

# **Elcometer 456**

## **Duct Deposit Measuring System**

### **Operating Instructions**



The Elcometer 456 Models B, S & T meet the Radio and Telecommunications Terminal Equipment Directive. The Model E meets the Electromagnetic Compatibility Directive. 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.

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.

**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.

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

This Class B digital apparatus complies with Canadian ICES-003

---

elcometer® is a registered trademark of Elcometer Limited, Edge Lane, Manchester, M43 6BU. United Kingdom

 Bluetooth are trademarks owned by Bluetooth SIG Inc and licensed to Elcometer Limited. Bluetooth SIG QDID = B014393

All other trademarks acknowledged.

Gauge dimensions: 140 x 720 x 450mm (5.51 x 2.83 x 1.77"). Gauge Weight: 154g (5.43oz) including batteries.

Applicable patents: US6243661; US5886522; US676203; US760667B2; GB2306009B; GB2367135B; GB2342450A, DE10131827

© Elcometer Limited 2011. All rights reserved. No part of this document may be reproduced, transmitted, transcribed, stored (in a retrieval system or otherwise) or translated into any language, in any form or by any means (electronic, mechanical, magnetic, optical, manual or otherwise) without the prior written permission of Elcometer Limited

## CONTENTS

---

<b>Section</b>	<b>Page</b>
<b>1 About this equipment</b> .....	<b>3</b>
<b>2 Getting started</b> .....	<b>5</b>
<b>3 Connecting your probe</b> .....	<b>5</b>
<b>4 Taking a reading</b> .....	<b>6</b>
<b>5 Using the duct cleaning template</b> .....	<b>7</b>
<b>6 Calibrating the gauge</b> .....	<b>9</b>
<b>7 Transferring readings to a computer</b> .....	<b>9</b>
<b>8 Producing reports using ElcoMaster™ 2.0</b> .....	<b>10</b>
<b>9 Probe technical data</b> .....	<b>14</b>
<b>10 Spares and accessories</b> .....	<b>15</b>
<b>11 Related equipment</b> .....	<b>15</b>

Thank you for your purchase of this Elcometer 456 Duct Deposit Measuring System. Welcome to Elcometer.

Elcometer are world leaders in the design, manufacture and supply of coatings inspection equipment. Our products cover all aspects of coating inspection, from development through application to post application inspection.

The Elcometer 456 Duct Deposit Measuring System is a world beating product. With the purchase of this product you now have access to the worldwide service and support network of Elcometer. For more information visit our website at [www.elcometer.com](http://www.elcometer.com).

## 1 ABOUT THIS EQUIPMENT

---

The Elcometer 456 Duct Deposit Measuring System is designed for measurement of the thickness of dust and grease deposits within ventilation systems and kitchen ducts made of ferrous metals.

Use the template supplied to help you take readings of deposit thickness over the test area and then save your measurements in the gauge memory. When you have finished testing, download your measurements to a PC via Bluetooth® or cable and then produce a professional survey report using the pre-designed reports in ElcoMaster™ 2.0 software. This is the DTT (Deposit Thickness Test) in HVCA guide TR/19.

**To maximise the benefits of your new Elcometer 456 Duct Deposit Measuring System, please take some time to read these Operating Instructions and the separate instruction manual for the Elcometer 456 gauge. Do not hesitate to contact Elcometer or your Elcometer supplier if you have any questions.**

## 1.1 CHECKING THE CONTENTS OF THE BOX

- Elcometer 456 Model T Coating Thickness Gauge
- Ferrous Scale 2B Probe: 0-5mm
- Probe calibration foils: 25, 50, 125, 250, 500, 1000 $\mu$ m, 2mm (x2)  
[1, 2, 5, 10, 20, 40, 80mils (x2)]
- Duct Cleaning Template
- ElcoMaster™ 2.0 Software, including Duct Deposit Report template
- USB Cable
- Batteries, x2
- Wrist Harness
- Black Plastic Carry Case
- Operating Instructions

## 1.2 PACKAGING

The equipment is packed in cardboard and plastic packaging. Please ensure that this packaging is disposed of in an environmentally sensitive manner. Consult your Local Environmental Authority for further guidance.

## 2 GETTING STARTED

---

1. Press and hold the ON/OFF button until the Elcometer logo is displayed
2. Select your language using the  $\uparrow$   $\downarrow$  softkeys
3. Follow the on screen menus

To access the language menu when in a foreign language:

1. Switch the gauge OFF
2. Press and hold the left softkey and switch the gauge ON
3. Select your language using the  $\uparrow$   $\downarrow$  softkeys

### 2.1 INTERFACING WITH A PC

Your gauge has a Bluetooth® interface. Connect your gauge to your PC using Bluetooth® for quick and easy data transfer and welcome screen download - see “Transferring readings to a computer” on page 8.

If your PC does not have a Bluetooth® interface, use a Bluetooth® to USB convertor (see “Spares and accessories” on page 14) or connect your gauge using the USB interface located on the end of your gauge with the optional USB connection cable supplied.

## 3 CONNECTING YOUR PROBE

---

1. Rotate the probe socket to align the pins
2. Screw in the collar - clockwise



## 4 TAKING A READING

---

### 4.1 BEFORE YOU START

*Have you calibrated the gauge?.....* see Cal and follow the steps on page 8

*Do you require statistics?.....* press Stats.

*Do you want to save readings?.....* press Batch.

*Have you selected units ( $\mu\text{m}$ , etc)?... press Menu/Setup/Units*

1. Hold the probe by the sleeve
2. To take a reading, bring the probe down onto the surface whilst holding it perpendicular
3. For subsequent readings, lift the probe off and then replace onto the coated surface

#### ✓ DO

- Hold the probe by the probe sleeve
- Gently place the probe onto the surface
- Allow the sleeve to make contact with the surface - to improve accuracy

- ▶ The display will dim if inactive for more than 15 seconds and will go 'black' if inactive for the period defined in Menu/Setup/Display/Screen Timeout.
- ▶ The gauge will switch off automatically after 5 minutes of inactivity
- ▶ - - - indicates reading outside range of probe

#### ✗ DO NOT

- Drag the probe over the coated surface
- Bang the probe down hard onto the surface
- Allow the probe to hover over the surface as this could result in a false reading

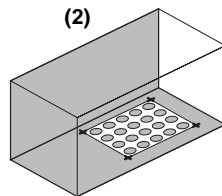
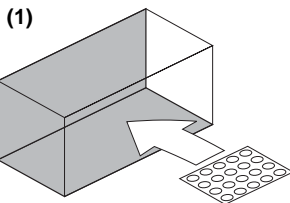
## 5 USING THE DUCT CLEANING TEMPLATE

---

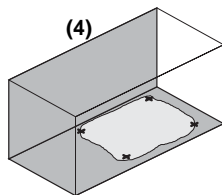
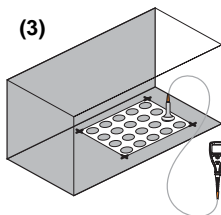
Take readings (see page 5) in accordance with the appropriate HVCA<sup>a</sup> method of measurement.

Use the Duct Cleaning Template supplied and the procedure described below to help you take a group of 20 readings before and after cleaning in the test location. Then output your readings to ElcoMaster™ 2.0.

1. Place the Duct Cleaning Template in the duct.
2. Mark the position of each corner.



3. Use your gauge to take a reading in each of the holes in the template and save all these readings in a batch.
4. Remove the template and clean the surface of the duct within the boundaries of the corner marks.

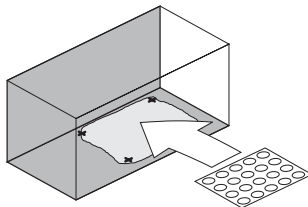
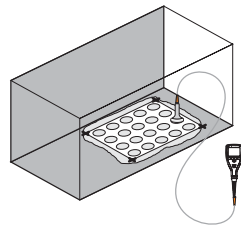


---

a. Heating and Ventilating Contractors' Association, Guide to Good Practice TR/19, Cleanliness of Ventilation Systems ([www.hvca.org.uk](http://www.hvca.org.uk)).



5. Replace the Duct Cleaning Template in the duct ensuring that it is in the same position as before - use the corner marks as positioning guides.
6. Use your gauge to take a second set of readings in the same order as the first set and save your readings in the same batch.
7. Connect your gauge to a PC and use the Duct Deposit Report template in ElcoMaster™ 2.0 to produce a professional report of your readings - see "Producing reports using ElcoMaster™ 2.0" on page 9.

**(5)****(6)**

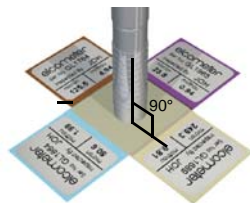
## 6 CALIBRATING THE GAUGE

---

1. Press the Cal softkey
2. For alternative calibration methods, select Cal/Cal Method
3. Select Calibrate and follow the on-screen instructions
4. When prompted place the probe on the centre of the foil(s)

**Note:** Foils can be stacked

You have now finished calibrating your gauge and it is ready for use. You may wish to test the gauge again using the stacked shims.



## 7 TRANSFERRING READINGS TO A COMPUTER

---

Transfer the readings you take from the memory of the gauge to a PC for archiving, analysis and reporting.

### 7.1 SOFTWARE

Your gauge comes complete with software which allows data to be transferred to a PC using Bluetooth® or the optional USB connection cable. The CD supplied with your gauge includes the ElcoMaster™ 2.0.

ElcoMaster™ 2.0 software contains a report designed specifically for duct deposit measurements. Data can be transferred from the batch memory of the Elcometer 456 gauge and can also be transferred as the measurements are taken. ElcoMaster™ 2.0 includes all the charts that you may need together with a report designer to let you design your reports the way you wish to see them. ElcoMaster™ 2.0 can also be used to create personalised welcome screens and upload them to your gauge.

## 7.2 CABLE CONNECTION

1. Connect your gauge to your PC using the optional USB connection cable. Connect the cable between the interface on the end of the gauge and an USB port on your PC.
2. Switch on your gauge and ensure the Reading Screen is displayed.
3. Start ElcoMaster™ 2.0 and follow the instructions included with the software.

## 7.3 BLUETOOTH® CONNECTION

Full instructions on how to interface your gauge with ElcoMaster™ 2.0 and download data are included in the ElcoMaster™ 2.0 help file supplied with the software.

## 8 PRODUCING REPORTS USING ELCOMASTER™ 2.0

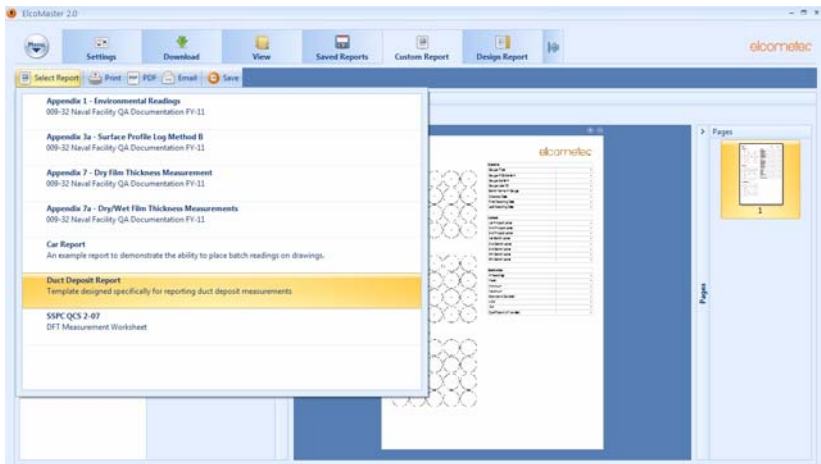
---

The ElcoMaster™ 2.0 software included with your Elcometer 456 gauge includes a report designed specifically for duct deposit measurements. Follow the steps listed below to download readings from the gauge to ElcoMaster™ 2.0 and then output the report to a printer, a file or to email. Further information can be found in the instructions provided with your gauge and the help file contained within ElcoMaster™ 2.0.

### 8.1 DOWNLOAD READINGS DATA FROM GAUGE MEMORY

Before you start, interface and add your gauge to ElcoMaster™ 2.0 - refer to the instructions included with ElcoMaster™ 2.0 software.

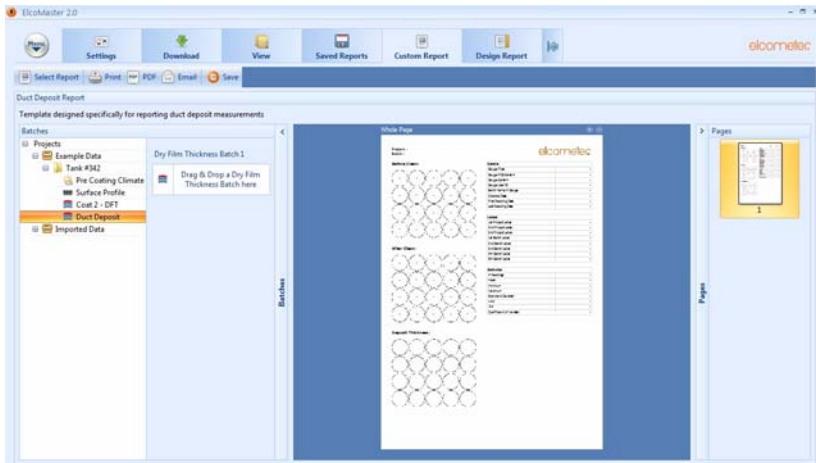
1. Ensure your gauge is connected - refer to the following screenshot.
2. Click on the batch or batches you want to download (hold down the Ctrl key to select multiple batches).
3. Click on the Download button.
4. Select which folder to download to and then press OK to start download.



## 8.2 VIEW THE DUCT DEPOSIT REPORT

1. In the Project Folder List, click on the folder where your measurements were saved.
2. In the List select the batch (or batches) to view.

3. In 'Custom Reports' choose 'Select Report' and select 'Duct Deposit Report' from the 'Batches' window, select the Project/Folder/Batch for the Report. Either double click the batch or drag and drop to the Report. The report will be shown and can be printed, converted to pdf or emailed - refer to the instructions included with ElcoMaster™ 2.0 software for more information.





## 9 PROBE TECHNICAL DATA

---

### RANGE

0  $\mu\text{m}$  to 1500  $\mu\text{m}$  (0 mil to 60 mils)

and 0 to 5 mm (0 to 200 mils) user selectable

### ACCURACY

$\pm 1\%$  to  $\pm 3\%$  or  $\pm 2.5 \mu\text{m}^b$  ( $\pm 0.1$  mil) for 0  $\mu\text{m}$  to 1500  $\mu\text{m}$

$\pm 1\%$  to  $\pm 3\%$  or  $\pm 20 \mu\text{m}$  ( $\pm 1.0$  mil) for 0 to 5 mm

### RESOLUTION

0.1  $\mu\text{m}$  in the range 0 - 99.9  $\mu\text{m}$ , 1.0  $\mu\text{m}$  100 - 1500  $\mu\text{m}$  (Scale 1)

0.01 mil in the range 0 - 4.99 mils, 0.1 mil in the range 5 to 60 mils (Scale 1)

1.0  $\mu\text{m}$  in the range 0 to 1.0 mm, 10  $\mu\text{m}$  in the range 1-5 mm (Scale 2)

0.1 mil in the range 0 to 50 mils, 1 mil in the range 50 to 200 mils (Scale 2)

---

b. Whichever is the greater.

## 10 SPARES AND ACCESSORIES

---

The following spare parts and optional accessories are available from Elcometer, or your Elcometer supplier. To place an order please quote the sales part number which follows the description of each part:

USB to Bluetooth® Interface	T99920130
Duct cleaning template:	T99913939
Precision Foil Set: Scale 2B	T99022255-8
Ferrous zero plate:	T99913969

## 11 RELATED EQUIPMENT

---

Elcometer produces a wide range of surface testing equipment and other associated coating inspection equipment. Users of the Elcometer 456 Duct Deposit Measuring System may also benefit from the following Elcometer products:

- Elcometer Duct Grease Thickness Comb

For further information contact Elcometer, your local Elcometer supplier or visit [www.elcometer.com](http://www.elcometer.com)