Hardness Testing Comparison Chart

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Test	Sample Size	Advantages	Standards	Applications	Technique
Rockwell Hardness Testing 	Small plate sample approximately 20mm x 20mm	This is a rapid test that usually takes no longer than ten seconds, provides a direct readout and is non-destructive so samples can usually be used again.	ASTM E18	Rockwell hardness test determines the hardness and strength of a material. It has other applications, which include: quality control for metal heat treatment, failure analysis, grade verification for plastics, weld evaluations and incoming material inspection. We can also provide temper testing for tin plate, which involves either applying a tensile testing technique or a hardness testing technique to the tinplate sample.	The sample is subjected to a minor load being applied followed by the application of a major load that causes an indentation. The indentations from both minor and major loads are compared to determine the hardness of the sample material.
Microhardness 	Typical sample approximately 50mm x 50mm	Micro hardness testers enable surface sensitive hardness tests to be performed rapidly, accurately and reliably in both industrial research (metals, sintered materials, ceramic products, integrated circuits, coatings, grain microstructure analyses) and in quality control environments (heat treated surfaces, cutting tools, wires, small-scale precision engineered components).	The standards to this testing technique are dependent on application. Information on standards can be supplied once the application has been confirmed.	They are particularly suitable for: examining the different phases in heterogeneous alloys (e.g. distinguishing between microstructure hardness, polycrystalline hardness and monocrystalline hardness): demonstrating diffusion processes :verifying increasing hardness as the alloy concentration in a mixed crystal is raised: mapping hardness zones from the surface into the body of the sample: hardness measurements on thin films: hardness measurements on components with a very small test surface area: hardness testing of parts whose surface must not be damaged to any large extent.	The indenter used in this technique is a square-based diamond pyramid with included face angles of 136°. The tester is controlled via the serial interface of a computer running special control and image processing software. This technique has a high reproducibility level and operator error is very unlikely.
Vickers Hardness Testing 	Typical sample approximately 50mm x 50mm	This technique is capable of providing extremely accurate readings, along with only having to use one type of indenter for all types of metals and surface treatments	ASTM E384	Vickers hardness test determines the hardness of a material and its ability to withstand deformation from a typical source. The test is also used for testing very thin materials, measuring the surface of a part, measuring individual microstructures and measuring the depth of case hardening.	This test applies various loads to the material using a Diamond Head indenter. The ratio of force applied, to surface area indentation is measured, which determines the hardness of the sample.

We hope this comparison chart is useful in helping you to determine which mechanical testing technique might be appropriate for your needs. Testing can be relatively inexpensive, especially if it is carried out under contract where testing of components is carried out routinely.

For more information on solder analysis options, call Dr Wayne Lam at ITRI Innovation on **01727 871328** or email him at **wayne.lam@itri.co.uk** Alternatively call **01727 875544** or visit the ITRI Innovation website at **www.itri-innovation.com**.

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