



Engineering Information

Polyurethanes or Urethanes are a family of elastomers, similar to rubbers, offering a unique combination of properties. When designing these products, it is important to note that these properties and some of the terminology differ considerably from metals or plastics. Elastomers are extensible and deform easily, and some properties change as the part is stressed. The combination of many outstanding properties within the single material makes a urethane distinctive from conventional rubbers and plastics. Urethane elastomers are often considered as a bridge between rubbers and structural plastics because they combine many of the desirable properties of both.

Poly-Pro Polyurethanes are thermosetting materials characterized by unusual toughness. They combine resilience and high load-bearing capacity with resistance to impact, abrasion and compression set and degradation by oxygen, ozone and oil. They are liquid polymers which are mixed with curing agents and poured into molds of any cross section or size to produce parts with consistent properties throughout. Since it is a low pressure molding process, large and inexpensive molds are often fabricated with sheet metal, aluminum, urethane or wood.

Our Polyurethanes are available from 20A (soft as gum rubber) to 75D (hard as a bowling ball).

Compounding and processing methods and conditions have a major bearing on the performance of a given product. A myriad of compounds can be produced in the same hardness, using a variety of chemical backbones. Even a minor variation in the ratios of the chemicals can result in a major variation in performance of that product for a particular application. Knowing a particular application, the molder can vary his compound to optimize some of the properties. Proper application engineering is very important for the success of a product.

The physical properties listed are for the standard compounds designed for our common applications. These are not to be construed as a warranty for any particular application. Application of sound Engineering principles and practices should be used.

Caveat emptor...buyer beware: All urethanes are not created equal. Unlike thermoplastics, a thermoset urethane is 'created' by the molder. Not all urethanes are created equal. The type of polymer and the type and ratio of curative play a very crucial role in the performance of the product. A urethane molded product can be compounded in a garage by using very minimal equipment (a paint mixer stick, a can, an oven and a scale is all that is needed to be a molder. They can get a bit more sophisticated and use an electric drill for mixing. The investment will still be in 3 digits !). Because of this, there are lots of companies that call themselves Urethane molders. But the performance and consistency of their products will be debatable as compared to some molders that use sophisticated metering and mixing machinery.

Types of Polyurethanes:

Cast Polyurethanes based on TDI, MDI,PPDI, polyethers, polyesters and polycaprolactones as building blocks, offer a wide variety of application possibilities and advantages.

Polyethers perform well in dynamic applications and in hydrolytic environments. They have better dynamic properties. They are extensively used in applications such as die-forming pads, press brake dies, die springs, fork lift tires, roller coaster wheels, rolls for steel and paper mills.

Polyesters have superior cut, tear and abrasion resistance as well as better resistance to oil and solvents. Typical applications include hydraulic seals, scraper blades, rolls for graphic arts, pipeline pigs, chute liners, etc.