

Durometer vs. Compression Force Deflection: Which is Better?

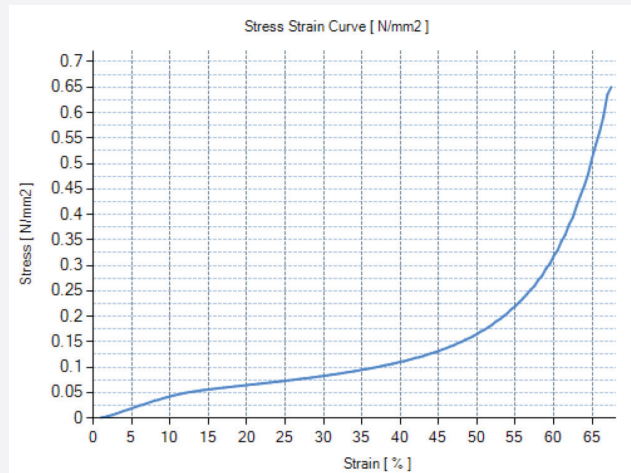
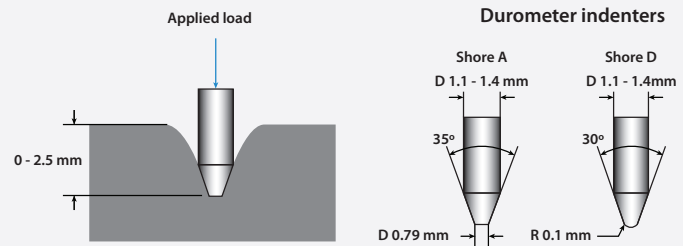
Various methods are used in industry to determine the firmness or hardness characteristic of a material. One of the most popular methods for measuring this property is durometer, primarily used for solid materials over a range of hardnesses. Rogers uses Compression Force Deflection (CFD) to represent the firmness of its foam products. Both measurements are common within the gasketing industry and are based on established ASTM guidelines and methods.

DUROMETER

Durometer is measured on a scale of Shore hardness such as Shore A, D, and O. The different Shore types dictate the shape and size of the testing plunger that is pressed into the material to determine the hardness. Shore type is chosen by the material classification and general hardness of the material. For example, Shore A and D are used for elastomeric and rubber materials, A for the softer types, and D for the harder. The test plunger applies a load to a *small point on the material* (see diagram) and generally assumes relative uniformity of the hardness of the surface of the test sample.

CFD

Compression Force Deflection is a method that compresses the entirety of a material sample (generally about 10 cm) and records the amount of force (stress) that the sample exerts at different levels of compression strain. This allows a more exact determination of firmness at different compression levels (see chart). The *larger size of the sample* allows a more accurate measure of the normalized compression force deflection over a wider area.



Why does Rogers use CFD over durometer?

Durometer is a far less accurate means for determining the hardness of cellular foams, especially open cellular. The hardness of an elastomeric foam is directly dependent on compression level and related to the test area of the specimen. For durometer, the Shore tips are only able to measure a small section of the surface area of the foam, which may not be representative of the entire sample of a cellular material. An accurate result would require a large number of test points to accurately average. Comparatively, CFD measures the average firmness for the entire material sample. Measuring CFD is more representative of how a material will perform in an application and, as a result, allows designers to determine hardness based on the compression level specific to the application.