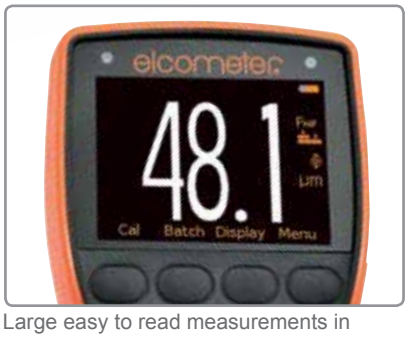
Elcometer 456 Coating Thickness Gauge

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

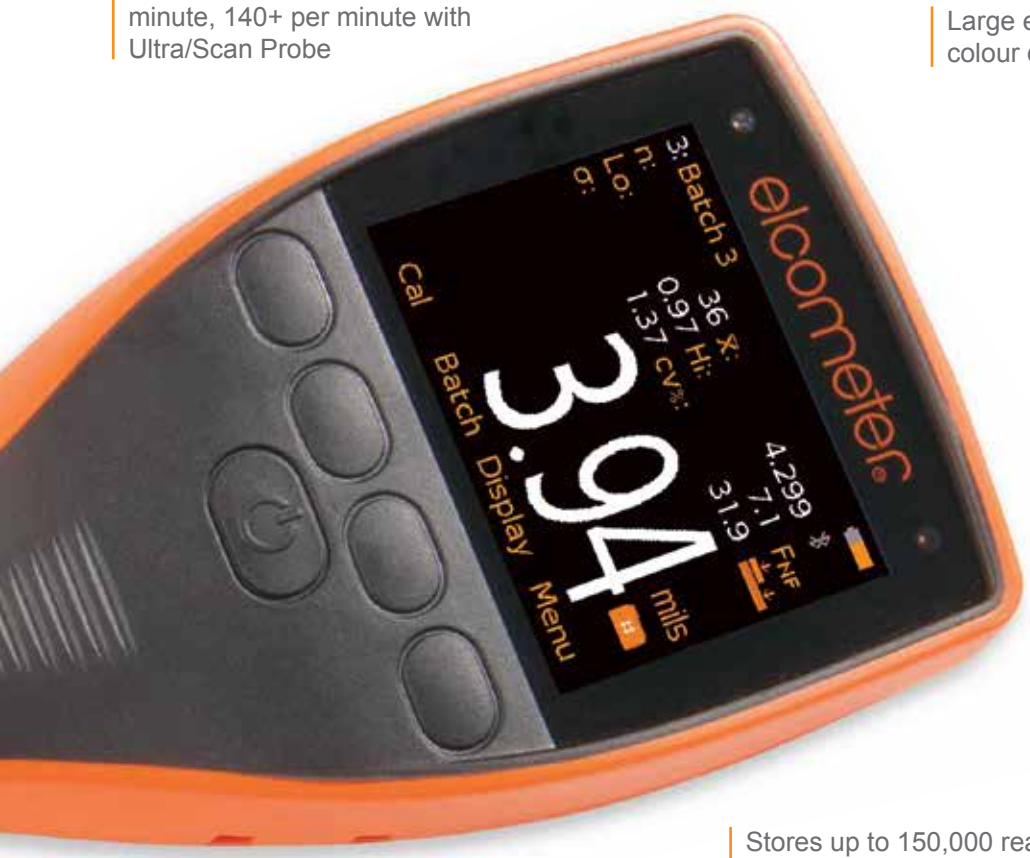
On-screen trend graph displaying last 20 measurement values

Coating Thickness Gauge

Elcometer 456

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

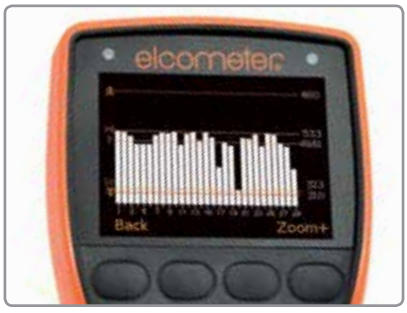
Stores up to 150,000 readings in alpha numeric batches

Large buttons with positive feedback

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

Android™

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

Coating Thickness Gauge

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

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

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 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.

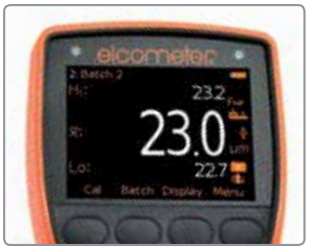
Elcometer 456

Coating Thickness Gauge

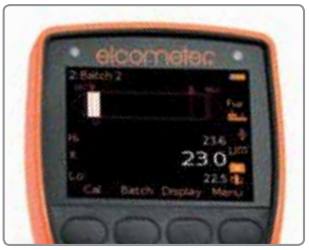
Scan Mode

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.

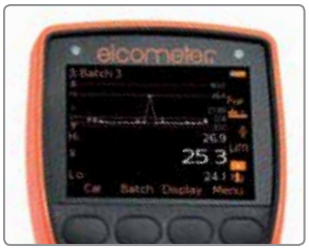
During each scan the Elcometer 456 displays the live thickness reading together with an analogue bar graph which graphically indicates the thickness relative to both the nominal thickness and any user-defined limits.



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

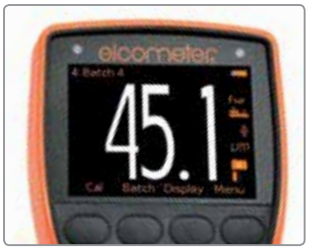


The Run Chart displays the average thickness as well as the highest and lowest readings for each scan

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.

Coating Thickness Gauge

Elcometer 456

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

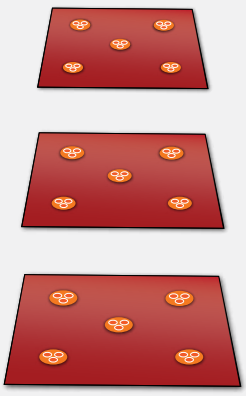
Working with Standards and Test Methods

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.



* 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®

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 11 for probe selection*		0-31mm 0-1220mils	0-31mm 0-1220mils	0-31mm 0-1220mils

*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			■	■
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 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 dry cell 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) 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 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 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 11 for more details.

Integral Model Options

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

	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 11 for details

Accessories

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

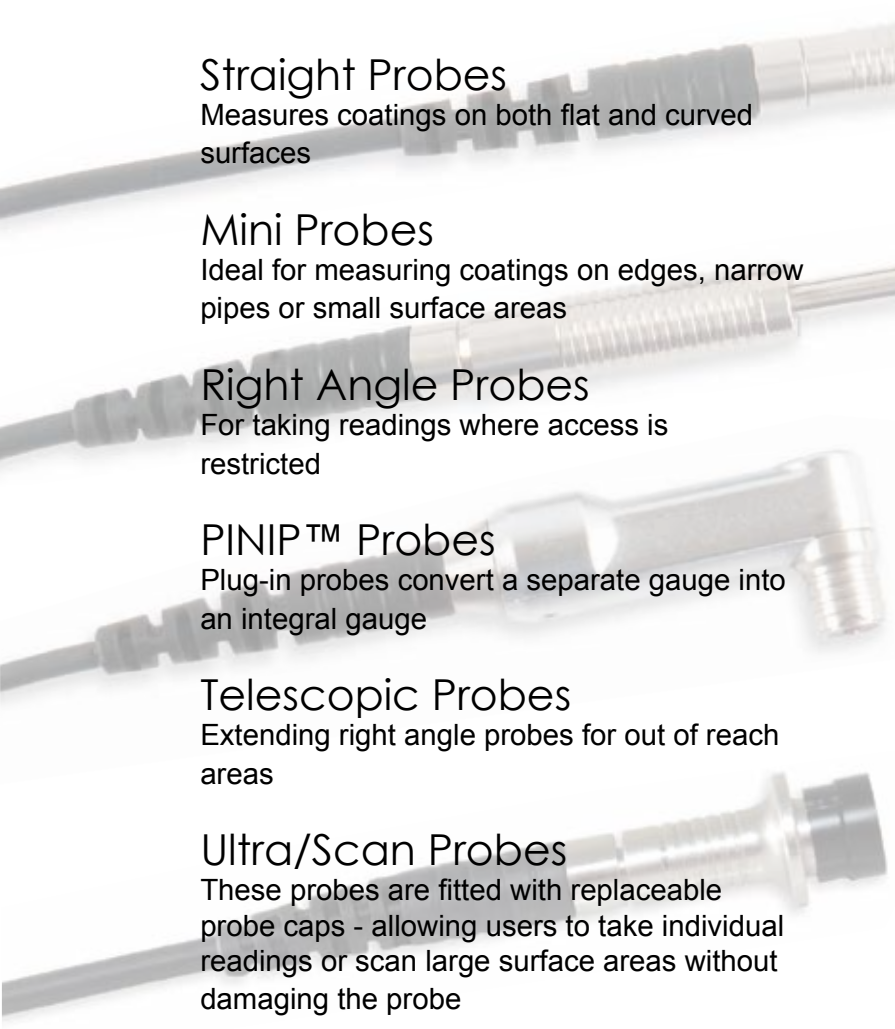
● Certificate supplied as standard.

* Whichever is the greater

Probe range

Elcometer 456

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 16 for further information.

elcometer®

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

* Whichever is the greater

● Certificate supplied as standard.

Probe range

Elcometer 456

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”) N 160mm (6.30”)	F 51 x 51mm² (2 x 2 sq. inch) N 58mm (2.29”)
 Armoured	T456CF6ARM	T456CN6ARM	-	F 190mm (7.48”) N 200mm (7.87”)	F 51 x 51mm² (2 x 2 sq. inch) 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”) N 6mm (0.24”)	F 3mm (0.12”) N 4mm (0.16”)
 Mini 90° 45mm (1.77”)	T456CFM3R90A	T456CNM3R90A	-	F 16mm (0.63”) N 16mm (0.63”)	F 3mm (0.12”) 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”) N 6mm (0.24”)	F 3mm (0.12”) N 4mm (0.16”)
Mini 90° 150mm (5.90”)	T456CFM3R90C	T456CNM3R90C	-	F 16mm (0.63”) N 16mm (0.63”)	F 3mm (0.12”) 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	-	N 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”)

Scale 1 Ultra/Scan

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 86mm (3.38”) FNF 89mm (3.50”)	F, FNF 15mm (0.59”)

Scale 2 Ultra/Scan

Range: 0-5mm (0-200mils)+ — Accuracy*^: ±1-3% or ±0.02mm (±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†
 Ultra/Scan Probe	T456CF2U	-	-	F 90mm (3.54”)	F 15mm (0.59”)

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

^ When calibrated using a sample of the uncoated substrate

+ Excluding probe end cap

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

* Whichever is the greater

● Certificate supplied as standard.

Elcometer 456 probes are covered by a 1 year warranty

Elcometer 456

Probe 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

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.

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)		

Coated Thickness Standards

Elcometer 995

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

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	●

Zero Test Plates

Elcometer 990

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 16).

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-

● Calibration Certificate supplied as standard.

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 - 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

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

Total Quality Assurance

ElcoMaster™ data management software

Professional inspection reports provide a competitive advantage in today's industrial environment.

The new ElcoMaster™ is a fast, easy to use software solution for all your reporting requirements.

Using ElcoMaster™ wizard, connecting a gauge to download data is fast and easy

Using ElcoMaster's™ inbuilt Report Designer, readings can quickly be displayed on an image or drawing

ElcoMaster™ allows you to download all your inspection measurements - from any Elcometer gauge

Suitable for use in Cloud Computing

Data can be stored in a simple file tree, by project and by inspection type. Data is clearly displayed in tabular format

Readings from different Elcometer gauges can be printed on the same report - and can be quickly inserted into standard report tables

ElcoMaster™ gives you the power to review your data and produce professional reports quickly and easily.

Internal wizards guide you through each step, from connecting a gauge to generating a report.

Features:

- Produce and combine measurements from any Elcometer inspection gauge in one report
- Add photographs, limits & notes to your reports
- Export to Excel or other spreadsheet formats
- Print, email or generate .pdf reports
- Design your own reports and drag & drop readings or statistics onto the report
- Combine multiple batches into one report
- Communicate and link with ElcoMaster™ Mobile
- Automatic upgrade notifications inform and allow users to upgrade their Elcometer gauges & ElcoMaster™ software in the field

ElcoMaster™ Mobile for iPhone and Android™ allows users to:

- Transfer live readings or batches from Elcometer Bluetooth® gauges to mobile phones, tablets or PC's
- Collect data via collection image templates, identifying where each reading should be taken[1]
- Provides instant data analysis remotely and emails key data, including readings, notes & photographs, etc. - generating .pdf reports[2] from the field to the office

For more information please visit our website at elcometer.com.

ANDROID APP ON Google play

Download on the App Store

[1] Available on Android only

[2] Available on iOS devices only

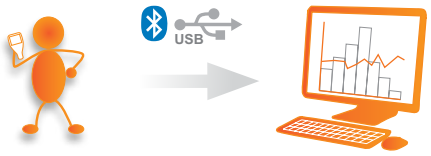
ElcoMaster™ data management software

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

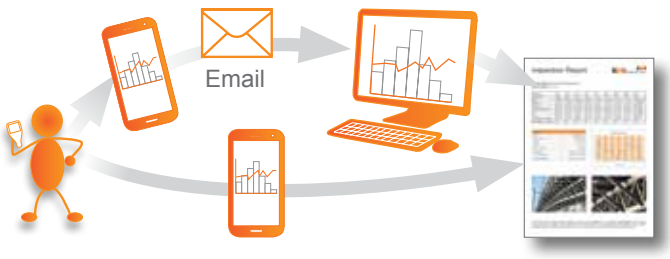


Transferring inspection data straight into Microsoft Excel via Bluetooth® or USB is simple and easy.

2. Gauge to PC data transfer into ElcoMaster™

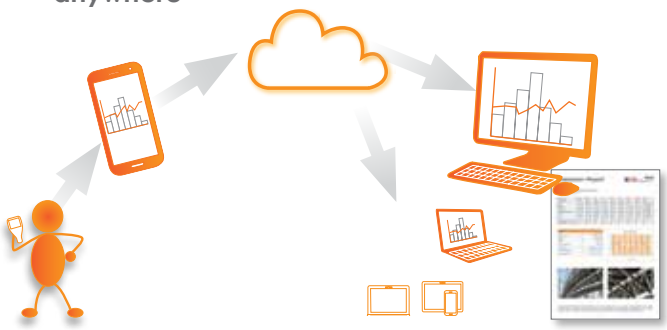
Using Bluetooth® or USB, ElcoMaster™ transfers inspection data in seconds, archiving data and generating reports at the click of a button.

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



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.

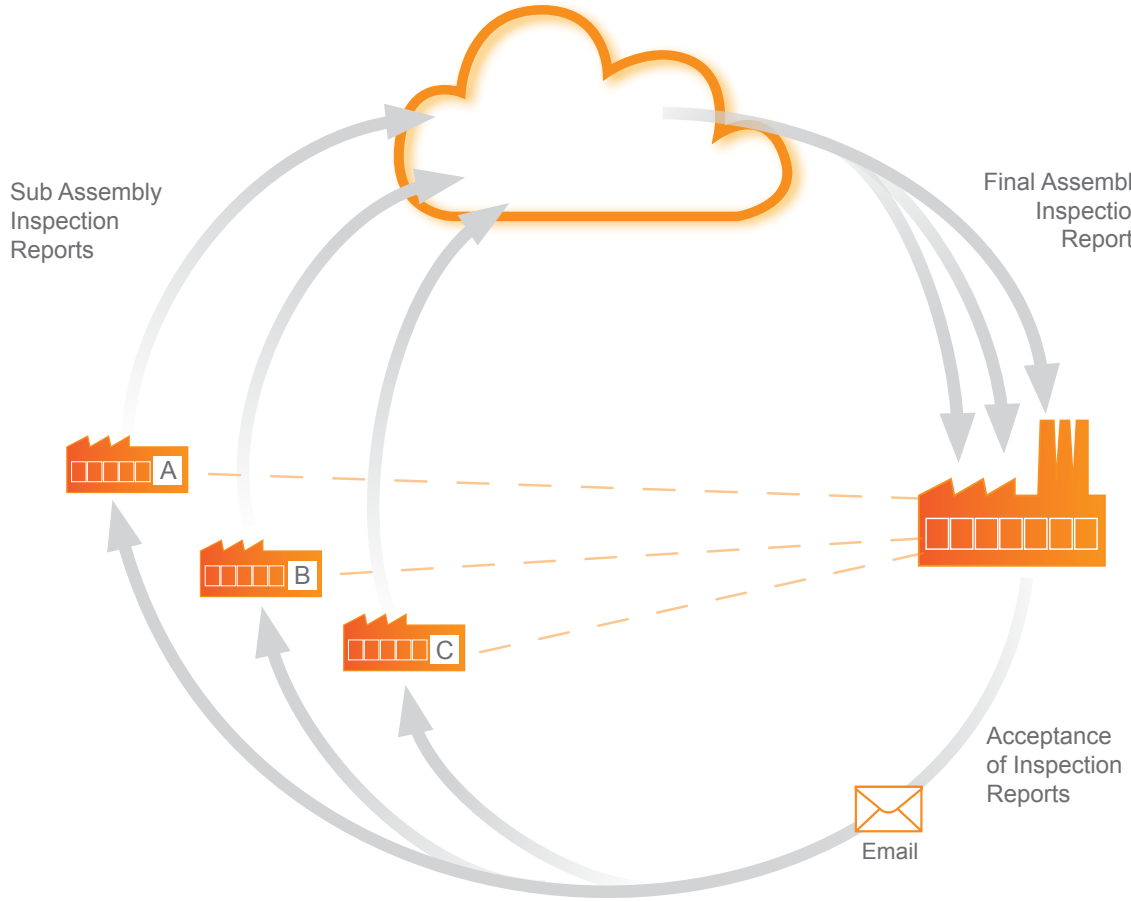
[1] Available on iOS devices only

[2] Available on Android™ only

How ElcoMaster™ Works

ElcoMaster™ data management software

6. Real time collaboration for multi-site projects



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