

THE CARTWHEEL FACTORY

Facts About Foam

The manufacturing of foam is a complex process! Understanding this process and the benefits of different foam doesn't have to be. In fact, there are many misconceptions about foam and its properties. The following definitions may help clarify these misconceptions, as well as open up a whole new appreciation for foam.

Density is the measurement of the mass per unit volume. It is normally recorded in pounds per cubic foot (or kilograms per cubic meter (kg/m³)), and is simply the sample weight divided by its volume. In foam, density is an indication of quality and lasting comfort. The denser the foam, the more resilient it will be. Thus, density is equivalent to performance durability. In addition, the higher the density, the higher the cost. (Density and compression are not related.)

Indentation Force Deflection (IFD) is a measure of the load bearing capacity. IFD is generally measured as the force (in pounds) required to compress a 50 square inch circular indenter foot into a four inch thick sample (typically 15 inches square or larger, to a stated percentage of the sample's initial height). Common IFD values are generated at 25 and 65 percent of initial height.

Compression is basically equivalent to 'firmness'. It is measured by a number called the Indentation Load Deflection (ILD) or the Indentation Force Deflection (IFD). These tests measure the pounds of force it takes to compress foam. The higher the IFD number, the firmer the foam. Firmness is controlled by the way the foam ingredients are mixed, whereas density is determined by the total amount of foam ingredients. You can have both soft and firm foams at the same density. (Density and compression are not related.)

Elongation indicates the extent to which foam can be stretched before snapping apart. An elongation of 200% means that a strip of foam 4 inches long can be stretched to 12 inches before breaking.

Flex Fatigue (Dynamic Fatigue) is a softening or loss of firmness. Flex fatigue is measured in the laboratory by repeatedly compressing a foam sample and measuring the change in IFD. Several different protocols, including methods contained in ASTM, ISO, and BIFMA testing standards, may be used. Even ASTM 3574, one of the more widely used sets of testing standards, contains multiple testing methods. In selecting one or more test methods, it is important to consider the intended foam application and to choose a testing protocol that closely simulates the intended application.

Tensile Strength (Tear Strength) is a measure of the force required to continue a tear in a foam after a split or break has been started and expressed in pounds per inch (lb./in.). This property is important in determining the suitability of foam in