

elcometer®  
inspection equipment



**Elcometer 456**  
coating thickness gauge

**Elcometer 456**

**Integral Coating Thickness Gauge**

The **Elcometer 456** coating thickness gauge is available with an **integral probe**; ideal for single handed operation for consistent, repeatable and accurate results.

Easy to read, user definable display with automatic screen brightness



Reading rate of 70+ per minute

Ergonomic design, ideal for continuous use

Measure coatings up to 13mm (500mils) on metal substrates

Stores up to 150,000 readings in alphanumeric batches

Scratch and solvent resistant screen

Bigfoot™ integral probe



## Integral Coating Thickness Gauge

### Elcometer 456

#### Easy

Calibrated and ready for immediate use

Easy to use menus, large buttons and colour LCD screen with auto rotate; factory calibrated and ready to use, straight from the box.



Large easy to read measurements in Metric and Imperial units

#### Accurate

Accurate measurements on smooth, rough, thin and curved surfaces

With a thickness measurement capability to  $\pm 1\%$  and increased reading resolution, the Elcometer 456 produces accurate, temperature stable measurements every time.



Bigfoot™ integral probe for accurate measurements

#### Reliable

Peace of mind

Repeatable and reproducible and available with a 2 year<sup>1</sup> manufacturer's warranty; giving you peace of mind.



Easy to use and minimum set up required

#### Rugged

Durable and suitable for use in harsh environments

Suitable for use in harsh environments, the Elcometer 456 is sealed, heavy duty and impact resistant with dust and waterproof equivalent to IP64.



USB and Bluetooth® data output to iPhone<sup>2</sup> or Android™ devices

#### Powerful

Store up to 150,000 readings in 2,500 batches

Measures up to 13mm (500mils) of coating on metal substrates with USB and Bluetooth® data output making it compatible with ElcoMaster® software.

#### 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 2178, 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

<sup>1</sup> The Elcometer 456 is supplied with a 1 year warranty against manufacturing defects. The warranty can be extended free of charge to 2 years within 60 days of purchase via [www.elcometer.com](http://www.elcometer.com).

<sup>2</sup> Compatible with iPod, iPhone and iPad.

# Integral Coating Thickness Gauge for Metal Substrates

**Elcometer 456**

## Product Features

■ Standard

□ Optional

	Model B	Model S	Model T
Automatic calibration; <i>for rapid calibration</i>		■	■
Calibration memory type; <i>gauge (g) or gauge &amp; batch (gb)</i>	g	gb	gb
Number of batches; <i>with unique calibrations</i>		1	2,500
Calibration memories; <i>3 user-programmable memories</i>			■
Measurement outside calibration warning			■
Calibration lock; <i>with optional PIN code unlock</i>	■	■	■
Delete last reading	■	■	■
Gauge memory; <i>number of readings</i>	Last 5	1,500	150,000
Individual batch calibrations; <i>sent to PC via ElcoMaster® software</i>		■	■
Limits; <i>user definable audible &amp; visual pass/fail warnings</i>		■	■
Gauge (g) or gauge & batch specific (gb) limits		g	gb
Date and time stamp		■	■
Review, clear & delete batches		■	■
Batch types; <i>normal, counted average, IMO PSPC</i>		■	■
Navsea Mode			■
Batch review graph			■
Copy batches and calibration settings			■
Alpha-numeric batch names; <i>user definable on the gauge</i>			■
Scan & Auto Repeat Modes; <i>with Scan probe connected</i>			■
Fixed Batch Size Mode; <i>with batch linking</i>			■

## Technical Specification

<b>Scale 1</b>	Range: 0-1,500µm (0-60mils)	Accuracy <sup>7</sup> : ±1-3% or ±2.5µm (±0.1mil)		
	Resolution: 0.1µm: 0-100µm; 1µm: 100-1,500µm (0.01mil: 0-5mils; 0.1mil: 5-60mils)			
Model	Model B	Model S	Model T	Certificate
Elcometer 456 Ferrous Integral	A456CFB11	A456CFSI1	A456CFT11	●
Elcometer 456 Non-Ferrous Integral	A456CNB11	See separate gauges with N2 PINIP™ Probe	See separate gauges with N2 PINIP™ Probe	●
Elcometer 456 Dual FNF Integral	A456CFNFB11	A456CFNFSI1	A456CFNFT11	●
<b>Scale 2</b>	Range: 0-5mm (0-200mils)	Accuracy <sup>7</sup> : ±1-3% or ±20µm (±1.0mil)		
	Resolution: 1µm: 0-1mm; 10µm: 1-5mm (0.1mil: 0-50mils; 1mil: 50-200mils)			
Model	Model B	Model S	Model T	Certificate
Elcometer 456 Ferrous Integral	A456CFB12	See separate gauges with F2 PINIP™ Probe	See separate gauges with F2 PINIP™ Probe	●
<i>For higher resolution &amp; accuracy on thin coatings Scale 2 gauges can be switched to the Scale 1 mode measurement performance</i>				
<b>Scale 3</b>	Range: 0-13mm (0-500mils)	Accuracy <sup>7</sup> : ±1-3% or ±50µm (±2.0mils)		
	Resolution: 1µm: 0-2mm; 10µm: 2-13mm (0.1mil: 0-100mils; 1mil: 100-500mils)			
Model	Model B	Model S	Model T	Certificate
Elcometer 456 Ferrous Integral	A456CFB13	See separate gauges with F3 PINIP™ Probe	See separate gauges with F3 PINIP™ Probe	●
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 <sup>8</sup>			
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)	156g (5.50oz)			
Operating Temperature	-10 to 50°C (14 to 122°F)			
Packing List	Elcometer 456 gauge, calibration foils, 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)			

<sup>7</sup> Whichever is the greater

<sup>8</sup> Using default settings & lithium batteries, alkaline or rechargeable batteries may differ

● Certificate supplied as standard.



# Dry Film Thickness - Digital

**Elcometer 456**

**Separate Coating Thickness Gauge**

The **Elcometer 456** coating thickness gauge is available with a wide range of interchangeable probes; providing greater coating thickness measurement flexibility on metal substrates.

Measure coatings up to 31mm (1,220mils) on metal substrates

Easy to read, user definable display with automatic screen brightness

Ergonomic design, ideal for continuous use

Dust and waterproof rugged design equivalent to IP64

Temperature stable measurements



## Separate Coating Thickness Gauge

### Elcometer 456

#### Fast

Helping you become more efficient

70+ readings per minute and 140+ per minute with Scan Probe, multiple calibration memories and alphanumeric batch identification.

#### Accurate

Accurate measurements on smooth, rough, thin and curved surfaces

Measures on smooth, rough, thin and curved surfaces to  $\pm 1\%$  in accordance with National & International Standards.

#### Easy

Large buttons and colour screen

LCD screen with auto rotate; factory calibrated with high and low reading limit indicators in multiple languages.

#### Reliable

Designed to last

Heavy duty, impact resistant and supplied with fully traceable test certificates and our 2 year gauge warranty\*.

#### Powerful

Store up to 150,000 readings in 2,500 batches

Measures up to 31mm (1,220mils) of coating on metal substrates with USB and Bluetooth® data output making it compatible with ElcoMaster® software.



Large easy to read measurements in Metric and Imperial units



Halve the inspection time using the scan probe

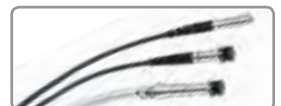


View up to 8 user selectable statistics on screen



Rugged and reliable, ideal for harsh environments

For a wide range of probes to meet your specific application, see page 8



\* The Elcometer 456 is supplied with a 1 year warranty against manufacturing defects. The warranty can be extended free of charge to 2 years within 60 days of purchase via [www.elcometer.com](http://www.elcometer.com).

### Scan and Auto Repeat Modes



#### Using the Scan Probe in Scan Mode

Using the Elcometer 456 in Scan Mode with the Scan Probe enables users to significantly reduce dry film thickness inspection times without affecting accuracy:

- 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.



#### Using the Scan Probe in Auto Repeat Mode

When the Scan Probe is slid over the coated surface in Auto Repeat Mode\*, a coating thickness reading is taken approximately every half a second. Each individual dry film thickness 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 dry film thickness inspection of large coated areas.



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



## Separate Coating Thickness Gauge

Elcometer 456

### Scan Probes

The Scan Probes further enhance the speed and accuracy of field based dry film coating thickness measurement:

- Featuring a highly durable 'snap on' replaceable probe cap
- A revolutionary design which allows users to take individual readings or rapidly scan large surface areas - without damaging the probe or coating
- Uses the Elcometer 456's patented offset feature<sup>1</sup>, ensuring that any cap wear during use<sup>2</sup> is incorporated within the calibration process - the gauge even informs the user when to replace the cap.
- Standard Scan Probe or larger Roller Bearing Scan Probe available
- Roller Bearing Scan Probe is ideal for large coated structures, abrasive coatings and pre-construction primers.



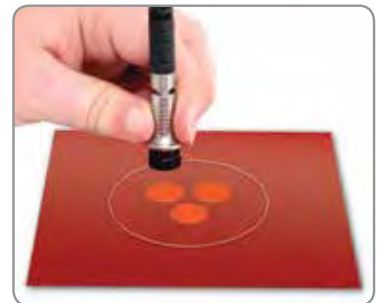
### Counted Average and Fixed Batch Modes

#### 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.

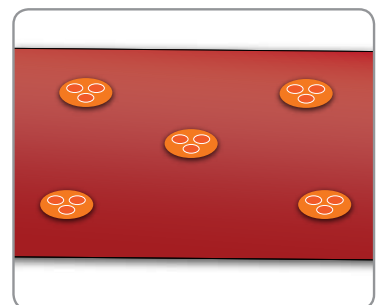
#### Fixed Batch Sizes

- 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.).



### 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<sup>2</sup> (~100ft<sup>2</sup>).
- 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.



<sup>1</sup> Patent Number US6243661

<sup>2</sup> When tested on smooth surfaces probe end caps have been scanned in excess of 50km (30 miles)



## Elcometer 456

## Separate Coating Thickness Gauge

### Product Features

■ Standard

□ Optional

	Model B	Model S	Model T
Fast, accurate reading rate; <i>70+ readings per minute</i>	■	■	■
Repeatable & reproducible measurements	■	■	■
Easy to use menu structure; <i>in 30+ languages</i>	■	■	■
Tough, impact, waterproof & dust resistant; <i>equivalent to IP64</i>	■	■	■
Bright colour screen; <i>with permanent backlight</i>	■	■	■
Scratch & solvent resistant display; <i>2.4" (6cm) TFT</i>	■	■	■
Large positive feedback buttons	■	■	■
USB power supply; <i>via PC</i>	■	■	■
Test certificate	■	■	■
2 year gauge warranty <sup>1</sup>	■	■	■
Automatic rotating display; <i>0°, 90°, 180° &amp; 270°</i>	■	■	■
Ambient light sensor; <i>with adjustable auto brightness</i>	■	■	■
Emergency light	■	■	■
Tap awake from sleep	■	■	■
Gauge software updates <sup>2</sup> ; <i>via ElcoMaster® software</i>	■	■	■
Data output	■	■	■
USB; <i>to computer</i>	■	■	■
Bluetooth®; <i>to computer, Android™ &amp; iOS<sup>3</sup> devices</i>	■	■	■
On screen statistics	■	■	■
Number of readings; $\eta$ Mean (average); $\bar{x}$ Standard deviation; $\sigma$ Highest reading; <i>Hi</i> Lowest reading; <i>Lo</i> Coefficient of variation; CV%, Elcometer index value <sup>4</sup> ; <i>EIV</i>	■	■	■
Nominal dry film thickness; <i>NDFT</i>	■	■	■
IMO PSPC; <i>%&gt;NDFT, %&gt;90&lt;NDFT, 90:10 pass/fail</i>	■	■	■
High & low limits; <i>definable audible &amp; visual alarms</i>	■	■	■
Number of readings above high limit;	■	■	■
Number of readings below low limit;	■	■	■
Live reading trend graph; <i>in Batch Mode</i>	■	■	■
ElcoMaster® software & USB cable	□	■	■
Replaceable screen protectors	□	■	■
Protective case	■	■	■
Plastic transit case	□	□	■
Separate models; <i>with automatic probe recognition</i>	■	■	■
Probe type; <i>Ferrous (F), Non-Ferrous (N), Dual (FNF)</i> <sup>5</sup>	F, N, FNF	F, N, FNF	F, N, FNF
Measurement range; <i>see page 8 for probe selection</i>	0-31mm 0-1,220mils	0-31mm 0-1,220mils	0-31mm 0-1,220mils
On screen calibration instructions; <i>in 30+ languages</i>	■	■	■
Multiple calibration methods	■	■	■
Factory; <i>resets to the factory calibration</i>	■	■	■
2-point; <i>for smooth and rough surfaces</i>	■	■	■
1-point; <i>zero calibration</i>	■	■	■
Zero offset <sup>6</sup> ; <i>for calibration according to ISO19840</i>	■	■	■
Predefined calibration & measurement methods	■	■	■
ISO, SSPC PA2, Swedish, Australian	■	■	■

<sup>1</sup> The Elcometer 456 is supplied with a 1 year warranty against manufacturing defects. The warranty can be extended free of charge to 2 years within 60 days of purchase via [www.elcometer.com](http://www.elcometer.com).

<sup>2</sup> Internet connection required

<sup>3</sup> Visit [www.elcometer.com/sdk](http://www.elcometer.com/sdk) to find out how to integrate Elcometer's MFi certified products to your App.

<sup>4</sup> Elcometer Index Values are used in the automotive industry to assess a coating's overall quality; USA Patent Number US7606671B2

<sup>5</sup> FNF Patent Number USA: 5886522

<sup>6</sup> Zero Offset USA Patent Number US6243661

## Separate Coating Thickness Gauge

**Elcometer 456**

### Product Features

■ Standard □ Optional

	Model B	Model S	Model T
Automatic calibration; <i>for rapid calibration</i>		■	■
Calibration memory type; <i>gauge (g) or gauge &amp; batch (gb)</i>	g	gb	gb
Number of batches; <i>with unique calibrations</i>		1	2,500
Calibration memories; <i>3 user-programmable memories</i>			■
Measurement outside calibration warning			■
Calibration lock; <i>with optional PIN code unlock</i>	■	■	■
Delete last reading	■	■	■
Gauge memory; <i>number of readings</i>	Last 5	1,500	150,000
Individual batch calibrations; <i>sent to PC via ElcoMaster® software</i>		■	■
Limits; <i>user definable audible &amp; visual pass/fail warnings</i>		■	■
Gauge (g) or gauge & batch specific (gb) limits		g	gb
Date and time stamp		■	■
Review, clear & delete batches		■	■
Batch types; <i>normal, counted average, IMO PSPC</i>		■	■
Navsea Mode			■
Batch review graph			■
Copy batches and calibration settings			■
Alpha-numeric batch names; <i>user definable on the gauge</i>			■
Scan & Auto Repeat Modes; <i>with Scan Probe connected</i>			■
Fixed Batch Size Mode; <i>with batch linking</i>			■

### Technical Specification

Model	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	A456CFNFST	●
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*			
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)	161g (5.68oz)			
Operating Temperature	-10 to 50°C (14 to 122°F)			
Packing List	Elcometer 456 gauge, wrist harness, transit case (T), protective case (B, S, T), 1 x screen protector (S, T), 2 x AA batteries, operating instructions, USB cable (S, T), ElcoMaster® software (S, T) For separate gauge probe options see page 8			

#### 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 2178, 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

\* Using default settings & lithium batteries, alkaline or rechargeable batteries may differ

● Certificate supplied as standard

**Elcometer 456**

**Probe Range for Separate Coating Thickness Gauge**

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



Fully interchangeable and available in a number of designs and scale ranges

Supplied with a Test Certificate and a set of calibration foils

Ferrous, non-ferrous and dual FNF probes available

Ergonomic design, ideal for continuous use

Temperature stable measurements

**Elcometer 456** **Probe Range for Separate Coating Thickness Gauge**

**Scale 0.5 Probe Range** **0-500µm / 0-20mils**



<b>Accuracy<sup>a</sup>:</b>	±1-3% or ±2.5µm	±1-3% or ±0.1mil
<b>Range:</b>	0-500µm	0-20mils
<b>Resolution:</b>	0.1µm: 0-100µm 1µm: 100-500µm	0.01mil: 0-5mils 0.1mil: 5-20mils
<b>Certificate:</b>	●	

See '#' on the probes table on the opposite page for comparison.



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