3.8.3 Vickers Hardness Test

This test is similar to Brinell test but uses a different type of indenter. A square based pyramid indenter of cone angle α = 136° between opposite faces of pyramid is used. The applied loads may be 5, 10, 30, 50, 100 or 200 kg. The Vickers hardness HV is calculated from the following equation.

$$H_V = \frac{P}{|d^2/2 \sin \alpha/2]}$$

$$= \frac{1.8544\,P}{d^2} \text{ for } \alpha = 136^o$$

Where, P is the applied load in kg, d is the diagonal length in mm of indentation made by the pyramid. The indenter and the indentation are shown in the figure below.
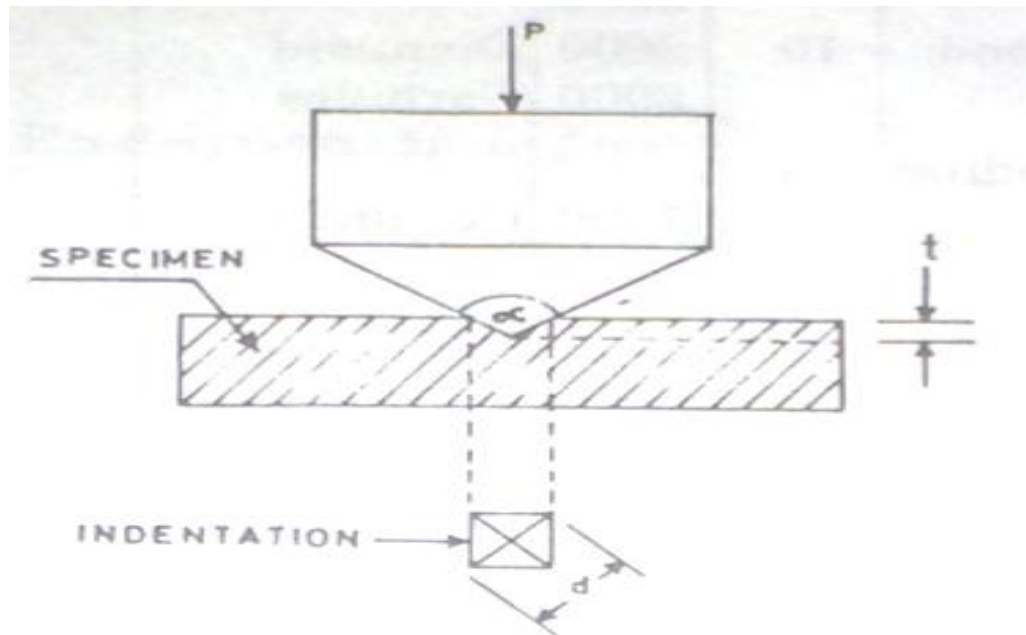
Fig.3.8.3(a) Square based pyramid indenter in Vicker's test

The test performed for similar cross-sections, very hard materials, polished and nitride surfaces, and very thin test pieces.

Testing Procedure:

1.The specimen is placed on the anvil.

2.Load is applied and then indenter is pressed on the surface of the sample.

3.Force is maintained for a period 10 t0 15 seconds known as dwell time.

4.The indenter is removed from the sample after the dwell time.

4. Indenter leaves a square indentation .

5.The two diagonal lengths of the square indenter on the sample is measured using optical microscope.

Advantages

•Greater precision in measurement compared to spherical ball in Brinell test.

•It can be used for test very hard materials, since diamond is used.

Limitations

•Complicated and expensive

•Can be considered for micro hardness testers, since, they cause small size impressions.