

How to measure Buchholz hardness using the Elcometer 3095 Buchholz Hardness Tester

There are a number of ways to test the hardness of a coating.

Whether it's the pencil hardness test, or Wolff Wilborn method; the Sclerometer or hardness pen, or using an automatic or manual Clemen Unit – the majority of methods use a scratch technique, where a tip is drawn across the surface of the coating to determine the hardness; also known as the "scratch hardness".

Alternatively, there's the indentation method, using the Elcometer 3095 Buchholz Hardness Tester; where a known downward force is applied to a formed shape for a predefined timeframe, and the amount of indentation left in the coating is measured.

So, let's do a test.

The Elcometer 3095 Buchholz Hardness Tester comes in a robust, padded carry case, and includes; an indentation tool with bevelled disc and two locating pins, an illuminated microscope, an indentation locating template, a pin adjusting shim, a hexagonal wrench, and an instruction manual complete with measurement lookup tables. You are also required to time the test, so you could use a stopwatch such as the Elcometer 7300, or you could simply use your phone.

To begin, ensure the locating pins on the indentation tool are level. To do this, place the pins in the pin adjusting shim, use the hexagonal wrench to loosen the screws, until the pins drop down to the surface, and then retighten the screws. Your indentation tool should now be level.

Place your test sample on a flat horizontal surface, then place the indentation locating template on top of it, ensuring you leave enough space for the indentation tool to also fit on the sample. Then press down firmly, to hold the template in place.

Carefully lower the indentation tool onto the template, supporting pins first, until the pins fit into the two holes on the template. Then lower the indenting tool very gently until the bevelled disc touches the surface of the test panel.

It's important that the bevelled disc is placed down gently, as the aim of this method is to test the hardness of the coating using a constant weight over a period of time, and not with a forceful impact. Therefore, placing the indentation tool down with force could affect the results of the test, potentially making a larger indentation than when placing down gently.

As soon as the bevelled disc touches the surface of the test panel, start the stop watch, and the indentation tool exerts a constant test load of 500g (17.6oz).

After 30 seconds, gently raise the bevelled disc away from the surface, and then remove the indenting tool entirely, taking care not to dislodge the template from its position on the test panel. Once again, you may want to press down on the template to ensure this.

Keeping the template firmly pressed down, place the microscope into the rounded shape of the template, with the light source at right angles to the indentation, so you can examine the result. Some Standards [ISO 2815] suggest you should examine the result 35 seconds after the removal of the indenter, unless otherwise specified, so you may want to use the stopwatch to time this.

Adjust the focus, positioning, and rotation of the scale of the microscope until you can see the indentation clearly, and measure it against the scale.

Once you've recorded the length, simply use the lookup table provided in the instruction manual to determine the resistance and depth of the indentation.

Standards such as ISO 2815 state that you should repeat the test on different parts of the same test panel, and then calculate the average value. Just make sure the indentation tool fits comfortably on the test panel, for each test.

As the indentation tool, pin adjusting shim, and illuminated microscope are all precision pieces of test equipment; we recommend storing them in the padded carry case provided, once testing is complete.

Please note while this video is a guide on how to use a Buchholz Hardness Tester, we recommend you always refer to the test method or Standard you are working to directly, before testing.

For more information on the Elcometer 3095 Buchholz Hardness Tester, simply visit Elcometer.com, or click on one of the links on screen to watch another video.

And please, don't forget to subscribe to the Elcometer Channel to be notified of any new videos.