elcometer®

inspection equipment

Elcometer 456
coating thickness gauge

Dry Film Thickness - Digital

Elcometer 456 — Coating Thickness Gauge

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

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

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

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

Secure probe connection for improved durability

Bluetooth®

USB

PDF

Email

Cloud

2 YEAR* WARRANTY

* Elcometer 456 gauges are supplied with a one year warranty against manufacturing defects.
The warranty can be extended to two years via www.elcometer.com

elcometer®

Coating Thickness Gauge

Elcometer 456

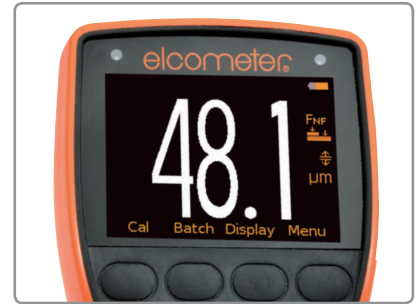Integral and Separate gauges to measure coatings up to 31mm (1220mils)

Scratch and solvent resistant screen

Auto rotating display with tap awake feature

Large buttons with positive feedback

Large easy to read colour display

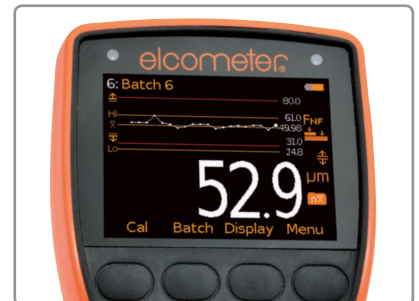Stores up to 150,000 readings in alpha numeric batches

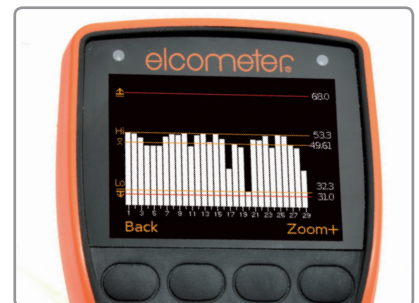Dust and waterproof rugged design equivalent to IP64

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

Individual batch readings can be reviewed numerically or graphically

Made for
iPod iPhone iPad

Android™

available with
Bluetooth®
wireless technology

compatible with
ElcoMaster®

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
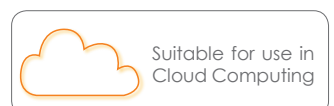
compatible with **ElcoMaster**®

available with **Bluetooth**® wireless technology

Suitable for use in Cloud Computing

* Elcometer 456 gauges are supplied with a one year warranty against manufacturing defects. The warranty can be extended to two years via www.elcometer.com

Coating Thickness Gauge   **Elcometer 456**

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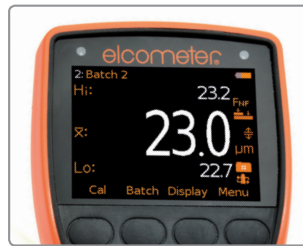
Scan Mode* stores the average, highest and lowest readings over a test area
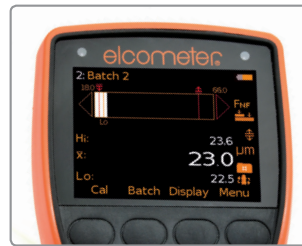
During a scan the live reading together with an analogue bar graph is displayed
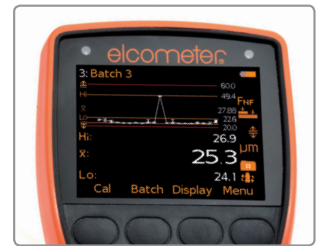
The Run Chart displays the average thickness as well as the highest and lowest readings for each scan

Auto Repeat Mode

When the 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.
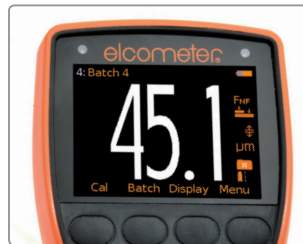
Auto Repeat Mode* measures and stores into memory over 140 individual readings per minute

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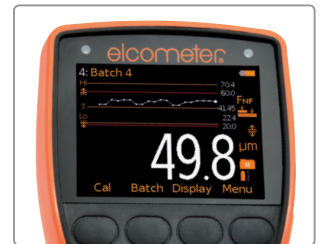
The Run Chart displays each individual reading allowing the user to identify any significant trends

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

Coating Thickness Gauge

Scan Probe

Featuring a highly durable 'snap on' replaceable probe cap, the Elcometer 456 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 Scan Probe enables users to significantly reduce inspection times without affecting accuracy.

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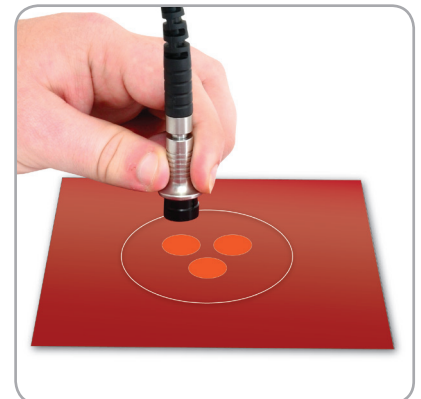
Counted Average and Fixed Batch Sizes can be used with all Elcometer 456 probes

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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 $10m^2$ (~$100ft^2$).

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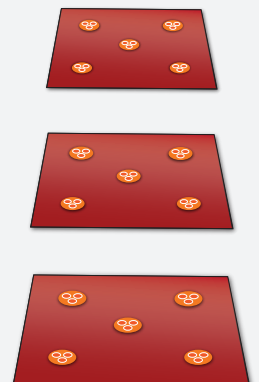
* Scan and Auto Repeat Modes require an Elcometer 456 Model T gauge with Scan Probe.
+ Patent Number US6243661
# When tested on smooth surfaces probe end caps have been scanned in excess of 50km (30 miles).

Elcometer 456   **Coating Thickness Gauge**

Product Features	■ Standard	□ Optional			

	Model 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); $\overline{x}$	■	■	■
Standard deviation; σ	■	■	■
Highest reading; *Hi*	■	■	■
Lowest reading; *Lo*	■	■	■
Coefficient of variation; *CV%*	■	■	■
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, N, FNF	F, N, FNF	F, N, FNF
Measurement range	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 0-1,220mils	0-31mm 0-1,220mils	0-31mm 0-1,220mils

■ 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 Number 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 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	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		■	■
Review, clear & delete batches		■	■
Batch types; *normal, counted average, IMO PSPC*		■	■
Navsea Mode			■
Batch review graph			■
Copy batches and calibration settings			■
Alpha-numeric batch names; *user definable on the gauge*			■
Scan & auto repeat modes; *with 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	approximately 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) 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) 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

Elcometer 456

Integral & Separate model range

The Elcometer 456 is available in three different models. Each gauge provides the user with increasing functionality - from the entry level Elcometer 456 Model B, 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 B	Model S	Model T	Certificate
Elcometer 456 Ferrous Integral	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	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 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 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	●

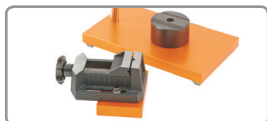### Separate Model Options   C

	Model 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 16

● Certificate supplied as standard.

* Whichever is the greater

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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

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 18 for further information.

Dry Film Thickness - Digital

Elcometer 456   Probe range

Scale 0.5: Range: 0-500µm / 0-20mils

Accuracy[a]:	±1-3% or ±2.5µm	±1-3% or ±0.1mil
Range:	0-500µm	0-20mils
Resolution:	0.1µm: 0-100µm 1µm: 100-500µm	0.01mil: 0-5mils 0.1mil: 5-20mils
Certificate:	●	

Description[c]	Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)			
Mini Probe - Straight, 45mm (1.77") long	T456CFM3---A	6mm (0.24")	3mm (0.12")
Mini Probe - 90°, 45mm (1.77") long	T456CFM3R90A	16mm (0.63")	3mm (0.12")
Mini Probe - 45°, 45mm (1.77") long	T456CFM3R45A	18mm (0.71")	3mm (0.12")
Mini Probe - Straight, 150mm (5.90") long	T456CFM3---C	6mm (0.24")	3mm (0.12")
Mini Probe - 90°, 150mm (5.90") long	T456CFM3R90C	16mm (0.63")	3mm (0.12")
Mini Probe - 90°, 300mm (11.8") long	T465CFM3R90D	16mm (0.63")	3mm (0.12")
Mini Probe - 45°, 300mm (11.8") long	T456CFM3R45D	18mm (0.71")	3mm (0.12")
Non-Ferrous (N)			
Mini Probe - Straight, 45mm (1.77") long	T456CNM3---A	6mm (0.24")	4mm (0.16")
Mini Probe - 90°, 45mm (1.77") long	T456CNM3R90A	16mm (0.63")	4mm (0.16")
Mini Probe - Straight,150mm (5.90") long	T456CNM3---C	6mm (0.24")	4mm (0.16")
Mini Probe - 90°, 150mm (5.90") long	T456CNM3R90C	16mm (0.63")	4mm (0.16")
Mini Probe - 90°, 400mm (15.7") long	T456CNM3R90E	16mm (0.63")	4mm (0.16")
Non-Ferrous - Graphite (N)			
Mini Probe - 90° Graphite, 45mm (1.77") long	T456CNMG3R90A	16mm (0.63")	4mm (0.16")
Mini Probe - 90° Graphite, 150mm (5.90") long	T456CNMG3R90C	16mm (0.63")	4mm (0.16")
Mini Probe - 90° Graphite, 400mm (15.7") long	T456CNMG3R90E	16mm (0.63")	4mm (0.16")

a. Whichever is the greater
b. FNF (F): FNF probe in F mode FNF (N): FNF probe in N mode

c. Probe length is measured from X to Y

● Certificate supplied as standard.

Elcometer 456 probes are covered by a 1 year warranty

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Probe range

Scale 1: Range: 0-1500µm / 0-60mils

Accuracy[ae]:	±1-3% or ±2.5µm	±1-3% or ±0.1mil
Range[d]:	0-1500µm	0-60mils
Resolution:	0.1µm: 0-100µm 1µm: 100-1500µm	0.01mil: 0-5mils 0.1mil: 5-60mils
Certificate:	●	
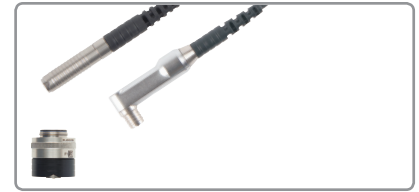
	Description[c]	Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Straight Probe	T456CF1S	85mm (3.35")	4mm (0.16")
	Straight Probe, sealed	T456CF1E	85mm (3.35")	4mm (0.16")
	Scan Probe	T456CF1U	86mm (3.38")	15mm (0.59")
	Scan Probe, armoured cable	T456CF1UARM	29mm (1.14")	15mm (0.59")
	Right Angle Probe	T456CF1R	28mm (1.10")	4mm (0.16")
	Mini Probe - 90°, 45mm (1.77") long	T456CFM5R90A	16mm (0.63")	4mm (0.16")
	Mini Probe - 90°, 45mm (1.77") long, sealed	T456CFME5R90A	16mm (0.63")	4mm (0.16")
	Mini Probe - 90°, 45mm (1.77") long, 2m cable, sealed	T456CFME5R90A-2	16mm (0.63")	4mm (0.16")
	PINIP™ Integral Probe	T456CF1P	170mm (6.69")	4mm (0.16")
Non-Ferrous (N)				
	Straight Probe	T456CN1S	85mm (3.35")	4mm (0.16")
	Right Angle Probe	T456CN1R	28mm (1.10")	4mm (0.16")
	Mini Probe - 90°, 45mm (1.77") long	T456CNM5R90A	16mm (0.63")	4mm (0.16")
	Mini Probe - 90°, 150mm (5.90") long	T456CNM5R90C	16mm (0.63")	4mm (0.16")
	Mini Probe - 90°, 400mm (15.7") long	T456CNM5R90E	16mm (0.63")	4mm (0.16")
	Anodiser Probe	T456CN1AS	100mm (3.94")	4mm (0.16")
	PINIP™ Integral Probe	T456CN1P	180mm (7.09")	4mm (0.16")
Ferrous & Non-Ferrous (FNF)				
	Straight Probe	T456CFNF1S	88mm (3.46")	F: 4mm (0.16") N: 6mm (0.24")
	Straight Probe, armoured cable	T456CFNF1ARM	185mm (7.28")	F: 4mm (0.16") N: 6mm (0.24")
	Scan Probe	T456CFNF1U	89mm (3.50")	15mm (0.59")
	Right Angle Probe	T456CFNF1R	38mm (1.50")	F: 4mm (0.16") N: 6mm (0.24")
	PINIP™ Integral Probe	T456CFNF1P	180mm (7.09")	F: 4mm (0.16") N: 6mm (0.24")

a. Whichever is the greater
b. FNF (F): FNF probe in F mode FNF (N): FNF probe in N mode

● Certificate supplied as standard.

c. Probe length is measured from X to Y
d. Excluding Scan probe end cap
e. Scan Probe calibrated using a sample of the uncoated substrate
   Elcometer 456 probes are covered by a 1 year warranty

Dry Film Thickness - Digital

Elcometer 456   Probe range

Scale 2: Range: 0-5mm / 0-200mils

Accuracy[ae]:	±1-3% or ±20μm	±1-3% or ±1.0mil
Range[d]:	0-5mm	0-200mils
Resolution:	1μm: 0-1mm 10μm: 1-5mm	0.1mil: 0-50mils 1.0mil: 50-200mils
Certificate:	●	

| Description[c]		Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Straight Probe	T456CF2S	89mm (3.50")	8mm (0.32")
	Straight Probe, armoured cable	T456CF2ARM	138mm (5.43")	8mm (0.32")
	Scan Probe	T456CF2U	90mm (3.54")	15mm (0.59")
	Right Angle Probe	T456CF2R	32mm (1.26")	8mm (0.32")
	Telescopic Probe - 56 -122cm (22 - 48") long	T456CF2T	36mm (1.42")	8mm (0.32")
	Soft Coating Probe	T456CF2B	89mm (3.50")	8mm (0.32")
	Waterproof Probe, 1m (3') cable	T456CF2SW	138mm (5.43")	8mm (0.32")
	Waterproof Probe, 5m (15') cable	T456CF2SW-5	138mm (5.43")	8mm (0.32")
	Waterproof Probe, 15m (45') cable	T456CF2SW-15	138mm (5.43")	8mm (0.32")
	Waterproof Probe, 30m (98') cable	T456CF2SW-30	138mm (5.43")	8mm (0.32")
	Waterproof Probe, 50m (164') cable	T456CF2SW-50	138mm (5.43")	8mm (0.32")
	Waterproof Probe, 75m (250') cable	T456CF2SW-75	138mm (5.43")	8mm (0.32")
	PINIP™ Integral Probe	T456CF2P	174mm (6.85")	8mm (0.32")
	Hi-Temperature PINIP™ Probe - 250°C (480°F)	T456CF2PHT	174mm (6.85")	8mm (0.32")
Non-Ferrous (N)				
	Straight Probe	T456CN2S	88mm (3.46")	14mm (0.55")
	PINIP™ Integral Probe	T456CN2P	185mm (7.28")	14mm (0.55")

Scale 3: Range: 0-13mm / 0-500mils
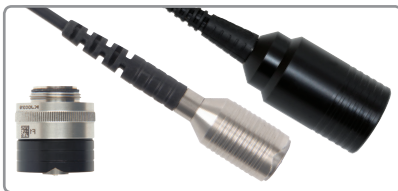
Accuracy[a]:	±1-3% or ±50μm	±1-3% or ±2.0mils
Range:	0-13mm	0-500mils
Resolution:	1μm: 0-2mm 10μm: 2-13mm	0.1mil: 0-100mils 1.0mil: 100-500mils
Certificate:	●	

Description[c]		Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Straight Probe	T456CF3S	102mm (4.02")	14mm (0.55")
	PINIP™ Integral Probe	T456CF3P	184mm (7.24")	14mm (0.55")
Non-Ferrous (N)				
	Straight Probe	T456CN3S	170mm (6.69")	35mm (1.38")

a. Whichever is the greater
b. FNF (F): FNF probe in F mode FNF (N): FNF probe in N mode

c. Probe length is measured from X to Y
d. Excluding Scan probe end cap
e. Scan Probe calibrated using a sample of the uncoated substrate
   Elcometer 456 probes are covered by a 1 year warranty

● Certificate supplied as standard.
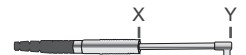
elcometer.

Probe range

Scale FM7: Range: 0.6-3.8mm / 25-150mils

Accuracy[a]:	±7.5% or ±114µm	±7.5% or ±4.5mils
Range[f]:	0.60-3.8mm	25-150mils
Resolution:	1µm: 0-1mm 10µm: 1-3.8mm	0.1mil: 0-139.3mils 1.0mil: 39.4-150mils
Certificate:	●	

Description[c]		Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Mini Probe - 45°, 45mm (1.77") long	T456CFM7R45A	20mm (0.79")	6.5 mm (0.26'')

Scale 6: Range: F: 0-25mm / 0-980mils   N: 0-30mm/ 0-1220mils

Accuracy[a]:	±1-3% or ±100µm	±1-3% or ±4.0mils
Range:	F: 0-25mm N: 0-30mm	F: 0-980mils N: 0-1200mils
Resolution:	10µm: 0-2mm 100µm: 2-30mm	1mil: 0-100mils 10mils: 100-1200mils
Certificate:	●	

Description[c]		Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Straight Probe	T456CF6S	150mm (5.90")	51 x 51mm² (2 x 2 inch²)
	Straight Probe, armoured cable	T456CF6ARM	190mm (7.48")	51 x 51mm² (2 x 2 inch²)
Non-Ferrous (N)				
	Straight Probe	T456CN6S	160mm (6.30")	58mm (2.29")
	Straight Probe, armoured cable	T456CN6ARM	200mm (7.87")	58mm (2.29")

## Scale 7: Range: 0-31mm / 0-1220mils

Accuracy[a]:	±1-3% or ±100µm	±1-3% or ±4.0mils
Range:	0-31mm	0-1220mils
Resolution:	10µm: 0-2mm 100µm: 2-31mm	1.0mil: 0-100mils 10mils:100-1220mils
Certificate:	●	

Description[c]		Part Number	Minimum Headroom	Minimum Sample Diameter[b]
Ferrous (F)				
	Straight Probe, armoured cable	T456CF7ARM	200mm (7.87")	55 x 55mm² (2.17 x 2.17 inch²)

a. Whichever is the greater
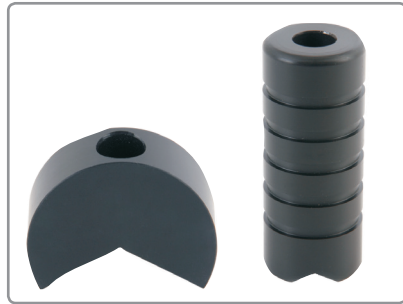b. FNF (F): FNF probe in F mode FNF (N): FNF probe in N mode

c. Probe length is measured from X to Y
f. For Elcometer 456 Model T gauges only
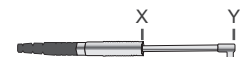
● Certificate supplied as standard.

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.

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	
T9997766-	T99913225	Jumbo Hand Grip
T9997381-	T99913133	V-Probe Adaptor

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

F & Dual FNF Probes	
T456C23956	Replacement 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

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 18 for more details.

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

elcometer®

Accessories

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.
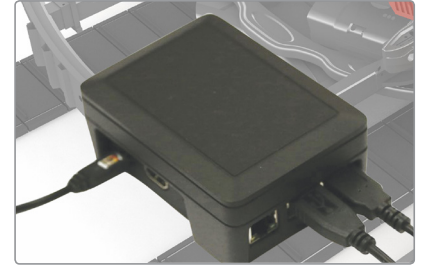
Part Number	Description
T99925387	Elcometer Data Output Controller
Operating Temperature	0 to 50°C (32°F to 122°F)
Data Input	USB
Data Output	One RS232 serial output via 9 way D-Type connector
Power Supply	Requires 5V 1A(min) DC supply via mini USB. External plug-in mains adapter with interchangeable 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)

Data Output Controller

The Elcometer 456 coating thickness gauge probe is attached to a robot arm, to automatically measure dry film thickness on the production line.

The Elcometer 456 connects to the data output controller to transfer live dry film thickness readings via RS232 ports to the automated production line.

Customised software for the data output controller can be produced, using high/low limits to trigger a pass or fail on the automated production line, helping to improve quality.
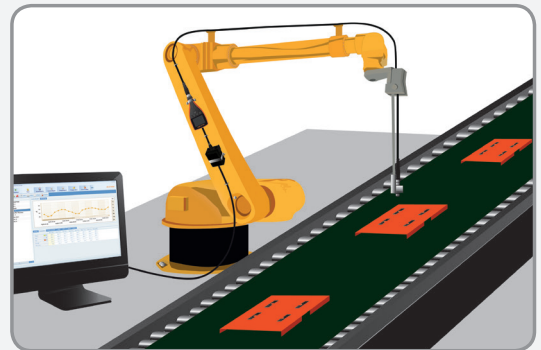
Elcometer 990

Calibration Foils Sets

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
- 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 ⓒ

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

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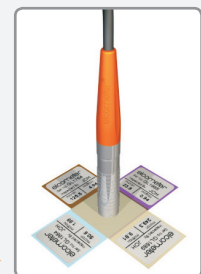
[1]The Scale 2B foil sets are designed for soft coating probes and have a larger foil surface area

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 Ferrous (F), Non-Ferrous (N) or Ferrous & Non-Ferrous 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

Ferrous

Part Number	Description	Values (µm)*	Values (mils)*	Certificate
T995-05F	Ferrous Coated Thickness Standards - Scale 0.5F	Zero, 40, 75, 125, 250, 500	Zero, 1.6, 3.0, 5.0, 10, 20	●
T995-1F	Ferrous Coated Thickness Standards - Scale 1F	Zero, 75, 250, 500, 1000, 1500	Zero, 3.0, 10, 20, 40, 60	●
T995-2F	Ferrous Coated Thickness Standards - Scale 2F	Zero, 250, 500, 1500, 3000, 5000	Zero, 10, 20, 60, 120, 200	●

Non Ferrous

Part Number	Description	Values (µm)*	Values (mils)*	Certificate
T995-05N	Non-Ferrous Coated Thickness Standards - Scale 0.5N	Zero, 40, 75, 125, 250, 500	Zero, 1.6, 3.0, 5.0, 10, 20	●
T995-1N	Non-Ferrous Coated Thickness Standards - Scale 1N	Zero, 75, 250, 500, 1000, 1500	Zero, 3.0, 10, 20, 40, 60	●
T995-2N	Non-Ferrous Coated Thickness Standards - Scale 2N	Zero, 250, 500, 1500, 3000, 5000	Zero, 10, 20, 60, 120, 200	●

Ferrous / Non-Ferrous

Part Number	Description	Values (µm)*	Values (mils)*	Certificate
T995-05FN	Ferrous/Non-Ferrous Coated Thickness Standards - Scale 0.5FN	F: Zero, 125, 250 N: Zero, 125, 250	F: Zero, 5, 10 N: Zero, 5, 10	●

* Nominal values. Actual coated thickness standard values may vary but are accurately labelled.

● Calibration Certificate supplied as standard.

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 18).

Technical Specification ⓒ

Description	Size	Size	Ferrous	Non-Ferrous	Certificate
Precision Zero Test Plate (±1%)	50.8 x 25.4mm	2.0 x 1.0"	T9994910-	T9994911-	
Zero Test Plate	76.2 x 50.8mm	3.0 x 2.0"	T9999529-	T9999530-	
Zero Test Plate (large)	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

○ Optional Calibration Certificate available.

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