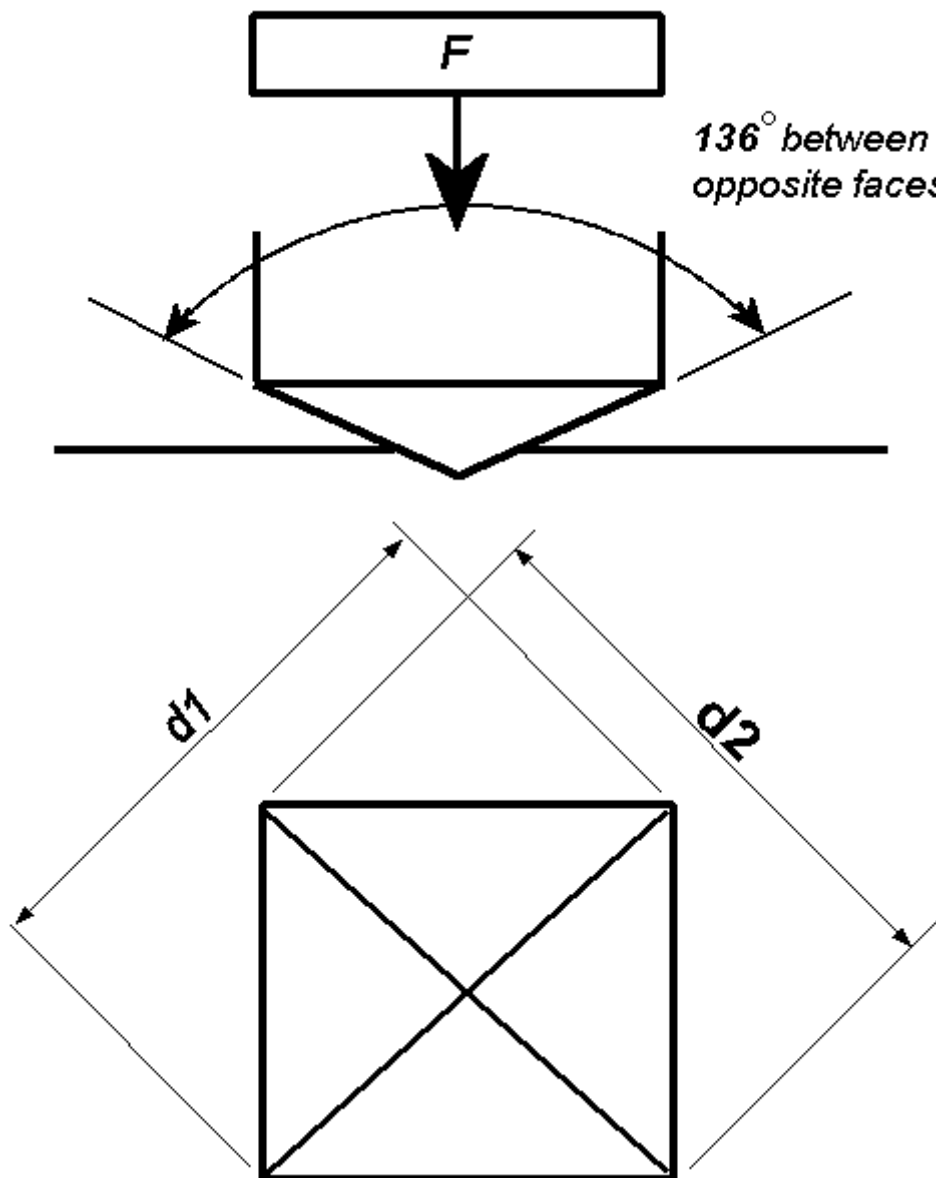


Vickers Hardness Test

The Vickers hardness test method consists of indenting the test material with a diamond indenter, in the form of a pyramid with a square base and an angle of 136 degrees between opposite faces subjected to a test force of between 1gf and 100kgf. The full load is normally applied for 10 to 15 seconds. The two diagonals of the indentation left in the surface of the material after removal of the load are measured using a microscope and their average calculated. The area of the sloping surfaces of the indentation is calculated. The Vickers hardness is the quotient obtained by dividing the kgf load by the square mm area of indentation.



- F* Load in kgf
d Arithmetic mean of the two diagonals, *d1* and *d2* in mm
HV Vickers hardness

$$HV = \frac{2F \sin \frac{136^\circ}{2}}{d^2} \quad HV = 1.854 \frac{F}{d^2} \text{ approximately}$$

When the mean diagonal of the indentation has been determined the Vickers hardness may be calculated from the formula. Modern digital Vickers hardness testers perform this calculation automatically and report the appropriate hardness result.

The Vickers hardness should be reported like 800 HV/10, which means a Vickers hardness of 800, was obtained using a 10 kgf test force. Several different loading settings give practically identical hardness numbers on uniform material, which is much better than the arbitrary changing of scale with the other hardness testing methods.

The advantages of the Vickers hardness test are that extremely accurate readings can be taken, and just one type of indenter is used for all types of metals and surface treatments. The Vickers method is capable of testing the softest and hardest of materials, under varying loads.

With modern advances in technology, PCs and software development, it is now possible to offer automatic indentation measurement. This has the benefit of eliminating any operator influence over the result, reducing R&R (repeatability and reproducibility) and uncertainty budgets. Automatic test surface focusing, motorised XY tables and automatic effective case depth determination are common place in advanced laboratories around the world who require the latest technology offering fast, reliable and traceable testing.