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## **Durometer Measurements for Polymer Hardness (ASTM D2240)**

Like metals, polymers can also be ranked according to their relative hardness. This measurement is generally referred to as durometer hardness, which may also be referred to as Shore<sup>®1</sup> hardness. The durometer hardness test methods are defined in ASTM standard D2240, which covers a variety of different methods and applicable polymer types. For example, the most common method used for harder polymers such as polycarbonates, polystyrenes, epoxies and others is the “Type D” (Shore<sup>®</sup> D). However, other types or scales are also used. For example, for soft elastomers, such as heavily plasticized PVC, butadiene, natural rubber, and others is the “Type A” (Shore<sup>®</sup> A) measurement. And for very fine or thin elastomers used in gaskets, seals, and others is the “Type M” (Shore<sup>®</sup> M). The measurement type should be specified when durometer measurements are used, as correlation between the different types is poor.

The durometer measurement is performed by measuring the depth of penetration of a loaded indenter into the material to be tested. The different types (A, D, M) have different indenter geometry's and loadings. The durometer tester is pushed against the polymer surface to be tested until it reaches a stop. The indenter is then forced into the polymer, and the depth of the indentation is read of on an arbitrary scale of 0 – 100. While the test is considered nondestructive, the indenter may leave a fine dent or hole in the test sample. The sample to be tested should have a minimum diameter of ½” and thickness of ¼” (A & D). For thinner elastomers, the Type M scale will measure thin elastomers as thin as 0.05”. Thinner materials (all types) may be stacked for sufficient thickness; however, the reliability of the measurement may be affected.

Note the durometer measurement is only one physical characteristic of polymers, which should be supplemented by additional physical and chemical techniques such as FTIR, TGA, and EDS for molecular and elemental composition.

### **Applications Include:**

Rubber Bumpers  
Synthetic Elastomers  
Fluorelastomers  
Plasticized PVC  
Vinyl Coverings

Films  
Case Plastics  
Catheters  
Plastic Optical Elements  
Polished Woods

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<sup>1</sup>Shore<sup>®</sup> is a registered name of Instron Corporation