Testing Coating Porosity using an Elcometer Continuous DC High Voltage Holiday Detector

When it comes to testing the porosity of coatings using the high voltage or holiday detection method, there are two versions – Continuous DC, and Pulsed DC which we'll discuss in another video in the series.

The high voltage Continuous DC method is typically used to test the porosity of non-conductive coatings up to 7.5mm (300mils) thick on conductive substrates.

Elcometer has two Continuous DC detectors: the Elcometer 236, and the Elcometer 266 - and regardless of which one you are using, both gauges give you full control over the voltage and sensitivity settings.

Setting the correct voltage is vital, as testing with a voltage that is too low could fail to break down the gap between the probe and substrate, missing flaws. While testing with a voltage that's too high could break down and damage the coating, causing the unit to alarm when there are no flaws, while creating a flaw in the process. Testing with bright blue sparks is a clear sign the voltage is too high, and is probably damaging the coating.

The voltage you should use is dependent on the dielectric strength and thickness of the coating being tested, and/or the test method or standard you're working to. The instruction books for the Elcometer 236 and Elcometer 266 both include an in-depth guide for working out your ideal test voltage based on your coating's thickness, its dielectric strength, and the dielectric strength of air. If you are working to a specific test method or standard, there are also simple look up tables for you to follow. The instruction books are available to read in-full, on the Elcometer website.

However, the Elcometer 266 makes working out your test voltage easier than ever before, with its in-built voltage calculator. Simply choose your test standard, enter the specified coating thickness, and gauge will automatically calculate and set the correct voltage.

Next, set the sensitivity, which is the level of current at which the alarm triggers to signify a flaw has been detected. If your holiday detector is too sensitive, it could alarm from a charge that is either naturally present or which builds up during the testing process. If it's not sensitive enough, the unit won't alarm at all, potentially missing flaws. So, to ensure the alarm only triggers within set parameters, when there really is a flaw, it's important to set the correct sensitivity to ensure reliable alarms.

On the Elcometer 236, turn the sensitivity dial anti-clockwise to decrease the sensitivity, and clockwise to increase the sensitivity. If you set the range selection switch to µA, the gauge will display the amount of current that is flowing from the probe, into the earth return cable. So, by testing a known flaw in the coating, you can see the amount of current that flows when you find a flaw, and then set the sensitivity accordingly.

On the Elcometer 266, the sensitivity can be set between 5µA - 99µA, and the lower the value the more sensitive the instrument is, and vice-versa.

The Elcometer 266 also has an Auto sensitivity mode, which signals a flaw when the detector notices any significant changes in the current, which is useful for testing partially conductive or mildly damp coatings.

To ensure you have the ideal voltage and sensitivity settings for your test, we advise if possible to test a known flaw in the coating to ensure your instrument detects it. If the flaw is not detected,

check the cable connections, as well as your voltage and sensitivity settings, and retest. If the flaw is detected, you're ready to begin.

Place the live probe on the test surface and move it over the work area at a speed of around one metre (three feet) every four seconds, keeping the probe in contact with the surface at all times.

The Elcometer 236 and Elcometer 266 are supplied with a 10m signal return cable as standard, so you have plenty of freedom to move when testing on large surfaces.

If you need to move to a new location to test, always switch off the instrument before disconnecting any cables. In the case of the Elcometer 236, you should also return the voltage to zero before moving.

Once you've moved to a new location, you should again test the probe against an uncoated section of the substrate, and ensure the voltage and sensitivity are correctly set.

This video is intended as a guide to using the Elcometer 236 and Elcometer 266, but you should always consult the instruments' instruction guide before use, and always use high voltage equipment with extreme care.

In the next part of the Elcometer Pinhole and High Voltage Detector series, we'll show you how to detect flaws using the high voltage pulsed DC method, using the state-of-the-art Elcometer 280.

You can click the pop-out in the top right to go to the next video in the series, select one of the icons at the end of the video, or simply visit Elcometer.com if you can't see the links.

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