

User Guide

Elcometer 415

Paint & Powder Gauge

(for measuring on smooth surfaces)

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Android™ 



Made for

 iPhone | iPad | iPod

For the avoidance of doubt, please refer to the original English language version.

Gauge Dimensions: 141 x 73 x 37mm (5.55 x 2.87 x 1.46")

Gauge Weight: 156g (5.5oz) including batteries

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1 GAUGE OVERVIEW



- 1 LED Indicators - Red (left), Green (right)
- 2 Colour Screen
- 3 Multifunction Softkeys
- 4 On/Off Key
- 5 Integral Probe
- 6 USB Data Output Socket (below cover)
- 7 Battery Compartment (¼ turn open/close)
- 8 Wrist Strap Connection

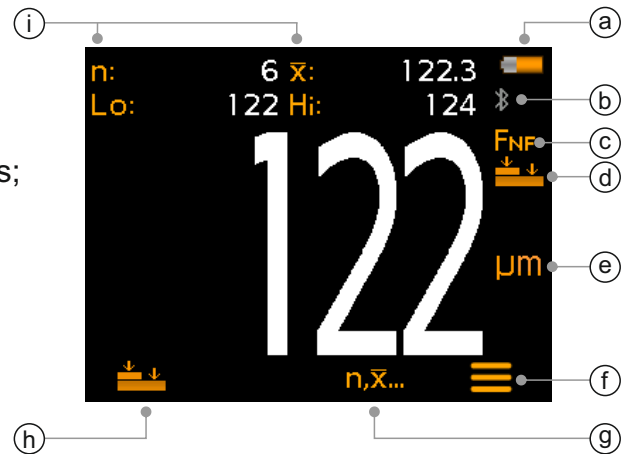
2 BOX CONTENTS

- Elcometer 415 Paint & Powder Gauge
- Calibration Check Piece; Steel
- Calibration Check Piece; Aluminium (FNF gauges only)
- Foil Set^a
- Screen Protector (Model T only)
- Wrist Strap
- Protective Case
- 2 x AA Batteries
- ElcoMaster[®] Software & USB Cable (Model T only)
- Test Certificate
- User Guide

^a Nominal Values: 25, 50, 125, 250, 500 & 1000µm (1.0, 2.0, 5.0, 10, 20, 40mils)

3 USING THE GAUGE

- a Power: Batteries or USB - including battery life indicator
- b Bluetooth On (Model T only) - Grey: not paired; Orange: paired
- c Substrate Type - F: Ferrous; FNF: Ferrous; FNF: Non-Ferrous
- d Calibration Method
- e Units of Measurement - μm , mils
- f Menu Softkey
- g Statistics Softkey (see page en-6)
- h Calibration Softkey
- i Statistics



4 GETTING STARTED

4.1 ENSURING YOUR GAUGE HAS THE LATEST FIRMWARE & UPGRADING YOUR GAUGE

To ensure that your gauge has the most up-to-date gauge firmware, allowing you to benefit from the latest features and functionality, we recommend that the gauge is connected to ElcoMaster® on a regular basis and before first use.

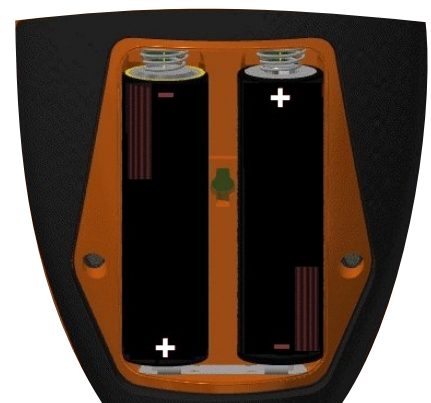
Simply connect the gauge via USB to an internet connected computer running ElcoMaster® using the 'Connect Gauge' feature. If a later version of the gauge firmware is available, 'Update Gauge' will be displayed to the right of the gauge details. Click 'Update Gauge' to install the latest firmware.

4.2 FITTING THE BATTERIES


Each gauge is supplied with 2 x AA alkaline batteries.

To insert or replace the batteries:

- 1 Lift the latch on the battery compartment cover and rotate anti-clockwise to remove the cover.
- 2 Insert 2 batteries taking care to ensure correct polarity.
- 3 Refit the cover and rotate the latch clockwise to close.



4 GETTING STARTED (continued)

The battery condition is indicated by a symbol in the top right of the display ():

- ▶ Full symbol (orange) = batteries at full capacity
- ▶ Empty symbol (red, flashing) = batteries at lowest sustainable level

4.3 SWITCHING ON / OFF

To switch on: Press and hold the ON/OFF button until the Elcometer logo is displayed.

To switch off: Press and hold the ON/OFF button until the screen goes blank.

Note: The gauge will switch off automatically after 1 minute of inactivity.

4.4 SETTING THE BEEP VOLUME

The gauge beeps each time a measurement is taken. To set the beep volume:

- 1 Press the '≡' softkey.
- 2 Use the ↑↓ softkeys to highlight '🔊' and press '☑' to select.
- 3 Use the ↑↓ softkeys to adjust the volume and press '☑' to set or '✕' to disregard any changes made and return to the previous screen.

4.5 SETTING THE SCREEN BRIGHTNESS

The screen brightness can be set to 'A' (Auto) - the brightness is adjusted automatically using the gauge's ambient light sensor - or can be set by the user to suit the measurement conditions. To set the screen brightness:

- 1 Press the '≡' softkey.
- 2 Use the ↑↓ softkeys to highlight '☀' and press '☑' to select.
- 3 Use the ↑↓ softkeys to adjust the screen brightness and press '☑' to set or '✕' to disregard any changes made and return to the previous screen.
 - ▶ The default setting is 'A' (Auto) .

4 GETTING STARTED (continued)

4.6 SELECTING THE MEASUREMENT UNITS



The Elcometer 415 can take measurements in μm and mils. To set the measurement units:

- 1 Press the '☰' softkey.
- 2 Use the $\uparrow\downarrow$ softkeys to highlight ' $\mu\text{m}/\text{mil}$ ' and press '☑' to alternate between ' μm ' and 'mil', followed by the \leftarrow softkey to return to the main reading screen.

4.7 SCREEN ROTATION

Using the internal accelerometer, the gauge will automatically rotate the display to allow the user to easily read the thickness value in any orientation - 0° , 90° , 180° & 270° .

To enable / disable automatic screen rotation:

- 1 Press the '☰' softkey.
- 2 Use the $\uparrow\downarrow$ softkeys to highlight '' and press '☑' to alternate between '' (disabled) and '☑' (enabled), followed by the \leftarrow softkey to return to the main reading screen.

5 TAKING A READING

The gauge should be calibrated before taking readings, see Section 7 'Calibrating the Gauge' on page en-6.

To take a reading:

- 1 Whilst holding the gauge perpendicular, gently place the probe onto the surface.
 - ▶ The reading may be inaccurate if the probe is not held flat against the surface.
- 2 The coating thickness is shown on the display.
 - ▶ '>1000 μm ' ('>40mils') indicates a reading outside the gauge range.
- 3 For subsequent readings, lift the probe off and then replace it on to the coated surface.

Using ElcoMaster® the Elcometer 415 can simultaneously transmit the live reading to a PC or mobile device (Model T only) for report generation, see Section 8 'Downloading Data' on page en-8 for more information.

The Elcometer 415 calculates and displays statistical values as each reading is taken, see Section 6 'Statistics' for details.

6 STATISTICS

The Elcometer 415 calculates and displays the following statistical values as each measurement is taken:

- Number of readings (n:)
- Average reading (\bar{X} :)
- Lowest reading (Lo:)
- Highest reading (Hi:)



To display or hide the statistics from the screen, press the 'n, \bar{X} ...' softkey.

To clear the current statistical values, press and hold the 'n, \bar{X} ...' softkey for approximately 3 seconds (when statistics are displayed). The gauge will beep and the statistics will reset to zero.

7 CALIBRATING THE GAUGE

Calibration adjustment is the process of setting the gauge to known values of thickness to ensure accuracy on different substrate types, shapes and surface finishes.

The calibration adjustment method chosen depends on the condition of the substrate to be measured. As the Elcometer 415 has been specifically designed for measuring smooth coatings on thin ferrous and non-ferrous metal surfaces, two calibration options are available; Zero Calibration and Smooth Calibration.

| Calibration Method | Icon | Description |
|--------------------|---|--|
| Zero Calibration |  | A simple method for calibrating on smooth substrates. Simply place the probe on the uncoated metal and the gauge will adjust the calibration accordingly. Also known as the single point calibration method. |
| Smooth Calibration |  | This is a more accurate method of calibrating the gauge than the Zero method as it requires the user to calibrate the gauge using a foil of known thickness and the uncoated substrate. |

7 CALIBRATING THE GAUGE (continued)

7.1 SELECTING THE CALIBRATION METHOD

- 1 Press the '☰' softkey.
- 2 Use the '↑'/'↓' softkeys to highlight '↓/☰' and press '☑' to alternate between Zero '↓' and Smooth '☰' calibration, followed by the '←' softkey to return to the main reading screen.

7.2 USING ZERO CALIBRATION

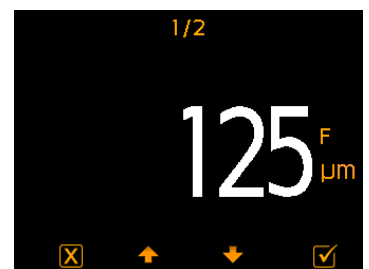
- 1 Press the '↓' softkey.
- 2 When prompted, whilst holding the gauge perpendicular, gently place the probe onto the uncoated metal substrate. 'Zero' will be displayed and the gauge will return to the main reading screen.

Note: FNF gauges must be calibrated in both the ferrous and non-ferrous mode to ensure accuracy of readings.



7.3 USING SMOOTH CALIBRATION

- 1 Press the '☰' softkey.
- 2 When prompted, whilst holding the gauge perpendicular, gently place the probe onto the centre of the foil(s).
 - ▶ When selecting the foil value, the user should choose a thickness that is close to but greater than the expected dry film thickness value.
 - ▶ Foils can also be stacked to increase the thickness value.
- 3 Use the '↑'/'↓' softkeys to adjust the value, followed by '☑' to set.
- 4 When prompted, whilst holding the gauge perpendicular, gently place the probe onto the uncoated metal substrate. 'Zero' will be displayed and the gauge will return to the main reading screen.



Note: FNF gauges must be calibrated in both the ferrous and non-ferrous mode to ensure accuracy of readings.

7 CALIBRATING THE GAUGE (continued)

7.4 CHECKING THE GAUGE CALIBRATION

- 1 Place a calibration foil on to the steel or aluminium check piece supplied.
- 2 Whilst holding the gauge perpendicular, gently place the probe onto the foil.
- 3 The gauge should read the value printed on the foil label $\pm 1-3\%$ or $\pm 2.5\mu\text{m}$ ($\pm 0.1\text{mil}$) - whichever is the greater.

If the gauge does not display a valid reading, it may require re-calibration - see Sections 7.2 & 7.3.

8 DOWNLOADING DATA

8.1 USING ELCOMASTER® ON A PC

Using ElcoMaster® - supplied with each gauge and available as a free download at elcometer.com - the Elcometer 415 can simultaneously transmit the live reading via USB or Bluetooth® (Model T only), to a PC for report generation. For more information on ElcoMaster® visit www.elcometer.com.

8.2 USING ELCOMASTER® MOBILE APPS - MODEL T

Ideal when out in the field or on-site, using the ElcoMaster® Mobile App users can:

- Store live readings directly on to a mobile device and save them into batches together with GPS coordinates.
- Add photographs of the test surface (via the mobile device's camera).
- Map readings on to a photograph or diagram (when using the 'Collect Design' function in ElcoMaster® - see Appendix 2 'ElcoMaster® Collect Design' on page en-13)
- Inspection data can be transferred from mobile to PC for further analysis and reporting.

For more information on ElcoMaster® Mobile Apps visit www.elcometer.com



Compatible with smart phones and tablets running Android 2.1 or above. To install, download via www.elcometer.com or using the Google Play™ Store app, and follow the on screen instructions.

8 DOWNLOADING DATA (continued)



Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation). To install, download via www.elcometer.com or the App Store, and follow the on screen instructions.

9 UPGRADING YOUR GAUGE

Gauge firmware can be upgraded to the latest version by the user via ElcoMaster®, as it becomes available. ElcoMaster® will inform the user of any updates when the gauge is connected to the PC with an internet connection.

10 SPARES & ACCESSORIES

The following spares and accessories are available from your local Elcometer supplier or direct from Elcometer.

| Description | Part Number |
|--|--------------|
| Calibration Check Piece; Steel (Ferrous) | T99916925 |
| Calibration Check Piece; Aluminium (Non-Ferrous) | T99916901 |
| Foil Set; 0 - 1000µm (0 - 40mils) ^a | T99022255-1 |
| Certified Foil Set; 0 - 1000µm (0 - 40mils) ^a | T99022255-1C |
| USB Cable | T99921325 |
| Self Adhesive Screen Protectors, Pack of 10 | T99922341 |

11 WARRANTY STATEMENT

Elcometer 415 gauges are supplied with a one year warranty against manufacturing defects, excluding contamination and wear.

The warranty can be extended to two years within 60 days of purchase via www.elcometer.com.

^a Nominal Values: 25, 50, 125, 250, 500 & 1000µm (1.0, 2.0, 5.0, 10, 20, 40mils)

12 TECHNICAL SPECIFICATION

| | | |
|---|--|---------------------------------|
| Range | 0 - 1000µm (0 - 40mils) | |
| Accuracy^b | ±1-3% or ±2.5µm (±0.1mil) | |
| Resolution | 0.1µm: 0-100µm; 1µm: 100-1000µm (0.01mil: 0-5mils; 0.1mil: 5-40mils) | |
| Minimum Substrate Thickness | Steel: | 300µm (12mils) |
| | Aluminium: | 100µm (4mils) - FNF gauges only |
| Measurement Speed | Up to 60 readings per minute | |
| Operating Temperature | -10 to 50°C (14 to 122°F) | |
| Relative Humidity | 0 to 95% | |
| Power Supply | 2 x AA Batteries or via USB Cable (rechargeable batteries can also be used) | |
| Battery Life^c | Alkaline: Approximately 16 hours Lithium: Approximately 24 hours | |
| Gauge Dimensions | 14.1 x 7.30 x 3.70cm (5.55 x 2.87 x 1.46") | |
| Gauge Weight (including batteries) | 156g (5.5oz) | |
| <p>Can be used in accordance with: AS2331.1.4, AS/NZS 1580.108.1, ASTM B 499, ASTM D 1186, ASTM D 1400, ASTM D 7091, ASTM E 376, BS 3900-C5-6A, BS 3900-C5-6B, BS 5411-11, BS 5411-3, BS 5599, DIN 50981, DIN 50984, ECCA T1, EN 13523-1, ISO 2178, ISO 2360, ISO 2808-12, ISO 2808-6A, ISO 2808-6B, ISO 2808-7C, ISO 2808-7D, JIS K 5600-1-7, NF T30-124</p> | | |

^b When subject to a 2-point calibration: ±1% when calibrated close to the required thickness, ±3% across the range.

^c Rechargeable batteries may differ.

13 LEGAL NOTICES & REGULATORY INFORMATION

Declaration of Conformity:

Elcometer 415 Model B complies with the requirements of the following EU Directives:

2014/30/EU Electromagnetic Compatibility
2011/65/EU Restriction of the use of certain hazardous substances

Elcometer 415 Model T complies with the requirements of the following EU Directives:

2014/53/EU Radio Equipment
2011/65/EU Restriction of the use of certain hazardous substances

Declarations of Conformity are available to download via:

Model B: www.elcometer.com/images/stories/PDFs/Datasheets/Declaration_of_Conformity/English/DoC_415C_B.pdf

Model T: www.elcometer.com/images/stories/PDFs/Datasheets/Declaration_of_Conformity/English/DoC_415C_T.pdf

Operational Frequency Band: 2,402 - 2,480 MHz

Maximum Transmitted Power: <4 dBm

This product is Class B, Group 1 ISM equipment according to CISPR 11.

Class B product: Suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Group 1 ISM product: A product in which there is intentionally generated and/or used conductively coupled radio frequency energy which is necessary for the internal functioning of the equipment itself.

The USB is for data transfer only and is not to be connected to the mains via a USB mains adapter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Elcometer 415 Model T: The FCC ID and Bluetooth SIG QDID can be accessed by pressing '≡' followed by '🔗'.

Elcometer 415 Model B: The regulatory information can be accessed by pressing and holding the ON/OFF button whilst the gauge is switched off until the menu is displayed, followed by '🔗'.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Modifications not expressly approved by Elcometer Limited could void the user's authority to operate the equipment under FCC rules.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with CAN ICES-3 (B)/NMB-3(B).

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 Bluetooth are trademarks owned by Bluetooth SIG Inc and licensed to Elcometer Limited.

Elcometer 415 Model T: Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation).

"Made for iPod," "Made for iPhone," and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPod, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPod, iPhone, or iPad may affect wireless performance.

iPad, iPhone, and iPod touch are trademarks of Apple Inc., registered in the U.S. and other countries.

App Store is a trademark of Apple Inc., registered in the U.S. and other countries.














Google Play is a trademark of Google Inc.

All other trademarks acknowledged.

The Elcometer 415 is packed in a cardboard package. Please ensure that all packaging is disposed of in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

Head-Office: Elcometer Limited, Edge Lane, Manchester, M43 6BU, United Kingdom.

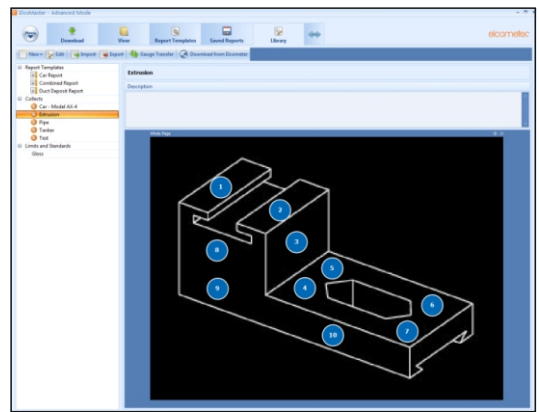
14 APPENDIX 1: SUMMARY OF GAUGE ICONS

| Icon | Description | Model |
|---|--|-------|
|  | Power: Batteries - Including Battery Life Indicator | B, T |
|  | Power: USB | B, T |
|  | Bluetooth On - Grey: not paired; Orange: paired | T |
| F, FNF, FNF | Substrate Type - F; Ferrous (Model B) FNF Gauges (Auto Detect) - FNF: Ferrous; FNF: Non-Ferrous | B, T |
| μm | Units of Measurement - μm | B, T |
| mils | Units of Measurement - mils | B, T |
|  | Menu Softkey | B, T |
| n, \bar{x} ... | Statistics Softkey | B, T |
|  | Calibration Softkey | B, T |
|  | Calibration Menu Option | B, T |
| $\mu\text{m}/\text{mils}$ | Units of Measurement Menu Option | B, T |
|  | Volume Setting Menu Option | B, T |
|  | Screen Brightness Menu Option | B, T |
|  | Automatic Screen Rotation - On / Off | B, T |
|  | Legal Information Menu Option | B, T |
|  | Select / Set Softkey | B, T |
|  | Escape Softkey | B, T |
|  | Elcometer Contact Details Menu Option | B, T |

15 APPENDIX 2: ELCOMASTER® COLLECT DESIGN

The 'Collect Design' function in ElcoMaster® allows users to set up a collection template to guide Inspectors where, and in which order, readings should be taken.

This image can be used as a collection guide in ElcoMaster® on a PC or can be transferred to a mobile device using the ElcoMaster® Mobile App.

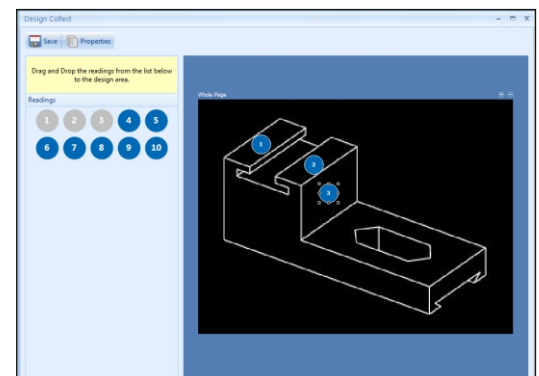
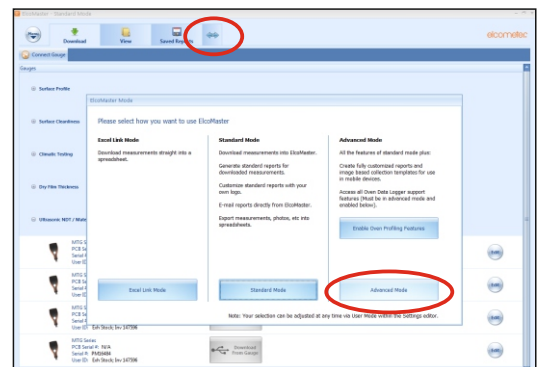


When creating a new 'Collect Design' the user:

- Adds the required image to collect readings against;
- Specifies the number of readings to be taken;
- Enters any relevant limits;
- Can request a prompt to begin the next set of readings or begin automatically;
- Choose to create a new batch for each set of readings or create a single batch with multiple readings.

To set up a new 'Collect Design':

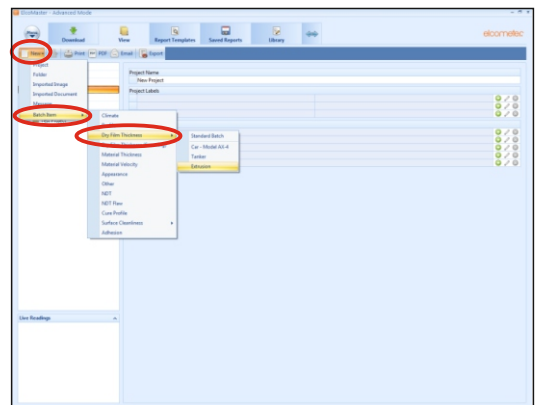
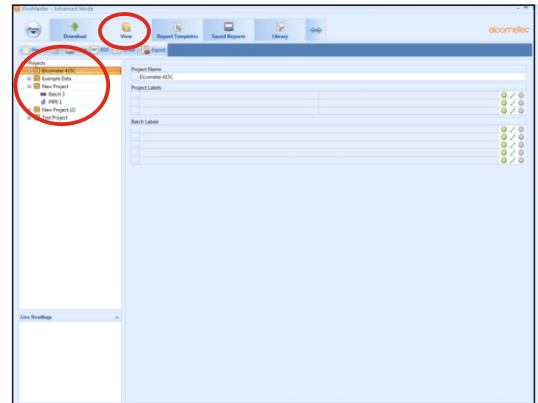
- 1 Switch ElcoMaster® to 'Advanced Mode' by clicking the expand arrow and selecting 'Advanced Mode'.
- 2 Click on 'Library' → 'New' → 'Collect Design'.
- 3 Follow the on-screen prompts and click 'Finish' to begin the design.
- 4 To indicate on the image where each reading is to be taken and in which order, simply click and hold each 'reading' circle in turn, drag onto the image and adjust the size accordingly.
- 5 When complete click 'Save' and click the 'x' button in the top right to close the design window.



15 APPENDIX 2: ELCOMASTER® COLLECT DESIGN

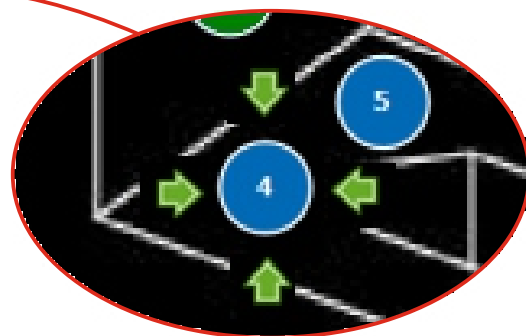
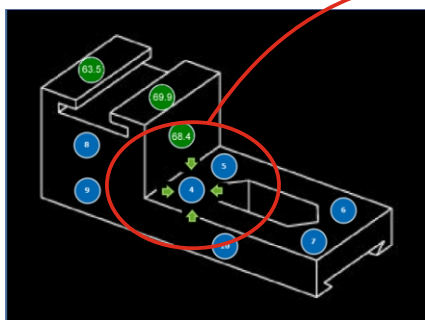
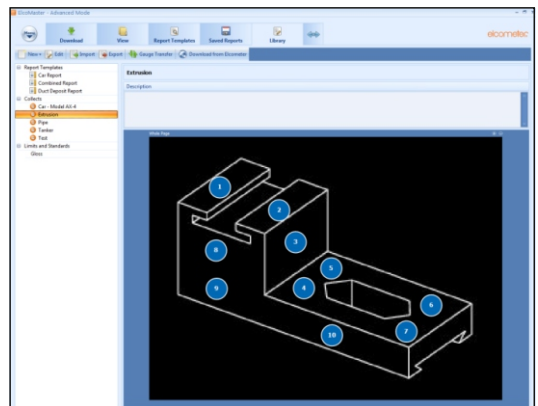
To use a 'Collect Design':

- 1 Click on the 'View' tab and select a folder or project.
- 2 Click on 'New' → 'Batch Item' → 'Dry Film Thickness' and select the required Collect Design. A new batch will be created. Unlike standard batches it will have an additional tab with the same name as the Collect Design, click on this to show your design.
- 3 To begin collection, click on 'Connect Gauge' in the 'Live Readings' window.
- 4 Select a gauge from the list[†].
- 5 Select the relevant connection method.



ElcoMaster® will link the selected gauge and, when ready, display the gauge information within the Live Readings window.

Once connected, green arrows will flash around the first 'reading' circle to measure. When a measurement is taken, the 'reading' circle will change to show the measured value[‡], and the green arrows will move to the next reading.



[†] The gauge must be connected to ElcoMaster® before it will appear in the list.

[‡] The 'reading circle' will be green if the measurement is within set limits or no limits have been set and red, if outside set limits.

