Durometer Hardness Testing

DESCRIPTION OF TECHNIQUE

Durometer testing is used to determine the hardness of thermoplastic elastomers, vulcanized rubber, elastomeric materials, cellular materials, gel-like materials, and other plastics that are unsuitable for measurement by conventional Rockwell or microindentation hardness testing. The durometer apparatus measures the deflection of a calibrated spring as the indenter is pressed into the material either manually (by hand) or using an operating stand.
The indenter protrudes from an orifice in a presser foot, which ensures consistent and repeatable contact between the durometer apparatus and the sample surface. Various presser foot geometries, indenter tip dimensions, and spring forces are used to create 12 different durometer types: A, B, C, D, DO, E, M, O, OO, OOO, OOO-S, and R. For each scale, the deflection of the spring is measured using either a dial indicator or digital readout on the apparatus.

ANALYTICAL INFORMATION

Multiple randomly-located impressions can measure the bulk hardness of many materials. No fundamental relationships to other material properties are available. However, empirical relations between durometer hardness and flexural modulus, resistance to extrusion, and other properties have been observed for some materials. Thus, comparative analysis between parts or lots is more commonly performed.

TYPICAL APPLICATIONS

- •Material process control
- •Simulated aging evaluation
- •Failure analysis
- •Verification of specified properties

SAMPLE REQUIREMENTS

The standard test specimen for most durometer types has a minimum thickness requirement of 6. The specimen should also have flat, parallel surfaces that are at least 24 mm in diameter. Specimens for types M, OOO, and OOO-S can be as thin as 1.25 mm with a 5 mm minimum diameter.

Multiple specimens may be stacked to provide the required thickness, but the results may not correlate with values obtained for a solid material specimen of the same thickness. For materials that are relatively hard, impressions may be made in locations less than the minimum distance to an edge if it is known that the results do not differ from impressions made in specimens with standard thickness.