

Smooth Substrate Calibration using the Elcometer 456 Coating Thickness Gauge

The Elcometer 456 Dry Film Thickness Gauge can measure the thickness of a coating on smooth, and on rough or blast coated substrates; and there are a number of calibration methods for each substrate profile – including Zero, Smooth, and Rough or 2 Point.

On Standard and Top gauges, there's also Zero Offset Calibration, for calibrating according to ISO 19840; and Auto Calibration, a rapid, error free method, for those who are regularly measuring coatings of the same target thickness.

To undertake a smooth surface calibration, you will need:

- An Elcometer 456 DFT gauge, and a probe if using a separate gauge.
- Ideally, an uncoated sample of the substrate you will be measuring on. An uncoated sample will always result in a more accurate calibration, and should be done whenever possible. However, if one is not available, a smooth Elcometer zero plate - either ferrous or non-ferrous depending on your sample's material - can be used. Don't forget, if you are working on both ferrous and non-ferrous materials, then you should calibrate on samples of both.
- And an undamaged, clean calibration foil or shim, which is slightly thicker than your expected coating thickness value. If you are not sure of the thickness, or wish to calibrate across the full range of the probe, then select a foil, or set of foils that, when combined, will achieve the probe's full scale range. You can stack foils to increase the thickness value if you need to. Just be sure to stack at 90 degrees so the label doesn't affect the combined foil thickness.

The Elcometer 456 is an intelligent gauge, so, once the gauge has been set to the Smooth Calibration Method, it will guide you through the calibration process, one step at a time.

To select the Smooth Calibration Method, press the "Cal" softkey. Highlight "Cal Method" using the up and down softkeys, and press the "Select" softkey. Then highlight and select "Smooth", followed by the Back softkey. The Smooth Surface Calibration Icon will now be displayed next to the "Cal Method" menu item.

To calibrate the Elcometer 456, simply select the "calibrate" menu item and follow the on screen prompts.

Please note, when using the Elcometer 456, hold gauge or probe like a pen, and place down evenly, at a 90 degree angle to the surface. When placing the probe on a calibration foil, ensure you take readings from the centre of the foil. When using an integral gauge or a probe with a wider scale range, extra care should be taken to ensure that none of the probe touches the foil label – otherwise you are measuring the thickness of the foil and the foil label!

Calibration Step 1

Put your selected foil flat onto the uncoated substrate (or zero plate). Then place the probe carefully onto the foil.

Take several readings on the foil to average out the individual readings, which increases the accuracy of the calibration - we advise at least three. If you get a massively different reading, this usually means the probe has been misplaced, and it's best to restart the routine. Simply press the "Escape" softkey and start again.

Once you've taken a sufficient number of readings on the calibration foil, adjust the value on the gauge to match the calibration foil's thickness. Pressing and holding a key down will change the readings rapidly. Then press "set".

Calibration Step 2

The Elcometer 456 will now ask you to place the probe onto the uncoated substrate. Again you can take a number of readings to obtain an average zero, then simply press the "zero" soft-key to complete the calibration process.

The Elcometer 456 then gives you the option to test your readings, so you can check the accuracy of your calibration before you start taking readings. If you have undertaken the calibration whilst within a memory batch, this feature ensures the test readings that you take are not included within your memory and measurement statistics.

To test the calibration of your gauge, simply replace the foil you used for the calibration, or any thickness below that value. Take a reading, and compare it to the foil thickness. If the gauge reading matches, or is within the gauge's specified accuracy, press OK.

Typically the Elcometer 456's specified accuracy is 1% at the point of calibration, and 3% across the full range; but check the website or product catalogue for the correct accuracy of the gauge/probe combination.

If the readings are not acceptable, simply undertake the calibration routine again.

If they are acceptable, your gauge is now calibrated for smooth surfaces.

For more information and training on the Elcometer 456 Coating Thickness Gauge, click on one of the links on-screen, or visit elcometer.com; and please don't forget to subscribe to the Elcometer Channel to be notified of any new videos.