● |

| | | Model S | Model T |
|---|---|---|---|
| Measurement Range | | 0-25µg/cm² | 0-50µg/cm²; 0-500mg/m²; 0-6000µS/cm; 0-6mS/cm; 0-3000ppm; 0-0.3% Salinity |
| Resolution | 0-10µg/cm²<br>10-25µg/cm²<br>25+µg/cm² | 0.1µg/cm²<br>0.2µg/cm² | 0.1µg/cm²<br>0.2µg/cm²<br>0.5µg/cm² |
| Measurement Accuracy | ±1% of reading ±0.1µg/cm² | | |
| Operating Range | 5°C - 50°C (41°F - 122°F) | | |
| Power Supply | 4 x AA batteries (rechargeable batteries can also be used), or power via USB | | |
| Number of Tests | Approximately 4,000 measurements before battery replacement | | |
| Sample Time | 2 minutes | Sampling Size | 100mm (4.3") circle, or part of |
| Dimensions | 250 x 145 x 50mm (9.8 x 5.7 x 1.9") | Weight | 780g (1.72lb) |
| Packing List | Elcometer 130 Salt Contamination Meter, 100 x high purity test papers, 250ml (8.5fl oz) pure water, 20 x PVC storage bags, disposable gloves, sensor wipes, 3 x 2.5ml (0.08fl oz) syringes, 2 x plastic tweezers, 4 x AA batteries, shoulder strap, carry case, test certificate and operating instructions, USB cable (T), ElcoMaster™ software (T) | | |

### Accessories

| | | | |
|---|---|---|---|
| T13023980 | Calibration Verification Tiles, Set of 3 | T13024094 | Box of 100 High Purity Test Papers |
| T13024091 | 2.5ml / 0.08fl oz Syringe (x3) | T13024092 | Box of 20 Disposable Vinyl Gloves |
| T99922341 | Pack of 10 Display Screen Protectors | T13024098 | Plastic Tweezers (x2) |
| T13024093 | Box of 20 Self Seal Polythene Bags | T13024087 | Box of 72 Sensor Wipes |
| T99911344 | Pure Water - 250ml (8.5fl oz) Bottle | T99921325 | USB Cable |

● Calibration certificate supplied as standard

# Bresle Salt Kit

It is essential that the level of contaminants on a surface is measured prior to application of the coating to ensure the quality of the coating and that its optimum lifetime is achieved.

If the coating is applied to a contaminated surface, which is not properly prepared, it could fail prematurely resulting in costly re-coating and high maintenance costs.

The Elcometer 138 Bresle Kit includes the Elcometer 138 Conductivity Meter. This lightweight, portable conductivity meter accurately measures the salinity of the test samples.

The cartridge type sensor can be easily replaced when necessary and displays conductivity in a range of units including: S/cm, S/m, ppm and % salinity.

**STANDARDS:**

AS 3894.6-A, IMO MSC.215 (82), IMO MSC.244 (83), ISO 8502-6, ISO 8502-9, SSPC Guide 15, US Navy NSI 009-32, US Navy PPI 63101-000

## Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E138-1 | Elcometer 138 Bresle Salt Kit | | |
| Measurement Range | 0 mS/cm to 19.9 mS/cm and 0 S/m to 1.99 S/m | | |
| Accuracy | 2% full scale ±1 digit (for Elcometer 138 see page 2-27 for full specification) | | |
| Dimensions | 300 x 220 x 75mm (11 x 8.6 x 3") | Weight | 2.1kg (4.62lb) |
| Packing List | Box of 25 Bresle patches, Elcometer 138 Conductivity Meter, 14ml (0.5fl oz) bottle of standard 1.41 mS/cm calibration solution, 14ml (0.5fl oz) bottle of moistening solution, 250ml (8.5fl oz) bottle of pure water, 3 x 5ml (0.1fl oz) syringes, 3 x blunt needles, 30ml (1fl oz) plastic beaker, 2 x CR2032 batteries, carry case and operating instructions | | |

## Accessories

| | | | |
|---|---|---|---|
| E135----B | Bresle Patches (Box of 25) | T13818519 | Plastic Beaker 30ml (1fl oz) |
| T13818517 | 3 x 5ml (0.1fl oz) Syringes | T13823926 | Calibration Solution 1.41 mS/cm 14ml (0.5fl oz) bottle |
| T13818518 | 3 x Needles | T99911344 | Pure Water 250ml (8.5fl oz) Bottle |

**Measuring salt contamination using the Bresle method in accordance with ISO 8502-6/ISO 8502-9**

Remove protective backing and foam centre from the patch.

Apply the patch to surface and press firmly around perimeter to achieve a complete seal - ensuring that a minimum amount of air is trapped within the test compartment.

Insert 3ml of deionised water from the syringe into the patch through its foam perimeter, at a 30° angle, so that it passes through the foam into the test compartment.

Inject 1.5ml of water into the test compartment.

Reposition the needle and remove the remaining air within the compartment.

Remove the needle and syringe and hold the syringe with the needle pointing upwards and expel the air.

Insert the syringe needle into the patch and inject the remaining water.

Withdraw and pull the solution back into the syringe and re-inject back into the patch.

Repeat at least four times and then extract as much solution as possible.

Remove the syringe from the patch and measure the conductivity of the solution using a suitable Conductivity Meter such as the Elcometer 138 on page 2-27.

## Elcometer 135A

### Bresle Samplers

The Elcometer 135A Bresle Sampler is a self-adhesive rubber film patch with a sealed compartment for sampling of soluble impurities from steel surfaces with a suitable solvent. The Elcometer 135A Bresle Samplers are also part of the Elcometer 138/2 Surface Contamination Kit, see page 2-28.

**STANDARDS:**
ISO 8502-6

### Technical Specification

| Part Number | Description |
|---|---|
| E135----A | Elcometer 135A Bresle Sampler |
| Tests per Kit | 50 |
| Test Area | 1250mm², 12.5cm² (1.93sq inches) |
| Sample Volume | 2.6ml ± 0.6ml |
| Dimensions | 52 x 52mm (2.0 x 2.0") |

## Elcometer 135B

### Bresle Patches

Elcometer 135B Bresle Patches are used to determine surface chloride contamination and are self-adhesive rubber film patches with a sealed compartment for sampling soluble impurities from steel surfaces with a suitable solvent.

Elcometer Bresle Patches are also available as part of the Elcometer 138 Bresle Salt Kit, see page 2-25.

**STANDARDS:**
ISO 8502-6

### Technical Specification

| Part Number | Description |
|---|---|
| E135----B | Elcometer 135B Bresle Patches |
| Tests per Kit | 25 |
| Test Area | 1250mm², 12.5cm² (1.93sq inches) |
| Sample Volume | 2.6ml ± 0.6ml |
| Dimensions | 52 x 52mm (2.0 x 2.0") |

## Conductivity Meter

Incorporating a flat sensor, the Elcometer 138 Conductivity Meter can measure the conductivity of a solution from a single drop of a sample.

Users can either place a sample on the meter's flat sensor or immerse the meter's sensor directly into the solution under test. The Elcometer 138 can be used for a broad range of applications, including: soluble salt concentrations, the electric conductivity (EC) of solutions used in agricultural operations and measuring rainwater pollution levels.

The Elcometer 138 Conductivity Meter includes a convenient salinity conversion indicator.

Features:
• Highly precise measurements can be obtained from a single drop
• Automatic range switching gives a wide measurement range of 1µs/cm to 19.9mS/cm
• Out of range and low battery alarms
• Visual indication when ambient temperature is outside the operating range

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| T13823925 | Elcometer 138 Conductivity Meter | | |
| Units | S/cm, S/m, % Salinity, ppm (Total Dissolved Salts - TDS) | | |
| Measuring Range | Conductivity:<br>Salt:<br>TDS: | 0 mS/cm to 19.9 mS/cm, 0 S/m to 1.99 S/m<br>0% to 1.1%<br>0 ppm to 9900 ppm | |
| Resolution | 0 µS/cm to 199 µS/cm:<br>0.20 mS/cm to 1.99 mS/cm:<br>2.0 mS/cm to 19.9 mS/cm:<br>20 mS/cm to 199 mS/cm: | 1 µS/cm<br>0.01 mS/cm<br>0.1 mS/cm<br>1 mS/cm | |
| Accuracy | 0 µS/cm to 199 µS/cm:<br>0.20 mS/cm to 1.99 mS/cm:<br>2.0 mS/cm to 19.9 mS/cm:<br>20 mS/cm to 199 mS/cm: | ± 5 µS/cm<br>± 0.05 mS/cm<br>± 0.5 mS/cm<br>± 5 mS/cm | |
| Operating Temperature | 5°C to 40°C (41°F to 104°F) | | |
| Power Supply | 2 x CR2032 batteries | Battery Life | approx. 400 hours of continuous use |
| Dimensions | 164 x 29 x 20mm (6.5 x 1.2 x 0.8") | Weight | 47g (1.7oz) |
| Packing List | Elcometer 138, 14ml (0.5fl oz) bottle of standard 1.41mS/cm calibration solution, 14ml (0.5fl oz) bottle of moistening solution, syringe, 2 x CR2032 batteries and operating instructions | | |

### Accessories

| | | |
|---|---|---|
| T13823926 | Standard 1.41 mS/cm Calibration Solution - 14ml (0.5fl oz) Bottle | |
| T99911344 | 250ml (8.5fl oz) Bottle of Pure Water | |
| T13818517 | 15ml (0.1fl oz) Syringe - Pack of 3 | |
| T13823928 | Replacement Conductivity Sensor | |

## Elcometer 138/2



## Surface Contamination Kit

Measuring the level of contaminants on a surface prior to application of the coating is essential to ensure the quality of the coating and that its optimum lifetime is achieved.

If the coating is applied to a contaminated surface, which is not properly prepared, it could fail prematurely resulting in costly recoating and high maintenance costs.

The Elcometer 138/2 Surface Contamination Kit provides the user with a means for testing invisible surface contaminants including:

- pH
- chloride ions
- iron
- salts

**STANDARDS:**
AS 3894.6-A, AS 3894.6-D, SSPC Guide 15

## Technical Specification

| Part Number | Description |
|---|---|
| E138----2 | Elcometer 138/2 Surface Contamination Kit |
| Measuring Range | pH: 0pH to 14pH<br>Iron: 3,10, 25, 50, 100, 250, 500mg/l Fe²<br>Chloride: 30- 600µg/cm² (30 - 600ppm) Cl |
| Dimensions | 300 x 220 x 75mm (11 x 8.6 x 3") |
| Weight | 2.1kg (4.62lb) |
| Packing List | 100 x pH test strips, 100 x Iron test strips, 40 x Chloride test strips, 50 x Bresle samplers, 3 x 5ml (0.2fl oz) syringes, 3 x needles, 30ml (1fl oz) plastic beaker, carry case and operating instructions |

## Accessories

| | |
|---|---|
| E135----A | Bresle Sampler (Box of 50) |
| T13818517 | 3 x 5ml (0.1fl oz) Syringes |
| T13818518 | 3 x Needles |
| T13818519 | Plastic Beaker, 30ml (1fl oz) |
| T99911344 | Pure Water, 250ml (8.5fl oz) Bottle |
| T13820562 | 100 x pH Test Strips |
| T13820563 | 100 x Iron Test Strips |
| T13820564 | 40 x Chloride Test Strips |

*elcometer*

## Chloride Test Strips

Chloride ions on a steel surface increase the probability that corrosion of the steel will take place even if a protective coating is applied. Chloride ions trapped under a coating in the presence of steel and moisture will form a corrosion cell. This corrosion process will result in premature failure of the protective coating and may cause blistering of coatings in immersion service.

The chloride test strips will indicate the concentration of chloride ions in the sample solution and if the area of sample collection and the volume of water is known the concentration can be measured in parts per million or micrograms per millilitre.

| Technical Specification | |
| --- | --- |
| Part Number | Description |
| T13820564 | 40 x Chloride Test Strips |

## Iron Test Strips

Ferrous ions are an indicator of the corrosion of steel as they are formed when the iron oxidises as a result of a corrosion cell formed between the steel and oxygen in the presence of water. The ferrous ion test strips will also indicate the concentration of ferrous ions in a sample solution in the same way as the chloride strips.

| Technical Specification | |
| --- | --- |
| Part Number | Description |
| T13820563 | 100 x Iron Test Strips |

## pH Test Strips

These strips will determine if a solution or surface is acid or alkaline in nature. Acids form when certain gases are dissolved in water, for example chlorine in water produces hydrochloric acid, carbon dioxide in water produces carbonic acid, sulphur dioxide in water produces sulphuric acid all of which are corrosive to steel.

The presence of these contaminants can either be detected in a solution washed from the surface or by putting a wet ph Test Strip on to the dry surface. pH does not measure the concentration but it does indicate how acidic or alkaline the surface is. Alkaline surfaces are normally associated with either concrete surfaces that are to be coated or steel re-enforcement bars buried in concrete.

| Technical Specification | |
| --- | --- |
| Part Number | Description |
| T13820562 | 100 x pH Test Strips |

## Elcometer 134S

## Chloride Ion Test Kit for Surfaces

Chloride salts left on the surface before the first coat is applied can result in the coating system being forced off the surface by corrosion or blistering before the full life of the coating has been reached. To ensure that the chloride has been removed it is essential that the surface is tested before the coating is applied.

Elcometer 134S test method: a latex sleeve is filled with a Chlor*Rid extract solution and stuck to the test surface where the solution is worked against the surface to extract the salts. The titration tube is inserted and the results can be recorded.

**STANDARDS:**

ISO 8502-5, SSPC Guide 15

### Technical Specification

| Part Number | Description |
|---|---|
| E134----1 | Elcometer 134S Salt Detection Kit for Blast Cleaned Surfaces |
| Measuring Range | 1 - 60µg/cm² (1 - 60ppm) |
| Scale Resolution | 1µg/cm² (1ppm) |
| Tests per Kit | 5 |
| Dimensions | 185 x 125 x 110mm (7 x 5 x 4.5") |
| Weight | 250g (9oz) |
| Packing List | 5 x test kits each containing: titration tube snapper, strap, clip, pre-measured bottle of Chlor*Rid extract solution, sleeve, titration tube and operating instructions |

### How to use a Chloride Ion Test Kit for Surfaces
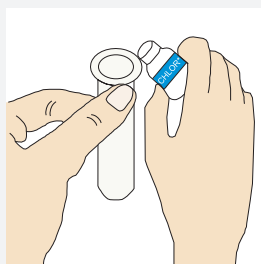
1. Remove cap from CHLOR*EXTRACT solution bottle and pour entire contents into the test sleeve.
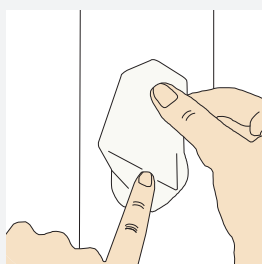
2. Firmly apply test sleeve to test surface, allowing extract solution to come into contact with test surface.

3. Insert the titration tube into the test sleeve.
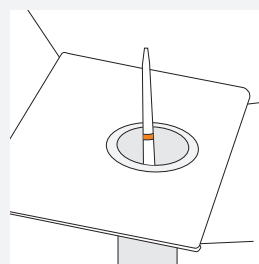
4. Insert sleeve with extract solution and titration tube into the hole previously made in the box lid and wait 1½ minutes.
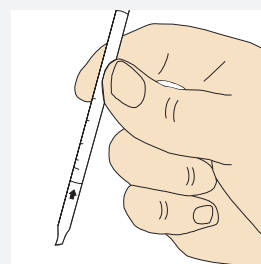
5. Immediately remove and read the number on the titration tube at the interface of the colour change. Pink is normal, white is the chloride level.

**For Chloride Ion Test Kits for water and abrasives see page 2-6**

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# CSN Chloride, Sulphate & Nitrate Kit

**Elcometer 134**

The Elcometer 134 CSN Salt Kit is designed to accurately measure surface chloride, sulphate and nitrate ions in minutes and offers a single kit solution for testing in the field.

All the components of the Elcometer CSN Test Kits are pre-measured and pre-dosed for trouble free testing.

Results are recorded in parts per million (ppm) requiring no complicated calculations. Elcometer 134 CSN tests are all designed to use a ratio of 1:1 for easy conversion to µg/cm².

Supplied in an ABS plastic carry case for easy portability around the site, each field kit is supplied with full instructions attached to the inside lid, together with:
- 5 x Chloride tests
- 5 x Sulphate tests, together with 1 x colorimeter, for sulphate testing
- 5 x Nitrate test strips
- 5 x Syringes (without needles)

Refill kits are available for all consumables.

**STANDARDS:**
ISO 8502-5, ISO 8502-11, SSPC Guide 15

## Technical Specification

| Part Number | Description |
|---|---|
| E134-CSN | Elcometer 134 CSN Chloride, Sulphate & Nitrate Test Kit |
| Measuring Range | 0 - 100µg/cm² (0 - 100ppm) |
| Scale Resolution | 1µg/cm² (1ppm) |
| Sample Time | 1 - 5 minutes (approximately) |
| Storage Temperature | Not exceeding 25°C (77°F) |
| Dimensions | 360 x 320 x 140mm (14.2 x 12.6 x 5.5") |
| Weight | 1.76kg (3.8lb) |
| Packing List | 5 x tests (containing: 5 x chloride tests, 5 x nitrate test strips, 5 x sulphate tests, 5 x syringes), 1 x colorimeter, carry case and operating instructions |

## Accessories

| | |
|---|---|
| T134---C | 1 set of 5 Nitrate Tests |
| T134-KIT | Refill Kit for Elcometer 134 CSN |

## Elcometer 146

# SaltSmart™ Contamination Meter

The Elcometer 146 SaltSmart™ Salt Contamination System determines the amount of soluble salts present in a test sample. Using both the Elcometer SaltSmart™ Test Strips and the Elcometer 146 SaltSmart™ Contamination Meter, this system offers a fast, easy-to-use alternative to the Bresle Test and has been proven to be equivalent to ISO 8502-9.

A de-ionised water bottle is attached to the end of the Elcometer 146 SaltSmart™ Test Strip which is then fixed to the substrate using non-residue tape. The test strip is positioned at a 10° angle to allow the water to flow on to the foam sensor which is in contact with the substrate.

After approximately 8 minutes the test strip is removed and the amount of soluble salts present is measured using the Elcometer 146 SaltSmart™ Contamination Meter, which displays and stores results in µS/cm, ug/cm² or mg/m².

## Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E146----1 | Elcometer 146 SaltSmart™ Soluble Salt Contamination Meter | | |
| Measuring Range | 0-150µS/cm (0-155 mg/m²) | Resolution | 1 µS (1.03 mg/m²) |
| Operating Temperature | 0-50 °C (32-122°F) | Accuracy | ±1% |
| Temperature Coefficent | 2.0 % per °C (F) | | |
| Battery Type | 2 x AA batteries; suitable for approx 100+ tests | | |
| Sample Time | 8 minutes for strip development, 15 seconds for meter analysis | | |
| Sampling Size | 20.6 x 15mm (309 mm²) | | |
| Dimensions | 160 x 80 x 30mm (6.30 x 3.15 x 1.18") | Weight | 1.2 kg (2.5 lb) |
| Packing List | Elcometer 146 SaltSmart™ Contamination Meter, Rubber Boot for SaltSmart™ Contamination Meter, USB Cable, SaltSmart™ Validation Strip , 2 x AA Batteries, Belt Pouch, Getting Started CD | | |

## Accessories

| | |
|---|---|
| T14623679 | Elcometer 146 SaltSmart™ Contamination Test Strips (Pack of 10) |
| T14623680 | Elcometer 146 SaltSmart™ Validation Strips (Pack of 1) |
| T14623681 | Elcometer 146 Non-Residue Tape (Pack of 2) |

### Measuring salt contamination using the SaltSmart™ Contamination Meter
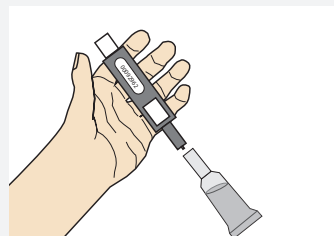


Taking care not to touch the white foam sensor, remove the protective packaging and place the de-ionized water bottle on to the SaltSmart™ test strip.
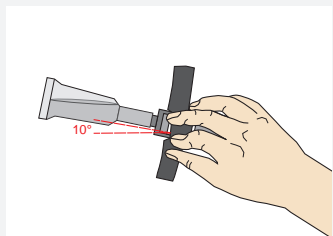
Place the test strip & bottle on to the substrate and hold in place with painters tape. On vertical surfaces, make sure that the red line on the test strip is horizontal - creating a 10° incline to allow water flow.
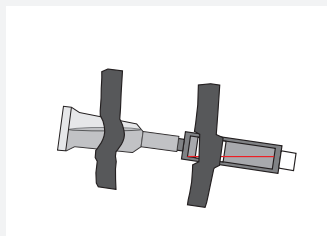
Whilst multiple test strips can be set up at the same time, after approximately 8 minutes remove each test strip in order from the surface.
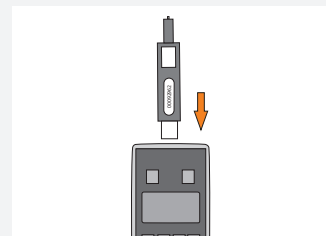
Place the test strip into the SaltSmart™ meter, and read the value on the display.

Environmentally discard the test strip, bottle and tape.

*elcometer*

## Amine Blush Swab Test Kit

When using amine cured epoxy resin coatings in a multi-layer system, if the original coating cures in a low ambient temperature and/or in a high humidity environment, problems - referred to in the industry as amine blush can develop.  The presence of amine blush can lead to inter-coat adhesion failures if the film is re-coated.

The Elcometer 139 Amine Blush Swab Test Kit is a rapid colorimetric test designed solely for the use in the quick and immediate qualitative identification of amine blush (carbamates) on the surface of coatings using surface swabs. The presence of amine blush is indicated by a visual change of colour of the test solution when compared with a control sample.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E139----A | Amine Blush Swab Test Kit | | |
| Dimensions | 172 x 110 x 100mm (6.75 x 4.25 x 4.00") | Weight | 350g (12.3oz) |
| Packing List | 20 x Polystyrene Sampler Test Tubes of 1.0ml (0.035fl oz) buffer solution, 1 x Test tube of Diluent Part A solution, 1 x Test tube of Diluent Part B solution, 2 x Diluent Transfer Pipettes, 3 x Test Part A dropper bottles - containing ACh-E powder (freeze dried), 3 x Test Part B dropper bottles - containing ATC powder (freeze dried), 1 x Test Part C dropper bottle - containing Chromogen DTNB solution,1 x Bottle of Swab Solution - containing 25ml (0.89fl oz) of rubbing alcohol (70% IPA), 20 x Cotton Swabs (q-tips), 2 x Swab Templates - 2.54 x 2.54cm (1 x 1"), 1 x Pair of Tweezers, 1 x Re-sealable plastic bag for content disposal 1 x User Guide. | | |

## Amine Blush Chip Screen Test Kit

The Elcometer 139 Amine Blush Chip Screen Test Kit is a rapid colorimetric test designed solely for the use in the quick and immediate qualitative identification of amine blush (carbamates) on the surface of coatings using a cotton swab. The presence of amine blush is indicated by a visual change of colour of the test solution when compared with a control sample.

The Elcometer 139 determines whether amine blush is or is not present on the coating's surface.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E139----C | Amine Blush Chip Screen Test Kit | | |
| Dimensions | 172 x 110 x 100mm (6.75 x 4.25 x 4.00") | Weight | 310g (10.9oz) |
| Packing List | 20 x Polystyrene Sampler Test Tubes of 1.0ml (0.035fl oz) buffer solution, 1 x Test tube of Diluent Part A solution, 1 x Test tube of Diluent Part B solution, 2 x Diluent Transfer Pipettes, 3 x Test Part A dropper bottles - containing ACh-E powder (freeze dried), 3 x Test Part B dropper bottles - containing ATC powder (freeze dried), 1 x Test Part C dropper bottle - containing Chromogen DTNB solution, 1 x Scissors 1 x Re-sealable plastic bag for content disposal, 1 x User Guide. | | |

### Accessories

| | | |
|---|---|---|
| T13923546 | Test Tube Stand | |

## Elcometer 142

### ISO 8502-3 Dust Tape Test Kit

The Elcometer 142 Dust Tape Test kit allows assessment of the quantity and size of dust particles on surfaces prepared for painting. Dust on blast cleaned surfaces can reduce coating adhesion, leading to premature coating failure and sub-standard coating finish.

Used in conjunction with the Elcometer 145 Dust Tape Roller the kit can be used in accordance with the recommendations of BS EN ISO 8502-3 either as a pass/fail test or as a permanent record of the presence of dust. Supplied in a carry case for use in the field to assess surface cleanliness.

**STANDARDS:**
AS3894.6-C, IMO MSC.215 (82), IMO MSC.244 (83), ISO 8502-3, US Navy PPI 63101-000

### Technical Specification

| Part Number | Description |
|---|---|
| E142----1 | Elcometer 142 ISO 8502-3 Dust Tape Test Kit |
| Measuring Range | Chart with dust classes ranging from 0 - 5 with descriptions for accurate class placement |
| Dimensions | 210 x 297mm (8.27 x 11.69")  Weight  250g (9oz) |
| Packing List | Microscope with 10x magnifier, 2 batteries (LR14), graticule, adhesive tape to specification ISO 8502-3, comparator display board, dust assessment plate, test record sheets (pack of 25) and operating instructions |

### Accessories

| | |
|---|---|
| T14219451 | Test Record Sheet |
| T14219454 | Display Board |
| T14223003 | Adhesive Tape 1 Roll Pack |
| T14219525 | Dust Assessment Plate |

## Elcometer 145

### Dust Tape Roller

The Elcometer 145 Dust Tape Roller is used in conjunction with the Elcometer 142 Dust Tape Test kit to assess the quantity and size of dust particles on surfaces prepared for painting.

The Dust Tape Roller presses the Elcometer 142 Dust Tape to the surface using a controlled constant force as required by BS EN ISO 8502-3 (BS 7079-B3:1993).

### Technical Specification

| Part Number | Description |
|---|---|
| E145----1 | Elcometer 145 Dust Tape Roller |
| Load Exerted | 39.2 to 49.0 N, (8.8 and 11.0 lbF) when spring fully depressed |
| Dimensions | 160 x 70 x 110mm (6.3 x 2.76 x 4.33")  Weight  615g (21.7oz) |

# Moisture & Corrosion Under Insulation

The measurement of moisture within the protective coatings industry, is often vital to the successful application of a coating and critical to the resulting quality, performance and life span of the coated product.

**Moisture:** The presence of moisture within a material will result in poor adhesion, premature coating failure and poor appearance. For example, applying a powder coating to a damp wooden panel will cause steam to be created when the panel passes through the curing oven, thus causing damage to the coating.

**Corrosion Under Insulation:** When water or moisture has entered a pipe or vessel's outer cladding through damaged insulation, weather barrier cladding or deteriorated mastic at the outer cladding - combined with fluctuating temperatures, this significantly increases the likelihood of corrosion occurring under the insulation.

Fluid, by its very nature, will flow to its lowest point and collect where it is able. The Elcometer 1001 simply allows the fluid to collect in the detection and indication device raising the fluorescent float and activating the high intensity LED, immediately alerting operatives to the potential for Corrosion Under Insulation, and to the Health and Safety issues surrounding leaking pipes.

# Elcometer 7000

## Digital Moisture Meters

The Elcometer 7000 range offers accurate and easy to use moisture measurement. Available with pin probes or non-invasive for non-destructive testing, the gauges give average moisture content by comparing the change in impedance between damp and acceptably dry substrates.

- Calibrated ready for use
- Instant readings on a clear, easy to read scale
- Fully portable, battery operated and non-destructive

### Technical Specification

| Model | Elcometer 7000S Concrete Moisture Meter | Elcometer 7000PS Digital Moisture Meter | Certificate |
|---|---|---|---|
| Part Number | G7000S | G7000PS | ○ |
| Measuring Range | 70 to 999 relative (non-invasive)<br>Dry (green); 70 - 169<br>At risk (yellow); 170 - 199<br>Wet (red); 200 - 999 | 70 to 999 relative (non-invasive)<br>Dry (green); 70 - 169<br>At risk (yellow); 170 - 199<br>Wet (red); 200 - 999<br>7.9% to 99% WME (pin measurement)<br>Dry (green); 7 - 16.9<br>At Risk (yellow); 17 - 19.9<br>Wet (red); 20 - 99.9 | |
| Measurement Depth | Non-invasive up to 19mm (3/4") | Non-invasive up to 19mm (3/4")<br>Pin up to 12.7mm (1/2") | |
| Display | LCD Display with separate colour indicators | | |
| Dimensions | 175 x 48 x 50mm (7.0 x 1.9 x 2.0") | 190 x 70 x 49mm (7.5 x 2.75 x 1.9") | |
| Weight | 195g (7oz) | 225g (8oz) | |
| Power Supply | 9V battery (~ 20 hours continuous use) | | |
| Packing list | Elcometer 7000 Moisture Meter, HD MC probe (Model PS), Deep Wall probe 127mm (5") (Model PS), pin calibration check (Model PS), wood calibration chart (Model PS), battery, carry case and operating instructions | | |

### Types of Moisture Meters

On porous materials such as concrete, plaster, brick, wood, the moisture content of the substrate should be measured, as the presence of moisture within a material will result in poor adhesion, premature coating failure and poor appearance.

It is not sufficient to simply ensure that the surface is dry as often the surface of the substrate is the driest point – due to evaporation. It is important to establish the moisture content within the substrate itself.

When powder coating wooden panels, for example, if the wood (or mdf) has too high a moisture content, as the panel passes through the oven, the moisture is heated, generating steam – causing significant coating finish issues.

Applying a coating to a concrete floor which is too damp can cause premature adhesion failure. Moisture meters have been developed to specifically determine the level of moisture in a substrate and come in two forms:

**Pin-type moisture meters:** Invasive pins are pushed firmly into the surface of the substrate being measured and by measuring the electrical resistance between the pin electrodes provide the percentage moisture content (%MC) in the substrate.

**Pinless, contact-type moisture meters:** Whilst pinless meters typically measure moisture content faster and are non-destructive they do require a relatively flat surface because the sensors are mounted on the base of the gauge making them ideal for concrete.

○ Optional Calibration Certificate available for Elcometer 7000PS Digital Moisture Meter only

## CUI Prevention

**Elcometer 1001**

When water or moisture has entered a pipe or vessel's outer cladding through damaged insulation, weather barrier cladding or deteriorated mastic at the outer cladding - combined with fluctuating temperatures, this significantly increases the likelihood of corrosion occurring under the insulation.



Pipeline failure through corrosion under insulation causes supply shortfalls, economic loss and environmental pollution

Fluid, by its very nature, will flow to its lowest point and collect where it is able. The Elcometer 1001* simply allows the fluid to collect in the detection and indication device raising the fluorescent float and activating the high intensity LED, immediately alerting operatives to the potential for Corrosion Under Insulation, and to the Health and Safety issues surrounding leaking pipes.

Moisture ingress will travel (wicking effect) through the insulation, and enter the collection funnel of the Elcometer 1001.

With the potential to reduce inspection, repair and maintenance costs, each self-contained Elcometer 1001 device will constantly and independently monitor, indicate and alert for the presence of fluids, remaining active for 24 hours a day, 365 days per year for up to five years (LED Battery).



Fitted to the underside of pipelines the Elcometer 1001 collects fluid as it flows to the lowest point

### Detecting Leaks

Some process products and pure 'hydrocarbon' will not activate the high intensity LED, however they will raise the highly visible fluorescent float, pinpointing where the product release under the insulation has occurred.

The collection vial of the Elcometer 1001's device can be unscrewed and the contents taken away for detailed analysis. A replacement vial can be attached to the Elcometer 1001 whilst the escaped fluid is examined and remedial actions reviewed.



When fluid is detected a high intensity LED and highly visible fluorescent float provide a visual indication of the presence of liquid

* GB2389417, International patents pending

## Elcometer 1001     Leak and Corrosion Under Insulation Gauge

Pipeline failure through corrosion under insulation causes supply shortfalls, economic loss and environmental pollution. Early detection of the presence of moisture significantly reduces the risk of corrosion developing underneath pipeline insulation.



**new**

Suitable for new or existing installations on or off-shore

5 year service life from date of purchase

High visibility fluorescent orange float provides fail safe detection of liquid/water

High intensity flashing LED visual alarm

Does not interfere with thermal properties of insulation

Detachable sample vial can be sent away for detailed analysis of contents

Works in extreme temperatures -40°C to +80°C on pipe work at +180°C

Suitable for any insulation type* on any pipe material of any diameter

Intrinsically safe

External dust and water resistant rugged design equivalent to IP66

*elcometer*

**Elcometer 1001**

**CUI Water Detector**

www.elcometer.com

* excluding glued insulation

**Leak and Corrosion Under Insulation Gauge**          **Elcometer 1001**

The Elcometer 1001 detects and identifies the location of any fluid leak on thermally insulated pipes, 24 hours a day, 365 days a year, preventing corrosion and reducing unplanned repair and maintenance costs.

## User Friendly

- Ideal for use in the oil, gas, chemical, water and power generation industries, on or off-shore

- Easy to fit in new or existing installations

- Straightforward replacement - a new module can be screwed on to the original funnel assembly

- Maintenance free for 5 years with simple testing on site at any time

## Accurate

- Identifies approximate location of fluid leak, preventing unnecessary removal of good insulation

- Detachable sample vial can be sent for further testing or chemical analysis of contents

## Reliable

- Can be located where flammable gases and vapour groups IIA, AAB and AAC may be present

- 5 year warranty from date of purchase

## Tough

- Heavy duty, impact resistant, dust and waterproof design equivalent to IP66

- Works in extreme ambient temperatures -40°C to +80°C (-40°F to +176°F) and on pipe work at +180°C (+356°F)

## Efficient

- Fast installation by one operator with minimal tools required

- Battery life of 5 years

- Each module has unique serial number for traceability

## Powerful

- Extends the life of pipe insulation

- Can reduce pipe replacement due to Corrosion under Insulation

- Fail safe high visibility fluorescent float as a visual indicator

- Powerful high intensity flashing LED alarm guaranteed to flash for a minimum of 7 days after actuation

new

## Elcometer 1001      Leak and Corrosion Under Insulation Gauge

### Location and Frequency of Corrosion Under Insulation Gauges

To ensure the Elcometer 1001 Corrosion Under Insulation Gauges can effectively detect leaks under insulation, it is recommended that on site assessment be carried out by suitably qualified risk-based inspection (RBI) Engineers.

**Low Risk Applications**
For low risk applications where there is minimal threat to business interruption, human health or environmental damage from a leak caused by corrosion, the minimum requirement is to install devices every 5-10 metres and wherever any of the following are installed:

•    Elbow
•    T joint
•    Horizontal pipe work low point
•    Bottom of vertical pipe work
•    Other insulated extrusions on pipe work
•    Vessels
•    Drain-holes
•    Drain-plugs
•    Drain-tubes

**Medium Risk Applications**
For medium risk applications where there is environmental risk and possible business interruption, it is recommended that the Elcometer 1001 is positioned every 2-5 metres and every junction/low point.

**High Risk Applications**
For high risk applications posing a threat to human health it is recommended that the Elcometer 1001 is positioned every 1 metre along all pipe work as well as all junctions/low points.

By installing an Elcometer 1001 at regular intervals, as one device is activated and another adjacent unit is empty, the point of the leakage can be determined. Should an adjacent device also become activated, the direction of the flow can be determined.
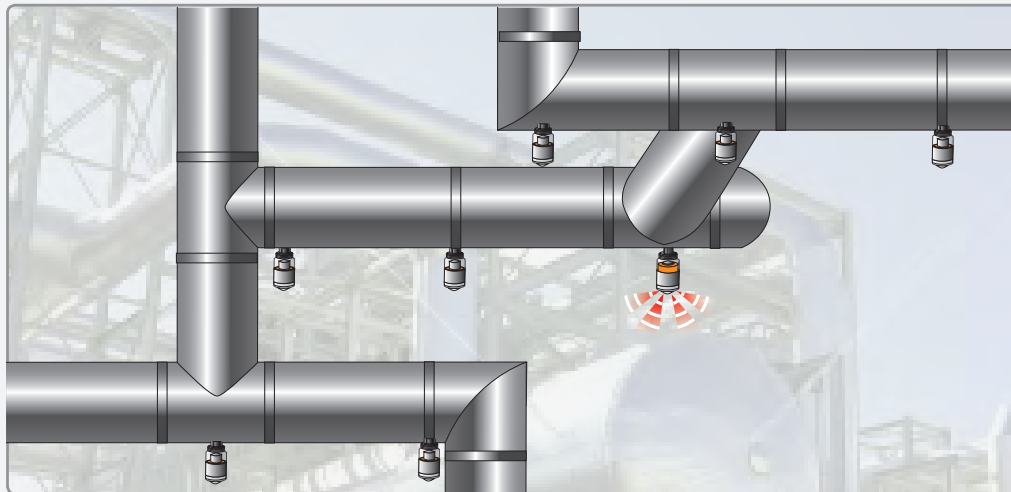


### In Use
Regular checks: Each Elcometer 1001 CUI device should be checked at regular intervals to see if either the LED is flashing or the float is visible. In either case, the cause is either moisture or fluid under the insulation.

Once triggered the unit will flash for 7 days before the battery is exhausted. In the case of an alarm condition the source of the leak should be ascertained and corrective action taken.

On re-instating the insulation, the Elcometer 1001 MUST be replaced.

Service Life: The Elcometer 1001 has a service life of 5 years after which it must be replaced, if the installation is sound, a new module can be screwed into the original funnel assembly.

# Leak and Corrosion Under Insulation Gauge

**Elcometer 1001**

## Installing Corrosion Under Insulation Gauge

The Elcometer 1001 is designed to function correctly when fitted at the 6-o'clock position at every joint of the thermal insulation on an insulated pipe, on the bottom of bends and on vessels and tanks - only where visible for inspection.

**New Installations**
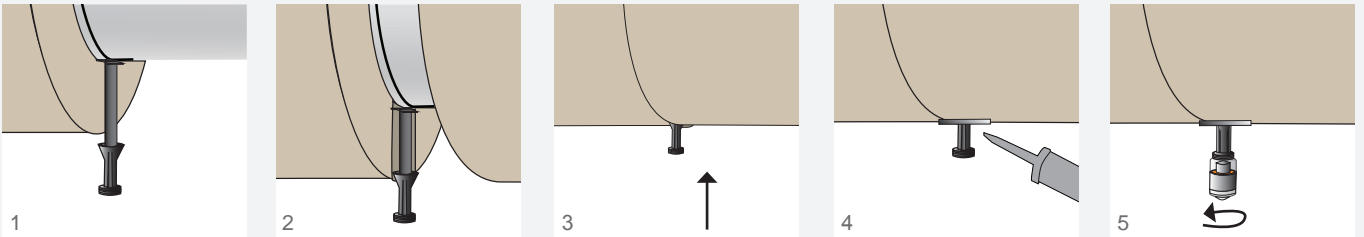


1. Installing the Elcometer 1001 can be achieved by fitting each unit tight up to the last section of the thermal insulation prior to fitting the next section.

   Thread a fixing strap through the flexible fixing strap and loosely fix it around the pipe.

   Slide the funnel assembly up to the edge of the insulation. The funnel must hang vertically with the threaded end facing down.

2. Cut the thermal insulation away around the funnel to ensure a snug fit. Tighten the fixing strap and slide up the next piece of insulation.

3. Adjust the height to ensure the threaded section of the 'o' ring seal is below and clear of the outer cladding.

4. Make sure that the point at which the funnel exits the outer cladding is fully sealed with silicon adhesive sealant after all protective layers and treatments have been applied to the thermal insulation.

5. Holding the collection funnel in place using a spanner, each funnel has a spanner 'Seating' to assist the 'Tightening' process, ensure the 'O' ring seal is engaged when screwing the housing to the exposed collection funnel screw thread.

**Existing Installations**
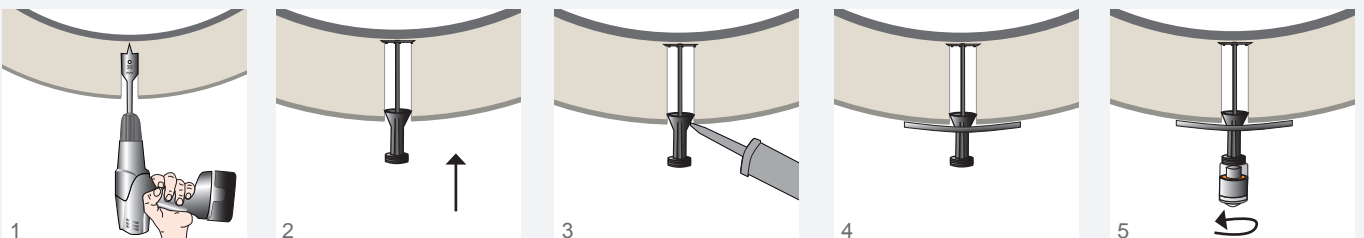


1. Using a standard drill with a 30mm diameter drill bit, drill the outer cladding on the underside of the insulation at the 6 o'clock position and core the insulation media to expose the pipe surface, taking care not to damage the pipe surface.

   Leaving the protection cap in place, take the black collection funnel and adjustable shaft and extend the shaft to its maximum height.

2. Insert the collection funnel until resistance is felt. The shaft has now touched the pipe surface. Continue to push the collection funnel until the funnel moves no further (this adjusts the funnel to the correct height to the thickness of the insulation).

3. Using a standard (in-use) sealant or mastic, apply to the joint of the funnel onto the outer cladding, ensuring there are no gaps or holes, smooth over and allow to cure.

4. When the sealant/mastic has set, apply a strip of quality metal sealant tape for added waterproofing and additional support.

5. Remove the protective cap. Gently screw on the housing by hand, holding the collection funnel in place using a spanner, ensure the 'O' ring seal is engaged when screwing the housing to the exposed collection funnel screw thread.

# Corrosion Under Insulation

## Leak and Corrosion Under Insulation Gauge

**Elcometer 1001**

Flexible Fixing Strap

Funnel Support

Collector Funnel

Collection Vial screwed into the funnel assembly

High visibility warning floatation device

High intensity LED visual alarm

Minimum / Maximum Insulation Thickness

PIPE

PIPE

10mm (0.4")

80mm (3.15")

### Technical Specification  C

| Part Number | Description |
|---|---|
| H1001-25 | Elcometer 1001 Leak and Corrosion Under Installation Gauge (x25) |
| Application | Fluid detector for thermally insulated pipes |
| Power Supply | Lithium Thionyl Chloride Battery |
| Service Life | 5 years |
| Max LED Alarm Operation Time | 7 days from actuation |
| Operating Temperature | -40°C to +80°C (-40°F to +176°F) |
| Max Pipe Temperature | +180°C (+356°F) |
| Certification | ATEX Approval# - see footnote |
| IP Rating | IP66 |
| Minimum Pipe Outside Diameter | 17mm (0.7") combined with a minimum 15mm (0.6") thickness of insulation |
| Insulation Thickness Range | 10mm - 80mm (0.4 - 3.1") |
| Protrusion from Pipe Surface | Maximum 157.0mm (6.2")  Minimum 125.4mm (4.9") |
| Gauge Diameter | Approximately 35.8mm (1.4") |
| Weight | Approximately 60g (2.1oz) - depending on funnel specification |
| Warranty Period | 5 consecutive years from the date of purchase. The Elcometer 1001 device is warranted to activate via visual float and LED, where there is the presence of sufficient ingression of water or moisture in the device. This warranty is only valid if the device has been installed and maintained in accordance with installation instructions. |

# Essential Health and Safety Requirement 1.0.6 Instructions specific to hazardous area installations (reference European ATEX Directive 94/9/EC, Annex II, 1.0.6). The following instructions apply to this equipment covered by certificate number Sira 05ATEX2277:
The equipment may be located where flammable gases and vapours of groups IIA, IIB and IIC may be present. The equipment is only certified for use in ambient temperatures in the range of -40°C to +80°C and should not be used outside this range. The equipment has not been assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, clause 1.5). Installation of this device shall be carried out by suitably trained personnel in accordance with the applicable code of practice (EN 60079-14 within Europe).
Repair of this equipment is not permitted. If faulty in any way it must be replaced in its entirety. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

# Climatic Testing

## Temperature, Relative Humidity & Dewpoint

**Monitoring climatic conditions, such as temperature, relative humidity, dewpoint and moisture, is often vital to the successful application of a coating and are critical to the resulting quality and performance of the coated product.**

**Climatic Conditions:** Elcometer offer a complete range of dewpoint and relative humidity meters, thermometers, dataloggers, moisture meters and anemometers to monitor climatic conditions.

In the protective coatings industry, moisture can form on the surface when the surface temperature is low enough to cause condensation from the atmosphere. The Dewpoint temperature (Td) is the point at which this occurs.

Monitoring the surface temperature (Ts) relative to the air temperature (Ta) and its relative humidity (%RH) allows the dewpoint temperature to be calculated and compared to the surface temperature. This difference in temperature (TΔ) is the key parameter dictating when it is safe to apply the coating.

| | |
|---|---|
| RH | % Relative Humidity |
| Ts | Surface Temperature |
| Ta | Ambient Air Temperature |
| Td | Dewpoint Temperature |
| TΔ | Difference between Td and Ts |
| Tdb | Dry Bulb Temperature |
| Twb | Wet Bulb Temperature |
| Te | External Temperature |
| SH | Specific Humidity |

## Elcometer 319　　　　Dewpoint Meter

This rugged gauge is designed to measure and record all relevant climatic parameters required to determine whether the conditions are suitable for painting.



Large easy to read measurements in degrees °C or °F

A hand-held Dewpoint meter with both manual and automatic data logging in one gauge

Integrated magnets allow the gauge to be attached to the substrate during remote logging



View up to 5 user selectable statistics on screen

Stores 25,000 records in up to 999 batches

Dustproof and waterproof gauge with fully sealed sensors (equivalent to IP66)



Review individual readings

## Elcometer 319

compatible with
**ElcoMaster**™

available with
**Bluetooth**®
wireless technology

Suitable for use in
Cloud Computing

Easy to use, intuitive
menu structure

Measure and record climatic parameters:
- Relative humidity
- Air temperature
- Surface temperature
- Dewpoint temperature
- TΔ (the difference between
  surface temperature and dewpoint)
- Dry Bulb temperature
- Wet Bulb temperature
- External temperature correction (K-type)
- Specific Humidity

Visual and audible indication of
user defined limits for any or all
parameters

**Android**™

USB and Bluetooth® data
output to ElcoMaster™
software

**Made for**
□ **iPod** □ **iPhone** □ **iPad**

**STANDARDS:**

BS 7079-B4, IMO MSC.215(82),
IMO MSC.244(83), ISO 8502-4,
US Navy NSI 009-32,
US Navy PPI 63101-000

| $T_s$ | $T_a$ | $T_d$ | $T_\Delta$ | RH | SH | $T_{db}$ | $T_{wb}$ | $T_e$ |

**Elcometer 319**         **Dewpoint Meter**

## Accurate

- Meets ISO 8502-4

- Each instrument is supplied with a Calibration Certificate

- Readings are switchable between Celsius and Fahrenheit

- All readings are time & date stamped

## Simple

- Easy menu-driven user interface in multiple languages

- Clear, illuminated display showing up to five user-defined parameters

- Arrow indicators show temperature trends

## Flexible

- The gauge can be used as either a hand-held Dewpoint meter or as a remote data logging monitor†

- Integrated K-Type connector allows measurement of surface temperature during remote logging using a remote probe

- Using an external probe the "Te" mode transforms the gauge into a thermometer - ideal for measuring temperature of a paint prior to application

- Hold/freeze function allows manual readings to be reviewed before being added into the memory

## Durable

- Safe use in climates ranging between -20°C (-4°F) and +80°C (+176°F)

- Waterproof and dust proof rating equivalent to IP66

- The rugged and ergonomic design extends to include durable sensors ideal for use in harsh environments

## Versatile

- Rapid response time

- Data can be downloaded to a PC via USB or Bluetooth® and evaluated using ElcoMaster™ Software†

- Each gauge can be powered by either 2 AA batteries (for up to 400 hours# use) or directly via the USB cable

- Adjustable limits can be set for each measurement parameter which trigger visual and audible alarms whenever a limit is exceeded

- Intelligent memory calculates total available logging time when using batches

† Top models only.
# Based on 1 reading every 10 minutes in logging mode.


Te - Ideal for use as a simple thermometer


Waterproof and rugged to IP66


Remote monitoring of climatic parameters

## Dewpoint Meter

### Technical Specification                                                                                    C

| Model | Standard Gauge | Top Gauge |
|---|---|---|
| Part Number | G319----S | G319----T |
| Reading Parameters - RH, Ta, Ts, Td, TΔ, Tdb, Twb[1], SH[1] | ■ | ■ |
| Statistics - number of readings, standard deviation, mean, coefficient of variation, minimum, maximum | ■ | ■ |
| Dustproof & Waterproof Gauge with Fully Sealed Sensors - equivalent to IP66 | ■ | ■ |
| Integral Magnets - secure the gauge during logging | ■ | ■ |
| High/Low Limits - audible, visual, red/green LED alarms can be set against any or all parameters | ■ | ■ |
| Multilingual Menus | ■ | ■ |
| Backlight - user selectable | ■ | ■ |
| K-Type Connector for External Measurement | ■ | ■ |
| Memory - with reading and statistic review | Last 10 records | 25,000 records in 999 batches |
| Manual Logging | ■ | ■ |
| Interval Logging[2] | Adjustable between 1 second and 1 hour | |
| Data Output | | |
|   USB | | ■ |
|   Bluetooth® *to computer, Android™ & iOS‡ devices* | | ■ |
| ElcoMaster™ software & USB cable | | ■ |
| Certificate | ● | ● |

| | Temperature Range | Accuracy | Resolution |
|---|---|---|---|
| Gauge# | -20 to +80°C (-4 to +176°F) | ±0.5°C (±1°F) | 0.1°C (0.1°F) |
| Air Temperature (Ta) | -20 to +80°C (-4 to +176°F) | ±0.5°C (±1°F) | 0.1°C (0.1°F) |
| Surface Temperature (Ts) | -20 to +80°C (-4 to +176°F) | ±0.5°C (±1°F) | 0.1°C (0.1°F) |
| External K-Type Thermocouple (Te) | -40 to +200°C (-40 to+392°F) | ±0.5°C (±1°F)* | 0.1°C (0.1°F) |
| Relative Humidity (RH) | 0 to 100%RH | ±3%RH | 0.1% |
| Gauge & LCD Operating Range | -20°C to +80°C (-4°F to +176°F) | | |
| Power Supply | 2 x AA batteries or via USB Cable | | |
| Battery Life | Manual Mode: Greater than 40 hours (Backlight Off) Interval Logging: up to 400 hours (1 reading every 10 minutes) | | |
| Dimensions — 180 x 75 x 35mm (7 x 3 x 1.4") | Weight | 300g (0.66lb) | |
| Packing List | Elcometer 319 Dewpoint Meter, 2 x AA batteries, wrist strap, carry case, calibration certificate, USB cable+, ElcoMaster™+ and operating instructions | | |

### Accessories

| | |
|---|---|
| T31920162 | Magnetic Surface Temperature Probe; -40 to +80°C (-40 to +176°F) |
| T9996390- | Liquid Temperature Probe; -200 to +1100°C (-328 to +2012°F) |
| T99921325 | USB Cable |
| T99916063 | Wrist Strap |
| T99923480 | Protective Carry Case/Pouch |

● Certificate supplied as standard.

[1]Calculated Value                          [2]With Part Number T31920162
‡ Available from March 2015. Visit www.elcometer.com/sdk to find out how to integrate Elcometer's MFi certified products to your App.
# Do not expose the gauge to temperatures outside the gauge and LCD operating range
* Accuracy ±2°C (4°F) with K Type probes supplied by Elcometer. Probes supplied by other manufacturers may vary.
+ Top Model only

## Elcometer 308 & 309

## Digital Hygrometers



The **Elcometer 308 Hygrometer** has been specifically designed for use in very hot climates where the surface temperature of the substrate can exceed the paint manufacturer's recommended limits for successful painting.

Painting outside recommended limits can have a detrimental affect on the performance and lifetime of the coating. The Elcometer 308 Hygrometer provides a simple and fast measurement of relative humidity and surface temperature.

The **Elcometer 309 Delta T Hygrometer** provides a simple and fast measurement of the two critical climate parameters within coatings:

- Delta T (T∆): The difference between the surface temperature (Ts) and the dewpoint temperature (Td). When T∆ is less than 3ºC (5ºF) painting should not occur.

- Relative Humidity (RH): This is the amount of water vapour taken up by air. Expressed as a percentage, RH is dependent on the air temperature.

Elcometer 308          Elcometer 309

**STANDARDS:**
BS 7079-B4 (Elcometer 309),
ISO 8502-4 (Elcometer 309)

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### Technical Specification                                                                    C

| Model | Elcometer 308 Hygrometer | Elcometer 309 Delta T Hygrometer |
|---|---|---|
| Part Number | G308----1 | G309----1 |
| | $T_S$  RH | $T_∆$  RH |
| Operating Range | -20ºC to +80ºC (-4 ºF to +176ºF) | -20ºC to +80ºC (-4 ºF to +176ºF) |
| Air Temperature (T∆) | | -20ºC to +80ºC (-4 ºF to +176ºF) |
| Surface Temperature (TS) | -20ºC to +80ºC (-4 ºF to +176ºF) | -20ºC to +80ºC (-4 ºF to +176ºF) |
| Relative Humidity (RH) & Accuracy | 0% to 100% RH (±3%) | 0% to 100% RH (±3%) (Default upper limit 75%, user adjustable) |
| Resolution | 0.1ºC (0.1ºF) / 0.1% | 0.1ºC (0.1ºF) / 0.1% |
| Power Supply | 2 x AA batteries or via USB Cable | 2 x AA batteries or via USB Cable |
| Battery Life | Greater than 40 hours (Backlight off) | Greater than 40 hours (Backlight off) |
| Certificate | ● | ● |
| Dimensions & Weight | 180 x 75 x 35mm (7 x 3 x 1.4")  300g (10.6oz) | 180 x 75 x 35mm (7 x 3 x 1.4")  300g (10.6oz) |
| Packing List | Elcometer 308 Hygrometer, wrist strap, 2 x AA batteries, protective carry case/pouch with belt clip, RH & surface probe calibration certificate and operating instructions. | Elcometer 309 Delta T Hygrometer, wrist strap, 2 x AA batteries, protective carry case/pouch with belt clip, RH probe calibration certificate and operating instructions. |



**Climatic conditions, surface profile and coating thickness in one easy to use inspection kit - see page 13-2**

● Basic Calibration Certificate supplied as standard.

## Whirling & Sling Hygrometers

**Elcometer 116**

These instruments are designed to determine the dewpoint and relative humidity at any given time.

The Elcometer 116A Whirling Hygrometer is available in Celsius scale only. A guide for relative humidity (RH) determination is supplied with each instrument and the dewpoint can accurately be obtained using the Elcometer 114 Dewpoint Calculator.

The Elcometer 116C Sling Hygrometer, shown as the black unit in the photograph, is a convenient, self contained instrument with an inbuilt slide rule for the calculation of %RH and dewpoint. It has spirit filled thermometers and is available in °C or °F scales.

- Manual operation
- Spirit filled thermometers

$T_{db}$  $T_{wb}$

**STANDARDS:**
ASTM E 337-B, BS 2842

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| G116A---1 | Elcometer 116A Whirling Hygrometer - Metric °C | | |
| G116C---1 | Elcometer 116C Sling Hygrometer - Metric °C | | |
| G116C---2 | Elcometer 116C Sling Hygrometer - Imperial °F | | |
| Measuring Range | -5°C to 50°C (23°F to 122°F) | | |
| Dimensions | 17 x 22mm (6.9 x 10") | Weight | 300g (0.6lb) |
| Packing list | Elcometer 116 Whirling Hygrometer or Elcometer 116 Sling Hygrometer, slide rule table and operating instructions | | |

### Accessories

| Part Number | Description | Part Number | Description |
|---|---|---|---|
| T1164441- | Elcometer 116A Spare Thermometer (°C) | T1164480- | Elcometer 116C Wicks (Pack of 4) |
| T1164478- | Elcometer 116C Spare Thermometer (°C) | T1164479- | Elcometer 116C Spare Thermometer (°F) |
| T1164487- | Elcometer 116A Wicks (Pack of 5) | T11600212 | Elcometer 116A Replacement Slide Rule |

## Dewpoint Calculator

**Elcometer 114**

This provides accurate values of dewpoint and relative humidity (RH) from the wet and dry bulb temperatures measured by a Whirling or Sling Hygrometer.

The range of the Elcometer 114 is -10°C to 50°C (14°F to 122°F) and has an accuracy of ±1% with respect to standard tables.

$T_d$  $RH$  $T_\Delta$

### Technical Specification

| Part Number | Description |
|---|---|
| G114----2 | Elcometer 114 Dewpoint Calculator |

# Climatic Conditions

## Elcometer 113

### Magnetic Thermometers

The Elcometer 113 Magnetic Thermometer continuously indicates the surface temperature of steel and other magnetic material.

The thermometers are based on a bimetallic strip and therefore do not require batteries but do require time to adjust to the temperature.

The Elcometer 113 is available in a number of scale ranges and as an economy version.

Ts

### Technical Specification

| Part Number | Description | Scale Range |
|---|---|---|
| G113----1 | Elcometer 113 Magnetic Thermometer | -35°C to 55°C |
| G113----2 | Elcometer 113 Magnetic Thermometer | 0°C to 120°C |
| G113----3 | Elcometer 113 Magnetic Thermometer | -20°C to 250°C |
| G113----4 | Elcometer 113 Imperial Magnetic Thermometer | 0°F to 500°F |
| G113----1B | Elcometer 113 Economy Magnetic Thermometer | -35°C to 55°C |
| G113----2B | Elcometer 113 Economy Magnetic Thermometer | 0°C to 120°C |
| Dimensions | 15 x 19 mm (0.5 x 0.7") | |
| Weight | 56g (1.9oz) | |
| Packing List | Elcometer 113 Magnetic Thermometer and protective pouch | |

## Elcometer 210

### Paint Thermometer

It is often important to ensure the temperature of the paint to be applied is at a temperature which will ensure correct application.

The Elcometer 210 Paint Thermometer is supplied with a clip to enable the thermometer to be hooked on to the edge of a paint can allowing accurate temperature measurement of the paint.

### Technical Specification

| Part Number | Description |
|---|---|
| G210----1 | Elcometer 210 Paint Thermometer |
| Scale Range | -40°C to 70°C (-40°F to 160°F) |
| Dimensions | 300mm (12") length with a 45mm (1¾") dial |
| Weight | 34g (1.2oz) |
| Packing List | Elcometer 210 Paint Thermometer |

# Digital Pocket Thermometer

<span style="color:orange">**Elcometer 212**</span>

The Elcometer 212 is a digital, pocket size thermometer ideal for day to day use.

Incorporating a fast response stainless steel liquid or surface probe, the Elcometer 212 provides temperature readings in under four seconds.

Housed in a water resistant case with integrated rubber seals and a moulded flush window, preventing dirt and leaks damaging the LCD display, the Elcometer 212 is ideal for use in the harshest of environments.

The probe conveniently folds back into the side of the instrument, preventing damage when not in use.

- Liquid or surface probe options available
- User switchable between °C and °F
- Resolution can be set to 0.1°C (0.1°F) or 1°C (1°F)

Ts

### Technical Specification

| Part Number | Description |
|---|---|
| G212----1A | Elcometer 212 Digital Pocket Thermometer with Liquid Probe |
| G212----2A | Elcometer 212 Digital Pocket Thermometer with Surface Probe |
| Measuring Range | -49.9°C to +299.9°C (-58°F to +572°F) user selectable |
| Operating Temperature | -20 to 50°C (-4 to 58°F) |
| Resolution | 0.1°C (0.1°F) or 1°C (1°F) user selectable |
| Accuracy | ±0.4°C (±0.7°F) up to 199.9°C (392°F), ±1°C (±1.8°F) above 199.9°C (392°F) |
| Probe | K-type Thermocouple |
| Display | 14mm LCD |
| Battery Type | 2 x CR2032 batteries |
| Battery Life | Approximately 1500 hours |
| Auto Switch Off Time | 10 minutes |
| Case Dimensions | 19mm x 47mm x 153mm (0.7" x 1.9" x 0.7") |
| Weight | 97g (3.4oz) |
| Packing List | Elcometer 212 Digital Pocket Thermometer with batteries fitted and operating instructions |

# Climatic Conditions

## Elcometer 213/2 — Digital Waterproof Thermometer

The Elcometer 213/2 Digital waterproof thermometer offers the latest microprocessor technology, superior durability and is designed for reliability and ease of use.

Features:
- Rubber bumper seals for impact resistance
- Waterproof case (IP66 & IP67 protection)
- Extruded aluminium case for superior durability
- °C/°F switchable
- Easy to read LCD display

Probes are available to purchase separately.

Ts    Te

### Technical Specification                                    C

| Part Number | Description | Certificate |
|---|---|---|
| G213----2 | Elcometer 213/2 Digital Thermometer* | ○ |
| Operating Range† | -49°C to +1372°C (-56°F to 2500°F) | |
| Accuracy | ±1% of the reading ±1 digit | |
| Resolution | 0.1°C (0.1°F) up to 299.9°C (572°F), 1°C (1°F) above 299.9°C (599.9°F) | |
| Battery Life | 5,000 hours | |
| Power Supply | 1 x MN1604/PP3 (9V) battery | |
| Dimensions | 35 x 60 x 115mm (1.4 x 2.4 x 4.5") | |
| Weight | 194g (0.42lb) | |
| Packing List | Elcometer 213/2 Digital Waterproof Thermometer, battery, carry case and operating instructions | |

*Probes are not supplied as standard with the Elcometer 213/2; please select from the list below
† Operating range is dependent on probe used

### Accessories

| | | |
|---|---|---|
| T9991728 | Magnetic Surface Probe,13mm Diameter (0.51 ) | Range: -50°C to 150°C (-58°F to 302°F) |
| T2136069- | Surface Probe,130 x 4.2mm Diameter (5.11 x 0.17") | Range: -50°C to 600°C (-58°F to 1112°F) |
| T9996390- | Liquid Probe,130 x 3mm Diameter (5.11 x 0.12") | Range: -50°C to 850°C (-58°F to 1562°F) |
| T2136391- | Needle Probe, 130 x 3mm Diameter (5.11 x 0.12") | Range: -50°C to 400°C (-58°F to 752°F) |

Other probes available on request. Contact Elcometer for further information.

Magnetic T99911728

Liquid T9996390-

Surface T2136069-

Needle T2136391-

○ Optional Calibration Certificate available.

# IR Digital Laser Thermometer

## Elcometer 214L

The Elcometer 214 is a simple, easy to use, non contact thermometer which safely and accurately measures surface temperature of non-reflective materials using infrared technology.

With a user switchable measuring range -35°C to 365°C or -31°F to 689°F, a digital display of the temperature is produced in less than one second.

- Non-contact technology with laser spot indicator
- °C / °F user switchable
- Fast, 1 second scanning of any surface
- Measure objects as small as 25mm (1")
- Distance-to-Target Ratio of 8:1
- Easy to read LCD display

The Elcometer 214 IR Digital Laser Thermometer has a D/T ratio (Distance-to-Target) of 8:1 and measures the emitted energy from a target spot one-eighth the size of the working distance.

As can be seen in the diagram below, if the distance from the sensor optics to the target is 200mm (8") for example, the diameter of the measured area is 25mm (1").

Ts

## Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| G214L----3 | Elcometer 214 Infrared Digital Laser Thermometer | | |
| Measuring Range | -35°C to 365°C (-31°F to 689°F) | | |
| Ambient Temperature | 0 to 50°C (32 to 122°F) | | |
| Resolution | 0.2°C (0.5°F) | | |
| Accuracy | ±1.5°C (2.7°F) | | |
| Distance-To-Target | 8:1, 25mm (1") spot size | | |
| Emissivity | Fixed at 0.95 | | |
| Response Time | 1 second | | |
| Battery Type | 2 x AAA batteries | Battery Life | 14+ hours continuous use |
| Dimensions | 166 x 34 x 64 (6.5 x 1.3 x 2.5") | Weight | 113g (3.98oz) |
| Packing List | Elcometer 214 Infrared Digital Laser Thermometer, 2 x AAA batteries (fitted), wrist strap and operating instructions | | |

### Digital Laser Thermometer

Spot Size

| 100mm (4") | 200mm (8") | 300mm (12") |

Distance to Target

| 800mm (32") | 1600mm (64") | 2400mm (96") |

## Elcometer 320

supplied with
ElcoMonitor™
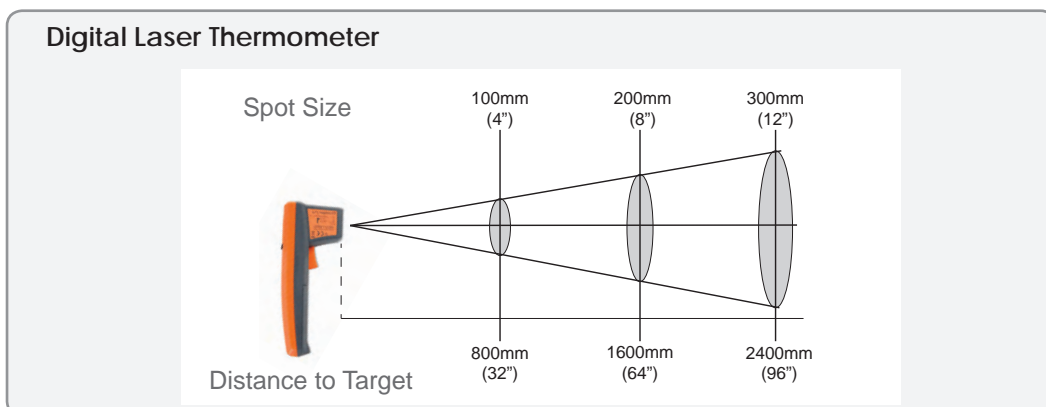
### Climate Monitoring System

The Elcometer 320 is a powerful system which accurately and remotely monitors climatic parameters.

Each red, yellow, green signal tower has an integrated alarm providing both visual and audible warnings

Remotely monitor and record climatic parameters:
- Relative humidity
- Ambient air temperature
- Surface temperature
- Specific humidity
- TΔ (the difference between surface temperature and dewpoint)

The Elcometer 320 can also be used as a stand alone environmental warning station - ideal for single zone monitoring

Up to 254 monitoring stations can be set up remotely either by Bluetooth® or over an Ethernet TCP/IP connection

$T_a$

$T_s$

$T_\Delta$

RH

SH

$T_e$

**Remote Climate Monitoring System**

Bluetooth®
ETHERNET

Administrator

Monitors 1 ... n

Station 1    Station 2    Station 3    Station 254
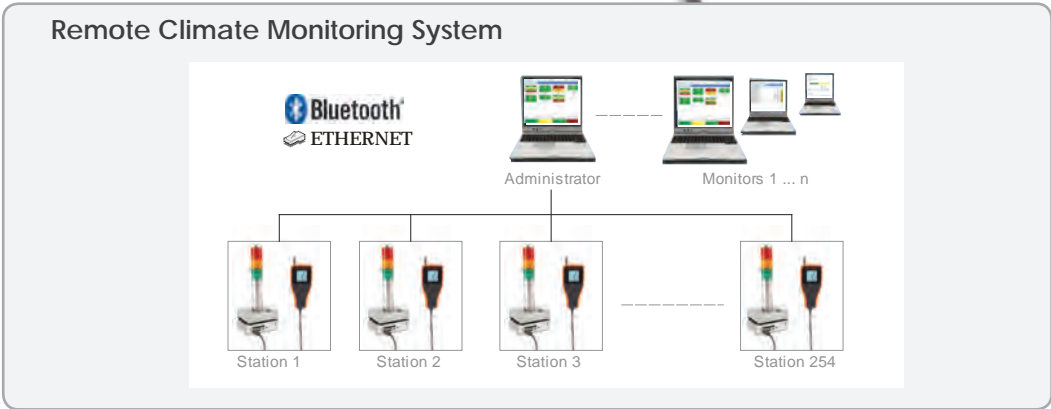
elcometer®

# Climate Monitoring System

The Elcometer 319 is connected to a signal tower and alarm via an embedded PC which is connected to the control and monitoring computers via standard Ethernet TCP/IP or by Bluetooth® for remote monitoring.

Through the simple use of the internationally recognised red, yellow, green traffic light sequence, ElcoMonitor™ allows Quality Managers to see, at a glance, the environmental conditions of up to 254 locations from the comfort of their office chair.

ElcoMonitor™ software incorporates Set Up Wizards which guide the User through the initial set up of each Elcometer 320 Monitoring Station. Once a station has been assembled and switched on, ElcoMonitor™ searches for all the active monitoring stations.

Each station can be set up remotely using ElcoMonitor™ Software.

Station set ups include:
- Which two climate parameters to be used for each station
- User definable red, yellow and green warning limits
- Flashing red light additional warning parameter
- Data recording frequency
- Warning buzzer alarm duration

Username and passwords are used to ensure that only approved administrators can amend the set up of each station.

All measurement values (RH, SH, Ta, Ts, TΔ) from each station are transmitted back to ElcoMonitor™ allowing remote investigation of all the environmental conditions.

Individual reports for each monitoring station can be generated from within ElcoMonitor™ or archived in spreadsheet form for further analysis.
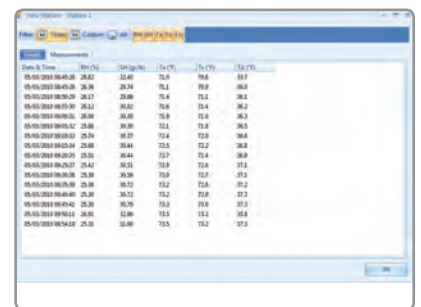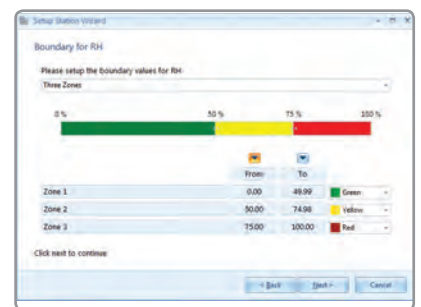
## Technical Specification   C

| Elcometer ElcoMonitor™ Monitoring System: | | Certificate |
|---|---|---|
| Part Number | G320-1 | ● |
| Measuring Parameters | RH, SH, Ta, Ts, TΔ | |
| Connectivity | Ethernet TCP/IP Network or Bluetooth® The embedded PC will automatically connect to a wired TCP/IP network with DHCP, which will allocate it an IP address | |
| Number of Stations | Maximum of 254 individual Elcometer 320 stations can be connected | |
| Embedded PC | eBox 3300-JSK with 2 x RS232 connections - or equivalent | |
| Central PC Requirements | Minimum Requirement of Windows XP with 1 GB RAM and 1GB free HD; 1024 x 768 Screen Resolution; Connection to the same Ethernet TCP/IP network as monitoring stations - preferably on the same subnet; Bluetooth® connections can be made via an integrated or USB Bluetooth® | |
| Packing List | Elcometer 319 Top Dewpoint Meter with calibration certificate, Light and audible alarm system with power supply, Elcometer 320 Climate Monitoring System Base Unit and power supply, Flash Card, Connection cables, ElcoMonitor™ Log and ElcoMonitor™ View Software, Bluetooth® USB dongle | |

● Certificate supplied as standard.

## Elcometer 410







## Wind Speed Anemometer

The Elcometer 410 Anemometer is a portable, pocket size instrument for taking accurate readings of wind speed.

The lightweight impeller with high precision jewel bearings provides very accurate airflow measurements even at low speeds. The impeller can easily be replaced without the need to return the unit to Elcometer.

The wind speed can be displayed in various measurement units; indicating current speed, maximum speed or average speed.

### Technical Specification

| Part Number | Description | |
|---|---|---|
| G410-1 | Elcometer 410 Anemometer | |
| Functions | Current wind speed (3 second average)<br>Average speed since power on (AVG)<br>Maximum 3 second gust since power on (MAX)<br>Data Hold | |
| Measurement Units | Knots (kt), metres per second (m/s), kilometres per hour (km/h), miles per hour (mph), feet per minute (ft/min) and Beaufort Force (B) | |
| Operating Range | 0.4m/s to 60m/s (0.8 to 135.0mph) | |
| Specification Range | 0.4m/s to 40m/s (0.8 to 89.0mph) | |
| On-axis Accuracy | ±3% of reading or least significant digit, whichever is the greater | |
| Off-axis Response | -1% at 5º, -2% at 10º, -3% at 15º | |
| Calibration Drift | <1% after 100 hours operation at 7m/s | |
| Resolution | 0.1 kt, m/s, km/h, mph. 1 ft/min below 1999 ft/min, 10 ft/min above 2000 ft/min.<br>1 Beaufort (0 to 12) | |
| Operating Temperature | -10ºC to +55ºC (14ºF to 131ºF) | |
| Storage Temperature | -30ºC to +60ºC (-22ºF to 140ºF) | |
| Power Supply | 1 x CR2032 battery | |
| Battery Life | Approximately 300 hours | |
| Auto Switch Off | 45 minutes after last key press | |
| Dimensions | Instrument Only:<br>Instrument and Protective Cover: | 122 x 42 x 20mm (4.8 x 1.6 x 0.8")<br>122 x 46 x 26mm (4.8 x 1.8 x 1") |
| Weight | Instrument Only:<br>Instrument and Protective Cover: | 65g (2.3oz)<br>102g (3.6oz) |
| Packing List | Elcometer 410 Anemometer, protective cover, lanyard, 1 x CR2032 battery and operating instructions. | |

### Accessories

T41021406   Replacement Impeller

elcometer

# Oven Temperature Profiling

Temperature profiling provides an effective method for measuring the actual environmental and product temperature during the cure process - essential for **ensuring quality finish and a successful cure** of a powder coating.

Not all components are alike, and are rarely of a uniform thickness, density or thermal capacity. This means that the oven temperature settings have to be adjusted to suit the coated product.

Monitoring and making adjustments to the oven temperature ensures that the product is brought to and held at, the specified temperature to ensure consistent quality of cure and visual properties at all times.

Incorrect oven temperature settings can lead to some or all of a product being too hot or too cold leading to under cure, coating burn, poor adhesion, discolouration, loss of gloss and other visible defects.

With a selection of magnetic or clamp type air & surface temperature probes, temperatures can be monitored both on or around the product and recorded by a data logger during the cure process. Once completed the measurement data can be transferred to the ElcoMaster™ software to provide instant oven profile reports, process validation and much more.

# Oven Temperature Profiling

## Elcometer 215   Oven Data Logger

The Elcometer 215 is the easy to use oven temperature profile solution, used to measure and store the temperature profiles of both the sample and the oven during the cure process.

Clamp air probe

Clamp surface probe

Magnetic surface probe

Combined clamp & magnetic surface probe

Probe ID Tags

Memory stores up to 260,000 readings

Ideal for testing for powder or liquid coatings in batch or conveyor ovens

Variable measurement interval, date, time, °C / °F

High temperature resistant teflon coated probe cables are easy to clean after each run

elcometer

## Oven Data Logger

Quick display shows maximum temperature, Cure-Index figure and pass/fail for each probe

Measure up to 6 different temperatures at one time

Ideal in situations where powder coated thickness is inconsistent

Start and stop logging at a pre-set temperature

Large menu-driven display for easy operation

Print full colour report directly to any HP printer

USB data output to ElcoMaster™ software and combine with other key inspection measurements

## Elcometer 215

## Oven Data Logger

ElcoMaster™ is the easy to use software solution designed specifically for the management and assessment of your temperature profile, allowing you to generate professional inspection reports in seconds. Features include:



**High Temperature Barrier Kit**
Thermal barrier & heat sinks for longer time at temperature



**Standard Thermal Barrier Kit**
With thermal barrier - ideal for single runs

**Oven Logger Set Up** - Create and store unique oven profile setups, name each of the 6 channels, set sampling rates, number of batch runs, start/stop triggers and transfer them to the gauge.

**Coating Parameters** - Set up a library of individual paint types incorporating min, mid & max cure temperatures as well as the maximum absolute and minimum cross link temperatures.

**Coating Datasheets** - Save a copy of the coating's data sheet as a permanent record.

**Product Probe Maps** - Simply drag and drop up to 6 probe ID markers on to your product photo or drawing to record exact probe placement for each production run.

**Customisable Templates** - Create your own comprehensive inspection profile - simply choose a relevant gauge setup, paint parameter and product probe map from your library and assign them to your logger data, providing instant, meaningful and professional reports.

**Elcometer Cure Value** - Using the industry accepted cure value calculation ElcoMaster™ provides instant Pass/Fail information by comparing the production run temperature to the coating supplier's cure requirements.

**Graphical Reporting** - Standard temperature profile graph, cure process and individual profile/cure graphs combined with the product probe map are available as standard.

**Combined Reports** - Fully customisable reports can be quickly generated - allowing oven profile reports to be combined with data from coating thickness, gloss & adhesion gauges.

elcometer

# Oven Data Logger

| ElcoMaster™ Software Oven Profiling Key Features | |
|---|---|
| Oven Logger set up & programming | ∎ |
| Paint/Powder parameter library | ∎ |
| Product probe maps | ∎ |
| Fully customisable inspection templates | ∎ |
| Selectable probe/channel traces | ∎ |
| Statistical analysis by probe/channel<br>Max, Min, standard deviation, coefficient of variation | ∎ |
| Temperature profile, cure progress, histogram &<br>individual cure value graphs against product | ∎ |
| Time at temperature, time of peak difference | ∎ |
| Time above maximum absolute & minimum<br>cross link temperatures | ∎ |
| Fully customisable inspection reports | ∎ |
| Combined reports - coating thickness, gloss, adhesion,<br>profile, climate, surface cleanliness | ∎ |
| Report generator wizard & PDF generator | ∎ |
| Email or export data | ∎ |
| Import photo's, data sheets, critical data, inspection<br>notes, etc & include on inspection reports | ∎ |
| Cloud computing - allows for cross site collaboration,<br>including internal text messaging tool | ∎ |
| Overlay temperature profiles, review and compare<br>multiple oven profiles over time | ∎ |

**For more information on ElcoMaster™ Software see page 1-2**



Create and store unique oven profile setups and transfer them to the gauge.



Set up a library of individual paint parameters.



Individual product probe maps record the exact probe placement for each component.



Standard temperature profile and cure process graphs can be viewed at any time.



Statistical analysis by probe/channel.

## Elcometer 215          **Oven Data Logger**

### Technical Specification                                                                     C

| Part Number | Description | | Certificate |
|---|---|---|---|
| G215----2S | Elcometer 215 Oven Data Logger - Standard Thermal Barrier Kit | | ○ |
| G215----2T | Elcometer 215 Oven Data Logger - High Temperature Thermal Barrier Kit* | | ○ |
| Gauge Measurement Range | -200°C to 1300°C (-328°F to 2372°F) | | |
| Gauge Operating Temperature | -30°C to 65°C (-22°F to 149°F) without thermal barriers | | |
| Accuracy | 5°C to 500°C: ±0.5°C (41°F to 932°F: ±1.0°F)<br>>500°C: ±1.0°C (> 932°F: ±2.0°F) | | |
| Resolution | 0.1°C (0.2°F) | | |
| Number of Channels | 6 | | |
| Measuring Intervals | Adjustable from 8 per second to 1 per hour | | |
| Memory | 260,000 readings or 8 production runs | | |
| Data Output | USB | | |
| Power Supply | 2 x AA batteries | | |
| Gauge Dimensions | 153 x 101 x 23mm (6 x 4 x 0.9") | | |
| Gauge Weight | 450g (15.8oz) | | |
| Thermal Characteristics | Standard Thermal Barrier Kit | High Temperature Thermal Barrier Kit* | |
| | 100°C (212°F) for 140 minutes<br>150°C (302°F) for 80 minutes<br>200°C (392°F) for 60 minutes<br>250°C (482°F) for 50 minutes | 100°C (212°F) for 340 minutes<br>150°C (302°F) for 195 minutes<br>200°C (392°F) for 130 minutes<br>250°C (482°F) for 100 minutes | |
| Dimensions (in thermal barrier) | 245 x 245 x 115mm (9.65 x 9.65 x 4.5") | | |
| Weight (in thermal barrier) | 4kg (8.8lb) | 6kg (13.2lb) | |
| Packing List | Elcometer 215 Oven Data Logger, thermal barrier (Model S), thermal barrier with heat sink block (Model T), ElcoMaster™ software, USB cable, carry case, 2 x AA batteries and operating instructions | | |

### Probes & Accessories

| | 1.5m (4'9") | 3m (9'8") | 6m (19'7") |
|---|---|---|---|
| Clamp Air Probe | T21521275 | T21521276 | T21521277 |
| Magnetic Air Probe | T21521287 | T21521288 | T21521569 |
| Clamp Surface Probe | T21521278 | T21521279 | T21521280 |
| Magnetic Surface Probe | T99921281 | T99921282 | T99921283 |
| Combined Magnetic Clamp Air & Surface Probe | T21521284 | T21521285 | T21521286 |
| Probe Identification Tags (Pack of 6) | | | T21521241 |
| Standard Thermal Barrier | | | T21521222 |
| High Temperature Thermal Barrier for Elcometer 215 Model T (Heat Sink Block not included) | | | T21521217 |
| Heat Sink Block for High Temperature Thermal Barrier | | | T21521219 |
| Data Logger to PC USB Cable | | | T21521220 |

○ Optional Calibration Certificate available.                                    *Includes Heat Sink

# Powder Thickness

When applying a powder coating, by **measuring the uncured film thickness, it is possible to predict the eventual dry film thickness.**

Powder coating is an efficient system producing a high quality finish with minimal waste – where excess or over-sprayed powder may be recycled and reused.

Ensuring that the end product has the correct levels of adhesion, gloss and colour - is dependent upon both the thickness of the powder prior to the curing process and the temperature profile within the oven.

The cured dry film thickness is determined by the level of shrinkage, which in turn is influenced by factors such as particle size and density of the uncured powder.

As all manufacturers' coatings are different, it is not generally possible to predict the dry film thickness post cure unless the level of shrinkage is known or the pre cure powder density is measured.
Measuring the thickness of the uncured powder is difficult.

Whereas wet film measurement is non-destructive, the measurement of powder thickness using any form of contact with the uncured coating, disturbs the powder - altering its thickness.

The revolutionary Elcometer 550 accurately predicts the final powder thickness prior to curing. Through the use of non-contact ultrasound technology the density of the powder can be measured providing a predictive value of the final cured coating thickness.

Used on the powder coating the Elcometer 550 gauge therefore offers the opportunity for 'right first time' production and minimal wastage.
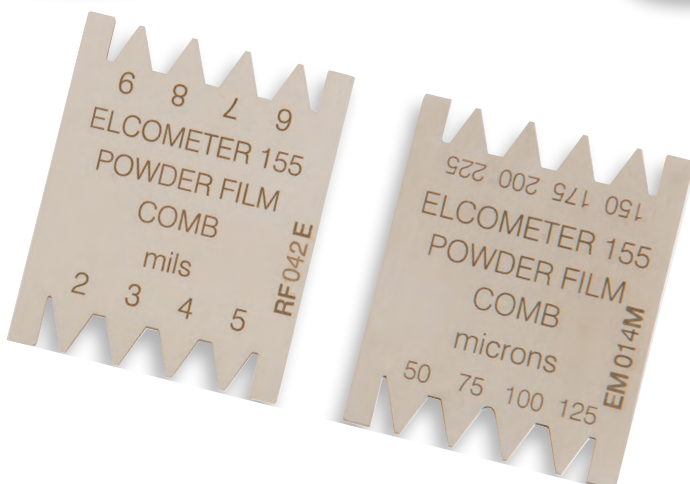
# Elcometer 550

## Non-Contact Powder Thickness Gauge

Using third generation proven airborne ultrasonic technology, the new Elcometer 550 accurately predicts cured coating thickness by non-contact measurement of coating powders.

Accurately predicts the cured coating thickness within ± 5% of the reading or ±5µm (±0.25mils) up to 110µm (4.4mils)

Can be used in accordance with ASTM D7378-C

Proven, third generation, airborne ultrasonic technology

Hand-held sensor allows easy positioning of the gun for fast measurement

Tough aluminium case, ideal for testing in an industrial environment

Ergonomic gun designed for comfort when taking multiple readings

Large illuminated colour display with positioning indicator to guide orientation of the sensor probe

Laser targeting system to ensure correct distance from surface

# Non-Contact Powder Thickness Gauge

**Elcometer 550**

By carefully controlling the thickness of powder applied to a product, you can minimise your powder usage and ensure the quality of your coating. As contact measurement solutions damage the finish and do not predict the cured coating thickness, measuring the powder thickness pre-cure requires a non-contact solution.

**Easy to Use**
- Easy to read, large colour display
- Adjustable screen brightness for all test conditions
- Ergonomic probe - ideal for continuous testing
- Can be used straight out of the box with minimal set up time
- On-screen guidance graph and handle LEDs help you orientate the probe sensor for fast, accurate measurements

**Reliable**
- Fast, accurate and repeatable results
- Can be used in accordance with ASTM D7378-Procedure C
- Proven, third generation, airborne ultrasonic technology
- User-programmable set up to account for varying powder shrinkage rates

**Enhanced Technology**
- Measure thicknesses from 30 - 110µm (1.18 - 4.4mils)
- 1mm² (0.04 sq in) measurement area - ideal for flat, curved and small surfaces
- Test coatings on a wide range of substrates, including metal, wood, MDF, plastic and pre-coated surfaces
- Laser targeting to accurately position the gauge at the correct distance from the surface to be measured





**STANDARDS:**
ASTM D7378 Procedure C

## Technical Specification    C

| Part Number | Description | | | Certificate |
|---|---|---|---|---|
| A550----4 | Elcometer 550 Non-Contact Powder Thickness Gauge | | | ● |
| A550----4L | Elcometer 550 Non-Contact Powder Thickness Gauge with Laser Targeting System | | | ● |
| Display | 3½ inches (90mm) QVGA Colour LCD | | | |
| Power Supply | Rechargeable battery, up to 7 hours continuous use | | | |
| Measurement Range | 30 - 110µm (1.18 - 4.4mils) | | | |
| Resolution | 1µm (0.04mils) | | | |
| Measurement Accuracy | ±5µm (±0.25mils) or ±5% of the coating thickness, whichever is greater | | | |
| Measurement Offset Distance | 18mm (0.71") from the coated substrate | | | |
| Measurement Area | 1mm² (0.04sq in) | | | |
| Operating Temperature Range | 10°C to 35°C (50°F to 95°F) | | | |
| Units | µm / mils switchable | | | |
| Dimensions | 115 x 185 x 35mm (4.6 x 7.4 x 1.4") | Weight | 900g (1.9lbs) | |
| Packing List | Elcometer 550 Gauge with rechargeable battery, universal charger unit and cable, sensor gun and lead, shoulder harness, reference block, USB-PC transfer cable, carry case, test certificate and operating instructions | | | |

● Certificate supplied as standard.
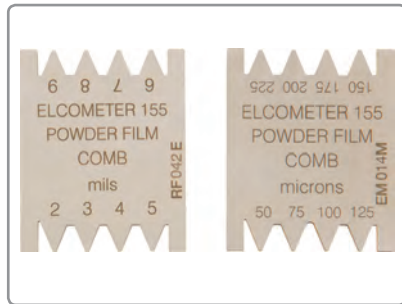
## Elcometer 155

### Uncured Powder Film Comb

Available in four scale ranges, the Elcometer 155 is designed to measure uncured powder coating film thickness. This enables the application system to be set up and fine tuned prior to the curing process. In turn, this will reduce the amount of scrap and over-spray.

Note: The thickness of a coating prior to cure is not the same value after curing but there is a correlation. The powder comb is suitable as a guide only.

**STANDARDS:**
ASTM D7378-A

### Technical Specification                                                    C

| Part Number* | Description | Range | Certificate |
|---|---|---|---|
| B15513573-5 | Elcometer 155 Metric Powder Film Comb | 50 - 255µm | ○ |
| B15513573-6 | Elcometer 155 Metric Powder Film Comb | 225 - 1250µm | ○ |
| B15513573-1 | Elcometer 155 Imperial Powder Film Comb | 2 - 9mils | ○ |
| B15513573-2 | Elcometer 155 Imperial Powder Film Comb | 9 - 50mils | ○ |
| B15513573-10 | Metric Comb Set (2 combs) | 50 - 225µm and 225 - 1250µm | ○ |
| B15513573-9 | Imperial Comb Set (2 combs) | 2 - 9mils and 9 - 50mils | ○ |
| Accuracy | ±5µm (±0.2mil) | | |
| Dimensions | 38mm x 46mm (1.5" x 1.8") | | |
| Weight | 18g (0.6oz) | | |
| Packing List | Elcometer 155 Powder Comb and powder comb wallet for two combs | | |

### How to use a powder comb
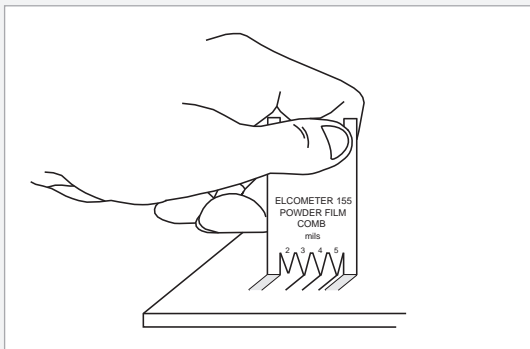
Place the comb into the powder and slide the comb along the surface. The measurement points (or teeth) are pointed and allow the powder to flow around them.

The thickness of the powder lies between the highest value where a drag mark is visible and the lowest value where a drag mark has not been produced.

* The Elcometer 155 is not available for sale in the USA

○ Optional Calibration Certificate available.

# Wet Film Thickness

When applying a liquid coating, by measuring **the uncured film thickness, it is possible to determine the eventual dry film thickness. Applying too much coating wastes time and materials. It can also affect the performance and finish of the product.**

Too much wet film can cause the coating to crack as it cures; too little coating increases the risk that the substrate will not be sufficiently protected, leading to rust spots.

The three methods for measuring wet film thickness are:

- Wet Film Combs
- Pfund Thickness Gauges
- Wet Film Wheels

In each case, the thickness of the coating is measured and the dry film thickness can be estimated using the coating's solid : wet ratio.

**Using a wet film comb**
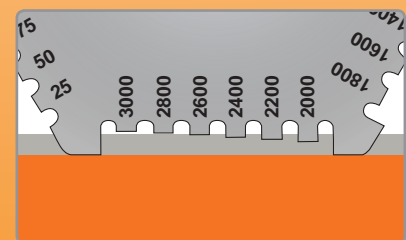


Place a comb perpendicular to and touching the substrate. Hold the comb in position and wait a few seconds until the teeth are wet. Remove the comb from the film.

The wet film thickness lies between the biggest value 'coated' or 'wet' tooth and the smallest value 'uncoated' or 'dry' tooth.

**Using a wet film wheel**
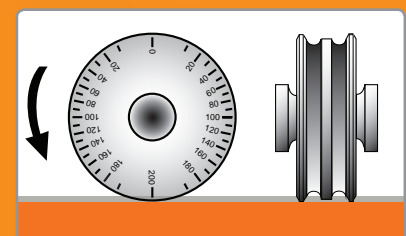


Roll the wheel through a wet coating, the centre wheel eventually touches the film. This point on the scale indicates the thickness. When the volume to solids ratio of the coating is known, generally found on a product data sheet, the wet film thickness can be used to predict the dry film thickness. Roll from maximum to minimum to avoid a false reading caused by surface tension.

## Elcometer 112 & 3236    **Hexagonal Wet Film Combs (Stainless Steel)**



These hexagonal precision formed stainless steel wet film combs are long lasting, reusable and supplied in a range of thicknesses measuring up to 3000µm (120mils).

These six sided combs vary in size, giving either 24 or 36 measurement steps, depending upon the comb, thus providing increased accuracy.

**STANDARDS:**

ASTM D 4414-A, AS/NZS 1580.107.3, BS 3900-C5-7B, ISO 2808-1A, ISO 2808-7B, JIS K 5600-1-7, NF T30-125, US Navy PPI 63101-000, US Navy NSI 009-32

### Technical Specification                                                                 C

| Part Number | Range | Values | Certificate |
|---|---|---|---|
| K0003236M201 | 20 - 370µm | 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 150, 170, 190, 210, 230, 250, 270, 290, 310, 330, 350, 370µm | ○ |
| K0003236M202 | 25 - 2000µm | 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000µm | ○ |
| B112----1B | 25 - 3000µm | 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 1000, 1100, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2600, 2800, 3000µm | ○ |
| K0003236M203 | 0.5 - 15mils | 0.5, 0.75, 1.0, 1.25, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 8, 9, 10, 11, 12, 13, 14, 15mils | ○ |
| K0003236M204 | 1 - 80mils | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 55, 60, 65, 70, 75, 80mils | ○ |
| B112----2B | 1 - 120mils | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 26, 28, 30, 32, 34, 36, 38, 40, 45, 50, 55, 60, 70, 80, 90, 100, 110, 120mils | ○ |
| Dimensions and Weight | Elcometer 3236 M201 / M203 | 53 x 50 x 1mm (2.09 x 1.97 x 0.04"), 10g (0.35oz) | |
| | Elcometer 3236 M202 / M204 | 77 x 90 x 1mm (2.95 x 3.54 x 0.04"), 22g (0.77oz) | |
| | Elcometer 112 | 75 x 65 x 1mm (2.95 x 2.54 x 0.04"), 20g (0.7oz) | |
| Packing List | Wet Film Comb, storage case and operating instructions | | |

○ Optional Calibration Certificate available.

## Wet Film Combs (Stainless Steel)

These reusable precision stainless steel combs are made to be long lasting and are supplied with either Metric or Imperial measurements.

Four separate thickness ranges are available up to a maximum of 1270µm or 50mils and are manufactured to an accuracy of 5% or 2.5µm (0.01mil), whichever is the greater.

Each comb has 10 measurement steps (teeth).

**STANDARDS:**

ASTM D 4414-A, AS/NZS 1580.107.3, BS 3900-C5-7B, ISO 2808-1A, ISO 2808-7B, JIS K 5600-1-7, NF T30-125, US Navy PPI 63101-000, US Navy NSI 009-32

### Technical Specification   C

| Metric Combs | | | | Imperial Combs | | | |
|---|---|---|---|---|---|---|---|
| Part Number | Range | Measurement Steps | Certificate | Part Number | Range | Measurement Steps | Certificate |
| B11529455M | 20 – 325µm | 20, 35, 50, 75, 100, 125, 175, 225, 375, 325µm | ○ | B11529451E | 1 – 13mils | 1, 1.5, 2, 3, 4, 5, 7, 9, 11, 13mils | ○ |
| B11529456M | 50 – 450µm | 50, 75, 100, 150, 200, 250, 300, 350, 400, 450µm | ○ | B11529452E | 2 – 18mils | 2, 3, 4, 6, 8, 10, 12, 14, 16, 18mils | ○ |
| B11529457M | 50 – 750µm | 50, 100, 150, 200, 250, 350, 450, 550, 650, 750µm | ○ | B11529453E | 2 – 30mils | 2, 4, 6, 8, 10†, 10†, 15, 20, 25, 30mils | ○ |
| B11529458M | 125 – 1250µm | 125, 250, 375, 500, 625, 750, 875, 1000, 1125, 1250µm | ○ | B11529454E | 5 – 50mils | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50mils | ○ |
| B1152959WM | - | Set of 4 Combs | ○ | B1152959WE | - | Set of 4 Combs | ○ |

† Two 10mil values, one on each edge of the comb

## Long Edge Wet Film Combs (Stainless Steel)

These stainless steel combs are wire eroded to provide an accuracy of ± 2.5µm (0.01mil) and are supplied with either Metric or Imperial measurements.

Each comb has 24 measurement steps (teeth) providing a more accurate wet film thickness value.

**STANDARDS:**

ASTM D 4414-A, AS/NZS 1580.107.3, BS 3900-C5-7B, ISO 2808-1A, ISO 2808-7B, JIS K 5600-1-7, NF T30-125, US Navy PPI 63101-000, US Navy NSI 009-32

### Technical Specification   C

| Metric Combs | | | | Imperial Combs | | | |
|---|---|---|---|---|---|---|---|
| Part Number | Range | Measurement Steps | Certificate | Part Number | Range | Measurement Steps | Certificate |
| K0003238M201 | 5 – 120µm | 5µm | ○ | K0US3238M201 | 0.5 – 6mils | 0.5mil | ○ |
| K0003238M202 | 25 – 600µm | 25µm | ○ | K0US3238M202 | 1.0 – 24mils | 1.0mil | ○ |
| K0003238M203 | 50 – 1200µm | 50µm | ○ | K0US3238M203 | 2.0 – 48mils | 2.0mil | ○ |
| K0003238M204 | - | Set of 3 Combs | ○ | K0US3238M204 | - | Set of 3 Combs | ○ |

○ Optional Calibration Certificate available.

## Elcometer 112AL



**STANDARDS:**
ASTM D 4414-A, AS/NZS 1580.107.3,
BS 3900-C5-7B, ISO 2808-1A,
ISO 2808-7B, JIS K 5600-1-7,
NF T30-125, US Navy PPI 63101-000,
US Navy NSI 009-32

## Punched Wet Film Combs (Aluminium)

These punched aluminium combs offer the user a low cost method of measuring the wet film thickness.

The Elcometer 112AL, being punched from aluminium, is not as accurate as precision formed stainless steel wet film combs and has a shorter lifespan.

Supplied in a pack of 10 combs, each comb has Metric (25 - 3000µm) on one side and Imperial (1 - 118mils) on the other.

The Elcometer 112AL can be customised with your logo. Please contact Elcometer for further details.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| B112AL12473-3 | Elcometer 112AL Aluminium Wet Film Comb (Pack of 10) | | |
| Dimensions | 75 x 65 x 1mm (2.95 x 2.56 x 0.04") | Weight | 90g (3.17oz) |
| Packing List | Elcometer 112AL (Pack of 10) and operating instructions | | |

## Elcometer 154
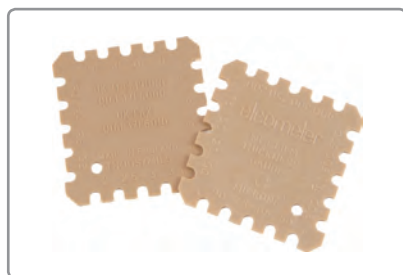


**STANDARDS:**
BS 3900-C5-7B, ISO 2808-1A,
ISO 2808-7B, JIS K 5600-1-7,
NF T30-125

## Plastic Wet Film Combs

The Elcometer 154 Wet Film Combs are made from ABS plastic and are designed to be used once and kept as a record of wet film thickness measurement for quality assurance or customer requirements.

Metric and Imperial values are on the same comb, 50 to 800µm on one side, 2 to 32mils on the other.

Supplied in a pack containing 500 combs. Each comb has 16 measurement steps.

### Technical Specification

| Part Number | Description |
|---|---|
| B154----1 | Elcometer 154 Plastic Wet Film Combs (Pack of 500) |
| Dimensions | 40 x 40mm (1.57 x 1.57") |
| Weight | 900g (2lb) |
| Packing List | Elcometer 154 Wet Film Combs (Pack of 500) and operating instructions |

# Wet Film Wheels

The Elcometer 3230 Wet Film Wheel is a high precision, accurate and easy to use instrument which consists of a set of three wheels. The central wheel is of a smaller diameter and is eccentric relative to the two outer wheels. By rolling the gauge through a wet coating, the centre wheel eventually touches the film. This point on the scale indicates the thickness.

A convenient mounting handle for the wheel is available in two lengths; 15cm (6") or 50cm (19"); please order separately.

When the volume to solids ratio of the coating is known (generally found on the product data sheet supplied by the manufacturer), the wet film thickness can be used to predict the dry film thickness.

Several measurement ranges between 0 to 25µm and 0 to 3000µm (0 to 1mil and 0 to 40mils) are available.

- Continuous scale produces ±5% measurement accuracy
- Suitable for flat and curved surfaces

**STANDARDS:**
ASTM D 1212-A, AS/NZS 1580.107.3, BS 3900-C5-7A, ISO 2808-1B, ISO 2808-7A, JIS K 5600-1-7, NF T30-125

## Technical Specification   C

| Metric Film Wheels | | | | Imperial Film Wheels | | | |
|---|---|---|---|---|---|---|---|
| Part Number | Range | Graduations | Certificate | Part Number | Range | Graduations | Certificate |
| K0003230M001 | 0 - 25µm | 1.25µm | ○ | K0US3230M001 | 0 - 1mil | 0.05mil | ○ |
| K0003230M016 | 0 - 40µm | 2.0µm | ○ | - | - | - | ○ |
| K0003230M002 | 0 - 50µm | 2.5µm | ○ | K0US3230M002 | 0 - 2mils | 0.10mil | ○ |
| K0003230M003 | 0 - 100µm | 5.0µm | ○ | K0US3230M003 | 0 - 4mils | 0.20mil | ○ |
| K0003230M004 | 0 - 150µm | 7.5µm | ○ | K0US3230M004 | 0 - 6mils | 0.25mil | ○ |
| K0003230M005 | 0 - 200µm | 10.0µm | ○ | - | - | - | ○ |
| K0003230M006 | 0 - 250µm | 12.5µm | ○ | - | - | - | ○ |
| K0003230M007 | 0 - 300µm | 15.0µm | ○ | K0US3230M005 | 0 - 12mils | 0.50mil | ○ |
| K0003230M008 | 0 - 400µm | 20.0µm | ○ | - | - | - | ○ |
| K0003230M009 | 0 - 500µm | 25.0µm | ○ | K0US3230M006 | 0 - 20mils | 1.0mil | ○ |
| K0003230M010 | 0 - 1000µm | 50.0µm | ○ | K0US3230M007 | 0 - 40mils | 2.0mils | ○ |
| K0003230M015 | 0 - 1500µm | 75.0µm | ○ | - | - | - | ○ |
| K0003230M011 | 0 - 2000µm | 100µm | ○ | - | - | - | ○ |
| K0003230M012 | 0 - 3000µm | 150µm | ○ | - | - | - | ○ |
| Dimensions | 50 x 30mm (1.97 x 1.18") | | | Weight | 220g (7.76oz) | | |
| Packing List | Wet Film Wheel, storage case and operating instructions | | | | | | |

## Accessories

| | |
|---|---|
| KT003230N003 | 15cm (6") Wet Film Wheel Handle |
| KT003230N002 | 50cm (19") Wet Film Wheel Handle |

○ Optional Calibration Certificate available.

## Elcometer 3230

## Coil Coating Wet Film Wheels

This instrument is similar to the Elcometer 3230 Wet Film Wheel, but is designed for use in the coil coating process. The outer wheels are knurled to allow measurements to be taken on slippery coatings or on fast moving substrates.

By rolling the gauge through a wet coating, the centre wheel eventually touches the film. This point on the scale indicates the thickness.

A convenient mounting handle for the wheel is available in two lengths; 15cm (6") or 50cm (19"); please order separately.

When the volume to solids ratio of the coating is known (generally found on the product data sheet supplied by the manufacturer), the wet film thickness can be used to predict the dry film thickness.

### Technical Specification ⓒ

| Part Number | Metric | | | Part Number | Imperial | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | Range | Graduations | Certificate | | Range | Graduations | Certificate |
| K0003230M017 | 0 - 50µm | 2.5µm | ○ | K0US3230M017 | 0 - 2mils | 0.1mils | ○ |
| K0003230M018 | 0 - 100µm | 5.0µm | ○ | K0US3230M018 | 0 - 4mils | 0.2mils | ○ |
| Dimensions | 50 x 30mm (1.97 x 1.18") | | | Weight | 220g (7.76oz) | | |
| Packing List | Coil Coating Wet Film Wheel, storage case and operating instructions | | | | | | |

### Accessories

| | | | |
| --- | --- | --- | --- |
| KT003230N003 | 15cm (6") Wet Film Wheel Handle | KT003230N002 | 50cm (19") Wet Film Wheel Handle |

## Elcometer 3233

## Pfund Thickness Gauge

Available in aluminium or stainless steel this instrument consists of two concentric cylinders, one sliding inside the other. A spherical glass lens, which has engraved measurements, is fitted to the end of the central cylinder and when pressed into the wet film, leaves a circular trace.

The diameter of the mark on the lens is measured and, using the supplied conversion table, the thickness of the coating can be easily assessed.

- Ideal for measuring the thickness of wet translucent products such as varnishes, oils etc.
- Measurement range of 2.25 - 360µm (0.09 - 14.17mils)

How to use a Pfund thickness gauge - see www.elcometer.com

### Technical Specification

| Part Number | Description | | |
| --- | --- | --- | --- |
| K0003233M001 | Elcometer 3233 Aluminium Pfund Thickness Gauge | | |
| K0003233M002 | Elcometer 3233 Stainless Steel Pfund Thickness Gauge | | |
| Dimensions | 60 x 80mm (2.36 x 3.15") | Weight | 195g (6.88oz) |
| Packing List | Pfund Thickness Gauge, stainless steel rule, conversion table, storage case and operating instructions | | |

○ Optional Calibration Certificate available.

elcometer

# Dry Film Thickness

**Dry Film Thickness** is probably the most critical measurement in the coatings industry. It provides vital information as to the expected **life of the substrate, the product's fitness** for purpose, its appearance and ensures compliance with a host of International Standards.

In 1947, Elcometer launched one of the world's first non-destructive coating thickness gauges, the Elcometer 101.

For more than 6 decades, the design and production qualities of this rugged and reliable instrument have been the watchwords for all our products and these philosophies are still held today.

Elcometer has a comprehensive range of Dry Film Thickness gauges to meet all of your coating inspection requirements, including:

Electronic (Type II); the most widely used as it is generally the most accurate and can be used to measure the coating on almost any substrate, whether ferrous or non-ferrous

Mechanical (Type I); still widely used, particularly in areas where no electrical instruments are permitted or high temperatures prevail

Destructive; used primarily in multi-coat procedures and non-metallic substrates

Formal quality systems, such as those described in ISO 9000, require gauges to be properly controlled, logged and in calibration. Increasingly, users are specifying that the readings taken by gauges are traceable to National Standards.

There are three types of coating thickness standards available from Elcometer:

Calibration Foils; supplied individually or in sets, these precision foils (or 'shims'), accurately measured to ±1%, offer you the ideal method for adjusting the calibration of your coating thickness gauge on your substrate, taking into account your specific substrate material, surface finish and form, to ensure the greatest possible accuracy. Foils are available with or without a calibration certificate traceable to National Standards (UKAS and NIST).

Coated Standards; mounted in a protective folder, these hard wearing coated ferrous or non-ferrous tiles are ideal for accurately measuring the performance of the coating thickness gauge. Coated standards are accurate to within ±2% and are supplied with a calibration certificate.

Zero Test Plates; in some cases, it may be difficult or impractical to obtain an uncoated substrate. For this reason Elcometer provide a range of zero test plates. These test plates, when used in conjunction with a set of foils, are ideal for accurately measuring the performance of your coating thickness gauge.

## Elcometer 456      **Coating Thickness Gauge**

Specialised probes to meet a wide range of applications, see page 8-11

Integral and Separate gauges to measure coatings up to 31mm (1220mils)

Dust and waterproof rugged design equivalent to IP64

Secure probe connection for improved durability
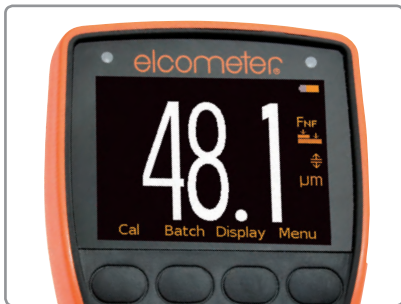
Large easy to read measurements in Metric and Imperial units

View up to 8 user selectable statistics on-screen

On-screen trend graph displaying last 20 measurement values

# Coating Thickness Gauge

Fast reading rate of 70+ per minute, 140+ per minute with Ultra/Scan Probe

Large easy to read colour display

Scratch and solvent resistant screen

Auto rotating display with tap awake feature

compatible with ElcoMaster™

available with **Bluetooth**® wireless technology

Suitable for use in Cloud Computing

Stores up to 150,000 readings in alpha numeric batches

Large buttons with positive feedback
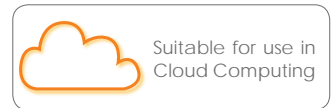
**Android**™

USB and Bluetooth® data output to ElcoMaster™ software suite of products

Made for iPod iPhone iPad

Individual batch readings can be reviewed numerically or graphically

The Elcometer 456 sets new standards; providing reliable and accurate coating thickness measurements; helping you to become more efficient.

## Elcometer 456


Bigfoot™ integral probe for accurate and repeatable measurements


Ergonomic design for comfort during continuous use


2.4" colour screen provides enhanced reading visibility at all angles

## Coating Thickness Gauge

### Easy

- Large buttons ideal for gloved hands

- Easy to use menus in multiple languages

- High contrast colour LCD with auto rotate

- High and low reading limit indicators

- Factory calibrated for immediate use

### Accurate

- Measurement capability to ±1%

- Can be used in accordance with National & International Standards

- Temperature stable measurements

- Increased reading resolution for thin coatings

- Measures accurately on smooth, rough, thin and curved surfaces

### Reliable

- Repeatable and reproducible

- 2 year gauge warranty

- Supplied with fully traceable test certificates

- Batch date and time stamp facility

**STANDARDS:**

AS 2331.1.4, AS 3894.3-B, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6B, BS 3900-C5-6A, BS 5411-11, BS 5411-3, BS 5599, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, IMO MSC.215(82), IMO MSC.244 (83), ISO 1461, ISO 19840, ISO 2063, ISO 2360, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, ISO 2808-12, JIS K 5600-1-7, NF T30-124, SS 184159, SSPC PA 2, US Navy PPI 63101-000, US Navy NSI 009-32

compatible with
ElcoMaster™

available with
**Bluetooth**®
wireless technology

Suitable for use in Cloud Computing
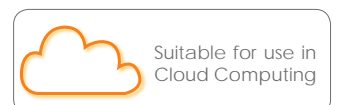
**Coating Thickness Gauge**

## Rugged

- Sealed, heavy duty and impact resistant

- Dust and waterproof equivalent to IP64

- Scratch and solvent resistant display

- Durable gauge and probe construction

- Suitable for use in harsh environments

## Efficient

- Fast reading rate of 70+ per minute, 140+ per minute with Ultra/Scan Probe

- Multiple calibration memories

- Alpha numeric batch identification

- User selectable calibration methods

- Compatible with ElcoMaster™ and ElcoMaster™ Mobile App

## Powerful

- Wide range of interchangeable probes

- USB and Bluetooth® data output to iPhone* or Android™ devices

- Stores up to 150,000 readings in 2,500 batches

- Measures up to 31mm (1220mils) of coating on metal substrates

Paperless Quality Assurance with the ElcoMaster™ suite of products

**Android**™

Made for
iPod   iPhone   iPad

*Compatible with iPod, iPhone and iPad.

**Elcometer 456**

## Coating Thickness Gauge

### Scan Mode

When the Scan Mode* is selected users can slide the Ultra/Scan probe over the entire surface area. As the probe is lifted off the surface the gauge displays the average coating thickness value, the highest thickness and the lowest thickness values. Each set of three readings (average, high and low) can be displayed on the run graph and stored into the memory.

During each scan the Elcometer 456 displays the live thickness reading together with an analogue bar graph which graphically indicates the thickness relative to both the nominal thickness and any user-defined limits.

Scan Mode* stores the average, highest and lowest readings over a test area
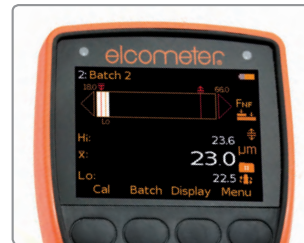
During a scan the live reading together with an analogue bar graph is displayed
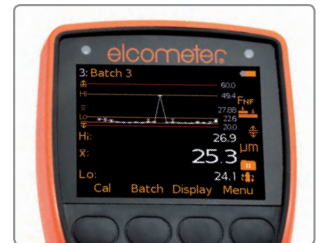
The Run Chart displays the average thickness as well as the highest and lowest readings for each scan

### Auto Repeat Mode

When the Ultra/Scan Probe is slid over the coated surface in Auto Repeat Mode*, a reading is taken approximately every half a second. Each individual reading is stored into the memory.

With a reading rate in excess of 140 readings per minute the Auto Repeat Mode can significantly speed up the inspection of large coated areas.
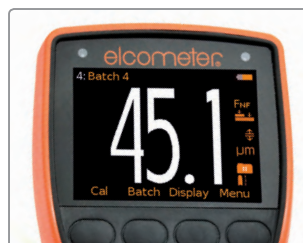
Auto Repeat Mode* measures and stores into memory over 140 individual readings per minute

The gauge updates and displays the statistical values as each individual reading is taken
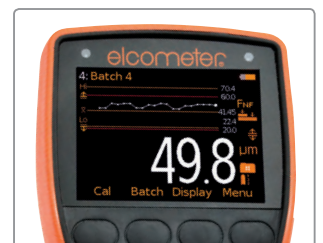
The Run Chart displays each individual reading allowing the user to identify any significant trends

* Scan and Auto Repeat Modes require an Elcometer 456 Model T gauge with Ultra/Scan Probe.

elcometer

## Coating Thickness Gauge

### Ultra/Scan Probe

Featuring a highly durable 'snap on' replaceable probe cap, the Elcometer 456 Ultra/Scan Probe is a revolutionary design which allows users to take individual readings or rapidly scan large surface areas - without damaging the probe or the coating.

When used in conjunction with the Elcometer 456 Scan or Auto Repeat Modes* the Ultra/Scan Probe enables users to significantly reduce inspection times without affecting accuracy.

The Ultra/Scan Probe uses the Elcometer 456's patented offset feature+, ensuring that any cap wear during use# is incorporated within the calibration process. The gauge even informs the user when to replace the cap.

The Ultra/Scan Probe with replaceable end caps for increased durability

### Counted Average Mode

The Elcometer 456 Model S and Model T are supplied with the Counted Average Mode. Once the user has defined the number of individual gauge readings to be taken within a spot measurement, the gauge stores the average of the individual gauge readings into the memory.

### Fixed Batch Sizes

The Fixed Batch Size feature within the Elcometer 456 Model T allows users to define the maximum number of readings in each batch. Once the maximum number of readings has been reached the gauge automatically opens up a new batch which is linked to the previous batch (name-1, name-2, etc.).

Counted Average and Fixed Batch Sizes can be used with all Elcometer 456 probes

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**Working with Standards and Test Methods**

International Standards and test methods often describe the number of individual gauge readings to be taken in a spot measurement and/or the number of spot measurements required over a defined surface area.

SSPC PA2 requires a minimum of three gauge readings to be taken per spot measurement and five spot measurements over 10m² (~100ft²).

The Elcometer 456 Model S or Model T can be set with a counted average of three and a fixed batch size of five to meet these requirements. Each batch defines an area of measurement.

When the Ultra/Scan Probe is connected to the Elcometer 456 Model T with Auto Repeat Mode selected, SSPC PA2 (or similar test methods) can be completed more than 40% faster.

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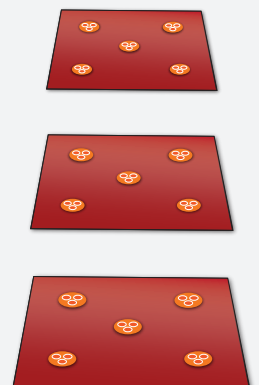
* Scan and Auto Repeat Modes require an Elcometer 456 Model T gauge with Ultra/Scan Probe.
+ Patent Number US6243661
# When tested on smooth surfaces probe end caps have been scanned in excess of 50km (30 miles).

## Elcometer 456    **Coating Thickness Gauge**

| Product Features | ■ Standard | □ Optional | | |
|---|:---:|:---:|:---:|:---:|
| | **Model E** | **Model B** | **Model S** | **Model T** |
| Fast, accurate reading rate; *70+ readings per minute* | ■ | ■ | ■ | ■ |
| Repeatable & reproducible measurements | ■ | ■ | ■ | ■ |
| Easy to use menu structure; *in 30+ languages* | ■ | ■ | ■ | ■ |
| Tough, impact, waterproof & dust resistant; *equivalent to IP64* | ■ | ■ | ■ | ■ |
| Bright colour screen; *with permanent back light* | ■ | ■ | ■ | ■ |
| Scratch & solvent resistant display; *2.4" (6cm) TFT* | ■ | ■ | ■ | ■ |
| Large positive feedback buttons | ■ | ■ | ■ | ■ |
| USB power supply; *via PC* | ■ | ■ | ■ | ■ |
| Test certificate | ■ | ■ | ■ | ■ |
| 2 year gauge warranty* | ■ | ■ | ■ | ■ |
| Automatic rotating display; *0°, 90°, 180° & 270°* | | ■ | ■ | ■ |
| Ambient light sensor; *with adjustable auto brightness* | | ■ | ■ | ■ |
| Emergency light | | ■ | ■ | ■ |
| Tap awake from sleep | | ■ | ■ | ■ |
| Gauge software updates[1]; *via ElcoMaster™ software* | | ■ | ■ | ■ |
| Data output | | ■ | ■ | ■ |
| USB; *to computer* | | ■ | ■ | ■ |
| Bluetooth ®; *to computer, Android™ & iOS‡ devices* | | | ■ | ■ |
| On screen statistics | | ■ | ■ | ■ |
| Number of readings; *η* | | ■ | ■ | ■ |
| Mean (average); $\bar{x}$ | | ■ | ■ | ■ |
| Standard deviation; σ | | ■ | ■ | ■ |
| Highest reading; *hi* | | ■ | ■ | ■ |
| Lowest reading; *lo* | | ■ | ■ | ■ |
| Coefficient of variation; *COV* | | ■ | ■ | ■ |
| Elcometer index value[2]; *EIV* | | ■ | ■ | ■ |
| Nominal dry film thickness; *NDFT* | | | ■ | ■ |
| IMO PSPC; *%>NDFT, %>90<NDFT, 90:10 pass/fail* | | | ■ | ■ |
| High & low limits; *definable audible & visual alarms* | | | ■ | ■ |
| Number of readings above high limit; | | | ■ | ■ |
| Number of readings below low limit; | | | ■ | ■ |
| Live reading trend graph; *in batch mode* | | | ■ | ■ |
| ElcoMaster™ software & USB cable | | □ | ■ | ■ |
| Replaceable screen protectors | □ | □ | ■ | ■ |
| Protective case | □ | ■ | ■ | ■ |
| Plastic transit case | □ | □ | □ | ■ |
| Integral models; *with automatic gauge switch on* | ■ | ■ | ■ | ■ |
| Probe type; *Ferrous (F), Non-Ferrous (N), Dual (FNF)[3]* | F, FNF | F, N, FNF | F, N, FNF | F, N, FNF |
| Measurement range | 0-1500µm 0-60mils | 0-13mm 0-500mils | 0-1500µm 0-60mils | 0-1500µm 0-60mils |
| Separate models; *with automatic probe recognition* | | ■ | ■ | ■ |
| Probe type; *Ferrous (F), Non-Ferrous (N), Dual (FNF)[3]* | | F, N, FNF | F, N, FNF | F, N, FNF |
| Measurement range; *see page 8-11 for probe selection* | | 0-31mm 0-1220mils | 0-31mm 0-1220mils | 0-31mm 0-1220mils |

■ Standard  □ Optional

*The Elcometer 456 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com.

  Elcometer 456 probes are covered by a 1 year warranty.

[1] Internet connection required        [2] Elcometer Index Values are used in the automotive industry to assess a coating's overall quality; USA Patent Number US7606671B2

[3] FNF Patent Numbers UK: GB2306009B; USA: 5886522        ‡ Visit www.elcometer.com/sdk to find out how to integrate Elcometer's MFi certified products to your App.

## Coating Thickness Gauge                                    **Elcometer 456**

| Product Features | | | ■ Standard | □ Optional |
|---|---|---|---|---|
| | Model E | Model B | Model S | Model T |
| On-screen calibration instructions; *in 30+ languages* | ■ | ■ | ■ | ■ |
| Multiple calibration methods | ■ | ■ | ■ | ■ |
|    Factory; *resets to the factory calibration* | ■ | ■ | ■ | ■ |
|    2-point; *for smooth and rough surfaces* | ■ | ■ | ■ | ■ |
|    1-point; *zero calibration* | | ■ | ■ | ■ |
|    Zero offset[4]*; for calibration according to ISO19840* | | | ■ | ■ |
| Predefined calibration & measurement methods | | | ■ | ■ |
|    ISO, SSPC PA2, Swedish, Australian | | | ■ | ■ |
| Automatic calibration; *for rapid calibration* | | | ■ | ■ |
| Calibration memory type; *gauge (g) or gauge & batch (gb)* | g | g | gb | gb |
| Number of batches; *with unique calibrations* | | | 1 | 2,500 |
| Calibration memories; *3 user-programmable memories* | | | | ■ |
| Measurement outside calibration warning | | | | ■ |
| Calibration lock; *with optional PIN code unlock* | | ■ | ■ | ■ |
| Delete last reading | | ■ | ■ | ■ |
| Gauge memory; *number of readings* | | Last 5 | 1,500 | 150,000 |
| Individual batch calibrations; *sent to PC via ElcoMaster™* | | | ■ | ■ |
| Limits; *user definable audible & visual pass/fail warnings* | | | ■ | ■ |
|    Gauge (g) or gauge & batch specific (gb) limits | | | g | gb |
| Date and time stamp | | | ■ | ■ |
| Batch types; *normal, counted average, IMO PSPC* | | | ■ | ■ |
| Batch review graph | | | | ■ |
| Review, clear & delete batches | | | ■ | ■ |
| Copy batches and calibration settings | | | | ■ |
| Alpha-numeric batch names; *user definable on the gauge* | | | | ■ |
| Scan & auto repeat modes; *with Ultra/Scan probe connected* | | | | ■ |
| Fixed batch size mode; *with batch linking* | | | | ■ |

### Technical Specification

| | |
|---|---|
| Display information | 2.4" (6cm) QVGA colour TFT display, 320 x 240 pixels |
| Battery type | 2 x AA batteries, rechargeable batteries can also be used |
| Battery life | approx 24 hours of continuous use at 1 reading per second[5] |
| Gauge dimensions (h x w x d) | 141 x 73 x 37mm (5.55 x 2.87 x 1.46") |
| Gauge weight (including batteries supplied) | Separate:   161g (5.68oz)<br>Integral:    156g (5.50oz) |
| Operating temperature | -10 to 50°C (14 to 122°F) |
| Packing List | Elcometer 456 gauge, calibration foils (integrals only), wrist harness, transit case (T), protective case (B, S, T), 1 x screen protectors (S, T), 2 x AA batteries, operating instructions, USB cable (S, T), ElcoMaster™ software (S, T)<br>For separate gauge probe options see page 8-11 |

■  Standard       □  Optional

[4] Zero Offset USA Patent Number US6243661

[5] Using default settings & lithium batteries, alkaline or rechargeable batteries may differ

# Dry Film Thickness - Digital

## Elcometer 456

### Integral & Separate model range

The Elcometer 456 is available in four different models. Each gauge provides the user with increasing functionality - from the entry level Elcometer 456 Model E, to the top of the range Elcometer 456 Model T.

Integral gauges are ideal for single handed operation as the wide footprint of the Bigfoot™ internal probe provides greater stability during measurement - allowing for consistent, repeatable and accurate results.

Separate models, with their wide range of probes, provide even greater measurement flexibility. See page 8-11 for more details.

### Integral Model Options  C

**Scale 1** | Range: 0-1500µm (0-60mils)  Accuracy*: ±1-3% or ±2.5µm (±0.1mil)
Resolution: 0.1µm: 0-100µm; 1µm: 100-1500µm (0.01mil: 0-5mils; 0.1mil: 5-60mils)

| | Model E | Model B | Model S | Model T | Certificate |
|---|---|---|---|---|---|
| Elcometer 456 Ferrous Integral | A456CFEI1 | A456CFBI1 | A456CFSI1 | A456CFTI1 | ● |
| Elcometer 456 Non-Ferrous Integral | - | A456CNBI1 | See separate gauges with N2 PINIP™ Probe | See separate gauges with N2 PINIP™ Probe | ● |
| Elcometer 456 Dual FNF Integral | A456CFNFEI1 | A456CFNFBI1 | A456CFNFSI1 | A456CFNFTI1 | ● |

**Scale 2** | Range: 0-5mm (0-200mils)  Accuracy*: ±1-3% or ±20µm (±1.0mil)
Resolution: 1µm: 0-1mm; 10µm: 1-5mm (0.1mil: 0-50mils; 1mil: 50-200mils)

*For higher resolution & accuracy on thin coatings Scale 2 gauges can be switched to the Scale 1 mode measurement performance*

| | Model E | Model B | Model S | Model T | Certificate |
|---|---|---|---|---|---|
| Elcometer 456 Ferrous Integral | - | A456CFBI2 | See separate gauges with F2 PINIP™ Probe | See separate gauges with F2 PINIP™ Probe | ● |

**Scale 3** | Range: 0-13mm (0-500mils)  Accuracy*: ±1-3% or ±50µm (±2.0mils)
Resolution: 1µm: 0-2mm; 10µm: 2-13mm (0.1mil: 0-100mils; 1mil: 100-500mils)

| | Model E | Model B | Model S | Model T | Certificate |
|---|---|---|---|---|---|
| Elcometer 456 Ferrous Integral | - | A456CFBI3 | See separate gauges with F3 PINIP™ Probe | See separate gauges with F3 PINIP™ Probe | ● |

### Separate Model Options  C

| | Model E | Model B | Model S | Model T | Certificate |
|---|---|---|---|---|---|
| Elcometer 456 Ferrous Separate | - | A456CFBS | A456CFSS | A456CFTS | ● |
| Elcometer 456 Non-Ferrous Separate | - | A456CNBS | A456CNSS | A456CNTS | ● |
| Elcometer 456 Dual FNF Separate | - | A456CFNFBS | A456CFNFSS | A456CFNFTS | ● |

Probes are supplied separately, see page 8-11 for details

**For a complete range of accessories see page 8-14**

● Certificate supplied as standard.  * Whichever is the greater

## Probe range

All Elcometer 456 probes are fully interchangeable and are available in a number of designs and scale ranges to meet your specific application.

### Straight Probes
Measures coatings on both flat and curved surfaces

### Mini Probes
Ideal for measuring coatings on edges, narrow pipes or small surface areas

### Right Angle Probes
For taking readings where access is restricted

### PINIP™ Probes
Plug-in probes convert a separate gauge into an integral gauge

### Telescopic Probes
Extending right angle probes for out of reach areas

### Ultra/Scan Probes
These probes are fitted with replaceable probe caps - allowing users to take individual readings or scan large surface areas without damaging the probe

### Waterproof Probes
Sealed for use underwater at depth, even in diving gloves

### High Temperature Probes
For use on hot coated materials up to 250°C (480°F)

### Anodiser Probes
Chemical resistant washable probes - ideal for the anodising environment

### Armoured Probes
Probes with metal reinforced heavy duty cables, reducing the risk of cable damage

### Soft Coating Probes
Large surface area probes for soft reach materials (HVCA approved)

### Specialist Probes
These probes are designed for measuring on specialist substrates, such as graphite, or electroplated components

Ferrous probes measure non magnetic coatings on ferro-magnetic substrates. Elcometer 456 ferrous gauges accept any ferrous probe. Non-ferrous probes measure non conductive coatings on non-ferrous metal substrates and Elcometer 456 non-ferrous gauges accept any non-ferrous probe. Dual FNF probes measure both ferrous and non-ferrous applications with automatic substrate detection. Elcometer 456 FNF gauges accept all ferrous, non-ferrous and dual FNF probes.

Elcometer probes have a maximum operating temperature of 80°C (176°F) with the exception of separate ferrous probes 150°C (300°F) and Hi-Temperature PINIP's 250°C (480°F). The stated temperature is the substrate temperature, and the duty cycle of the probe must be reduced to ensure a minimal temperature build-up within the probe.

All Elcometer probes are supplied with a Test Certificate and a set of calibration foils appropriate to the scale range of the probe - see page 8-24 for further information.

## Elcometer 456 — Probe range

### Scale 1

| | Range: 0-1500µm (0-60mils) | | | Accuracy*: ±1-3% or ±2.5µm (±0.1mil) | | | |
|---|---|---|---|---|---|---|---|
| | Resolution: 0.1µm: 0-100µm; 1µm: 100-1500µm (0.01mil: 0-5mils; 0.1mil: 5-60mils) | | | | | Certificate: ● | |
| Probe Design | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
| Straight | T456CF1S | T456CN1S | T456CFNF1S | F, N | 85mm (3.35") | F, N, FNF (F) | 4mm (0.16") |
| | | | | FNF | 88mm (3.46") | FNF (N) | 6mm (0.24") |
| Right Angle | T456CF1R | T456CN1R | T456CFNF1R | F, N | 28mm (1.10") | F, N, FNF (F) | 4mm (0.16") |
| | | | | FNF | 38mm (1.50") | FNF (N) | 6mm (0.24") |
| Mini 90° (M5) 45mm (1.77") | T456CFM5R90A | T456CNM5R90A | - | F, N | 16mm (0.63") | F, N | 4mm (0.16") |
| Mini 90° (M5) 150mm (5.9") | - | T456CNM5R90C | - | N | 16mm (0.63") | N | 4mm (0.16") |
| Mini 90° (M5) 400mm (15.7") | - | T456CNM5R90E | - | N | 16mm (0.63") | N | 4mm (0.16") |
| Straight Sealed | T456CF1E | | | F | 85mm (3.35") | F | 4mm (0.16") |
| Mini 90° (M5) Sealed 45mm (1.77") | T456CFME5R90A | | | F | 16mm (0.63") | F | 4mm (0.16") |
| Mini 90° (M5) Sealed 45mm (1.77") 2m Cable | T456CFME5R90A-2 | | | F | 16mm (0.63") | F | 4mm (0.16") |
| Anodiser | - | T456CN1AS | - | N | 100mm (3.94") | N | 4mm (0.16") |
| PINIP™ | T456CF1P | T456CN1P | T456CFNF1P | F | 170mm (6.69") | F, N, FNF (F) | 4mm (0.16") |
| | | | | N, FNF | 180mm (7.09") | FNF (N) | 6mm (0.24") |

### Scale 2

| | Range: 0-5mm (0-200mils) | | | Accuracy*: ±1-3% or ±20µm (±1.0mil) | | | |
|---|---|---|---|---|---|---|---|
| | Resolution: 1µm: 0-1mm; 10µm: 1-5mm (0.1mil: 0-50mils; 1mil: 50-200mils) | | | | | Certificate: ● | |
| Probe Design | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
| Straight | T456CF2S | T456CN2S | - | F | 89mm (3.50") | F | 8mm (0.32") |
| | | | | N | 88mm (3.46") | N | 14mm (0.55") |
| Right Angle | T456CF2R | - | - | F | 32mm (1.26") | F | 8mm (0.32") |
| Armoured | T456CF2ARM | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| Telescopic 56 -122cm (22 - 48") | T456CF2T | - | - | F | 36mm (1.42") | F | 8mm (0.32") |
| Soft Coating | T456CF2B | - | - | F | 89mm (3.50") | F | 8mm (0.32") |
| Waterproof 1m (3') cable | T456CF2SW | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| Waterproof 5m (15') cable | T456CF2SW-5 | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| Waterproof 15m (45') cable | T456CF2SW-15 | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| Waterproof 30m (98') cable | T456CF2SW-30 | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| Waterproof 50m (164') cable | T456CF2SW-50 | - | - | F | 138mm (5.43") | F | 8mm (0.32") |
| PINIP™ | T456CF2P | T456CN2P | - | F | 174mm (6.85") | F | 8mm (0.32") |
| | | | | N | 185mm (7.28") | N | 14mm (0.55") |
| Hi-Temperature 250°C (480°F) | T456CF2PHT | - | - | F | 174mm (6.85") | F | 8mm (0.32") |

### Scale 3

| | Range: 0-13mm (0-500mils) | | | Accuracy*: ±1-3% or ±50µm (±2.0mils) | | | |
|---|---|---|---|---|---|---|---|
| | Resolution: 1µm: 0-2mm; 10µm: 2-13mm (0.1mil: 0-100mils; 1mil: 100-500mils) | | | | | Certificate: ● | |
| Probe Design | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
| Straight | T456CF3S | - | - | F | 102mm (4.02") | F | 14mm (0.55") |
| PINIP™ | T456CF3P | - | - | F | 184mm (7.24") | F | 14mm (0.55") |

† FNF (F): FNF probe in F mode  FNF (N): FNF probe in N mode

● Certificate supplied as standard.

* Whichever is the greater

## Probe range

### Scale 6

Range: F: 0-25mm (0-980mils) N: 0-30mm (1200mils) — Accuracy*: ±1-3% or ±100µm (±4.0mil)

Resolution: 10µm: 0-2mm; 100µm: 2-30mm (1mil: 0-100mils; 10mils: 100-1200mils) — Certificate: ●

| Probe Design | | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
|---|---|---|---|---|---|---|---|---|
|  | Straight | T456CF6S | T456CN6S | - | F | 150mm (5.90") | F | 51 x 51mm² (2 x 2 sq. inch) |
| | | | | | N | 160mm (6.30") | N | 58mm (2.29") |
|  | Armoured | T456CF6ARM | T456CN6ARM | - | F | 190mm (7.48") | F | 51 x 51mm² (2 x 2 sq. inch) |
| | | | | | N | 200mm (7.87") | N | 58mm (2.29") |

### Scale 7

Range: F: 0-31mm (0-1220mils) — Accuracy*: ±1-3% or ±100µm (±4.0mil)

Resolution: 10µm: 0-2mm; 100µm: 2-31mm (1mil: 0-100mils; 10mils: 100-1220mils) — Certificate: ●

| Probe Design | | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
|---|---|---|---|---|---|---|---|---|
|  | Armoured | T456CF7ARM | - | - | F | 200mm (7.87") | F | 55 x 55mm² (2.17 x 2.17 sq. inch) |

### Scale 0.5

Range: 0-500µm (0-20mils) — Accuracy*: ±1-3% or ±2.5µm (±0.1mil)

Resolution: 0.1µm: 0-100µm; 1µm: 100-500µm (0.01mil: 0-5mils; 0.1mil: 5-20mils) — Certificate: ●

| Probe Design (M3) | | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
|---|---|---|---|---|---|---|---|---|
|  | Mini 45mm (1.77") | T456CFM3---A | T456CNM3---A | - | F | 6mm (0.24") | F | 3mm (0.12") |
| | | | | | N | 6mm (0.24") | N | 4mm (0.16") |
|  | Mini 90° 45mm (1.77") | T456CFM3R90A | T456CNM3R90A | - | F | 16mm (0.63") | F | 3mm (0.12") |
| | | | | | N | 16mm (0.63") | N | 4mm (0.16") |
|  | Mini 45° 45mm (1.77") | T456CFM3R45A | - | - | F | 18mm (0.71") | F | 3mm (0.12") |
|  | Mini 150mm (5.90") | T456CFM3---C | T456CNM3---C | - | F | 6mm (0.24") | F | 3mm (0.12") |
| | | | | | N | 6mm (0.24") | N | 4mm (0.16") |
|  | Mini 90° 150mm (5.90") | T456CFM3R90C | T456CNM3R90C | - | F | 16mm (0.63") | F | 3mm (0.12") |
| | | | | | N | 16mm (0.63") | N | 4mm (0.16") |
|  | Mini 90° 300mm (11.8") | T465CFM3R90D | - | - | F | 16mm (0.63") | F | 3mm (0.12") |
|  | Mini 45° 300mm (11.8") | T456CFM3R45D | - | - | F | 18mm (0.71") | F | 3mm (0.12") |
|  | Mini 90° 400mm (15.7") | - | T456CNM3R90E | - | F | 16mm (0.63") | N | 4mm (0.16") |

### Scale 0.5 Graphite

Range: 0-500µm (0-20mils) — Accuracy*: ±1-3% or ±2.5µm (±0.1mil)

Resolution: 0.1µm: 0-100µm; 1µm: 100-500µm (0.01mil: 0-5mils; 0.1mil: 5-20mils) — Certificate: ●

| Probe Design | | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
|---|---|---|---|---|---|---|---|---|
|  | Mini 90° Graphite 45mm (1.77") | - | T456CNMG3R90A | - | N | 16mm (0.63") | N | 4mm (0.16") |
|  | Mini 90° Graphite 150mm (5.90") | - | T456CNMG3R90C | - | N | 16mm (0.63") | N | 4mm (0.16") |
|  | Mini 90° Graphite 400mm (15.7") | - | T456CNMG3R90E | - | N | 16mm (0.63") | N | 4mm (0.16") |

### Ultra/Scan Probe

Range: 0-1500µm (0-60mils)+ — Accuracy*^: ±1-3% or ±2.5µm (±0.1mil)

Resolution: 1µm: 0-1500µm (0-60mils) — Certificate: ●

| Probe Design | | Ferrous F | Non-Ferrous N | Dual Probe FNF | Minimum Headroom | | Minimum Sample Diameter† | |
|---|---|---|---|---|---|---|---|---|
|  | Ultra/Scan Probe | T456CF1U | - | T456CFNF1U | F, FNF | 85mm (3.50") | F, FNF | 15mm (0.59") |
|  | | T456C23956 | Replacement Ultra/Scan Probe End Caps (3 per pack)# | | | | | |

† FNF (F): FNF probe in F mode FNF (N): FNF probe in N mode

^ When calibrated using a sample of the uncoated substrate

# When tested using smooth surfaces probe end caps have been scanned in excess of 50 km (30 miles)

+ Excluding probe end cap

● Certificate supplied as standard.

* Whichever is the greater

Elcometer 456 probes are covered by a 1 year warranty

## Elcometer 456

## Accessories



### Jumbo Hand Grip

Ideal for precision placement for the most accurate results on flat and curved surfaces. Place the probe inside the Jumbo Hand Grip and take measurements - ideal when wearing gloves. Suitable for any Elcometer 456 Scale 1 or Scale 2 straight probes.

| F and N Probes | Dual FNF Probes | |
|---|---|---|
| T9997766- | T99913225 | Jumbo Adaptor |



### V-Probe Adaptor

Ideal for precision placement for the most accurate results on medium and large diameter curved surfaces such as pipes and cylinders. Suitable for any Elcometer 456 Scale 1 or Scale 2 straight probes.

| F and N Probes | Dual FNF Probes | |
|---|---|---|
| T9997381- | T99913133 | V-Probe Adaptor |



### Ultra/Scan Probe Replacement End Caps

Highly durable - when tested on smooth surfaces probe end caps have been scanned in excess of 50 km (30 miles) - each end cap snaps on to the end of the Ultra/Scan probe significantly enhancing the lifetime of the probe.

| F & Dual FNF Probes | |
|---|---|
| T456C23956 | Replacement Ultra/Scan Probe End Caps (3 per pack) |



### Probe Placement Jig

The Elcometer probe placement jig is the ideal accessory for measuring coatings on small or complex components when the highest levels of repeatability and accuracy are required.

| | |
|---|---|
| T95012880 | Probe Placement Jig |

Each probe placement jig is supplied with a probe housing and a component holder to suit Scale 1 or Scale 2 straight probes.

| | |
|---|---|
| T95013028 | Component Hand Vice |
| T95012888 | Cable Release Assembly - ideal for remote measurements |
| T95015961 | Dual FNF Probe Housing Adaptor |
| T95016896 | Mini Probe Housing Adaptor |

### Accessories

| | |
|---|---|
| T99922341 | Self Adhesive Screen Protectors (x10) |
| T99921325 | USB Cable |
| T45622371 | Benchtop Inspection Stand - for Separate Gauges |

## Accessories

**Calibration Foils/ Coated Standards/ Zero Test Plates**
Elcometer offers a range of individual precision foils, foil sets, coated thickness standards and zero test plates to ensure the greatest possible accuracy.

See page 8-24 for more details.



**Data Output Controller**
Enables data to be output from the Elcometer 456 via RS232 ports for the purposes of controlling automated production lines.

The Elcometer Software Support Team, or users can produce their own customised software to utilise the data output from the Elcometer 456 gauge in order to remotely trigger pass/fail criteria for their processes.



| Part Number | Description |
|---|---|
| T99925387 | Elcometer Data Output Controller |
| Operating Temperature | 0 to 50°C (32°F to 122°F) |
| Data Input | USB |
| Data Output | One RS232 serial output via 9 way D-Type connector |
| Power Supply | Requires 5V 1A(min) DC supply via mini USB. External plug-in mains adapter with interchangeable UK/EU/US/AUS pins supplied. |
| Packing List | Elcometer Data Output Controller, USB to RS232 converter lead, power supply (with 4 sets of interchangeable pins) |

# ELCOMETER 456
## DIGITAL INSPECTION KITS

## Fast and accurate measurement of surface profile, climatic conditions and coating thickness in one kit

Ideal for 'paperless' quality assurance systems the kits come complete with ElcoMaster™ Data Management Software for professional reporting and analysis.

See page 13-2 for more information.

compatible with
**ElcoMaster™**

available with
**Bluetooth**®
wireless technology

| Surface Profile | Climate Monitoring | Coating Thickness | ElcoMaster™ |
|---|---|---|---|
| The Elcometer 224 digital surface profile gauge, available as either integral or separate probe versions, is faster than ever before. | The Elcometer 319 dewpoint meter records all the critical climate parameters for the coating's professional: surface, air & dewpoint temperatures, %RH & ΔT. | Up to 40% faster than other coating thickness gauges, the new Elcometer 456 provides you with accurate and repeatable readings. Integral & separate probes available. | ElcoMaster™ is the simple yet powerful software solution; combining all your inspection results in one professional report, instantly. |
| | | | |

# Coating Thickness Gauge

**Elcometer 355**

The Elcometer 355's watchwords are accuracy, simplicity, versatility and durability making this a true state of the art hand-held measuring system packed with time-saving and cost-cutting features.

Available as a standard and top model, the unit's large memory stores up to 10,000 readings in batches and data can be output to a PC, datalogger or printer as required.

With a comprehensive range of Probe Modules available, just select the most appropriate for the application. All modules are supplied with calibration foils.

- ±1% or 1µm, whichever is the greater, accuracy
- Rugged aluminium case designed for the toughest environments
- ElcoMaster™ software supplied, see page 1-4
- Full statistical analysis - mean standard deviation, number of readings, highest and lowest value
- RS232 output
- Date and time stamp
- For a full list of probes and accessories, see page 8-18

compatible with **ElcoMaster™**

**STANDARDS:**

AS 2331.1.4, AS 3894.3-B, AS/NZS 1580.108.1, ASTM B 244, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6A, BS 3900-C5-6B, BS 5411-3, BS 5411-11, BS 5599, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, IMO MSC.215(82), IMO MSC.244 (83), ISO 1461, ISO 19840, ISO 2063, ISO 2360, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, ISO 2808-12, JIS K 5600-1-7, NF A49-211, NF T30-124, SS 184159, SSPC PA 2, US Navy PPI 63101-000, US Navy NSI 009-32

| Product Features | | C |
|---|---|---|
| **Part Number** | **Description** | **Certificate** |
| A355----S | Elcometer 355 Standard Coating Thickness Gauge | ○ |
| A355----T | Elcometer 355 Top Coating Thickness Gauge | ○ |
| Operating Temperature | 0°C to 50°C (32°F to 120°F) | |
| Storage Temperature | -10°C to 60°C (14°F to 140°F) | |
| Dimensions | 175 x 83 x 42mm (6.9 x 3.3 x 1.6") | |
| Weight | 650g (1.43lb) | |
| Reading Speed | 40 readings per minute    Auto Repeat Mode   130/140 readings per minute | |
| Data Output | RS232C Serial or Parallel Output via D25 Type Connector (Female) | |
| Memory | Standard: 5,000 reading memory in 25 pre-set batches<br>Top: 10,000 reading memory in up to 200 batches (individually calibrated) | |
| Battery Type | 3 x 1.5V AA Cells (Alkaline) or 3 x 1.5V Nickel Metal Hydride rechargeable cells | |
| Battery Life | Minimum: 40 hours with alkaline batteries, 20 hours with rechargeable batteries | |
| Packing List | Elcometer 355 Top or Standard Gauge, leather carry case, 3 x AA batteries, ElcoMaster™ software, PC cable and operating instructions | |

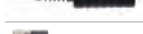**For a full range of calibration standards and foils sets see page 8-24**

○ Optional Calibration Certificate available.

# Dry Film Thickness - Digital

## Elcometer 355

## Coating Thickness Gauge

Unique probe modules allow the Elcometer 355 Coating Thickness Gauges to be versatile and flexible for any measurement application.

Probe modules can be freely interchanged as required for both ferrous (F) and non-ferrous (N) metal substrates.

Most probe modules are capable of an accuracy of ±1% of the reading on a variety of coatings and surfaces.

Telescopic probes extend from 410mm (16") to 1100mm (43").

| Probe Range | | | | C |
|---|---|---|---|---|

### Scale 1

| | Range: 0-1500µm (0-60mils) | | Accuracy*: ±1% or ±1µm (±0.04mil) | |
|---|---|---|---|---|
| | Resolution: | 0.1µm: 0-200µm; 0.5µm: 200-500µm; 1µm: 500-1500µm (0.005mil: 0-8mils; 0.02mil: 8-20mils; 0.05mil: 20-60mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F1 Standard | T35511952 | 85mm (3.35") | 6mm (0.24") | ● |
| F1 Right Angle | T35511953 | 28mm (1.10") | 6mm (0.24") | ● |
| F1 Telescopic | T35511959 | 30mm (1.18") | 6mm (0.24") | ● |
| N1 Standard | T35511982 | 85mm (3.35") | 8mm (0.31") | ● |

### Scale 2

| | Range: 0-5mm (0-200mils) | | Accuracy*: ±1% or ±5µm (±0.2mil) | |
|---|---|---|---|---|
| | Resolution: | 2µm: 0-500µm; 5µm: 500-5000µm (0.1mil: 0-20mils; 0.2mil: 20-200mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F2 Standard | T35511954 | 89mm (3.50") | 10mm (0.39") | ● |
| F2 Telescopic | T35511960 | 36mm (1.42") | 10mm (0.39") | ● |
| N2 Standard | T35511984 | 88mm (3.46") | 18mm (0.71") | ● |

### Scale 3

| | Range: 0-13mm (0-500mils) | | Accuracy*: ±2% or ±30µm (±1mil) | |
|---|---|---|---|---|
| | Resolution: | 5µm: 0-1mm; 10µm: 1-13mm (0.2mil: 0-40mils; 0.2mil: 40-500mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F3 Standard | T35511956 | 102mm (4.02") | 18mm (0.71") | ● |

### Scale 4

| | Range: 0-250µm (0-10mils) | | Accuracy*: ±1% or ±1µm (±0.04mil) | |
|---|---|---|---|---|
| | Resolution: | 0.1µm: 0-250µm (0.005mil: 0-10mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F4 Standard | T35511950 | 85mm (3.35") | 4mm (0.16") | ● |
| F4 Right Angle (long) | T35511951 | 18mm (0.71") | 3mm (0.12") | ● |
| N4 Standard | T35511980 | 90mm (3.54") | 8mm (0.31") | ● |

### Scale 5

| | Range: 0-800µm (0-32mils) | | Accuracy*: ±1% or ±2µm (±0.08mil) | |
|---|---|---|---|---|
| | Resolution: | 1µm: 0-800µm (0.1mil: 0-32mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F5 (Rebar) | T35511962 | 85mm (3.35") | 4mm (0.16") | ● |

### Scale 6

| | Range: 0-25mm (0-1000mils) | | Accuracy*: ±2% or ±100µm (±4mils) | |
|---|---|---|---|---|
| | Resolution: | 10µm: 0-5mm, 50µm: 5-25mm (0.5mil: 0-200mils, 2mil: 200-1000mils) | | |
| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
| F6 Standard | T35511964 | 150mm (5.9") | 51mm (2.0") | ● |

\* Whichever is greater

● Test certificate supplied as standard.

elcometer

# Coating Thickness Gauge

> Accessories

**Jumbo Hand Grip**
Ideal for precision placement for the most accurate results on flat and curved surfaces. Place the probe inside the Jumbo Hand Grip and take measurements - ideal when wearing gloves.

**V-Probe Adaptor**
Ideal for precision placement for the most accurate results on medium and large diameter curved surfaces such as pipes and cylinders.



| Part Number | Description |
|---|---|
| T9997766- | Jumbo Hand Grip - F and N Probes |
| | For use with the following Elcometer 355 probes:<br>F1 Standard, F2 Standard, F4 Standard, F5 Rebar, N1 Standard |
| T9997381- | V-Probe Adaptor - F and N Probes |
| | For use with the following Elcometer 355 probes:<br>F1 Standard, F2 Standard, F4 Standard, F5 Rebar, N1 Standard |

**Probe Placement Jig**
For the most reliable and repeatable coating thickness measurements, making the gauge score highly in repeatability and reproducibility studies. Ideal for small and large components alike. The probe placement jig is supplied with a probe housing to suit standard F1, F2, F4, F5 and N1 probes. Housings to suit other probes are available as optional accessories.



| Part Number | Description |
|---|---|
| T95012880 | Probe Placement Jig |
| T95013028 | Component Hand Vice |
| T95012888 | Cable Release Assembly - ideal for remote measurements |
| T95015589 | N4 Probe Adaptor - must be purchased for use with N4 Probes |

## Elcometer 415

## Paint and Powder Gauge

The Elcometer 415 Paint and Powder Coating Thickness Gauge provides a simple, accurate and reliable way to measure coatings on all smooth ferrous and non-ferrous metal surfaces. The gauge auto-switches to read on either ferrous or non-ferrous substrates. This is ideal for measuring paint or powder on both steel and aluminium surfaces such as car body panels or in a powder shop.

The gauge features a large, easy-to-read screen and is capable of taking more than 60 readings per minute. The central Bigfoot™ internal probe, with the integrated V-groove, allows repeatable readings on both flat and curved surfaces. On screen instructions, in over 20 languages, make the gauge usable straight from the box.

Features:

- Large angled display for viewing from all angles
- Metric or Imperial measurements - displays readings in mils or microns
- Fast and accurate with more than 60 readings per minute
- Factory calibrated for use straight from the box - calibration foils supplied
- Simple "Zero Cal" feature with fixed calibration setting if access to the uncoated substrate is not available
- Ergonomic design for maximum comfort
- Bigfoot™ probe for repeatable results
- On screen instructions in over 20 languages

**STANDARDS:**
AS2331.1.4, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 7091, ASTM E 376, BS 3900-C5-6A, BS 3900-C5-6B, BS 5411-11, BS 5411-3, BS 5599, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, ISO 2360, ISO 2808-12, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, JIS K 5600-1-7, NF T30-124

### Technical Specification

| Part Number | Description |
|---|---|
| A415FNFI1 | Elcometer 415 Paint and Powder Coating Thickness Gauge |
| A415FNFI1AUTO | Elcometer 415 Automotive Gauge (complete with F & N calibration plates) |
| Range | 0 to 1000µm (0 to 40mils) |
| Resolution | 1µm (0.1mil) |
| Accuracy | ±3% or ±3µm (±0.12mil) |
| Measurement Speed | Greater than 60 readings per minute |
| Operating Temperature (ambient) | 0°C to 50°C (32°F to 120°F) |
| Maximum Operating Temperature (probe) | 80°C (176°F) |
| Storage Temperature | -10°C to 55°C (14°F to 130ºF) |
| Case | High impact ABS plastic |
| Batteries | 2 x AAA batteries |
| Weight | 130g (4.1oz) |
| Dimensions | 110 x 75 x 35mm (4.3 x 3 x 1.38") |
| Packing List | Elcometer 415 gauge, calibration foils, soft carry case, 2 x AAA batteries & operating instructions. The Elcometer 415 AUTO has 2 calibration zero plates. |

## Automotive Refinishing Gauge

### Elcometer 311

The Elcometer 311 has been specifically designed to meet the requirements of today's automotive refinishing market and is available in two models.

The Ferrous instrument is ideal for measuring coatings on steel body panels. The FNF instrument enables the user to measure on both steel and aluminium panels using one gauge with automatic switching.

Pre-calibrated on steel and aluminium car body panels, the Elcometer 311 is very easy to use. Checkpieces are supplied with each instrument to verify accuracy.

- Designed specifically to meet the requirements of the automotive industry

- Ferrous (F) and Ferrous/Non Ferrous (FNF) gauges available

- Pre-calibrated on automotive steel and aluminium

- Bigfoot™ integral probe for stable, repeatable readings

- Scale range of 0-500µm (0-20mils)

- Auto On/Off

- Ferrous (F) checkpiece included to verify performance - the FNF gauge is also supplied with a non-ferrous (N) checkpiece

- Available in Metric or Imperial versions

### Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| A311FM | A311FE | Elcometer 311 Automotive Refinishing Gauge (Ferrous) |
| A311FNFM | A311FNFE | Elcometer 311 Automotive Refinishing Gauge (FNF) |
| Scale Range | | 0 - 500µm (0 - 20mils) |
| Resolution | | 10µm (0.5mil) |
| Accuracy | | ±5% or ±20µm (±5% or ±1.0mil) |
| Probe Type | | Integral with auto On/Off |
| Operating Temperature | | 0° to 50°C (32°F to 120°F) |
| Speed of Readings | | 30 per minute |
| Weight | | 115g (4.05oz) |
| Battery Type | | 2 x AAA batteries          Battery life: 20 hours |
| Dimensions | | 120 x 56 x 24mm (4.75 x 2.2 x 0.95") |
| Packing List | | Elcometer 311F or Elcometer 311FNF Automotive Refinishing Gauge, 2 x AAA batteries, steel checkpiece, aluminium checkpiece  (FNF model) with foil, carry case and operating instructions |

### Accessories

| | | | |
|---|---|---|---|
| T99916925 | Steel (F) Checkpiece | T99916901 | Aluminium (N) Checkpiece |
| T99016898 | Calibration Foil (Metric) 125µm | T99016897 | Calibration Foil (Imperial) 5mils |

## Elcometer 157

### Coating Thickness Gauge

This simple, pull-off gauge is a top-pocket, lightweight, foreman's type gauge for spot check indications of coating thicknesses.

- Insensitive to hot and cold coatings or surfaces - ideal for hot sprayed metal coatings for immediate results

- Easy to use and lightweight

- 3 scales on the instrument body: mils, microns and linear

- Pre-calibrated with no adjustment required

### Technical Specification

| Part Number | Description |
|---|---|
| A157----A | Elcometer 157 Coating Thickness Gauge |
| Ranges | Three scales printed on the body: 0 - 600µm, 0 - 25mils, linear (0 - 10 equally spaced divisions) |
| Accuracy | ±15% of the reading |
| Packing List | Elcometer 157, protective case, graph card and operating instructions |

## Elcometer 101

### Coating Thickness Gauge

The original non-destructive dry film thickness gauge, the Elcometer 101 was the world's first portable coating thickness gauge with the original being produced in 1947.

- Insensitive to hot and cold surfaces - ideal for hot sprayed metal coatings

- Incorporates reading hold feature

- Accuracy of ±10%

- Ideal for hazardous areas

**STANDARDS:**
AS 2331.1.3, ASTM B 499,
ASTM G 12, BS 5411-11, ISO 2178,
JIS K 5600-1-7, SSPC PA2

### Technical Specification C

| Part Number | Description | Scale Range | Certificate |
|---|---|---|---|
| A101A-01A | Elcometer 101 Mechanical Coating Thickness Gauge | 0 - 600µm (0 - 25mils) | ○ |
| Operating Plane | 90° to substrate | | |
| Minimum Measurement Area | 38 x 15mm (1.5 x 0.6") | | |
| Minimum Measurement Diameter | 25mm (1") (on bar material) | | |
| Accuracy | ±10% of the reading or 2.5µm (0.1mil) whichever is the greater | | |
| Packing List | Elcometer 101, calibration foils, carry case, wrist harness and operating instructions | | |

○ Optional Calibration Certificate available.

# Mechanical Coating Thickness Gauge

## Elcometer 211

The Elcometer 211, commonly referred to as the "Banana Gauge", is a Type I dry film thickness gauge which is not only ideal for use in environments where the use of electronic instruments is difficult, e.g. inflammable atmospheres in oil and gas production, but can also be used for underwater coating inspection.

This is one of the most popular mechanical gauges in the world.

• Factory calibrated - with user calibration adjustment

• Foils supplied to check calibration on site

• Ideal for cold surfaces and underwater use

• Small and portable with an accuracy ±5%

• The "V" grooved base, ideal for pipeline inspection

• Available in either Metric or Imperial versions, the Elcometer 211 measures coatings up to 6mm (250mils).

**STANDARDS:**
AS 2331.1.3, AS 3894.3-A, ASTM G 12, ASTM B 499, AS/NZS 1580.108.1, BS 5411-11, BS 3900-C5-6A, DIN 50981, ISO 2178, ISO 2808-6A, ISO 2808-7A, JIS K 5600-1-7, NF T 30-124, SSPC-PA2

## Technical Specification                                                      C

| Part Number | Description | Range | Certificate |
|---|---|---|---|
| A211F--1M | Elcometer 211 Coating Thickness Gauge | 0 - 1000µm | ○ |
| A211F--8M | Elcometer 211 Coating Thickness Gauge | 0.65 - 6mm | ○ |
| A211F--1E | Elcometer 211 Coating Thickness Gauge | 0 - 40mils | ○ |
| A211F--8E | Elcometer 211 Coating Thickness Gauge | 25 - 250mils | ○ |
| Accuracy | ±5% of the reading or ±2.5µm/0.1mil (whichever is the greater) | | |
| Substrate Thickness | 0.4mm (16mils) minimum | | |
| Measurement Area | 30mm (1.18") Diameter minimum | | |
| Measurement Diameter | 20mm (0.8") minimum | | |
| Edge Effects | Must be at least 6mm (0.24") from edge | | |
| Dimensions | 200 x 60 x 30mm (7.8 x 2.4 x 1.2") | | |
| Packing List | Elcometer 211, calibration foil set, carry pouch, wrist strap and operating instructions | | |

**For a full range of calibration standards and foils sets see page 8-24**

○ Optional Calibration Certificate available.

# Dry Film Thickness - Foils & Standards

## Elcometer 990



### Individual Precision Foils

Calibration foils or 'shims' are the most convenient way of creating a coating thickness standard on the substrate material, surface finish or form. This is the ideal method for adjusting the calibration of the coating thickness gauge to ensure the greatest possible accuracy.

### Technical Specification                                                    C

| Part Number | Colour | Dimensions | | Values* | | Certificate+ |
|---|---|---|---|---|---|---|
| T99022570-1A | Silver | 50 x 25mm | (1.97 x 0.98") | 12.5µm | (0.5mil) | ○ |
| T99022570-2A | Purple | 50 x 25mm | (1.97 x 0.98") | 25µm | (1.0mil) | ○ |
| T99022570-4A | Dark Blue | 50 x 25mm | (1.97 x 0.98") | 50µm | (2.0mils) | ○ |
| T99022570-6A | Green | 50 x 25mm | (1.97 x 0.98") | 75µm | (3.0mils) | ○ |
| T99022570-7A | Brown | 50 x 25mm | (1.97 x 0.98") | 125µm | (5.0mils) | ○ |
| T99022570-9A | Peacock Blue | 50 x 25mm | (1.97 x 0.98") | 175µm | (7.0mils) | ○ |
| T99022570-10A | White | 50 x 25mm | (1.97 x 0.98") | 250µm | (10mils) | ○ |
| T99022570-12A | Black | 50 x 25mm | (1.97 x 0.98") | 500µm | (20mils) | ○ |
| T99022570-14A | Grey-Blue | 50 x 25mm | (1.97 x 0.98") | 1000µm | (40mils) | ○ |
| T99022570-16A | Clear | 50 x 25mm | (1.97 x 0.98") | 1mm | (40mils) | ○ |
| T99022570-17A | Off White | 50 x 25mm | (1.97 x 0.98") | 1500µm | (60mils) | ○ |
| T99022570-18A | Clear | 50 x 25mm | (1.97 x 0.98") | 2mm | (80mils) | ○ |
| T99022570-20A | Clear | 50 x 25mm | (1.97 x 0.98") | 3mm | (120mils) | ○ |
| T99022570-21A | Clear | 50 x 25mm | (1.97 x 0.98") | 4mm | (160mils) | ○ |
| T99022570-23A | Clear | 50 x 25mm | (1.97 x 0.98") | 8mm | (310mils) | ○ |
| T45618978-2** | Grey | n/a | | 1500µm | (60mils) | ○ |
| T45618978-3** | Grey | n/a | | 5000µm | (197mils) | ○ |

### Using calibration foils



◄ Each foil has been independently measured at the centre point.

For the greatest accuracy, place the probe in the centre of the foil.

Up to 4 foils can be combined to create a wider range of thickness values. ►



Alternative 75 x 50mm foils upon request

*Actual foil values may vary, but are accurately labelled

**For use with the high temperature PINIP™ probes only due to the potential high temperature of the sample.

Foils supplied in a cap which fits over the PINIP™ probe.

+A Certificate can be supplied with any combination of up to 8 Foils

○ Optional Calibration Certificate available.

elcometer

## Calibration Foils Sets

**Elcometer 990**

The Elcometer 990 Calibration Foils are ideal for use in the laboratory, on the production line or on site. Calibration foils or 'shims' are the most convenient way of creating a coating thickness standard on the substrate material, surface finish or form. This is the ideal method for adjusting the calibration of the coating thickness gauge to ensure the greatest possible accuracy.

Features:

• Metric and Imperial values displayed on each foil

• Available individually or in foil sets - with or without Zero Plate

• Precision foils with ±1% accuracy

• Each foil has a unique serial number for traceability

• Available in thicknesses from 12.5μm to 20mm (0.5 to 790mils)

### Technical Specification  C

| Description | Foil Values (μm) | Foil Values (mils) | Un-Certified | Certified |
|---|---|---|---|---|
| Scale 1 Foil Set; 0-1500μm (0-60mils) | 25, 50, 125, 250, 500, 1000 | 1.0, 2.0, 5.0, 10, 20, 40 | T99022255-1 | T99022255-1C |
| Scale 2 Foil Set; 0-5mm (0-200mils) | 25, 50, 125, 250, 500, 1000, 2000, 3000 | 1.0, 2.0, 5.0, 10, 20, 40, 80, 120 | T99022255-2 | T99022255-2C |
| Scale 3 Foil Set; 0-13mm (0-500mils) | 250, 500, 1000, 2000, 4000, 8000 | 10, 20, 40, 80, 160, 315 | T99022255-3 | T99022255-3C |
| Scale 4 Foil Set; 0-250μm (0-10mils) | 12.5, 25, 50, 125, 250 | 0.5, 1.0, 2.0, 5.0, 10 | T99022255-4 | T99022255-4C |
| Scale 5 Foil Set; 0-500μm (0-20mils) | 12.5, 25, 50, 125, 250, 500 | 0.5, 1.0, 2.0, 5.0, 10, 20 | T99022255-5 | T99022255-5C |
| Scale 6 Foil Set; 0-30mm (0-1200mils) | 1000, 2000, 5000, 9500, 15mm, 25mm | 40, 80, 200, 375, 590, 980 | T99022255-6 | T99022255-6C |
| Scale M3 Foil Set; 0-500μm (0-20mils) | 12.5, 25, 50, 125, 250, 500 | 0.5, 1.0, 2.0, 5.0, 10, 20 | T99022255-7 | T99022255-7C |
| Scale 2B Foil Set[1]; 0-5mm (0-200mils) | 25, 50, 125, 250, 500, 1000, 2000, 2000 | 1.0, 2.0, 5.0, 10, 20, 40, 80, 80 | T99022255-8 | T99022255-8C |

[1]The Scale 2B foil sets are designed for soft coating probes and have a larger foil surface area

## Elcometer 995

### Coated Thickness Standards

The Elcometer 995 Coated Thickness Standards are hard wearing, durable and are mounted in a protective folder. They provide the user with an ideal method to accurately measure the performance of the coating thickness gauge.

Features:
- ±2% accuracy, supplied with Calibration Certificate as standard
- Available with either Ferrous (F) or Non-Ferrous (N) substrates
- Each standard is individually serial numbered for traceability
- Can be re-certified by Elcometer to meet ISO requirements
- Standards available in a range of thicknesses
- Special thicknesses can be supplied to meet specific needs
- Coated with a hard wearing film for extended life span

| Technical Specification | | | | C |
|---|---|---|---|---|
| Part Number | Description | Values (µm) | Values (mils) | Certificate |
| T995111262 | 4 Piece Thickness Standards - Ferrous | Zero, 40, 75, 125, 175 | Zero, 1.6, 3.0, 5.0, 7.0 | ● |
| T995111271 | 4 Piece Thickness Standards - Non Ferrous | Zero, 40, 75, 125, 175 | Zero, 1.6, 3.0, 5.0, 7.0 | ● |
| T995111263 | 4 Piece Thickness Standards - Ferrous | Zero, 50, 80, 125, 200 | Zero, 2.0, 3.0, 5.0, 8.0 | ● |
| T995111261 | 4 Piece Thickness Standards - Ferrous | Zero, 50, 150, 250, 500 | Zero, 2.0, 6.0, 10, 20 | ● |

## Elcometer 990

### Zero Test Plates

Elcometer provides a range of Zero Test Plates. When used in conjunction with a set of foils, Test Plates are ideal to test a coating thickness gauge's functionality and calibration, ideal for when it may be difficult or impractical to obtain an uncoated substrate.

For a list of standards, foils and foil sets, (see page 8-24).

| Technical Specification | | | | |
|---|---|---|---|---|
| Description | Size | Size | Ferrous | Non-Ferrous |
| Zero Test Plate ±1% | 50.8 x 25.4mm | 2.0 x 1.0" | T9994910- | T9994911- |
| Zero Test Plate ±2% | 76.2 x 50.8mm | 3.0 x 2.0" | T9999529- | T9999530- |
| Zero Test Plate - large ±2% | 76.2 x 101.6mm | 3.0 x 4.0" | T9994054- | T9994055- |
| Steel (F) Checkpiece* | 50.8 x 88.9mm | 2.0 x 3.5" | T99916925 | - |
| Aluminium (N) Checkpiece* | 50.8 x 88.9mm | 2.0 x 3.5" | - | T99916901 |

*To be used only with the Elcometer 311 or Elcometer 415

● Calibration Certificate supplied as standard.

# Standard & Top Paint Inspection Gauges (P.I.G.)

**Elcometer 121/4**

Available in two models, the Elcometer 121 Paint Inspection Gauge is designed to measure the thickness of single or multiple layers of coatings.

Both models are supplied with illuminated integrated graticule microscopes.

The Top model has an internal carousel allowing each of the three cutters to be selected easily together with a cross hatch adhesion tester.

- Compact and convenient, ideal for use in confined areas
- Made of anodised aluminium for durability
- Bright LED light source for clear vision
- Top Model can hold one cross hatch cutter & three standard cutters which are locked tight, a simple rotation of the cutter holder changes the cutting tool.

**STANDARDS:**
AS 1580.108.2, AS 1580.408.4*, AS 3894.9*, ASTM D 3359-B*, ASTM D 4138-A, BS 3900-C5-5B, BS 3900-E6*, DIN 50986, ECCA T6*, EN 13523-6*, ISO 2808-5B, ISO 16276-2*, ISO 2409*, ISO 2808-6B, JIS K 5600-1-7, NF T30-038*, NF T30-123

## Technical Specification    C

| | Description | | |
|---|---|---|---|
| | Elcometer 121/4 Standard P.I.G. | Elcometer 121/4 Top P.I.G. | Certificate |
| Part Number | A121---S | A121---T | ○ |
| Range | 2 - 2000µm (0.08 - 80mils) Accuracy is dependent on tool cut angle, half a division | | |
| Dimensions | 110 x 75 x 30mm (4.3 x 3 x 1.2"), 369g (13oz) | 110 x 75 x 40mm (4.3 x 3 x 1.6 ), 383g (13.5oz) | |
| Packing List | Elcometer 121/4, cutters 1, 4 and 6, x50 microscope, 4 x AG3 batteries for lamp (fitted), hexagonal wrench, black marker pen, wrist strap, carry case and operating instructions | | |

## Accessories    C

| Part Number | Description | Angle | Measurement Range | Graticule | Certificate |
|---|---|---|---|---|---|
| T99915761-1 | Tungsten Carbide Cutter No 1 | 45° | 20 - 2000µm (1 - 80mils) | 20µm (1mil) | ○ |
| T99915761-4 | Tungsten Carbide Cutter No 4 | 26.6° | 10 - 1000µm (0.5 - 35mils) | 10µm (0.5mil) | ○ |
| T99915761-6 | Tungsten Carbide Cutter No 6 | 5.7° | 2 - 200µm (0.1 - 8mils) | 2µm (0.1mil) | ○ |
| | | | Coating Thickness | Standard | |
| T99913700-1 | X-Hatch Cutter, 6 teeth x 1mm | | 0 - 60µm (0 - 2.4mils) | ISO | ○ |
| T99913700-2 | X-Hatch Cutter, 11 teeth x 1mm | | 0 - 50µm (0 - 2.0mils) | ASTM | ○ |
| T99913700-3 | X-Hatch Cutter, 11 teeth x 1.5mm | | 0 - 60µm (0 - 2.4mils) | - | ○ |
| T99913700-4 | X-Hatch Cutter, 6 teeth x 2mm | | 50 - 125µm (2.0 - 5.0mils) | ASTM | ○ |
| T99913700-4 | X-Hatch Cutter, 6 teeth x 2mm | | 0 - 60µm (0 - 2.4mils) | ISO | ○ |
| T99913700-4 | X-Hatch Cutter, 6 teeth x 2mm | | 61 - 120µm (2.4 - 4.7mils) | ISO | ○ |
| T99913700-5 | X-Hatch Cutter, 6 teeth x 3mm | | 121 - 250µm (4.8 - 9.8mils) | ISO | ○ |
| K0001539M001 | Adhesion Tape (1 roll) | | | ASTM | |
| T9998894- | Adhesion Tape (2 rolls) | | | ASTM | |
| K0001539M002 | Adhesion Tape (1 roll) | | | ISO | |
| T9999358- | Adhesion Tape (2 rolls) | | | ISO | |

* Standards apply to Top Model only

○ Optional Calibration Certificate available.

# Dry Film Thickness - Destructive

## Elcometer 141

## Paint Inspection Gauge

The Elcometer 141 Paint Inspection Gauge is a useful method to determine the thickness of both single & multiple layer coatings.

Ideal for use on metallic & non-metallic substrates such as wood, glass and plastics.

- Large easy grip handle - makes cutting thick or hard coatings easy
- Internal cutter storage compartment
- x50 magnification microscope

**STANDARDS:**
AS 1580.108.2, ASTM D 4138-A, BS 3900-C5-5B, DIN 50986, ISO 2808-5B, ISO 2808-6B, JIS K 5600-1-7, NF T 30-123

### Technical Specification — C

| Part Number | Description | Certificate |
|---|---|---|
| A141---D | Elcometer 141 Paint Inspection Gauge | ○ |
| Scale Range | 0 to 1.8mm (0 to 0.07") | |
| Scale Resolution | 0.02mm (0.001") | |
| Dimensions (fitted to handle) | 160 x 100 x 35mm (6.3 x 4 x 1.4") | |
| Weight (fitted to handle) | 510g (1lb 2oz) | |
| Packing List | Elcometer 141 P.I.G, x50 microscope, 3 cutters, marker pen, hexagonal wrench, carry case and operating instructions | |

### Accessories — C

| Part Number | Description | Cutting Angle | Measurement Range | Graticule Scale Factor | Certificate |
|---|---|---|---|---|---|
| T99915761-1 | Tungsten Carbide Cutter No 1 | 45° | 20 - 2000µm (1 - 80mils) | 20µm (1mil) | ○ |
| T99915761-4 | Tungsten Carbide Cutter No 4 | 26.6° | 10 - 1000µm (0.5 - 35mils) | 10µm (0.5mil) | ○ |
| T99915761-6 | Tungsten Carbide Cutter No 6 | 5.7° | 2 - 200µm (0.1 - 8mils) | 2µm (0.1mil) | ○ |

### Using the Paint Inspection Gauge

1. Take the coated product.

2. Using the supplied marker, draw a line across the coating.
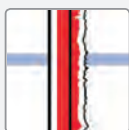
3. Using the P.I.G, make a cut at right angles to the marker line, all the way down to the substrate.
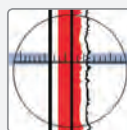
4. Use the supplied microscope to count the number of graticule divisions across the coating layer & calculate the thickness value using the graticule scale factor.

○ Optional Calibration Certificate available.

# Material Thickness

Ultrasonic thickness gauges are used to accurately determine the thickness of a variety of materials when only one side is accessible - ideal for monitoring corrosion and erosion.

Converting the time of flight of a pulse of sound energy, sent into and reflecting back from a defect or opposite surface, ultrasonic thickness gauges are ideal for measuring a material's thickness and detecting pits and flaws in a material without damage.

A coated surface may disguise defects in the substrate beneath; the wall thickness of a pipeline, for example, may have been eroded by the flow of the material inside.

Likewise the walls of a storage tank may appear acceptable on the outside but be dangerously thin inside due to the corrosive chemicals stored within.

From a steel thickness gauge to a gauge which ignores the thickness of the coating, Elcometer has a range of ultrasonic material thickness gauges to meet your specific requirements.

**Definitions:**

**Scan Mode:** Measuring up to 16 readings per second, the gauge captures the minimum recorded thickness

**Alarm Mode:** Once a minimum acceptable thickness has been set, a red LED illuminates and a buzzer sounds if a measurement falls below the preset value

**Differential Mode:** Set an acceptable thickness (nominal) value in the gauge and the unit will display the positive or negative (±) difference from the nominal value entered

**PE Mode**
**Pulse Echo (PE):** The standard method for measuring material thicknesses from 0.63mm to 500mm (0.025 to 20")

**IE Mode**
**Interface Echo (IE):** More accurate than the PE mode, IE displays the total thickness from the top surface to the material density boundary - i.e. ignores the couplant thickness.

**EE Mode**
**Echo-to-Echo (ThruPaint™) Mode (EE):** Measuring materials as thin as 0.15mm (0.006") the Echo-to-Echo mode ignores the thickness of any coating applied to the surface under inspection

**Plas Mode**
**PLAS Mode:** A mode specifically used for measuring very thin plastics. A special graphite delay line accessory is required for this mode

## Elcometer 207

### Precision Ultrasonic Thickness Gauge

The Elcometer 207 series of Precision Ultrasonic Thickness Gauges is designed to provide accurate measurements on thin materials. All Elcometer 207 and 207DL gauges have the special PLAS mode. This is specifically designed to provide accurate readings when measuring thin plastics.

Using the latest transducer designs, the Elcometer 207 gauges can accurately measure material thickness from 0.15 - 25.4mm (0.006-1") without the need to change the measurement mode.

**STANDARDS:**
ASTM E 797, EN 15317

| IE Mode | EE Mode | Plas Mode |
|---------|---------|-----------|

compatible with ElcoMaster™

### Technical Specification                                                                 C

| Part Number | C207----1 | C207DL----1 |
|---|---|---|
| Model | Elcometer 207 | Elcometer 207DL |
| PLAS Mode* | ■ | ■ |
| Scan & Differential Modes | ■ | ■ |
| Alarm Mode | ■ | ■ |
| Data Output (immediate) | ■ | ■ |
| Data Logging (memory) | | 1000 readings |
| ElcoMaster™ Software | | ■ |
| Certificate | ● | ● |
| Maximum Measurement Range | 0.15 - 25.4mm (0.006 - 1") | |
| Velocity Range | 1250 - 10000m/s (0.0492 - 0.3937 in/µs) | |
| Accuracy & Resolution | Accuracy[1]: ±0.02mm (0.0008"); Resolution: 0.002mm (0.0001") | |
| Units | Millimetres and Inches | |
| Operating Temperature | -30°C to 50°C (-20°F to 120°F) | |
| Transducer | Each unit is supplied with 15MHz, 6mm (¼") microdot right angle transducer | |
| Display | 114mm (4½) Digit Liquid Crystal Display with backlight | |
| Battery Type (Life) | 2 x AA 1.5V batteries (200 hours) | |
| Weight | 295g (10oz)          Dimensions          63 x 120 x 31mm (2.5 x 4.5 x1.24") | |
| Packing List | Elcometer 207 or 207DL gauge, ultrasonic couplant, 2 x batteries, carry case, microdot transducer, calibration certificate and operating instructions. Elcometer 207DL: CD with ElcoMaster™ software and data transfer cable | |

### Accessories

| | |
|---|---|
| T92016526 | Precision Ultrasonic Transducer: Frequency 15.MHz, Crystal Diameter: 6.35mm (0.25"), Wearface Diameter: 7.42mm (0.3125"), Measurement Range in Steel: 0.15 - 25.4mm (0.006 - 1.0") |
| T92016871 | Graphite Delay Line (for PLAS mode) |
| T92015701 | Ultrasonic Couplant, 120ml (4fl oz) Bottle |

\* To use the PLAS mode, a special Graphite delay line is required which must be ordered separately - see Accessories

● Calibration Certificate supplied as standard.

[1] Dependent on material and conditions

# Steel Thickness Gauge

## Elcometer 204

Pre-calibrated for ease of use, the Elcometer 204 Steel Ultrasonic Thickness Gauge provides a fast, accurate measurement of the thickness of steel.

Each gauge is supplied with an integrated steel "zero" plate to ensure the greatest accuracy. Supplied with a transducer & ultrasonic couplant, simply switch on the gauge and take readings. The inbuilt backlight allows measurements in low light conditions.

- Supplied with everything required for use
- Low cost and easy to use
- Measure material thickness when there is access to only one side

**STANDARDS:**
ASTM E 797, EN 15317

PE
Mode

## Technical Specification                                                                C

| Part Number | Description | Certificate |
|---|---|---|
| C204----1 | Elcometer 204 Steel Ultrasonic Thickness Gauge | ● |
| Maximum Measurement Range | 0.63mm to 199.99mm or 0.025" to 19.999" (switchable) | |
| Accuracy | ±2% of reading or ±0.5mm (0.02"), depending on material and conditions | |
| Resolution | 0.01mm (0.001") | |
| Weight | 295g (10oz) including batteries        Dimensions        63 x 120 x 31mm (2.5 x 4.5 x 1.24") | |
| Units | Millimetres and Inches | |
| Operating Temperature | -30°C to 50°C (-20°F to 120°F) depending on climatic conditions | |
| Case | Extruded aluminium body, nickle plated aluminium end caps | |
| Battery Life | 200 hours continuous use (alkaline dry batteries) | |
| Battery Type | 2 x AA batteries | |
| Packing List | Elcometer 204 Steel Ultrasonic Gauge, transducer, calibration certificate, ultrasonic couplant, 2 x batteries, carry case and operating instructions | |

## Accessories

| | |
|---|---|
| T92015646 | Transducer: Potted Right Angle 5.0MHz, 6.4mm (¼") Transducer |
| T92015701 | Ultrasonic Couplant - 120ml (4fl oz) Bottle |
| T92015617 | Instrument Carry Case |
| T9205243- | Test Wedge: 2 - 25mm (0.07 - 0.98") in 6 Steps |
| T9205270- | Test Wedge: 30 - 100mm (1.18 - 3.93") in 8 Steps |

● Calibration Certificate supplied as standard.

# Material Thickness

## Elcometer 205 & 206DL — Ultrasonic Thickness Gauge

The Elcometer 206 & 206DL are hand-held ultrasonic thickness gauges that allow you to make reliable measurements or scan a length of material for defects, or for the thinnest point.

Each gauge comes with 3 calibration options: single point, 2 point and speed of sound selection - allowing accurate measurements on a wide range of materials. Compatible with a wide range of measurement transducers, these ultrasonic thickness gauges are available with or without memory and all come with a backlight for measuring in darkened environments. Transducers are supplied separately, see pages 9-7.

**STANDARDS:** ASTM E 797, EN 15317

PE Mode

compatible with ElcoMaster™

### Technical Specification — C

| Model | Elcometer 205 | Elcometer 206DL |
|---|---|---|
| Part Number | C205----1 | C206DL----1 |
| Scan Mode | ■ | ■ |
| Differential Mode | | ■ |
| Alarm Mode | | ■ |
| Data Output (Immediate) | | ■ |
| Data Logging | | 1000 readings |
| ElcoMaster™ Software | | ■ |
| Certificate | ● | ● |
| Maximum Measurement Range | 0.63 - 500mm (0.025 - 20") dependent on transducer and material | |
| Velocity Range | 1250 - 10000m/s (0.0492 - 0.3930 in/µs) | |
| Accuracy & Resolution | Accuracy[1]: ±0.1mm (0.004"); Resolution: 0.01mm (0.001") | |
| Units | Millimetres and Inches | |
| Operating Temperature | -30°C to 50°C (-20°F to 120°F) | |
| Keypad Type | Sealed Membrane | |
| Display | 114mm (4½") Digit Liquid Crystal Display with backlight | |
| Transducer | Select from transducer options on page 9-7 | |
| Battery Type (Life) | 2 x AA batteries (200 hours) | |
| Weight | 295g (10oz)   Dimensions   63 x 120 x 31mm (2.5 x 4.75 x 1.25") | |
| Packing List | Elcometer 205 or 206DL gauge, bottle of couplant, 2 x batteries, carry case, calibration certificate and operating instructions. Elcometer 206DL: CD with ElcoMaster™ software and data transfer cable | |

### Accessories

| | |
|---|---|
| T92015701 | Ultrasonic Couplant 120ml (4fl oz) Bottle |
| T9205243- | Test Wedge: 2 - 25mm (0.07 - 0.98") in 6 Steps |
| T9205270- | Test Wedge: 30 - 100mm (1.18 - 3.93") in 8 Steps |

● Calibration Certificate supplied as standard.

[1] Dependent on material and conditions

# Ultrasonic ThruPaint™ Thickness Gauge

## Elcometer 208 & 208DL

Rugged & repeatable hand-held gauges designed to non destructively measure the thickness of metal substrates whilst ignoring the thickness of up to 2mm (80mils) of an applied coating (Echo to Echo mode).

Supplied with or without data logging, each gauge can be used with a wide range of measurement transducers and has a wide range of functions including Scan mode and Alarm mode. Transducers are supplied separately, see page 9-7.

**STANDARDS:**
ASTM E 797, EN 15317

compatible with
ElcoMaster™

| PE Mode | EE Mode |

### Technical Specification                                                                                                    C

| Part Number | C208----1 | C208DL----1 |
|---|---|---|
| Model | Elcometer 208 | Elcometer 208DL |
| Scan Mode | ■ | ■ |
| Alarm Mode | ■ | ■ |
| Data Output (immediate) | ■ | ■ |
| Data Logging (memory) | | 1000 readings |
| ElcoMaster™ Software | | ■ |
| Certificate | ● | ● |
| Maximum Measurement Range | 0.63 - 500mm (0.025 - 20"); 2.54 - 25.4mm (0.1 to 1.0") in Echo-to-Echo Mode | |
| Velocity Range | 1250 - 10000m/s (0.0492 - 0.3937 in/µs) | |
| Accuracy & Resolution | Accuracy[1]: ±0.1mm (0.004"); Resolution: 0.01mm (0.001") | |
| Units | Millimetres and Inches | |
| Operating Temperature | -20°C to 50°C (-4°F to 120°F) | |
| Keypad Type | Sealed Membrane | |
| Display | 114mm (4½") Digit Liquid Crystal Display with backlight | |
| Battery Type (Life) | 2 x AA batteries (200 hours) | |
| Weight | 295g (10oz)                    Dimensions    63 x 120 x 31mm (2.5 x 4.75 x 1.25") | |
| Packing List | Elcometer 208 or 208DL gauge, bottle of couplant, 2x batteries, carry case, calibration certificate and operating instructions.<br>Elcometer 208DL: CD with ElcoMaster™ software and data transfer cable | |

### Accessories

| | |
|---|---|
| T92016967 | 5MHz High Damped Transducer - Steel Applications |
| T92016968 | 7.5MHz High Damped Transducer - Aluminium, Stainless Steel & Titanium Applications |
| T92015701 | Ultrasonic Couplant, 120ml (4fl oz) Bottle |
| T9205243- | Test Wedge: 2 - 25mm (0.07 - 0.98") in 6 Steps |
| T9205270- | Test Wedge: 30 - 100mm (1.18 - 3.93") in 8 Steps |

● Calibration Certificate supplied as standard.

[1] Dependent on material and conditions
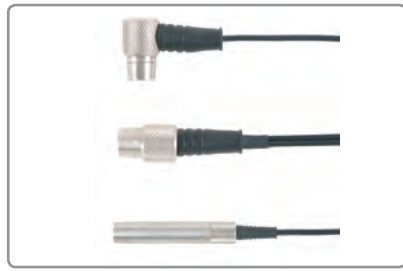
# Elcometer




Potted Transducers


Microdot Transducer


Dual Element

## Ultrasonic Transducer Options

Elcometer has a wide range of transducers available for use with the Elcometer 205, 206 & 208 range of Ultrasonic Thickness Gauges.

When selecting a transducer, it is important to choose one which will meet the application, taking the following into consideration:

• The type of material to be tested
• The design of the transducer probe
• The measurement range
• Whether the shape of the substrate is flat or curved or hard to reach
• A range of frequencies and sizes are available to meet specific needs
• Straight and right angle transducers available as potted or microdot

**Definitions:**

• **Microdot Transducer:**
  The cable can be unplugged from the transducer and easily replaced on site should it become damaged
• **Potted Transducer:**
  Unlike the microdot transducers, the cables are hard wired into the transducer head
• **Exxon Specification:**
  The gauge and transducer combination must hit specified standards without missing the first cycle
• **High Temperature Transducers:** temperature up to 340°C (650°F)

### Speed of Sound Through Materials

| Material | km/sec | in/msec | Material | km/sec | in/msec |
|---|---|---|---|---|---|
| Air | 0.33 | 0.013 | Neoprene | 1.60 | 0.063 |
| Aluminium (2024-T4) | 6.38 | 0.251 | Nickel | 5.64 | 0.222 |
| Beryllium | 12.88 | 0.507 | Nylon | 2.69 | 0.106 |
| Boron Carbide | 10.92 | 0.430 | Platinum | 3.69 | 0.156 |
| Brass | 4.39 | 0.173 | Plexiglass | 2.69 | 0.106 |
| Cadmium | 2.77 | 0.109 | Polystyrene | 2.34 | 0.092 |
| Copper | 4.65 | 0.183 | Polyurethane | 1.78 | 0.070 |
| Glass (Plate) | 5.77 | 0.227 | PVC | 2.39 | 0.094 |
| Glycerine | 1.93 | 0.076 | Quartz | 5.74 | 0.226 |
| Gold | 3.25 | 0.128 | Silver | 3.61 | 0.142 |
| Inconel | 5.82 | 0.229 | Steel (4340) | 5.84 | 0.230 |
| Iron | 5.89 | 0.232 | Steel (303 Stainless) | 5.66 | 0.223 |
| Iron, Cast | 4.55 | 0.179 | Teflon | 1.52 | 0.060 |
| Lead | 2.16 | 0.085 | Tin | 3.33 | 0.131 |
| Magnesium | 5.84 | 0.230 | Titanium | 6.10 | 0.240 |
| Mercury | 1.45 | 0.057 | Tungsten | 5.18 | 0.204 |
| Molybdenum | 6.25 | 0.246 | Uranium | 3.38 | 0.133 |
| Monel | 5.36 | 0.211 | Water | 1.47 | 0.058 |
| Motor Oil (SAE 30) | 1.75 | 0.069 | Zinc | 4.32 | 0.170 |

# Ultrasonic Transducer Options

Elcometer Ultrasonic Thickness Gauges can be calibrated by the user for the appropriate material in two ways:

- Set the calibration to the thickness of the known standard of the same material
- Set the frequency calibration to the appropriate value using the velocity chart on page 9-6.

## Technical Specification

| Part Number | Cast Iron | Plastic | Glass Fibre | Thin Glass | Steel | Glass | Thin Plastic | Aluminium | Potted | Straight Probe | Right Angle | Microdot | Extra Res | Exxon Spec | Measurement Range in steel | Frequency (MHz) (Colour Code) | Crystal Diameter | Wearface Diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T92015620 | ■ | ■ | ■ |  |  |  |  |  | ■ | ■ |  |  |  |  | 3.8 - 51mm 0.15 - 2" | 1.0 brown/ yellow | 12.7mm 0.50" | 15.9mm 0.625" |
| T92015621 | ■ | ■ | ■ |  |  |  |  |  | ■ |  | ■ |  |  |  | 3.8 - 51mm 0.15 - 2" | 1.0 brown/ yellow | 12.7mm 0.50" | 15.9mm 0.625" |
| T92015627 | ■ | ■ |  | ■ |  |  |  |  | ■ |  | ■ |  |  |  | 1.5 - 102mm 0.06 - 4" | 2.25 red | 6.4mm 0.25" | 9.5mm 0.375" |
| T92015634 | ■ | ■ |  | ■ |  |  |  |  | ■ |  | ■ |  |  |  | 1.5 - 127mm 0.06 - 5" | 2.25 red | 12.7mm 0.50" | 15.9mm 0.625" |
| T92015641 |  |  |  |  | ■ | ■ | ■ |  | ■ | ■ |  |  |  |  | 1.5 - 51mm 0.06 - 2" | 5.0 green | 4.8mm 0.19" | 6.4mm 0.250" |
| T92015642 |  |  |  |  | ■ | ■ | ■ |  | ■ |  | ■ |  |  |  | 1.5 - 51mm 0.06 - 2" | 5.0 green | 4.8mm 0.19" | 6.4mm 0.250" |
| T92015645 |  |  |  |  | ■ | ■ | ■ |  | ■ | ■ |  |  |  |  | 1.0 - 152mm 0.04 - 6" | 5.0 green | 6.4mm 0.25" | 9.5mm 0.375" |
| T92015646 |  |  |  |  | ■ | ■ | ■ |  | ■ |  | ■ |  |  |  | 1.0 - 152mm 0.04 - 6" | 5.0 green | 6.4mm 0.25" | 9.5mm 0.375" |
| T92015648 |  |  |  |  | ■ | ■ | ■ |  |  |  | ■ | ■ |  |  | 1.0 - 152mm 0.04 - 6" | 5.0 green | 6.4mm 0.25" | 9.5mm 0.375" |
| T92015657 |  |  |  |  | ■ | ■ | ■ |  | ■ | ■ |  |  |  |  | 1.3 - 508mm 0.05 - 20" | 5.0 green | 12.7mm 0.50" | 15.9mm 0.625" |
| T92015658 |  |  |  |  | ■ | ■ | ■ |  | ■ |  | ■ |  |  |  | 1.3 - 508mm 0.05 - 20" | 5.0 green | 12.7mm 0.50" | 15.9mm 0.625" |
| T92015663 |  |  |  |  | ■ | ■ | ■ | ■ | ■ | ■ |  |  |  | ■ | 1.0 - 152mm 0.04 - 6" | 7.5 grey | 6.40mm 0.25" | 9.5mm 0.375" |
| T92015664 |  |  |  |  | ■ | ■ | ■ | ■ | ■ | ■ | ■ |  |  | ■ | 1.0 - 152mm 0.04 - 6" | 7.5 grey | 6.40mm 0.25" | 9.5mm 0.375" |
| T92015667 |  |  |  |  | ■ | ■ | ■ | ■ | ■ | ■ |  |  | ■ |  | 0.6 - 152mm 0.025 - 6" | 7.5 blue | 6.40mm 0.25" | 9.5mm 0.375" |
| T92015668 |  |  |  |  | ■ | ■ | ■ | ■ | ■ |  | ■ |  | ■ |  | 0.6 - 152mm 0.025 - 6" | 7.5 blue | 6.40mm 0.25" | 9.5mm 0.375" |
| T92015670 |  |  |  |  | ■ | ■ | ■ |  |  |  |  | ■ | ■ |  | 0.6 - 152mm 0.025 - 6" | 7.5 blue | 6.40mm 0.25" | 9.5mm 0.375" |
| T92016526 | ■ |  |  | ■ | ■ | ■ | ■ |  |  |  | ■ |  |  |  | 0.15 - 25.4mm 0.006 - 1.0" | 15.0 green | 6.35mm 0.25" | 7.42mm 0.3125" |

**Additional transducers are available - for more information visit www.elcometer.com**

# ELCOMETER 280
## PULSED HOLIDAY DETECTOR

## Making pulsed DC holiday detection safer, easier and more reliable

Rugged, shockproof and water resistant, the Elcometer range of DC, Pulsed DC, and Low Voltage Holiday Detectors are designed to meet the most exacting specifications. Ergonomic features and interchangeable probes make Elcometer's range the most versatile in the industry.

### Pinhole Detection

The Elcometer 270 sets the standard for wet sponge detectors - high quality, low voltage detectors with a range of accessories to meet your requirements.

See page 11-2

### DC Holiday Detection

The Elcometer 266 High Voltage DC holiday detector's menu allows access to every major International Standard and automatically sets the required parameters.

See page 11-8

### Pulsed DC Holiday Detection

The new Elcometer 280 Pulsed DC holiday detector with three grounding options makes pipeline inspection faster and safer than ever before.

See page 11-4

### Adaptors & Accessories

Elcometer offers a wide range of versatile accessories designed to meet every application along with adaptors to work with your current brushes and probes.

See page 11-12

# Adhesion

From the largest man-made structures to the smallest household appliances, most manufactured products have a protective or cosmetic coating. Premature failure of this coating can, at the very least, result in additional costs of rework.

Adhesion testing after the coating process will quantify the strength of the bond between substrate and coating, or between different coating layers or the cohesive strength of some substrates. Routine testing is used as part of inspection and maintenance procedures to help detect potential coating failures.

**Adhesion Methods**

**Pull Off Adhesion:** simple to use, quantitative range giving a definitive adhesion value, ideal for the laboratory or field on flat or curved substrate applications. Tensile Dollies (or stubs) are glued to the coating and, when the adhesive has cured, the force required to pull the coating off the surface is measured.

**Push Off Adhesion:** a dolly is adhered to the coating. When the adhesive has cured, the dolly is pushed off the surface by the adhesion tester. The push-off design makes this method ideal for flat and curved surfaces.

**Cross Hatch / Cross Cut:** a fast, low cost, visual comparison method for paint and powder coatings up to a thickness of 250µm (10mils). The coating is cut into small squares, thereby reducing lateral bonding, and the adhesion assessed against ISO, ASTM or Corporate Standards.

When selecting an adhesion gauge, it is important to use the same inspection test methods throughout the inspection to ensure accurate comparisons.

## Elcometer 510      Automatic Pull-Off Adhesion Gauge

The Elcometer 510 Automatic Pull-Off Adhesion Gauge accurately measures the strength of the bond between the coating and the substrate.

compatible with
**ElcoMaster™**

available with
**Bluetooth®**
wireless technology

Suitable for use in Cloud Computing

new

Automatic hydraulic pump ensures smooth and continuous pressure application for consistent, repeatable results

Fully adjustable pull rates 0.1-1.4MPa/s (15-203psi) to meet National and International Standards

User definable measurement range with an accuracy of ±1% of full scale:
10mm dolly: 100MPa / 14400psi
14.2mm dolly: 50MPa / 7200psi
20mm dolly:  25MPa / 3600psi
50mm dolly: 4MPa /580psi

User definable limits with unique pressure hold and release function

**Android™**

Made for
**iPod** **iPhone** **iPad**

# Automatic Pull-Off Adhesion Gauge

## Elcometer 510

Hand-held, waterproof  rugged design equivalent to IP64

10, 14.2, 20 and 50mm diameter dolly options

Intuitive & easy to use menu structure in multiple languages

Store up to 60,000 readings with individual pull graphs in up to 2,500 alpha numerical batches, complete with attribute failure information

new

50mm

10mm

14.2mm

20mm

## Elcometer 510          Automatic Pull-Off Adhesion Gauge

## Key Features Explained

Automatic adhesion tester with selectable pull rates for 10, 14.2, 20 & 50mm diameter dollies.

View trend graphs or live statistics alongside the reading value.

Individual user definable pull rate graphs can be saved with each reading.

Stores individual readings and pull rate graphs in up to 2,500 alpha numeric batches, together with date, time and attribute information.

Either pull to maximum or pull to preset limit. Unique time hold feature allows users to set a delay before pressure returns to zero.
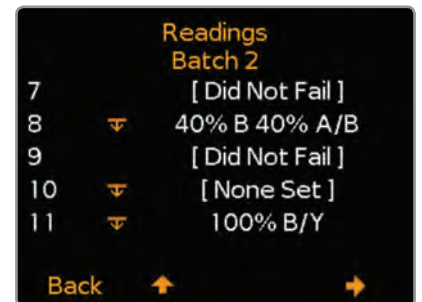
Save cohesive and adhesive failure attributes alongside your adhesion pull data in accordance with National and International Standards.

## Testing coatings on low bond strength substrates

When testing coatings on low bond strength substrates such as concrete, wood or other fibrous materials, a larger surface area of dolly (50mm) is required to provide accurate, repeatable and reproducible results.

The Elcometer 510 is available as a Concrete Adhesion Tester Kit, or 50mm accessory items (skirt, dolly, cutter) can be added to existing Elcometer 510 adhesion kits.

## Automatic Pull-Off Adhesion Gauge

<span style="color:orange">**Elcometer 510**</span>



Powered by either standard rechargeable batteries or AC mains*. Each battery charge performs up to 200 pulls. Battery recharge time <300 minutes.



Transfer data to your PC via USB or Bluetooth® for further analysis with ElcoMaster™ software or view live pull rate graphs in ElcoMaster™ during the test.



Using wireless Bluetooth® communication link the gauge to an Android™ or iPhone‡ mobile device. Live GPS coordinates from your mobile device can be added to reports and emailed instantly.



A range of interchangeable thin & standard substrate skirt adaptors allow each gauge to be used with 10, 14.2, 20 or 50mm diameter reusable dollies, ideal for testing coatings on thin, thick, flat or convex substrates.



The optional magnetic anchor clamp ensures the actuator doesn't fall during tests on vertical surfaces or testing at height.



Supplied in a robust plastic carry case for easy transportation to and around the job site.

### Adhesion Verification Unit for Verification in the Field



The Elcometer 510 gauge's inbuilt Adhesion Verification feature allows users to connect the gauge to the Elcometer AVU to verify gauge accuracy in the field.
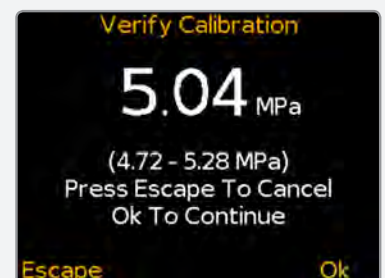


* Model T only.

‡ iPod, iPhone and iPad compatible

## Elcometer 510      Automatic Pull-Off Adhesion Gauge

## Assessing The Results - Failure Attributes

Many National and International Standards, including ISO 4624 & ASTM D4541, require the user to record not only the pull-off force but also the nature of the failure. This is done by examining the bottom of the dolly and assessing the failure. In 'Advanced' mode on the Elcometer 510 it is possible to select the 'Attributes' feature (Menu/Setup/Gauge Mode/Advanced) allowing the nature of the fracture to be recorded against each reading and stored within the batch.

**Examining The Dolly**

a) Cohesive Failure: The coating fails within the body of a coating layer leaving the same coating on the surface and on the dolly face.

b) Adhesive Failure: Failure occurs at the interface between layers (intercoat) where one pulls away from the other. The "coating" on the dolly face will not be the same as that on the test area.

c) Glue Failure: When no coating is present on the dolly it must be recorded as a failure of the glue. This may be due to incorrect or insufficient mixing of the component parts of the adhesive, incompatibility between the adhesive/coating/dolly/test surface.

Dolly Face     Substrate



a) 50% Cohesive failure

b) 100% Adhesive failure between two layers

c) Glue failure
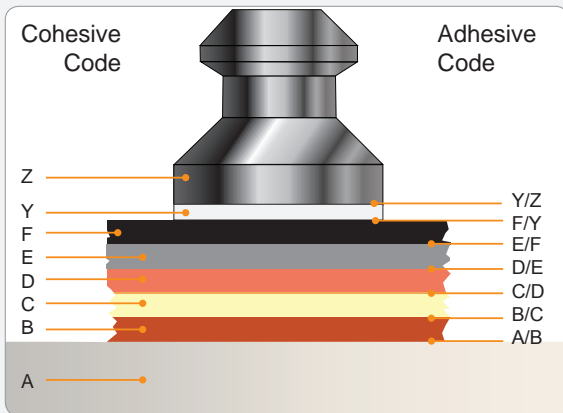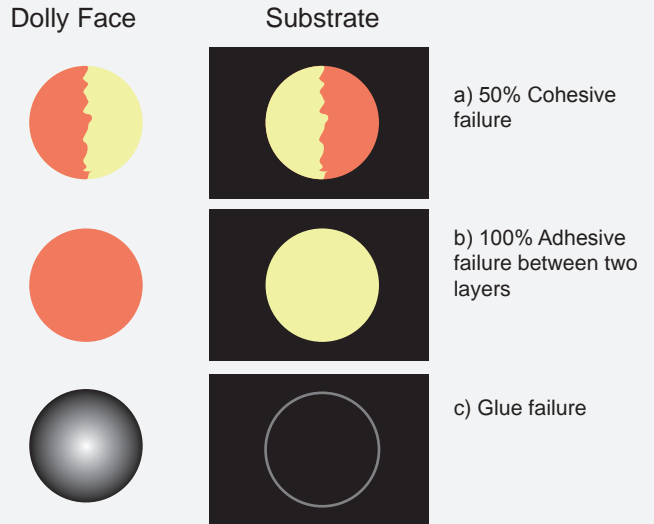


| Cohesive Failure Layer[d] | | Adhesive Failure Layers | |
|---|---|---|---|
| Code | Description | Code | Description |
| A | Substrate | A/B | Substrate & Layer 1 |
| B | Layer 1 | B/C | Layer 1 & Layer 2 |
| C | Layer 2 | C/D | Layer 2 & Layer 3 |
| D | Layer 3 | D/E | Layer 3 & Layer 4 |
| E | Layer 4 | E/F | Layer 4 & Layer 5 |
| F | Layer 5 | F/Y | Layer 5 & Glue |
| Y | Glue | Y/Z | Glue & Dolly |

The data is saved in the batch and can be viewed at any time displayed as

**##.## MPa**[e]    **N% A M% A/B**, where;

| | |
|---|---|
| ##.## MPa[e] | = Pull Force in MPa or other measurement units (psi, Newtons or Nmm$^{-2}$) |
| N% | = Cohesive failure percentage[f] |
| A | = Cohesive failure layer |
| M% | = Adhesion failure percentage[f] |
| A/B | = Intercoat adhesive failure layers |
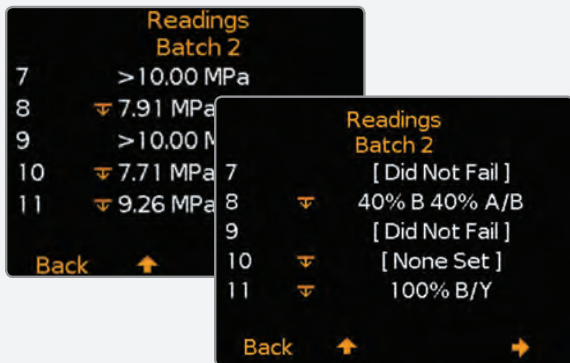


[d] The number of layers can be user defined for each batch via Batch/New Batch/Number of Layers. This will affect the number of layers available for selection during attribute recording. The maximum number of layers available is five, excluding the substrate and glue.

[e] Or equivalent units. [f] To the nearest 10%, in line with International Standards.

**Automatic Pull-Off Adhesion Gauge**　　　　　　**Elcometer 510**

# Create instant reports with ElcoMaster™

## What you do with the collected data is just as important as taking the readings themselves.

ElcoMaster™ is a fast, easy to use software solution for all your data management and quality assurance needs, preparing professional inspection reports at the click of a button.

Whether you are out in the field or on the factory floor, using the ElcoMaster™ Mobile App users can;

- Store live readings directly on to a mobile device and save them into batches.
- View the pull rate graph in real-time for the duration of the test.
- Add attribute data to each individual batch reading.
- Add photographs of the dolly and test surface to each individual batch reading at the click of a button.
- Plot individual readings on to a location map, photograph or diagram.
- Inspection data can be transferred from mobile to PC for further analysis and reporting.
- Generate instant .pdf report for submission.

Combine different inspection parameters (such as dry film thickness, surface profile, salt contamination, climate or adhesion) together with images, notes and other project specific information into customised reports.

Data transferred from the gauge to ElcoMaster™ includes;
- Adhesion Measurements
- Date & Time
- Cohesive/Adhesive Failure Attributes
- Dolly size
- Pull rate graph
- Pull to Limit/Max
- Limit values
- Limit Hold Time
- Cutting Device
- Number of Layers
- Skirt Type/Support Ring Dimensions
- Batch Information & Statistics
- Calibration Information
- Calibration Verification Date/Time

# Elcometer 510

## Automatic Pull-Off Adhesion Gauge

| Product Features | ■ Standard | □ Optional | C | Model S | Model T |
|---|---|---|---|---|---|
| Repeatable & reproducible measurements | | | | ■ | ■ |
| Easy to use menu structure; *in multiple languages* | | | | ■ | ■ |
| Tough, impact, waterproof & dust resistant; *equivalent to IP64* | | | | ■ | ■ |
| Bright LCD colour screen; *with ambient light sensor* | | | | ■ | ■ |
| Scratch & solvent resistant display; *2.4" (6cm) TFT* | | | | ■ | ■ |
| Calibration certificate | | | | ■ | ■ |
| 2 year gauge warranty[+] | | | | ■ | ■ |
| Automatic rotating display; *0°, 180°* | | | | ■ | ■ |
| Data output via USB (Live readings - and batch) | | | | ■ | ■ |
| Data output via Bluetooth® | | | | | ■ |
| PC command; *start & stop gauge from a PC with live readings (USB only)* | | | | | ■ |
| Switchable Units (MPa, psi, N, Nmm$^{-2}$) | | | | ■ | ■ |
| On-Screen Statistics ($\eta, \bar{x}, \sigma, hi, lo, COV, N>hi\ limit$[‡]) | | | | ■ | ■ |
| Pull Rate Indicator | | | | ■ | ■ |
| Trend Graph | | | | ■ | ■ |
| Pull Rate Graph *(Load v Time)* | | | | | ■ |
| Interchangeable Dolly Selection; *10, 14.2, 20 & 50mm* | | | | ■ | ■ |
| User Selectable Pull Rates; (Model S & Model T Standard Mode)<br>*10mm: 1.00, 2.00, 3.00, 4.00, 5.00 MPa/s    125, 200, 400, 600, 725psi/s*<br>*14.2mm: 0.4, 0.7, 1.4, 2.0, 2.5 MPa/s    60, 100, 200, 300, 360psi/s*<br>*20mm: 0.2, 0.3, 0.7, 1.0, 1.2 MPa/s    30, 50, 100, 150, 180psi/s*<br>*50mm: 0.04, 0.08, 0.12, 0.16, 0.20 MPa/s    5, 8, 16, 24, 30psi/s* | | | | ■ | ■ |
| User Selectable Pull Rates; (Model T Advanced Mode)<br>*10mm: 0.40 - 5.60 MPa/s    58 - 812psi/s    in 0.1MPa / 1psi steps*<br>*14.2mm: 0.20 - 2.80 MPa/s    29 - 403psi/s    in 0.1MPa / 1psi steps*<br>*20mm: 0.10 - 1.40 MPa/s    15 - 203psi/s    in 0.1MPa / 1psi steps*<br>*50mm: 0.02 - 0.22 MPa/s    2 - 32psi/s    in 0.01MPa / 0.1psi steps* | | | | | ■ |
| User Selectable Limit & Limit Hold Time | | | | | ■ |
| Gauge Memory; *maximum number of readings* | | | | 60 | 60,000* |
| Number of Batches *(Alpha Numeric - Model T)* | | | | 1 | 2,500 |
| Attribute Modes to meet National & International Standards | | | | | ■ |
| Display Modes | | | | | |
|    Readings, Selected Stats & Run Chart (last 20 readings) | | | | ■ | ■ |
|    Pull Rate Graphs | | | | | ■ |
|    Batch Review | | | | | ■ |
| Power; *Battery (B), AC Mains Power (M)* | | | | B | B, M |
| USB Cable & ElcoMaster™ CD | | | | ■ | ■ |
| Power Cable with Multi International Plug Adaptor *(UK, EU, US, AUS)* | | | | | ■ |
| Plastic Transit Case | | | | ■ | ■ |
| Date & Time | | | | | ■ |
| In Field Adhesion Calibration Verification Mode | | | | ■ | ■ |

[+]The Elcometer 510 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com

[‡] Model T only.

* When 'Rate Graph' is enabled, the number of readings which can be stored depends on the graph resolution selected

elcometer®

## Automatic Pull-Off Adhesion Gauge     Elcometer 510

| Technical Specification | | | | C |
|---|---|---|---|---|
| Part Number | Description | | | Certificate |
| F510-20S | Elcometer 510 Model S Automatic Adhesion Gauge; 20mm Kit | | | ● |
| F510-20T | Elcometer 510 Model T Automatic Adhesion Gauge; 20mm Kit | | | ● |
| F510-50S | Elcometer 510 Model S Automatic Adhesion Gauge; 50mm Concrete Kit | | | ● |
| F510-50T | Elcometer 510 Model T Automatic Adhesion Gauge; 50mm Concrete Kit | | | ● |
| Pressure Accuracy | ±1% of full scale | | Pull Rate Accuracy | ±(2.5% + 0.3 seconds) |
| Pressure Resolution | 0.01MPa (1 psi) | | Pull Rate Resolution | 0.01MPa/s (1psi/s) |
| Dolly Diameter | **10mm (0.39”)** | **14.2mm (0.56”)** | **20mm (0.76”)** | **50mm (1.96”)** |
| Operating Range | 8 to 100 MPa (1200 to 14400 psi) | 4 to 50 MPa (600 to 7200 psi) | 2 to 25 MPa (300 to 3600 psi) | 0.3 to 4 MPa (50 to 580 psi) |
| Pull Rate Range | 0.4 - 5.6MPa/s (58 - 812psi/s) | 0.2 - 2.8MPa/s (29 - 403psi/s) | 0.1 - 1.4MPa/s (15 - 203psi/s) | 0.02 - 0.22MPa/s (2 - 32psi/s) |
| Gauge Dimensions | 260 x 100 x 66mm (6.3 x 3.9 x 2.6”) | | | |
| Actuator Height[1] | 85mm (3.4”) | 85mm (3.4”) | 85mm (3.4”) | 110mm (4.3”) |
| Instrument Weight[1] | 2.9kg (6.4lb) | 2.9kg (6.4lb) | 2.9kg (6.4lb) | 3.1kg (8.3lb) |
| Kit Weight | - | - | 6.1kg (13.5lb) | 7.3kg (16.1lb) |
| Power Supply | 8 x AA batteries (16 rechargeable batteries supplied complete with charger) or AC mains power (Model T only) | | | |
| Battery Life | ~200 pulls per charge up to 25MPa (3600psi) at 1MPa/s (150psi/s), recharge time <5 hours | | | |
| Packing List: 20mm Kit | Elcometer 510 Adhesion Tester with 20mm dollies (x10), standard skirt for 20mm dollies, 20mm dolly cutter handle, 20mm dolly cutter, Araldite standard two part epoxy adhesive (2 x 15ml tubes), abrasive pad, shoulder harness, carry case, 16 x AA MiMH rechargeable batteries & charger (UK, EU, US, AUS), mains power supply (UK, EU, US, AUS) (Model T), ElcoMaster™ CD & USB cable, calibration certificate and operating instructions. | | | |
| Packing List: 50mm Kit | Elcometer 510 Adhesion Tester with 50mm dollies (x6), standard skirt for 50mm dollies, 50mm dolly cutter arbor, 50mm dolly cutter, Araldite standard two part epoxy adhesive (2 x 15ml tubes), abrasive pad, shoulder harness, carry case, 16 x AA MiMH rechargeable batteries & charger (UK, EU, US, AUS), mains power supply (UK, EU, US, AUS) (Model T), ElcoMaster™ CD & USB cable, calibration certificate and operating instructions. | | | |

| Accessories | | | | | | |
|---|---|---|---|---|---|---|
| Dolly Diameter | Pack of 10[†] | Pack of 100 | Standard Skirt | Thin Substrate Skirt | Cutter Handle/ Arbor | Dolly Cutter |
| 10mm (0.39”) | T5100010AL-10 | T5100010AL-100 | T9991420S | - | - | - |
| 14.2mm (0.56”) | T9990014AL-10 | T9990014AL-100 | T9991420S | T9990014T | T9991420H | T9990014CT |
| 20mm (0.76”) | T9990020AL-10 | T9990020AL-100 | T9991420S | T9990020T | T9991420H | T9990020CT |
| 50mm (1.96”) | T9990050AL-4 | - | T9990050S | - | T9990050H | T9990050CT |
| 50mm (1.96”) Stainless Steel | T9990050SS-4 | - | - | - | - | - |

| Part Number | Description |
|---|---|
| T99923797 | Magnetic Anchor Clamp - holds actuator securely during tests on vertical surfaces |
| T99912906 | Araldite Standard Two Part Epoxy Adhesive, 2 x 15ml Tubes |
| T99923147 | Dolly Cleaning Heating Tongs - EUR 220V / UK 240V |
| T99923103 | Dolly Cleaning Heating Tongs - US 110V (No Plug) |

● Calibration Certificate supplied as standard.

[1] Including Actuator with Standard Skirt fitted.
[†] 50mm (2”) dollies are supplied in packs of 4.

## Elcometer 510      Automatic Pull-Off Adhesion Gauge

### Pull-Off Adhesion Tests - Preventing Adhesive and Cohesive Failures

**Preparing the surface and dolly**

1. Select an appropriate test area which is flat and has sufficient area to attach the adhesion gauge.
2. Abrade the dolly and surface, clean both to remove any dust - minimising the risk of an 'adhesive' failure.

**Fixing the dolly**

3. Mix the adhesive correctly and apply a uniform adhesive film over the entire dolly face.
4. Test Standards require that the dolly is pulled off perpendicularly to the test surface. The dolly must therefore be adhered on to a prepared flat test surface (see images below). Apply an even pressure to the dolly to ensure that the dolly face is parallel to the test surface.
5. Remove any excess adhesive from around the dolly and allow to fully cure.  Tape maybe required when applying dollies to vertical surfaces during the cure process.
6. If required, once the dolly has fully cured, score the coating around the dolly using the dolly cutter provided.
7. Attach the gauge actuator to the dolly and begin test.



**Correct dolly position** ✓      **Incorrect dolly position** ✗

Dolly and Actuator

Coating

Substrate

Direction of pull     Direction of pull     Moment of fracture
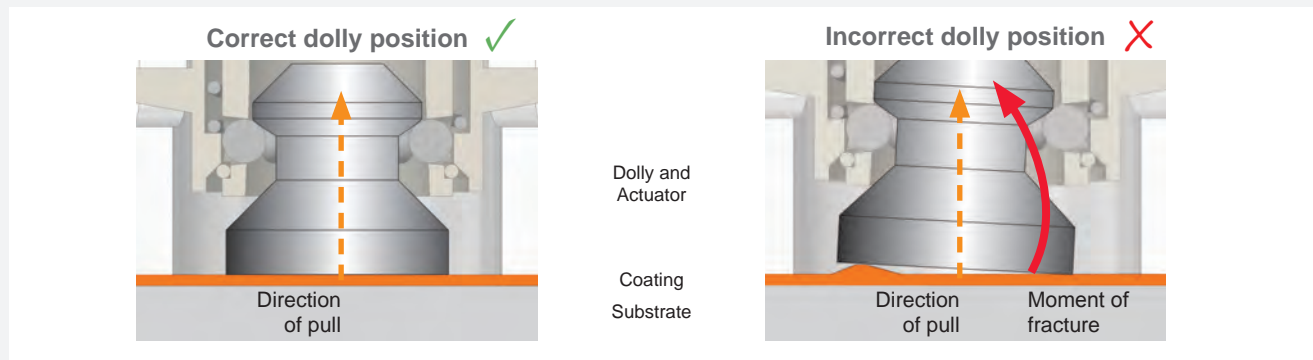
**Assessment of the Adhesion Test**

For a valid pull test the coating must cover at least 50% of the area of the dolly face. If the glue fails and no coating is present on the dolly, or it covers less than 50% of the dolly face area, the pull-test is invalid and should be repeated.

When the coating has failed within the layer leaving the same coating on both the dolly and the test panel it is known as a *'cohesive failure'*.

*'Adhesive failures'* occur when either the coating has failed at the interface with another coating (leaving a coating on the dolly and another coating on the substrate), or when the coating has failed at the substrate (leaving the coating on the dolly and the substrate is bare).

NOTE: If the glue fails at a value above the specification then it can be reported that the adhesion exceeded the specification for this individual test.

### Coating Adhesion Testing on Concrete
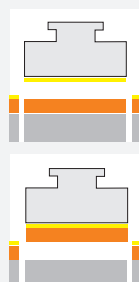


Adhesive Failure
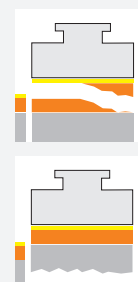
Partial Coating Failure

Coating Failure

Concrete Failure

# Adhesion Verification Unit (AVU)

## Elcometer AVU

The Elcometer AVU has been designed to provide users with the means to confirm the accuracy of their pull-off adhesion gauge.

Due to its robust design the Elcometer AVU is suitable for use on site or in the laboratory and allows users to verify or self-certify their pull-off adhesion gauges.

A range of dolly adaptors are available for testing the Elcometer 106, Elcometer 506 and Elcometer 510 adhesion gauges. Adaptors are also available for testing other manufacturers' gauges.

Attach the appropriate dolly adaptor to the AVU, connect your adhesion gauge, apply load and compare the adhesion tester value to the reading on the AVU Display.

Features include:
• Max hold and live reading display
• MPa / psi switchable units
• Backlit display
• Automatic switch off

The Elcometer AVU is supplied with either a test certificate or full calibration certificate, suitable for self-certification.

| Technical Specification | | C |
|---|---|---|
| Part Number | Description | Certificate |
| T99923924 | Elcometer AVU Adhesion Verification Unit | ● |
| T99923924C | Elcometer AVU Adhesion Verification Unit - Certified | ○ |
| Range | 0-30MPa (0-4000psi) | |
| Resolution | 0.01MPa (1psi) | |
| Accuracy | ±0.1MPa (±14.5psi) | |
| Battery Type | 2 x AA batteries | |
| Gauge Dimensions | 165 x 155 x 105mm (6.5 x 6.1 x 4.1") | |
| Gauge Weight | 3kg (6.6lbs) | |
| Packing List | Elcometer AVU, Elcometer 506/510 20mm (0.76") dolly adaptor, test or calibration certificate (as appropriate), 2 x AA batteries, carry case and operating instructions | |

| Accessories | |
|---|---|
| T99923935 | Elcometer 506 & 510 Dolly Adaptor; 20 & 14.2mm (0.76 & 0.56") Skirts |
| T99923936 | Elcometer 506 & 510 Dolly Adaptor; 50mm (2.0") Skirt |
| T99923937 | Elcometer 106 Dolly Adaptor; Scales 1 to 4 |
| T99923938 | Elcometer 106 Dolly Adaptor; Scale 6 |
| T99923939 | AT-M & AT-A Adhesion Gauge Dolly Adaptor |
| T99923986 | PAT Adhesion Gauge Dolly Adaptor |

● Test Certificate supplied as standard.

○ Calibration Certificate supplied as standard.

## Elcometer 506

## Pull-Off Adhesion Tester

The Elcometer 506 Pull-Off Adhesion Testers allow the user to accurately measure the strength of the bond between the coating and the substrate.



Digital and analogue gauges available for both harsh and hazardous environments

Hand-held, ergonomic and fully portable - ideal for on-site adhesion testing



Low height actuator allows access in restricted areas. Safety harness clip prevents accidental damage of surrounding areas during test on vertical surfaces

Quick connect coupling for 14.2, 20 and 50 mm diameter dollies



Actuator skirts for a range of substrate thicknesses and bond strengths, on flat or curved surfaces

elcometer®

**Pull-Off Adhesion Tester**

## Powerful

- Suitable for use on metal, wood, concrete and other substrates

- Rugged & lightweight - ideal for frequent testing

- Smooth load application up to 50 MPa (7250 psi)

Measurement range up to 50 MPa (7250 psi) with an accuracy of ±1% of full scale

## Flexible

- Easy to use hand-held design

- Ideal for laboratory and field use

- 14.2, 20 and 50 mm (0.56, 0.76 & 1.96") diameter reusable dollies

Rotating crank handle applies an even uniform load up to 50 MPa (7250 psi)

- Measures on small, curved and flat surfaces

## Accurate

- Measurement range up to 50 MPa (7250 psi) with an accuracy of ±1% of full scale

## Durable

- Sealed, heavy duty and impact resistant

- Dust and waterproof equivalent to IP65

- Suitable for use in harsh environments

## Elcometer 506 — Pull-Off Adhesion Tester

### Technical Specification C

| Part Number | Description | Certificate |
|---|---|---|
| F506-20A | Elcometer 506 Analogue Adhesion Tester Kit; 20mm | ● |
| F506-20AC | Elcometer 506 Analogue Adhesion Tester Kit; 20mm - Certified | ○ |
| F506-20D | Elcometer 506 Digital Adhesion Tester Kit; 20mm | ● |
| F506-20DC | Elcometer 506 Digital Adhesion Tester Kit; 20mm - Certified | ○ |
| F506-50D | Elcometer 506 Digital Adhesion Tester Kit; 50mm | ● |
| F506-50DC | Elcometer 506 Digital Adhesion Tester Kit; 50mm - Certified | ○ |
| Accuracy | ±1% of full scale | |
| Pressure Rating | 26 MPa (3800 psi) | |

| | 14.2mm (0.56") Dolly | 20mm (0.76") Dolly | 50mm (1.96") Dolly |
|---|---|---|---|
| Operating Range | 4 to 50 MPa (600 to 7200 psi) | 2 to 25 MPa (300 to 3600 psi) | 0.3 to 4 MPa (50 to 580 psi) |
| Scale Resolution | Analogue: 0.1 MPa (10 psi) Digital: 0.01 MPa (1 psi) | Analogue: 0.1 MPa (10 psi) Digital: 0.01 MPa (1 psi) | Analogue: 0.05 MPa (5 psi) Digital:0.01 MPa (1 psi) |
| Instrument Length | 290mm (11.5") | 290mm (11.5") | 290mm (11.5") |
| Actuator Height (skirt fitted) | 85mm (3.4") | 85mm (3.4") | 110mm (4.3") |
| Instrument Weight | 1.8kg (4lb) | 1.8kg (4lb) | 2.0kg (4.4lb) |
| Kit Weight | 4kg (8.8lb) | 4kg (8.8lb) | 5.2kg (11.5lb) |
| Battery Type | 2 x AA batteries (digital gauge only) | | Battery Life: 2000 hours |

Packing List:

**20mm Kit** — Elcometer 506 Adhesion Tester with 20mm dollies (x10), standard skirt for 20mm dollies, 20mm dolly cutter handle, 20mm dolly cutter, Araldite standard two part epoxy adhesive (2 x 15ml tubes), abrasive pad, carry case, 2 x LR6 (AA) batteries (Digital Gauge only), test certificate and operating instructions.

**50mm Kit** — Elcometer 506 Adhesion Tester with 50mm dollies (x6), standard skirt for 50mm dollies, 50mm dolly cutter arbor, 50mm dolly cutter, Araldite standard two part epoxy adhesive (2 x 15ml tubes), abrasive pad, carry case, 2 x LR6 (AA) batteries (Digital Gauge only), test certificate and operating instructions.

### Accessories

| Dolly Diameter | Pack of 10[†] | Pack of 100 | Standard Skirt | Thin Substrate Skirt | Dolly Cutter Handle | Dolly Cutter |
|---|---|---|---|---|---|---|
| 14.2mm (0.56") | T9990014AL-10 | T9990014AL-100 | T999101420S | T9990014T | T9991420H | T9990014CT |
| 20mm (0.76") | T9990020AL-10 | T9990020AL-100 | T999101420S | T9990020T | T9991420H | T9990020CT |
| 50mm (1.96") | T9990050AL-4 | - | T9990050S | - | T9990050H | T9990050CT |

| Part Number | Description |
|---|---|
| T99923797 | Magnetic Anchor Clamp - holds actuator securely during tests on vertical surfaces |
| T99912906 | Araldite Standard Two Part Epoxy Adhesive, 2 x 15ml Tubes |
| T99923924 | Elcometer AVU Adhesion Verification Unit - see page 10-11 for further information |
| T99923147 | Dolly Cleaning Heating Tongs - EUR 220V / UK 240V |
| T99923103 | Dolly Cleaning Heating Tongs - US 110V (No Plug) |

All gauges come with a 1 year warranty as standard, the Elcometer 506 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com

● Test Certificate supplied as standard.
○ Calibration Certificate supplied as standard.

[†] 50mm (2") dollies are supplied in packs of 4.
[#] When using the analogue gauge with 14.2mm (0.56") dollies, multiply the 20mm dolly scale reading by 2.

# Pull Off Adhesion Tester

This easy to operate and fully portable Type II adhesion gauge provides a numerical value for adhesion. Applications include paint or plasma spray on bridge decking, coatings on steel, aluminium, concrete etc.

- Supplied in a carry case - ideal for site tests
- Hand operated - no power supply necessary
- Includes a cutter for EN13144 and ISO 4624 tests

## Test Method

A test dolly is bonded to the coating using an adhesive. The Elcometer 106 houses a spring arrangement which applies a lift force to the dolly as the tension is increased.

When the coating is pulled off the surface, an indicator on the scale shows the numerical value of adhesion expressed in terms of the force per unit area required to remove the dolly.

Inspection of the dolly face is required to determine the failure mode.

**STANDARDS:**
AS 1580.408.5, ASTM D 4541, AS/NZS 1580.408.5, EN 13144, EN 24624, ISO 4624, ISO 16276-1, JIS K 5600-5-7, NF T30-062, NF T30-606

## Technical Specification                                                      C

| Part Number | Description | Range MPa (N/mm²) | kg/cm² | psi | Certificate |
|---|---|---|---|---|---|
| F106----5 | Elcometer 106 Adhesion Tester - Scale 5 | 0 - 0.2 | 0 - 2 | 0 - 30 | ○ |
| F106----1 | Elcometer 106 Adhesion Tester - Scale 1 | 0 - 3.5 | 0 - 35 | 0 - 500 | ○ |
| F106----2 | Elcometer 106 Adhesion Tester - Scale 2 | 0 - 7.0 | 0 - 70 | 0 - 1000 | ○ |
| F106----3 | Elcometer 106 Adhesion Tester - Scale 3 | 0 - 15 | 0 - 150 | 0 - 2000 | ○ |
| F106----4 | Elcometer 106 Adhesion Tester - Scale 4 | 0 - 22 | 0 - 220 | 0 - 3200 | ○ |
| Dimensions | Scales 1, 2, 5: 175 x 76mm (7 x 3")  Scales 3 and 4: 185 x 76mm (7.5 x 3") | | | | |
| Dolly Diameter | 20mm (0.76") | | Dolly Area | 314mm² (0.49 sq inch) | |
| Gross weight of Kit | Scale 1, 2 and 5: 2.1kg (4.7lb)   Scale 3: 3.4kg (7.5lb)   Scale 4: 3.6kg (8.0lb) | | | | |
| Packing List | Elcometer 106 Pull Off Adhesion Tester, pack of 20 dollies, Araldite adhesive, base support ring, magnetic dolly clamp, dolly cutter, carry case and operating instructions | | | | |

## Accessories

| | |
|---|---|
| T1062895-10 | Spare Dollies 20mm (0.76") Diameter (Pack of 10) |
| T1062895- | Spare Dollies 20mm (0.76") Diameter (Pack of 100) |
| T1062914- | Large Dollies 40mm (1.52") Diameter (Pack of 5) |
| T1062915- | Large Base Ring for 40mm (1.52") Dollies |
| T99923924 | Elcometer AVU Adhesion Verification Unit - see page 10-11 for further information |
| T99912906 | Araldite Epoxy Adhesive |
| T99914009 | 20mm (0.76") Dolly Cutter |

○ Optional Calibration Certificate available.

## Elcometer 106/6







**STANDARDS:**
ASTM D 7234, BS 1881-207,
DIN 1048-2, EN 1542, EN 12636

## Adhesion Tester for Coatings on Concrete

The Elcometer 106/6 Adhesion Tester has been specifically designed to measure coatings on concrete.

Operating in a similar way to the regular Elcometer 106 Adhesion Tester, the Elcometer 106/6 uses a 50mm (2") diameter dolly for testing coatings on concrete.

The Elcometer 106/6 is fully portable and supplied in a carry case - making it ideal for on site tests.

| Technical Specification | | C |
|---|---|---|
| Part Number | Description | Certificate |
| F106----6 | Elcometer 106 Coatings on Concrete Adhesion Tester - Scale 6 | o |
| Range | 0 - 3.5MPa (N/mm²) 0 - 500psi | |
| Dimensions | 105 x 210mm (4 x 8") | |
| Packing List | Elcometer 106/6 Coatings on Concrete Adhesion Tester, 5 x 50mm (2") dollies, support ring, Araldite adhesive, ratchet spanner, carry case and operating instructions | |

### Accessories

| | | | | |
|---|---|---|---|---|
| T10618570 | 50mm (2") Diameter Dollies (Pack of 5) | | T99912906 | Araldite Epoxy Adhesive |
| KT001910P122 | 50mm (2") Diameter Dolly Cutting Tool | | | |

### Coating Adhesion Testing on Concrete



Adhesive Failure

Partial Coating Failure

Coating Failure

Concrete Failure
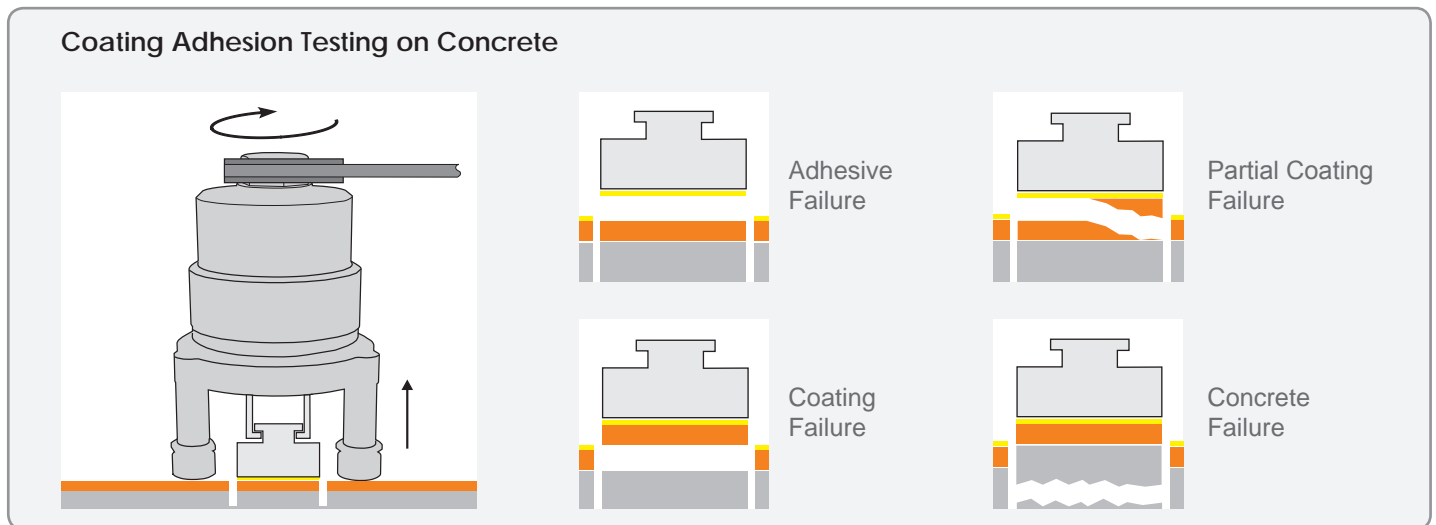
o Optional Calibration Certificate available.

# Hydraulic Adhesion Tester

# Elcometer 108

The Elcometer 108 Hydraulic Adhesion Tester is an extremely versatile Type III adhesion gauge which can be used for many adhesion requirements. Tests can be made on flat or curved (concave and convex) surfaces.

The Elcometer 108 is the ideal gauge for coatings on Tanks, Pipelines, etc.

- Hand-Powered and portable
- Ideal for site work
- Reusable stainless steel dollies

Elcometer Digital Adhesion Gauge features:

- Maximum hold - displays the highest value reached
- Backlit display for dark areas
- Rubber protective casing
- Switchable Metric/Imperial

The Elcometer 108 can be used with convex and concave dollies, making this the gauge for adhesion of coatings on all pipelines including those with small diameter, tanks and other curved surfaces. There is a wide range of curved dollies available, each designed for a specific range of curvature.

**STANDARDS:**
ASTM D 4541, ISO 16276-1, NF T30-606

## Technical Specification

| Part Number | | Description | Certificate |
|---|---|---|---|
| UK 240V/EUR 220V | US 110V | | |
| F108---1D | F108---1C | Elcometer 108/1 Hydraulic Adhesion Tester - Analogue Dial Gauge | o |
| F108---2D | F108---2C | Elcometer 108/2 Hydraulic Adhesion Tester - Digital Gauge | o |
| Operating Range | | Analogue: 0 - 18MPa (0 - 2600psi)<br>Digital: 0 - 25MPa (0 - 3600psi) | |
| Analogue Instrument Accuracy | | ±1MPa Metric Scale; 150psi (Imperial Scale) | |
| Digital Instrument Accuracy | | ±3% or 60psi (whichever is the greater) | |
| Dolly Size | Outside Diameter | 19.4mm (0.76") | |
| | Inside Diameter | 3.7mm (0.15") | |
| | Area | 284mm² (0.44sq.inch) | |
| Packing List | | Elcometer 108, ABS carry case, 5 flat dollies, 5 nylon plugs, MC1500 quick curing adhesive, dolly cleaning tool, heating tongs, 2 x LR6 (AA batteries) (Digital gauge only) and operating instructions | |

## Accessories

| | |
|---|---|
| T99911135 | Cyanoacrylate Adhesive |
| T1089646- | Standard Flat Dolly 19.4mm (0.76") |
| T99923147 | Dolly Cleaning Heating Tongs - EUR 220V / UK 240V |
| T99923103 | Dolly Cleaning Heating Tongs - US 110V (No Plug) |

Concave & Convex dollies are available upon request

o Calibration Certificate available.

## Elcometer 107



**STANDARDS:**
AS 3894.9, AS 1580.408.4, ASTM D 3359-B, BS 3900-E6, ECCA T6, EN 13523-6, ISO 2409, ISO 16276-2, JIS K 5600-5-6, NF T30-038

## Cross Hatch Cutter

The Elcometer 107 Cross Hatch Cutter provides an instant assessment of the quality of the bond to the substrate. Due to its rugged construction this gauge is ideal for thin, thick or tough coatings on all surfaces. An ideal field or laboratory test.

- Robust design
- Large, non slip grip
- Ideal for thin, thick or hard coatings
- A quick change, four sided cutter allows adhesion testing on a wide range of coating thicknesses (1mm, 1.5mm, 2mm and 3mm)

The Elcometer 107 Cross Hatch Cutter is available as a Basic or Full Kit.

### Technical Specification C

| Part Number | Description | Coating Thickness | | Certificate |
|---|---|---|---|---|
| F10713222-1 | Elcometer 107 Basic Kit (6 x 1mm) | 0 - 60µm | 0 - 2.0mils | ○ |
| F10713348-6 | Elcometer 107 Full Kit with ISO Tape (6 x 1mm) | 0 - 60µm | - | ○ |
| F10713348-1 | Elcometer 107 Full Kit with ASTM Tape (6 x 1mm) | 0 - 50µm | 0 - 2.0mils | ○ |
| F10713222-2 | Elcometer 107 Basic Kit (11 x 1mm) | 0 - 50µm | 0 - 2.0mils | ○ |
| F10713348-2 | Elcometer 107 Full Kit with ASTM Tape (11 x 1mm) | 0 - 50µm | 0 - 2.0mils | ○ |
| F10713222-3 | Elcometer 107 Basic Kit (11 x 1.5mm) | - | - | ○ |
| F10713222-4 | Elcometer 107 Basic Kit (6 x 2mm) | 0 - 125µm | 0 - 5.0mils | ○ |
| F10713348-9 | Elcometer 107 Full Kit with ISO Tape (6 x 2mm) | 0 - 120µm | - | ○ |
| F10713348-4 | Elcometer 107 Full Kit with ASTM Tape (6 x 2mm) | 50 - 125µm | 2.0 - 5.0mils | ○ |
| F10713222-5 | Elcometer 107 Basic Kit (6 x 3mm) | 121 - 250µm | - | ○ |

| Packing List | **Basic Kit:** Robust handle, cutter, hexagonal wrench, presentation storage case and instructions (together with Classification of Adhesion Test Results chart)<br>**Full Kit:** Robust handle, cutter, hexagonal wrench, instructions (together with Classification of Adhesion Test Results chart), eye glass, brush and adhesive tape (either ASTM or ISO tape), all in a plastic ABS carry case |
|---|---|

### Accessories C

| Part Number | Description | Methods | | | Certificate |
|---|---|---|---|---|---|
| | | ISO | ASTM | AS | |
| T99913700-1 | 6 x 1mm Four sided cutter blade | ● | | | ○ |
| T99913700-2 | 11 x 1mm Four sided cutter blade | | ● | | ○ |
| T99913700-3 | 11 x 1.5mm Four sided cutter blade | ● | | | ○ |
| T99913700-4 | 6 x 2mm Four sided cutter blade | ● | ● | | ○ |
| T99913700-5 | 6 x 3mm Four sided cutter blade | ● | | | ○ |
| K0001539M001 | Adhesive Tape (1 roll) ASTM D 3359 | | ● | | |
| K0001539M002 | Adhesive Tape (1 roll) ISO 2409 | ● | | | |
| T9998894- | Adhesive Tape (2 rolls) ASTM D 3359 | | ● | | |
| T9999358- | Adhesive Tape (2 rolls) ISO 2409 | ● | | | |

○ Optional Calibration Certificate available.

# Cross Hatch Adhesion Tester

## Elcometer 1542

The Elcometer 1542 Cross Hatch Adhesion Tester is a simple but effective method for determining the adhesion of coatings. The instrument is ideal for coatings on flat surfaces and is available with one of three different spacings;

• 1mm spacing - for coating thickness < 60µm (2.4mils)
• 2mm spacing - for coating thickness < 125µm (5.0mils)
• 3mm spacing - for coating thickness < 250µm (9.8mils)

Each gauge can be supplied separately or combined in a kit with a standardised brush and x10 magnifier.

• Efficient cross hatch cutter with 8 cutting faces
• Anodised aluminium handle with a wheel for stable operation, ideal for test panels
• Supplied with an adjustment tool for accurate positioning of the cutter face

**STANDARDS:**
AS 3894.9, AS 1580.408.4, ASTM D 3359-B, BS 3900-E6, ECCA T6, EN 13523-6, ISO 2409, ISO 16276-2, JIS K 5600-5-6, NF T30-038

## Technical Specification                                                 C

| Part Number | Description | Coating Thickness | | Certificate |
|---|---|---|---|---|
| K0001542M001 | Elcometer 1542 Cross Hatch Adhesion Tester (6 x 1mm)[1] | 0 - 60µm | 0 - 2.4mils | ○ |
| K0001542M002 | Elcometer 1542 Cross Hatch Adhesion Tester (6 x 2mm)[2] | 50 - 125µm | 2.0 - 5.0mils | ○ |
| K0001542M003 | Elcometer 1542 Cross Hatch Adhesion Tester (6 x 3mm)[3] | 121 - 250µm | 4.8 - 9.8mils | ○ |
| K0001542M201 | Elcometer 1542 Cross Hatch Adhesion Kit (6 x 1mm)[1] | 0 - 60µm | 0 - 2.4mils | ○ |
| K0001542M202 | Elcometer 1542 Cross Hatch Adhesion Kit (6 x 2mm)[2] | 50 - 125µm | 2.0 - 5.0mils | ○ |
| K0001542M203 | Elcometer 1542 Cross Hatch Adhesion Kit (6 x 3mm)[3] | 121 - 250µm | 4.8 - 9.8mils | ○ |
| K0001542M204 | Elcometer 1542 Cross Cut Kit including 3 Cross Hatch Cutters[2] | | | ○ |
| Weight | 200g (0.44lb) | | | |
| Dimensions | 150 x 25 x 35mm (6 x 1 x 1.25") | | | |
| Packing List | Cross Hatch Cutter, adjustment tool for setting cutting blades, hexagonal wrench, brush, magnifying glass, carry case and operating instructions | | | |

## Accessories                                                              C

| Part Number | Description | Methods | | | Certificate |
| | | ISO | ASTM | AS | |
|---|---|---|---|---|---|
| KT001542P001 | 6 x 1mm Cross Hatch Wheel | • | • | | ○ |
| KT001542P002 | 6 x 2mm Cross Hatch Wheel | • | • | • | ○ |
| KT001542P003 | 6 x 3mm Cross Hatch Wheel | • | | | ○ |
| K0001539M001 | Adhesive Tape (1 roll) ASTM D 3359 | | • | | |
| K0001539M002 | Adhesive Tape (1 roll) ISO 2409 | • | | | |
| T9998894- | Adhesive Tape (2 rolls) ASTM D 3359 | | • | | |
| T9999358- | Adhesive Tape (2 rolls) ISO 2409 | • | | | |
| T10713357 | Cross Cut DIN Brush | | | | |
| KT001546N002 | Magnifier (x10) | | | | |
| KT001542F006 | Cutter Angle Adjustment Tool | | | | |

[1] ASTM, ISO Test Methods        [2] AS, ASTM, ISO Test Methods        [3] ISO Test Methods

○ Optional Calibration Certificate available.

# Adhesion - Cross Hatch

## Elcometer 1540

### Cross Cut Tester

The Elcometer 1540 is a simple instrument for quickly determining the adhesion of a large variety of paints up to 50µm (2 mils) thickness.

Made from steel, it has 11 tapered teeth with 1mm spacing. Two sets of lines are cut at right angles to obtain a pattern of 100 squares.

Results are determined by the table below.

| Technical Specification | | C |
|---|---|---|
| Part Number | Description | Certificate |
| K0001540M001 | Elcometer 1540 Cross Cut Tester (11 x 1mm) | ○ |

### Classification of Cross Hatch Test Results

| Surface | Typical description of result | ISO | ASTM |
|---|---|---|---|
| | The edges of the cuts are completely smooth, none of the squares of the lattice is detached. | 0 | 5B |
| | Detachment of small flakes of the coating at the intersections of the cuts. A cross cut area not significantly greater than 5%, is affected. | 1 | 4B |
| | The coating has flaked along the edges and/or at the intersections of the cuts. A cross cut area significantly greater than 5%, but not significantly greater than 15%, is affected. | 2 | 3B |
| | The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. A cross cut area significantly greater than 15%, but not significantly greater than 35%, is affected. | 3 | 2B |
| | The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross cut area significantly greater than 35%, but not significantly greater than 65%, is affected. | 4 | 1B |
| | Any degree of flaking that cannot be classified even by classification 4 (1B). | 5 | 0B |

Images and descriptions based on information published in ISO2409 and ASTM D 3559-B

# Pinhole & Porosity

Premature corrosion of a substrate is usually due to a coating failure. A major cause is the **presence of flaws in the finished coating.**

Collectively referred to as porosity, the main types of flaws are:

**Runs & Sags:** Coatings move under gravity leaving a thin dry film.

**Cissing:** When a coating does not re-flow to cover the voids generated by air bubbles being released from the surface of a coating.

**Cratering:** If the substrate is wet or the coating has poor flow characteristics, voids are created in the coating.

**Pinholes:** Caused by air entrapment which is then released from the surface, or by the entrapment of particulates (dust, sand etc.) which do not stay in place.

**Over Coating:** If too much coating is applied, as it cures internal stresses of the coating can cause it to crack.

**Under Coating:** Uncoated areas, or where the coating flows away from edges or corners of a substrate or welds. Insufficient coating over a rough surface profile may also leave the peaks of the profile exposed.

There are essentially, three flaw detection methods in our range:

**Wet Sponge Technique:** A low voltage is applied to a moist sponge. When the sponge moves over a coating flaw, liquid penetrates to the substrate and completes an electrical circuit, setting off the alarm. The wet sponge technique is suitable for measuring insulating coatings less than 500µm (20mils) on conductive substrates, and is ideal for powder coatings and other coatings where the user does not wish to damage the coating.

**High Voltage Technique:** The high voltage, or porosity technique, can be used to test coatings up to 25mm (1") thick and is ideal for inspecting pipelines and other protective coatings. Coatings on concrete can also be tested using this method.

A power supply generates a high voltage DC or pulsed DC to a probe. As the probe passes over a flaw, a spark at the contact point sets off the alarm. This technique is suitable for locating the types of flaws described above, although care is required on thin coatings.

**UV Pinhole Detection:** UV light can be used as a low cost, quick method of detecting pinholes in coatings. A base coat containing a UV fluorescing additive is applied. When the UV flashlight shines on the coating, areas where the base coat is not covered fluoresce, identifying the location of the pinhole.

# Pinhole & Porosity

## Elcometer 270

### Pinhole Detector

The Elcometer 270 range utilises the wet sponge technique and sets the standard for wet sponge detectors - high quality, low voltage detectors with a wide range of accessories to meet your requirements.

User selectable voltages:
9V, 67.5V or 90V

Automatic internal voltage check ensures that the selected voltage can be achieved

Easy release, snag proof cables - available in 4m (13'2") & 10m (32'10") lengths

Visual and audible alarms indicate a pinhole

A wide range of wand accessories available

Each unit can be converted into a separate wand with a base unit using the separate wand adaptor

elcometer

# Pinhole Detector

**Elcometer 270**

## Accessories

**Standard wand**
A universal flat sponge to suit almost all applications

T27016867

**Spare flat sponge set
Pack of 3 sponges;**
150 x 60 x 25mm (6 x 2.3 x 1")

T27018050

**Roller sponge wand**
Ideal for large flat surface inspection

T27016960

**Spare roller sponge**

T27018051

**Telescopic wand adaptor**
with belt clip - extends to 1m(39"), ideal for floors or high areas

T27016998

**Separate wand adaptor**
with belt clip - converts the gauge into a separate pinhole detector

T27016999
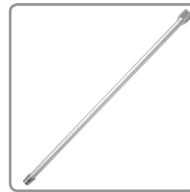
**Extension piece**
420mm (16.5") extensions to expand operators reach. Additional extension pieces can be connected to each other

T27016965

**Pinhole Inspector's Kit**
The complete pinhole detection kit. Each kit is supplied with:
1 x separate wand handle & lead
1 x roller wand
1 x 10m (32') signal return cable
2 x extension pieces
1 x telescopic extension
1 x belt clip
1 x bottle of wetting agent
3 x AA batteries
1 x spare flat sponge
1 x spare roller sponge
The kit does not include the main instrument; just add the model number to the order

T27018191

**Return cable - 4m (13')**
supplied as standard, complete with crocodile clip and connection plug

T99916954

**Return cable - 10m (32')**
supplied on a drum, complete with clip and connection plug

T99916996

**Wetting agent**
50ml (1.7floz) bottle - helps aid the fast detection of pinholes. Just add to the water used to dampen the sponge

T27018024

## Technical Specification

C

| Model | Elcometer 270/3 | Elcometer 270/4 | Certificate |
|---|---|---|---|
| Part Number | D270----3 | D270----4 | |
| Part Number with Certificate | D270----3C | D270----4C | ● |
| Voltage | 9V and 90V | 9V, 67.5V and 90V | |
| Coating Range (Max) | 500µm (20mils) | 500µm (20mils) | |
| Sensitivity | 9V: 90kΩ ±5%<br>90V: 400kΩ ±5% | 9V: 90kΩ ±5%<br>67.5V: 125kΩ ±5%<br>90V: 400kΩ ±5% | |
| Battery Life (continuous use) | 9V: up to 200 hours<br>90V: up to 80 hours | 9V: up to 200 hours<br>67.5V: up to 100 hours<br>90V: up to 80 hours | |
| Battery Type | 3 x AA batteries<br>(rechargeable batteries can also be used, battery life will be reduced by up to 75%) | | |
| Accuracy of Setting | ±5% | | |
| Dimensions | Without wand  210 x 42 x 37mm (8.3 x 1.7 x 1.5") | | |
| | Standard wand  175mm (6.9") long (including sponge) | | |
| Weight | 610g (21oz) including wand, cable and batteries | | |
| Packing List | Pinhole Detector, standard wand and flat sponge, 4m (13' 2") return lead with crocodile clip, 3 x AA (LR1600) batteries and operating instructions | | |

● Calibration Certificate supplied as standard.

## Elcometer 280

## Pulsed DC Holiday Detector

The Elcometer 280 is a 'stick type' holiday detector which has been designed to make pulsed DC high voltage holiday detection safer, easier and more reliable than ever before.

Using state of the art electronics, the Elcometer 280 allows users to inspect coatings - without connecting the earth return lead to the component substrate, ideal for inspecting large surfaces and pipelines.

Flashing display, bright LED and a user adjustable volume alarm indicates detection of a holiday

0.5 - 35kV range (user selectable) for detecting porosity in coatings up to 25mm (1") thick

Safety trigger integrated inside the handle cuts power if released

Rugged, shock proof and water resistant design to ensure long life, even in harsh environments

Balanced, ergonomic design, complete with shoulder strap allows long periods of continuous use

# Pulsed DC Holiday Detector

**Elcometer 280**

A wide range of interchangeable probe accessories available - compatible with all Elcometer holiday detectors

Ideal for testing clean, damp, dirty or slightly conductive coatings

Voltage calculator automatically sets the correct voltage from your coating thickness value

Internal jeep tester ensures that the selected voltage equals the test voltage

The Elcometer 280 uses the high voltage pulsed DC technique to detect holidays in coatings - even if the coating is damp, dirty or slightly conductive.

From the two stage safety switch, bright LED's and screen icons signifying when the high voltage is on, to the extended ribbing to protect the user from spark creep, the Elcometer 280 sets the standard for high voltage measurement safety.

Using the wide range of probe accessories users can detect porosity/holidays in coatings up to 25mm (1") thick.

Rugged, shockproof and water resistant, each unit is designed for use even in the harshest of environments.

# Pinhole & Porosity

## Elcometer 280

## Key Features

Red LED indicates high voltage ON

Earth signal return lead disconnected icon

Porosity Detector overload icon
indicates that the unit cannot obtain selected voltage with current accessory / coating combination

Calculation softkey
select the relevant standard and coating thickness value

Voltage adjustment softkey
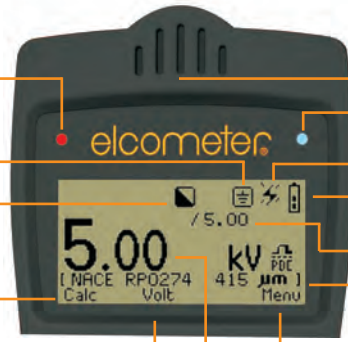
Waterproof buzzer

Blue LED flashes as holidays are detected

Holiday detected icon

Battery symbol indicating remaining charge

Voltage selected

Porosity standard in use
used in conjunction with setting the coating thickness within the Voltage Calculator

Menu softkey

Voltage level achieved at probe

Specialised extended ribbing
designed to standard EN61010, ribs provide additional protection to the user during use

Integrated safety trigger switch
switches off the high voltage if released

Quick release battery pack
fully charged in 4 hours, provides up to 30+ hours of continuous use*

Earth return lead socket
including ¼ turn lock/release to ensure connection during testing

Rubberised second hand grip
provides greater control and balance during testing

Large, waterproof buttons
ideal for use - even in gloves

Shoulder harness point
strap can be quickly clipped on as required

Clear, backlit LCD display
shows all relevant information, even in dark environments

High Voltage ON/OFF
separate button minimises risk of accidental switch on

* the battery life is dependant on selected voltage and load applied - see Technical Specification for more information

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# Pulsed DC Holiday Detector                    Elcometer 280

## Technical Specification                                          C

| Description | Model S | Model T | Certifcate |
|---|---|---|---|
| Elcometer 280 Pulsed DC Holiday Detector Inspection Kit | D280-S-KIT | D280-T-KIT | ○ |
| Elcometer 280 Pulsed DC Holiday Detector | D280-S---- | D280-T---- | ○ |
| Rugged, Shockproof & Water Resistant | ▪ | ▪ | |
| Integrated Safety Trigger Switch | ▪ | ▪ | |
| Quick Release Battery Pack | ▪ | ▪ | |
| Internal Jeep Tester | ▪ | ▪ | |
| Integrated Voltage Calculator | | ▪ | |
| Pulsed DC High Voltage Range | 0.5kV - 35kV | | |
| Voltage Adjustment | User adjustable: 0.5 - 1kV: 10 Volt steps, 1 - 35kV: 100V steps | | |
| High Voltage Output Accuracy | ±5% or ±50V below 1000 Volts | | |
| Pulse Repetition Rate | ~30Hz | | |
| Operating Temperature | 0°C to 50°C (32°F to 120°F) | | |
| Power Supply | Rechargeable battery Pack; Battery fully charged within 4 hours | | |
| Typical Battery Life | Battery life is dependant upon selected voltage and load applied;<br>12" (DN305) Rolling Spring: 30 hours at 10kV; 12 hours at 35kV<br>40" (DN1016) Rolling Spring: 22 hours at 10kV;   8 hours at 35kV | | |
| Instrument Case Dimensions | PC ABS case; (l x w x h): 603 x 219 x 193mm (23.7 x 8.6 x 7.6") | | |
| Weight (no probes attached) | 3.0kg (6.6lb)  - including battery pack | | |
| Packing List | **Elcometer 280 Pulsed DC Holiday Detector**<br>Gauge ( Model S or T), 5m (16') trailing signal return lead, battery pack, battery charger with mains cables (UK, EUR and US), shoulder strap and operating instructions<br>**Elcometer 280 Pulsed DC Holiday Detector Inspection Kit**<br>Gauge (Model S or T), 5m (16') trailing signal return lead, battery pack (2 supplied with Model T), battery charger with mains cables (UK, EUR & US), stainless steel rolling spring holder (supplied with Model T only), 250mm (9.8") probe extension shaft, shoulder strap and operating instructions - packed in a light weight, rugged, wheeled transit case - ideal for transportation | | |

## Accessories

| | |
|---|---|
| Light weight, rugged, wheeled transit case - ideal for gauge transportation, with additional space to house up to 20m (66') of phosphor bronze or 6m (30') of stainless steel rolling spring | T28022769 |
| Grounding mats are ideal for testing on ungrounded pipes. The conductive rubber mat is wrapped around the coated pipe and connected to both the grounding pin (supplied separately) and the signal return lead. | |
| 750mm (29.5") long - for pipe diameters up to 9" (NPS)/ 229mm (DN) | T28022637-1 |
| 1500mm (59") long - for pipe diameters up to 18" (NPS)/ 457mm (DN) | T28022637-2 |
| 2500mm (98.5") long - for pipe diameters up to 30" (NPS)/ 762mm (DN) | T28022637-3 |
| 3500mm (137.5") long - for pipe diameters up to 42" (NPS)/ 1067mm (DN) | T28022637-4 |
| Grounding pin; 60cm (23.5") long x 0.2cm (0.75") diameter | T28022748 |
| Trailing signal return lead, 5m (16') | T28022622 |
| 10m (32') earth lead, clips each end (for use with the grounding mat) | T28022749 |
| 10m (32') earth lead, clip / Elcometer 280 connector (for use with the grounding mat) | T28022750 |

**For a full range of rolling springs, rubber or wire brush probes and other accessories see page 11-12**



○ Optional Calibration Certificate available.

## Elcometer 266

### Holiday Detector

The Elcometer 266 revolutionises High Voltage DC testing of coatings porosity detection making it safer, easier and more reliable than ever before.

**STANDARDS:**
ANSI/AWWA C213, AS 3894.1, ASTM C 536, ASTM C 537, ASTM D 4787, ASTM D 5162-B, ASTM G 62-B, BS1344-11, DIN 55670, EN 14430, ISO 2746, ISO 29601, JIS K 6766, NACE RP0274, NACE RP0188, NACE RP0190, NACE RP0490, NACE SP0188, NACE SP0490

Voltage calculator automatically sets the correct voltage from your coating thickness value

A wide range of probe brushes and rolling springs available

Adjustable Voltage:
0.5kV - 1kV in 50V steps
1kV to 30kV in 100V steps

To change maximum voltage range, select a different handle; 5kV, 15kV or 30kV DC

Visual and audible alarms, Bright LEDs on the handle, as well as a loud buzzer, clearly indicate when a holiday is detected

Internal Voltmeter/Jeep tester ensures that the test voltage equals the selected voltage

Dual safety switch on handle to avoid accidental switch on

# Key Features

### Interchangeable DC probe handles

| Part Number | Description |
|---|---|
| T26620033-1 | DC5 (0 - 5kV) |
| T26620033-2 | DC15 (0 - 15kV) |
| T26620033-3 | DC30 (0 - 30kV) |
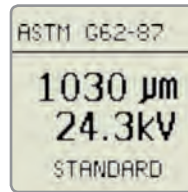
### Integrated voltage calculator
Enter the test standard & the coating thickness then the gauge will automatically programme the correct voltage

### Testing has never been safer
Ribbing provides additional user protection - specifically designed to meet EN 61010

### Second hand grip is available
Ideal for testing pipes and tank floors with 2 hands - without compromising safety

| Part Number | Description |
|---|---|
| T26620081 | Second Hand Grip |

### Removeable, quick charge batteries
Fully charge the battery pack in 4 hours, within the gauge or separately, for up to 40 hours of continuous testing

| Part Number | Description |
|---|---|
| T99923482 | Rechargeable lithium ion battery pack |

### Universal probe adaptors
Enables the Elcometer 266 to work with all major holiday detector's accessories. For the complete range of adaptors see page 11-12

## Technical Specification   C

| Description | Part Number* | Certificate |
|---|---|---|
| Elcometer 266* | D266----4 | ○ |
| High Voltage Output Accuracy | ±5% or ±50V below 1000 Volts | |
| Operating Temperature | 0°C to 50°C (32°F to 120°F) | |
| Power Supply | Rechargeable battery Pack; battery fully charged within 4 hours | |
| Measured Current Flow Accuracy | ±5% of full scale ;     0 - 100µA maximum Output Current | |
| Typical Battery Life - Backlight Off (On) | DC5: 40 (20) hours     DC15: 20 (15) hours     DC30: 10 (8) hours | |
| Instrument Case Dimensions | Waterproof, ABS case;     520 x 370 x 125mm (20.5 x 14.5 x 5") | |
| Weight | Base unit (including battery pack): 1.2kg (2.7lb)   Handle: 0.6kg (1.3lb) | |
| Packing List | Elcometer 266 DC Holiday Detector, battery pack, curly connection cable for high voltage handle, 10m (32') signal return lead, battery charger with 3 mains cables (UK, EUR and US), band brush, shoulder strap, tough plastic carry case and operating instructions | |

## Probe Handles   C

| | DC5 (0 - 5kV) | DC15 (0 - 15kV) | DC30 (0 - 30kV) | Certificate |
|---|---|---|---|---|
| Elcometer 266 Probe Handle (Voltage)* | T26620033-1 | T26620033-2 | T26620033-3 | ○ |
| Elcometer 266 Probe Handle Certified* | T26620033-1C | T26620033-2C | T26620033-3C | |
| Second Hand Grip | T26620081 | | | |

**For a full range of rolling springs, rubber or wire brush probes and other accessories see page 11-12**

*The Elcometer 266 does not include the probe handle; please select the required handle from the list above

○ Optional Calibration Certificate available.

## Elcometer 236

## Holiday Detector

The Elcometer 236 Holiday Detector provides high voltage porosity testing to detect pits, flaws, holes, etc. in a wide variety of non-metallic coatings.

**STANDARDS:**
ANSI/AWWA C213, AS 3894.1, ASTM C 536, ASTM C 537, ASTM D 4787, ASTM D 5162-B, ASTM G 62-B, BS1344-11, DIN 55670, EN 14430, ISO 2746, ISO 29601, JIS K 6766, NACE RP0274,  NACE RP0188, NACE RP0190, NACE RP0490, NACE SP0188, NACE SP0490

Standard and telescopic handles available for hard to reach areas

Available in 2 versions; 15 and 30kV; fully adjustable in 100 Volt steps
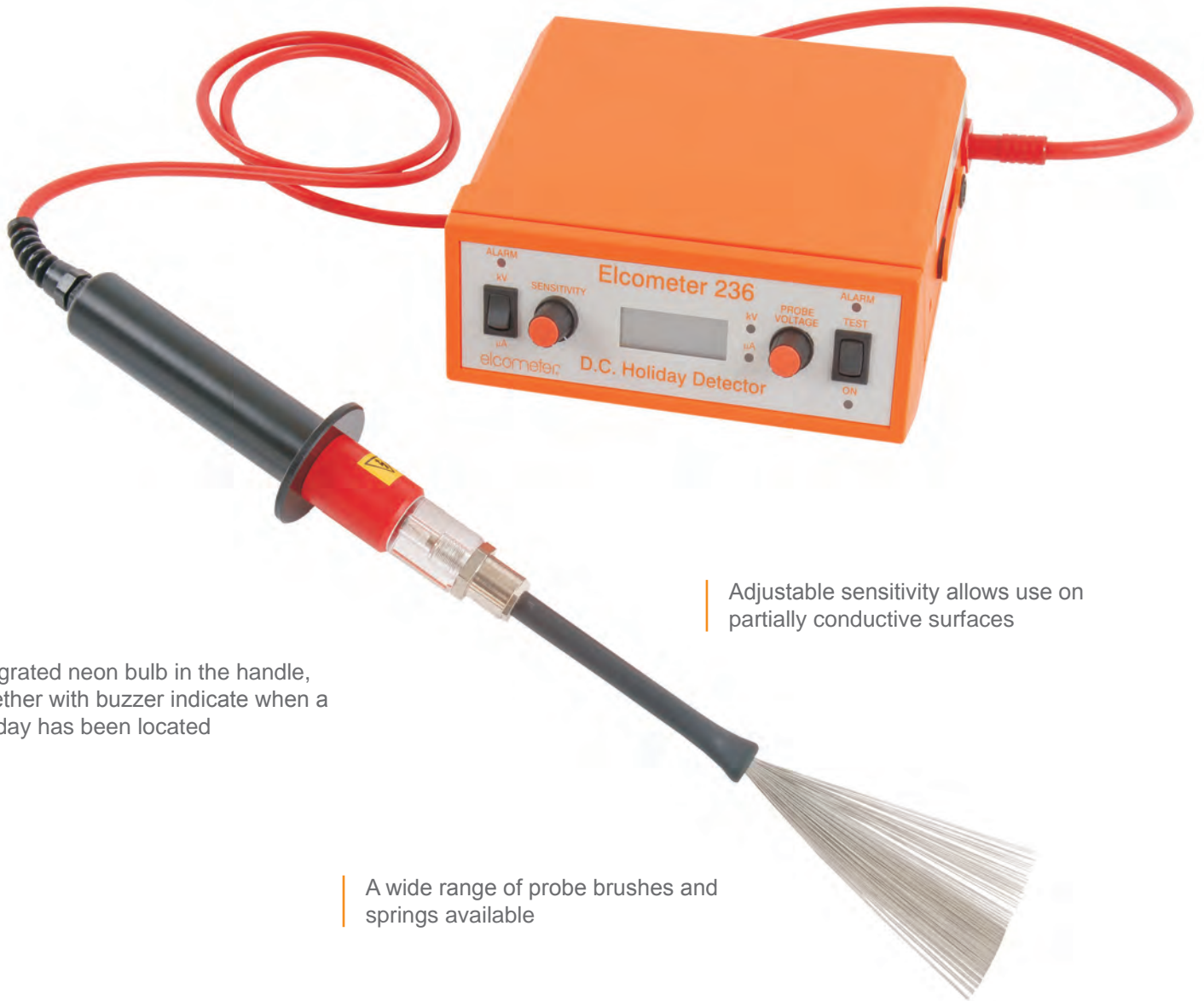
Adjustable sensitivity allows use on partially conductive surfaces

Integrated neon bulb in the handle, together with buzzer indicate when a holiday has been located

A wide range of probe brushes and springs available

# Holiday Detector

**Elcometer 236**

The Elcometer 236 provides the user with complete control of voltage and sensitivity settings and is available in 2 versions, 15kV and 30kV.

Each unit is supplied in a convenient carry case which also holds the probe handle and an additional (optional) external re-chargeable battery pack which doubles the testing time available.

Due to its unique design, the probe handle can be replaced with a telescopic probe handle - extending the measurement reach up to almost 4m (13'), ideal for testing on large/high structures.



| Technical Specification | | | C |
|---|---|---|---|
| | Elcometer 236 15kV | Elcometer 236 30kV | Certificate |
| Part Number | D236--15KV | D236--30KV | ○ |
| Part Number with Certificate | D236--15KVC | D236--30KVC | ● |
| Voltage Output | 0.5 - 15kV in 100V steps | 0.5 - 30kV in 100V steps | |
| Display Resolution | 0.01kV | 0.1kV | |
| Approximate Thickness Range | 0 - 3.75mm (0 - 150mils) | 0 - 7.5mm (0 - 300mils) | |
| Alarms | Audible & Visual | | |
| Power Supply | 12V internal rechargeable battery | | |
| Battery Life (approximate) | 10/12 hours continuous use,  20/24 hours with the optional external battery pack | | |
| Dimensions | 200 x 170 x 70mm (6 x 7 x 3") | | |
| Weight | 2.8kg (6lb 3oz) | | |
| Packing List | Elcometer 236, probe handle and lead, band brush probe, 2m (79") & 10m (394") signal return/earth leads, battery charger with 3 mains cables (UK, EUR and US), carry case, transit case and operating instructions | | |

| Accessories | |
|---|---|
| T23622790-1 | Telescopic probe handle, 600 - 1200mm (24 - 47") |
| T23622790-2 | Telescopic probe handle, 1800 - 3600mm (71 - 142") |
| T236139031 | 2m (6.5') earth signal return lead |
| T236139032 | 10m (32') earth signal return lead |
| T23615550 | External battery pack (doubles operational use between charges) |

**For a full range of rolling springs, rubber or wire brush probes and other accessories see page 11-12**



○ Optional Calibration Certificate available.

# Pinhole & Porosity

## Elcometer 236, 266 & 280   High Voltage Holiday Detector Accessories

### Batteries, Chargers & Earth Signal Return Leads

| Part Number | Description | Compatible with | | |
|---|---|---|---|---|
| | | Elcometer 236 | Elcometer 266 | Elcometer 280 |
| T23615550 | External rechargeable battery pack | ■ | | |
| T23613907 | Battery charger & mains lead (UK 240V) | ■ | | |
| T23613908 | Battery charger & mains lead (EU 220V) | ■ | | |
| T23613909 | Battery charger & mains lead (US 110V) | ■ | | |
| T99923482 | Rechargeable battery pack | | ■ | ■ |
| T99919999A | Battery charger & mains lead (UK 240V) | | ■ | ■ |
| T99919999B | Battery charger & mains lead (EU 220V) | | ■ | ■ |
| T99919999C | Battery charger & mains lead (US 110V) | | ■ | ■ |
| T236139031 | Earth signal return lead, 2m (6.5') | ■ | | |
| T236139032 | Earth signal return lead, 10m (32') | ■ | | |
| T99916954 | Earth signal return lead, 4m (13') | | ■ | |
| T99916996 | Earth signal return lead, 10m (32') | | ■ | |
| T28022750 | 10m (32') earth lead, clip / Elcometer 280 connector | | | ■ |
| T28022622 | Trailing signal return lead, 5m (16') | | | ■ |

### Telescopic Probes, Probe Extension Rods

| Part Number | Description | Elcometer 236 | Elcometer 266 | Elcometer 280 |
|---|---|---|---|---|
| T23622790-1 | Telescopic probe handle, 0.6 - 1.20m (24 - 47") | □ | | |
| T23622790-2 | Telescopic probe handle, 1.8 - 3.60m (71 - 142") | □ | | |
| T99919988-3 | Probe extension rod, 250mm (9.8") | □ | ■ | ■ |
| T99919988-1 | Probe extension rod, 500mm (20") | □ | ■ | ■ |
| T99919988-2 | Probe extension rod, 1000mm (39") | □ | ■ | ■ |

### Accessory Adaptors  Allows other manufacturer's accessories to fit Elcometer models

| Part Number | Description | Elcometer 236 | Elcometer 266 | Elcometer 280 |
|---|---|---|---|---|
| T99920084 | Adaptor for models: AP, APS, AP/S1, AP/S2, AP/W, 10/20, 14/20,10, 20 & 20S | □ | ■ | ■ |
| T99920083 | Adaptor for models:  P20, P40, P60, 780, 785 & 790 | □ | ■ | ■ |
| T99920252 | Adaptor for models:  PHD 1-20 & PHD 2-40 | □ | ■ | ■ |
| T99922747 | Adaptor for models:  4S, 4.0, 8.0, 35 | □ | ■ | ■ |
| T99920082 | Adaptor for current range to fit old accessories | ■ | ■ | ■ |
| T99922768 | Adaptor for Elcometer 136 and older 236 models | ■ | | |

### Band brush probes

| Part Number | Description | Elcometer 236 | Elcometer 266 | Elcometer 280 |
|---|---|---|---|---|
| T99919975 | Band brush probe | □ | ■ | ■ |
| T99922751 | Phosphor bronze brush probe | □ | ■ | ■ |

□ Older Elcometer 236 models may require adaptor piece T99922768

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## High Voltage Holiday Detector Accessories

Wire Brush Probes, flat brush, internal and external pipe brush probes

| Part Number | Description | | | Compatible with | | |
|---|---|---|---|---|---|---|
| | | | | Elcometer 236 | Elcometer 266 | Elcometer 280 |
| | | Width | | | | |
| T99920022-1 | Right angled wire brush probe | 0.25m | 9.8" | ☐ | ■ | ■ |
| T99920022-2 | Right angled wire brush probe | 0.50m | 19.7" | ☐ | ■ | ■ |
| T99920022-3 | Right angled wire brush probe | 1.00m | 39" | ☐ | ■ | ■ |
| T99926621 | Spare wire brush electrode | 0.25m | 9.8" | ■ | ■ | ■ |
| T99926622 | Spare wire brush electrode | 0.50m | 19.7" | ■ | ■ | ■ |
| T99926623 | Spare wire brush electrode | 1.00m | 39" | ■ | ■ | ■ |
| | | Diameter | | | | |
| T99920071-1 | Internal circular wire pipe brush probe | 38mm | 1.5" | ☐ | ■ | ■ |
| T99920071-2 | Internal circular wire pipe brush probe | 51mm | 2.0" | ☐ | ■ | ■ |
| T99920071-3 | Internal circular wire pipe brush probe | 64mm | 2.5" | ☐ | ■ | ■ |
| T99920071-4 | Internal circular wire pipe brush probe | 76mm | 3.0" | ☐ | ■ | ■ |
| T99920071-5 | Internal circular wire pipe brush probe | 89mm | 3.5" | ☐ | ■ | ■ |
| T99920071-6 | Internal circular wire pipe brush probe | 102mm | 4.0" | ☐ | ■ | ■ |
| T99920071-7 | Internal circular wire pipe brush probe | 114mm | 4.5" | ☐ | ■ | ■ |
| T99920071-8 | Internal circular wire pipe brush probe | 127mm | 5.0" | ☐ | ■ | ■ |
| T99920071-9 | Internal circular wire pipe brush probe | 152mm | 6.0" | ☐ | ■ | ■ |
| T99920071-10 | Internal circular wire pipe brush probe | 203mm | 8.0" | ☐ | ■ | ■ |
| T99920071-11 | Internal circular wire pipe brush probe | 254mm | 10" | ☐ | ■ | ■ |
| T99920071-12 | Internal circular wire pipe brush probe | 305mm | 12" | ☐ | ■ | ■ |
| T99920071-13 | Internal circular wire pipe brush probe | 356mm | 14" | ☐ | ■ | ■ |
| T99920071-14 | Internal circular wire pipe brush probe | 406mm | 16" | ☐ | ■ | ■ |
| T99920071-15 | Internal circular wire pipe brush probe | 508mm | 20" | ☐ | ■ | ■ |
| T99920071-16 | Internal circular wire pipe brush probe | 610mm | 24" | ☐ | ■ | ■ |
| T9993766- | Spare circular wire brush electrode | 38mm | 1.5" | ■ | ■ | ■ |
| T9993767- | Spare circular wire brush electrode | 51mm | 2.0" | ■ | ■ | ■ |
| T9993768- | Spare circular wire brush electrode | 64mm | 2.5" | ■ | ■ | ■ |
| T9993769- | Spare circular wire brush electrode | 76mm | 3.0" | ■ | ■ | ■ |
| T9993770- | Spare circular wire brush electrode | 89mm | 3.5" | ■ | ■ | ■ |
| T9993771- | Spare circular wire brush electrode | 102mm | 4.0" | ■ | ■ | ■ |
| T9993772- | Spare circular wire brush electrode | 114mm | 4.5" | ■ | ■ | ■ |
| T9993773- | Spare circular wire brush electrode | 127mm | 5.0" | ■ | ■ | ■ |
| T9993774- | Spare circular wire brush electrode | 152mm | 6.0" | ■ | ■ | ■ |
| T9993775- | Spare circular wire brush electrode | 203mm | 8.0" | ■ | ■ | ■ |
| T9993776- | Spare circular wire brush electrode | 254mm | 10" | ■ | ■ | ■ |
| T9993777- | Spare circular wire brush electrode | 305mm | 12" | ■ | ■ | ■ |
| T9993778- | Spare circular wire brush electrode | 356mm | 14" | ■ | ■ | ■ |
| T9993779- | Spare circular wire brush electrode | 406mm | 16" | ■ | ■ | ■ |
| T9993780- | Spare circular wire brush electrode | 508mm | 20" | ■ | ■ | ■ |
| T9993781- | Spare circular wire brush electrode | 610mm | 24" | ■ | ■ | ■ |

☐ Older Elcometer 236 models may require adaptor piece T99922768

## Elcometer 236, 266 & 280   High Voltage Holiday Detector Accessories

### Wire Brush Probes, band brush, flat brush, internal and external pipe brush probes

| Part Number | Description | Outside Diameter (OD) | | Compatible with | | |
|---|---|---|---|---|---|---|
| | | | | Elcometer 236 | Elcometer 266 | Elcometer 280 |
| T99922752 | 'C-type' wire brush holder† (order C-type brush from the list below) | | | □ | ■ | ■ |
| T99922907 | 'C-type' wire brush support handle* | | | □ | ■ | ■ |
| | | DN | NPS | | | |
| T99922745-1 | External 'C-type' wire brush | 150 - 250mm | 6 - 9" | ■ | ■ | ■ |
| T99922745-2 | External 'C-type' wire brush | 250 - 350mm | 9 - 12" | ■ | ■ | ■ |
| T99922745-3 | External 'C-type' wire brush | 350 - 450mm | 12 - 16" | ■ | ■ | ■ |
| T99922745-4 | External 'C-type' wire brush | 450 - 550mm | 16 - 20" | ■ | ■ | ■ |
| T99922745-5 | External 'C-type' wire brush | 550 - 650mm | 20 - 24" | ■ | ■ | ■ |
| T99922745-6 | External 'C-type' wire brush | 650 - 750mm | 24 - 28" | ■ | ■ | ■ |
| T99922745-7 | External 'C-type' wire brush | 750 - 850mm | 28 - 32" | ■ | ■ | ■ |
| T99922745-8 | External 'C-type' wire brush | 850 - 950mm | 32 - 36" | ■ | ■ | ■ |
| T99922745-9 | External 'C-type' wire brush | 950 - 1050mm | 36 - 40" | ■ | ■ | ■ |
| T99922745-10 | External 'C-type' wire brush | 1050 - 1150mm | 40 - 44" | ■ | ■ | ■ |

† Wire brush holder supplied separately (T99922752)
* Wire brush support handle ideal for two handed use or second person for large diameters

### Conductive Rubber Probes

| Part Number | Description | Width | | Compatible with | | |
|---|---|---|---|---|---|---|
| T99920022-11 | Right angled rubber probe | 250mm | 9.8" | □ | ■ | ■ |
| T99920022-12 | Right angled rubber probe | 500mm | 19.7" | □ | ■ | ■ |
| T99920022-13 | Right angled rubber probe | 1000mm | 39" | □ | ■ | ■ |
| T99920022-14 | Right angled rubber probe | 1400mm | 55" | □ | ■ | ■ |
| T99926731 | Spare rubber electrode | 250mm | 9.8" | ■ | ■ | ■ |
| T99926732 | Spare rubber electrode | 500mm | 19.7" | ■ | ■ | ■ |
| T99926733 | Spare rubber electrode | 1000mm | 39" | ■ | ■ | ■ |
| T99926734 | Spare rubber electrode | 1400mm | 55" | ■ | ■ | ■ |

### Rolling Springs Holders

| Part Number | Description | | | Elcometer 236 | Elcometer 266 | Elcometer 280 |
|---|---|---|---|---|---|---|
| T99920086 | Phosphor bronze rolling spring holder Order the relevant phosphor bronze spring(s) from the list on page 11-15 | | | □ | ■ | ■ |
| T99922746 | Stainless steel rolling spring holder Order the relevant stainless steel spring(s) from the list on page 11-15 | | | □ | ■ | ■ |

□ Older Elcometer 236 models may require adaptor piece T99922768

elcometer

## High Voltage Holiday Detector Accessories

Rolling Springs  *Available in phosphor bronze or stainless steel*

Each spring is supplied with an easy-release coupling piece, allowing users to quickly connect and disconnect the rolling spring from stanchions, pillars, etc.

Please note that rolling springs are not supplied with a spring holder. Please order the appropriate rolling spring holder separately.

Rolling springs are available in 2 versions, phosphor bronze round spring and 304 stainless steel box section spring. The 19mm (0.75") diameter phosphor bronze springs are almost 3 times lighter than the 34mm (1.33") diameter stainless steel springs.

| Rolling Spring Dimensions | | Nominal Pipe Size | | Pipe Outside Diameter (OD) | | | |
|---|---|---|---|---|---|---|---|
| Part Number | | DN | NPS | millimeters (mm) | | inches (") | |
| Phosphor Bronze | Stainless Steel | (mm) | (inches) | min OD | max OD | min OD | max OD |
| T99920438-15A<br>T99920438-15B | -<br>- | 40 | 1.5 | 48<br>54 | 54<br>60 | 1.9<br>2.1 | 2.1<br>2.4 |
| T99920438-20A<br>T99920438-20B | -<br>- | 50 | 2.0 | 60<br>66 | 66<br>73 | 2.4<br>2.6 | 2.6<br>2.9 |
| T99920438-25A<br>T99920438-25B | T99922744-25A<br>T99922744-25B | 65 | 2.5 | 73<br>80 | 80<br>88 | 2.9<br>3.1 | 3.1<br>3.5 |
| T99920438-30A<br>T99920438-30B | T99922744-30A<br>T99922744-30B | 80 | 3.0 | 88<br>95 | 95<br>100 | 3.5<br>3.7 | 3.7<br>3.9 |
| T99920438-35A<br>T99920438-35B | T99922744-35A<br>T99922744-35B | 90 | 3.5 | 100<br>108 | 108<br>114 | 3.9<br>4.3 | 4.3<br>4.5 |
| T99920438-40A | T99922744-40A | 100 | 4.0 | 114 | 125 | 4.5 | 4.9 |
| T99920438-45A<br>T99920438-45B | T99922744-45A<br>T99922744-45B | 114 | 4.5 | 125<br>136 | 136<br>141 | 4.9<br>5.4 | 5.4<br>5.6 |
| T99920438-50A<br>T99920438-50B | T99922744-50A<br>T99922744-50B | 125 | 5.0 | 141<br>155 | 155<br>168 | 5.6<br>6.1 | 6.1<br>6.6 |
| T99920438-60A<br>T99920438-60B | T99922744-60A<br>T99922744-60B | 152 | 6.0 | 168<br>180 | 180<br>193 | 6.6<br>7.1 | 7.1<br>7.6 |
| T99920438-70A<br>T99920438-70B | T99922744-70A<br>T99922744-70B | 178 | 7.0 | 193<br>213 | 213<br>219 | 7.6<br>8.4 | 8.4<br>8.6 |
| T99920438-80A | T99922744-80A | 203 | 8.0 | 219 | 240 | 8.6 | 9.4 |
| T99920438-90A | T99922744-90A | 229 | 9.0 | 240 | 264 | 9.4 | 10.4 |
| T99920438-100A | T99922744-100A | 254 | 10.0 | 264 | 290 | 10.4 | 11.4 |
| T99920438-110A | T99922744-110A | 279 | 11.0 | 290 | 320 | 11.4 | 12.6 |
| T99920438-120A | T99922744-120A | 305 | 12.0 | 320 | 350 | 12.6 | 13.8 |
| T99920438-140A<br>T99920438-140B | T99922744-140A<br>T99922744-140B | 356 | 14.0 | 350<br>375 | 375<br>400 | 13.8<br>14.8 | 14.8<br>15.7 |

□ Older Elcometer 236 models may require adaptor piece T99922768

## Elcometer 236, 266 & 280  High Voltage Holiday Detector Accessories

### Rolling Springs  Available in phosphor bronze or stainless steel

Rolling springs are available in 2 versions, phosphor bronze round spring and 304 stainless steel box section spring. The 19mm (0.75") diameter phosphor bronze springs are almost 3 times lighter than the 34mm (1.33") diameter stainless steel springs.

| Rolling Spring Dimensions | | Nominal Pipe Size | | Pipe Outside Diameter (OD) | | | |
| Part Number | | DN | NPS | millimeters (mm) | | inches (") | |
| Phosphor Bronze | Stainless Steel | (mm) | (inches) | min OD | max OD | min OD | max OD |
|---|---|---|---|---|---|---|---|
| T99920438-160A | T99922744-160A | 406 | 16.0 | 400 | 435 | 15.7 | 17.1 |
| T99920438-160B | T99922744-160B | | | 435 | 450 | 17.1 | 17.7 |
| T99920438-180A | T99922744-180A | 457 | 18.0 | 450 | 500 | 17.7 | 19.7 |
| T99920438-200A | T99922744-200A | 508 | 20.0 | 500 | 550 | 19.7 | 21.7 |
| T99920438-220A | T99922744-220A | 559 | 22.0 | 550 | 600 | 21.7 | 23.6 |
| T99920438-240A | T99922744-240A | 610 | 24.0 | 600 | 650 | 23.6 | 25.6 |
| T99920438-260A | T99922744-260A | 660 | 26.0 | 650 | 700 | 25.6 | 27.6 |
| T99920438-280A | T99922744-280A | 711 | 28.0 | 700 | 750 | 27.6 | 29.5 |
| T99920438-300A | T99922744-300A | 762 | 30.0 | 750 | 810 | 29.5 | 31.9 |
| T99920438-320A | T99922744-320A | 813 | 32.0 | 810 | 860 | 31.9 | 33.9 |
| T99920438-340A | T99922744-340A | 864 | 34.0 | 860 | 910 | 33.9 | 35.8 |
| T99920438-360A | T99922744-360A | 914 | 36.0 | 910 | 960 | 35.8 | 37.8 |
| T99920438-380A | T99922744-380A | 965 | 38.0 | 960 | 1010 | 37.8 | 39.8 |
| T99920438-400A | T99922744-400A | 1016 | 40.0 | 1010 | 1060 | 39.8 | 41.7 |
| T99920438-420A | T99922744-420A | 1067 | 42.0 | 1060 | 1110 | 41.7 | 43.7 |
| T99920438-440A | T99922744-440A | 1118 | 44.0 | 1110 | 1160 | 43.7 | 45.7 |
| T99920438-460A | T99922744-460A | 1168 | 46.0 | 1160 | 1210 | 45.7 | 47.6 |
| T99920438-480A | T99922744-480A | 1219 | 48.0 | 1210 | 1270 | 47.6 | 50.0 |
| T99920438-500A | T99922744-500A | 1270 | 50.0 | 1270 | 1320 | 50.0 | 52.0 |
| T99920438-520A | T99922744-520A | 1321 | 52.0 | 1320 | 1370 | 52.0 | 53.9 |
| T99920438-540A | T99922744-540A | 1372 | 54.0 | 1370 | 1425 | 53.9 | 56.1 |

Other sizes are available upon request. Please contact your nearest distributor for more information.

### Grounding Mats

Grounding mats are ideal for testing on ungrounded pipes. The conductive rubber mat is wrapped around the coated pipe and connected to both the grounding pin (supplied separately) and the signal return lead.
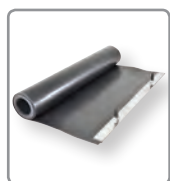
| Part Number | Description | Outside Diameter (OD) | | Compatible with | | |
| | | DN | NPS | Elcometer 236 | Elcometer 266 | Elcometer 280 |
|---|---|---|---|---|---|---|
| T28022637-1 | Grounding Mat | up to 229mm | up to 9" | | | ■ |
| T28022637-2 | Grounding Mat | up to 457mm | up to 18" | | | ■ |
| T28022637-3 | Grounding Mat | up to 762mm | up to 30" | | | ■ |
| T28022637-4 | Grounding Mat | up to 1067mm | up to 42" | | | ■ |
| T28022748 | Grounding pin; 60cm (23.5") long | | | | | ■ |
| T28022749 | 10m (32') earth lead, clips each end | | | | | ■ |
| T28022750 | 10m (32') earth lead, clip / Elcometer 280 connector | | | | | ■ |

□ Older Elcometer 236 models may require adaptor piece T99922768

# UV Pinhole Flashlight

The Elcometer 260 UV Pinhole Flashlight is battery powered and housed in a rugged aluminium case providing a quick, low cost method of testing coatings for pinholes.

Featuring a single Watt purple light emitting diode, the Elcometer 260 UV flashlight has a beam wavelength of 405nm (±5nm), which the human eye perceives as a purple light.

A UV reflective additive is applied to the base coat. The UV flashlight shines the purple light on the coating, the base coat fluoresces where it is not covered by any subsequent coating - identifying any pinholes in the top coat.

**STANDARDS:**
ASTM E2501

## Technical Specification

| | |
|---|---|
| Part Number | D260----2 |
| Beam Wavelength | 405nm ±5nm |
| Flashlight Casing | Hard anodised aluminium |
| Battery Life | 6 hours (continuous use) |
| Battery Type | 2 x CR123A batteries |
| Lens Type | Dual element diffuser |
| Weight | 173g (6.1oz) |
| Dimensions | 150 x 35mm (6 x 1.4") |
| Packing List | Elcometer 260 UV Pinhole Flashlight, UV protective glasses, nylon belt holster, 2 x CR123A batteries, operating instructions |

## Accessories

| | |
|---|---|
| T26020140 | UV Protective Glasses |
| T26020141 | 2 x Replacement 123A batteries |

# ElcoMaster™

## DATA MANAGEMENT SOFTWARE

## Combines all your inspection records in one report, instantly!

From surface profile to climate monitoring, dry film thickness to data management; Elcometer combines high quality products with simple data management, producing professional inspection reports at the click of a button.

Suitable for use in Cloud Computing

| **Surface Profile** | **Climate Monitoring** | **Coating Thickness** | **Adhesion** |
|---|---|---|---|
| The Elcometer 224 digital surface profile gauge, available as either integral or separate probe versions, is faster than ever before. | The Elcometer 319 dewpoint meter records all the critical climate parameters for the coating's professional: surface, air and dewpoint temperatures, %RH & ΔT. | Up to 40% faster than other coating thickness gauges, the new Elcometer 456 provides you with accurate and repeatable readings. Integral and separate probes available. | Fast, accurate and portable automatic adhesion testing on thin, thick, flat or convex substrates. The Elcometer 510 quickly and easily records, stores and transfers all your adhesion data. |
| See page 2-8 | See page 4-2 | See page 8-2 | See page 10-2 |

# Inspector's Accessories

Elcometer offers a full range of accessories **specifically for the coatings inspector, these** include:

**Inspection Mirrors**: It may be necessary to take a detailed look at a specific area where you cannot get to. In this case an inspection mirror is required.

**Magnifiers & Microscopes**: For close up investigations, the inspector may require magnification of the surface for a clearer understanding.

**Torches/Flashlight**: In dark or shaded areas such as in ballast tanks or on large production sites, further investigation may require additional light.

**Publications**: Inspection manuals for general coating defects or those specific to pipeline inspection.

Pictorial Surface Standards for blast cleaning incorporating standards for BS, ISO, SIS, and SSPC.

The Macaw's Pipeline Defects is a text book specific to pipelines and contains information on pipeline coatings.

## Elcometer 131



## Inspection Mirrors

Ideal for inspecting difficult to access areas - inside pipes, behind corners, underneath inspection tanks, and other inaccessible or awkward areas.

Combined with the full range of test equipment from Elcometer, these high quality, robust mirrors help to provide a detailed examination of the component or project under inspection.

---

### Technical Specification



| Part Number | Description |
| --- | --- |
| H131---1A | Elcometer 131/1A Telescopic Inspection Mirror |
| Dimensions | Extends from 520mm (20.5") to 1500mm (59")<br>Mirror diameter: 63mm (2.5") |
| Weight | 650g (1.43lb) |
| Packing List | Elcometer 131 Inspection Mirror and operating instructions |



| Part Number | Description |
| --- | --- |
| H131---1B | Elcometer 131/1B Telescopic Inspection Mirror |
| Dimensions | Extends from 165mm (6.5") to 925mm (36")<br>Mirror diameter: 57mm (2.25") |
| Weight | 100g (0.22lb) |
| Packing List | Elcometer 131 Inspection Mirror and operating instructions |



| Part Number | Description |
| --- | --- |
| H131---1C | Elcometer 131/1C Telescopic Inspection Mirror |
| Dimensions | Extends from 165mm (6.5") to 750mm (29.5")<br>Mirror diameter: 82mm (3.25") |
| Weight | 100g (0.22lb) |
| Packing List | Elcometer 131 Inspection Mirror and operating instructions |



| Part Number | Description |
| --- | --- |
| H131---2A | Elcometer 131/2A Illuminated Inspection Mirror<br>(Battery Type 2 x LR14 C) |
| Dimensions | Mirror diameter: 63mm (2.5") |
| Weight | 650g (1.43lb) |
| Packing List | Elcometer 131 Inspection Mirror and operating instructions |

## Illuminated (x10) Magnifier

**Elcometer 137**

From time to time a closer inspection of a surface is required to ascertain the exact conditions of the material's profile, cleanliness etc.

The Elcometer 137 illuminated magnifier is the ideal product for the job as many environments can be in low light or dark areas - ballast tanks, oil and gas tanks, etc.

- Lightweight, battery powered, portable magnifier
- Ideal for viewing surface comparators
- x10 magnification for close surface inspection
- Scaled lens for easy measurement of surface features

### Technical Specification

| Part Number | Description |
| --- | --- |
| H137----1 | Elcometer 137 Illuminated Magnifier |
| Battery Type | 3 x LR14 (C) |
| Dimensions | 33 x 215mm (1.3 x 8.5") |
| Weight | 236g (0.52lb) |
| Packing List | Elcometer 137 Illuminated Magnifier and operating instructions |

## Pocket (x30) Microscope

**Elcometer 7210**

The Elcometer 7210 is pocket size making it an extremely practical microscope for site inspections.

Having x30 magnification and an inbuilt light source, the Elcometer 7210 Pocket Microscope is the ideal choice for close up investigation of defects and surface cleanliness.

### Technical Specification

| Part Number | Description |
| --- | --- |
| KT007210M001 | Elcometer 7210 Pocket Microscope |
| Battery Type | 1 x AAA battery |
| Dimensions | 140 x 50 x 22mm (5.5 x 2 x 0.9") |
| Weight | 68g (0.14lb) |
| Packing List | Elcometer 7210 Pocket Microscope and operating instructions |

# Inspection Accessories

## Elcometer 900

### Illuminated (x50) Microscope



The Elcometer 900 is a very simple, graduated x50 microscope with internal illumination.

This allows the user to quickly determine the width by counting the number of graduated reticules on the scaled lens and then calculating the value.

### Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| W90018568-D | Elcometer 900 Microscope | | |
| Battery Type | 1 x AAA battery | | |
| Dimensions | 120 x 43 x 115 mm (4.7 x 1.7 x 4.5") | Weight | 145g (0.31lb) |
| Packing List | Elcometer 900 Illuminated Microscope and operating instructions | | |

## Elcometer 132

### Safety Torch / Flash Light



Many environments can have low light, dark areas or explosive gas present; ballast tanks, oil and gas tanks, etc. It is imperative for safety reasons to be able to inspect the coating adequately and to have sufficient light.

The Elcometer 132 Safety Torch/Flash Light is explosion proof and meets the ATEX directive as category 2 equipment.

It is approved to the latest EN Standards for electrical apparatus for potential explosive atmospheres. This allows for use in Group II applications zones 1 and 2, IIA and IIB gases, where T4 temperature class permits.

### Technical Specification

| Part Number | Description |
|---|---|
| H132---1A | Elcometer 132 Safety Torch/Flash Light |
| Battery Type | 2 x LR20 (D) |
| Dimensions | 200 x 60 mm (7.8 x 2.4") |
| Weight | 150g (5.3oz) without batteries |
| Packing List | Elcometer 132 Safety Torch/Flash Light and operating instructions |

## Paint Safe Marker Pens

Paint Safe Marker Pens are used to highlight visual areas of non conformance, providing a clear indication of areas where rework or other processes need to be carried out.

The Safinah Marker pen has been specially selected for use as an inspection marker for all types of large steel fabrications which include both coated or uncoated ships and offshore structures.

The pen which is available in black, is ideal for testing application in the most sensitive areas.

### Technical Specification

| Part Number | Description |
|---|---|
| H144----1 | Elcometer 144 Paint Safe Marker Pens (pack of 5) |

## Weld Gauge

The Elcometer 147 Weld Gauge measures many aspects of welds in both metric and imperial:

- angle of preparation 0 to 60°
- misalignment (high - low)
- fillet weld throat size
- fillet weld length
- 2mm (0.79") edge roundness test

- excess weld metal (capping size)
- depth of undercut
- depth of pitting
- general linear measurements up to 60mm (2")

### Technical Specification

| Part Number | Description |
|---|---|
| H147----1 | Elcometer 147 Weld Gauge |
| Angle of Preparation Scale | 0 - 60° in 5° divisions |
| Misalignment Scale | 0 - 25mm in 1mm divisions and 0 - 1" in 1/16" divisions |
| Fillet Leg & Excess Weld Scale | 0 - 25mm in 1mm divisions and 0 - 1" in 1/16" divisions |
| Fillet Throat Scale | 0 - 20mm in 1mm divisions and 0 - 3/4" in 1/16" divisions |
| Undercut Scale | 0 - 4mm in 1mm divisions and 0 - 1/4" in 1/16" divisions |
| Dimensions | 100 x 68mm (3.9 x 2.7") |
| Weight | 154g (5.4oz) |
| Packing List | Elcometer 147 Weld Gauge and instruction card |

**For Pictorial Surface Standards see page 2-2**

# Inspection Accessories

## Fitz







### Elcometer Fitz's Atlas 2 of Coatings Defects

The Elcometer Fitz's Atlas 2 of Coating Defects (EFA) takes the reader through a comprehensive range of problems and discusses each in detail.

EFA provides the User with a greater understanding of the defect, the probable cause and possible solutions. With in excess of 180 colour photographs, the user can quickly gain an insight into the coatings industry and the possible pitfalls.

Sections:
- Welding Faults: welds, cracks, surface porosity, undercut
- Surface Conditions: surface preparation, oil contamination, skip weld
- Coatings Defects: a comprehensive list of possible defects including blistering, bloom, chalking, cracking, erosion, fish eyes, orange peel
- Microcopy: blisters, bubbles, delamination, pinholes, voids, weed fouling
- Marine Fouling: animal fouling, barnacles, molluscs, weed or algae fouling

### Technical Specification

| Part Number | Description |
| --- | --- |
| H99916043 | Elcometer Fitz's Atlas 2 of Coating Defects |
| Dimensions | 223 x 220 x 70mm (9 x 8.6 x 3") |
| Weight | 0.45kg (1lb) |

## Macaw



### Elcometer Macaw's Pipeline Defects

The aim of this publication is to illustrate the range of defects that may be encountered in high pressure steel pipelines and pipeline coatings.

The manual gives advice on the probable cause and significance of the defects and comments on appropriate remedial actions.

The defects included in this book encompass all aspects of high pressure steel pipeline manufacture, construction and operation, together with sections on coating and cathodic protection defects and examples of how defects interact to generate new or modified risks to pipeline integrity.
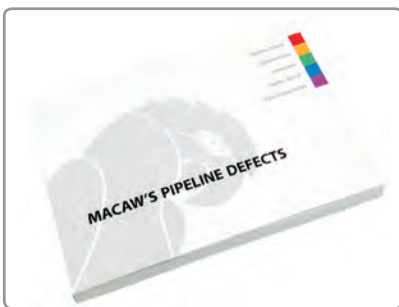
### Technical Specification

| Part Number | Description |
| --- | --- |
| H99918572 | Elcometer Macaw's Pipeline Defects |
| Dimensions | 210 x 148 x 15mm (8 x 6 x 0.5") |
| Weight | 0.4kg (1.1lb) |

# Inspection Kits

Elcometer offers one of the widest ranges of inspection equipment available. Our products are used across numerous industry sectors. In all cases, there is always a need to **undertake a number of specific inspections** during quality control assessments - as one parameter can affect another.

One inspection parameter can affect another, for example the thickness of an applied coating can affect properties such as adhesion, gloss, colour and porosity.

Elcometer has put together a number of inspection kits which are both product and industry specific - combining those gauges from our range into one robust carry case, ideal for transporting to and from the inspection site.

Elcometer inspection kits are available for:

- Blasting Inspection
- Protective Coating Inspection
- Hazardous Area Inspection
- Automotive Inspection
- Qualicoat & Powder Inspection
- Surface Contamination
- Soluble Salt & Ion Specific Inspection
- Pinhole & Holiday Detection
- Heating, Ventilation & AC Duct Inspection

Custom kits can also be developed for your particular requirements, please contact your distributor for further information.

## Elcometer

## Digital Inspection Kits

These digital inspection kits have been specifically designed to undertake the three principal inspection requirements in the Protective and Industrial Coatings Industry – climate, surface profile and dry film thickness. Ideal for 'paperless' quality assurance systems the kits come complete with ElcoMaster™ Data Management Software for professional reporting and analysis.

Two inspection kits are available (Basic & Top) to meet your specific needs.

Measurement parameters include:
* Surface profile
* Climatic conditions
* Coating thickness

compatible with
ElcoMaster™

available with
Bluetooth®
wireless technology
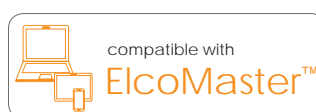
**STANDARDS:**

AS 2331.1.4, AS 3894.3-B, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 4417-B, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6B, BS 3900-C5-6A, BS 5411-11, BS 5411-3, BS 5599, DIN 50981, BS 7079-B4, DIN 50984, ECCA T1, EN 13523-1, IMO MSC.215(82), IMO MSC.244 (83), ISO 1461, ISO 19840, ISO 2063, ISO 2360, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, ISO 2808-12, ISO 8502-4, JIS K 5600-1-7, NF T30-124, SANS 5772, SS 184159, SSPC PA 2, US Navy PPI 63101-000, US Navy NSI 009-32

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| Elcometer 456 | Ferrous/FNF PINIP Probe: Scale 1 | □ | □ | 8-12 |
| ElcoMaster™ | Data Management Software and USB Cable | | ■ | 1-2 |

## Technical Specification

| Part Number | Description |
|---|---|
| YKIT-DIGITAL-B | Elcometer Basic Digital Inspection Kit (F) |
| YKIT-DIGITAL-T | Elcometer Top Digital Inspection Kit (F) |
| YKIT-DIGITALFNF-B | Elcometer Basic Digital Inspection Kit (FNF) |
| YKIT-DIGITALFNF-T | Elcometer Top Digital Inspection Kit (FNF) |

□ Space in kit to fit, but not supplied. Order separately if required.

# Blasting Inspection Kits

The Elcometer Blasting Inspection Kit is a surface preparation inspection kit providing a range of inspection equipment to test surface profile and surface contamination of blasted profiles.

An Elcometer 456 Gauge and probe can also be supplied. (Order separately if required.)

Measurement parameters include:
- Surface assessment
- Blast equipment inspection
- Surface profile
- Surface contamination

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**STANDARDS:**

AS 3894.5, AS 3894.6-A, AS 3894.6-C, AS 3894.6-D, ASTM D 2200, ASTM D 4417-A, ASTM D 4417-B, ASTM D 4417-C, BS 7079-C5, IMO MSC.215(82), IMO MSC.244(83), ISO 8501-1, ISO 8502-3, ISO 8502-5, ISO 8502-6, ISO 8502-9, ISO 8503-1, ISO 8503-2, ISO 8503-5, NACE RP0287, SANS 5772, SS 55900, SSPC Guide 15, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000

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| Elcometer 124 | Testex Dial Thickness Gauge | ■ | | 2-15 |
| Elcometer 224 | Surface Profile Separate Gauge, Model T | | ■ | 2-8 |
| Elcometer 224 | Standard Separate Probe | | ■ | 2-13 |
| Elcometer 142 | Dust Tape Test Kit | | ■ | 2-34 |
| Elcometer 134 | Chlor*Test Surface Testing Kit | ■ | ■ | 2-30 |
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| Elcometer 138 | Bresle Salt Kit | | ■ | 2-25 |
| Elcometer 138/2 | Surface Contamination Kit | | ■ | 2-28 |
| ElcoMaster™ | Data Management Software & USB Cable | | ■ | 1-2 |

[1]Swedish Rust Standard ISO 8501, SIS055900 supplied in Metric Kit
US Standard SSPC VIS 1-01 and VIS-3 supplied in Imperial Kit

## Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| YKIT-BLAST-1M | YKIT-BLAST-1E | Elcometer Blasting Inspection Kit 1 |
| YKIT-BLAST-2M | YKIT-BLAST-2E | Elcometer Blasting Inspection Kit 2 |
| Dimensions | Kit 1 | 495 x 420 x 175mm (19.49 x 16.54 x 6.89") |
| | Kit 2 | 575 x 475 x 205mm (22.64 x 18.70 x 8.07") |

## Elcometer







# Protective Inspection Kits 1, 2 & 3

The Elcometer Protective Coatings Inspection Kits 1, 2 & 3 provide the tools required for the on-site inspection of a coating, including surface profile, dewpoint, relative humidity, both wet and dry film thickness and also adhesive testing.

Available as metric or imperial kits and housed in a sturdy, lightweight carry case, Elcometer Protective Coatings Inspection Kits are invaluable to the operator in the field to ensure the coating is, or has been, applied correctly.

**Protective Inspection Kit 1**
An entry level inspection kit containing profile, climate, wet and dry film thickness. The Elcometer 456 coating thickness gauge connects via Bluetooth® to ElcoMaster™ Data Management Software for paperless quality assurance.

**Protective Inspection Kit 2**
Like the Protective Inspection Kit 1 but with the addition of the Elcometer 224 digital surface profile gauge with data collection functionality and the Elcometer 319 digital dewpoint meter. Reports via ElcoMaster™ can include data from both profile and climate inspections as well as dry film thickness.

**Protective Inspection Kit 3**
A comprehensive digital inspection kit providing gauges with data collection functionality for profile, climatic conditions and dry film thickness.

It comes complete with ElcoMaster™ data management software with Bluetooth® communication to PC and Android™ Mobile Apps for instant data analysis and reporting for paperless quality assurance.

Measurement parameters include:
• Surface profile
• Surface temperature
• Climatic conditions
• Coating thickness
• Adhesion

compatible with ElcoMaster™

available with Bluetooth® wireless technology

**STANDARDS:**

AS 1580.408.4, AS 2331.1.4, AS 3894.3-B, AS 3894.9, AS/NZS 1580.107.3, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 3359-B, ASTM D 4414-A, ASTM D 4417-B, ASTM D 4417-C, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6B, BS 3900-C5-6A, BS 3900-C5-7B, BS 3900-E6, BS 7079-C5, BS 5411-11, BS 5411-3, BS 5599, BS 7079-B4, DIN 50981, DIN 50984, ECCA T1, ECCA T6, EN 13523-1, EN 13523-6, IMO MSC.215(82), IMO MSC.244(83), ISO 1461, ISO 16276-2, ISO 19840, ISO 2063, ISO 2360, ISO 2409, ISO 2808-1A, ISO 2808-6A, ISO 2808-6B, ISO 2808-7B, ISO 2808-7C, ISO 2808-7D, ISO 2808-12, ISO 8502-4, ISO 8503-5, JIS K 5600-1-7, JIS K 5600-5-6, NACE RP0287, NF T30-038, NF T30-124, NF T30-125, SANS 5772, SS 184159, SSPC PA 2, US Navy NSI 009-32, US Navy PPI 63101-000

## Protective Inspection Kits 1, 2 & 3        **Elcometer**

### Contents

| Model | Description | Kit 1 | Kit 2 Standard | Kit 2 Top | Kit 3 Standard | Kit 3 Top | Page |
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| Elcometer 122 | Testex Tape, Coarse & Extra Coarse | ■ | ■ | ■ | | | 2-15 |
| Elcometer 124 | Thickness Gauge | ■ | ■ | ■ | | | 2-15 |
| Elcometer 224 | Digital Surface Profile Gauge | | Model B Integral | Model T Separate | Model B Integral | Model T Separate | 2-8 |
| Elcometer 224 | Standard Separate Probe | | | ■ | | ■ | 2-13 |
| Elcometer 212 | Digital Thermometer °C (°F) with Surface Probe | ■ | | | | | 4-9 |
| Elcometer 116 | Whirling Hygrometer °C (Metric), Sling Hygrometer °F (Imperial) | ■ | | | | | 4-7 |
| Elcometer 114 | Dewpoint Calculator | ■ | | | | | 4-7 |
| Elcometer 319 | Digital Dewpoint Meter | | Standard | Top | Standard | Top | 4-2 |
| Elcometer 112 | Hexagonal Wet Film Comb 25 - 3000µm (1 - 120mils) | ■ | ■ | ■ | | | 7-2 |
| Elcometer 115 | Wet Film Comb (Set of 4) | | | | ■ | ■ | 7-3 |
| Elcometer 456 | Integral Digital Coating Thickness Gauge, 0 - 1500µm (0 - 60mils) | Ferrous Model B | | | | | 8-2 |
| Elcometer 456 | Separate Digital Coating Thickness Gauge | | Ferrous Model S | Ferrous Model S | Dual FNF Model T | Dual FNF Model T | 8-2 |
| Elcometer 456 | Standard Separate Probe, 0 - 1500µm (0 - 60mils) | | Ferrous | Ferrous | Dual FNF | Dual FNF | 8-12 |
| Elcometer 107 | Cross Hatch Full Kit[1] | ■ | ■ | ■ | ■ | ■ | 10-18 |
| ElcoMaster™ | Data Management Software & USB Cable | | ■ | ■ | ■ | ■ | 1-2 |

[1] Kit 1: supplied with 6 x 1mm and 6 x 2mm cutters, Kits 2 & 3 Metric: supplied with 6 x 2mm cutter, Kits 2 & 3 Imperial: supplied with 6 x 1mm cutter

### Technical Specification

| Part Number Metric | Imperial | Description |
|--------------------|----------|-------------|
| YKIT-PROTECTIVE-1M | YKIT-PROTECTIVE-1E | Elcometer Protective Inspection Kit 1 |
| YKIT-PROTECTIVE-2SM | YKIT-PROTECTIVE-2SE | Elcometer Protective Inspection Kit 2 Standard |
| YKIT-PROTECTIVE-2TM | YKIT-PROTECTIVE-2TE | Elcometer Protective Inspection Kit 2 Top |
| YKIT-PROTECTIVE-3SM | YKIT-PROTECTIVE-3SE | Elcometer Protective Inspection Kit 3 Standard |
| YKIT-PROTECTIVE-3TM | YKIT-PROTECTIVE-3TE | Elcometer Protective Inspection Kit 3 Top |
| Dimensions | Kit 1 | 456 x 384 x 110mm (17.95 x 15.12 x 4.33") |
| | Kit 2 | 456 x 384 x 127mm (17.95 x 15.12 x 5.00") |
| | Kit 3 | 456 x 384 x 127mm (17.95 x 15.12 x 5.00") |

*If the kit that you require is not listed above, Elcometer will be happy to discuss your requirements and create one to suit your particular needs.*

# Inspection Kits

## Elcometer

## Protective Coating Inspection Kit 4

The Elcometer Protective Coatings Inspection Kit 4 provides a range of test equipment to help an inspector assess a substrate prior to the application of a coating.

Measurement parameters include:
- Surface inspection
- Weld inspection
- Surface cleanliness
- Climatic conditions
- Surface profile
- Coating thickness

compatible with ElcoMaster™

available with Bluetooth® wireless technology

**STANDARDS:**

AS 2331.1.4, AS 3894.3-B, AS 3894.6-A, AS 3894.6-C, AS 3894.9, AS/NZS 1580.107.3, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 2200, ASTM D 4414-A, ASTM D 4417-C, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6A, BS 3900-C5-6B, BS 5411-11, BS 5411-3, BS 5599, BS 7079-B4, BS 7079-C5, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, IMO MSC.215(82), IMO MSC.244(83), ISO 1461, ISO 19840, ISO 2063, ISO 2360, ISO 2808-12, ISO 2808-1A, ISO 2808-6A, ISO 2808-6B, ISO 2808-7B, ISO 2808-7C, ISO 2808-7D, ISO 8501-1, ISO 8502-3, ISO 8502-4, ISO 8502-6, ISO 8502-9, ISO 8503-5, JIS K 5600-1-7, NACE RP0287, NF T30-124, NF T30-125, SANS 5772, SS 184159, SS 55900, SSPC Guide 15, SSPC PA 2, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000

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| Elcometer 131/1C | Telescopic Inspection Mirror | ■ | 12-2 |
| Elcometer 144 | Paint Safe Marker Pens (Pack of 3) | ■ | 12-5 |
| Elcometer 147 | Weld Gauge | ■ | 12-5 |
| Elcometer 142 | Dust Tape Test Kit | ■ | 2-34 |
| Elcometer 138 | Bresle Salt Kit[2] | ■ | 2-25 |
| Elcometer 319 | Digital Dewpoint Meter with Magnetic Surface Probe | Top | 4-2 |
| Elcometer 224 | Integral Digital Surface Profile Integral Gauge | Model T | 2-8 |
| Elcometer 112 | Hexagonal Wet Film Comb: 25 - 3000µm (1 - 120mils) | ■ | 7-2 |
| Elcometer 456 | Separate Digital Coating Thickness Gauge with F2 Standard Probe | Ferrous Model T | 8-2 |
| ElcoMaster™ | Data Management Software & USB Cable | ■ | 1-2 |

## Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| YKIT-PROTECTIVE-4M | YKIT-PROTECTIVE-4E | Elcometer Protective Coatings Kit 4 |
| Dimensions | | 495 x 420 x 175mm (19.49 x 16.54 x 6.89") |

[1] Swedish Rust Standard ISO 8501, SIS055900 supplied in Metric Kit, US Standard SSPC VIS 1-01 and VIS-3 supplied in Imperial Kit
[2] Supplied with Bresle Samplers not Bresle Patches

elcometer®

# Protective Inspection Kit 5

A more comprehensive kit than kits 1-4, the Elcometer Protective Coatings Inspection Kit 5 expands the range of instruments available to the protective coatings inspector.

Measurement parameters include:

- Material thickness
- Surface inspection
- Weld inspection
- Surface cleanliness
- Surface profile
- Climatic conditions
- Coating thickness
- Adhesion

compatible with
**ElcoMaster™**

available with
**Bluetooth®**
wireless technology

**STANDARDS:**

AS 1580.108.2, AS 1580.408.4, AS 2331.1.4, AS 3894.3-B, AS 3894.6-A, AS 3894.6-C, AS 3894.6-D, AS 3894.9, AS/NZS 1580.107.3, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 2200, ASTM D 3359-B, ASTM D 4138-A, ASTM D 4414-A, ASTM D 4417-C, ASTM D 7091, ASTM E 376, ASTM E 797, ASTM G 12, BS 3900-C5-5B, BS 3900-C5-6A, BS 3900-C5-6B, BS 3900-E6, BS 5411-11, BS 5411-3, BS 5599, BS 7079-B4, BS 7079-C5, DIN 50981, DIN 50984, DIN 50986, ECCA T1, ECCA T6, EN 13523-1, EN 13523-6, EN 15317, IMO MSC.215(82), IMO MSC.244(83), ISO 1461, ISO 16276-2, ISO 19840, ISO 2063, ISO 2360, ISO 2409, ISO 2808-12, ISO 2808-1A, ISO 2808-5B, ISO 2808-6A, ISO 2808-6B, ISO 2808-7B, ISO 2808-7C, ISO 2808-7D, ISO 8501-1, ISO 8502-3, ISO 8502-4, ISO 8502-6, ISO 8502-9, ISO 8503-5, JIS K 5600-1-7, NACE RP0287, NF T30-038, NF T30-123, NF T30-124, NF T30-125, SANS 5772, SS 184159, SS 55900, SSPC Guide 15, SSPC PA 2, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000

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| Elcometer 128 | Pictorial Standards[1] | ■ | 2-2 |
| Elcometer 131/1C | Telescopic Inspection Mirror | ■ | 12-2 |
| Elcometer 137 | Illuminated Magnifier | ■ | 12-3 |
| Elcometer 144 | Paint Safe Marker Pens (Pack of 3) | ■ | 12-5 |
| Elcometer 147 | Weld Gauge | ■ | 12-5 |
| Elcometer 142 | Dust Tape Test Kit | ■ | 2-34 |
| Elcometer 138 | Bresle Salt Kit[2] | ■ | 2-25 |
| Elcometer 138/2 | Surface Contamination Kit | ■ | 2-28 |
| Elcometer 122 | Testex Tape, Coarse & Extra Coarse | ■ | 2-15 |
| Elcometer 124 | Thickness Gauge | ■ | 2-15 |
| Elcometer 224 | Digital Surface Profile Separate Gauge & Standard Separate Probe | Model T | 2-8 |
| Elcometer 319 | Digital Dewpoint Meter, with Magnetic Surface Probe | Top | 4-2 |
| Elcometer 112 | Hexagonal Wet Film Comb: 25 - 3000µm (1 - 120mils) | ■ | 7-2 |
| Elcometer 456 | Separate Digital Coating Thickness Gauge with F2 Standard Probe | Ferrous Model T | 8-2 |
| Elcometer 121 | Paint Inspection Gauge with Cross Hatch Cutters 6 x 1, 2 & 3mm and ISO (ASTM) Adhesive Tape | Top | 8-27 |
| ElcoMaster™ | Data Management Software & USB Cable | ■ | 1-2 |

## Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| YKIT-PROTECTIVE-5M | YKIT-PROTECTIVE-5E | Elcometer Protective Coatings Inspection Kit 5 |
| Dimensions | | 575 x 475 x 205mm (22.64 x 18.70 x 8.07") |

[1] Swedish Rust Standard ISO 8501, SIS055900 supplied in Metric Kit, US Standard SSPC VIS 1-01 and VIS-3 supplied in Imperial Kit
[2] Supplied with Bresle Samplers not Bresle Patches

## Elcometer

## Protective Coating Inspection Kit 6

The Elcometer Protective Coatings Inspection Kit 6 is a comprehensive kit which incorporates all the key gauges and inspection accessories required to assess a structure before, during and after coating has been applied.

Measurement parameters include:

- Material thickness
- Surface inspection
- Weld inspection
- Surface cleanliness
- Surface profile

- Climatic conditions
- Coating thickness
- Adhesion
- Pinhole detection

compatible with ElcoMaster™

available with Bluetooth® wireless technology

**STANDARDS:**
AS 1580.108.2, AS 1580.408.4, AS 2331.1.4, AS 3894.2, AS 3894.3-B, AS 3894.6-A, AS 3894.6-C, AS 3894.6-D, AS 3894.9, AS/NZS 1580.107.3, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 2200, ASTM D 3359-B, ASTM D 4138-A, ASTM D 4414-A, ASTM D 4417-C, ASTM D 5162-A, ASTM D 7091, ASTM E 376, ASTM E 797, ASTM G 12, ASTM G6, ASTM G62-A, BS 3900-C5-5B, BS 3900-C5-6A, BS 3900-C5-6B, BS 3900-E6, BS 5411-11, BS 5411-3, BS 5599, BS 7079-B4, BS 7079-C5, BS 7793-2, DIN 50981, DIN 50984, DIN 50986, ECCA T1, ECCA T6, EN 13523-1, EN 13523-6, EN 15317, IMO MSC.215(82), IMO MSC.244(83), ISO 1461, ISO 14654, ISO 16276-2, ISO 19840, ISO 2063, ISO 2360, ISO 2409, ISO 2808-12, ISO 2808-1A, ISO 2808-5B, ISO 2808-6A, ISO 2808-6B, ISO 2808-7B, ISO 2808-7C, ISO 2808-7D, ISO 8289-A, ISO 8501-1, ISO 8502-3, ISO 8502-4, ISO 8502-6, ISO 8502-9, ISO 8503-5, JIS K 5600-1-7, JIS K 6766, NACE RP 0188, NACE RP0287, NACE SP 0188, NACE TM0384, NF T30-038, NF T30-123, NF T30-124, NF T30-125, SANS 5772, SS 184159, SS 55900, SSPC Guide 15, SSPC PA 2, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000

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| Elcometer 131/1C | Telescopic Inspection Mirror | ■ | 12-2 |
| Elcometer 137 | Illuminated Magnifier | ■ | 12-3 |
| Elcometer 144 | Paint Safe Marker Pens (Pack of 3) | ■ | 12-5 |
| Elcometer 147 | Weld Gauge | ■ | 12-5 |
| Elcometer 142 | Dust Tape Test Kit | ■ | 2-34 |
| Elcometer 138 | Bresle Salt Kit[2] | ■ | 2-25 |
| Elcometer 138/2 | Surface Contamination Kit | ■ | 2-28 |
| Elcometer 122 | Testex Tape, Coarse & Extra Coarse | ■ | 2-15 |
| Elcometer 124 | Thickness Gauge | ■ | 2-15 |
| Elcometer 224 | Digital Surface Profile Separate Gauge & Standard Separate Probe | Model T | 2-8 |
| Elcometer 319 | Digital Dewpoint Meter, with Magnetic Surface Probe | Top | 4-2 |
| Elcometer 112 | Hexagonal Wet Film Comb: 25 - 3000µm (1 - 120mils) | ■ | 7-2 |
| Elcometer 456 | Separate Digital Coating Thickness Gauge with F2 Standard Probe | Ferrous Model T | 8-2 |
| Elcometer 121 | Paint Inspection Gauge (Top) with Cross Hatch Cutters 6 x 1, 2 & 3mm & ISO (ASTM) Adhesive Tape | Top | 8-27 |
| Elcometer 270 | Pinhole Detector (9 , 67.5 & 90V) | ■ | 11-2 |

## Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| YKIT-PROTECTIVE-6M | YKIT-PROTECTIVE-6E | Elcometer Protective Coatings Kit 6 |
| Dimensions | 575 x 475 x 205mm (22.64 x 18.70 x 8.07") | |

[1] Swedish Rust Standard ISO 8501, SIS055900 supplied in Metric Kit, US Standard SSPC VIS 1-01 and VIS-3 supplied in Imperial Kit
[2] Supplied with Bresle Samplers not Bresle Patches

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# Protective Inspection Kit for Hazardous Areas

**Elcometer**

The Elcometer Hazardous Area Inspection Kit is a protective coating inspection kit suitable for use in hazardous areas where electronic equipment is prohibited.

The kit provides all the tools required for the on-site inspection of a coating, including surface profile, dewpoint, relative humidity, both wet and dry film thickness and also adhesive testing.

Measurement parameters include:

- Surface inspection
- Surface profile
- Surface contamination
- Climatic conditions
- Coating thickness
- Adhesion

**STANDARDS:**

AS 1580.408.4, AS 2331.1.3, AS 3894.3-A, AS 3894.5, AS 3894.9, AS/NZS 1580.107.3, AS/NZS 1580.108.1, ASTM B 499, ASTM D 2200, ASTM D 3359-B, ASTM D 4414-A, ASTM D 4417-A, ASTM D 4417-C, ASTM G 12, BS 3900-C5-6A, BS 3900-C5-7B, BS 3900-E6, BS 5411-11, BS 7079-C5, DIN 50981, ECCA T6, EN 13523-6, IMO MSC.215(82), IMO MSC.244(83), ISO 16276-2, ISO 2178, ISO 2409, ISO 2808-1A, ISO 2808-6A, ISO 2808-7A, ISO 2808-7B, ISO 8501-1, ISO 8503-1, ISO 8502-5, ISO 8503-2, ISO 8503-5, JIS K 5600-1-7, JIS K 5600-5-6, NACE RP0287, NF T30-038, NF T 30-124, NF T30-125, SS 55900, SSPC Guide 15, SSPC-PA2, SSPC VIS 1, SSPC VIS 2, SSPC VIS 3, SSPC VIS 4, SSPC VIS 5, US Navy NSI 009-32, US Navy PPI 63101-000

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| Elcometer 114 | Dewpoint Calculator | 4-7 |
| Elcometer 112 | Hexagonal Wet Film Comb: 25 -3000µm (1 - 120mils) | 7-2 |
| Elcometer 211 | Thickness Gauge | 8-23 |
| Elcometer 107 | Cross Hatch Full Kit - ISO (ASTM) Tape, Brush & Eye Glass | 10-18 |

## Technical Specification

| Part Number Metric | Imperial | Description |
|---|---|---|
| YKIT-HAZARD-1M | YKIT-HAZARD-1E | Elcometer Hazardous Area Inspection Kit |
| Dimensions | | 495 x 420 x 175mm (19.49 x 16.54 x 6.89") |

[1]Swedish Rust Standard ISO 8501, SIS055900 supplied in Metric Kit, US Standard SSPC VIS 1-01 and VIS-3 supplied in Imperial Kit

# Inspection Kits

## Elcometer



**STANDARDS:**

AS/NZS 1580.108.1, ASTM B 499,
ASTM D 7091, ASTM E 376,
ISO 2360, ISO 2808-12,
ISO 2808-7C, ISO 2808-7D,
NF T30-124

## Automotive Inspection Kit

Produced specifically for the automotive aftermarket and Insurance Assessors, 3rd party consultants, body shops and used car sales, these kits provide an instant measure of the coating thickness of panels. An illuminated magnifier is supplied to enable close inspection of bodywork.

Measurement parameters include:
- Surface temperature
- Surface inspection
- Coating thickness

### Contents

| Model | Description | Kit 1 | Kit 2 | Page |
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| Elcometer 415 | Paint and Powder Gauge | ■ | ■ | 8-20 |
| Elcometer 214L | Infrared Digital Laser Thermometer | | ■ | 4-11 |

Individual Instruments can be used in accordance with many other tests.
Please see individual Product Information Pages for details.

### Technical Specification

| Part Number | Description |
|---|---|
| YKITAUTOMOTIVE-1 | Elcometer Automotive Inspection Kit 1 |
| YKITAUTOMOTIVE-2 | Elcometer Automotive Inspection Kit 2 |
| Dimensions | 310 x 260 x 80mm (12.2 x 10.2 x 3.1") |
| Weight | Kit 1: 1kg (2.2lb)<br>Kit 2: 1.5kg (3.3lb) |

*elcometer*

# Powder Coating Inspection Kit

The Powder Coating Inspection Kit covers all eventualities in the powder inspection process, Elcometer has produced this kit to enable the inspection of powder coatings on all surfaces.

For a smooth surface, the digital Elcometer 415 may be used, but, for more demanding, uneven, surfaces, the Elcometer 1542 is included.

Measurement parameters include:
- Surface inspection
- Coating thickness
- Adhesion

**STANDARDS:**

AS 1580.408.4, AS/NZS 1580.108.1, ASTM B 499, ASTM D 7091, ASTM E 376, ISO 2360, ISO 2808-12, ISO 2808-7C, ISO 2808-7D, NF T30-124

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|---|---|---|
| Elcometer 137 | Illuminated Magnifier (x10) | 12-3 |
| Elcometer 415 | Powder Coating Thickness Gauge | 8-20 |
| Elcometer 1542 | Cross Hatch Cutter. 6 x 2mm or 6 x 1mm with ISO or ASTM Adhesive Tape | 10-19 |

Individual Instruments can be used in accordance with many other tests.
Please see individual Product Information Pages for details.

## Technical Specification

| Part Number ISO Kit | ASTM Kit | Description |
|---|---|---|
| YKITPOWDER-1M | YKITPOWDER-1E | Elcometer Powder Coatings Inspection Kit |
| Dimensions | | 360 x 300 x 120mm (12.2 x 10.2 x 3.1") |
| Weight | | 580g (1.27lb) |

# Inspection Kits

## Elcometer



## Qualicoat Powder Coating Inspection Kit

The Qualicoat Organisation brings together the ideals of several national coating associations into one quality label for the powder coating applied to aluminium architectural applications. The aim of Qualicoat is to establish the minimum standard that plant installations, coating materials and finished products which have been powder coated must meet.

Within this quality label, Qualicoat identifies a range of inspection requirements to be undertaken with regards to the quality control of powder coated products.

The Elcometer Qualicoat Powder Coating Inspection Kit provides the various test instrumentation required to meet the high standards of this organisation.

Measurement parameters include:

- Appearance
- Impact & deformation
- Hardness
- Oven temperature
- Coating thickness
- Adhesion

compatible with ElcoMaster™

available with Bluetooth® wireless technology

## Contents

| Model | Description | Basic | Top | Page |
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| Elcometer 1506 | Mandrel Bend Tester with 5mm and 8mm (0.20 and 0.31") Mandrels | ■ | | 21-3 |
| Elcometer 1615 | Base Unit and Tube Assembly | ■ | | 21-6 |
| Elcometer 1615 | Kit B: ISO 6272/2 and BS 6496 | ■ | | 21-8 |
| Elcometer 1620 | Manual Cupping Tester with Digital Gauge | ■ | | 21-5 |
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| Elcometer 215 | Oven Data Logger and Kit[+] | Standard | Top | 5-2 |
| Elcometer 415 | FNF Integral Digital Coating Thickness Gauge for smooth surfaces | ■ | | 8-20 |
| Elcometer 456 | FNF Separate Digital Coating Thickness Gauge | | Model T | 8-2 |
| Elcometer 456 | Standard FNF 1 Probe, 0 - 1500µm | | ■ | 8-12 |
| Elcometer 1542 | Cross Cut Set 6 x 1, 2, 3mm with ISO and ASTM Adhesive Tape | ■ | | 10-19 |

Individual Instruments can be used in accordance with many other tests.
Please see individual Product Information Pages for details.

## Technical Specification

| Part Number Basic | Top | Description |
|-------------------|-----|-------------|
| YKITQUALICOAT-1B | YKITQUALICOAT-1T | Elcometer Qualicoat Powder Coatings Inspection Kit |

[+] A wide range of k-type temperature probes is available. These are not supplied in the Qualicoat Kits and must be ordered separately.

elcometer®

## Surface Contamination Kit

**Elcometer 138/2**

The Elcometer 138/2 Surface Contamination Kit provides the means for testing invisible surface contaminants and includes tests for:

- pH
- chloride ions
- iron
- soluble salts

**STANDARDS:**
AS 3894.6-A, AS 3894.6-D, SSPC Guide 15

### Contents

| Model | Description |
|---|---|
| E135----A | Bresle Sampler (Box of 50) |
| T13818517 | 3 x 5ml (0.1fl oz) Syringes |
| T13818518 | 3 x Needles |
| T13818519 | Plastic Beaker, 30ml (1fl oz) |
| T99911344 | Pure Water, 250ml (8.5fl oz) |
| T13820562 | 100 x pH Test Strips |
| T13820563 | 100 x Iron Test Strips |
| T13820564 | 40 x Chloride Test Strips |

### Technical Specification

| Part Number | Description |
|---|---|
| E138----2 | Elcometer 138/2 Surface Contamination Kit |
| Measurement Range | pH: 0pH to 14pH<br>Iron: 3 - 10 - 25 - 50 - 100 - 250 - 500mg/l Fe²<br>Chloride: 30µg/cm² (30ppm) Cl to 600µg/cm² (600ppm) Cl |
| Dimensions | 300 x 220 x 75mm (11 x 8.6 x 3") |
| Weight | 2.1kg (4.62lb) |
| Packing List | 100 x pH test strips, 100 x Iron test strips, 40 x Chloride test strips, 50 x Bresle samplers, 3 x 5ml (0.2fl oz) syringes, 3 x needles, 30ml (1fl oz) plastic beaker, carry case and operating instructions |

# Elcometer 138

## Bresle Salt Kit

It is essential that the level of contaminants on a surface is measured prior to application of the coating to ensure the quality of the coating and that its optimum lifetime is achieved.

If the coating is applied to a contaminated surface, which is not properly prepared, it could fail prematurely resulting in costly re-coating and high maintenance costs.

The Elcometer 138 Bresle Kit includes the Elcometer 138 Conductivity Meter. This lightweight, portable conductivity meter accurately measures the salinity of the test samples.

The cartridge type sensor can be easily replaced when necessary and displays conductivity in a range of units including: S/cm, S/m, ppm and % salinity.

**STANDARDS:**

AS 3894.6-A, IMO MSC.215 (82), IMO MSC.244 (83), ISO 8502-6, ISO 8502-9, SSPC Guide 15, US Navy NSI 009-32, US Navy PPI 63101-000

## Technical Specification

| Part Number | Description | | |
|---|---|---|---|
| E138-1 | Elcometer 138 Bresle Salt Kit | | |
| Measurement Range | 0 mS/cm to 19.9 mS/cm and 0 S/m to 1.99 S/m | | |
| Accuracy | 2% full scale ±1 digit (for Elcometer 138 see page 2-27 for full specification) | | |
| Dimensions | 300 x 220 x 75mm (11 x 8.6 x 3") | Weight | 2.1kg (4.62lb) |
| Packing List | Box of 25 Bresle patches, Elcometer 138 Conductivity Meter, 14ml (0.5fl oz) bottle of standard 1.41 mS/cm calibration solution, 14ml (0.5fl oz) bottle of moistening solution, 250ml (8.5fl oz) bottle of pure water, 3 x 5ml (0.1fl oz) syringes, 3 x blunt needles, 30ml (1fl oz) plastic beaker, 2 x CR2032 batteries, carry case and operating instructions | | |

## Accessories

| | | | |
|---|---|---|---|
| E135----B | Bresle Patches (Box of 25) | T13818519 | Plastic Beaker 30ml (1fl oz) |
| T13818517 | 3 x 5ml (0.1fl oz) Syringes | T13823926 | Calibration Solution 1.41 mS/cm 14ml (0.5fl oz) bottle |
| T13818518 | 3 x Needles | T99911344 | Pure Water 250ml (8.5fl oz) Bottle |

### Measuring salt contamination using the Bresle method in accordance with ISO 8502-6/ISO 8502-9

Remove protective backing and foam centre from the patch.

Apply the patch to surface and press firmly around perimeter to achieve a complete seal - ensuring that a minimum amount of air is trapped within the test compartment.

Insert 3ml of deionised water from the syringe into the patch through its foam perimeter, at a 30° angle, so that it passes through the foam into the test compartment.

Inject 1.5ml of water into the test compartment.

Reposition the needle and remove the remaining air within the compartment.

Remove the needle and syringe and hold the syringe with the needle pointing upwards and expel the air.

Insert the syringe needle into the patch and inject the remaining water.

Withdraw and pull the solution back into the syringe and re-inject back into the patch.

Repeat at least four times and then extract as much solution as possible.

Remove the syringe from the patch and measure the conductivity of the solution using a suitable Conductivity Meter such as the Elcometer 138 on page 2-27.

# CSN Chloride, Sulphate & Nitrate Kit

## Elcometer 134 CSN

Designed to accurately, measure surface chloride, sulphate and nitrate ions in minutes, the Elcometer 134 CSN Salt kit offers a single kit solution for testing in the field.

All the components of the Elcometer CSN Test Kits are pre-measured and pre-dosed for trouble free testing.

Results are recorded in parts per million (ppm) requiring no complicated calculations. Elcometer 134 CSN tests are all designed to use a ratio of 1:1 for easy conversion to μg/cm².

Supplied in an ABS plastic carry case for easy portability around the site, each field kit is supplied with full instructions attached to the inside lid, together with:
- 5 x Chloride tests
- 5 x Sulphate tests, together with 1 x colorimeter, for sulphate testing
- 5 x Nitrate test strips
- 5 x Syringes (without needles)

**STANDARDS:**
ISO 8502-5, ISO 8502-11, SSP Guide 15

## Technical Specification

| Part Number | Description |
|---|---|
| E134-CSN | Elcometer 134 CSN Chloride, Sulphate & Nitrate Test Kit |
| Measuring Range | 0 - 100μg/cm² (0 - 100ppm) |
| Scale Resolution | 1μg/cm² (1ppm) |
| Sample Time | 1 - 5 minutes (approximately) |
| Storage Temperature | Not exceeding 25°C (77°F) |
| Dimensions | 360 x 320 x 140mm (14.2 x 12.6 x 5.5") |
| Weight | 1.76kg (3.8lb) |
| Packing List | 5 x tests (containing: 5 x chloride tests, 5 x nitrate test strips, 5 x sulphate tests, 5 x syringes) 1 x colorimeter, carry case and operating instructions |

## Accessories

| Part Number | Description |
|---|---|
| T134---C | 1 set of 5 Nitrate Tests |
| T134-KIT | Refill Kit for Elcometer 134 CSN |

# Inspection Kits

## Elcometer 270 — Pinhole Detection Inspection Kit

The Elcometer 270 Pinhole Detectors Inspection Kit utilises the wet sponge technique and has been designed to set a new standard for wet sponge detectors - a high quality, low voltage detector with similar accessories to a high voltage spark tester.

The Inspector's Kit does not include the main instrument; just add the model number to the order:

| Model | Description |
|---|---|
| D270----3 | Elcometer 270/3 Pinhole Detector (9V & 90V) |
| D270----4 | Elcometer 270/4 Pinhole Detector (9V, 67.5V & 90V) |

For more information see page 11-2.

**STANDARDS:**
AS 3894.2, ASTM D 5162-A, ASTM G6, ASTM G62-A, BS 7793-2, ISO 8289-A, ISO 14654, JIS K 6766, NACE RP 0188, NACE SP 0188, NACE TM0384

### Technical Specification

| Model | Description |
|---|---|
| T27018191 | Elcometer 270 Inspection Kit |
| Packing List | Separate wand handle & lead, roller wand, 10m (32') signal return cable, extension pieces, telescopic extension, belt clip, bottle of wetting agent, AA batteries, spare flat sponge, spare roller sponge |

The kit does not include the main instrument; see page 11-2 for more information

### Accessories

**Standard wand** — T27016867
A universal flat sponge to suit almost all applications

**Spare flat sponge set** — T27018050
Pack of 3 sponges;
150 x 60 x 25mm (6 x 2.3 x 1")

**Roller sponge wand** — T27016960
Ideal for large flat surface inspection

**Spare roller sponge** — T27018051

**Separate wand adaptor** — T27016999
with belt clip - converts the gauge into a separate pinhole detector

**Telescopic wand adaptor** — T27016998
with belt clip - extends to 1m(39"), ideal for floors or high areas

**Extension piece** — T27016965
420mm (16.5") extensions to expand operators reach
Additional extension pieces can be connected to each other

**Wetting agent** — T27018024
50ml (1.7floz) bottle - helps aid the fast detection of pinholes. Simply add to the water used to dampen the sponge

**Return cable - 4m (13')** — T99916954
supplied as standard, complete with crocodile clip and plug

**Return cable - 10m (32')** — T99916996
supplied on a drum, complete with clip and connection plug

# Pulsed DC Holiday Detector Inspection Kit

## Elcometer 280

The Elcometer 280 is a 'stick type' holiday detector which has been designed to make pulsed DC high voltage holiday detection safer, easier and more reliable than ever before.

Using state of the art electronics, the Elcometer 280 allows users to inspect coatings - without connecting the earth return lead to the component substrate - ideal for inspecting large surfaces and pipelines.

The Elcometer 280 uses the high voltage pulsed DC technique to detect holidays in coatings - even if the coating is damp, dirty or slightly conductive.

From the two stage safety switch, bright LED's and screen icons signifying when the high voltage is on, to the extended ribbing to protect the user from spark creep, the Elcometer 280 sets the standard for high voltage measurement safety.

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**STANDARDS:**

AS 3894.1, ANSI/AWWA C203, ANSI/AWWA C214, ASTM D4787, ASTM D5162, ISO 29601, JIS G 3491, JIS G 3492, NACE RP0274, NACE SP0188, NACE SP0490, NACE TM0186, NACE TM0384

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### Technical Specification

| Part Number | Description |
|---|---|
| D280-T-KIT | Elcometer 280 Pulsed DC Holiday Detector Inspection Kit |
| Packing List | Elcometer 280 Pulsed DC Holiday Detector Gauge (Model T), 5m (16') trailing signal return lead, battery pack (2 supplied with Model T), battery charger with mains cables (UK, EUR & US), stainless steel rolling spring holder (supplied with Model T only), 250mm (9.8") probe extension shaft, shoulder strap and operating instructions - packed in a lightweight, rugged, wheeled transit case |

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### Accessories - For more information see page 11-4

**Band brush probes**

See page 11-12

**External 'C-type' wire brushes**

See page 11-14

**Right angled wire brush probes**

See page 11-13

**Right angled rubber probes**

See page 11-14

**Internal circular wire pipe brush probes**

See page 11-13
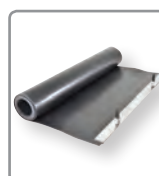
**Grounding mats**

See page 11-16

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## Elcometer

# Duct Deposit Measuring System

Controlling ducting deposits and monitoring their build-up is essential to maintain hygiene standards and reduce fire risks in heating and ventilation systems.

The Elcometer 456 Duct Deposit Measuring System has been specifically designed to meet the requirements of the DTT (Deposit Thickness Test) in HVCA's (Heating & Ventilation Contractor's Association) Guide to Good Practice, for the measurement of dust and grease deposits within ventilation systems and kitchen ducts made of ferrous metals.

By using the Elcometer 456 Ferrous Top Gauge with the specially designed probe and duct cleaning templates, readings can be taken of the deposit thickness on a specific test area, before and after cleaning.

ElcoMaster™ software, supplied as standard with the Elcometer 456 Duct Deposit Measuring System includes a template designed specifically for reporting duct deposit measurements.

compatible with
**ElcoMaster**™

available with
**Bluetooth**®
wireless technology

**Android**™

Made for
**iPod** **iPhone** **iPad**

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**STANDARDS:**

AS 2331.1.4, AS 3894.3-B, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186-B, ASTM D 1400, ASTM D 7091, ASTM E 376, ASTM G 12, BS 3900-C5-6B, BS 3900-C5-6A, BS 5411-11, BS 5411-3, BS 5599, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, IMO MSC.215(82), IMO MSC.244 (83), ISO 1461, ISO 19840, ISO 2063, ISO 2360, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, ISO 2808-12, JIS K 5600-1-7, NF T30-124, SS 184159, SSPC PA 2, US Navy PPI 63101-000, US Navy NSI 009-32

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## Technical Specification

| Part Number | Description | Certificate |
|---|---|---|
| A456CDUCT | Elcometer 456 Duct Deposit Measuring System | ○ |
| Measurement Range | 0 - 1500μm (0 - 60mils) | |
| Packing List | Elcometer 456 Top Separate Gauge, Ferrous duct probe, duct cleaning template, precision foil set 25μm, 50μm, 125μm, 250μm, 500μm, 1000μm, 2mm (x2), ElcoMaster™ software, batteries, wrist harness, carry case and operating instructions | |

## Accessories

| | |
|---|---|
| T456CF2B | Elcometer 456 Duct Probe |
| T99913939 | Duct Cleaning Template |
| T99022255-8 | Precision Foil Set: Scale 2B; 0 - 5mm (0 - 200mils) |
| T99022255-8C | Certified Precision Foil Set: Scale 2B; 0 - 5mm (0 - 200mils) |
| T99913969 | Ferrous Zero Plate |
| T99920130 | USB Bluetooth® Transmitter/Receiver |

○ Optional Calibration Certificate available.

# Appearance

## Gloss, Haze, DOI, Colour

**Visual appearance can determine a person's perception of a product. Colour and Gloss are two key parameters that are used to define a product's overall quality. Perception is subjective, but Elcometer's range of instruments quantify the appearance criteria.**

**Gloss:** The ability of a surface to reflect light without scattering is known as gloss. Gloss is measured by directing a constant intensity light beam at a fixed angle to the test surface and then by monitoring the amount of reflected light at the same angle. Different surfaces require different reflective angles.

Elcometer Glossmeters cover the range necessary to measure almost any surface from high gloss to matt, from large to small surfaces.

**Haze:** Some materials appear to have a considerable difference in gloss yet give comparable readings when measured with a traditional glossmeter. These materials can be differentiated by measuring at a second angle and comparing the two readings using a haze meter. Reflectance haze is defined by ASTM D4039 as the difference between gloss at 60° and the gloss at 20°.

**Rspec:** Peak specular reflectance is a measure of the peak gloss value of a surface; this value is obtained very close to the specular angle.

**Distinctiveness of Image (DOI):** Measures the effect of surface textures such as orange peel on a reflected image. Reflections seen in a totally smooth high gloss surface are completely sharp and distinct. As surface textures increase the image becomes fuzzy and distorted.

**Colour:** A material's ability to absorb certain wavelengths of light and reflect others is defined as its colour. For example a black material reflects no light across the complete colour spectrum. A pure white material reflects all of the light, whilst all other colours reflect light at different points of the spectrum. Colour is quantified by the material's Red, Green and Blue (RGB) values.

# Gloss & Haze Measurement

Visual appearance can determine a person's perception of a product. Perception is subjective. A key measurement parameter used to define and quantify a product's overall visual quality is gloss.
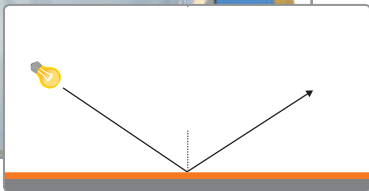


Gloss is measured by directing a constant intensity light beam, at a fixed angle, on to the test surface and then monitoring the amount of reflected light from the same angle. This specular reflectance is measured using a glossmeter.

Different surfaces require different reflective angles.

High Gloss

### High Gloss
Surfaces with a brilliant or highly polished finish reflect images clearly. This distinct reflection is caused by the incident light reflecting on the surface in a specular direction.
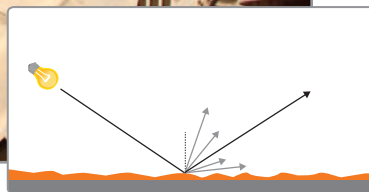
### Semi & Matt Gloss
Semi and matt surfaces reflect images less distinctly and with reduced intensity.

On semi or matt surfaces light not only reflects in a specular direction but also is scattered causing the reflected image to appear diffused.

Semi & Matt Gloss

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## Choosing the correct angle for gloss measurement

Gloss measurement is based on the amount of light reflected on the surface relative to a polished glass reference standard, measured in Gloss Units (GU). The amount of light that is reflected on the surface is dependent on the angle of incidence and the properties of the surface.

Gloss is categorised as either matt, semi or high gloss. In order to determine the most appropriate measurement angle start with a glossmeter set at a 60° angle of incidence.

If the result is between 10 - 70GU, the coating is termed 'semi-gloss' and should be measured using the 60° angle. If the result is less than 10GU, the product is 'low gloss' and should be measured using the 85° angle and if it is greater than 70GU, the product is known as 'high gloss' and should be measured using the 20° angle.

All three angles should be recorded (20, 60 & 85°) when measuring gloss on anodised metals to ensure a complete understanding of the specular reflectance between the coating and the metal substrate.

| Gloss Range | 60° value | Measure with |
|---|---|---|
| High Gloss | > 70GU | 20° |
| Semi Gloss | 10 - 70GU | 60° |
| Low/ Matt | < 10GU | 85° |

**% Reflectance (%)**
% Reflectance compares the amount of light energy transmitted and received by a glossmeter and expresses the value as a percentage. The shinier a surface is, the closer the value will be to 100%.

Whilst the Gloss Unit (GU) scale is linear, each angle of incidence has a different measurement range; 0 – 2000GU (20°), 0 – 1000GU (60°), 0 – 160GU (85°).

% Reflectance displays the measurement value as a percentage relative to the selected angle of incidence. For example, a value of 1000GU at 20° would be expressed as 50%$_{20}$ and 500GU would be expressed as 25%$_{20}$, but at 60° this would be expressed as 50%$_{60}$.

**Haze (HU)**
Haze causes a drop in reflected contrast and causes 'halos' to appear around the reflected light sources, dramatically reducing the visual quality.

In accordance with ASTM D4039 haze is defined as the numeric difference between the specular reflectance at 60° and 20°.

This is expressed in Haze Units (HU).
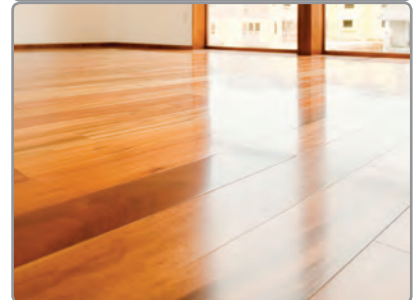
# Gloss & Haze Measurement

## Elcometer 480      **Glossmeters**

The Elcometer 480 range are easy to use glossmeters which combine high accuracy, repeatability and reproducibility with functionality making them the most advanced glossmeters on the market today.

- Small, robust & ergonomic

- 3 - 10 readings per second

- Repeatable, reproducible & accurate

- Multiple angles; 20°, 60°, 85°

- 40,000 reading memory in up to 2,500 batches

- Date and time stamped readings

- USB & Bluetooth® data output

- PC, iPhone or Android™ compatible

- Automatic gauge & tile diagnostics

- Auto calibration tile recognition via RFID*

- 40 user definable limit standards

- Standard, auto repeat and scan modes

- Differential mode with pass/fail

- Display readings, statistics, graphs & batch review

**STANDARDS:**
AS/NZS 1580.602.2, ASTM C584, ASTM C523, ASTM D523, ASTM D1455, ASTM D2457, ASTM D4039, ASTM D4449, ASTM D5767, ASTM E430, ASTM E2387, BS 3900 D5, DIN 67530, ECCA T2, EN 12373-11, EN 13523-2, ISO 7668, ISO 2813, ISO 13803, ISO 17025, JIS K 5600-4-7, JIS Z 8741, TAPPI T 653 (20°)

* Radio Frequency Identification; patent applied for

## Elcometer 480
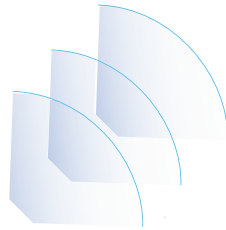


Small, robust and ergonomic, the Elcometer 480 range of glossmeters have been designed to exceed the demands of industry today.

Combining easy to use, multi-lingual menu structures with exceptional repeatability, reproducibility & accuracy, the Elcometer 480 provides users with best in class hand held gloss measurement.

Using state of the art design and manufacturing techniques provides world leading features and functionality - reliably measuring & recording Gloss, % Reflectance & Haze on any material, including paint, plastic, ceramic or metal.

The Elcometer 480's rapid LED technology accurately measures up to 3 angles at the same time at a rate of 10 readings per second.

Measurements can be instantly transferred to PC, iPhone, Android™ or other mobile devices via USB or Bluetooth®.

Using the ElcoMaster™ software, professional reports for gloss and other appearance measurements can be quickly generated. Alternatively gloss readings can be combined with other key measurement parameters such as coating thickness, adhesion and oven temperature profile - within the same software package.

PC **Android**™

Made for iPod iPhone iPad

compatible with ElcoMaster™

# Gloss & Haze Measurement
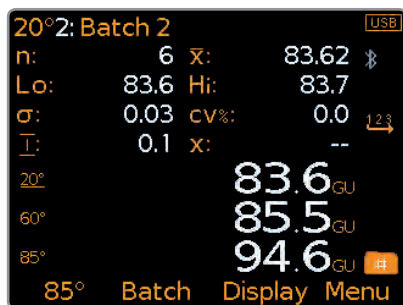
## Elcometer 480



## Glossmeters

### The Model Range

The Elcometer 480 is available as either a simple entry level 60° glossmeter or state of the art Single, Dual or Triple angle variants.

*   Single: 60°
*   Dual: 20° & 60°
*   Triple: 20°, 60° & 85°



### Memory and Batching

Store 40,000 date and timed stamped readings in up to 2,500 user definable alpha-numeric batches.

Readings can be transferred to PC, iPhone, Android™ or other mobile devices via USB or Bluetooth® for instant reporting using ElcoMaster™ software.



### Display Modes

Fully customisable, scratch and solvent resistant colour LCD allows the user to display:

*   Gloss, % Reflectance or Haze readings
*   Statistics
*   Readings and Differential with pass/fail
*   Trend Graph
*   Analogue Scan Bar



### Standard, Auto Repeat & Scan Modes

No two inspections are the same.  It is for this reason that the Elcometer 480 is equipped with three measurement modes:

*   Standard Mode: Press the measure button to take an individual spot measurement.
*   Auto Repeat Mode: When the glossmeter is slid over the surface a measurement of all three angles is automatically taken at a user definable rate between 10 - 180 readings per minute.  When enabled all the individual readings are stored into memory.
*   Scan Mode: As the glossmeter slides over the entire surface area the gauge measures all three angles at a continuous rate of 10 readings per second. When stopped, the gauge displays and stores the average, highest and lowest values - ideal for checking a sample's overall uniformity.

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# Glossmeters

### Accuracy & Repeatability

Advanced electronics and a superior optical design combines highly accurate, repeatable and reproducible measurements with industry leading inter-instrument agreement - across its entire 0 - 2,000GU range.

| Range | 0-10GU | 10-100GU | 100-2000GU |
|---|---|---|---|
| Repeatability | ±0.1GU | ±0.2GU | ±0.2% |
| Reproducibility | ±0.2GU | ±0.5GU | ±0.5% |

### Limit Standards and Differential Mode with Pass/Fail

When visual appearance is critical Master Standards are created. These are generated and approved by the customer and then used by manufacturers as part of their quality control inspection regime. As these Master Standards have been visually approved they often do not have numerical gloss values assigned.

In order to avoid subjectivity between inspectors, the Elcometer 480 can automatically generate and store the nominal (target), highest & lowest acceptable gloss values (Limits) from the Master Standard.

Up to 40 Limits for each customer's Master Standards can be stored within, and recalled from, the gauge's 'Limit Standard' memory.

When Limit Standards are used in combination with the gauge's Differential Mode, the Elcometer 480 displays the measurement value together with the difference from the nominal (target) value.

Readings outside the Limit Standard are displayed in red, providing quick Pass/Fail analysis.

Due to the Elcometer 480's industry leading inter-instrument agreement, once a Master Standard Limit has been created, the gauge can transfer these values to other Elcometer 480 glossmeters, via the ElcoMaster™ software's Library of Limit Standards, at any time.

Information from multiple glossmeters can be combined into a single inspection report within ElcoMaster™, ideal for multiple production and assembly lines.

## Elcometer 480

# Create instant reports with ElcoMaster™

What you do with the collected data is just as important as taking the readings themselves.



ElcoMaster™ is a fast, easy to use software solution for all your data management and quality assurance needs, preparing professional inspection reports at the click of a button.

Data transferred to ElcoMaster™ includes;
- 20° 60° & 85° Gloss Units (GU)
- Haze Unit (HU)
- % Reflectance (%)
- Date & time for each reading
- Limit Standard values
- Batch information & statistics
- Calibration information including date/time, serial number & tile values

Whether you are in the field or on the factory floor, using the ElcoMaster™ Mobile App users can;
- Store live readings directly on to a mobile device and save them into batches
- View graphs in real-time whilst carrying out the inspection
- Add notes to individual batch reading
- Add photographs of the test surface to each individual batch reading at the click of a button
- Plot individual readings on to a location Map photograph or diagram via the mobile device's internal GPS[1]
- Inspection data can be transferred from mobile to PC for further analysis and reporting
- Generate instant .pdf[2] report for submission

[1] Available on Android™ only     [2] Available on iOS devices only

## Elcometer 480

**Connect**
Connect gauge via Bluetooth® to see live readings directly on the phone and save them into batches.

**Review**
Review average, maximum and minimum readings instantly.

**Manage & Print**
Store all data; gloss, dry film thickness, surface profile, climate and manual reports in easy to manage folders.

**Photos & Notes**
Add photos, notes and comments.

**Image Collection**
Use measurement location points on images to indicate the position for the next reading.

**Combine**
Combine different inspection parameters (such as gloss, dry film thickness, oven temperature profile and adhesion) together with images, notes and other project specific information into reports.

**Collaborate**
Share inspection data securely via the Cloud and collaborate on projects using the instant messaging feature in ElcoMaster™.

**Send**
Email inspection data from a mobile device to a PC for further analysis and reporting or transfer data via the Cloud.

PDF

Email

Cloud

Dropbox · Google Drive · FTP server

Using the Limit Standard Library within ElcoMaster™, Limit Standards from one gauge can be transferred to other gauges optimising the inspection process.

PC

ANDROID APP ON Google play

Download on the App Store

compatible with ElcoMaster™

# Gloss & Haze Measurement

## Elcometer 480      Glossmeters

| Product Features | ■ Standard     □ Optional | |
|---|---|---|
| | **Model B** | **Model T** |
| Measurement geometries | 60° | 60°, 20/60° or 20/60/85°* |
| Measurement units | GU | GU, HU† & % |
| Fast, accurate reading rate | ■ | ■ |
| Repeatable & reproducible measurements | ■ | ■ |
| Easy to use menu structure; *in 30+ languages* | ■ | ■ |
| Tough, impact, waterproof & dust resistant | ■ | ■ |
| Scratch & solvent resistant colour display; *2.4" (6cm) TFT* | ■ | ■ |
| Rotating display: *auto, 0°, 180°* | ■ | ■ |
| Ambient light sensor; *with adjustable auto brightness* | ■ | ■ |
| Data output | | |
|     USB live readings | ■ | ■ |
|     USB batch download | | ■ |
|     Bluetooth®: *to PC, iOS or Android™ mobile devices* | | ■ |
| USB & battery powered | ■ | ■ |
| Calibration Certificate | ■ | ■ |
| Manual gauge calibration | ■ | ■ |
| Auto gauge calibration; *via RFID tagging of integrated calibration tile#* | | ■ |
| On screen statistics - *user selectable* | | |
|     Number of readings, Mean (average), Standard deviation, | ■ | ■ |
|     Highest reading, Lowest reading, Range | | ■ |
|     Coefficient of variation, | | ■ |
|     Nominal value, High Limit value, Low Limit value | | ■ |
|     Number above high limit, Number below low limit | | ■ |
| Measurement modes | | |
|     Standard Mode | ■ | ■ |
|     Auto Repeat Mode*; programmable 10-180 readings per minute* | | ■ |
|     Scan Mode; *10 readings per second* | | ■ |
|     Differential Mode with Pass/ Fail mode*;* | | ■ |
| Limit Standards; *up to 40 programmable standards* | | ■ |
|     Gauge & batch specific standard limits | | ■ |
| Gauge memory 40,000 readings in up to 2,500 batches | | ■ |
| Alpha-numeric batch names | | ■ |
| Fixed batch size mode | | ■ |
| Date and time stamp | | ■ |
| Gauge auto diagnostics | ■ | ■ |
| Display modes; *user selectable* | | |
|     Readings; *gloss, % reflectance†, haze†* | ■ | ■ |
|     Selected statistics | ■ | ■ |
|     Live trend graph; *last 20 readings* | | ■ |
|     Scan bar | | ■ |
|     Readings & differential (with pass/fail) | | ■ |
| Delete last reading | ■ | ■ |
| 2 year extended warranty^ | ■ | ■ |

^The Elcometer 480 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com
* Dependant on model        † Haze on Dual and Triple models only
# Radio Frequency Identification; patent applied for
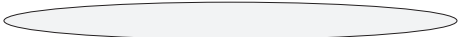
## Glossmeters                                    Elcometer 480

### Technical Specification                                    C

| Part Number | Description | Certificate |
|---|---|---|
| J480B-6 | Elcometer 480 Model B 60° Glossmeter | ● |
| J480T-6 | Elcometer 480 Model T 60° Glossmeter | ● |
| J480T-26 | Elcometer 480 Model T 20/60° Glossmeter | ● |
| J480T-268 | Elcometer 480 Model T 20/60/85° Glossmeter | ● |
| Display information | 2.4'' (6cm) QVGA colour TFT display, 320 x 240 pixels | |
| Power | USB (via PC) or 2 x AA batteries (~50,000 readings) | |

| | 20° | 60° | 85° |
|---|---|---|---|
| Measurement Dimensions | 20°: 10 x 10mm | 60°: 8 x 16mm | 85°: 4 x 55mm |
| Measurement Range | 0 - 2,000GU | 0 - 1,000GU | 0 - 160GU |

| | |
|---|---|
| Repeatability | ± 0.1GU (0 - 10GU); ±0.2GU (10 - 100GU); ±0.2%: 100 - 2000GU |
| Reproducibility | ± 0.2GU (0 - 10GU); ±0.5GU (10 - 100GU); ±0.5% 100 - 2000GU |
| Resolution | Gloss: 0.1 GU (0 - 100GU); 1 GU (>100GU) |
| | % Reflectance: 0.01% (0 - 10GU); 0.1% (10 - 100GU) |
| | Haze: 0.1 HU (0 - 100HU); 1 HU (>100HU) |
| Operating Temperature | -10°C to 50°C (14 to 122°F); Relative Humidity: 0 - 85%RH |
| Dimensions (H x W x D) | 68 x 155 x 50mm (2.68 x 6.10 x 1.97") |
| Weight | 534g (1lb 3oz) *[including batteries]* |
| Packing List | Elcometer 480 Glossmeter, integrated calibration tile, calibration certificate, 2 x AA batteries, wrist strap, operating instructions, plastic carry case, ElcoMaster™ software (Model T) and USB cable (Model T) |

### Accessories

| | | | |
|---|---|---|---|
| T48024798-LC | Low Gloss Calibration Tile | Nominal Value: 22GU at 60° | ● |
| T48024798-MDC | Mid Gloss Calibration Tile | Nominal Value: 55GU at 60° | ● |
| T48024798-H | High Gloss Calibration Tile* | Nominal Value: 97GU at 60° | |
| T48024798-HC | High Gloss Calibration Tile | Nominal Value: 97GU at 60° | ● |
| T48024798-MRC | Mirror Gloss Calibration Tile | Nominal Value: 1900GU at 20° | ● |
| T48024798-SH | Soft Material Specimen Holder, complete with 3 sample trays | | |
| T48025004 | Soft Material Sample Trays (x3) | | |
| T99923535 | Gloss Tile Cleaning Cloth | | |
| T99925002 | USB Cable | | |

Each calibration tile is supplied within its own base unit to ensure measurement accuracy and repeatability

The soft material specimen holder is supplied with 3 sample trays - ideal for testing soft, powder or viscous materials

● Certificate supplied as standard.                    * Supplied with gauge

# DOI

## Elcometer 408

### Triple Angle Gloss & DOI Meter

The Elcometer 408 provides the very latest in gloss measurement technology, providing accurate gloss, haze and distinctiveness of image (DOI) analysis in a single reading.

Press button once to measure all parameters; gloss, haze, DOI, Rspec, RIQ and Goniophotometric profiles

USB or Bluetooth® data output

On screen statistics with trend & measurement graphs

Stores up to 999 readings with full goniophotometric profiles in user definable batches

Integrated calibration tile for fully automatic error-free calibration

Easy to read large colour screen with adjustable brightness

Fast and simultaneous measurement of all parameters
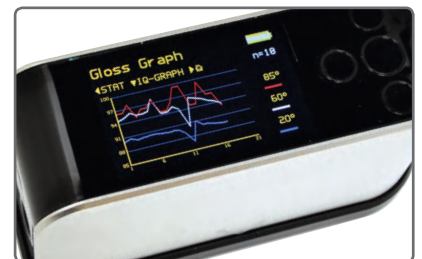
On screen graph highlights trends in the measured batch

elcometer®

# Gloss & DOI Meter Definitions

**Distinctness of Image (DOI)**
Distinctness of Image measures the sharpness of a reflected image in a coating surface. Similar coatings may have identical gloss values but visually the quality may be very different. A visually poor coating may have a highly textured dimpled appearance known as "orange peel". When a reflected object is viewed in such a coating the image becomes fuzzy and distorted.

A surface that has a perfect undistorted image returns a value of 100. As the value decreases the image becomes more distorted.
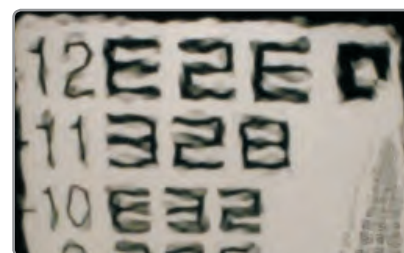


Distinctiveness of Image (DOI)

**Haze (HU) & Log Haze (HULog)**
High quality gloss surfaces have a clear, deep, brilliant finish. Haze causes a drop in reflected contrast and causes halos to appear around light sources, these unwanted effects dramatically reduce visual quality.

Undetectable by traditional gloss meters the Elcometer 408 measures Haze Units in accordance with ASTM D4039 at the same time as simultaneously measuring gloss and DOI.
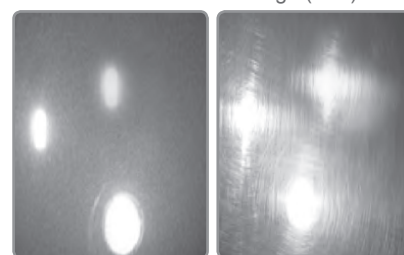


Haze (HU) & Haze Log (HULog)

**Peak Reflectance (Rspec)**
Rspec is the peak reflectance measured over a very narrow angle in the specular direction and is very sensitive to any surface texture, waviness or rippling. When Rspec is equal to the gloss the surface is smooth. Rspec drops as the surface texture increases.
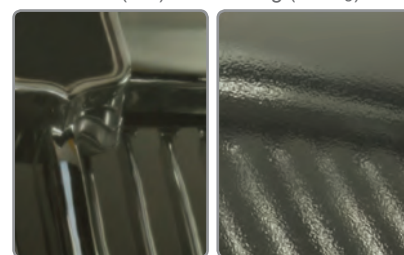


Peak Reflectance (Rspec)

**Reflected Image Quality (RIQ)**
Reflected Image Quality provides greater sensitivity when evaluating highly reflective coatings and the specular / diffuse element of lower gloss materials.
A surface that exhibits a perfect undistorted image returns a value of 100, as the values decrease higher surface texture is present and the image sharpness reduced.
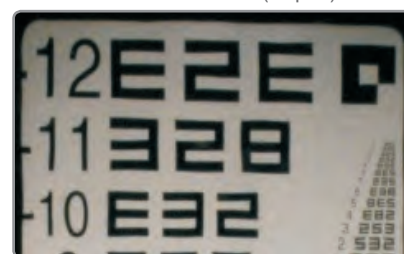


Reflected Image Quality (RIQ)

**Goniophotometric Profile**
The gloss, haze, DOI and Rspec values produced by the Elcometer 408 can be used to assess the visual quality of any surface. The full range of goniophotometric curves can be downloaded to a computer for detailed understanding of specular reflectance. The Elcometer 408 can also be used to quantify an orange peel finish or a substandard coating with a low DOI.
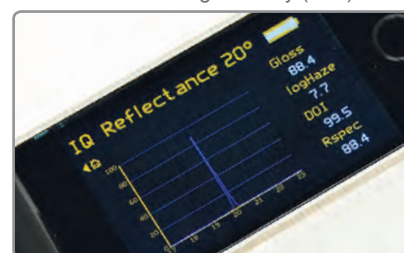


Goniophotometric Profile

**Elcometer 408**      **Triple Angle Gloss & DOI Meter**

## Accurate

- Fast and simultaneous measurement of gloss, haze, DOI, Rspec, RIQ and Goniophotometric profiles

- Each instrument is supplied with a Calibration Certificate

## Simple

- Bright, easy to read LCD screen displays the gloss value, statistics & graphs

- Display measurements are user definable

- Each set of readings is time & date stamped

## Flexible

- Triple (20/60/85°) angle for maximum accuracy and resolution in all gloss applications

- Bluetooth® or USB download to ElcoMaster™ data management software for instant analysis

## Durable

- Robust aluminium construction ensures optical stability

- 17hrs+ continuous operation or 20,000+ readings

- Compact & portable instrument with integrated tile holder

## Efficient

- Easy menu-driven user interface in multiple languages

- Clear, illuminated display showing up to five parameters on screen

- On board trend analysis with gloss and image quality (IQ) values

## Powerful

- On board memory for 999 readings with full goniophotometric profiles

- Internal battery is fully rechargeable in 2.5 hours

Paperless Quality Assurance
with ElcoMaster™

compatible with
ElcoMaster™

available with
**Bluetooth**®
wireless technology

elcometer®

# Triple Angle Gloss & DOI Meter

**Elcometer 408**

---

## Product Features

| | |
|---|---|
| Easy to use menu structure | English, Spanish, French, Italian, German, Chinese |
| Bright colour screen; *with permanent back light* | Adjustable brightness, 6 button touch sensitive interface |
| User definable measurement display | ■ |
| Scratch & solvent resistant display | ■ |
| USB power supply | ■ |
| Calibration certificate | ■ |
| Data output | ■ |
| USB; *to PC* | ■ |
| Bluetooth®: *to PC or Android™ mobile device#* | ■ |
| On screen statistics | $\overline{x}$, σ, maximum & minimum value |
| ElcoMaster™ software & USB cable | ■ |
| Date and time stamp | ■ |
| Gauge memory; *number of readings* | up to 999 readings & curves |
| Repeat measurement mode | user definable: 2, 5 or 10 seconds |
| Delete last reading | ■ |
| Standard & fixed batch sizes | ■ |
| Trend, gloss & image graphs | ■ |
| Measurement modes | Gloss (GU): 20°, 60°, 85°*; Haze (HU) & Haze Log (HU Log); Distinctiveness of Image (DOI); Peak Reflectance (Rspec); Reflected Image Quality (RIQ) & Goniophotometric Profile |

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## Technical Specification                                                    C

| Part Number | Description | | | | Certificate |
|---|---|---|---|---|---|
| J408--268 | Elcometer 408 Triple Angle Gloss & DOI Meter (20, 60 & 85 Degree) | | | | ● |
| Power Supply | Rechargeable Battery Pack | | | | |
| Recharge Time | USB 4.5 hours | | | | |

| | Gloss | Haze | DOI | RIQ | Goniophotometric |
|---|---|---|---|---|---|
| Measurement Range | 20°: 0-2,000GU; 60°: 0-1,000GU; 85°: 0-150GU | 0-2,000GU | 0-100 DOI | 0-100 RIQ | - |
| Resolution | 0.1GU | 0.1HU | 0.1 | | 0.1GU |
| Repeatability | 0.2GU | 0.2HU | 0.2 | | 0.2GU |
| Reproduceability | 0.5GU | 0.5HU | 0.5 | | 0.5GU |
| Peak Specular Reflectance at 20° | ± 0.09375° | | | | |
| Dimensions (H x W x D) | 65 x 140 x 50mm (2.5 x 5.5 x 1.9") | Weight | 790g (1lb 12oz) | | |
| Packing List | Elcometer 408 Gloss & DOI Meter, high gloss calibration tile with calibration certificate, gloss tile cleaning cloth, transit case, USB cable, ElcoMaster™ software and operating instructions. | | | | |

---

## Accessories

| | |
|---|---|
| T40823532 | High Gloss Calibration Tile with Calibration Certificate |
| T40823533 | Mirror Gloss Calibration Tile with Calibration Certificate |
| T99923535 | Gloss Tile Cleaning Cloth |
| T99921325 | USB Cable |

\* Elcometer 408 Triple Angle Gloss & DOI Meter only

● Certificate supplied as standard.

# Live readings only

## Elcometer 6085 — Portable Sphere Spectrophotometer

The Elcometer 6085 is an affordable sphere spectrophotometer, designed to give fast, precise and accurate colour measurement information on materials ranging from paper and paint to plastics and textiles.

- Lightweight, compact, portable instrument
- Diffuse/8° sphere optical geometry
- Fixed 8mm aperture
- Large, easy-to-read high res graphical colour LCD display
- Opacity and colour strength measurement
- Simultaneous measurement of both specular component included and specular component excluded
- Rugged construction
- Reliable detent lock
- Rechargeable battery for portable use

**STANDARDS:**
AS/NZS 1580.601.3, ASTM C 609, ASTM D 2244, ASTM E 1164, ASTM E 308, ASTM E 313, BS 8493, DIN 5033-2, DIN 5033-3, DIN 5033-4, DIN 5033-7, DIN 6174, EN 12373-12, EN 13523-15, ISO 7724-2, ISO 7724-3, JIS K 5600-4-5, JIS K 5600-4-6, NF T36-006, NF X08-012-1, NF X08-012-2

### Key Features

- **Measuring Functions and Indices**
  The Elcometer 6085 provides absolute and difference measurements for the following colourmetric systems. These values can be obtained from any of the nine illuminants with 2° or 10° observer angle: L*a*b*, DL*Da*Db*, L *C*h°, DL*DC*DH*, DE*ab, DECMC, DE CIE94 and XYZ. Whiteness and Yellowness per ASTM E 313-98.

- **Pass/Fail Mode**
  The instrument stores up to 1000 standards with tolerances for easy pass/fail measurement. A simplified green tick shown on screen shows a straight forward pass indication or a red cross to show a failed. Results are shown at a glance showing detailed colour comparison data for analyst.

- **Quick Colour Compare**
  A quick measurement can be taken to compare two colours. This allows the operator to take quality control readings in a time efficient manner without having to create tolerances or store data.

- **The Sphere**
  The Elcometer 6085's diffusing sphere is made of Spectalon®, a durable, highly reflective material designed to perform in a rigorous production environment. The diffusing material prevents degradation due to the flaking and chipping of the sphere wall material.

- **Opacity, Colour Strength and Shade Sorting**
  The instrument can measure opacity as well as three colour-strength options: chromatic, apparent and tri-stimulus calculations. The Elcometer 6085 also performs 555 shade sorting. This is an important consideration in the colour quality control of manufactured products involving plastics, painted or textile materials.

- **Texture and Gloss influence**
  To determine the influence of the specular component, the 6085 allows simultaneous measurement of both specular - included (colour) and specular-excluded (appearance).

- **User friendly Ergonomics**
  In addition to on-board programmes to assist the operator in the measurement process, the instrument itself is highly user-friendly. It is compact and lightweight with an ergonomic overmold design that provides a smooth and comfortable grip. The flip-back shoe is designed to withstand heavy use, and has a reliable detent lock. Read-outs are large and easy to see with a high res colour LCD screen. A rechargeable battery pack allows extended operation of the instrument.

## Portable Sphere Spectrophotometer                    Elcometer 6085

| Part Number | Description | Certificate |
|---|---|---|
| K6085M001 | Elcometer 6085 Ci60 Portable Sphere Spectrophotometer | • |
| K6085M002 | Elcometer 6085 Ci62 Portable Sphere Spectrophotometer | • |
| Measuring Geometrics | d/8°, DRS spectral engine, fixed 8mm aperture Simultaneous SPIN / SPEX | |
| Light Source | Gas filled tungsten lamp | |
| Illuminant Types | A, C, D50, D55, D65, F2, F7, F11 & F12 | |
| Standard Observers | 2° and 10° | |
| Spectral Range | 400-700nm | |
| Memory | 1,000 standards with tolerances, 4,000 samples | |
| Measurement Range | 0 to 200% reflectance | |
| Measuring Time | Approximately 2 seconds | |
| Inter-Instrument Agreement (Ci60) | CIE L*a*b*: Avg. 0.40 ΔE*ab based on average of 12 BCRA Series II tiles (specular component included) Max. 0.60 ΔE*ab on any tile (specular component included) | |
| Inter-Instrument Agreement (Ci62) | CIE L*a*b*: Avg. 0.20 ΔE*ab based on average of 12 BCRA Series II tiles (specular component included) Max. 0.40 ΔE*ab on any tile (specular component included) | |
| Short-term Repeatability† | Ci60 - 0.10 ΔE*ab on white ceramic (standard deviation) Ci62 - 0.5 ΔE*ab on white ceramic (standard deviation) | |
| Lamp Life | Approximately 500,000 measurements | |
| Power Supply | Removable battery pack; 7.4 VDC, 2400 mAh | |
| Measurements per Charge | 1,000 measurements within 8 hour period | |
| Weight | 1.05kg (2.32lbs.) | |
| Screen Display | 3.2 inch backlit Colour Graphic LCD | |
| Dimensions | 109 x 91 x 213mm (4.3 x 3.6 x 8.4") | |
| Packing List | Elcometer 6085 Ci60, calibration standards, calibration certificate for standards, AC adaptor, mains leads (UK & EUR), carry case & operating instructions | |
| Packing List | Elcometer 6085 Ci62, calibration standards, calibration certificate for standards, AC adaptor, mains leads (UK & EUR), carry case & USB cable, operating instructions | |

Accessories

| Part Number | Description |
|---|---|
| KT006085P001 | Battery Pack |
| KT006085P002 | External Battery Charger |

• Certificate supplied as standard.                    †Based on 20 measurements on a white tile

## Elcometer 6300



## Colour Assessment Cabinets

Colour assessment cabinets are suitable for any industry where there is a need to maintain colour consistency and quality. These include paint, textiles, automotive, ceramics, cosmetics, dyeing, food, footwear, inks, knitwear, packaging, printing, etc.

The Elcometer 6300 range of colour assessment cabinets, also known as light cabinets or colour matching booths, ensures accurate visual colour assessment and colour comparison. Constructed from steel, Elcometer's lightweight colour assessment cabinets are supplied with different light sources used to simulate different conditions.

Light sources available:

• Artificial Daylight (D65)

• Point of Sale Illuminant (TL84 supplied with UK 240V/EUR 220V models, CWF supplied with US 110V models)

• Home Illuminant (Illuminant A)

• Ultraviolet Illuminant (UV)

• Alternative Point of Sale Illuminant (TL83 emits a reddish, yellow energy)

The Elcometer 6300 Colour Assessment Cabinets also enable easy detection of metamerism. Metamerism is commonly discussed in the terms of illuminants, where two samples appear the same (spectrally matched) under one illuminant, but not another. For example, two car door panels appear the same colour in daylight, but, under a streetlight at night, appear completely different colours.

There is a choice of 3, 4 or 5 light sources with the Elcometer 6300 range. Cabinets are either available with manual light source selection or digital light source selection. The digital cabinets are able to programme the sequence of lights and the duration of each illumination. The lamp timer function, which is standard on all digital cabinets and as an option on manual cabinets, measures the number of hours the D65 daylight bulb has been in operation.

### Colour Assessment Cabinet Overview

| Model | Light Sources | | | | | Weight | Control |
|---|---|---|---|---|---|---|---|
| | D65 | TL84/CWF | Illuminant A | UV | TL83 | | |
| Elcometer 6300 MM-1E | ▪ | ▪ | ▪ | | | 14kg (30lb) | Manual |
| Elcometer 6300 MM-2E | ▪ | ▪ | ▪ | | | 10kg (22lb) | Manual |
| Elcometer 6300 MM-4E | ▪ | ▪ | ▪ | ▪ | ▪ | 17kg (38lb) | Digital |
| Elcometer 6300 MM-1E UV/65 | ▪ | ▪ | ▪ | ▪ | | 14kg (30lb) | Manual |
| Elcometer 6300 MM-2E UV/65 | ▪ | ▪ | ▪ | ▪ | | 10kg (22lb) | Manual |

## Colour Assessment Cabinets

The Elcometer 6300 range is available with a choice of 3, 4 or 5 light source cabinets, in a range of sizes and functionality to suit your particular requirements. Lamp Kits are available for each Colour Assessment Cabinet.

**STANDARDS:**
AS/NZS 1580.601.1, ASTM D1729, ASTM D 4086, BS-950-1, ISO 3668, JIS K 5600-4-3, SAE J361, TAPPI T 515

### Colour Assessment Cabinet Dimensions

| Part Number | | | Model | Dimensions | Light Source |
|---|---|---|---|---|---|
| UK 240V | EUR 220V | US 110V | | | |
| K0UK6300M002 | K0006300M002 | K0US6300M002 | Elcometer 6300 MM-1E | 483 x 660 x 432mm (19 x 26 x 17") | 3 |
| K0UK6300M001 | K0006300M001 | K0US6300M001 | Elcometer 6300 MM-2E | 457 x 520 x 330mm (18 x 20 x 13") | 3 |
| K0UK6300M003 | K0006300M003 | K0US6300M003 | Elcometer 6300 MM-4E | 483 x 685 x 483mm (19 x 27 x 19") | 5 |
| K0UK6300M202 | K0006300M202 | K0US6300M202 | Elcometer 6300 MM-1E UV/65 | 483 x 660 x 432mm (19 x 26 x 17") | 4 |
| K0UK6300M201 | K0006300M201 | K0US6300M201 | Elcometer 6300 MM-2E UV/65 | 457 x 520 x 330mm (18 x 20 x 13") | 4 |
| Packing List | Elcometer 6300 Light source, viewing surface, side walls, rear wall, power cable, assembly instructions, maintenance and operating instructions. | | | | |

### Accessories

| Part Number | | | Description |
|---|---|---|---|
| UK 240V | EUR 220V | US 110V | |
| KTUK6300P002 | KT006300P002 | KTUS6300P002 | Elcometer 6300 MM-1E Lamp Kit D65, TL84 & Illuminant A |
| KTUK6300P001 | KT006300P001 | KTUS6300P001 | Elcometer 6300 MM-2E Lamp Kit D65, TL84 & Illuminant A |
| KTUK6300P003 | KT006300P003 | KTUS6300P003 | Elcometer 6300 MM-4E Lamp Kit D65, TL84, Illuminant A, UV & TL83 |
| KTUK6300P202 | KT006300P202 | KTUS6300P202 | Elcometer 6300 MM-1E UV/65 Lamp Kit D65, TL84, Illuminant A & UV |
| KTUK6300P201 | KT006300P201 | KTUS6300P201 | Elcometer 6300 MM-2E UV/65 Lamp Kit D65, TL84, Illuminant A & UV |

### Light Source Key

| | |
|---|---|
| D65 | Artificial Daylight |
| TL84 | Point of Sale Illuminant (supplied with UK 240V & EUR 220V units) |
| CWF | Point of Sale Illuminant (supplied with US 110V units) |
| TL83 | Alternative Point of Sale Illuminant |
| Illuminant A | Home Illuminant |
| UV | Ultraviolet Illuminant |

# Colour

## Elcometer 6210



## RAL Colour Charts

A system of reference colours, enabling many industrial products to be identified, compared and classified, ideal for use with Elcometer 6300 Colour Assessment Cabinets, (see page 14-18).

Available either in the form of compact colour charts or in separate sheets of different sizes, with or without colourmetric identification, separately or in groups supplied in a file or a box.

### Elcometer 6210 RAL Chart K1

High gloss colour chart, 16 colours per page, each with a 1.8 x 2.8cm colour illustration.

| Part Number: | K0006210M013 |
|---|---|

### Elcometer 6210 RAL Chart K5

Fan deck with RAL Classic colours, complete with U-shaped protective cover. Each colour has a full page 5.0 x 15.0cm, perfect for colour combination and colour comparison.

| Part Number: | K0006210M001 |
|---|---|

### Elcometer 6210 RAL Chart 841-GL

Box set of high gloss finish RAL Classic colour A5 card set featuring A6 colour illustrations.

| Part Number: | K0006210M015 |
|---|---|

### Elcometer 6210 RAL Chart K7

Fan deck with RAL Classic colours, complete with U-shaped protective cover. Features 5 colours per page, with each colour swatch measuring 2.0 x 5.0cm.

| Part Number: | K0006210M002 |
|---|---|

### Elcometer 6210 RAL Chart 840-HR

Box set of matt finish RAL Classic colour A5 card set featuring A6 colour illustrations.

| Part Number: | K0006210M009 |
|---|---|

elcometer

# Dispersion & Density
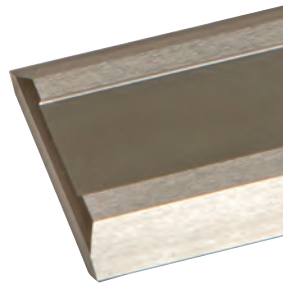
From the development of coatings, inks & cosmetics in the laboratory to testing during the production process, quick and precise measurement of the particle size of the material (Dispersion) and volumetric mass (Density) are essential measurement techniques required for reliable and repeatable formulations.

Elcometer's stringent manufacturing standards ensure that the highest level of precision and quality is maintained for all its gauges in order to comply with the requirements of the industries where the grinding process is involved, particularly in the fields of wet paints and powder, varnishes, printing inks and cosmetics.

### Dispersion

The comprehensive range of Elcometer fineness of grind gauges consists of stainless steel blocks with a precision ground scraper. Each block has either one or two channels, precision ground in a uniformly increasing depth from zero at one end to a specified depth at the other, identified by the scale on the gauge.

### Density

To maintain consistency of a coating, the Density should remain constant from batch to batch.

Density Cups, also known as Specific Gravity Cups or Picnometers, are used to determine the mass per unit volume (Specific Gravity) of a liquid at a given temperature.

Specific Gravity is defined as the ratio of the density of a given substance to the density of water, when both are at the same temperature.

As the Specific Gravity Cup is an exact measurement of the volume of the liquid, it is imperative that the exact weight of the sample is obtained.

Elcometer offers a range of cups and laboratory balances for accurate measurements during the development of a coating.

## Elcometer 2020 & 2041

# Fineness of Grind Gauges (Dual Channels)
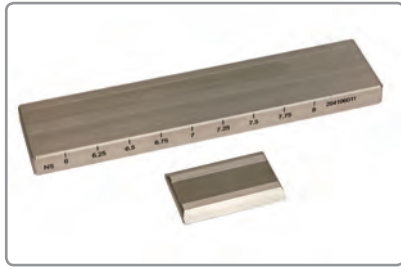




The Elcometer Fineness of Grind Gauges are used to determine the particle size and fineness of grind of many materials including paints, pigments, inks, coatings, chocolates and other similar products.

These two channel gauges, are made of hardened stainless steel and have two grooves with a graded slope (dependent on the model chosen).

Graduated in microns, mils, NS (Hegman) or PCU (North), the gauges have a tolerance of ±2µm (0.08mil).  The groove width for all models is 12mm (0.47") with a groove length of 127mm (5.0").

**STANDARDS:**
ASTM D 1210, AS/NZS 1580.204.1
DIN 53203, EN 21524,
FTMS 141 4411.1, ISO 1524,
JIS K 5600-2-5, NF T30-046

## Technical Specification                                                                 C

| Part Number Metric | Imperial | Model | Range (µm) | Range (mils) | Graduation (µm) | Graduation (mils) | Hegman (NS or H) | Paint Club (PCU) | Certificate |
|---|---|---|---|---|---|---|---|---|---|
| K0002020M003 | - | Elcometer 2020/3 | 0 - 15 | - | 1 | - | 8 - 7 | 10 - 9 | ○ |
| K0002041M002 | K0US2041M002 | Elcometer 2041/2 | 0 - 25 | 0 - 1 | 2.5 | 0.1 | - | - | ○ |
| K0002020M004 | K0US2020M004 | Elcometer 2020/4 | 0 - 25 | 0 - 1 | 2.5 | 0.1 | 8 - 6 | 10 - 8 | ○ |
| - | K0US2041M003 | Elcometer 2041/3 | - | 0 - 2 | - | 0.2 | - | - | ○ |
| K0002020M001 | K0US2020M001 | Elcometer 2020/1 | 0 - 50 | 0 - 2 | 5 | 0.2 | 8 - 4 | 10 - 5 | ○ |
| K0002041M004 | K0US2041M004 | Elcometer 2041/4 | 0 - 100 | 0 - 4 | 10 | 0.5 | - | - | ○ |
| K0002020M002 | K0US2020M002 | Elcometer 2020/2 | 0 - 100 | 0 - 4 | 10 | 0.5 | 8 - 0 | 10 - 0 | ○ |
| Packed Dimensions | | 180 x 40 x 12mm (7.1 x 1.6 x 0.5") | | | | | | | |
| Packed Weight | | 1.36kg (3lb) | | | | | | | |
| Packing List | | Elcometer 2020 or Elcometer 2041 Fineness of Grind Gauge, scraper, plastic case and operating instructions | | | | | | | |

## Accessories

| | |
|---|---|
| KT002020N001 | Replacement Scraper for Elcometer 2020 |
| KT002030N001 | Replacement Scraper for Elcometer 2041 |

### How to use a Fineness of Grind Gauge

The material is placed on the deepest part of the groove and, using the scraper provided, drawn up the slope - the particle size is indicated where the material stops.



○ Optional Calibration Certificate available.

# High Precision Grindometer (Single Channel)

## Elcometer 2050

This single channel precision gauge is used to determine particle size and fineness of grind for many materials including paints, pigments, inks, coatings, chocolates and other similar products.

Manufactured out of hardened stainless steel each gauge is graduated in microns on the top to an accuracy of ±1µm (0.04mil). The groove width is 12mm (0.47") and the groove length is 200mm (7.87").

The High Precision Grindometer has a single groove.





**STANDARDS:**
ASTM D 1210, AS/NZS 1580.204.1
DIN 53203, EN 21524,
FTMS 141 4411.1, ISO 1524,
JIS K 5600-2-5, NF T30-046

## Technical Specification                                                            C

| Part Number | | Model | Range | | Graduation | | Certificate |
|---|---|---|---|---|---|---|---|
| Metric | Imperial | | (µm) | (mils) | (µm) | (mils) | |
| K0002050M001 | K0US2050M001 | Elcometer 2050/1 | 0 - 25 | 0 - 1 | 1 | 0.05 | ○ |
| K0002050M002 | K0US2050M002 | Elcometer 2050/2 | 0 - 50 | 0 - 2 | 2 | 0.1 | ○ |
| K0002050M005 | K0US2050M005 | Elcometer 2050/5 | 0 - 100 | 0 - 4 | 5 | 0.2 | ○ |
| K0002050M008 | K0US2050M008 | Elcometer 2050/8 | 0 - 250 | 0 - 10 | 12.5 | 0.5 | ○ |
| Tolerance | | ±1µm (0.04mil) | | | | | |
| Packed Dimensions | | 250 x 40 x 15mm (9.8 x 1.6 x 0.6") | | | | | |
| Packed Weight | | 1.45kg (3.2lb) | | | | | |
| Packing List | | Elcometer 2050 High Precision Grindometer, scraper, plastic case and operating instructions | | | | | |

## Accessories

| KT002030N001 | Replacement Scraper for Elcometer 2050 |
|---|---|

○ Optional Calibration Certificate available.

# Dispersion & Density

## Elcometer 2070
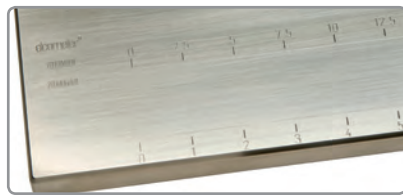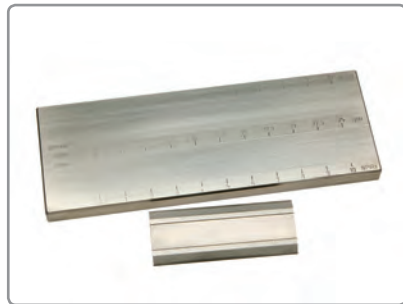
### NPIRI Fineness of Grind Gauge





This precision gauge is used to determine particle size and the fineness of grind of particles in printing inks according the National Printing Inks Research Institute (NPIRI) scale.

As ink particles are so fine the two grooves of the gauge have a gentle gradient allowing a scale of 2.5µm for better resolution.

The groove width is 25mm (0.98") and the groove length is 165mm (6.5"). The NPIRI scale is displayed alongside the microns scale. The NPIRI gauge and its scraper are made of hardened stainless steel.

**STANDARDS:**
ASTM D 1316

### Technical Specification                                                                                   C

| Part Number | | Model | Range | | Graduation | | Certificate |
|---|---|---|---|---|---|---|---|
| Metric | Imperial | | (µm) | (mils) | (µm) | (mils) | |
| K0002070M001 | K0US2070M001 | Elcometer 2070 | 0 - 25 | 0 - 1 | 2.5µm / 1 NPIRI | 0.1mil / 1 NPIRI | ○ |
| Packed Dimensions | | 220 x 80 x 12mm (8.6 x 3.1 x 0.5") | | | | | |
| Packed Weight | | 2.2kg (4.8lb) | | | | | |
| Packing List | | Elcometer 2070 NPIRI Fineness of Grind Gauge, scraper, plastic case and operating instructions | | | | | |

### Accessories

| KT002070N001 | Replacement Scraper for Elcometer 2070 |
|---|---|

○ Optional Calibration Certificate available.

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## Density Cup

The Elcometer 1800 is a stainless steel precision cup for determining the specific gravity or density of paints and similar products.

The density cup consists of a cylindrical container and lid with a hole for the exhaust of excess liquid.

**STANDARDS:**
ASTM D 891-B, ASTM D1475, DIN 53217-2, FTMS 141 4183, ISO 2811-1, JIS K 5600-2-4, NBN T22-110, NFT 30-020

| Technical Specification | | | | C |
|---|---|---|---|---|
| Part Number | Description | | Volume/ Capacity | Certificate |
| K0001800M001 | Elcometer 1800/1 Density Cup stainless steel | | 50cc | |
| K0001800M002 | Elcometer 1800/2 Density Cup stainless steel with calibration certificate | | 50cc | ● |
| K0001800M005 | Elcometer 1800/5 Density Cup stainless steel | | 100cc | |
| K0001800M006 | Elcometer 1800/6 Density Cup stainless steel with calibration certificate | | 100cc | ● |

**How to use a Density Cup:**

- Weigh the Cup and Lid when empty
- Fill with the liquid
- Place lid on the Cup, removing excess liquid*
- Weigh the Density Cup when full
- Divide the weight by the cup volume/capacity to determine the Specific Gravity

*Each Cup has an escape hole in the lid to allow excess liquid to escape. Any excess liquid should be removed before weighing.

The formulae for calculating Density and Specific Gravity are:

$$\text{Density} = \frac{\text{Weight}}{\text{Unit Volume}}$$

Note: 50cc = 50cm³ = Volume
100cc = 100cm³ = Volume

$$\text{Specific Gravity} = \frac{\text{Density of the Material}}{\text{Density of Water at the Same Temperature}}$$

● Certificate supplied as standard.

# Dispersion & Density

## Elcometer 8720

### Compact Balance

The Elcometer 8720 KB is a compact, low cost balance which offers extensive weighing functions selectable by the user.

The Elcometer 8720/1 Compact Balance is very easy to use and is supplied with a protective working cover and an adjusting test weight to allow the user to quickly adjust the calibration.

| Technical Specification | | | | C |
|---|---|---|---|---|
| **Part Number** | | | **Description** | **Certificate** |
| UK 240V | EUR 220V | US 110V | | |
| K0UK8720M001 | K0008720M001 | K0US8720M001 | Elcometer 8720/1 Standard Balance | |
| K0UK8720M001C | K0008720M001C | K0US8720M001C | Elcometer 8720/1 Standard Balance - Certified | ● |
| Range | Elcometer 8720/1: 0 - 1210g (0 - 42.7oz) | | | |
| Reproducibility | Elcometer 8720/1: 0.01g (0.0004oz) | | | |
| Linearity | Elcometer 8720/1: ±0.03g (0.001oz) | | | |
| Dimensions | 165 x 230 x 80mm (6 x 9 x 3.1") | | | |
| Weight | 1kg (2.2lb) | | | |
| Packing List | Elcometer 8720 Compact Balance, 1 x 200g test weight, power cable and operating instructions | | | |

● Certificate supplied as standard.

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# Viscosity

## Flow Cups, Dip Cups, Rotational & Krebs

Viscosity is perceived as 'thickness' or resistance to pouring, but there is more **to viscosity than this. All fluids have an** internal friction between molecules, which **determines how well fluid flows. Due to this** internal friction, energy is required to move the liquid and viscosity is the measure of the **resistance to flow.**

**Measuring Viscosity**
Elcometer manufactures and supplies a wide range of viscosity gauges from flow cups to dip cups to rotational viscometers.

**Flow Cups:** The process of flow through an orifice can often be used as a relative measurement and classification of viscosity.
This measured kinematic viscosity is generally expressed in seconds of flow time which can be converted into Centistokes using a viscosity disc calculator.

**Dip Cups:** Using the same principle as flow cups, dip cups (Frikmar, Zahn, Shell etc.) can be used to provide a quick viscosity measurement either on-site or on the shop-floor.

**Rotational:** Krebs and Rotational viscometers are used to determine the viscosity of liquids which do not depend solely on temperature or pressure.

**Flow Measurement:** Simple to use instruments that measure the fluidity and flow of coatings, especially thick or paste-like materials.

**Definitions**:

**Viscosity**: A measure of the resistance of a liquid to flow.

**Kinematic Viscosity**: The absolute viscosity of a fluid divided by the density of the fluid. Also known as the coefficient of kinematic viscosity.

**Centipoise**: A unit of measurement of which water is the standard at 1cP.

**Newtonian fluids**: Are fluids that continue to flow at a given temperature, such as water and some oils - regardless of the forces acting on it. No matter how fast it is stirred or mixed, Newtonian fluids will always behave in the same manner.

Newtonian fluids are typically measured with flow and dip viscosity cups, see page 16-2.

**Non-Newtonian fluids**: Are fluids which change viscosity when a force is applied, e.g. paints and ketchup, etc.

Non-Newtonian fluids are usually measured using Rotational Viscometers, see page 16-11.

## Elcometer 2353 & 2354

# Viscosity Flow Cups



Viscosity Flow Cups are very easy to use instruments made of anodized aluminium with a stainless steel orifice, for measuring the consistency of paints, varnishes and similar products. The measured kinematic viscosity is generally expressed in seconds(s) flow time. If the Standards stipulate conversion methods the flow time can be converted into Centistokes (cSt) using the Elcometer ElcoCalc™ Mobile Apps.

Calibration certificates which offer traceability and assurance that each viscosity cup has been individually tested and comply to Standards are also available.

The cups can be supplied separately or with an adjustable stand which includes a precision level and an overflow glass draw plate. They can also be supplied with a flow jacket for temperature control (thermojacket), see page 16-5 for more information.

**STANDARDS:**
**ISO:** ASTM D 5125, ISO 2431
**BS:** AS/NZS 1580.214.2 (cup 4)
BS 3900-A6:1971
**FORD/ASTM:** ASTM D 1200
**DIN:** DIN 53211 (cup 4)
**AFNOR:** NF T30-014

compatible with ElcoCalc™

Download on the App Store

ANDROID APP ON Google play

| Technical Specification | | | | C |
|---|---|---|---|---|

### ISO Viscosity Flow Cups

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002353M001 | Elcometer 2353/1 ISO Viscosity Cup 3 | 3mm | 7 - 42 | ◇ |
| K0002353M002 | Elcometer 2353/2 ISO Viscosity Cup 4 | 4mm | 34 - 135 | ◇ |
| K0002353M003 | Elcometer 2353/3 ISO Viscosity Cup 5 | 5mm | 91 - 326 | ◇ |
| K0002353M004 | Elcometer 2353/4 ISO Viscosity Cup 6 | 6mm | 188 - 684 | ◇ |
| K0002353M005 | Elcometer 2353/5 ISO Viscosity Cup 8 | 8mm | - | ◇ |
| K0002353M001C | Elcometer 2353/1 with calibration certificate | 3mm | 7 - 42 | ● (e) |
| K0002353M002C | Elcometer 2353/2 with calibration certificate | 4mm | 34 - 135 | ● (e) |
| K0002353M003C | Elcometer 2353/3 with calibration certificate | 5mm | 91 - 326 | ● (e) |
| K0002353M004C | Elcometer 2353/4 with calibration certificate | 6mm | 188 - 684 | ● (e) |
| K0002353M005C | Elcometer 2353/5 with calibration certificate | 8mm | - | ● (d) |

### BS Viscosity Flow Cups

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002354M001 | Elcometer 2354/1 BS Viscosity Cup 2 | 2.38mm | 6 - 43 | ◇ |
| K0002354M002 | Elcometer 2354/2 BS Viscosity Cup 3 | 3.17mm | 28 - 150 | ◇ |
| K0002354M003 | Elcometer 2354/3 BS Viscosity Cup 4 | 3.97mm | 89 - 340 | ◇ |
| K0002354M004 | Elcometer 2354/4 BS Viscosity Cup 5 | 4.76mm | 79 - 441 | ◇ |
| K0002354M005 | Elcometer 2354/5 BS Viscosity Cup 6 | 7.14mm | 369 - 1302 | ◇ |
| K0002354M001C | Elcometer 2354/1 with calibration certificate | 2.38mm | 6 - 43 | ● (e) |
| K0002354M002C | Elcometer 2354/2 with calibration certificate | 3.17mm | 28 - 150 | ● (e) |
| K0002354M003C | Elcometer 2354/3 with calibration certificate | 3.97mm | 89 - 340 | ● (e) |
| K0002354M004C | Elcometer 2354/4 with calibration certificate | 4.76mm | 79 - 441 | ● (e) |
| K0002354M005C | Elcometer 2354/5 with calibration certificate | 7.14mm | 369 - 1302 | ● (e) |

[1] For Information Only          (d) Dimensional Certificate          (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.          ◇ Batch Calibration Certificate supplied as standard.

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## Viscosity Flow Cups

| Technical Specification | | | | C |
|---|---|---|---|---|

**FORD/ASTM Viscosity Cups**

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002351M001 | Elcometer 2351/1 FORD/ASTM Viscosity Cup 1 | 1.90mm | 10 - 35 | ◇ |
| K0002351M002 | Elcometer 2351/2 FORD/ASTM Viscosity Cup 2 | 2.53mm | 25 - 120 | ◇ |
| K0002351M003 | Elcometer 2351/3 FORD/ASTM Viscosity Cup 3 | 3.40mm | 49 - 220 | ◇ |
| K0002351M004 | Elcometer 2351/4 FORD/ASTM Viscosity Cup 4 | 4.12mm | 70 - 370 | ◇ |
| K0002351M005 | Elcometer 2351/5 FORD/ASTM Viscosity Cup 5 | 5.20mm | 200 - 1200 | ◇ |
| K0002351M001C | Elcometer 2351/1 with calibration certificate | 1.90mm | 10 - 35 | ● (e) |
| K0002351M002C | Elcometer 2351/2 with calibration certificate | 2.53mm | 25 - 120 | ● (e) |
| K0002351M003C | Elcometer 2351/3 with calibration certificate | 3.40mm | 49 - 220 | ● (e) |
| K0002351M004C | Elcometer 2351/4 with calibration certificate | 4.12mm | 70 - 370 | ● (e) |
| K0002351M005C | Elcometer 2351/5 with calibration certificate | 5.20mm | 200 - 1200 | ● (e) |

**DIN Viscosity Cups**

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002350M001 | Elcometer 2350/1 DIN Viscosity Cup 2 | 2mm | - | |
| K0002350M002 | Elcometer 2350/2 DIN Viscosity Cup 4 | 4mm | 96 - 683 | ◇ |
| K0002350M003 | Elcometer 2350/3 DIN Viscosity Cup 6 | 6mm | - | |
| K0002350M004 | Elcometer 2350/4 DIN Viscosity Cup 8 | 8mm | - | |
| K0002350M001C | Elcometer 2350/1 with calibration certificate | 2mm | - | ● (d) |
| K0002350M002C | Elcometer 2350/2 with calibration certificate | 4mm | 96 - 683 | ● (e) |
| K0002350M003C | Elcometer 2350/3 with calibration certificate | 6mm | - | ● (d) |
| K0002350M004C | Elcometer 2350/4 with calibration certificate | 8mm | - | ● (d) |

**AFNOR Viscosity Cups**

| Part Number | Description | Orifice Diameter | Range[1] (cP)[2] | Certificate |
|---|---|---|---|---|
| K0002352M001 | Elcometer 2352/1 AFNOR Viscosity Cup 2.5 | 2.46mm | 5 - 140 | ◇ |
| K0002352M002 | Elcometer 2352/2 AFNOR Viscosity Cup 4 | 4mm | 50 - 1100 | ◇ |
| K0002352M003 | Elcometer 2352/3 AFNOR Viscosity Cup 6 | 6mm | 510 - 5100 | ◇ |
| K0002352M001C | Elcometer 2352/1 with calibration certificate | 2.46mm | 5 - 140 | ● (d) |
| K0002352M002C | Elcometer 2352/2 with calibration certificate | 4mm | 50 - 1100 | ● (d) |
| K0002352M003C | Elcometer 2352/3 with calibration certificate | 6mm | 510 - 5100 | ● (d) |

**Viscosity Flow Cups - Cup Designs**



ISO    BS    FORD/ASTM    DIN    AFNOR

[1] For Information Only          [2] cSt values only apply to fluids with a specific density of 1          (d) Dimensional Certificate          (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.          ◇ Batch Calibration Certificate supplied as standard.
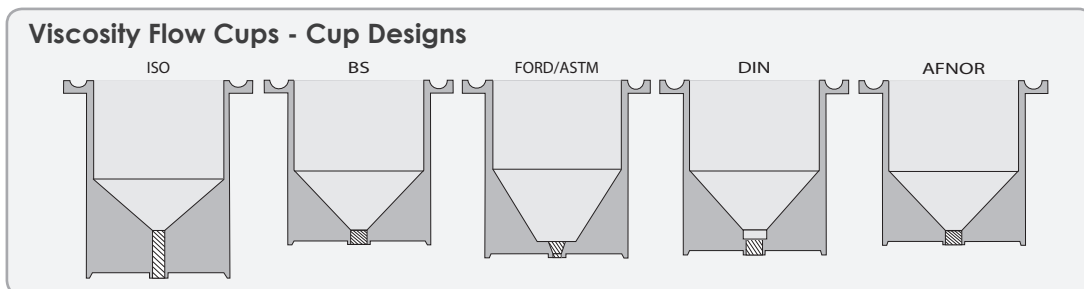
# Viscosity Cups

## Viscosity Cup Conversion

The table below lists the major flow cup types together with a conversion chart of Efflux Time (in seconds) to Viscosity in Centistokes (cSt). It has been constructed from the various International Standard Calculators.

Each cup design is unique, care must be taken when comparing viscosity values between different cup types. These values are the absolute values and do not include the allowed tolerances, as these differ considerably between each of the Standards.

### Viscosity Cup Type

| Time (seconds) | DIN | BS | | | | | ISO | | | | FORD / ASTM | | | | ZAHN | | | | | SHELL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| 15 | 38 | 6.4 | | 19 | 40 | 234 | | | 35 | 66 | | | 19 | 40 | | 4 | 88 | 148 | 322 | | | 20 | 48 | 91 | 235 |
| 16 | 45 | 6.8 | 3 | 24 | 48 | 262 | | | 39 | 75 | | | 22 | 44 | | 7 | 99 | 163 | 345 | | | 21 | 52 | 98 | 251 |
| 17 | 51 | 7.3 | 5 | 28 | 56 | 290 | | | 43 | 84 | | | 24 | 48 | | 11 | 111 | 178 | 368 | | | 23 | 55 | 104 | 267 |
| 18 | 57 | 7.7 | 7 | 32 | 64 | 317 | | | 47 | 93 | | | 26 | 52 | | 14 | 123 | 192 | 391 | 1.1 | 7.5 | 24 | 59 | 111 | 284 |
| 19 | 63 | 8.1 | 9 | 35 | 72 | 343 | | | 51 | 101 | | 1 | 29 | 56 | | 18 | 135 | 207 | 414 | 1.4 | 8.1 | 26 | 62 | 117 | 300 |
| 20 | 69 | 8.6 | 11 | 39 | 79 | 369 | | | 55 | 110 | | 3 | 31 | 60 | | 21 | 146 | 222 | 437 | 1.6 | 8.6 | 27 | 66 | 124 | 316 |
| 21 | 74 | 9.0 | 13 | 43 | 86 | 395 | | | 58 | 118 | | 4 | 33 | 64 | | 25 | 158 | 237 | 460 | 1.8 | 9.2 | 29 | 69 | 130 | 332 |
| 22 | 80 | 9.4 | 15 | 47 | 93 | 420 | | | 62 | 126 | | 6 | 36 | 67 | | 28 | 170 | 252 | 483 | 2.0 | 9.8 | 30 | 72 | 137 | 348 |
| 23 | 85 | 9.8 | 17 | 50 | 100 | 445 | 1 | | 66 | 134 | | 7 | 38 | 71 | | 32 | 181 | 266 | 506 | 2.3 | 10.4 | 32 | 76 | 143 | 365 |
| 24 | 91 | 10.3 | 18 | 54 | 107 | 470 | 2 | | 70 | 142 | | 9 | 40 | 75 | | 35 | 193 | 281 | 529 | 2.5 | 10.9 | 33 | 79 | 150 | 381 |
| 25 | 96 | 10.7 | 20 | 57 | 114 | 494 | 3 | | 73 | 150 | | 10 | 43 | 79 | | 39 | 205 | 296 | 552 | 2.7 | 11.5 | 35 | 83 | 156 | 397 |
| 26 | 101 | 11.1 | 22 | 60 | 120 | 519 | 4 | | 77 | 157 | | 12 | 45 | 83 | | 42 | 216 | 311 | 575 | 2.9 | 12.1 | 36 | 86 | 163 | 413 |
| 27 | 107 | 11.5 | 23 | 64 | 127 | 543 | 4.5 | | 80 | 165 | | 13 | 47 | 87 | | 46 | 228 | 326 | 598 | 3.2 | 12.7 | 38 | 90 | 169 | 429 |
| 28 | 112 | 12.0 | 25 | 67 | 133 | 567 | 5 | | 84 | 173 | | 14 | 49 | 91 | | 49 | 240 | 340 | 621 | 3.4 | 13.2 | 39 | 93 | 176 | 446 |
| 29 | 117 | 12.4 | 26 | 70 | 140 | 591 | 6 | | 88 | 180 | | 16 | 52 | 94 | | 53 | 252 | 355 | 644 | 3.6 | 13.8 | 41 | 97 | 182 | 462 |
| 30 | 122 | 12.8 | 28 | 73 | 146 | 614 | 6.6 | 34.5 | 91 | 188 | | 17 | 54 | 98 | 1 | 56 | 263 | 370 | 667 | 3.8 | 14.4 | 42 | 100 | 189 | 478 |
| 31 | 127 | 13.3 | 30 | 77 | 153 | 638 | 7.3 | 36.0 | 95 | 196 | | 19 | 56 | 102 | 2 | 60 | 275 | 385 | 690 | 4.1 | 15.0 | 44 | 104 | 195 | 494 |
| 32 | 132 | 13.7 | 31 | 80 | 159 | 662 | 7.9 | 37.5 | 98 | 203 | | 20 | 59 | 106 | 3 | 63 | 287 | 400 | 713 | 4.3 | 15.6 | 45 | 107 | 202 | 510 |
| 33 | 137 | 14.1 | 33 | 83 | 165 | 685 | 8.6 | 38.0 | 102 | 210 | | 22 | 61 | 110 | 4 | 67 | 298 | 414 | 736 | 4.5 | 16.1 | 47 | 110 | 208 | 527 |
| 34 | 142 | 14.5 | 34 | 86 | 171 | 709 | 9.2 | 41.0 | 105 | 218 | | 23 | 63 | 114 | 6 | 70 | 310 | 429 | 759 | 4.7 | 16.7 | 48 | 114 | 215 | 543 |
| 35 | 147 | 15.0 | 35 | 89 | 177 | 732 | 9.8 | 42.0 | 109 | 225 | | 24 | 66 | 117 | 7 | 74 | 322 | 444 | 782 | 5.0 | 17.3 | 50 | 117 | 221 | 559 |
| 36 | 152 | 15.4 | 37 | 92 | 184 | 755 | 10.4 | 44.0 | 112 | 233 | | 26 | 68 | 121 | 8 | 77 | 333 | 459 | 805 | 5.2 | 17.9 | 51 | 121 | 228 | 575 |
| 37 | 157 | 15.8 | 38 | 96 | 190 | 778 | 11.0 | 45.2 | 115 | 240 | | 27 | 70 | 125 | 9 | 81 | 345 | 474 | 828 | 5.4 | 18.4 | 53 | 124 | 234 | 591 |
| 38 | 162 | 16.3 | 40 | 99 | 196 | 801 | 11.6 | 47.0 | 119 | 247 | 1 | 29 | 73 | 129 | 10 | 84 | 357 | 488 | 851 | 5.6 | 19.0 | 54 | 128 | 241 | 608 |
| 39 | 167 | 16.7 | 41 | 102 | 202 | 825 | 12.1 | 48.0 | 122 | 254 | 2 | 30 | 75 | 133 | 11 | 88 | 369 | 503 | 874 | 5.9 | 19.6 | 56 | 131 | 247 | 624 |
| 40 | 172 | 17.1 | 43 | 105 | 208 | 848 | 12.7 | 50.0 | 126 | 262 | 2 | 32 | 77 | 137 | 12 | 91 | 380 | 518 | 897 | 6.1 | 20.2 | 57 | 135 | 254 | 640 |
| 41 | 176 | 17.5 | 44 | 108 | 214 | 871 | 13.3 | 51.2 | 129 | 269 | 3 | 33 | 80 | 141 | 13 | 95 | 392 | 533 | 920 | 6.3 | 20.7 | 59 | 138 | 260 | 656 |
| 42 | 181 | 18.0 | 45 | 111 | 220 | 893 | 13.8 | 53.0 | 133 | 276 | 4 | 35 | 82 | 144 | 14 | 98 | 404 | 548 | 943 | 6.6 | 21.3 | 60 | 141 | 267 | 672 |
| 43 | 186 | 18.4 | 47 | 114 | 226 | 916 | 14.4 | 54.0 | 136 | 283 | 4 | 36 | 84 | 148 | 15 | 102 | 415 | 562 | 966 | 6.8 | 21.9 | 62 | 145 | 273 | 689 |
| 44 | 191 | 18.8 | 48 | 117 | 232 | 939 | 14.9 | 56.0 | 139 | 291 | 5 | 37 | 86 | 152 | 17 | 105 | 427 | 577 | 989 | 7.0 | 22.5 | 63 | 148 | 280 | 705 |
| 45 | 196 | 19.2 | 50 | 120 | 238 | 962 | 15.5 | 57.0 | 143 | 298 | 5 | 39 | 89 | 156 | 18 | 109 | 439 | 592 | 1012 | 7.2 | 23.0 | 65 | 152 | 286 | 721 |
| 46 | 200 | 19.7 | 51 | 123 | 244 | 985 | 16.0 | 59.0 | 146 | 305 | 6 | 40 | 91 | 160 | 19 | 112 | 450 | 607 | 1035 | 7.5 | 23.6 | 66 | 155 | 293 | 737 |
| 47 | 205 | 20.1 | 52 | 126 | 250 | 1008 | 16.6 | 60.0 | 149 | 312 | 6 | 42 | 93 | 164 | 20 | 116 | 462 | 622 | 1058 | 7.7 | 24.2 | 68 | 159 | 299 | 753 |
| 48 | 210 | 20.5 | 54 | 129 | 255 | 1030 | 17.1 | 62.0 | 153 | 319 | 7 | 43 | 96 | 168 | 21 | 119 | 474 | 636 | 1081 | 7.9 | 24.8 | 69 | 162 | 306 | 770 |
| 49 | 215 | 21.0 | 55 | 132 | 261 | 1053 | 17.6 | 63.5 | 156 | 326 | 7 | 45 | 98 | 171 | 22 | 123 | 486 | 651 | 1104 | 8.1 | 25.3 | 71 | 166 | 312 | 786 |
| 50 | 219 | 21.4 | 56 | 135 | 267 | 1076 | 18.2 | 64.5 | 160 | 334 | 8 | 46 | 100 | 175 | 23 | 126 | 497 | 666 | 1127 | 8.4 | 25.9 | 72 | 169 | 319 | 802 |
| 51 | 224 | 21.8 | 58 | 138 | 273 | 1099 | 18.7 | 66.0 | 163 | 341 | 8 | 48 | 103 | 179 | 24 | 130 | 509 | 681 | 1150 | 8.6 | 26.5 | 74 | 173 | 325 | 818 |
| 52 | 229 | 22.2 | 59 | 141 | 279 | 1121 | 19.2 | 67.5 | 166 | 348 | 8 | 49 | 105 | 183 | 25 | 133 | 521 | 696 | 1173 | 8.8 | 27.1 | 76 | 176 | 332 | 834 |
| 53 | 234 | 22.7 | 60 | 144 | 285 | 1144 | 19.7 | 69.0 | 170 | 355 | 9 | 50 | 107 | 187 | 26 | 137 | 532 | 710 | 1196 | 9.0 | 27.6 | 77 | 179 | 338 | 851 |
| 54 | 238 | 23.1 | 62 | 147 | 291 | 1166 | 20.2 | 70.0 | 173 | 362 | 9 | 52 | 110 | 191 | 28 | 140 | 544 | 725 | 1219 | 9.3 | 28.2 | 79 | 183 | 345 | 867 |
| 55 | 243 | 23.5 | 63 | 150 | 297 | 1189 | 20.7 | 71.5 | 176 | 369 | 10 | 53 | 112 | 194 | 29 | 144 | 556 | 740 | 1242 | 9.5 | 28.8 | 80 | 186 | 351 | 883 |
| 56 | 248 | 24.0 | 64 | 153 | 302 | 1212 | 21.2 | 73.0 | 180 | 376 | 10 | 55 | 114 | 198 | 30 | 147 | 567 | 755 | 1265 | 9.7 | 29.4 | 82 | 190 | 358 | 899 |
| 57 | 253 | 24.4 | 66 | 156 | 308 | 1234 | 21.7 | 75.0 | 183 | 383 | 11 | 56 | 116 | 202 | 31 | 151 | 579 | 770 | 1288 | 9.9 | 30.0 | 83 | 193 | 364 | 915 |
| 58 | 257 | 24.8 | 67 | 159 | 314 | 1257 | 22.2 | 76.0 | 186 | 390 | 11 | 58 | 119 | 206 | 32 | 154 | 591 | 784 | 1311 | 10.2 | 30.5 | 85 | 197 | 371 | 932 |
| 59 | 262 | 25.2 | 68 | 162 | 320 | 1279 | 22.7 | 77.0 | 190 | 397 | 12 | 59 | 121 | 210 | 33 | 158 | 603 | 799 | 1334 | 10.4 | 31.1 | 86 | 200 | 377 | 948 |
| 60 | 267 | 25.7 | 70 | 165 | 326 | 1302 | 23.2 | 79.0 | 193 | 405 | 12 | 60 | 123 | 214 | 34 | 161 | 614 | 814 | 1357 | 10.6 | 31.7 | 88 | 204 | 384 | 964 |
| 65 | 290 | 27.8 | 76 | 179 | 354 | 1414 | 26 | 86.0 | 210 | 440 | 15 | 68 | 135 | 233 | 40 | 179 | 673 | 888 | 1472 | 11.8 | 34.6 | 95 | 221 | 416 | 1045 |
| 70 | 313 | 29.9 | 83 | 194 | 383 | 1526 | 28 | 93.0 | 226 | 475 | 17 | 75 | 147 | 252 | 45 | 196 | 731 | 962 | 1587 | 12.9 | 37.4 | 103 | 238 | 449 | 1126 |
| 75 | 337 | 32.1 | 89 | 208 | 412 | 1638 | 31 | 100 | 243 | 510 | 20 | 82 | 158 | 271 | 51 | 214 | 790 | 1036 | 1702 | 14.0 | 40.3 | 110 | 255 | 481 | 1207 |
| 80 | 360 | 34.2 | 96 | 223 | 441 | 1750 | 33 | 108 | 260 | 545 | 22 | 89 | 170 | 291 | 56 | 231 | 848 | 1110 | 1817 | 15.1 | 43.2 | 118 | 273 | 514 | 1288 |
| 85 | 383 | 36.4 | 102 | 237 | 469 | 1861 | 35 | 115 | 276 | 580 | 25 | 96 | 181 | 310 | 61.6 | 249 | 907 | 1184 | 1932 | 16.3 | 46.1 | 125 | 290 | 546 | 1369 |
| 90 | 406 | 38.5 | 108 | 252 | 498 | 1973 | 37 | 122 | 293 | 615 | 27 | 104 | 193 | 329 | 67 | 266 | 965 | 1258 | 2047 | 17.4 | 49.0 | 133 | 307 | 579 | 1450 |
| 100 | 452 | 42.8 | 121 | 280 | 554 | 2195 | 42 | 135 | 326 | 684 | 32 | 118 | 216 | 368 | 78 | 301 | 1082 | 1406 | 2277 | 19.7 | 54.7 | 148 | 342 | 644 | 1612 |
| 110 | 499 | 47.0 | 134 | 309 | 611 | 2418 | 47 | | 359 | 754 | 37 | 132 | 239 | 406 | 89 | 336 | 1199 | 1554 | 2507 | 21.9 | 60.5 | 163 | 376 | 709 | 1774 |
| 120 | 545 | 51.3 | 146 | 338 | 668 | 2640 | 51 | | 392 | 823 | 42 | 147 | 262 | 445 | 100 | 371 | 1316 | 1702 | 2737 | 24.2 | 66.2 | 178 | 411 | 774 | 1936 |
| 130 | 591 | 55.6 | 159 | 366 | 724 | 2862 | 56 | | 425 | 893 | 47 | 161 | 285 | 483 | 111 | 406 | 1433 | 1850 | 2967 | 26.4 | 72.0 | 193 | 445 | 839 | 2098 |
| 140 | 637 | 59.9 | 171 | 395 | 781 | 3084 | 61 | | 458 | 962 | 51 | 176 | 308 | 522 | 122 | 441 | 1550 | 1998 | 3197 | 28.7 | 77.8 | 208 | 480 | 904 | 2260 |
| 150 | 682 | 64.2 | 184 | 424 | 837 | 3305 | 65 | | 491 | 1031 | 56 | 190 | 331 | 560 | 133 | 476 | 1667 | 2146 | 3427 | 31.0 | 83.5 | 223 | 514 | 969 | 2422 |

All measurements are in Centistokes (cSt). Centipoise (cP) = cSt x product density

elcometer

## Viscosity Flow Cups Accessories                    **Elcometer**

Accessories

**KT002400N201** — Viscosity Cup Stand with Bubble Level and Glass Draw Plate
To ensure the viscosity cup is positioned correctly to carry out the test.

**KT002400N001** — Viscosity Cup Precision Stand with Bubble Level and Glass Draw Plate
To ensure the viscosity cup is positioned correctly to carry out the test.

**KT002400P001** — Bubble Level for Viscosity Cup
To ensure the viscosity cup is parallel to the surface.

**KT002400P999** — Viscosity Glass Draw Plate
To retain test sample until operator is ready to commence test and provides surface for bubble level.

**KT002400N002** — Double-walled Stand with Thermojacket
For heating test samples for viscosity measurement at specific elevated temperatures.

**K0007300M201** — Elcometer 7300 High Precision Stopwatch

**KT002400N003** — Elcometer 2400 Conversion Disc
Allowing viscosity (cSt) and flow times of different cups to be calculated.
Front: No.4 cups according to AFNOR, BS, NF, ASTM, DIN, Zahn 2
Back: No.3-4-5-6 cups according to ISO and Zahn 3
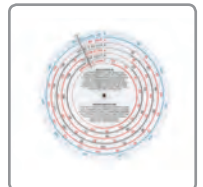
**For a full range of Calibration Oils see page 16-10**

Thermometers

To accurately measure flow for viscosity the temperature needs to be 23°C ± 2°C (73.4°F). Here are a range of thermometers from Elcometer. For more information see page 4-8.

| Code | Description |
|---|---|
| T1164441- | Spirit Thermometer in °C |
| T1164442- | Spirit Thermometer in °F |
| G212----1A | Elcometer 212 Digital Pocket Thermometer (°C/°F) with Liquid Probe |
| | For more information see page 4-9 |
| G213----2 | Elcometer 213/2 Digital Thermometer (°C/°F) |
| T9996390- | Elcometer 213/2 Liquid Probe |
| | For more information see page 4-10 |

## Elcometer 2437 & 2435    Viscosity Dip Cups - Frikmar
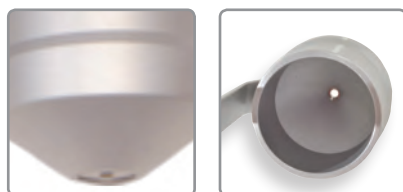


Thanks to its handle, this cup is very easy to use to perform checks on site or during the manufacturing process. It is ideal for measuring the consistency of paints, varnishes and other similar products.

Simply dip the cup into the product to be measured, lift it out and measure how long it takes for the contents to empty through the orifice.

The measured kinematic viscosity is generally expressed in seconds (s) flow time, which can be converted to Centistokes (cSt) if the Standard stipulates a conversion method.

Several ranges are available, according to the Standards being used; from 7 to 1100cSt.

**STANDARDS:**
**DIN:** DIN 53211 (cup 4 only)
**FORD/ASTM:** ASTM D 1200
**ISO:** ASTM D 5125, ISO 2431
**AFNOR:** NF T30-014

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### Technical Specification                                                                 C

**ISO Viscosity Dip Cups**

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002437M002 | Elcometer 2437/2 ISO Dip Cup 3 | 3mm | 7 - 42 | ◇ |
| K0002437M003 | Elcometer 2437/3 ISO Dip Cup 4 | 4mm | 34 - 135 | ◇ |
| K0002437M006 | Elcometer 2437/6 ISO Dip Cup 5 | 5mm | 91 - 326 | ◇ |
| K0002437M004 | Elcometer 2437/4 ISO Dip Cup 6 | 6mm | 188 - 684 | ◇ |
| K0002437M005 | Elcometer 2437/5 ISO Dip Cup 8 | 8mm | - | ◇ |
| K0002437M002C | Elcometer 2437/2 with calibration certificate | 3mm | 7 - 42 | ● (e) |
| K0002437M003C | Elcometer 2437/3 with calibration certificate | 4mm | 34 - 135 | ● (e) |
| K0002437M006C | Elcometer 2437/6 with calibration certificate | 5mm | 91 - 326 | ● (e) |
| K0002437M004C | Elcometer 2437/4 with calibration certificate | 6mm | 188 - 684 | ● (e) |
| K0002437M005C | Elcometer 2437/5 with calibration certificate | 8mm | - | ● (d) |

**FORD/ASTM Viscosity Dip Cups**

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002435M001 | Elcometer 2435/1 FORD/ASTM Dip Cup 4 | 4.12mm | 70 - 370 | ◇ |
| K0002435M001C | Elcometer 2435/1 with calibration certificate | 4.12mm | 70 - 370 | ● (e) |



**For a full range of Calibration Oils see page 16-10**

[1] For Information Only          (d) Dimensional Certificate          (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.     ◇ Batch Calibration Certificate supplied as standard.

## Viscosity Dip Cups - Frikmar

| Technical Specification | | | | C |
|---|---|---|---|---|

| **DIN Viscosity Dip Cups** | | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| Part Number | Description | | | |
| K0002434M001 | Elcometer 2434/1 DIN Dip Cup 2 | 2mm | - | ◇ |
| K0002434M002 | Elcometer 2434/2 DIN Dip Cup 4 | 4mm | 96 - 683 | ◇ |
| K0002434M003 | Elcometer 2434/3 DIN Dip Cup 6 | 6mm | - | ◇ |
| K0002434M004 | Elcometer 2434/4 DIN Dip Cup 8 | 8mm | - | ◇ |
| K0002434M001C | Elcometer 2434/1 with calibration certificate | 2mm | - | ● (d) |
| K0002434M002C | Elcometer 2434/2 with calibration certificate | 4mm | 96 - 683 | ● (e) |
| K0002434M003C | Elcometer 2434/3 with calibration certificate | 6mm | - | ● (d) |
| K0002434M004C | Elcometer 2434/4 with calibration certificate | 8mm | - | ● (e) |

| **AFNOR Viscosity Dip Cups** | | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| Part Number | Description | | | |
| K0002436M001 | Elcometer 2436/1 AFNOR Dip Cup 4 | 3.99mm | 50 - 1100 | ◇ |
| K0002436M001C | Elcometer 2436/1 with calibration certificate | 3.99mm | 50 - 1100 | ● (d) |

## Lory Viscosity Cup

The Elcometer 2215 Lory Viscosity Cup is a conventional cylindrical cup with a needle fixed into the bottom for quick measurements on-site or during production.

The cup is first dipped into the product to be measured, which then empties through the escape hole. Unlike other Viscosity cups, the flow time is measured as soon as the point of the needle appears.

| Technical Specification | | | |
|---|---|---|---|

| Part Number | Description | Cup Number | Range (cSt)[1] |
|---|---|---|---|
| K0002215M001 | Elcometer 2215 Lory Viscosity Cup | 1 | 50 - 1100 |

[1] For Information Only          (d) Dimensional Certificate          (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.     ◇ Batch Calibration Certificate supplied as standard.

## Elcometer 2210

### Zahn Viscosity Dip Cups

The Elcometer 2210 Zahn Dip Cup is a small U-shaped cup suspended from a looped wire. This method is ideal for measuring the consistency of paints, varnishes and similar products.

Simply dip the cup into the product to be measured, lift it out and measure how long it takes for the contents to empty through the orifice.

There are five cups with five different orifice sizes available, ranging from 5 to 1840cSt.

**STANDARDS:**
ASTM D 1084-D, ASTM D 4212

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Technical Specification     C

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002210M001 | Elcometer 2210/1 Zahn Dip Cup 1 | 1.8mm | 5 - 56 | ◇ |
| K0002210M002 | Elcometer 2210/2 Zahn Dip Cup 2 | 2.7mm | 21 - 231 | ◇ |
| K0002210M003 | Elcometer 2210/3 Zahn Dip Cup 3 | 3.8mm | 146 - 848 | ◇ |
| K0002210M004 | Elcometer 2210/4 Zahn Dip Cup 4 | 4.3mm | 222 - 1110 | ◇ |
| K0002210M005 | Elcometer 2210/5 Zahn Dip Cup 5 | 5.3mm | 460 - 1840 | ◇ |
| K0002210M001C | Elcometer 2210/1 with calibration certificate | 1.8mm | 5 - 56 | ● (e) |
| K0002210M002C | Elcometer 2210/2 with calibration certificate | 2.7mm | 21 - 231 | ● (e) |
| K0002210M003C | Elcometer 2210/3 with calibration certificate | 3.8mm | 146 - 848 | ● (e) |
| K0002210M004C | Elcometer 2210/4 with calibration certificate | 4.3mm | 222 - 1110 | ● (e) |
| K0002210M005C | Elcometer 2210/5 with calibration certificate | 5.3mm | 460 - 1840 | ● (e) |

**For a full range of Calibration Oils see page 16-10**

[1] For Information Only     (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.     ◇ Batch Calibration Certificate supplied as standard.

# Shell Viscosity Dip Cups

## Elcometer 2310

The Elcometer 2310 Shell Viscosity Dip Cups are stainless steel cups for quick measurements on-site or during production. These cups are often used in the printing or ink industry.

Simply dip the cup into the product to be measured, lift it out and measure how long it takes for the contents to empty through the orifice.

The measured kinematic viscosity is generally expressed in seconds (s) flow time, which can be converted into Centistokes (cSt).

There are six different orifice diameter sizes available, for measurements between 2 and 1300cSt.

**STANDARDS:**
ASTM D 4212

## Technical Specification                                                           C

| Part Number | Description | Orifice Diameter | Range[1] (cSt) | Certificate |
|---|---|---|---|---|
| K0002310M001 | Elcometer 2310/1 Shell Dip Cup 1 | 1.8mm | 2 - 20 | ◇ |
| K0002310M002 | Elcometer 2310/2 Shell Dip Cup 2 | 2.4mm | 10 - 50 | ◇ |
| K0002310M003 | Elcometer 2310/3 Shell Dip Cup 3 | 3.1mm | 30 - 120 | ◇ |
| K0002310M004 | Elcometer 2310/4 Shell Dip Cup 4 | 3.8mm | 70 - 270 | ◇ |
| K0002310M005 | Elcometer 2310/5 Shell Dip Cup 5 | 4.6mm | 125 - 520 | ◇ |
| K0002310M006 | Elcometer 2310/6 Shell Dip Cup 6 | 5.8mm | 320 - 1300 | ◇ |
| K0002310M001C | Elcometer 2310/1 with calibration certificate | 1.8mm | 2 - 20 | ● (e) |
| K0002310M002C | Elcometer 2310/2 with calibration certificate | 2.4mm | 10 - 50 | ● (e) |
| K0002310M003C | Elcometer 2310/3 with calibration certificate | 3.1mm | 30 - 120 | ● (e) |
| K0002310M004C | Elcometer 2310/4 with calibration certificate | 3.8mm | 70 - 270 | ● (e) |
| K0002310M005C | Elcometer 2310/5 with calibration certificate | 4.6mm | 125 - 520 | ● (e) |
| K0002310M006C | Elcometer 2310/6 with calibration certificate | 5.8mm | 320 - 1300 | ● (e) |

[1] For Information Only          (d) Dimensional Certificate          (e) Efflux Time Certificate

● Calibration Certificate supplied as standard.     ◇ Batch Calibration Certificate supplied as standard.

## Elcometer 2410



### Elcometer Viscosity Cup Standard Calibration Oils

In order to check the viscosity cup's calibration or to certify it for ISO purposes, it is imperative that viscosity cup standard calibration oils are used.

Standard oils have a specific drain time, dependent upon the viscosity cup type (Ford, Shell, Zahn etc.) and the orifice or cup number used.

To check the viscosity cup, use the standard viscosity oils in place of the liquid and measure the drain time.

Specific calibration oils can only be used with specific flow and dip cups. Please use the table below to determine which calibration oil is required with each cup, or contact Elcometer. Viscosity oils are supplied in ½ litre (1 pint) bottles.

| Technical Specification | | | | | | | | C |
|---|---|---|---|---|---|---|---|---|
| | Dip Cups | | | | Flow Cups | | | |
| Part Number | Zahn | DIN Frikmar | ISO Frikmar | Shell | DIN | ASTM/FORD | ISO | Kinematic Viscosity at 25°C (77°F)[†] | Certificate |
| K0002410M021 | 1 | | 3 | 2 | | 2 | 3 | 34cSt | ● |
| K0002410M022 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 120cSt | ● |
| K0002410M023 | 3 | 4 | 6 | 5 | 4 | 4 | 6 | 230cSt | ● |
| K0002410M024 | 4 | 4 | 6 | 6 | 4 | | 6 | 460cSt | ● |
| K0002410M025 | 5 | | | | | | | 850cSt | ● |
| K0002410M026 | 6 | | | | | | | 1600cSt | ● |

[†] Nominal Value

● Calibration certificate supplied as standard.

# Rotational Viscometers

Available in four versions with a choice of low to medium or medium to high viscosity ranges, either manually or PC controlled, the Elcometer 2300 range of rotational viscometers can be used to measure the viscosity of liquids in accordance with ISO 2555 and a number of ASTM standards.

**STANDARDS:**
AS/NZS 1580.214.5, ASTM D 1084-B, ASTM D 2196, BS 3900-A7-2, ISO 2555, ISO 2884-2

Low to medium or medium to high viscosity versions - manually or PC controlled via ViscosityMaster™

Clear, backlit LCD displays:

- Viscosity reading (cP or mPas)
- Spindle rotation speed
- % torque
- Sample temperature
- Auto range
- Shear rate & shear stress

Wide range of spindles for various viscosity and shear rate measurements

Automated Krebs test - set up and press 'Start'

Audible warning if viscosity reading exceeds the limits set by the user

Temperature probe supplied for increased accuracy of measurement

supplied with
ViscosityMaster™

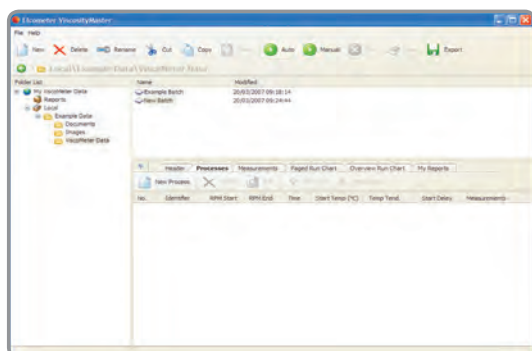# Elcometer 2300     Rotational Viscometers

| Technical Specification | | | | C |
|---|---|---|---|---|

| Model          Elcometer 2300 | RV1-L | RV2-L | RV1-R | RV2-R |
|---|---|---|---|---|
| Part Number | K2300M101 | K2300M201 | K2300M102 | K2300M202 |
| Measuring Range (mPas) | 3 - 2,000,000 | 3 - 2,000,000 | 20 - 13,000,000 | 20 - 13,000,000 |
| Spindles Supplied | L1 to L4 | L1 to L4 | R2 to R7 | R2 to R7 |
| Backlit LCD | ■ | ■ | ■ | ■ |
| Readings in cP and mPas | ■ | ■ | ■ | ■ |
| Low to Medium Viscosity | ■ | ■ | | |
| Medium to High Viscosity | | | ■ | ■ |
| Sample Temperature Measurement | ■ | ■ | ■ | ■ |
| Manually Controlled | ■ | ■ | ■ | ■ |
| PC Controlled | | ■ | | ■ |
| Certificate | ● | ● | ● | ● |
| Measurement Accuracy & Repeatability | ±1% of full scale | ±0.2% | | |
| Maximum Altitude above Sea Level | 2000m (6562ft) | | | |
| Speeds (rpm) | 0.3, 0.5, 0.6, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 10, 12, 20, 30, 50, 60, 100, 200 | | | |
| Accuracy (Speed) | <0.5% of the absolute value | | | |
| Sample Temperature Measurement Range[†] | -15°C to +180°C (5°F to 356°F) | | | |
| Sample Temperature Measurement Resolution[†] | 0.1°C (0.18°F) | | | |
| Sample Temperature Measurement Accuracy[†] | ±0.1°C (±0.18°F) | | | |
| Ingress Protection | Level 2 | | | |
| Dimensions & Weight (including carry case) | 495 x 420 x 200mm (19.5 x 16.5 x 8"), 9kg (20lb) | | | |
| Packing List | Elcometer 2300 Digital Rotational Viscometer, spindle set, 3 x mains lead (UK, EUR and US), hexagonal wrench, RS232 connection cable, VisosityMaster™ Software[‡], calibration certificate and operating instructions | | | |

† Temperature measurement using PT100 Thermometer

‡ RV1 Models: For data transfer from Viscometer to PC only; RV2 Models: For bi-lateral data transfer between Viscometer and PC

## VisosityMaster™



## Elcometer ViscosityMaster™ Software

VisosityMaster™ is the powerful, yet easy to use software supplied with all Elcometer 2300 Rotational Viscometers. Specifically designed to maximise the versatility and usability of the viscometer, data can be stored along with associated images, test notes and all related test information.

VisosityMaster™ makes it easy to collate and use the data recorded. Whether the data is required for analysis or to create professional reports for distribution to customers or colleagues, VisosityMaster™ can deliver. With inbuilt report templates and easy access to all data, images and other associated files, VisosityMaster™ makes managing data quick and easy.

● Calibration Certificate supplied as standard.

# Rotational Viscometers

Accessories

### Spindles

Each Elcometer 2300 is supplied with a set of stainless steel spindles as standard, suitable for both Newtonian & non-Newtonian fluids.

Elcometer 2300 RV-L is supplied with spindles L1-L4 for low to medium viscosity testing.

Elcometer 2300 RV-R is supplied with spindles R2-R7 for medium to high viscosity testing.

A large R1 spindle (underlined) can be purchased separately.

| Part Number | Description |
| --- | --- |
| KT00230019698 | Spindle Set: Type L1 to L4 for Low to Medium Viscosity Testing |
| KT00230019699 | Spindle Set: Type R2 to R7 for Medium to High Viscosity Testing |
| KT00230019700 | R1 Spindle |

### Small Sample Adaptor

The small sample adaptor consists of a cylindrical sample chamber which can be used in conjunction with spindles TL & TR to accurately obtain viscosity measurements, shear rate and shear stress of sample volumes between 8 - 13ml (0.27 - 0.44fl.oz).

The TL spindles are for low to medium viscosity samples and TR spindles are for use with medium to high viscosity samples.

| Part Number | Description |
| --- | --- |
| KT00230019702 | Adaptor Kit for Small Volume Samples[‡] |
| KT00230019784 | Adaptor Kit for Small Volume Samples & Integrated Temperature Sensor[‡] |
| KT00230019703 | Small Volume Spindle Set: Type TL5 to TL7 for Low to Medium Viscosity Testing |
| KT00230019704 | Small Volume Spindle Set: Type TR8 to TR11 for Medium to High Viscosity Testing |

‡ Small volume spindle set required

### Low Viscosity Adaptor

The low viscosity adaptor consists of a cylindrical sample chamber and is supplied complete with spindle. Used to accurately obtain viscosity measurements, shear rate and shear stress of low viscosity materials from 1cP (mPa), the stainless steel chamber can hold a sample volume from 16 - 18ml (0.54 - 0.61fl.oz).

Running temperature controlled water through the water jacket supplied keeps the sample at a constant specified temperature of between 0°C and 100°C (32°F and 212°F).

| Part Number | Description |
| --- | --- |
| KT00230019710 | Low Viscosity Adaptor Kit with Spindle |

## Elcometer 2300    Rotational Viscometers

Accessories

### High Temperature Adaptor
Ideal for use with materials such as hot resins, bitumens and oils, the high temperature adaptor allows precise measurement of viscosity at high temperatures. It can accurately obtain viscosity measurements, shear rate and shear stress from 1-2100cP (mPa)[‡] up to temperatures of 200°C (392°F).

The stainless steel chamber can hold a sample volume from 16 - 18ml (0.54 - 0.61fl.oz). Each adaptor is supplied complete with a spindle.

| Part Number | Description |
| --- | --- |
| KT00230019711 | High Temperature Adaptor Kit with Spindle |

### Helical Movement Adaptor
Some materials, such as creams, pastes and gels, do not flow easily, so standard spindles and testing methods cannot be used as they create a 'hole' in the material, generating invalid results. The helical movement adaptor moves smoothly up and down, automatically staying within pre-programmed limits, allowing the needle style spindle to cut into the material without making a 'hole' and making the measurement of viscosity possible.

The kit is supplied with the motor and 6 T-shaped spindles: PA, PB, PC, PD, PE, PF.

| Part Number | Description |
| --- | --- |
| KT00230019705 | Helical Movement Adaptor Kit with Spindle Set, UK 240V |
| KT00230019706 | Helical Movement Adaptor Kit with Spindle Set, EUR 220V |
| KT00230019707 | Helical Movement Adaptor Kit with Spindle Set, US 110V |

### Standard Calibration Oils
Silicone standard oils are used to check viscosity measurements. The values are given for 6 different temperatures between 20°C and 27°C (68°F and 80°F).

These oils are specifically manufactured for use with Elcometer 2300 Rotational Viscometers and values quoted are nominal at 25°C (77°F).

| Part Number 500ml (1 pint) | Description | Centipoise (cP) | Certificate |
| --- | --- | --- | --- |
| KT009999N101 | Rotational Viscosity Calibration Oil | 300 | ● |
| KT009999N102 | Rotational Viscosity Calibration Oil | 700 | ● |
| KT009999N103 | Rotational Viscosity Calibration Oil | 1000 | ● |
| KT009999N104 | Rotational Viscosity Calibration Oil | 2500 | ● |
| KT009999N105 | Rotational Viscosity Calibration Oil | 4000 | ● |

● Calibration Certificate supplied as standard.

[‡] Based on Model RVR1-R & RV2-R.

## Krebs Viscometer

Featuring a unique automatic test mode, the Elcometer 2250 Krebs Viscometer measures the viscosity of paints, varnishes, adhesives, pastes and liquid inks at the touch of a button.

Fully automated Krebs test
- simply set up and press 'Start'

Choice of measurement:
Krebs Units (KU), Grams (g),
or Centipoise (cP)

Designed for use with either a 600ml beaker, 1 pint or ½ pint cans

Standard Krebs spindle with fixed spindle speed of 200rpm

Can be used with non-standard containers and sample volumes

User adjustable "Sample Waiting Time" and "Measuring Time"

Date and time stamp for each reading

Designed for use in accordance with National and International Standards - the Elcometer 2250 is ideal for both process control and quality assurance.

## Elcometer 2250

## Krebs Viscometer

The Elcometer 2250 offers users both an automatic or manual Krebs viscosity test. The unit has a fixed spindle speed of 200rpm and displays the viscosity value on screen in Krebs Units (KU), Grams (g) or Centipoise (cP).

The Elcometer 2250 has two operating modes; 'Automatic' and 'Manual'.

- Automatic Mode:

  Automatic test - ensuring reliability and consistency of results - ideal for repeatable and reproducible testing.

  Once the sample beaker is positioned on the support, and the 'Start' button is pressed, the drive head automatically moves down until the spindle reaches the correct position within the sample.

  After a pause to let the sample settle, the Elcometer 2250 begins the test and displays the viscosity value. Once the test has been completed, the head automatically returns to the start position allowing the sample to be removed.

- Manual Mode:

  The Elcometer 2250 can also be used manually - ideal for measuring non-standard sample sizes.

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### Measuring viscosity of non-Newtonian fluids

The viscosity of non-Newtonian fluids is dependent upon temperature, shear rate and time. There are several different categories of non-Newtonian fluids and depending on how viscosity changes with time, the flow behaviour is characterised as:

**Thixotropic** - time thinning, i.e. viscosity decreases with time. Thixotropics - are gel-like substances at rest but liquid when agitated, eg: non-drip paints, ketchup and varieties of honey.

**Rheopectic** - time thickening, i.e. where viscosity increases with duration of stress, eg: some lubricants. Rheopectic liquids are very rare. Some liquids show time thinning behaviour due to breakdown of the structure. This phenomenon is sometimes known as Rheomaiaxis.

Depending on how viscosity changes with shear rate, the flow behaviour is characterised as:

**Pseudoplastics or shear thinning** - where viscosity decreases with increased shear rate, eg: blood, gelatin and clay.

**Dilatant or shear thickening** - the viscosity increases with increased shear rate, eg: corn starch or concentrated sugar solution.

**Plastic** - exhibits a so-called yield value, i.e. a certain shear stress must be applied before a flow occurs.

Newtonian fluids, (such as water, paints, etc.), which continue to flow at a given temperature regardless of the forces acting on it are typically measured using viscosity flow and dip cups, see page 16-2.

# Krebs Viscometer

## Technical Specification · C

| Part Number | Description | | Certificate |
|---|---|---|---|
| K2250M001 | Elcometer 2250 Krebs Viscometer | | ● |
| Measurement Units | Krebs Units (KU) | Grams (g) | Centipoise (cP) |
| Range | 40 KU to 141 KU | 32g to 1099g | 27 cP to 5274 cP |
| Resolution | 0.1 KU | 1g | 5 cP |
| Measurement Accuracy | ±1% of full scale | | |
| Repeatability | ±0.5% | | |
| Speed (Accuracy) | 200rpm (±1rpm) | | |
| Operating Temperature | 10°C to 40°C (50°F to 104°F) | | |
| Maximum Altitude | 2000m (6500ft) above sea level | | |
| Dimensions | 500 x 325 x 190mm (19.7 x 12.8 x 7.5") | | |
| Weight | 8.5kg (18.7lb) | | |
| Packing List | Elcometer 2250 Krebs Viscometer, krebs spindle, large sample container support for 600ml glass beaker or 1 pint (USA) can, small sample container support for ½ pint (USA) can, sample container support locating plug, glass beaker 600ml (20.3fl.oz.), hexagonal wrench, 3 x mains lead (UK, EUR and US), calibration certificate and operating instructions | | |

## Accessories

| Part Number | Description |
|---|---|
| KT00225021791 | Special Krebs Spindle |
| KT00225022906 | Special Paste Spindle |
| KT00225021794 | Sample Container Support for 600ml (20.3 fl.oz.) Glass Beaker or 1 pint (USA) Can |
| KT00225021795 | Sample Container Support for ½ pint (USA) Can |
| KT00225021793 | Sample Container Support Locating Plug |
| KT00225021796 | Glass Beaker: 600ml (20.3 fl.oz.) |

## Krebs Viscosity Standard Calibration Oils · C

| Part Number | Description | Krebs Units (KU) | Centipoise (cP) | Certificate |
|---|---|---|---|---|
| KT002250N001 | Krebs Calibration Oil: S200 | 64 | 400 | ● |
| KT002250N002 | Krebs Calibration Oil: N350 | 79 | 750 | ● |
| KT002250N003 | Krebs Calibration Oil: N400 | 84 | 940 | ● |
| KT002250N004 | Krebs Calibration Oil: S600 | 95 | 1400 | ● |
| KT002250N005 | Krebs Calibration Oil: N1000 | 115 | 2600 | ● |
| Packing List | Supplied in 500ml (1 pint) bottles complete with calibration certificate and accurate to ±1% of the stated viscosity values | | | |

● Calibration Certificate supplied as standard.

## Elcometer 2280

### Matthis Fluidometer

The Elcometer 2280 is a simple and easy-to-use instrument to measure the fluidity of a coating.

The coating to be measured is poured into the semi-spherical cavity of the instrument, which is in the horizontal position. The instrument is then lifted vertically allowing the liquid in the groove to flow under gravity, this is graduated in mm.

The distance flowed after approximately 10 seconds ± 0.5 seconds, measured with the sand timer provided, indicates the fluidity of the coating.

### Technical Specification

| Part Number | Description |
|---|---|
| K0002280M001 | Elcometer 2280 Matthis Fluidometer |
| K0002280N001 | Elcometer 2280 Replacement Sand Bottle |

## Elcometer 2290

### Daniel Flow Gauge

This simple instrument is used to assess the ability of thick or paste-like materials such as paints or printing inks to flow.

The product is poured into the semi-cylindrical reservoir. When the instrument is lifted vertically, the product runs on a graduated plate, which is fixed perpendicular to the reservoir.

The distance covered in a pre-determined time is the measure of the fluidity.

### Technical Specification

| Part Number | Description |
|---|---|
| K0002290M001 | Elcometer 2290 Daniel Flow Gauge |

*elcometer*

# Film Application & Test Charts

**For numerous products, such as paint, ink, varnishes, glue and cosmetics, the reliability of many laboratory tests is directly related to the quality and consistency of the samples.**

Any measurements made on coatings for the purpose of describing their physical properties (drying time, elasticity, abrasion, gloss, colour, shade, etc.) are made on the basis of uniform and comparable samples with precisely controlled thickness.

In order to meet such specific demands, Elcometer has a wide range of high precision film applicators and spiral bar coaters.

Elcometer's range of Motorised Film Applicators has been designed specifically to ensure the greatest levels of repeatability and reproducibility by ensuring:
- constant speed of application
- smoothness of operation - ensuring no jerks which create ridges and variation in thickness

Available with a highly engineered table, available with or without a vacuum and heating element, each Elcometer Motorised Film Applicator is accurately measured using a Co-ordinate Measuring Machine to meet an incredibly high level of flatness.

The average variation on Elcometer Application Tables is 2.3µm (0.092mil), while the average variation on glass used on some low cost tables is 12.0µm (0.48mil).

If a 100µm (4mils) coating is tested, readings taken using an Elcometer table would produce readings between 97.7 (3.9mils) and 102.3µm (4.1mils). On glass, the readings produced would be between 88 (3.5mils) and 112µm (4.48mils) - a 47% variation.

Elcometer also offers a wide range of Leneta Test Charts to meet all specific requirements, which feature a combination of black and white markings. These are the two extremes of colour thereby indicating the thickness of coating required to cover the whole colour spectrum.

This range of Leneta Test Chart covers a variety of testing needs including the hiding power of coatings, ink qualities, penetration, spreading rates and opacity.

# Film Application

## Elcometer 4340      Motorised/Automatic Film Applicator

The Elcometer 4340 Motorised Film Applicator is the essential machine for preparing a wide variety of product samples including paint, varnish, cosmetics and glue.

11 pre-set transverse speeds from 0.2 - 3.9 inches per second

Ideal for testing liquids including: paint, varnish, cosmetics, glue

Adjustable travel carriage with 'auto stop' at end of travel

Precision engineered flat aluminium table for better repeatability - 5 times flatter than glass

Heavy base unit to minimise vibration and to produce high quality samples, without "Vibration ridges"

elcometer

## Motorised/Automatic Film Applicator

**Elcometer 4340**

Standard table & perforated or channelled vacuum tables available

Electric or water heated sample tables available for temperature control

Can be used with a full range of Elcometer Film Applicators, see page 17-9



Each table is engineered to the highest flatness rating



Use up to 3 film applicators simultaneously



11 pre-set speeds and adjustable stroke length - from 5-150mm (0.2 - 5.9")
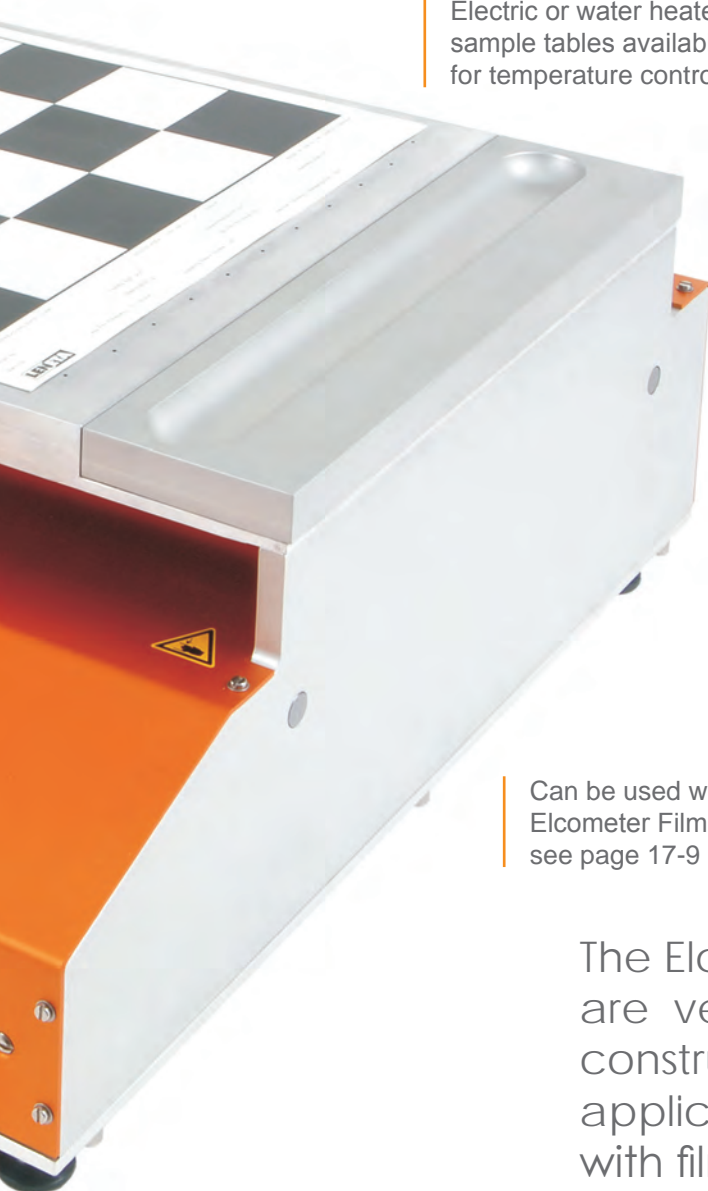
The Elcometer 4340 Motorised Film Applicators are versatile, rugged and precise. The rigid construction ensures a smooth, consistent application without the ridges often associated with film application.

## Elcometer 4340      Motorised/Automatic Film Applicator

The Elcometer 4340 provides total consistency and reproducibility on various substrates including contrast charts, sheet steel, plastic foils and glass.

> **STANDARDS:**
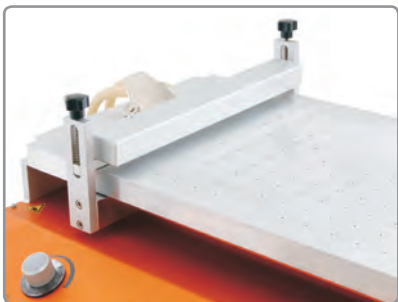> ASTM D 823-C
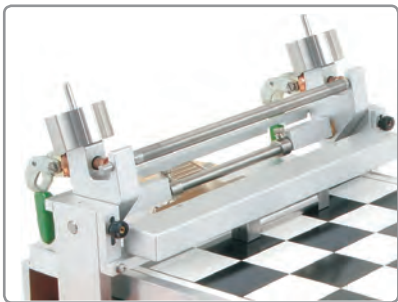


## Interchangeable head attachments

Easily switched between film applicators

- Spiral Bar Head Attachment
- Standard Applicator Head Attachment
- Combined Spiral/Standard Head Attachment



## Durable & Rugged

- Sturdy rigid design to eliminate vibration during film application
- Up to 15 years of standard use



## Choice of Bed

- Standard flat table
- Single and double channelled vacuum tables
- Perforated and heated vacuum tables



## Smooth & multiple concurrent tests

- Use up to 3 film applicators simultaneously
- Test up to 2 test charts simultaneously

# Motorised/Automatic Film Applicator

## Elcometer 4340

A range of applicator head attachments is available separately, allowing the user to select the most appropriate for their specific use and Standard (if applicable).

The Elcometer 4340 range of motorised Film Applicators comes as one universal base with user selectable head attachments - allowing the flexibility to test using standard film applicators (filmographs), spiral bar coaters or using the combined attachment of both the film applicator and spiral bar attachment. For a complete range of film applicators and spiral bar coaters etc. see page 17-7.

Each table is engineered to the highest flatness rating (up to five times flatter than glass - see page 17-6), and can be supplied in a number of variations to meet your specific test requirements, simply select the model from the Technical Specification below.


Film Applicator Attachment


Spiral Bar Attachment


Combined Film Applicator and Spiral Bar Attachment

### Technical Specification   C

| Part Number | Test Chart Clip | Standard Table | Perforated Vacuum Table+ | Single Channel Vacuum Table+ | Double Channel Vacuum Table+ | High Speed | Water Heated Temperature* +15 to 100°C (59 to 212°F) | Electrically Heated Ambient to 200°C (Ambient to 392°F) | Certificate |
|---|---|---|---|---|---|---|---|---|---|
| K4340M10- | ■ | ■ | | | | | | | ○ |
| K4340M11- | ■ | ■ | | | | | ■ | | ○ |
| K4340M12-‡ | ■ | ■ | | | | | | ■ | ○ |
| K4340M13-‡ | ■ | ■ | | | | ■ | | | |
| K4340M100 | ■ | | ■ | | | | | | ○ |
| K4340M101 | ■ | | | ■ | | | | | ○ |
| K4340M102 | ■ | | | | ■ | | | | ○ |
| K4340M110 | ■ | | ■ | | | | ■ | | ○ |
| K4340M111 | ■ | | | ■ | | | ■ | | ○ |
| K4340M112 | ■ | | | | ■ | | ■ | | ○ |
| K4340M120 ‡ | ■ | | ■ | | | | | ■ | ○ |
| K4340M130 ‡ | ■ | | ■ | | | ■ | | ■ | |
| K4340M121 ‡ | ■ | | | ■ | | | | ■ | ○ |
| K4340M122 ‡ | ■ | | | | ■ | | | ■ | ○ |
| Dimensions | 780 x 490 x 320mm (30.7 x 19.3 x 12.6") | | | | | | | | |
| Weight | 29kg (64lb) | | | | | | | | |
| Packing List | Elcometer 4340 Film Applicator, 3x mains leads (UK, EUR & US) and operating instructions | | | | | | | | |

### Motorised Film Applicator Attachments

| Models | | |
|---|---|---|
| M10-, M100, M101, M102 | M11-, M12-, M110, M111, M112, M120, M121, M122 | |
| KT004340N001 | KT004340N101 | Film Applicator Attachment |
| KT004340N002 | KT004340N102 | Spiral Bar Coater Attachment# |
| KT004340N003 | KT004340N103 | Combined Film Applicator & Spiral Bar Coater Attachment# |

‡ For 110V unit, add D to end of part number, e.g. K4340M120D
# Each Spiral Bar Coater Attachment is supplied with a rubber mat

+ Vacuum Pump supplied separately (Elcometer 4930, see page 17-6)
* Supplied ready to be fitted with a temperature bath. Temperature bath is not supplied

○ Optional Calibration Certificate available.

# Film Application

## Elcometer 4900

### Free Standing Vacuum Tables

Elcometer 4900 free standing vacuum tables provide an ideal surface for manual application of films on test charts or samples. Made of perforated aluminium, the Elcometer 4900 keeps a wide range of test pieces absolutely flat (2.3µm variation over a 100mm length), including glass, plastic sheets, contrast charts etc. ideal for thicker, more substantial test pieces.

Elcometer vacuum tables are engineered to be flat and precise with little variation for "perfect" flatness. All Elcometer standard tables, channelled and perforated vacuum tables are 5 times flatter than glass.

Perforated tables have two sample size settings, 210 x 297mm (8.3" x 11.7") and 297 x 420mm (11.7" x 16.6"), selected by means of a switch on the table.

### Technical Specification

| Part Number | Description | Paper Size | Table Dimensions | |
|---|---|---|---|---|
| | | | mm | inches |
| K0004900M001 | Perforated Vacuum Table | A4 | 220 x 300 | 8.5 x 12 |
| K0004900M002 | Perforated Vacuum Table | A3 | 300 x 450 | 12 x 18 |

### Accessories

| | | |
|---|---|---|
| KTUK4930M001 | Vacuum Pump (UK 240V) - | used to provide vacuum to the Vacuum Tables |
| KT004930M001 | Vacuum Pump (EUR 220V) - | used to provide vacuum to the Vacuum Tables |
| KTUS4930M001 | Vacuum Pump (US 110V) - | used to provide vacuum to the Vacuum Tables |

## Elcometer 4350

### Non-Slip Rubber Mat

A non-slip rubber mat designed to minimise surface defects. Suitable for use with the Elcometer Spiral Bar Coaters and the Elcometer 4340 Motorised Film Applicators; see page 17-7 and 17-2.

### Technical Specification

| Part Number | Description | Depth | | Dimensions | |
|---|---|---|---|---|---|
| | | mm | inches | mm | inches |
| KT004350P051 | Elcometer 4350/51 Non-Slip Rubber Mat | 5 | 0.2" | 510 x 140 | 20 x 5.5 |
| KT004350P052 | Elcometer 4350/52 Non-Slip Rubber Mat | 5 | 0.2" | 510 x 250 | 20 x 9.8 |

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# Spiral Bar Coaters

Made of stainless steel and consisting of a cylindrical bar wound with stainless steel wire, these spiral bar coaters are used to apply a predetermined thickness for coatings with high levelling characteristics.

- A wide range of different wire diameters to measure coating thicknesses from 4 to 500µm (0.157 to 19.685mils).

- 2 standard bar widths are available,140mm (5.5") or 250mm (9.8"), allowing the user to apply the correct film width dependent on the substrate or test chart width. Other widths are available on request.

Ideal for use with the Elcometer 4340 Motorised Film Applicators; see page 17-2. A range of standard and heated vacuum tables are available; see page 17-6 for more information.

**STANDARDS:**
ASTM D 4147

## Technical Specification

| Bar Width 140mm (5.5") | | Coating Thickness | | Part Number | Model | Coating Thickness | |
|---|---|---|---|---|---|---|---|
| Part Number | Model | µm | mils | | | µm | mils |
| K0004361P001 | Elcometer 4361/1 | 4 | 0.157 | K0004361P017 | Elcometer 4361/17 | 66 | 2.598 |
| K0004361P002 | Elcometer 4361/2 | 6 | 0.236 | K0004361P018 | Elcometer 4361/18 | 70 | 2.755 |
| K0004361P003 | Elcometer 4361/3 | 8 | 0.315 | K0004361P019 | Elcometer 4361/19 | 76 | 2.992 |
| K0004361P004 | Elcometer 4361/4 | 10 | 0.393 | K0004361P020 | Elcometer 4361/20 | 80 | 3.149 |
| K0004361P005 | Elcometer 4361/5 | 12 | 0.472 | K0004361P021 | Elcometer 4361/21 | 90 | 3.543 |
| K0004361P006 | Elcometer 4361/6 | 16 | 0.630 | K0004361P022 | Elcometer 4361/22 | 100 | 3.937 |
| K0004361P007 | Elcometer 4361/7 | 20 | 0.787 | K0004361P023 | Elcometer 4361/23 | 110 | 4.330 |
| K0004361P008 | Elcometer 4361/8 | 26 | 1.024 | K0004361P024 | Elcometer 4361/24 | 120 | 4.724 |
| K0004361P009 | Elcometer 4361/9 | 30 | 1.181 | K0004361P025 | Elcometer 4361/25 | 130 | 5.118 |
| K0004361P010 | Elcometer 4361/10 | 34 | 1.338 | K0004361P026 | Elcometer 4361/26 | 140 | 5.511 |
| K0004361P011 | Elcometer 4361/11 | 38 | 1.496 | K0004361P027 | Elcometer 4361/27 | 150 | 5.905 |
| K0004361P012 | Elcometer 4361/12 | 40 | 1.574 | K0004361P029 | Elcometer 4361/29 | 175 | 6.890 |
| K0004361P013 | Elcometer 4361/13 | 46 | 1.811 | K0004361P030 | Elcometer 4361/30 | 200 | 7.874 |
| K0004361P014 | Elcometer 4361/14 | 50 | 1.968 | K0004361P031 | Elcometer 4361/31 | 300 | 11.811 |
| K0004361P015 | Elcometer 4361/15 | 56 | 2.205 | K0004361P032 | Elcometer 4361/32 | 400 | 15.748 |
| K0004361P016 | Elcometer 4361/16 | 60 | 2.362 | K0004361P033 | Elcometer 4361/33 | 500 | 19.685 |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

## Elcometer 4360





**STANDARDS:**
ASTM D 4147

## Spiral Bar Coaters

Made of stainless steel and consisting of a cylindrical bar wound with stainless steel wire, these spiral bar coaters are used to apply a predetermined thickness for coatings with high levelling characteristics.

- A wide range of different wire diameters to measure coating thicknesses from 4 to 500µm (0.157 to 19.685mils).

- 2 standard bar widths are available,140mm (5.5") or 250mm (9.8"), allowing the user to apply the correct film width dependent on the substrate or test chart width. Other widths are available on request.

Ideal for use with the Elcometer 4340 Motorised Film Applicators; see page 17-2. A range of standard and heated vacuum tables are available; see page 17-6 for more information.

### Technical Specification

| Bar Width 250mm (9.8") | | Coating Thickness | | Part Number | Model | Coating Thickness | |
|---|---|---|---|---|---|---|---|
| Part Number | Model | µm | mils | | | µm | mils |
| K0004360P001 | Elcometer 4360/1 | 4 | 0.157 | K0004360P017 | Elcometer 4360/17 | 66 | 2.598 |
| K0004360P002 | Elcometer 4360/2 | 6 | 0.236 | K0004360P018 | Elcometer 4360/18 | 70 | 2.755 |
| K0004360P003 | Elcometer 4360/3 | 8 | 0.315 | K0004360P019 | Elcometer 4360/19 | 76 | 2.992 |
| K0004360P004 | Elcometer 4360/4 | 10 | 0.393 | K0004360P020 | Elcometer 4360/20 | 80 | 3.149 |
| K0004360P005 | Elcometer 4360/5 | 12 | 0.472 | K0004360P021 | Elcometer 4360/21 | 90 | 3.543 |
| K0004360P006 | Elcometer 4360/6 | 16 | 0.630 | K0004360P022 | Elcometer 4360/22 | 100 | 3.937 |
| K0004360P007 | Elcometer 4360/7 | 20 | 0.787 | K0004360P023 | Elcometer 4360/23 | 110 | 4.330 |
| K0004360P008 | Elcometer 4360/8 | 26 | 1.024 | K0004360P024 | Elcometer 4360/24 | 120 | 4.724 |
| K0004360P009 | Elcometer 4360/9 | 30 | 1.181 | K0004360P025 | Elcometer 4360/25 | 130 | 5.118 |
| K0004360P010 | Elcometer 4360/10 | 34 | 1.338 | K0004360P026 | Elcometer 4360/26 | 140 | 5.511 |
| K0004360P011 | Elcometer 4360/11 | 38 | 1.496 | K0004360P027 | Elcometer 4360/27 | 150 | 5.905 |
| K0004360P012 | Elcometer 4360/12 | 40 | 1.574 | K0004360P029 | Elcometer 4360/29 | 175 | 6.890 |
| K0004360P013 | Elcometer 4360/13 | 46 | 1.811 | K0004360P030 | Elcometer 4360/30 | 200 | 7.874 |
| K0004360P014 | Elcometer 4360/14 | 50 | 1.968 | K0004360P031 | Elcometer 4360/31 | 300 | 11.811 |
| K0004360P015 | Elcometer 4360/15 | 56 | 2.205 | K0004360P032 | Elcometer 4360/32 | 400 | 15.748 |
| K0004360P016 | Elcometer 4360/16 | 60 | 2.362 | K0004360P033 | Elcometer 4360/33 | 500 | 19.685 |



**Can be used with the Elcometer 4340 Motorised Film Applicator, see pages 17-2**

# Baker Film Applicator

## Elcometer 3520

The Elcometer 3520 Baker Film Applicator is made of hardened stainless steel with a cylindrical applicator body. These gauges apply a coating of specified thickness and film width on flat, relatively firm substrates.

It can also be used with the Elcometer 4340 Motorised Film Applicators, see pages 17-2.

Each Elcometer 3520 Baker Film Applicator has four high precision specified coating thickness sizes for accuracy and is available in a range of film widths.
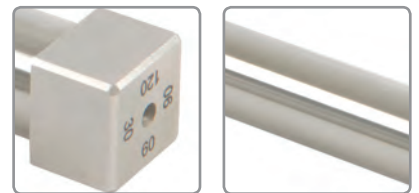
Elcometer 3520

**STANDARDS:**
ASTM D 823-E

### Technical Specification     C

| Part Number Metric | Model | Film Thickness µm | | | | Film Width⁺ mm | Certificate |
|---|---|---|---|---|---|---|---|
| K0003520M001 | Elcometer 3520/1 | 30, | 60, | 90, | 120 | 25 | ○ |
| K0003520M002 | Elcometer 3520/2 | 30, | 60, | 90, | 120 | 50 | ○ |
| K0003520M003 | Elcometer 3520/3 | 30, | 60, | 90, | 120 | 60 | ○ |
| K0003520M101 | Elcometer 3520/101 | 50, | 100, | 150, | 200 | 60 | ○ |
| K0003520M004 | Elcometer 3520/4 | 30, | 60, | 90, | 120 | 75 | ○ |
| K0003520M005 | Elcometer 3520/5 | 30, | 60, | 90, | 120 | 100 | ○ |
| K0003520M006 | Elcometer 3520/6 | 30, | 60, | 90, | 120 | 125 | ○ |
| K0003520M007 | Elcometer 3520/7 | 30, | 60, | 90, | 120 | 150 | ○ |
| K0003520M011 | Elcometer 3520/11 | 30, | 60, | 90, | 120 | 175 | ○ |
| K0003520M008 | Elcometer 3520/8 | 30, | 60, | 90, | 120 | 200 | ○ |
| K0003520M009 | Elcometer 3520/9 | 30, | 60, | 90, | 120 | 250 | ○ |

⁺ Add 30mm (1.2") to the Film Width to calculate the total width of the applicator

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

○ Optional Calibration Certificate available.

# Film Application

## Elcometer 3525 & 3530    Adjustable Baker Film Applicators

The Elcometer 3525 & 3530 are manufactured using the very latest machining techniques to ensure outstanding accuracy. These Baker Film Applicators allow the user to select the specific gap size required. The coating thickness gap size can be set to produce either a uniform film or a film wedge. Each film applicator has thickness markings down each side for fast set up.
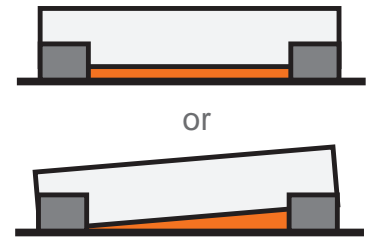
Available in two gap size ranges and a number of film widths, these stainless steel applicators can be used manually or with the Elcometer 4340 Motorised Film Applicator, see page 17-2.
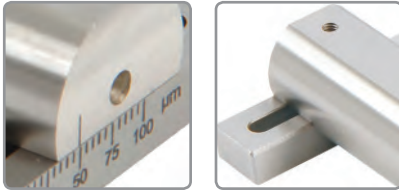
**STANDARDS:**
ASTM D 823-E

Elcometer 3530

or

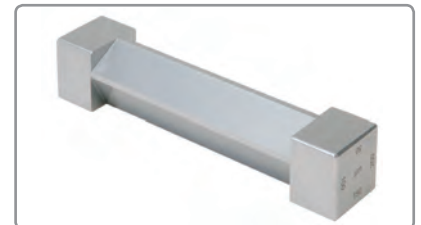### Technical Specification                                                                C

| Part Number | | Model | Film Thickness | | Film Width+ | | Certificate |
|---|---|---|---|---|---|---|---|
| Metric | Imperial | | µm | mils | mm | inches | |
| K0003525M001 | - | Elcometer 3525/1 | 0 - 100 | - | 50 | - | ○ |
| K0003525M002 | - | Elcometer 3525/2 | 0 - 100 | - | 75 | - | ○ |
| K0003525M003 | - | Elcometer 3525/3 | 0 - 100 | - | 100 | - | ○ |
| K0003525M004 | - | Elcometer 3525/4 | 0 - 100 | - | 150 | - | ○ |
| K0003525M005 | - | Elcometer 3525/5 | 0 - 100 | - | 200 | - | ○ |
| K0003525M006 | - | Elcometer 3525/6 | 0 - 100 | - | 250 | - | ○ |
| K0003530M001 | K0US3530M001 | Elcometer 3530/1 | 0 - 250 | 0 - 10 | 50 | 2 | ○ |
| K0003530M002 | K0US3530M002 | Elcometer 3530/2 | 0 - 250 | 0 - 10 | 75 | 3 | ○ |
| K0003530M003 | K0US3530M003 | Elcometer 3530/3 | 0 - 250 | 0 - 10 | 100 | 4 | ○ |
| K0003530M004 | K0US3530M004 | Elcometer 3530/4 | 0 - 250 | 0 - 10 | 150 | 6 | ○ |
| K0003530M005 | K0US3530M005 | Elcometer 3530/5 | 0 - 250 | 0 - 10 | 200 | 8 | ○ |
| K0003530M006 | K0US3530M006 | Elcometer 3530/6 | 0 - 250 | 0 - 10 | 250 | 10 | ○ |

+ Add 30mm (1.2") to the Film Width to calculate the total width of the applicator

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

○ Optional Calibration Certificate available.

elcometer

## Single Sided Film Applicator

**Elcometer 3550**

The Elcometer 3550 Single Sided Film Applicators are easy to clean gauges manufactured to the highest accuracy. These precision ground stainless steel Single Sided Film Applicators have a flat edged prismatic body making them suitable for coatings applied to a flat and relatively strong substrate.

The Elcometer 3550 Single Sided Film Applicator can be used with the Elcometer 4340 Motorised Film Applicators, see page 17-2.
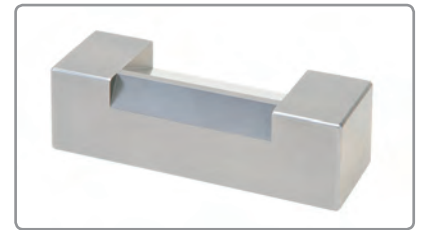
**STANDARDS:**
ASTM D 823-E

### Technical Specification      C

| Part Number Metric | Imperial | Model | Film Thickness µm | mils | Film Width+ mm | inches | Certificate |
|---|---|---|---|---|---|---|---|
| K0003550M001 | K0US3550M001 | Elcometer 3550/1 | 50 | 2 | 50 | 2 | o |
| K0003550M002 | K0US3550M002 | Elcometer 3550/2 | 50 | 2 | 75 | 3 | o |
| K0003550M003 | K0US3550M003 | Elcometer 3550/3 | 50 | 2 | 150 | 6 | o |
| K0003550M201 | K0US3550M201 | Elcometer 3550/1 | 75 | 3 | 50 | 2 | o |
| K0003550M202 | K0US3550M202 | Elcometer 3550/2 | 75 | 3 | 75 | 3 | o |
| K0003550M203 | K0US3550M203 | Elcometer 3550/3 | 75 | 3 | 150 | 6 | o |

## Four Sided Film Applicator

**Elcometer 3540**

The Elcometer 3540 Four Sided Film Applicators are easy to clean gauges manufactured to the highest accuracy. These precision ground stainless steel Four Sided Film Applicators have 4 thicknesses per applicator each with a flat edged prismatic body making them suitable for coatings applied to a flat and relatively strong substrate.

Available in a range of film widths and can be used with the Elcometer 4340 Motorised Film Applicators, see page 17-2.

**STANDARDS:**
ASTM D 823-E

### Technical Specification      C

| Part Number Metric | Imperial | Model | Film Thickness µm | mils | Film Width+ mm | inches | Certificate |
|---|---|---|---|---|---|---|---|
| K0003540M001 | K0US3540M001 | Elcometer 3540/1 | 50, 100, 150, 200 | 2, 4, 6, 8 | 50 | 2 | o |
| K0003540M002 | K0US3540M002 | Elcometer 3540/2 | 50, 100, 150, 200 | 2, 4, 6, 8 | 75 | 3 | o |
| K0003540M003 | K0US3540M003 | Elcometer 3540/3 | 50, 100, 150, 200 | 2, 4, 6, 8 | 100 | 4 | o |
| K0003540M004 | K0US3540M004 | Elcometer 3540/4 | 50, 100, 150, 200 | 2, 4, 6, 8 | 150 | 6 | o |
| K0003540M005 | K0US3540M005 | Elcometer 3540/5 | 50, 100, 150, 200 | 2, 4, 6, 8 | 200 | 8 | o |
| K0003540M006 | K0US3540M006 | Elcometer 3540/6 | 50, 100, 150, 200 | 2, 4, 6, 8 | 250 | 10 | o |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

o Optional Calibration Certificate available.

+ Add 40mm (1.6") to the Film Width to calculate the total width of the applicator

## Elcometer 3570

## Micrometric Film Applicators

The Elcometer 3570 is made of anodised aluminium with a reservoir and a bevelled blade applicator body, and is suitable for high-precision manual application of high viscosity fluids on to relatively firm substrates.

The gap can be adjusted, in 1 micron intervals, from 0 to 1mm by the inclination of the device, using a micrometric screw.



Elcometer 3570

**STANDARDS:**
ASTM D 823-E

| Technical Specification | | | | | C |
|---|---|---|---|---|---|
| Part Number | Description | Film Thickness | Film Width⁺ | | Certificate |
| | | µm | mm | inches | |
| K0003570M201 | Elcometer 3570/1 Micrometric Film Applicator | 0 - 1000 | 75 | 3 | ○ |
| K0003570M002 | Elcometer 3570/2 Micrometric Film Applicator | 0 - 1000 | 100 | 4 | ○ |
| K0003570M003 | Elcometer 3570/3 Micrometric Film Applicator | 0 - 1000 | 150 | 6 | ○ |
| K0003570M004 | Elcometer 3570/4 Micrometric Film Applicator | 0 - 1000 | 200 | 8 | ○ |

⁺ Add 36mm (1.4") to the Film Width to calculate the total width of the applicator

○ Optional Calibration Certificate available.

# Casting Knife Film Applicator

## Elcometer 3580

The Elcometer 3580 is available in a wide range of film widths and has extended sides to confine the coating during the application and is an ideal gauge for the laboratory.

The film thickness can be adjusted in 10 micron steps from 0 to 6mm by means of two integrated micrometric screws.

Manufactured in anodised aluminium, with a bevelled blade applicator body, the Elcometer 3580 is recommended for manually applying thick, high viscosity fluids, on solid and flat substrates.
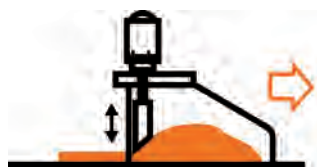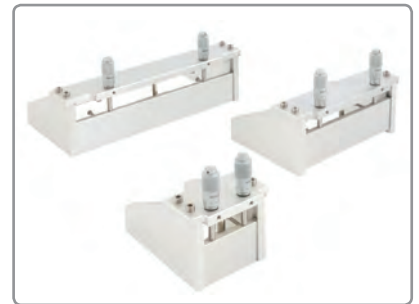
Elcometer 3580

**STANDARDS:**
ASTM D 823-E

## Technical Specification                                              C

| Part Number | Model | Film Thickness | Film Width[+] | | Certificate |
|---|---|---|---|---|---|
| | | µm | mm | inches | |
| K0003580M201 | Elcometer 3580/1 Casting Knife Film Applicator | 0 - 6000 | 50 | 2 | ○ |
| K0003580M202 | Elcometer 3580/2 Casting Knife Film Applicator | 0 - 6000 | 75 | 3 | ○ |
| K0003580M203 | Elcometer 3580/3 Casting Knife Film Applicator | 0 - 6000 | 100 | 4 | ○ |
| K0003580M204 | Elcometer 3580/4 Casting Knife Film Applicator | 0 - 6000 | 125 | 5 | ○ |
| K0003580M005 | Elcometer 3580/5 Casting Knife Film Applicator | 0 - 6000 | 150 | 6 | ○ |
| K0003580M006 | Elcometer 3580/6 Casting Knife Film Applicator | 0 - 6000 | 175 | 7 | ○ |
| K0003580M007 | Elcometer 3580/7 Casting Knife Film Applicator | 0 - 6000 | 200 | 8 | ○ |

[+] Add 15mm (0.6") to the Film Width to calculate the total width of the applicator
Also available in Stainless Steel - Contact Elcometer for further information

○ Optional Calibration Certificate available.

# Film Application

## Elcometer 3505 — Cube Film Applicators

These two cube film applicators, manufactured from hardened stainless steel, accurately apply film stripes in either a single or up to a block of five film stripes, each 12mm (0.5" wide).

Ideal for preparing samples for use with the Elcometer 5300 Linear Drying Time Recorder (see page 18-2) or for simultaneously comparing formulations. Each cube film applicator is supplied with a set of nineteen thickness gauges from 30 - 1000μm (1 - 40mils) to adjust the film thickness.

**STANDARDS:**
ASTM D 823-E

### Technical Specification C

| Part Number Metric | Imperial | Model | Film Thickness μm | mils | Film Width⁺ mm | inches | Number of Stripes | Certificate |
|---|---|---|---|---|---|---|---|---|
| K0003505M001 | K0US3505M001 | Elcometer 3505/1 | 30 - 1000 | 1 - 40 | 12 | 0.50 | 1 | ○ |
| K0003505M202 | K0US3505M202 | Elcometer 3505/2 | 30 - 1000 | 1 - 40 | 12 | 0.50 | 5 | ○ |

⁺ Elcometer 3505/1 total width: 26mm (1.0");   Elcometer 3505/2 total width: 146mm (5.7")

### Accessories

| | |
|---|---|
| KT003600P001 | 19 Metric Thickness Gauges for Calibration |
| | (30-40-50-60-70-80-90-100-150-200-250-300-400-500-600-700-800-900-1000μm) |

## Elcometer 3508 & 3560 — 4 Gap Applicator with Reservoir

These film applicators are precision engineered from hardened stainless steel to provide four film thicknesses in one gauge. Simply rotate the applicator to the required thickness, fill the reservoir with the test coating and draw down a uniform stripe.

The Elcometer 3508 is supplied with two reservoirs, ideal for preparing samples for the Elcometer 1720 Abrasion and Washability Testers (see page 19-2) or for comparing two coatings simultaneously.

**STANDARDS:**
ASTM D 823-E (Elcometer 3560)

### Technical Specification C

| Part Number Metric | Imperial | Model | Film Thickness μm | mils | Film Width⁺ mm | inches | Certificate |
|---|---|---|---|---|---|---|---|
| K0003560M201 | K0US3560M201 | Elcometer 3560/1 | 30, 60, 90, 120 | 1, 2, 3, 4 | 60 | 2 | ○ |
| K0003560M202 | K0US3560M202 | Elcometer 3560/2 | 50, 100, 150, 200 | 2, 4, 6, 8 | 60 | 2 | ○ |
| K0003508M001 | K0US3508M001 | Elcometer 3508/1 | 100, 150, 200, 250 | 4, 6, 8, 10 | 2 x 50 | 2 x 2 | ○ |

⁺ Elcometer 3560 total width: 90mm (3.5"); Elcometer 3508 total width: 165mm (6.5")

○ Optional Calibration Certificate available.

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## Sag Tester

Made from stainless steel, the straight scraper has 11 notches of increasing clearance. The Elcometer 4270 Sag Tester is used to establish a coating's resistance to sag due to gravity.

A contrast chart is immediately placed in a vertical position with the thinnest film at the top.

Elcometer 4270
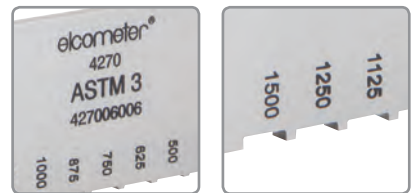
**STANDARDS:**
ASTM D 4400, FTMS 141 4494.1
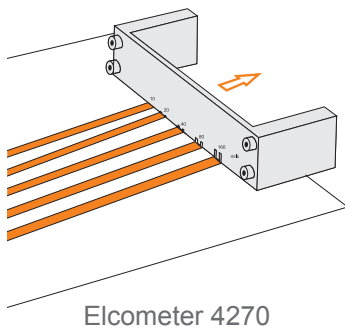
| Technical Specification | | | | | | | C |
|---|---|---|---|---|---|---|---|
| Part Number | | Description+ | Range | | Notch Depth | | Certificate |
| Metric | Imperial | | µm | mils | µm | mils | |
| K0004270M001 | K0US4270M001 | Elcometer 4270/1 | 75 - 300 | 3 - 12 | 75, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300 | 3, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | ○ |
| K0004270M002 | K0US4270M002 | Elcometer 4270/2 | 25 - 150 | 1 - 6 | 25, 37, 50, 62, 75, 87, 100, 112, 125, 137, 150 | 1, 1.5, 2., 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 | ○ |
| K0004270M203 | K0US4270M203 | Elcometer 4270/3 | 350 - 1500 | 14 - 60 | 350, 400, 450, 500, 620, 750, 875, 1000, 1125, 1250, 1500 | 14, 16, 18, 20, 25, 30, 35, 40, 45, 50, 60 | ○ |
| K0004270M204 | K0US4270M204 | Elcometer 4270/4 | 100 - 600 | 4 - 24 | 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600 | 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 | ○ |

+ Elcometer 4270 total width: 127mm (5")

○ Optional Calibration Certificate available.

## Elcometer 4695

## Leneta Test Charts

Elcometer supplies a wide range of Leneta Test Charts, from plain white to those having different patterns of black and white. Made from naturally bright, non-flourescent white paper, these charts contain no optical brighteners that can affect instrumental colour measurements.

Leneta Test Charts are the market standard in today's coatings industry.

Foil Card substrates of steel, aluminium, glass and plastic are also available.

Leneta Test Charts are available in boxes & cases.

## Elcometer 4695

Form 2A

Form 2C

Form 3B

Form 5C

## Opacity Charts

The term "Opacity Chart" refers to charts on which the test pattern is a simple combination of black and white areas, large enough for wider aperture reflectance instruments, as well as for visual opacity and colour observations.

Used to test the hiding power of the coating, using large black and white areas.

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| Box | Case | | mm | inches | | | |
| K0004695M003 | K0004695M203 | Leneta Chart 2A | 140 x 254 | $5_{1/2}$ x 10 | 2.72kg (6lb) | 250 | 6 |
| K0004695M004 | - | Leneta Chart 2C | 194 x 260 | $7_{5/8}$ x $10_{1/4}$ | 4.08kg (9lb) | 250 | 4 |
| K0004695M006 | K0004695M206 | Leneta Chart 3B | 194 x 289 | $7_{5/8}$ x $11_{3/8}$ | 4.08kg (9lb) | 250 | 4 |
| K0004695M015 | K0004695M215 | Leneta Chart 5C | 194 x 260 | $7_{5/8}$ x $10_{1/4}$ | 4.08kg (9lb) | 250 | 4 |



**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

elcometer

## Brushout Cards

Designed for informal brushout applications, thicker paper is used for the testing of coatings applied with a brush or roller.

The paper stock is almost twice the thickness of regular chart paper to give greater rigidity for more convenient handling - nominal thickness 0.5mm (20 mils).

Brushout Cards are also used widely for drawdowns and colorimetric measurements.

Form 2DX

Form 5DX

Form WDX

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Box Weight | Quantity | Boxes |
| Box | Case | | mm | inches | | per Box | per Case |
| --- | --- | --- | --- | --- | --- | --- | --- |
| K0004695M005 | K0004695M205 | Leneta Chart 2DX | 98 x 152 | 37/8 x 6 | 3.18kg (7lb) | 500 | 4 |
| K0004695M016 | K0004695M216 | Leneta Chart 5DX | 98 x 152 | 37/8 x 6 | 3.18kg (7lb) | 500 | 4 |
| K0004695M102 | K0004695M302 | Leneta Chart WDX | 98 x 152 | 37/8 x 6 | 3.18kg (7lb) | 500 | 4 |

## Duplex Applicator Charts

Originally made to be used with the Duplex Film Applicator, an instrument designed for rapid production of side-by-side drawdowns, they now serve mostly as generic paint test charts.

Form WF

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Box Weight | Quantity | Boxes |
| Box | Case | | mm | inches | | per Box | per Case |
| --- | --- | --- | --- | --- | --- | --- | --- |
| K0004695M103 | - | Leneta Chart WF | 76 x 184 | 3 x 71/4 | 2.27kg (5lb) | 500 | - |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

# Test Charts

## Elcometer 4695

### Display Charts/Spreading Rate

Display Chart    Spreading Rate Chart



Form 8B     Form 8H

These charts employ time-tested, diagonally striped patterns, having a strong visual impact that emphasises variations in film opacity. They are frequently used for hiding power display purposes, by means of drawdowns or brushouts.

Spreading Rate Charts (Form 8H) are accurately 0.1 square metres (approximately one square foot) in area, and are used in brushout hiding tests at specified spreading rates as described in ASTM Method D 344.

**Technical Specification**

| Part Number Box | Case | Description | Chart Dimensions mm | inches | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| K0004695M022 | K0004695M222 | Leneta Chart 8B | 194 x 289 | 7$5/8$ x 11$3/8$ | 4.08kg (9lb) | 250 | 4 |
| K0004695M023 | K0004695M223 | Leneta Chart 8H | 286 x 438 | 11$1/4$ x17$1/4$ | 5kg (11lb) | 125 | 4 |

## Elcometer 4695

### Checkerboard Charts

Display Chart



Form 10B

One of the earliest hiding power test surfaces was linoleum with a black and white checkerboard pattern, this was soon replaced by sealed paperboard charts.

Checkerboard Rate Charts are typically used in drawdown hiding tests.

**Technical Specification**

| Part Number Box | Case | Description | Chart Dimensions mm | inches | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| K0004695M030 | - | Leneta Chart 10B | 194 x 289 | 7$5/8$ x 11$3/8$ | 4.08kg (9lb) | 250 | 4 |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

elcometer

## Metopac™ Metal Test Panels

Painted steel panels, used for measuring the hiding power of powder coatings and industrial enamels.
Available in half black/half white and all black.
**Black surface:**
Solvent Resistant, Non bleeding, Reflective
• 1% maximum, measured according to ASTM Method E1347
**White surface:**
Solvent Resistant, Colour Retentive, Reflective, Reflectance
• 80% minimum, measured according to ASTM Method E1347
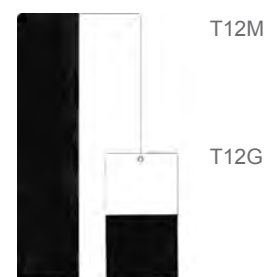
T12M

T12G

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| Box | Case | | mm | inches | | | |
| K0004695M094 | K0004695M294 | Leneta Panel T12G | 76 x 132 | 3 x 5$3/16$ | 3.63kg (8lb) | 125 | 4 |
| K0004695M095 | K0004695M295 | Leneta Panel T12M | 132 x 279 | 5$3/16$ x 11 | 1.81kg (4lb) | 50 | 4 |

## Plain White Charts

Available in varying thicknesses and size. The Leneta WDX card comes with convenience hole at the top.

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| Box | Case | | mm | inches | | | |
| Card thickness 0.5mm | | | | | | | |
| K0004695M102 | K0004695M302 | Leneta Chart WDX | 98 x 152 | 3$7/8$ x 6 | 3.18kg (7lb) | 500 | 4 |
| Card thickness 0.3mm | | | | | | | |
| K0004695M103 | - | Leneta Chart WF | 76 x 184 | 3 x 7$1/4$ | 2.27kg (5lb) | 500 | 6 |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

# Test Charts

## Elcometer 4695

### Unvarnished Test Charts

Unvarnished Test Charts are ideal for testing applications of clear coatings and stains.

The unvarnished (semi-porous) surface simulates wood or unsealed wallboard.

Form N2A

#### Technical Specification

| Part Number Box | Case | Description | Chart Dimensions mm | inches | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| K0004695M064 | K0004695M264 | Leneta Chart N2A | 140 x 254 | 5$_{1/2}$ x 10 | 2.72kg (6lb) | 250 | 6 |

## Elcometer 4695

### Spray Monitors - Self Adhesive Hiding Power

These are pressure sensitive labels with a hiding power test pattern and a sealed, solvent-resistant surface. They are used primarily with metal panels on which the panel alone provides no visual clue as to the thickness of the applied paint film.

When placed on such a surface the Monitor presents a contrasting feature by which to observe how well the coating hides the surface, thereby facilitating film thickness control. It adheres firmly whether air-dried or baked, to present a permanent visual record of film opacity.

Form M12

#### Technical Specification

| Part Number Box | Case | Description | Chart Dimensions mm | inches | Box Weight | Quantity per Box | Boxes per Case |
|---|---|---|---|---|---|---|---|
| K0004695M056 | K0004695M256 | Leneta Spray Monitor M12 | 25 x 25 | 1 x 1 | 0.91kg (2lb) | 2000 | 4 |

**Can be used with the Elcometer 4340 Motorised Film Applicator, see page 17-2**

elcometer
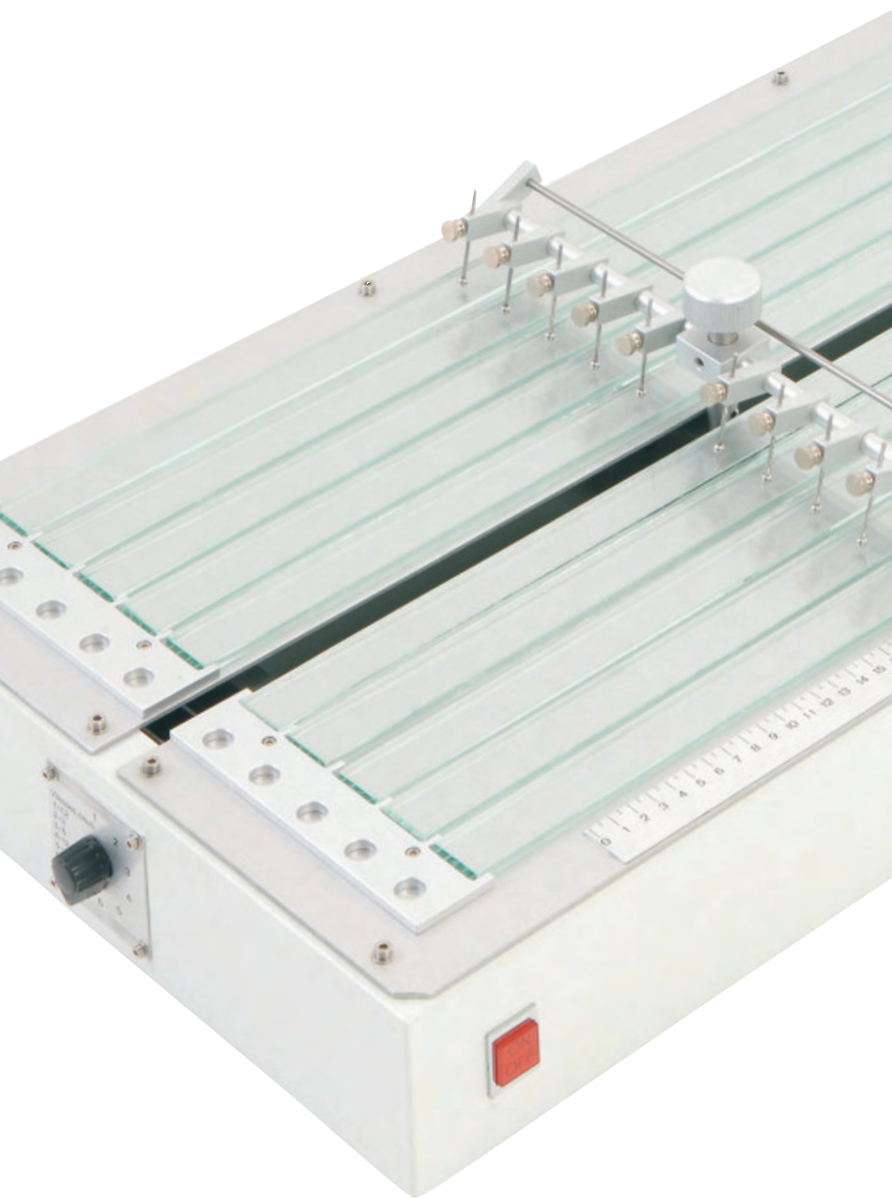
# Drying Time

When developing a coating process, it is important to know the exact time it takes for the coating to dry or cure. For multicoat paint systems, having knowledge of the drying time enables the operator to know when any subsequent layers can be applied.

There are many stages involved in the coating drying time. Once a coating has been applied, it levels off under gravity, and, as the coating begins to cure, a thin dry film appears on the surface. The coating then continues to dry until, finally, it is totally cured.

**Permeability:** Describes how much and how fast moisture transfers through a film as vapour. The film is gripped between a ring fitted with a seal and the cup, which contains a quantity of water or desiccant.

**Permeability Cups:** When applying a multicoat system, it is often acceptable to apply a subsequent coat before the previous coat has fully cured. Payne Permeability Cups can be used to determine the degree to which the volatile liquid can permeate any subsequent layer.

## Elcometer 5300

**Linear Drying Time Recorder**

The Elcometer 5300 is designed to determine paint drying time by linear recording, with up to 10 positions (5 each side of the centre column) tested simultaneously.

Ten rods with hemispherical tips, fitted to a carriage, are brought into contact with the fresh films at one end of the test piece and moved lengthwise.

The drying time is calculated from the distance travelled, measured using a graduated rule along the edge, corresponding to the various stages observed on the trace.

The coatings are applied beforehand on glass strips 25mm (0.98") wide and 700mm (27.5") long. Using the Elcometer 3505 Cube Film Applicators (see page 17-14), it is possible to apply up to five coatings simultaneously on a glass plate.

- The drying time recorder automatically stops at the end of travel
- The load on each ball is 11g (0.37oz), although additional weights can bring this load up to 21g (0.71oz)

| Technical Specification | | C |
|---|---|---|

| Part Number | | Description | |
|---|---|---|---|
| UK 240V/ EUR 220V | US 110V | | Certificate |
| K0005300M002 | K0US5300M002 | Elcometer 5300 Linear Drying Time Recorder | ○ |
| Tool Diameter | 4.76mm (0.19") | | |
| Speed | 6 speeds, between 12mm (0.5") and 600mm (24") per hour | | |
| Dimensions | 860 x 420 x 170mm (34 x 16.5 x 6.7") | | |
| Weight | 18kg (40lb) | | |
| Packing List | Elcometer 5300, 12 glass strips, 10 x 10g (0.35oz) weights and operating instructions | | |

**For a full range of accessories, see page 18-3**

○ Optional Calibration Certificate available.

## Linear Drying Time Recorder

### Accessories

| Part Number | Description |
| --- | --- |
| K0003505M001 | Elcometer 3505/1 Metric Cube Film Applicator - 1 Stripe* |
| K0US3505M001 | Elcometer 3505/1 Imperial Cube Film Applicator - 1 Stripe* |
| K0003505M202 | Elcometer 3505/2 Metric Cube Film Applicator - 5 Stripes* |
| K0US3505M202 | Elcometer 3505/2 Imperial Cube Film Applicator - 5 Stripes* |

* see page 17-14 for details

| Part Number | Description |
| --- | --- |
| KT005300P002 | Ball Tool - set of 5 |
| KT005300P003 | Additional 10g (0.35oz) Weights, set of 5 |

| Part Number | Description |
| --- | --- |
| KT005300P001 | Glass Strip 700 x 25mm (28 x 1"), set of 10 |
| KT005300P004 | Glass Plate 700 x 145mm (28 x 5.7"), set of 6 |

### How to use a linear drying time recorder



|1 Levelling | 2 Basic Trace | 3 Ripped Film | 4 Surface Trace | 5 Dry |
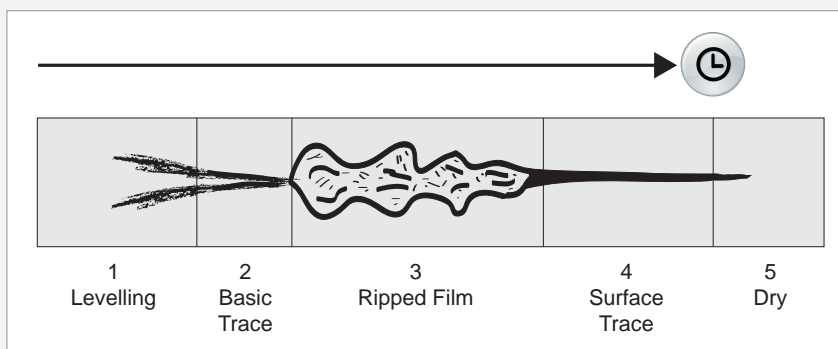
A Linear Drying Time Recorder calculates the drying time using the principle that

*Distance = Speed x Time*

A ball tip is placed into the coating being tested and the drying time recorder begins to move the ball at a predefined speed. As the coating dries, the visual trace left in the coating by the ball identifies each stage of the cure.

## Elcometer 5100

## Payne Permeability Cups

The Elcometer 5100 Payne Permeability Cups are made of anodised aluminium and are used to determine the permeability of films of paints, varnish, plastic, cellophane, etc.

The water evaporates or is absorbed and, after a certain time, the weight change relative to the film thickness is calculated, indicating the degree of permeability or permeance.

### Technical Specification

| Part Number | Description | Area | | Volume | |
|---|---|---|---|---|---|
| | | $cm^2$ | $inches^2$ | $cm^3$ | $inches^3$ |
| K0005100M201 | Elcometer 5100/1 Payne Permeability Cup | 10 | 1.55 | 15 | 0.91 |
| K0005100M202 | Elcometer 5100/2 Payne Permeability Cup | 30 | 4.65 | 50 | 3.05 |
| K0005100M203 | Elcometer 5100/3 Payne Permeability Cup | 30 | 4.65 | 75 | 4.58 |
| Packing List | Elcometer 5100 Payne Permeability Cup, storage case and operating instructions | | | | |

### Accessories

| Part Number | Description | Chart Dimensions | | Quantity per Box |
|---|---|---|---|---|
| | | $mm^2$ | $inches^2$ | |
| K0004695M112 | Leneta Chart RP-1K | 219 x 286 | 8.62 x 11.26 | 250 |



**For use with Elcometer 8720 compact balance, see page 15-6**

### How to use Payne Permeability Cups



Prepare the film to be tested using a film applicator and suitable test chart.

Disassemble the permeability cup.

Fill with required liquid (typically water) or dry desiccant (absorbent).

Place the film on to the cup and reassemble making sure the gasket is fitted first.

Weigh the prepared permeability cup and record the result (in grams).

Leave for appropriate time, re-weigh, calculate the change in mass (∆m) & water vapour transmission rate.

# Washability & Abrasion

Improved mechanical resistance to wear is a key requirement of a wide range of products. From coatings to clothing, leather to upholstery, keypads to plastic toys, a product's ability to resist wear is an important characteristic.

There are testing methods relating to the 'abrasion by friction' concept. Others are based on the projection of abrasive particles on to the test specimen. These techniques provide valuable information about materials and processes.

These mechanical tests can make an accurate comparison between samples and can be used to determine lifetime wear.

**Definitions:**

**Abrasion:** The ability of a coating to resist damage caused by a defined material rubbing its surface. Abrasive wear is the erosion of material from a solid surface by the action of another solid.

**Washability:** The ability of a coating to withstand being washed using either wet or dry scrubbing action. The effect can be determined in terms of coating weight loss, loss of gloss or loss of thickness after the scrubbing process.

## Elcometer 1720    **Washability & Abrasion Testers**

These robust, reliable and extremely versatile machines have been designed for testing the washability, brushability and resistance of a wide range of materials including paint, lacquers, inks, coatings, leather, wood, plastics, printed material, fabrics etc.

Made from anodised aluminium making it durable and robust

All stations can be tested wet or dry

The durable and robust design is stable under test allowing repeatable results, even at the fastest stroke speeds

Rapid tool change

elcometer

# Washability & Abrasion Testers

**Elcometer 1720**

Test up to 4 samples simultaneously

Multi-lingual digital display

User adjustable stroke length from 10 to 300mm (0.4 to 11.8")

Speed Cycles can be adjusted from 10 to 65 cycles per minute or set to the ISO Standard of 37 cycles /min

Wide range of tools available, for testing flat and curved samples (see page 19-6)

Elcometer 1720 Washability Tester

## Elcometer 1720



# Washability & Abrasion Testers

### *Meeting Standards*

- With the wide range of tools available many Standards can be tested in one unit

- All units can be used in accordance with ASTM, DIN, EN and ISO Standards

- Easily adjustable to customers unique applications using the special tools

- Washability and abrasion testing on flat and curved samples up to 13mm (0.51") thick



### *Interchangeable Tools*

- All tools are interchangeable with the rapid tool change system, making the unit ideal for use in accordance with a wide range of Standards

  For the complete range of tools, see page 19-6



### *User Adjustable*

- Stroke length can be quickly and easily changed by the user to meet their specific requirements between 10 - 300mm (0.4 - 11.8")

- Speed of carriage can be adjusted between 10 and 65 cycles per minute

- Cycle counter can be pre-set for a defined number of cycles from 1 - 32,760



### *Wet and Dry*

- All stations can be tested wet or dry

- Versions are available with or without an internal liquid pump

- Samples can be tested under wet or dry conditions



### *Economic*

- With the ability to test up to 4 different characteristics simultaneously, significant time can be saved

- With it's rapid tool change system setting up tests is fast and easy

- Easy sample placement allows quick change between tests

**elcometer**

# Washability & Abrasion Testers

Available in 2 versions:
2 station - undertakes two tests at a time,
4 station - tests up to four samples with 4 different tests.

Stroke speed can be varied between 10 and 65 cycles/min or set to 37 cycles/min to meet ISO Standards.

Stroke length can be adjusted by the user to meet specific requirements, from 10 to 300mm (0.4 to 11.8").

Available with or without liquid dosers, allowing test liquids to be regulated automatically or independently.

Digital display allows easy, accurate speed variation and simple reporting.

The rapid tool change system allows the user to test the samples in accordance with a wide range of National and International Standards on both flat and curved samples simultaneously.

## Technical Specification                                                                 C

| Part Number | Description | Certificate |
|---|---|---|
| K1720M202 | Elcometer 1720 Abrasion Tester, 2 Station (110 - 240V) | ○ |
| K1720M204 | Elcometer 1720 Abrasion Tester, 4 Station (110 - 240V) | ○ |
| K1720M302 | Elcometer 1720 Abrasion & Washability Tester, 2 Station (110 - 240V) | ○ |
| K1720M304 | Elcometer 1720 Abrasion & Washability Tester, 4 Station (110 - 240V) | ○ |
| Dimensions | 550 x 460 x 320mm (21.7 x 18.1 x 12.6") | |
| Weight | 2 Station: 31.5kg (70lb), 4 Station: 33kg (73lb) | |
| Packing List | Elcometer 1720, 250μm (10mil) metal strip for ASTM D2486 Standard, sample drip tray, 1 x glass sheet (2 station), 2 x glass sheet (4 station), 1 x specimen holding frame (2 station), 2 x specimen holding frame (4 station), set of 3 tools for instrument set up, 3 x mains leads (UK, EUR and US) and operating instructions. Elcometer 1720 part numbers K1720M302 and K1720M304 also include a liquid dosing bottle, liquid delivery pipe and 2 liquid drain pipes. Tools are supplied separately, please order from the list on page 19-6. | |

**Scrub Test Panels are also available - see page 19-8 for more information**

○ Optional Calibration Certificate available.

# Elcometer 1720    Washability & Abrasion Testers

The Elcometer 1720 can undertake tests according to a wide range of different Standards and Test Methods by simply changing the abrasive tools. For more information on Standards, please see section 23 for details. Please select the required tools from the list on the following two pages. Samples can be tested in a combination of both wet and dry methods.

### Tool 1: Wild Boar Brush

Wild boar hair brush and stainless steel brush holder.
Total weight: 250g (8.82oz)

Part Number:    KT001720P003

**STANDARDS:**
DIN 53778-2:1983

### Tool 2: Nylon Brush

Nylon bristle brush, stainless steel brush holder and 177g (6.2oz) mass.
Total weight: 454g (16.01oz)

Part Number:    KT001720P030

**STANDARDS:**
ASTM D2486

### Tool 3: Sponge

Sponge and stainless steel brush holder, 337g (11.9oz).
Total weight: 508g (17.92oz)

Part Number:    KT001720P005

**STANDARDS:**
ASTM D4213:92, ASTM D4828

### Tool 4: Sponge

Sponge and stainless steel brush holder, 337g (11.9oz) and 250g (8.8oz) mass to bring gross weight to 750g.
Total weight: 750g (26.45oz)

Part Number:    KT001720P073

**STANDARDS:**
ASTM D3450

### Tool 5: Sponge / Abrasive

Sponge & stainless steel holder abrasive pads - top and bottom & 76g (2.7oz) mass.
Total Weight: 232g (8.12oz)

Part Number:    KT001720P029

**STANDARDS:**
ASTM D4213

### Tool 6: Abrasive

Aluminium holder, abrasive pads (x5).
Total weight: 135g (4.76oz)

Part Number:    KT001720P036

**STANDARDS:**
ISO 11998

### Tool 7: Universal Material Clamp

Stainless steel holder allowing users to fix their own test sample or abrasive material. Ideal for abrasion and wear of labels, textiles, ink etc.

Part Number:    KT001720P207

### Tool 8: Linear Abrader "Crockmeter"

This tool is ideal for testing abrasion on both curved and flat surfaces and for testing colour fastness of fabrics. Supplied with a removable stainless steel rod, test felt, textile fixing ring and a set of additional masses - 2x100g (3.5oz), 1x200g (7oz), 1x500g (17.6oz). Total weight (excluding masses): 200g (7oz)

Part Number:    KT001720P074

**STANDARDS:**
ASTM F1319, ISO 105-X12, PSA D45 1010

# Washability & Abrasion Testers

### Tool 9: Linear Abrader

For testing the resistance to abrasion of automotive components, includes a felt disc of 10mm (0.4") diameter and 10mm (0.4") thick working under a mass of 400g (14.1oz).
Total weight: 400g (14.11oz)

| Part Number: | KT001720P075 |
|---|---|

**STANDARDS:**
GME 60269

### Tool 9A: Linear Abrader

As Tool 9 but with 16mm (0.63") diameter felt wool disc.
Total weight: 820g (28.9oz)

| Part Number: | KT001720P075-1 |
|---|---|

### Tool 9B: Linear Abrader

Felt holder for 16mm (0.63") diameter felt wool disc working under a mass of 900g (31.7oz)
Total weight: 900g (31.74oz)

| Part Number: | KT001720P075-2 |
|---|---|

**STANDARDS:**
EN 13523-11, ECCA T11

### Tool 10: Curved Sample Tool

Height adjustable with an elbow joint for curved samples, this tool is ideal for testing abrasion resistance of both coatings and inks. Supplied with felt disc, rod for masses, 1x50g (1.75oz), 1x100g (3.5oz), 2x200g (7oz) and 2x500g (17.5oz) mass

| Part Number: | KT001720N003 |
|---|---|

**STANDARDS:**
EN 60730-1-A

## Accessories

| Part Number | Description |
|---|---|
| KT001720P004 | Wild Boar Brush for Tool 1 |
| KT001720P009 | Nylon Brush for Tool 2 |
| KT001720P006 | Sponge (5) for Tools 3 & 4 |
| KT001720P141 | Sponge/Abrasive (5) for Tool 5 |
| KT001720P037 | Abrasive Pads (10) for Tool 6 |
| KT001720P064 | Abrasive Pads (100) for Tool 6 |
| KT001720P051 | Abrasive G 120 Sheets (4), for Tools 1 & 2 |
| KT001720P008 | 25m Abrasive Roll for Tool 7 |
| KT001720P062 | Felt Disks (2) for Tool 10 |
| KT001720N009 | Non-Abrasive Scrub Medium - SC1 |
| KT001720N002 | Abrasive Scrub Medium - SC2 |
| KT001720P016 | 50g Mass   (To fit tools 1 - 8, 10) |
| KT001720P017 | 100g Mass (To fit tools 1 - 8, 10) |
| KT001720P018 | 200g Mass (To fit tools 1 - 8, 10) |
| KT001720P031 | 227g Mass (To fit tools 1 - 8, 10) |
| KT001720P019 | 500g Mass (To fit tools 1 - 8, 10) |
| KT001720P214 | Glass Plate, 478 x 165mm |
| KT001720P012 | ASTM Test Foil 250µm (10mils) |
| KT001720P013 | 10m Replacement Channel Gasket |
| K0004695M068 | Scrub Test Panels - see page 19-8 |

## Elcometer 4695

## Scrub Test Panels



Form P121-10N



Fig 1. Typical failure using shim per ASTM D2486 Method A



Fig 2. Typical failure without

**STANDARDS:**
ISO 11998

In a typical scrub test, the coating is applied to the Leneta Scrub Test Panel at a specified film thickness, allowed to dry and then subjected to scrubbing with a straight-line scrub tester.

When used in accordance with ASTM D2486, Method A, a 10mil shim is inserted under the panel to accelerate failure and thereby reduce testing time. The scrub resistance is the number of scrub cycles required to remove the coating to a specified end point.

Alternatively, the loss in weight is determined after a specified number of scrub resistance cycles, with calculation of equivalent loss in film thickness.

These Scrub Test Panels are ideal for use with the Elcometer 1720 Washability & Abrasion Testers, see page 19-2.

### Technical Specification

| Part Number | | Description | Chart Dimensions | | Quantity | Boxes |
|---|---|---|---|---|---|---|
| Box | Case | | mm | inches | per Box | per Case |
| K0004695M068 | K0004695M268 | Black Scrub Test Panel P121-10N | 165 x 432 | 6$1/2$ x 17 | 100 | 5 |
| K0004695M069 | K0004695M269 | White Scrub Test Panel P122-10N | 165 x 432 | 6$1/2$ x 17 | 100 | 5 |

### Accessories

| | |
|---|---|
| KT001720P012 | ASTM Test Foil 250µm (10mils) |

# Taber® Linear Abrasers

Whatever your product, be it curved, round, big or small, the Linear Abraser from Taber® can test it all. Using a free floating head to follow the contours of the sample, the Taber® 5750 is the ideal abrasion tester for flat or curved surfaces. It may also be used as a scratch tool, using the scratch kit accessory.

Abrasion media, length of stroke, load and speed of stroke can all be user defined to meet specific requirements.

The Linear Abraser uses a range of Wearasers™. The size and shape of a pencil eraser, the Wearaser™ uses the same high quality Taber® abrasive media as used on the Taber® Rotary Abrasers, simulating real-life wear conditions.

Features:
- Stroke lengths of 12.7, 25, 76 and 102mm (0.5, 1.0, 3.0 and 4.0")
- Variable stroke speed from 2 - 75 cycles per minute
- Preset stroke speed buttons for 2, 15, 25, 30, 40 and 60 cycles per minute
- Variable load from 350 - 2100g (12.4 - 74.1oz) with optional weights
- Stainless steel Wearaser™ holder (Collet) for use with vitrified or resilient Wearasers™
- Laser alignment guide

**STANDARDS:**

AATCC Method 8, ASTM D 2197, ASTM D 5178, ASTM D 6279, ASTM F1319, ISO 105-X12, JIS L 0849

## Technical Specification

| Part Number | Description |
|---|---|
| ST985750 | Elcometer Taber® 5750 Linear Abraser (230V/115V, 50/60Hz) |
| Dimensions | 208 x 228 x 279mm (20 x 9 x 11") |
| Weight | 10kg (22lb) |
| Packing List | Elcometer Taber® 5750 Linear Abraser, Wearaser™ Collet and Spine Shaft, 3 x 250g (8.82oz) discs, 10 x CS-10 Wearasers™, 5 x H-18 Wearasers™, power cords (230V and 115V), allen key, Wearaser™ depth tool gauge, 50 x S-14 refacing strips, hand brush and operating instructions |

## Accessories

| Part Number | Description | Abrasive Action | Composition |
|---|---|---|---|
| ST130684 | CS-10F Resilient Wearaser™ (pack of 10) | Very Mild | Rubber and Abrasive Grain |
| ST130685 | CS-10 Resilient Wearaser™ (pack of 10) | Mild | Rubber and Abrasive Grain |
| ST130686 | CS-17 Resilient Wearaser™ (pack of 10) | Harsh | Rubber and Abrasive Grain |
| ST130681 | H-18 Non-resilient Wearaser™ (pack of 5) | Medium, Coarse | Vitrified Clay |
| ST130682 | H-22 Non-resilient Wearaser™ (pack of 5) | Very Coarse | Vitrified Clay |
| ST131852 | Wearaser™ Holder (collet) Kit - Aluminium | | |
| ST131852-1 | Wearaser™ Holder (collet) Kit - Plastic | | |
| ST130570 | Crockmeter Kit* | | |

*Crockmeter kit includes finger, clamp ring and cloths

## Elcometer 5135 & 5155    Taber® Rotary Abrasers

Used primarily in the testing of ceramics, plastics, textiles, metals, leather, rubber and painted, lacquered and electroplated surfaces, accelerated wear test procedures have also been written into many test specifications including ASTM, ISO, TAPPI and DIN - as well as automotive manufacturing procedures around the world.

The Taber® Rotary Abraser is an industry standard used in the wear and durability testing and is available with either a single test head or dual testing heads, which allows the user to test two different or identical materials simultaneously.

Choose from a wide variety of abrading wheels and abraser accessories to simulate real-life wear conditions.

Features :
- Platform speeds 60 and 72rpm
- Balanced, calibrated arms and wheel mounts
- Vacuum system with precision height adjustment
- Sealed aluminium housing with membrane control panel and digital display

**STANDARDS:**

ANSI INCITS 322, AS/NZS 1580.403.2, AS/NZS 4266.2, ASTM C1353, ASTM C217, ASTM C241, ASTM C501, ASTM D1044, ASTM D3389, ASTM D3884, ASTM D4060, ASTM D6037, ASTM D-7255, ASTM F1478, ASTM F1978, ASTM F362, ASTM F 510, BS 5599, DIN 52347, DIN 53109, DIN 53754, DIN 53799, DIN 68861-2, ECCA T16, EN 13329, EN 13523-16, EN 14323, EN 14327, EN 14354, EN 14431, EN 14688, EN 14864, EN 1504-2, EN 438-2, EN 660-2, EN 13696, FORD BN108-02, GM9515P, ISO 10074, ISO 14656, ISO 24338, ISO 3537, ISO 4586-2, ISO 5470-1, ISO 7784-1, ISO 7784-2, ISO 9352, JIS A 1453, JIS H 8503, JIS K 5600-5-8, JIS K 5600-5-9, JIS K 6404-22, JIS K 6902, JIS K 7205, NEMA LD 3, NF Q03-055, SAE J 1530, SAE J 1847, SAE J 365, SAE J 948, SIS 923509, SS 923509, TAPPI T 476, UNE 135203-1, UNE 48250, UNE 56842, UNE 56843, UNE 56868, UNE 57095

### Technical Specification

| Part Number UK/EUR 230V | US 115V | Description | Certificate |
|---|---|---|---|
| ST985135-2 | ST985135-1 | Elcometer Taber® 5135 Single Head Abraser | ● |
| ST985155-2 | ST985155-1 | Elcometer Taber® 5155 Dual Head Abraser | ● |
| Dimensions & Weights | | Elcometer Taber® 5135:  279 x 406 x 279mm (11 x 16 x 11"), 19.50kg (43lb) | |
| | | Elcometer Taber® 5155:  482 x 355 x 279mm (19 x 14 x 11"), 31.75kg (70lb) | |
| | | Vacuum unit:  279 x 279 x 610mm (11 x 11 x 24"),10.00kg (22lb) | |
| Packing List | | Elcometer Taber® Abraser, auxiliary weights - 1 x 500g (17.64oz) load and 1 x 1000g (35.27oz) load, specimen holder 109.2mm (4.3") O/D (E-100-125), holding down ring (E-100-101), 100 x refacing discs (S-11), Calibrase® Wheel set (CS-10), Calibrade® Wheel set (H-18), vacuum unit with suction hose, round brush and operating instructions | |

**For the complete range of Accessories, see pages 19-11 to 19-13**

● Calibration Certificate supplied as standard.

# Abrading Wheels

Taber® Abrading Wheels are available in five levels of abrasiveness to suit a wide range of material testing applications.

Wool, felt or plain rubber wheels test delicate materials or abrasiveness of materials such as dental powders.

Wheels featuring abrasive particles in a resilient matrix of rubber or a hard matrix of vitrified clay are suitable for stiffer materials.

- *Calibrase*® : resilient abrasive wheel - rubber and aluminium oxide
- *Calibrade*®: a non-resilient abrasive wheel - vitrified clay and silicon carbide
- *Plain Rubber*: contains no abrasive particles unless used with sandpaper strips
- *Tungsten Carbide*: severe cutting and tearing action with helical teeth for use on resilient materials such as rubber, leather and floor coverings

Technical Specification

**Elcometer 5135 and 5155 Taber® Rotary Abrasers (2 wheel set)**

| Part Number | Description | Abrasive Action | Composition |
|---|---|---|---|
| ST125319 | CS-5 Resilient Wheel (Pack of 2) | None | Wool Felt |
| ST125321 | CS-10F Resilient Wheel (Pack of 2) | Very Mild | Rubber and Abrasive Grain |
| ST125320 | CS-10 Resilient Wheel (Pack of 2) | Mild | Rubber and Abrasive Grain |
| ST125322 | CS-17 Resilient Wheel (Pack of 2) | Harsh | Rubber and Abrasive Grain |
| ST125345 | S-35 Non-resilient Wheel (Pack of 2) | Severe Cutting | Tungsten Carbide |
| ST125323 | H-10 Non-resilient Wheel (Pack of 2) | Coarse | Vitrified Clay |
| ST125324 | H-18 Non-resilient Wheel (Pack of 2) | Medium, Coarse | Vitrified Clay |
| ST125325 | H-22 Non-resilient Wheel (Pack of 2) | Very Coarse | Vitrified Clay |
| ST125326 | H-38 Non-resilient Wheel (Pack of 2) | Very Fine, Hard | Vitrified Clay |
| ST125344 | CS-0, S-32 Resilient Wheel (Pack of 2) | Very Mild | Non-Abrasive Rubber |
| ST125564 | Sand Paper Strips for use with CS-0,S-42 | Medium | Sand Paper Strips (pack of 100) |
| ST121124 | Sand Paper Strips for use with CS-0, S-33 | Fine | Sand Paper Strips (pack of 100) |

# Elcometer 5135 & 5155    Taber® Rotary

Accessories

### Multi-Media Attachment

This attachment is used to recreate contact surface wear caused by liquids, fluids and powders. Measures the abrasivity of materials including paints, pigments, adhesives, sealants, pastes, additives etc.

If you require either the Elcometer Taber® 5135 or Taber® 5155 ready assembled with the Multi-Media Attachment, please contact Elcometer.

Part Number: ST985500

### Sample Cutter

The Model 5000 Sample Cutter will cut a precise 106mm (4.2") circular sample with a 6.35mm (0.25") centre hole to prepare your specimens for use with the Elcometer Taber® Abrasers.

An easy counter-clockwise cutting motion allows you to cut a variety of materials. Optional pads, which allow cutting thicknesses of 0.03mm (0.001") to 6.35mm (0.25"), are also available.

Part Number: ST985000

### Grit Feeder Attachment

Provides a unique method to evaluate 3-body abrasion resistance on a variety of materials. Aluminium oxide grit particles are evenly distributed on to the specimen wear path and pass under a pair of leather wheels. This loose grit acts as an abradant aiding the action that contributes to the physical breakdown of materials.

The Abraser Vacuum is attached to the grit feeder and continuously removes both abraded material and used grit.

The Grit distributor and vacuum removal nozzle heights are adjusted using a thumbscrew.

Two versions are available, Model 155 and Model 255. The Model 155 uses an alignment guide screw to set the position of the instrument. An alignment block is incorporated into the base of Model 255, to ensure the correct location of the grit feeder in relation to the Abraser.

Both models are supplied complete with:

• S-39 Leather wheel set
• S-38 Standardisation Plates
• S-41 #240 Aluminium oxide
• Alignment guide and mounting hardware

| Part Number: ST980503-1 | Model 155 |
| --- | --- |
| Part Number: ST980503-2 | Model 255 |

# Taber® Rotary Abrasers

## Quiet Cabinet

Comprising an upper and lower unit, this solid wood cabinet is suitable for use in a laboratory environment and achieves an approximate 20% reduction in operating sound level.

The top cabinet provides a convenient, dust-free work space for the Abraser and features a Plexiglas® viewing window to monitor testing and removable front for easy transfer of the Abraser in and out of the cabinet.

The base cabinet holds the Abraser Vacuum Unit and includes an inbuilt exhaust system for effective air circulation.

Both cabinets offer ample room to store test specimens, supplies and accessories. The Quiet Cabinet can be purchased as a complete unit or the top and base separately. The lower cabinet exhaust system is available for 230V/50Hz or 115V/60Hz.

### Technical Specification

| Part Number | Description |
|---|---|
| ST129497 | Complete 230V - both upper and base cabinets |
| ST128372 | Complete 115V - both upper and base cabinets |
| ST129498 | Base unit only 230V - includes vacuum unit |
| ST128371 | Base unit only 115V - includes vacuum unit |
| ST128370 | Upper unit only - work space and viewing window |

## Calibration Verification Kit

A cost effective method that enables users to verify that an instrument is in calibration, or requires attention. Each kit is individually calibrated providing a reliable check system.

Kit allows you to verify:
- Longitudinal alignment of abraser arm
- Transverse alignment of abraser arm
- Wheel tracking and wear pattern
- Bearing integrity (tracking pattern compliance)
- Vacuum nozzle orifice size
- Minimum vacuum nozzle suction force
- S-30 Weartrac precision wheels (x1 set)

Supplied complete with:
- S-45 Wheel tracking cards (x15)
- Vacuum nozzle suction and orifice gauge
- Vacuum nozzle O-ring
- Dual unit vacuum plug
- Taber® Abraser clean-up hose

### Technical Specification

| Part Number | Description |
|---|---|
| ST132030 | Calibration Verification Kit |

# ELCOMETER 480 GLOSSMETERS

## Repeatable and reproducible test results, time after time after time

From appearance to film application, abrasion and washability to coating thickness; Elcometer's range of high quality instruments ensure accurate, repeatable and reproducible test results, every time.

---

### Film Application
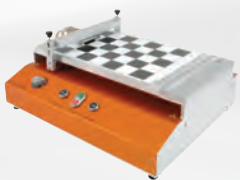
Our range of manual & automatic film applicators ensure smooth, reproducible, accurate and reliable application of a wide range of coatings & product samples.

### Coating Thickness

Up to 40% faster than other coating thickness gauges, the new Elcometer 456 provides you with accurate and repeatable readings. Integral & separate probes available.

### Colour

The Elcometer 6300 range of colour assessment cabinets ensures accurate visual colour assessment and colour comparison.

### ElcoMaster™

ElcoMaster™ is the simple yet powerful software solution; combining all your inspection results in one professional report, instantly.

# Hardness & Scratch Resistance

**Hardness can be defined as a material's resistance to permanent deformation. In the coatings industry, hardness measurement can be used to determine the resistance of the coating to scratching from general wear and tear and also if a coating is fully cured.**

**Hardness**: Hardness can be defined as a material's resistance to permanent deformation.

The term "Hardness" is used to refer to different properties of material, specifically:

• Resistance to scratch and wear
• Resistance to penetration/indentation

Depending on the requirements, there are various methods for testing hardness. Some are dedicated to characterise coatings and others are more suitable for testing bulk materials such as metals, plastics, rubber or elastomers.

**Scratch Resistance**:
To assess a coating's resistance to scratch there are a number of different instruments that can be used:

• Pencil Hardness Tester (Wolff-Wilborn)
• Sclerometer
• Clemen Apparatus
• Scratching and Shearing Instrument

**Resistance to Indentation**:
There are many instruments available to assess the resistance to penetration. For coatings in particular, there are three common methods where the depth of penetration of a weighted tool is used to show the coating's resistance to penetration:

• Buchholz
• Barcol
• Shore

# Hardness & Scratch Resistance

## Elcometer 3080

## Pencil Hardness Tester

This is a simple and effective technique to evaluate the hardness of many coatings.

The pencil lead, prepared beforehand by using the special pencil sharpener and rubbing it on fine abrasive paper (400 grade), is maintained at an angle of 45° and pushed with uniform pressure on to the sample, leaving either a superficial trace or causing destruction down to the substrate.

The Elcometer 3080 Pencil Hardness Tester is supplied complete with stand and a series of 14 pencils, ranging from 6B to 6H hardness values.
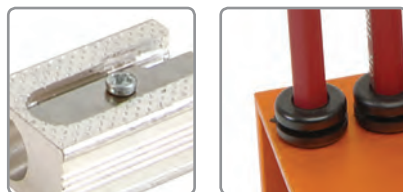
### Technical Specification

| Part Number | Description |
|---|---|
| K0003080M003 | Elcometer 3080 6B to 6H Pencil Hardness Tester with Stand |
| Dimensions | 330 x 280 x 330mm (13 x 11 x 13") |
| Weight | 1kg (2.2lb) |
| Packing List | Elcometer 3080 Pencil Hardness Tester, Pencil set - (14 pencils, grades 6B - 6H), x 2 pencil sharpeners, abrasive paper block, storage stand and operating instructions |

### Accessories

| Part Number | Description | Part Number | Description |
|---|---|---|---|
| T99923042-1 | 12 Hardness Pencils (6B) | T99923042-8 | 12 Hardness Pencils (F) |
| T99923042-2 | 12 Hardness Pencils (5B) | T99923042-9 | 12 Hardness Pencils (H) |
| T99923042-3 | 12 Hardness Pencils (4B) | T99923042-10 | 12 Hardness Pencils (2H) |
| T99923042-4 | 12 Hardness Pencils (3B) | T99923042-11 | 12 Hardness Pencils (3H) |
| T99923042-5 | 12 Hardness Pencils (2B) | T99923042-12 | 12 Hardness Pencils (4H) |
| T99923042-6 | 12 Hardness Pencils (B) | T99923042-13 | 12 Hardness Pencils (5H) |
| T99923042-7 | 12 Hardness Pencils (HB) | T99923042-14 | 12 Hardness Pencils (6H) |
| T99923039 | Set of 14 Pencils (6B to 6H) | | |
| T501190451 | Pencil Sharpener (6H to 2B) | | |
| T501190452 | Pencil Sharpener (3B to 6B) | | |

elcometer

## Pencil Hardness Tester

The pencil hardness test, also referred to as the Wolff-Wilborn test, uses the varying hardness values of graphite pencils to evaluate a coating's hardness.

The Elcometer 501 has been designed to ensure that the cylindrical pencil lead is maintained at a constant angle of 45° and exerts a force of 7.5N (1.68lbF).

The pencil lead, prepared beforehand using the special sharpener and abrasive paper, is inserted into the Elcometer 501 and pushed over the smooth, flat coated surface. The lowest hardness value of the pencil which marks the coating determines the coating's hardness rating.

**STANDARDS:**
ASTM D 3363, ECCA T4,
EN 13523-4, ISO 15184:2012,
JIS K 5600-5-4

### Technical Specification   C

| Part Number | Description | Certificate |
|---|---|---|
| H501----1 | Elcometer 501 Pencil Hardness Tester | ○ |
| Dimensions (with Pencils) | 130 x 130 x 50mm (5 x 5 x 2") | |
| Weight | 2.1kg (4lb) | |
| Packing List | Elcometer 501 Pencil Hardness Tester, pencil set (14 pencils, grades 6B - 6H), positioning block, 2 x pencil sharpeners, abrasive paper block, carry case and operating instructions | |

### Accessories

| Part Number | Description | Part Number | Description |
|---|---|---|---|
| T99923042-1 | 12 Hardness Pencils (6B) | T99923042-8 | 12 Hardness Pencils (F) |
| T99923042-2 | 12 Hardness Pencils (5B) | T99923042-9 | 12 Hardness Pencils (H) |
| T99923042-3 | 12 Hardness Pencils (4B) | T99923042-10 | 12 Hardness Pencils (2H) |
| T99923042-4 | 12 Hardness Pencils (3B) | T99923042-11 | 12 Hardness Pencils (3H) |
| T99923042-5 | 12 Hardness Pencils (2B) | T99923042-12 | 12 Hardness Pencils (4H) |
| T99923042-6 | 12 Hardness Pencils (B) | T99923042-13 | 12 Hardness Pencils (5H) |
| T99923042-7 | 12 Hardness Pencils (HB) | T99923042-14 | 12 Hardness Pencils (6H) |
| T99923039 | Set of 14 Pencils (6B to 6H) | | |
| T501190451 | Pencil Sharpener (6H to 2B) | | |
| T501190452 | Pencil Sharpener (3B to 6B) | | |

○ Optional Calibration Certificate available.

## Elcometer 3086

## Motorised Pencil Hardness Tester

Traditional pencil hardness testers can be limited in their reproducibility and repeatability by two key factors; the uniformity of the carriage speed and the variation of the applied force by the user as the manual tester is moved across the coating.

The Elcometer 3086 Motorised Pencil Hardness Tester, using the same test methods and principles as the Elcometer 501 pencil hardness tester, removes both of these variables by being fully independent. The internal motor drives the unit at a constant, uniform speed across the coated surface, exerting a fixed, user determined force between 0 - 10N (0 - 2.25lbF).

Using the pencil lead holder, pencil leads of varying hardness values can be quickly interchanged to determine a coating's hardness rating.

Manufactured from anodised aluminium, the Elcometer 3086 can travel forwards (chip method) or backwards (indentation method), as required.

**STANDARDS:**
ASTM D 3363, ECCA T4, EN 13523-4, ISO 15184:2012, JIS K 5600-5-4

### Technical Specification     C

| Part Number | | | Description | Certificate |
|---|---|---|---|---|
| UK 240V | EUR 220V | US 110V | | |
| K0UK3086M001 | K0003086M001 | K0US3086M001 | Elcometer 3086 Motorised Pencil Hardness Tester | ○ |
| Dimensions | 280 x 140 x 240mm (11 x 5.5 x 9.4") | | | |
| Weight | 3.8kg (8.4lb) | | | |
| Packing list | Elcometer 3086, lead holder, lead set (14 packs of leads, grades 6H to 6B), positioning block, abrasive sharpener, abrasive paper and operating instructions | | | |

### Accessories

| Part Number | Description | Part Number | Description |
|---|---|---|---|
| KT003084P220 | Spare Metal Pencil Lead Holder | | |
| KT003084P001 | 12 Hardness Leads (6B) | KT003084P008 | 12 Hardness Leads (F) |
| KT003084P002 | 12 Hardness Leads (5B) | KT003084P009 | 12 Hardness Leads (H) |
| KT003084P003 | 12 Hardness Leads (4B) | KT003084P010 | 12 Hardness Leads (2H) |
| KT003084P004 | 12 Hardness Leads (3B) | KT003084P011 | 10 Hardness Leads (3H) |
| KT003084P005 | 12 Hardness Leads (2B) | KT003084P012 | 10 Hardness Leads (4H) |
| KT003084P006 | 12 Hardness Leads (B) | KT003084P013 | 10 Hardness Leads (5H) |
| KT003084P007 | 12 Hardness Leads (HB) | KT003084P014 | 10 Hardness Leads (6H) |

○ Optional Calibration Certificate available.

# Sclerometer Hardness Tester

**Elcometer 3092**

The Elcometer 3092 tests the hardness of a coating by moving a Tungsten Carbide Tip over the coating with predetermined force.

The body of the instrument contains a cursor fitted with a screw lock and a round tip, compressed by one of the four springs corresponding to the four printed scales:

- *Grey spring:*       0-3N (0.671lbF)
- *Red spring:*        0-10N (2.248lbF)
- *Blue spring:*       0-20N (4.49lbF)
- *Green spring:*      0-30N (6.74lbF)

The spring force can be set by the "collar"; compressing the spring increases the force with which the tip is pushed on to the surface of the test piece. By making short, straight movements while gradually increasing the load, the user can observe the force at which the tip leaves a mark or destroys the coating.

Each Elcometer 3092 is supplied in a case with a 0.75mm (0.03") diameter tungsten carbide tip and 3 springs (grey, red and blue). An optional green spring of 0 - 30N is also available.

new
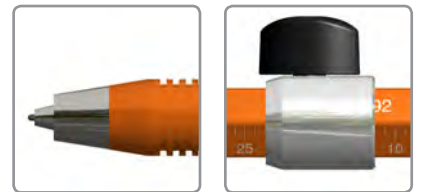
**STANDARDS:**
AS 3894.4, EN 438-2, ISO 4586-2

## Technical Specification

| Part Number | Description |
| --- | --- |
| K0003092M201 | Elcometer 3092 Sclerometer Hardness Testers - 3 ranges |
| Dimensions | 165 x 24 x 16mm (6.5 x 1 x 0.6") |
| Weight | 370g (13oz) |
| Packing List | Elcometer 3092 Sclerometer, tool with 0.75mm (0.03") diameter tungsten carbide tip, 3 springs (grey, red and blue), carry case and operating instructions |

## Accessories

| Part Number | Description |
| --- | --- |
| KT003092P001 | 0.5mm (0.02") Tungsten Carbide Tip |
| KT003092P002 | 0.75mm (0.03") Tungsten Carbide Tip |
| KT003092P003 | 1.0mm (0.04") Tungsten Carbide Tip |
| KT003092P008 | 90° Diamond Point Cone, 90µm (3.54mils) Radius - ISO Type |
| KT003092P004 | Grey Spring 0 - 3N (0 - 0.67lbF) |
| KT003092P005 | Red Spring 0 - 10N (0 - 2.248lbF) |
| KT003092P006 | Blue Spring 0 - 20N (0 - 4.49lbF) |
| KT003092P007 | Green Spring 0 - 30N (0 - 6.74lbF) |

# Hardness & Scratch Resistance

## Elcometer 3000

## Motorised Clemen Unit

The Elcometer 3000 Motorised Clemen Unit is a robust and accurate instrument for evaluating the resistance to scratching of a coated surface. The sample can be metal, wood, glass, plastic or other hard materials.

A tool is fitted with an hemispherical tip of 1mm (0.04") diameter (standard), lowered gradually on to the sample surface which is then pulled linearly 60mm (2.36").

As the sample is pulled the tool lowers automatically on to the sample, moves along the sample and gently rises up at the end of the stroke.

To ensure consistent, repeatable and reproduceable tests, the Motorised Clemen Unit automatically brings the tool gently in contact with the sample, moves across the coating and then lifts it with the automatic Start/Stop function. Depending on the load applied, varying degrees of penetration of the tool into the coating are observed - from a superficial trace to total destruction.

If the coating is completely removed during the test, the contact of the tool with the metallic substrate is indicated by a lamp and voltmeter indicator.

Elcometer offer a range of cutting tools, please see Accessories below.

### Technical Specification                                                                                     C

| Part Number | Description | | Certificate |
|---|---|---|---|
| K0003000M003 | Elcometer 3000 Motorised Clemen Unit (UK 240V / EUR 220V) | | ○ |
| K0US3000M003 | Elcometer 3000 Motorised Clemen Unit (US 110V) | | ○ |
| Sample Width | 75mm (2.95") | Variable Load    0 - 5000g (176.4oz) | |
| Dimensions | 460 x 280 x 330mm (18 x 11 x 13") | | |
| Weight | 20kg (44lb) | | |
| Packing List | Elcometer 3000 Motorised, 1kg (35.27oz) x 4 weights, 1mm (0.04") ball tool and operating instructions | | |

### Accessories

| Part Number | Description |
|---|---|
| KT003000P021 | 1mm (0.04") Ball Tool in Tungsten Carbide |
| KT003000N001 | 2mm (0.08") Cutting Tool in Tungsten Carbide |
| KT003000N013 | VW Cutting Tool |
| KT003000N002 | 1cm² (0.15 inch²) Rubber Tool (to be used as a guide to the dryness of a sample) |
| KT003000N015 | Adjustment Kit to test from 5 to 20mm (0.02 to 0.8") |
| KT007210M001 | Illuminated Microscope (x30) |
| KT003025P007 | Magnifier (x10) |

○ Optional Calibration Certificate available.

## Manual Clemen Unit

The Elcometer 3000 Manual Clemen Unit is a robust and simple to use instrument for evaluating the resistance to scratching of a coated surface.

A tool is fitted with an hemispherical tip of 1mm (0.04") diameter (standard), lowered gradually on to the sample surface which is then pulled linearly 60mm (2.36").

Depending on the load applied, varying degrees of penetration of the tool into the coating are observed - from a superficial trace to total destruction.
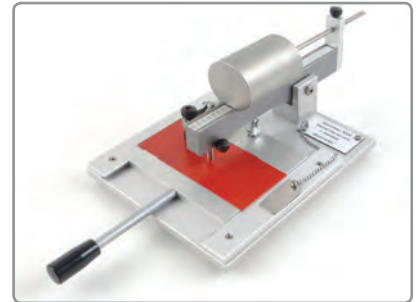
**STANDARDS:**
AS/NZS 1580.403.1, BS 3900-E2, DIN 53799, ECCA T12, EN 13523-12, ISO 1518-1:2011, JIS K 5600-5-5

### Technical Specification C

| Part Number | Description | | | Certificate |
|---|---|---|---|---|
| K0003000M001 | Elcometer 3000 Manual Clemen Unit | | | o |
| Sample Width | 75mm (2.95") | Variable Load | 0 - 2000g (70.5oz) | |
| Dimensions | 410 x 200 x 155mm (16.1 x 7.9 x 6.1") | | | |
| Weight | 6kg (13.2lb) | | | |
| Packing List | Elcometer 3000 Manual, 1mm (0.04") ball tool and operating instructions | | | |

### Accessories

| Part Number | Description |
|---|---|
| KT003000P021 | 1mm (0.04") Ball Tool in Tungsten Carbide |
| KT003000N001 | 2mm (0.08") Cutting Tool in Tungsten Carbide |
| KT003000N013 | VW Cutting Tool |
| KT003000N002 | 1cm² (0.15 inch²) Rubber Tool (to be used as a guide to the dryness of a sample) |
| KT003000N015 | Adjustment Kit to test from 5 to 20mm (0.02 to 0.8") |
| KT007210M001 | Illuminated Microscope (x30) |
| KT003025P007 | Magnifier (x10) |

o Optional Calibration Certificate available.

## Elcometer 3025

## Scratch/Shear Tester

The Elcometer 3025 is a motorised device to test the resistance of many materials to scratching, shearing, gouging, marring, scraping and engraving. This portable instrument tests materials up to 12.7mm (½") thick by 101mm (4") square or round.

The height of the scale beam is adjusted by the user to match the thickness of the sample. The tool, a conical diamond tip, is then placed on the sample and the instrument is activated by the user with the On/Off switch.

The tip leaves a trace mark and the extent of this, in relation to the load used, indicates the degree of coating or material hardness. The turntable rotates at a constant 5rpm to ensure repeatability and reproducibility of tests. By changing the load on the tool, from 0 - 1000g (0 - 2.2lb), the sample's scratch resistance can be evaluated.

## Sample Cutter

The Sample Cutter cuts precise 106mm (4.2") circular samples with a 6.35mm (0.25") centre hole to prepare specimens for use with the Taber® Abrasers.

An easy counter-clockwise cutting motion allows the user to cut a variety of materials. Optional pads allowing cutting thicknesses of 0.03mm (0.001"), 4.74mm (0.187") and 6.35mm (0.25") are available.

### Technical Specification

| Part Number | | | Description |
|---|---|---|---|
| UK 240V | EUR 220V | US 110V | |
| K0UK3025M001 | K0003025M001 | K0US3025M001 | Elcometer 3025 Scratch/Shear Tester |
| Dimensions | 445 x 190 x 150mm (17 x 7.8 x 6") | | |
| Weight | 6.8kg (14.9lb) | | |
| Packing List | Elcometer 3025 and operating instructions | | |

### Accessories

| Part Number | Description |
|---|---|
| ST985000 | Sample Cutter |
| ST131569 | Sample Cutter Upper Pad – 4.74mm (0.187") |
| ST131570 | Sample Cutter Upper Pad – 6.36mm (0.250") |
| KT003025P007 | Magnifier (x10) |

# Buchholz Hardness Tester

## Elcometer 3095

Measuring a coating's hardness using the indentation method, the Elcometer 3095 Buchholz Hardness Tester consists of a bevelled disc indenting tool which is fitted into a stainless steel block exerting a constant test load of 500g (17.6oz).

The gauge is placed on to the coating and then removed after 30 seconds. The length of any subsequent indentation in the coating is measured using the graduated microscope.

The result is expressed as units of Buchholz Indentation Resistance using the scale provided.

**STANDARDS:**
BS 3900-E9, DIN 53153, ISO 2815, NF T30-052

## Technical Specification                                                      C

| Part Number | Description | Certificate |
|---|---|---|
| K0003095M001 | Elcometer 3095 Buchholz Hardness Tester | ○ |
| Dimensions | 360 x 310 x 120mm (14.2 x 12.2 x 4.7") | |
| Weight | 2.9kg (6.4lb) | |
| Packing List | Elcometer 3095 Buchholz Hardness Tester, indentation tool with bevelled disc and two locating pins, pin adjusting shim, x20 illuminated microscope, indentation locator template, hexagonal wrench, plastic carry case and operating instructions | |

## Accessories

| Part Number | Description |
|---|---|
| KT003095P001 | Spare Pin Supports (x2) |
| KT003095P002 | Bevelled Hardened Steel Disc Indenter |

### Measure of Buchholz Hardness

| Indentation Length | | Indentation Resistance | Indentation Depth | | Minimum coating thickness for which a measurement is valid | |
|---|---|---|---|---|---|---|
| µm | mm | | µm | mils | µm | mils |
| 20 | 0.8 | 125 | 5 | 0.2 | 15 | 0.59 |
| 21 | 0.85 | 118 | 6 | 0.24 | 20 | 0.79 |
| 23 | 0.9 | 111 | 7 | 0.28 | 20 | 0.79 |
| 24 | 0.95 | 105 | 7 | 0.28 | 20 | 0.79 |
| 25 | 1.0 | 100 | 8 | 0.31 | 20 | 0.79 |
| 38 | 1.05 | 95 | 9 | 0.35 | 20 | 0.79 |
| 28 | 1.1 | 91 | 10 | 0.39 | 20 | 0.79 |
| 29 | 1.15 | 87 | 11 | 0.43 | 25 | 1 |
| 30 | 1.2 | 83 | 12 | 0.47 | 25 | 1 |
| 33 | 1.3 | 77 | 14 | 0.55 | 25 | 1 |
| 35 | 1.4 | 71 | 16 | 0.63 | 30 | 1.18 |
| 38 | 1.5 | 67 | 18 | 0.71 | 30 | 1.18 |
| 41 | 1.6 | 63 | 21 | 0.83 | 35 | 1.38 |
| 43 | 1.7 | 59 | 24 | 0.94 | 35 | 1.38 |

○ Optional Calibration Certificate available.

# Hardness & Scratch Resistance

## Elcometer 3101

### Barcol Impressor Hardness Tester

These easy to use hardness testers are ideal for testing the hardness of soft metals, plastics, fibreglass and leather.

Making sure the indenter point is perpendicular to the surface being tested, the instrument is placed on to the sample and a light pressure is exerted against the instrument driving the spring-loaded indenter point into the material. The hardness reading is instantly indicated on the dial.

There are three models in the range:

Elcometer 3101/1  Model 934-1: for soft metals such as aluminium and its alloys, brass, copper, and some of the harder plastics and fibreglass. This unit meets ASTM Standard D2583.
Elcometer 3101/2  Model 935: for softer plastics and very soft metals.
Elcometer 3101/3  Model 936: for extremely soft materials such as lead, linoleum and leather.

To ensure the Barcol Hardness Tester is in calibration, a number of Standard Test Discs are available. Please select the appropriate Test Disc from the list of Accessories below to supplement the disc supplied.

All results are recorded in Barcol Units (BU).

**STANDARDS:**
AS 3894.4, ASTM B 648, ASTM D 2583, NF P38-501

## Technical Specification

| Part Number | Description |
|---|---|
| K0003101M001[a] | Elcometer 3101/1 Barcol Hardness Tester Type 934/1 at 25-150 Brinell Hardness |
| K0003101M002[b] | Elcometer 3101/2 Barcol Hardness Tester Type 935 at 50-100 Rockwell |
| K0003101M003[c] | Elcometer 3101/3 Barcol Hardness Tester Type 936 |
| Dimensions | 152 x 106 x 50mm (6 x 4 x 2") |
| Weight | 900g (2lb) |
| Packing List | Elcometer 3101, adjusting spanner, 2 x indenting points, appropriate standard test disc and operating instructions |

## Accessories

| Part Number | Description | |
|---|---|---|
| KT003101P001 | Spare Indenter Point for Elcometer 3101/1 and Elcometer 3101/2 | |
| KT003101P006 | Spare Indenter Point for Elcometer 3101/3 | |
| KT003101P202 | Standard Test Disc 934-1; (x1) | 87 - 89 BU |
| KT003101P002 | Certified Test Disc 934-1; (x5) | 87 - 89 BU |
| KT003101P203 | Standard Test Disc 934-1; (x1) | 43 - 48 BU |
| KT003101P003 | Certified Test Disc 934-1; (x5) | 43 - 48 BU |
| KT003101P204 | Standard Test Disc 935; (x1) | 87 - 89 BU |
| KT003101P004 | Certified Test Disc 935; (x5) | 87 - 89 BU |
| KT003101P205 | Standard Test Disc 936; (x1) | 48 - 50 BU |
| KT003101P005 | Certified Test Disc 936; (x5) | 48 - 50 BU |

[a] Supplied with Standard Test Disc 934-1; 43 - 48 BU, Standard Test Disc 934-1; 87 - 89 BU
[b] Supplied with Standard Test Disc 935; 87 - 89 BU
[c] Supplied with Standard Test Disc 936; 48 - 50 BU

elcometer®

## Shore Durometer

**Elcometer 3120**

The Elcometer 3120 range of durometers is widely used to test the hardness of soft materials. A round point indents the material under a fixed force spring and the hardness is displayed on the dial in Shore Hardness Units.

The instrument can be either hand-held or fitted to an optional stand for increased repeatability.

*Note: The Elcometer 3120 range of Shore Durometers encompasses a number of hardness values. Please refer to the table below.*

**STANDARDS:**
ASTM D 2240, BS 7442-3.2, DIN 53505, FIAT 50411, ISO 868, ISO 7267-2, NF T51-123, NF T 51-174

### Technical Specification

| Part Number Without Certificate | With Certificate | Description | Certificate |
|---|---|---|---|
| K0003120M001 | K0003120M015 | Elcometer 3120 Shore Durometer A | ○ |
| K0003120M008 | - | Elcometer 3120 Shore Durometer A with Max indicator | |
| - | K0003120M025 | Elcometer 3120 Shore Durometer A with Max indicator and 10N weight | ○ |
| K0003120M005 | K0003120M018 | Elcometer 3120 Shore Durometer D | ○ |
| K0003120M009 | - | Elcometer 3120 Shore Durometer D with Max indicator | |
| Dimensions | | 50 x 50 x 110mm (1.9 x 1.9 x 4.3") | |
| Weight | | 300g (10.58oz) | |
| Packing List | | Elcometer Shore Durometer and operating instructions. A Check Piece is supplied with Elcometer Shore Durometers A and D | |

### Accessories

| Part Number | Description |
|---|---|
| KT003120N002 | Test Stand BS 61 II with 10N Load for Shore A, B & O |
| KT003120N005 | Test Stand BS 61 II with 50N Load & Control Ring for Shore D, C & DO |

**Material Relative Hardness Range**

| ← Soft | Medium | Hard → |
|---|---|---|
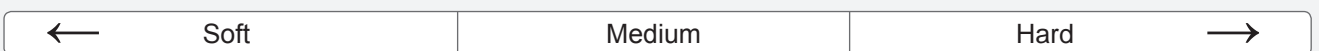
**Shore A** ASTM D2240, DIN 53505, ISO 868, ISO 7267-2

**Shore D** ASTM D2240, DIN 53505, ISO 868, ISO 7267-2

○ Calibration Certificate available under the separate part number listed.
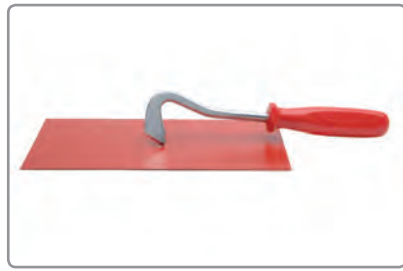
## Elcometer 1537

### ISO Scratching Tool

The Elcometer 1537 ISO Scratching Tool is a simple but effective instrument which is used to scratch the surface of samples in preparation for adhesion, salt spray and corrosion tests. The tool is held horizontally and pulled across the sample to produce the scratch.

The Elcometer 1537 has a tungsten carbide blade which is set to give a 90° cutting angle with a 75° cutting edge.

Certificate of Conformity available upon request.

**STANDARDS:**
BS 7479, EN 22063, ISO 2063, ISO 7253, ISO 9227, NF A91-124

### Technical Specification                                                    C

| Part Number | Description | Certificate |
|---|---|---|
| K0001537M001 | Elcometer 1537 ISO Scratching Tool | o |
| Dimensions | 200 x 45 x 20mm (7.8 x 1.7 x 0.8") | |
| Weight | 100g (3.5oz) | |
| Packing List | Elcometer 1537 ISO Scratching Tool, operating instructions | |

## Elcometer 1538

### DIN Scratching Tool

The Elcometer 1538 has interchangeable carbide cutters for the preparation of specimens to be used for corrosion testing. Supplied complete with a 0.5mm (0.02") or 1mm (0.04") cutter.

A Renault-version of the tool with a blade adjustment device to ensure accurate settings, is also available.

**STANDARD:**
DIN 53167

### Technical Specification                                                    C

| Part Number | Description | Certificate |
|---|---|---|
| K0001538M201 | Elcometer 1538 DIN Scratching Tool with 1mm (0.04") Cutter - CASS Test | o |
| K0001538M202 | Elcometer 1538 DIN Scratching Tool with 0.5mm (0.02") Cutter - Salt Spray Test | o |
| K0001538M004 | Elcometer 1538 DIN Scratching Tool with 0.5mm (0.02") Cutter - Renault Version | o |
| K0001538M005 | Elcometer 1538 DIN Scratching Tool with 1mm (0.04") Cutter - Renault Version | o |
| Weight | 113g (4oz) | |
| Packing List | Elcometer 1538 DIN Scratching Tool, hexagonal wrench, cutter, storage case, operating instructions | |

### Accessories

| KT001538N002 | Spare 0.5mm (0.02") Cutter | KT001538N001 | Spare 1mm (0.04") Cutter |
|---|---|---|---|

o Optional Calibration Certificate or Certificate of Conformity available.

# Elasticity & Deformation

**The performance of coatings when influenced by external stresses caused by stretching, bending or impact, determines their suitability for their designed application.**

A coating designed for use in the coil coating industry, for example, should have the ability to stretch as the substrate is formed into its desired shape without damage.

Deformation or damage can reduce the protective quality and appearance of the coating including colour change, adhesion, gloss, etc.

A coating designed for industrial use should be able to withstand an acceptable level of impact during the life of the product.

In order to characterise a coating's performance to elongation and deformation, a number of repeatable and reproducible tests have been developed.

**Cylindrical & Conical Mandrel Bend Test:** A coated metal sheet is bent over a conical or cylindrical mandrel and any subsequent cracks, colour change, adhesion etc. of the coating are evaluated. Corresponding results, produced by decreasing mandrel sizes, indicate the degree of elasticity of the coating.

A conical mandrel allows the user to perform fewer tests to achieve a similar result to cylindrical mandrels.

**Cupping Test:** A coated metal sheet is subjected to a gradual deformation by a polished die being pushed from beneath the coating i.e. from the reverse side of the sheet.

**Variable Impact Tests:** There are two methods: either a weight with a punch attached falls on a coated metal sheet or a weight falls on to a punch which is resting on the coated metal sheet. In either test, the damage caused is observed and evaluated. These methods are used to identify how the coating performs under a rapid deformation process.

## Elcometer 1500

## Cylindrical Mandrel on a Stand



The Elcometer 1500 is a simple instrument for determining the elasticity, adhesion and cracking of dry paint on flat specimens, consisting of a mandrel support which also serves as a test stand.

Coated metal sheets, maximum 150mm (5.9") in length x 100mm (3.93") wide, are manually and successively bent around mandrels of decreasing diameter until cracks appear.
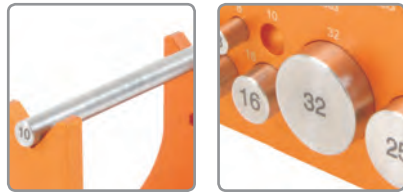


**STANDARDS:**
AS/NZS 1580.402.1, ASTM D 522-B, ASTM D 1737, BS 3900-E1, DIN 53152, ISO 1519-1, JIS K 5600-5-1 NF T30-040

### How to use the Cylindrical Mandrel on a Stand
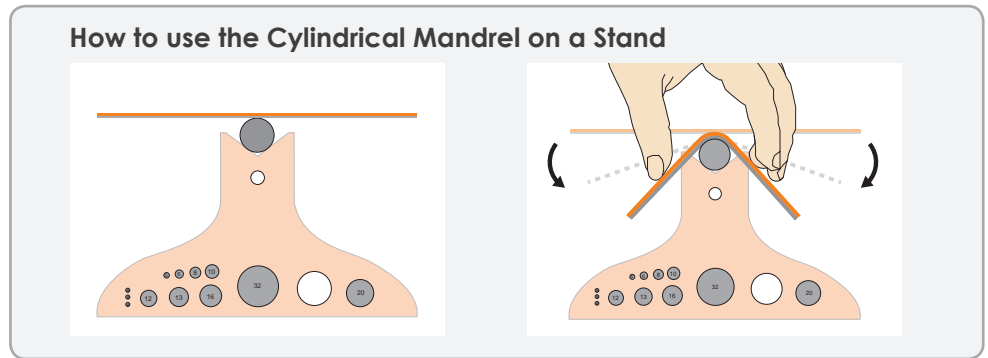


### Technical Specification

| Part Number | Description |
| --- | --- |
| K0001500M002 | Elcometer 1500/2 Metric Set of 13 Cylindrical Mandrels on a stand from 2 to 32mm |
| K0US1500M001 | Elcometer 1500/1 Imperial Set of 7 Mandrels from ⅛" to 1" |
| Mandrel Size | Metric Version: 2, 3, 4, 5, 6, 8, 10, 12, 13, 16, 20, 25, and 32mm |
| | Imperial Version: ⅛, ¼, ⅜, ½, ⅝, ¾, 1" |
| Dimensions | 178 x 138 x 145mm (7 x 5.3 x 5.7") |
| Weight | 3.3kg (7.26lb) |
| Packing List | Set of 7 mandrels (Elcometer 1500/1), Set of 13 mandrels (Elcometer 1500/2) and operating instructions |

### How to use a Cylindrical Mandrel Bend Tester



Insert large diameter mandrel followed by the coated test panel, making sure that the painted area faces away from the mandrel.

Tighten the vice by rotating the vice handle.



With a smooth action pull the lever around the mandrel. Check coating for damage.

Repeat as necessary with smaller diameter mandrels.
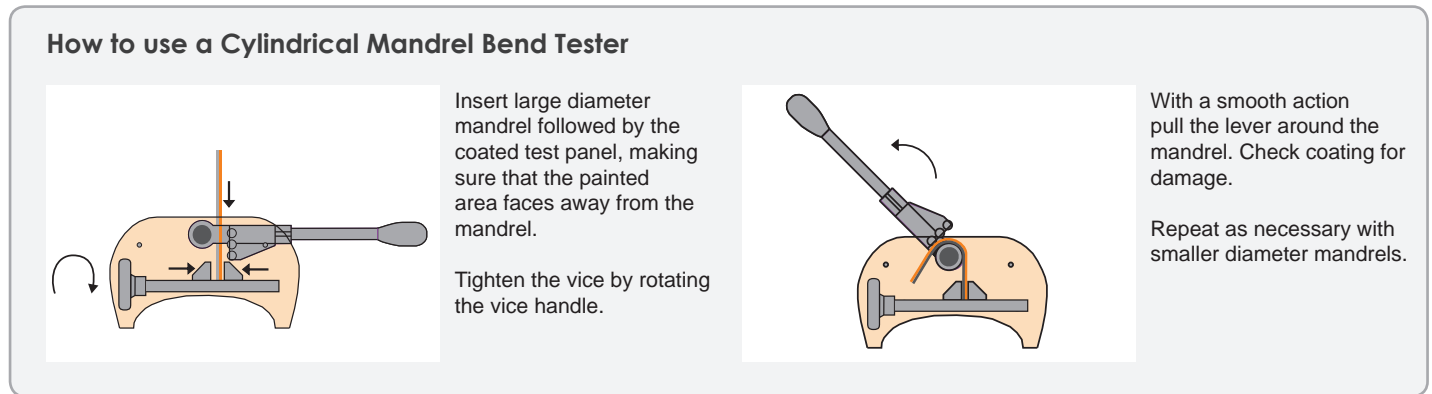
## Cylindrical Mandrel Bend Tester

### Elcometer 1506

The Elcometer 1506 is similar in use to the Elcometer 1510, being a very robust mechanical unit for determining the elasticity, adhesion and elongation properties of cured coatings on sheet metal.

The frame has a bending lever with height-adjustable rollers and a sliding vice for clamping the sample which means the test pieces are bent perfectly and regularly on decreasing mandrels until the desired effect can be observed.

The instrument can be adjusted to the diameter of the mandrel used as the mandrels are easily changed.

A wide range of metric and imperial mandrels are available. Mandrel sets or individual mandrels should be ordered separately - please see accessories below.

**STANDARDS:**
AS/NZS 1580.402.1, ASTM D 522-B, ASTM D 1737, ISO 1519-2, JIS K 5600-5-1

### Technical Specification

| Part Number | Description |
|---|---|
| K1506M201 | Elcometer 1506 Cylindrical Mandrel Bend Tester |
| Test Piece Width | Maximum: 64mm (2.5") |
| Test Piece Length | Maximum: 80 to 100mm (3.15 to 3.93") depending on the size of the mandrel used |
| Dimensions | 320 x 135 x 130mm (12.6 x 5.3 x 5.1") |
| Weight | 4.3kg (9.5lb) |
| Packing List | Elcometer 1506 Cylindrical Mandrel Bend Tester and operating instructions |

### Accessories

| | | | |
|---|---|---|---|
| KT001506P201 | Elcometer 1506 Metric Mandrel Set, 2 to 32mm (one of each of the Metric Mandrels below) | | |
| KTUS1506P201 | Elcometer 1506 Imperial Mandrel Set, 1/8 to 1" (one of each of the Imperial Mandrels below) | | |
| | **Metric** | | **Imperial** |
| KT001506F002 | 2mm Mandrel | KTUS1506F022 | ⅛" Mandrel |
| KT001506F003 | 3mm Mandrel | KTUS1506F023 | ¼" Mandrel |
| KT001506F004 | 4mm Mandrel | KTUS1506F024 | ⅜" Mandrel |
| KT001506F005 | 5mm Mandrel | KTUS1506F025 | ½" Mandrel |
| KT001506F006 | 6mm Mandrel | KTUS1506F026 | ⅝" Mandrel |
| KT001506F007 | 8mm Mandrel | KTUS1506F027 | ¾" Mandrel |
| KT001506F014 | 10mm Mandrel | KTUS1506F028 | 1.0" Mandrel |
| KT001506F015 | 12mm Mandrel | | |
| KT001506F016 | 13mm Mandrel | | |
| KT001506F017 | 16mm Mandrel | | |
| KT001506F018 | 19mm Mandrel | | |
| KT001506F019 | 20mm Mandrel | | |
| KT001506F020 | 25mm Mandrel | | |
| KT001506F021 | 32mm Mandrel | | |

## Elcometer 1510

## Conical Mandrel Bend Tester

The Elcometer 1510 Bend Tester is a mechanical tester used to determine the effects of bending on the elasticity, adhesion and elongation properties of cured coatings on sheet metal.

The frame has a bending lever with a roller which pivots on a steel conical mandrel with a diameter from 3.2 - 38.1mm (0.12 - 1.5"). A graduation indicates the mandrel diameter in both mm and inches.

The specimen can be bent on part of, or along, the entire length of the mandrel, and the results (cracks) corresponding to different test diameters can be observed in a single operation. This is ideal for use in conjunction with the cylindrical mandrel, as it identifies the stop point for more focused testing.

As the instrument is machined out of a solid block of steel, the particularly robust and rigid construction provides excellent resistance to wear and provides long service life. A large, sturdy anodised base, which can be permanently fixed to a workstation, ensures stability during testing.

**STANDARDS:**
ASTM D 522-A, BS 3900-E11, ISO 6860

| Technical Specification | | C |
|---|---|---|
| Part Number | Description | Certificate |
| K0001510M001 | Elcometer 1510 Conical Mandrel Bend Tester | ○ |
| Diameter Range | 3.2 - 38.1mm (0.1 x 1.5") | |
| Sample Size | 180 x 100 x 0.8mm (7 x 4 x 0.03") | |
| Dimensions | 325 x 350 x100mm (12.8 x 13.8 x 4") | |
| Weight | 9kg (20lb) | |
| Packing List | Elcometer 1510 Conical Mandrel Bend Tester and operating instructions | |

○ Optional Calibration Certificate available.

# Cupping Tester

This robust and user-friendly instrument is used for assessing the cupping ability of coatings applied to metal sheets up to 1.2mm (0.05") thick.

The Elcometer 1620 has a 27mm (1.06") diameter hardened steel die in a clamping device and a 20mm (0.79") diameter punch. A hand-rotated crank and reduction drive moves the punch progressively into the sample.

The Elcometer 1620 has a digital gauge with an illuminated magnifier to accurately view the resultant damage and provides accurate readings of the cupping depth on an integrated gauge. Direct viewing of the fissures, cracks and tears in the coating of up to 10μm (0.4mil) can be viewed through the supplied x10 illuminated magnifying glass.

**STANDARDS:**
BS 3900 E4, DIN 53156, DIN 53232, ECCA T6, EN 13523-6, ISO 1520, JIS K 5600-5-2, NBN T22-104, NF T30-019

## Technical Specification    C

| Part Number | Description | Gauge Type | Certificate |
|---|---|---|---|
| K0001620M004 | Elcometer 1620/4 Manual Cupping Tester | Digital (mm, mils) | o |
| Dimensions | 300 x 240 x 500mm (12 x 10 x 20") | | |
| Weight | 24kg (53lb) | | |
| Packing List | Elcometer 1620 Cupping Tester, gauge, gauge holder, zero setting sheet, illuminated 10x magnifying glass with magnet and operating instructions | | |

o Optional Calibration Certificate available.

# Elasticity & Deformation

## Elcometer 1615      Variable Impact Tester

This simple to use gauge is ideal for evaluating the resistance of a coating to impact (elongation, cracking or peeling), and is suitable for use on both direct and indirect test methods.

Direct: either a weight with a hemispherical punch attached falls on to a coated metal sheet.

Indirect: a weight falls on to a hemispherical punch which is resting on the coated metal sheet.

The Elcometer 1615 Impact Tester comes as one universal assembly with the option of seven different kits providing the functionality for various testing methods.

The base unit is common to all tests. Simply select the appropriate kit to meet your requirements, for more information see page 21-8.

The test specimen is fixed into position by the quick release clamp. The weight is lifted to the predetermined height and can be set by the adjustable collar device. The weight is then released and the resulting deformation is observed.

Tube height
1000mm (39")

Fast and safe weight release mechanism

Graduated tube engraved in both kg-cm & lb-inch (1m, 39" height) metric and imperial units

Integrated bubble level to ensure the tester is perpendicular for repeatable accurate results

Stop collar with 10 settings between 2mm and 15mm (0.08 and 0.60") to change the depth of impact when working in accordance with ISO Standards, supplied with Kits A, D and F

Magnifier x10

Heavy-duty, passivated base plate and anodised arm to prevent rusting

Rapid fix sample clamp; the test sample can be secured or released by a simple twist of the clamp handle supplied with Kits A, D and F

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# Variable Impact Tester

**Variable Impact Tester Kits**

The Elcometer 1615 Variable Impact Testers are designed to meet a wide range of National and International Standards. Simply select the appropriate kit from page 21-8 and attach the punch, die and accessories to the base unit.

Interchangeable dies - enable the user to match the die to the size of the relevant punch to conform to the required Standard or method.
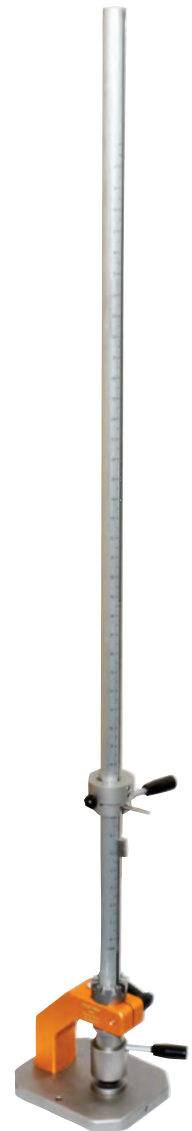
**STANDARDS:**

ASTM D 2794, ASTM D 5420, AS/NZS 1580.406.1, BS 6496:1984, BS 3900-E13, ECCA T5, EN 12206-1:2004, EN 13523-5, ISO 6272:1993, ISO 6272-1, ISO 6272-2, JIS K 5600-5-3:1999, NF T30-017:1989

## Technical Specification

| Part Number | Description |
|---|---|
| K0001615M201 | Elcometer 1615 Impact Tester Universal Base Unit and Tube |
| Weight | 10.6kg (23.34lb) |
| Dimensions | 1460 x 200 x 165mm (57.5 x 8.0 x 6.5") |
| Packing List | Elcometer 1615 Impact Tester with passivated base, integrated bubble leveller, graduated tube, collar release mechanism and operating instructions |

**Elcometer 1615**

## Elcometer Impact Tester Kits

In order to test a sample in accordance with a specified standard, a number of kits have been created to provide a single Impact Tester which, by using the appropriate kit, allow the user to work in accordance with a wide range of National and International standards.

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITA | Elcometer Impact Tester Kit A | ○ |

**Kit A:** Falling 1kg (2.2lb) weight with a 20mm (0.79") punch; 27mm (1.06") die with fixing screw; sample clamp with two fixing screws; stop collar*; 3mm (0.12") and 4mm (0.16") hexagonal wrench

**STANDARDS:**
ISO 6272:1993, EN 13523, JIS K 5600-5-3, DIN EN ISO 6272-1

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITB | Elcometer Impact Tester Kit B | ○ |

**Kit B:** Falling 1kg (2.2lb) weight with static indenter with 15.9mm (0.6") punch; 12.7mm (0.5") punch; 16.3mm (0.64") die with fixing screw; 3mm (0.12") hexagonal wrench

**STANDARDS:**
ASTM D 2794, BS EN ISO 6272-2, ISO 6272-2 :2002, Qualicoat

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITC | Elcometer Impact Tester Kit C | ○ |

**Kit C:** Falling 2lb (908g) weight with static indenter with 15.9mm (0.6") punch; 16.3mm (0.64") die with fixing screw; 3mm (0.12") hexagonal wrench

**STANDARDS:**
ASTM D 2794, BS6496:1984, EN 12206-1
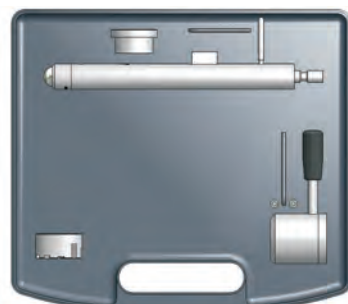
| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITD | Elcometer Impact Tester Kit D | ○ |

**Kit D:** Falling 1kg (2.2lb) weight with 20mm (0.79") punch and stop key; 27mm (1.06") die with fixing screw; stop collar*; sample clamp with fixing screws; 3mm (0.12") and 4mm (0.16") hexagonal wrench

**STANDARDS:**
ISO 6272-1, BS EN ISO 6272-1, NF EN ISO 6272-1

* Values: 2, 3, 4, 5, 6, 7, 8, 9, 10 & 15mm (0.08, 0.12, 0.16, 0.20, 0.24, 0.28, 0.31, 0.35, 0.39 & 0.60")

○ Optional Calibration Certificate available.

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## Elcometer Impact Tester Kits

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITE | Elcometer Impact Tester Kit E | ○ |

**Kit E:** Falling 400g (0.9lb) weight with 23mm (0.90") punch; 22mm (0.87") die with fixing screw; 3mm (0.12") hexagonal wrench

> **STANDARDS:**
> NF T30-017:1989

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITF | Elcometer Impact Tester Kit F | ○ |

**Kit F:** Falling 1kg (2.2lb) weight with a 20mm (0.79") punch; 27mm (1.06") die with fixing screw; Falling 1kg (2.2lb) weight with 12.7mm (0.5") punch; sample clamp with two fixing screws; 16.3mm (0.64") die with fixing screw; stop collar*; static indenter with 15.9mm (0.6") punch; 3mm (0.12") hexagonal wrench; 4mm (0.16") hexagonal wrench
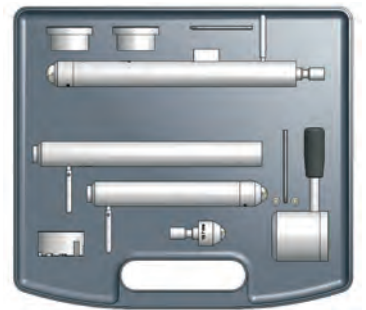
> **STANDARDS:**
> ASTM D 2794, BS EN ISO 6272, DIN EN ISO 6272-1, EN 13523-5, ISO 6272, Qualicoat 2006, SN EN ISO 6272-1

| Part Number | Description | Certificate |
|---|---|---|
| KT001615KITG | Elcometer Impact Tester Kit G | ○ |

**Kit G:** Falling 1kg (2.2lb) weight with a 15.9mm (0.62") static indenter with handle and punch; 12.7mm (0.5") static indenter with handle and punch; 16.3mm (0.64") die with fixing screw; guide bracket with two fixing screws; 3mm (0.12") hexagonal wrench; 4mm (0.16") hexagonal wrench

Additional 1kg (2.2lb) weights are available as an optional extra.
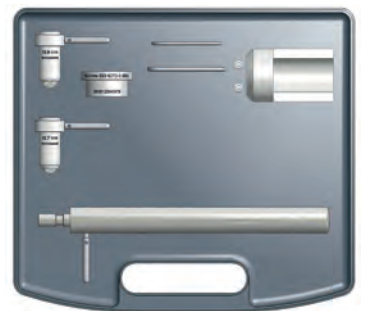
> **STANDARDS:**
> BS EN ISO 6272-2:2011

> **For a full range of kits, dies and other accessories to meet a wide range of National and International Standards see page 21-8**

○ Optional Calibration Certificate available.

## Elcometer 1615



## Variable Impact Tester Accessories

The following range of accessories have been designed to help you evaluate the resistance of a coating to impact (elongation, cracking or peeling) when used in conjunction with the Elcometer 1615 Variable Impact tester.

Punches are universal and can be used either fitted to a falling weight or as a punch resting on the sample.

### Accessories

| | | Suitable for Kit | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G |
| KT001615N201 | Additional 1kg (2.2lb) Falling Weight, 24.6mm (0.97 ) Diameter | | | | ■ | | | |
| KT001615N221 | Additional 1kg (2.2lb) Falling Weight, 25.0mm (0.98 ) Diameter | ■ | | | | | ■ | ■ |
| KT001615N226 | 20mm (0.79") Diameter Punch (Outside Diameter 25mm) | ■ | | | | | ■ | |
| KT001615N215 | 12.7mm (0.5") Diameter Punch | | ■ | | | | ■ | |
| KT001615N205 | 15.9mm (0.6") Diameter Punch | | ■ | ■ | | | ■ | |
| KT001615N206 | 20mm (0.79") Diameter Punch (Outside Diameter 24.6mm) | | | | ■ | | | |
| KT001615N207 | 23mm (0.9") Diameter Punch | | | | | ■ | | |
| KT001615N216 | Static Indenter with 12.7mm/0.5" Diameter Punch | | | | | | | ■ |
| KT001615N217 | Static Indenter with 15.9mm/0.6" Diameter Punch | | | | | | | ■ |
| KT001615N208 | Stop Ring Collar | ■ | | | ■ | | ■ | |
| KT001615N209 | Sample Clamp Mechanism | ■ | | | ■ | | ■ | |
| KT001615N210 | Weight Release Mechanism | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| KT001615N211 | Replacement Graduated Tube | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| KT001615N212 | 16.3mm (0.64") Die | | ■ | ■ | | | ■ | |
| KT001615N232 | 16.3mm (0.64") Die (with 1.5mm Radius) | | | | | | | ■ |
| KT001615N213 | 22mm (0.87") Die | | | | | ■ | | |
| KT001615N214 | 27mm (1.06") Die | ■ | | | ■ | | ■ | |

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# Concrete Inspection & Metal Detection

**A covermeter, or rebar locator, is a gauge that measures the thickness of concrete cover over steel reinforcement bars and metal pipes. The covermeter can tell you the depth of the rebar, the location and orientation of reinforcement bar (rebar) and determine the diameter of the rebar.**

A rebar locator is used to determine the presence and orientation of steel reinforcement rebars under the surface of the concrete.

A contractor engaged in maintenance work will be familiar with the problem of accurately locating the exact position of rebar, wall ties, studs and other metal fasteners. These low cost, simple to use gauges can meet their everyday requirements.

Test hammers are used to determine the surface hardness of concrete and are one of the most widely used instruments to assess concrete compressive strength. It is the quickest, simplest and least expensive method to obtain an estimate of the quality and strength of the concrete.

Test Hammers with both analogue and digital displays are available.

Many concrete structures have a protective or cosmetic coating. Premature failure of this coating can, at the very least, result in additional costs of rework.

Adhesion tests verify that both surface preparation and coating application are within specification.

Concrete structures are porous and will absorb moisture, our range of moisture meters and climate monitoring gauges allows moisture content to be measured.

More extensive range includes gauges used for the measurement of crack width in concrete and other structures.

The Elcometer Metal Detection range includes Valve Box Locators that are rugged and simple to use making them the ideal choice for all location work in all types of terrain.

## Elcometer 181



**STANDARDS:**
ASTM C805, BS 1881:202, DIN 1048, EN 12504-2, ISO 8045, NFP18-417, UNI 9189

## Analogue Concrete Test Hammer

The concrete test hammer provides a quick, simple and inexpensive method for non-destructive evaluation of concrete compression strength and other masonry materials.

Concrete test hammers are one of the most widely used instruments in the field of non-destructive testing and Elcometer offer both mechanical and digital models.

This gauge consists of a spring loaded plunger which, when released, strikes the surface with fixed and constant impact energy. During the rebound stroke, the mass moves a pointer that indicates the maximum point of return and at the same time indicates a reference value called Rebound Number.

This number, converted by the correlations available on the hammer, gives the compression resistance value in respect of the impact angle.

Key Features:

- Impact Energy 2.207 Nm
- Supplied with grinding stone to prepare test surface
- Aluminium body
- Rebound value indicated on test hammer
- Rebound value chart on body, for quick calculation of compressive strength
- Curve selection on chart dependant on testing angle

---

### Technical Specification                                                                 C

| Part Number | Description | Certificate |
|---|---|---|
| W181----1 | Elcometer 181 Analogue Concrete Test Hammer - MPa / PSI Scale | ○ |
| Accuracy | Better than ±2 Rebound Number (When tested on Calibration Anvil at 80) | |
| Resolution | 2 Rebound Number(s) | |
| Range | 10 to 100 Rebound Number(s) | |
| Dimensions | Hammer: 280mm (11.02") length x 55mm (2.17") diameter | |
| | In Case: 350mm (13.78") length x 80mm (3.15") diameter | |
| Weight | 1.5kg (3.3lbs) with case | |
| Packing List | Elcometer 181 analogue concrete test hammer, plastic storage case, abrasive stone & operating instructions | |

### Accessories

| | | |
|---|---|---|
| TW99919563 | Calibration Anvil (supplied complete with Test Certificate) | |

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○ Optional Calibration Certificate available.

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## Digital Concrete Test Hammer

The Elcometer 182 Digital Concrete Test Hammer is equipped with an electronic transducer which converts the rebound values into a reading on the digital display. It displays a range of statistics and there is a facility to download to a PC.

The software and digital display are integrated into the design of the hammer.

- Light and easy to use
- High resolution and accuracy
- Possibility to store measurements and download data to PC
- Setting of test parameters and factors (age, shape, correction factors)
- Rapid and simple calibration procedure
- Selection of testing angle
- Selection of unit (N/mm², MPa, PSI, kgf/cm²) Automatic conversion of rebound index to equivalent compression strength
- Selection between 7 different correlation curves between rebound index and compressive strength, 2 pre-set and 5 user definable
- Statistical evaluation of test results (mean value, standard deviation, concrete strength estimation)
- Supplied with abrasive stone to prepare test surface
- Storage of up to 5,000 results
- RS 232 output to PC
- Rechargeable internal battery
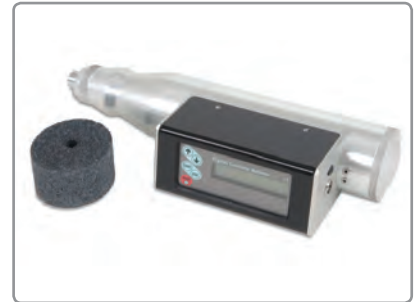
**STANDARDS:**
ASTM C805, BS 1881:202, DIN 1048, EN 12504-2, ISO 8045, NFP18-417, UNI 9189

### Technical Specification

| Part Number | Description | Certificate |
|---|---|---|
| W182---4 | Elcometer 182 Digital Concrete Test Hammer | ● |
| Impact Energy | 2.207 Nm | |
| Accuracy | Better than ± 2 Rebound Number(s) (When tested on Calibration Anvil at 80) | |
| Resolution | 0.1 Rebound Number | |
| Range | 10 to 70 MPa | |
| Memory | 5,000 tests | |
| Unit Selection | N/mm²; MPa; kgf/cm²; PSI | |
| Autonomy (Continuous Use) | >5 Hours | |
| Dimensions | Hammer: 280mm (11.02") length x 55mm (2.17") diameter | |
| | In Case: 190 x 100 x 350mm (7.48" x 3.94" x 13.78") | |
| Weight | 2kg (4.4lbs) with case | |
| Packing List | Hammer, battery charger (UK, EUR & US), serial cable for PC, abrasive stone, instruction manual, calibration certificate and carry case | |

### Accessories

| | | |
|---|---|---|
| TW99919563 | Calibration Anvil (supplied complete with Test Certificate) | |
| TW18219475-1 | Replacement Mains Adaptor, UK 240V | |
| TW18219475-2 | Replacement Mains Adaptor, EUR 220V | |
| TW18219475-3 | Replacement Mains Adaptor, US 110V | |

● Calibration certificate supplied as standard

# Elcometer 331

## Covermeters & Half-Cell Meters

**STANDARDS:**
ACI 318, ASTM C876-91, BS1881:201,
BS1881:204,  BS8110, CP 110,
DGZfP:B2, DGZfP:B3, DIN 1045,
EC2, SIA 262, SS-EN 206,
Concrete Society Technical Report 60,
UNI 10174

Intuitive menus in multiple languages:
Clear on-screen instructions

Fast and accurate:
Locate and determine orientation
of rebar quickly, easily & accurately

Large, easy to read backlit display:
For easy viewing in dark
environments

Range of fully interchangeable search heads including standard, narrow
pitch, deep cover, borehole probe and half cell.

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## Covermeters & Half-Cell Meters

Single handed operation:
All functions can be accessed & controlled through 4 simple keys on both the main unit and search head

International bar sizes:
User selectable bar sizes: metric, US Bar Numbers, ASTM/Canadian and Japanese

Rechargeable battery supply:
Battery packs can be charged in the unit or externally

Ergonomically designed:
For ease of use and comfort

Probe Storage Locator on base unit for portability

An easy to use gauge that quickly and accurately locates/orientates reinforcement bars and measures the depth of cover over the rebar.

Designed to meet IP65 this rugged waterproof gauge can be used in the harshest of environments.

## Elcometer 331 — Covermeters & Half-Cell Meters

Elcometer have seven covermeters in their range, The Elcometer 331² H & HM are Half-Cell only instruments, the Elcometer 331² Model B is a Covermeter only and the Elcometer 331² Models BH, SH and TH incorporate the Half-Cell technology required to assess potential corrosion of rebar. Finally, the THD model can accurately locate stainless steel rebar.

## User Friendly

- Easy to transport and store
- Ergonomically shaped case for comfort
- Single handed operation: All functions can be accessed & controlled through 4 simple keys/buttons

## Accurate

- Locate and determine orientation of rebar quickly, easily & accurately
- Up to 240,000 readings can be stored on the gauge for detailed reporting*
- Memory and data logging with data output to PC or direct to printer*
- Graph Plotting allows an immediate visual indication of results

## Reliable

- Stainless Steel rebars can be located by the THD Model
- Battery packs can be charged in the unit or externally. Additional batteries allow continued use

## Tough

- Specifically designed for use on-site
- Rugged, waterproof IP65 case provides protection against the elements.
- Backlit screen for viewing in dark environments

## Efficient

- Rebar locator, concrete covermeter and half-cell measurement all available in a single gauge - (selected models)
- Intuitive menus enable each gauge to be used straight from the box

## Powerful

- Links to Covermaster™ software
- Ultimate data management tool to store cover & half cell readings and produce professional reports
- On Screen graphic display provides visual assessment of readings allowing identification of areas of low concrete cover or potential areas of corrosion



Elcometer 331 Covermeter



Elcometer 331 Half-Cell Meter

* Selected models only

## Covermeters & Half-Cell Meters

**Elcometer 331**

### Product Features

| Models | H | HM | B | BH | SH | TH | THD |
|---|---|---|---|---|---|---|---|
| Covermeter /rebar location | | | ■ | ■ | ■ | ■ | ■ |
| Half-Cell measurement | ■ | ■ | | ■ | ■ | ■ | ■ |
| Rebar orientation | | | ■ | ■ | ■ | ■ | ■ |
| Depth of cover | | | ■ | ■ | ■ | ■ | ■ |
| Large cover (thickness) reading mm or inches | | | ■ | ■ | ■ | ■ | ■ |
| Large graphics display with backlight | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Multiple language menu structure | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Signal strength bar | | | ■ | ■ | ■ | ■ | ■ |
| Interchangeable heads with LED & keypad | | | ■ | ■ | ■ | ■ | ■ |
| User selectable bar range sizes & numbers | | | ■ | ■ | ■ | ■ | ■ |
| Rugged waterproof case (IP65) | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Adjustable beep volume & earphone socket | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Measurement sound modes | | | ■ | ■ | ■ | ■ | ■ |
|   Locate *(tone increases as head approaches rebar)* | | | ■ | ■ | ■ | ■ | ■ |
|   Under Cover *(tone only sound for low cover)* | | | | | ■ | ■ | ■ |
|   Maxpip *(tone only as head passes rebar centre)* | | | | | ■ | ■ | ■ |
| Large half cell reading mV | | | | ■ | ■ | ■ | ■ |
| Automatic bar size estimate | | | | | ■ | ■ | ■ |
| Orthogonal bar size calculation | | | | | ■ | ■ | ■ |
| RS232 Output - direct to printer or PC | | | | | ■ | ■ | ■ |
| Covermaster™ software | | ■ | | | ■ | ■ | ■ |
| Statistics | | ■ | | | ■ | ■ | ■ |
| Minimum & maximum cover limits | | | | | ■ | ■ | ■ |
| Date & Time | | ■ | | | ■ | ■ | ■ |
| Memory | | | | | ■ | | ■ |
|   Linear batch memory | | Up to 200 batches of 1000 readings# | | | 10 linear batches of 1,000 readings each | Up to 200 batches of 1000 readings# | Up to 200 batches of 1000 readings# |
|   Grid batch memory | | Up to 240,000 readings# | | | | Up to 240,000 readings# | Up to 240,000 readings# |
| User certified batch size | | | | | | ■ | ■ |
| Graphics plot | | | | | | ■ | ■ |
| Threshold plot | | | | | | ■ | ■ |
| Stainless steel measurement mode | | | | | | | ■ |

# Linear batch mode: up to 200 batches of 1,000 readings each  Grid batch mode: up to 1,000 batches, maximum number of readings: 240,000

### Technical Specification

| | Model H | Model HM | Model B | Model BH | Model SH | Model TH | Model THD |
|---|---|---|---|---|---|---|---|
| Part Numbers | W331H---4 | W331HM--4 | W331B---4 | W331BH--4 | W331SH--4 | W331TH--4 | W331THD-4 |

| | |
|---|---|
| Power supply | 7.4V battery pack provides up to 32 hours of continuous use (20 hrs if backlight is on). Rechargeable in 4 hours either inside or outside the gauge using an external charger. |
| Operating temperature | 0 to 50°C (32 to 120°F) |
| Dimensions | 230 x 130 x 125mm (9 x 5.1 x 4.9")    Weight    1.54kg (3.4lbs) |
| Packing List | **Standard Items**: Rechargeable battery pack & charger (UK, US & EU), earphone, shoulder strap, plastic carry case & operating instructions. **Model H & HM**: Half Cell Meter, 25m extension cable on spool, 1.7m red rebar connecting cable with connecting clip & 1.7m black half-cell connecting cable. **Model B**: Concrete Covermeter, standard search head & search head connecting cable. **Model BH, SH, TH & THD***: Concrete Covermeter with Half-Cell & search head connecting cable. Model HM, SH, TH & THD are also supplied with Covermaster™ software and PC cable. |

* Search Heads and Half-Cell Probes are not included as standard and must be ordered separately

## Elcometer 331
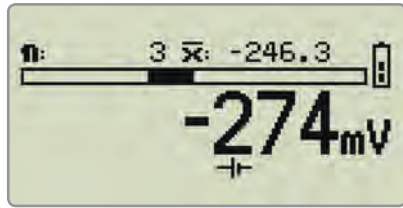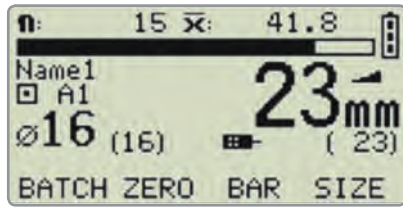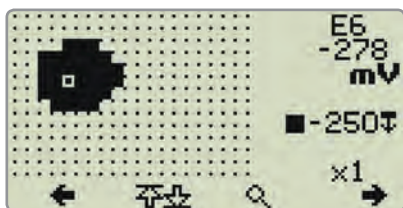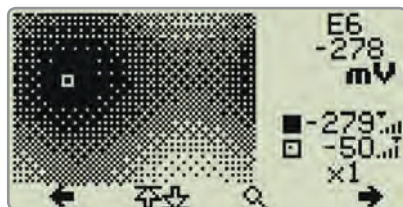
## Covermeters & Half-Cell Meters

Cover Display Screen -

Alternative / Typical Data Review Screen View

- Backlit screens for use in dark conditions
- Easy to use menus, in multiple languages to enable access to all data needed whilst on site without constant reference to the instruction book
- Alternative view shows the typical display when using the deep cover search head
- Bar size and depth of cover can be manually inputted to suit specific requirements
- Typical data review screen clearly displays where readings are below or above a user specified tolerance, where a reading has not been taken
- Units of measurement can be displayed in mm or inches for cover, or mV for Half Cell

Half-Cell Mode -

Typical Screen View

- Elcometer 331 Model BH/SH/TH/THD can read both Cover and Half-Cell Values
- Elcometer 331 Model B can read Cover Values only
- Data logging information displayed on screen
- Menu soft keys are visible in Elcometer 331 Model SH and TH

Graphics Plot Mode

- Half-Cell Mode - the gauge indicates the areas with the most potential for corrosion
- Covermeter mode - the gauge indicates the depth of cover
- Black indicates most potential for corrosion
- White indicates least potential for corrosion with varying greyscale shade in between
- Zoom feature allows the user to take a closer look at different areas that are of interest

Threshold View

- Ideal method for a simple pass or fail analysis
- Once the threshold value has been set, anything before the value is shown in black, while anything over the value is shown in white

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## Covermeters & Half-Cell Meters

Autosizing and orthogonal function

- Autosizing automatically estimates the size of rebar and the depth of cover

- If this estimated figure differs greatly from your expected rebar size or you do not know the expected rebar size, the orthogonal size function provides an accurate measurement of bar size

- The step by step directions for orthogonal function on the covermeter make the accurate sizing of bars quick and easy





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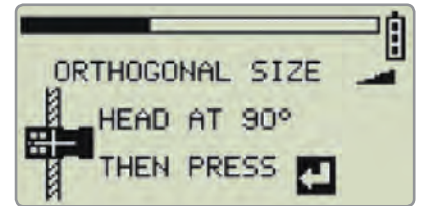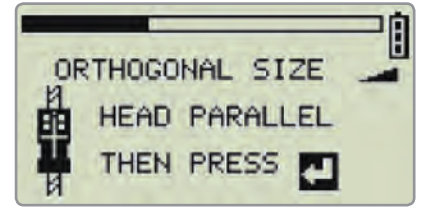
### Bar Size Dimensions

Selecting a bar size

Dimensions of reinforcement bars are stored in the covermeter and includes the following four standards bar series: Metric, US Bar, ASTM/Canadian and Japanese. Due to this wide selection of bar sizing, the Elcometer 331 Covermeters can be utilised worldwide with accurate results. When taking measurements for high tensile steel or Grades 304, 316 and Duplex Stainless Steel, details for the Bar Grade and Bar Size can be manually input into the covermeter, alternatively the gauge can be used in autosizing mode.

| Metric | | US Bar | | ASTM/Canadian | | Japanese | |
|---|---|---|---|---|---|---|---|
| Bar Size | Diam. (mm) | Bar Size | Diam. (Inch) | Bar Size | Diam. (mm²) | Bar Size | Diam. (mm) |
| 5 | 5 | #2 | 0.250 | 10M | 100 | 6 | 6 |
| 5.5 | 5.5 | #3 | 0.375 | 15M | 200 | 10 | 10 |
| 6 | 6 | #4 | 0.500 | 20M | 300 | 13 | 13 |
| 7 | 7 | #5 | 0.625 | 25M | 500 | 16 | 16 |
| 8 | 8 | #6 | 0.750 | 30M | 700 | 19 | 19 |
| 9 | 9 | #7 | 0.875 | 35M | 1000 | 22 | 22 |
| 10 | 10 | #8 | 1.000 | 45M | 1500 | 25 | 25 |
| 11 | 11 | #9 | 1.125 | 55M | 2500 | 29 | 29 |
| 12 | 12 | #10 | 1.250 | | | 32 | 32 |
| 14 | 14 | #11 | 1.375 | | | 35 | 35 |
| 16 | 16 | #12 | 1.500 | | | 38 | 38 |
| 18 | 18 | #13 | 1.625 | | | 41 | 41 |
| 20 | 20 | #14 | 1.750 | | | 44 | 44 |
| 22 | 22 | #15 | 1.875 | | | 48 | 48 |
| 25 | 25 | #16 | 2.000 | | | 51 | 51 |
| 28 | 28 | #18 | 2.250 | | | 57 | 57 |
| 32 | 32 | | | | | | |
| 36 | 36 | | | | | | |
| 40 | 40 | | | | | | |
| 44 | 44 | | | | | | |
| 50 | 50 | | | | | | |

## Elcometer 331



## Covermeters & Half-Cell Meters

### Data Logging Feature

- Simple Data Management on the Elcometer 331 Models SH, TH and THD

- The Elcometer 331 Model SH can store up to 10 batches of 1,000 cover or half-cell readings, with batch statistics, ready for evaluation and report generation using Covermaster™ software package

- The Elcometer 331 TH and THD models have user definable memory batches with either linear and grid batch data logging modes. (Linear batching is where data is stored in a batch one reading after another)

- Grid batches allow data to be stored in a 'spreadsheet format' with each cell relating to the survey area typically mapped out on the structure prior to inspection. The grid batch feature facilitates fast surveying for both cover and half-cell readings. Problem areas that do not fall within specification can be immediately identified and marked directly on the concrete

- Cover and half-cell readings can be recorded and 'overlaid' in each grid location

### Powerful Statistics Feature

- Continually calculates and displays the statistical analysis of readings as they are taken. So, while the covermeter is in use, you are always informed and know exactly how your site survey is progressing

- Statistics values are also calculated for the readings within each batch and these values are stored in the batch along with all individual readings

The following statistics and values can be viewed and stored within the gauge:

| Icon | Icon Meaning | Description |
|---|---|---|
| η | Number of readings | The running value for the number of readings taken in a group |
| x̄ | Mean | The average of a group of readings; the sum of the individual readings divided by the numbers of readings |
| σ | Standard deviation | A statistical measure of the spread of values in a group of readings |
| CV% | Coefficient of Variation | The standard deviation divided by the mean for a group of readings expressed as a percentage |
| ↓ıll | Lowest Reading | The value of the lowest reading taken in a group of readings |
| ↓ ıll | Highest Reading | The value of the highest reading taken in a group of readings |
| << | Under Range | The number and percentage of readings under range |
| ⊽ or < | Low Limit | The number and percentage of readings below the limit |
| ⊣⊦ | Within Limits | The number and percentage of readings within limits |
| ⬆ or > | High Limit | The number and percentage of readings above the high limit |
| ∞ | Over Range | The number and percentage of readings over range (or infinite) |
| ⬚ | Blank Readings | Number and percentage of blank readings (skipped/ not recorded /deleted) |

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# Covermaster™ Software

**Elcometer 331**



Elcometer's Covermaster™ software will manage your data efficiently and effectively.

Data is transferred quickly into the Covermaster™ software data management system via RS232 connection. Both Covermeter and half-cell readings can be stored together with associated photographs, Word documents, Excel spreadsheets and other files.

Covermaster™ software is supplied free of charge with all Elcometer 331 models that have batch data storage.

Features:



- Data easily translated into a typographic view giving you all the information you need at a glance

- Data for each reading can be presented in colour or can be shown in greyscale, complete with reading values in each grid.

- Site survey data from both cover and half cell measurements can be shown on the same typographic (or gradient) chart.

- Reports can be fully customised giving the ability to add corporate logos, photos, memos and to provide a fully comprehensive report for clients.



- All survey information in one place, Covermaster™ links directly with Excel™, Word™ and PowerPoint™ files, it is simple to analyse and assess your results.

- Covermaster™ - one platform for the storage of data, notes, photographs, PDF files for the creation of comprehensive reports.
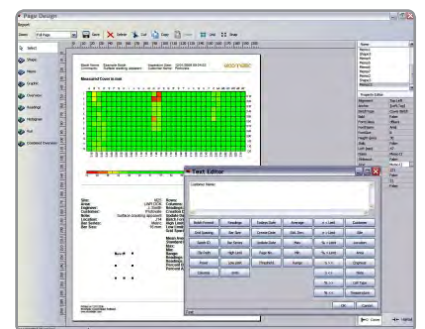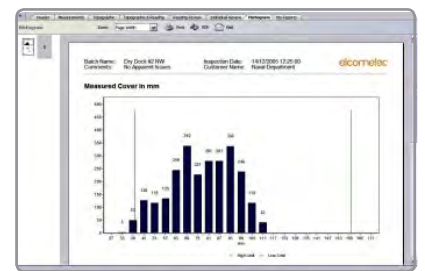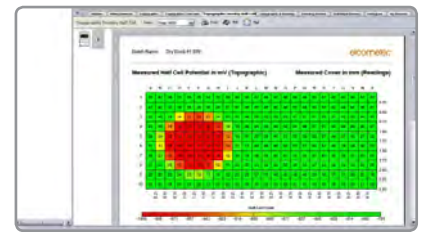
## Elcometer 331      Accessories

For the Elcometer 331 BH, SH, TH and THD models, all search heads, the borehole probe and half-cell probes are fully interchangeable there is no requirement to return your gauge to Elcometer.

Elcometer 331 SH, TH and THD models are also supplied with Covermaster® & EDTS Excel link transfer software and PC Cable.

The Elcometer 331 Model B does not have half-cell capability and cannot be used with the half-cell probes.

### Standard Search Head
Design to meet most of your measurement requirements.

| | |
|---|---|
| Part Number | TW33119124-1A |
| Range | 40mm / 1.6" bar 15mm to 95mm / 0.6" to 3.75" |
| | 8mm / 0.3" bar 8mm to 70mm / 0.3" to 2.75" |
| Dimensions | 155 x 88 x 42mm / 6.1 x 3.5 x 1.65" |
| Sensing area | 120 x 60mm / 4.72 x 2.36" |

### Narrow Pitch Search Head
Accurately measures the cover thickness when the gaps (pitch) between each of the rebars are close together.

| | |
|---|---|
| Part Number | TW33119124-2A |
| Range | 40mm / 1.6" bar 8mm to 80mm / 0.3" to 3.1" |
| | 8mm / 0.3" bar 5mm to 60mm / 0.2" to 2.4" |
| Dimensions | 155 x 88 x 42mm / 6.1 x 3.5 x 1.65" |
| Sensing area | 120 x 60mm / 4.72 x 2.36" |

### Deep Cover Search Head
The ideal search head for accurately measuring rebars that are deep within the structure.

| | |
|---|---|
| Part Number | TW33119171A |
| Range | 40mm /1.6" bar 35mm to 180mm / 1.4" to 7" |
| | 8mm / 0.3" bar 25mm to 160mm / 1" to 6.3" |
| Dimensions | 170 x 94 x 54mm / 6.7 x 3.7 x 2.1" |
| Sensing area | 160 x 80mm / 6.3 x 3.15" |

### Dual Search Head for high tensile and stainless steels
The search head specifically designed to locate High Tensile and Stainless Steel.

| | |
|---|---|
| Part Number | TW33120014D |
| Range | 40mm /1.6" bar 35mm to 180mm / 1.4" to 7" |
| | 8mm / 0.3" bar 25mm to 160mm / 1" to 6.3" |
| Dimensions | 170 x 94 x 54mm / 6.7 x 3.7 x 2.1" |
| Sensing area | 160 x 80mm / 6.3 x 3.15" |

## Accessories

### Borehole Probe

The solution for locating tendon ducts and multiple layers of rebar lying deep within the concrete.



| | | Metric | Imperial |
|---|---|---|---|
| Part Number | Short | TW33119223-1A | TW33119223-3A |
| | Long | TW33119223-2A | TW33119223-4A |
| Measurement depth | | Short Probe: 0 - 40cm / 0 - 16"<br>Long Probe: 0 - 100cm / 0 - 40" | |
| Approximate detection ranges | | Tendon duct (70mm/2.75" diameter):<br>up to 90mm / 3.54" | |

### Half-Cell Kit

Consisting of either a copper electrode in a copper sulphate solution or a silver electrode in a silver chloride solution, each half cell is a sealed unit - no need to mix chemicals. Supplied with a 25m / 80' cable, every half-cell probe is guaranteed for 5 years.



| Part Number | TW331CUKIT | Copper/Copper Sulphate |
|---|---|---|
| | TW331AGKIT | Silver/Silver Chloride |

### Extension Cable 100m / 325ft

The extension cable for use with the half-cell kits gives the flexibility to take readings in difficult to reach areas.



| Part Number | TW33119683 |
|---|---|

### Verification Block

The verification block allows the user to check the calibration of their gauge in order to ensure maximum measurement accuracy.



| Part Number | TW33119218 |
|---|---|
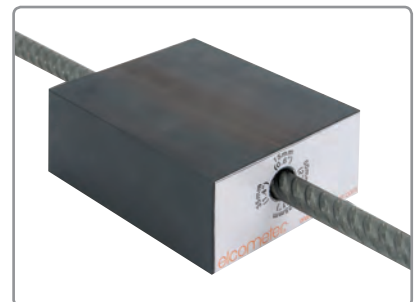
### Extension Arm Kit

This kit allows the user to scan bridge decks and floor areas using the hand held search heads from a standing position. Both the standard or narrow pitch search head can be attached to the extension arm.



| Part Number | TW33119222 |
|---|---|
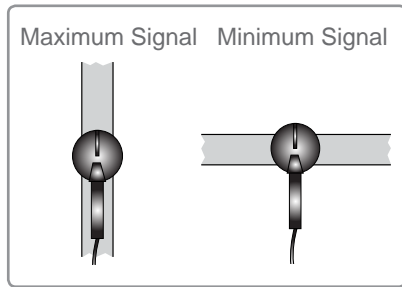
# Elcometer P100

## 'Imp' Rebar Locator

The Elcometer P100 is a robust and economical gauge designed to identify the location and orientation of reinforcement bars and metal pipes.

Mild steel and stainless steel galvanised wall ties can also be found with an optional search coil (or probe).

Simple to use, the Elcometer P100 is supplied in an ABS plastic carry case, together with a 100mm (4") search coil and batteries.

- Fast and accurate - gives a loud audible signal when the exact location of the rebar has been found
- Directional search field - distinguishes between horizontal and vertical bars – see diagram
- No need to re-zero - unaffected by moisture, temperature changes and electrical interference

Maximum Signal    Minimum Signal

## Technical Specification

| Part Number | Description |
|---|---|
| W100157A9D | Elcometer P100 Imp Rebar Locator |
| Packing List | Elcometer 100 Imp Rebar Locator,  search head, 4 x LR6 (AA) batteries, leather carry case, operating instructions |

## Accessories

| | |
|---|---|
| TW999198F | 100mm (4") Directional Search Coil for Rebar |
| TW999198G | 200mm (8") Hi-Depth Locator Search Coil - Short-handled (250mm) |
| TW999198H | 200mm (8") Hi-Depth Locator Search Coil - Long-handled (650mm) |

**Detection Ranges For Single Reinforcement Bars**

| Rebar Diameter | | Detection Depth | |
|---|---|---|---|
| mm | inches | mm | inches |
| 8 | 0.32 | 90 | 3.5 |
| 16 | 0.63 | 100 | 3.9 |
| 32 | 1.25 | 110 | 4.3 |

# Rebar Locator

## Elcometer P120

The Elcometer P120 Rebar Locator provides a simple means to detect reinforcement bars in concrete, identifying the rebar's location, direction and an indication of the depth of concrete over the rebar.

Supplied together with a 100mm (4") search coil, leather carry case and batteries the Elcometer P120 is available in both metric and imperial versions.

- Fast, accurate and stable - Loud audio tone and clear analogue meter, with no need to re-zero the instrument during use

- High resolution controlled field search head - The strongest signal is in the centre of the search head making it accurate even when working at very close reinforcement bar centres or near metal objects, e.g. close to scaffolding or metal window frames

- Versatile - Supplied with a standard 100mm (4") head it will also accept a 150mm (6") head and a Borehole Probe for locating rebars and locating tendon ducts at great depths

- Rebar Plus rebar locators can quickly and easily distinguish between horizontal and vertical bars due to their highly directional detection field

- Clear Instrument Display - High quality meter shows signal strength and battery state

- Headphone socket - Clearly detect the rebar in noisy environments
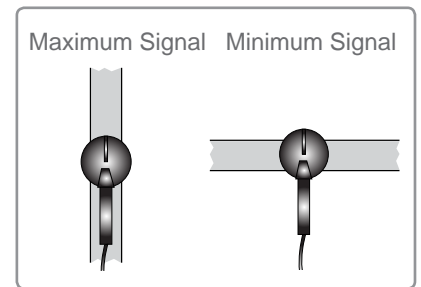
**Identification and Orientation of the bar**

The Elcometer P120 can distinguish between horizontal and vertical bars. After locating the steel reinforcement bars in the concrete, rotate the rebar locator's search coil (probe) until the maximum and minimum signals are found. The maximum signal indicates the bar is running parallel to the search coil's handle, the minimum signal indicates that the bar is running at 90° to the search coil's handle – see diagram.

Maximum Signal   Minimum Signal

## Technical Specification

| Part Number | Description |
|---|---|
| W120155I | Elcometer 120 Imp Rebar Plus Locator - Metric |
| W120155J | Elcometer 120 Imp Rebar Plus Locator - Imperial |
| Packing List | Elcometer 120 Imp Rebar Plus Locator, search head, 4 x LR6 (AA) batteries, leather carry case, operating instructions |

## Accessories

| | |
|---|---|
| TW999165G | Probe Lead for Elcometer P120 |
| TW999198F | 100mm (4") Directional Search Coil for Elcometer P120 |
| TW999198E | 150mm (6") Extra-Depth Directional Search Coil for Elcometer P120 |

**Detection Ranges For Single Reinforcement Bars**

| Rebar Diameter | | Detection Depth | | Resolution of Parallel Bars | |
|---|---|---|---|---|---|
| mm | inches | mm | inches | mm | inches |
| 8 | 0.32 | 120 | 4.72 | 60mm pitch at up to 35mm | 2.36" pitch at up to 1.37" |
| 16 | 0.63 | 140 | 5.50 | 75mm pitch at up to 50mm | 2.95" pitch at up to 1.97" |
| 32 | 1.25 | 160 | 6.30 | 150mm pitch at up to 85mm | 5.90" pitch at up to 3.35" |

## Elcometer P130



# Wall Tie & Stud Locator

The Elcometer P130 will rapidly and precisely locate mild steel or stainless steel wall tie and also make an excellent stud locator / stud detector.

This small, battery operated gauge has:

- High-impact ABS control unit in tough leather case

- Search coils encapsulated in epoxy resin for unmatched ruggedness

- Built-in loudspeaker for clear audio signal; Standard 3.5mm (0.14") stereo jack socket for headphones if required

- Single control button for on/off and sensitivity/backoff control

Key Features:

- Fast and accurate - the strongest signal is in the middle of the search head making it easy to pin point the wall ties. A clear audio tone helps to identify the quick and precise location without the need to keep looking at the meter

- No need to re-zero - the Elcometer P130 is very stable in all weather conditions.

- Designed with the needs of the operator in mind - easy to use, built to last, supplied with leather case and shoulder strap

- Single Handed Operation - for safety and convenience when working on scaffold or ladders

---

### Technical Specification

| Part Number | Description |
|---|---|
| W130157B9D | Elcometer P130/D Wall-Tie Locator - Mild-Steel |
| W130157C9E | Elcometer P130/E Wall-Tie Locator – Mild & Stainless Steel with shoulder strap |
| Packing List | Elcometer P130/D:  complete with 100mm (4") Locator Search Coil , Leather Case & Plastic Carry Case, 4 x LR6 (AA) batteries, operating instructions |
|  | Elcometer P130/E:  complete with 100mm (4") Locator Search Coil, 150mm (6") Stainless Steel Search Coil, Leather case with shoulder strap, Plastic Carry Case, 4 x LR6 (AA) batteries, operating instructions |

### Accessories

| | |
|---|---|
| TW999198D | 100mm (4") Locator Search Head |
| TW999198F | 100mm (4") Directional Search Head - for Elcometer P130/D only |
| TW999198E | 150mm (6") Stainless Steel Search Head – for Elcometer P130E only |

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# Rebar & Wall Tie Locator

This fast, combined rugged gauge is supplied with three detector heads to determine both rebar and wall tie location and can also be used as an excellent stud locator / stud detector making it an extremely versatile instrument.

Supplied with two mild steel 100mm (4") search heads and an additional 150mm (6") search head which allows the gauge to locate phosphor-bronze, copper and some types of stainless steel* wall tie.

The Elcometer P150 can detect mild and stainless steel rebars, bed joint reinforcement, hoops irons, and can locate wiring in plaster walls.

- High-impact ABS control unit in a tough leather case

- Search coils encapsulated in epoxy resin for unmatched ruggedness

- Unit is switchable to detect or ignore stainless steel

- Single control button for on/off and sensitivity/back off control

- Built-in loudspeaker for clear audio signals; Standard 3.5mm stereo jack socket for headphones if required

- Fast and accurate - Strongest signal is in the middle of the search head which makes it easy to pin point wall ties. A clear audio tone assists in the quick and precise location - no need to keep looking at the meter

- No need to re-zero and stable in all weather conditions

- Designed with the operator in mind, easy to use, single handed operation with leather carry case and shoulder strap for safety and convenience

## Technical Specification

| Part Number | Description |
|---|---|
| W150157E9E | Elcometer P150 Rebar Locator, Mild-Steel & Stainless-steel Wall-Tie Locator |
| Packing List | Elcometer P150/E, 100mm (4") Locator Search Coil, 100mm (4") Directional Search Coil, 150mm (6") Stainless Steel Search Coil, Leather Case with shoulder strap & Plastic Carry Case, 4 x LR6 (AA) batteries, operating instructions |

## Accessories

| | |
|---|---|
| TW999198D | 100mm (4") Locator Search Head for Elcometer P150 |
| TW999198F | 100mm (4") Directional Search Head  for Elcometer P150 |
| TW999198E | 150mm (6") Search Head for Stainless Steel Wall-Ties |

**Approximate Detection Ranges**

| | |
|---|---|
| Mild Steel / Galvanised Fishtail Wall Ties (100mm/4" Search Head) | 130mm (5.11") |
| Mild Steel / Galvanised Butterfly Wall Ties (100mm/4" Search Head) | 130mm (5.11") |
| Stainless Steel Fishtail Wall Ties (with 150mm/6" Search Head) | 80mm (3.15") |

*Stainless steel does not give a strong signal. Please either send a drawing or ideally a sample of stainless steel wall tie you need to locate so we can test and advise as necessary.

## Elcometer P500

## Metal Box Locator

Although originally designed to accurately locate valve boxes and manhole covers, the Elcometer P500 can also be used as a general metal detector. The Elcometer P500 is straight forward to use and very rugged making it a popular choice in the market.

Detecting metal objects to a maximum depth of 1m (39.4"), the Elcometer P500 has a number of key unique features:

- Strong focused search field ensures the accurate location of objects close to metal fencing and vehicles
- Ignores any ghost signals from cigarette packets, drinks cans and other metallic waste materials
- Manufactured from a single moulded design, in high impact ABS plastic, the Elcometer P500 stands up to a tough environment
- Balanced, lightweight unit with a single control button for ease of use
- Audio signal with headphone socket and an ultra-bright LED visual indicator identify when metal has been detected

### Technical Specification

| Part Number | Description |
|---|---|
| W500157F | Elcometer P500 Imp Box Locator |
| Overall Length | 96cm (38") |
| Search Head Diameter | 21cm (8") |
| Weight | 1.1kg (2.5lb) |
| Power Supply | 4 x 1.5V AA Cells or 4 x 1.5V NiMH Rechargeable Cells |
| Packing List | Elcometer P500 Imp Box Locator, 4 x LR6 (AA) batteries, operating instructions |

**Approximate Detection Ranges**

| Typical Object Type | Metric | Imperial |
|---|---|---|
| Stop Top Box | 50cm | 19" |
| Fire Hydrant Cover | 87cm | 34" |
| Inspection Cover | 95cm | 37" |

# Deep Cover Metal Detector

## Elcometer P520

The Elcometer P520 Metal Detector is very high powered for increased depth detection.

Originally designed to locate water mains, pipes and cables, the Elcometer P520 is also the perfect choice for location work in cluttered areas and at depths where other metal detectors simply do not work.

- Deep-seeking and accurate - can locate a 100mm (4") metal water main at 1.20m (46") and unlike traditional metal detectors will locate valves even when the frame and cover are missing

- Unaffected by temperature changes or power lines - the Elcometer P520 water main locator is unaffected by changes in temperature and moisture, and the presence of overhead power lines (where normal tracing can not be used)

- Stable and reliable - the Elcometer P520 does not need constant zeroing or recalibrating

- Clear Audio Signal – loudspeaker with a clear audio tone. In loud environments, simply connect headphones to the socket point

- Internal Battery – no need to find replacement batteries

## Technical Specification

| Part Number | | | Description |
|---|---|---|---|
| UK 240V | EUR 220V | USA 110V | |
| W520162H | W520162I | W520162J | Elcometer P520 Metal Detector – TS62 |
| Overall Length | | | 96cm (38") |
| Main Unit Dimensions | | | 23.3 x 18 x 10cm (9.2 x 7 x 4") |
| Search Head Diameter | | | 22 cm (8.7") |
| Weight | | | 850g (1.87lb) |
| Power Supply | | | Internal Rechargeable Battery (supplied with charger unit) |
| Packing List | | | Elcometer P520 Metal Detector, Search head, leather carry case, charger, operating instructions |

## Accessories

| | |
|---|---|
| TW999060C | Replacement Mains Charger, UK 240V |
| TW999060F | Replacement Mains Charger, EUR 220V |
| TW999060G | Replacement Mains Charger, US 110V |
| TW520197B | Replacement 8" Search Coil for the Elcometer P520 |

**Approximate Detection Ranges**

| Typical Object Type | Metric | Imperial |
|---|---|---|
| Cast Iron Main - 80mm (3") | 100cm | 39" |
| Cast Iron Main - 100mm (4") | 118cm | 46" |
| Valve Only - 100mm (4") | 83cm | 33" |
| Cast Iron Main - 150mm (6") | 127cm | 50" |
| Washout / Fire Hydrant Cover | 121cm | 47" |
| Plate - 140mm (5½") Diameter | 70cm | 27" |

# Concrete Inspection

## Elcometer 143
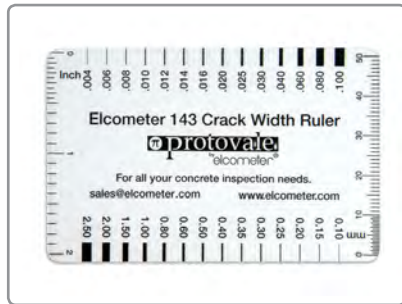


## Crack Width Ruler

This simple gauge is designed specifically to provide inspectors with a low cost alternative to a graduated microscope when determining the width of a crack in concrete or other building materials.

Similar in size to a standard credit card, this transparent gauge is marked with a range of graded line. Each line is a specified width.

To use, position the gauge over the crack and identify which line is a similar width to the crack. Read off the width value.

### Technical Specification

| Part Number | Description |
|---|---|
| E143----1 | Elcometer 143 Crack Width Ruler |
| Range | 0.10 - 2.50 mm / 0.004 - 0.100 inches |

## Standards Information

This section lists all Standards included in this catalogue. Current Standards are shown in orange and superseded Standards are shown in grey. For further information please see the catalogue introduction. For the most up to date information, please refer to our website.

| Standard | Reference | Elcometer Model | Page |
|---|---|---|---|
| **AATCC** | | | |
| AATCC Method 8 | Washability & Abrasion | 5750 | 19.9 |
| **ACI** | | | |
| ACI 318 | Concrete | 331 | 22.4 - 22.13 |
| **ANSI** | | | |
| ANSI INCITS 322 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| ANSI/AWWA C 203 | Porosity | 280 | 11.4 - 11.7 |
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| TAPPI T 653 | Appearance | 480, 408 | 14.4 - 14.15 |

| **UNE** | | | |
|---|---|---|---|
| UNE 135203-1 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| UNE 48250 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| UNE 56842 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| UNE 56843 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| UNE 56868 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |
| UNE 57095 | Washability & Abrasion | 5135, 5155 | 19.10 - 19.13 |

| **UNI** | | | |
|---|---|---|---|
| UNI 10174 | Concrete | 331 | 22.4 - 22.13 |
| UNI 9189 | Concrete | 181, 182 | 22.2 - 22.3 |

| **US NAVY** | | | |
|---|---|---|---|
| US Navy 009-32 FY12 | Surface Preparation | 146 | 2.32 |
| US Navy NSI 009-32 | Climatic Testing | 319 | 4.2 - 4.5 |
| US Navy NSI 009-32 | Climatic Testing | 320 | 4.12 - 4.13 |
| US Navy NSI 009-32 | Dry Film Thickness | 355 (F,N), 456 (FNF) | 8.2 - 8.19 |
| US Navy NSI 009-32 | Surface Preparation | 138 | 2.25 |
| US Navy NSI 009-32 | Surface Preparation | 128 | 2.2 |
| US Navy NSI 009-32 | Surface Preparation | 122, 124 | 2.15 |
| US Navy NSI 009-32 | Surface Preparation | 123, 223, 224 | 2.8 - 2.14 |
| US Navy NSI 009-32 | Wet Film & Powder | 112, 115, 3236, 3238 | 7.2 - 7.3 |
| US Navy PPI 63101-000 | Climatic Testing | 319 | 4.2 - 4.5 |
| US Navy PPI 63101-000 | Climatic Testing | 320 | 4.12 - 4.13 |
| US Navy PPI 63101-000 | Dry Film Thickness | 355 (F,N), 456 (FNF) | 8.2 - 8.19 |
| US Navy PPI 63101-000 | Surface Preparation | 142 | 2.34 |
| US Navy PPI 63101-000 | Surface Preparation | 138 | 2.25 |
| US Navy PPI 63101-000 | Surface Preparation | 128 | 2.2 |
| US Navy PPI 63101-000 | Surface Preparation | 122, 124 | 2.15 |
| US Navy PPI 63101-000 | Surface Preparation | 123, 223, 224 | 2.8 - 2.14 |
| US Navy PPI 63101-000 | Wet Film & Powder | 112, 115, 3236, 3238 | 7.2 - 7.3 |

# Appendix

## What is the correct probe for each Coating/Substrate?

The table below shows common coating/substrate combinations.  If you do not see your coating/substrate combination, please contact Elcometer to discuss your particular requirement.

Elcometer offers a free Test Sample Report.  Contact us to arrange for our Technical Department to establish the most appropriate gauge for your process or application.

| COATING | SUBSTRATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Aluminium | Brass | Bronze | Copper | Steel | Magnesium | Stainless Steel | Titanium | Uranium | Zinc |
| Aluminium | - | - | - | - | F | - | - | - | - | - |
| Anodising | NF | - | - | - | - | NF | - | - | - | - |
| Brass | - | - | - | - | F | - | - | - | - | - |
| Bronze | - | - | - | - | F | - | - | - | - | - |
| Cadmium | - | - | - | - | F | - | - | - | - | - |
| Ceramic | - | - | - | - | F | - | - | - | - | - |
| Chrome (Hard) | NF* | - | - | NF* | F | - | - | - | - | - |
| Copper | - | - | - | - | F | - | - | - | - | - |
| Eloxal | NF | - | - | - | F | - | - | - | - | - |
| Epoxy | NF | NF | NF | NF | F | - | NF | NF | - | NF |
| Galvanising | - | - | - | - | F | - | - | - | - | - |
| Lacquer | NF | NF | NF | NF | F | - | NF | - | - | NF |
| Metal Spray | - | - | - | - | F | - | - | - | - | - |
| Molybenum Disulphide | - | - | - | - | F | - | NF | - | - | - |
| Nickel (Electroless) | NF* | NF* | - | NF* | F | - | - | - | - | - |
| Paint | NF | NF | NF | NF | F | NF | NF | NF | NF | NF |
| Plastic | NF | NF | NF | NF | F | NF | NF | NF | NF | NF |
| Plating | - | - | - | - | F | - | - | - | - | - |
| Rubber | NF | - | - | - | F | - | - | - | NF | - |
| Resist | - | - | - | NF | - | - | - | - | - | - |
| Tin | - | - | - | - | F | - | - | - | - | - |
| Varnish | NF | NF | NF | NF | F | - | - | - | - | - |
| Zinc | - | - | - | - | F | - | - | - | - | - |

NF : use Non-Ferrous probe
F : use Ferrous probe
* : known sample required for calibration

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## Coating Inspection
A comprehensive range of test equipment from the laboratory to the field.

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Ultrasonic corrosion thickness gauges, flaw detectors, velocity gauges, bolt tension monitors, etc.

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For more information please contact Elcometer.

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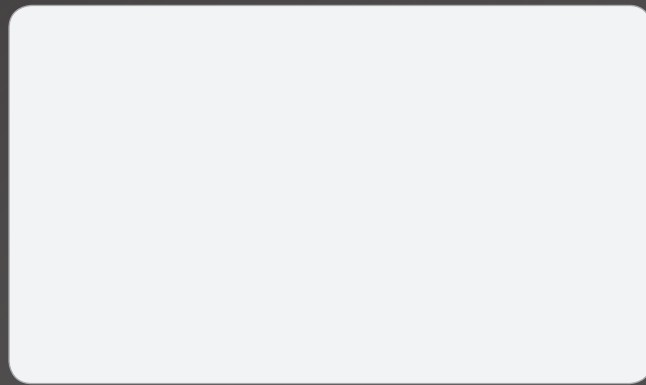
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