How is the hardness of metals measured?

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There is a wide variety of hardness test methods and scales that can be used when analyzing the hardness of a material. Common hardness test methods for metals include the Rockwell, Vickers, Brinell, and Knoop hardness tests.

During a hardness test, an indenter of specific shape (i.e. ball, cone, pyramid, etc.) is pressed into the testing surface with a specified load, resulting in a permanent indentation (See Figure 1). Features of the permanent indentation are then measured and translated into a hardness value. The indenter material, indenter shape, applied load, measured indent feature, and hardness range vary between the different hardness testing methodologies.

Every test method has its own advantages and disadvantages. Certain advantages of specific testing methods include minimal indentation size, minimal indentation depth, ease of measurement, applicable material hardness range, etc.

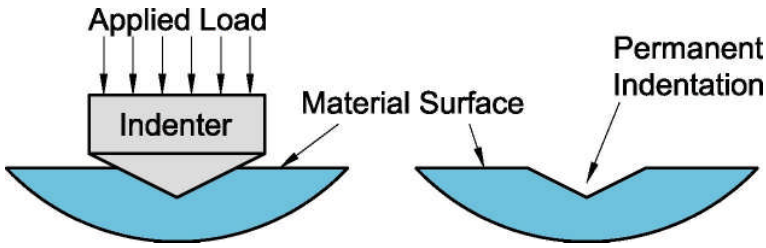

Figure 1. Hardness test schematic showing the indenter creating a permanent indentation on a surface.