adhere academy: hardness

A recent ***adhere academy*** post discussed the modulus of elasticity of materials. Closely linked to that is another physical factor which we often quote on product data sheets: **hardness**.

One way to define the hardness of a material is its resistance to permanent indentation. We all know that rubber balls are soft, and rock is hard, but in order to give us some quantitative numbers with which to make comparisons, we normally use measurements from an instrument called a durometer. A durometer measures the depth of an indentation in the material created by a given force. But because rubber balls and rocks are so different in their hardness, the durometer methods to measure them are different too. These different methods mean that we use different numerical scales, which we call Shore scales (named after the chap who invented the durometer).

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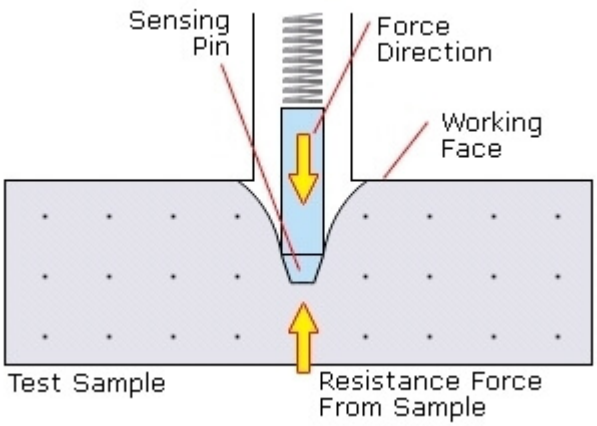

In our data sheets, we quote durometer hardness figures from the **Shore 00**, **Shore A** and **Shore D** scales. There are overlaps on these scales, but they don't necessarily have a direct linear relationship.

Shore 00 is for quite soft products (rubbers and gels), **Shore A** is in the medium range (harder rubbers, softer plastics), and **Shore D** is for harder materials (plastics).

Here are some examples, both from our portfolio and from real life:

Material	Shore 00	Shore A	Shore D

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Chewing gum	20		
Dymax GA-108 FIP gasket	65		
Elastic band		20	
Wacker Elastosil N9111 silicone adhesive sealant		30	
Opti-tec 7020 silicone potting compound		40	
Car tyre		70	
Opti-tec 4200 polyurethane potting compound		70	
Wacker Semicosil 975 TC thermally conductive silicone		98	
Dymax 3069 plastic bonding adhesive			55

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Dymax 3099 plastic bonding adhesive			75
Bone			90
Opti-tec 5054 epoxy adhesive			92

Understanding how we quantify material hardness and make comparisons against other materials will help in material selection.

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