Polyurethane Rubber (AU - EU)

Classification

Polyurethane elastomers are special rubbers whose performance and characteristics of processability have been designed to satisfy particular technical demands in the sector of the rubber. Their items are characterized in fact from the following peculiarities:

- ✓ excellent mechanical properties (elevated elongation and tensile strength)
- ✓ good elastic characteristics from -76 to 230ºF (-60 to +110ºC)
- ✓ good abrasion resistance
- ✓ good compression set from -22 to +158ºF (-30 to +70ºC)
- ✓ excellent resistance to light, ozone, to the oxidation and the atmospheric agents
- ✓ good/excellent chemical resistance (aliphatic aromatic solvents)
- ✓ low gas permeability

Polymer type

Polyurethane elastomers are based on the poly-addition of diol-ester (AU) or diol-ethers (EU) with diisocyanate. These two classes differentiate mainly for the hydrolysis resistance, better in the diol-ethers, and for the oil resistance, better in the diol-ester types. These last ones they potentially exhibit besides a set of best mechanical characteristics. A lot of variations are possible in the chemical structure of these products and the processing, as elastomers, can happen in different ways: with the procedure for casting as thermoplastic materials or with the classical technologies of the rubber industry. The choice is almost always dictated by the technical reasons what:

- disposition equipments
- according properties
- dimensions of the final manufactured article

Polyurethane elastomers can be cross linked by isocyanate, peroxides and recently new types are available with sulphur cure system. The different systems substantially influence the process of workmanship while the performances are nearly lined up between them.

Peroxide Vulcanization				
Hardness ShA	Pti	60	70	80
Tensile strength	Mpa	28	31	30
Elongation	%	700	550	450
Abrasion resistance DIN 53516	mm^3	60	55	45
Compression set 70 H @ 212ºF	%	28	28	30
Compression set 70 H @ -4ºF	%	28	30	33
Heat ageing 7 days @ 212ºF				
Tensile strength	%	-5	-10	-13
Elongation	%	-30	-20	-25
Hardness ShA	Pti	+4	+3	+3
ASTM N.3 70 H @ 158ºF				
Volume	%	+2	+3	+3
ASTM Fluid B 70 H @ 73.4ºF				
Volume	15	+15	+13	+13
Gehman test	ºF	-79.6	-76	-76

Applications

Polyurethane elastomers applications take into account high mechanical properties and abrasion resistance. The combination of these characteristics allows the obtainment of seals, mountings, belts, round belts, suspensions, rolls, solid wheels covering stamps for ceramic industry.

Supports are also realizable with excellent characteristics of resistance to abrasion, good elasticity and toughness with high hardness and good low temperature characteristics. Some limitations concern high temperature applications and where the need is and elevated hydrolysis resistance (vapor, acids and alkali).

The end user of Polyurethane articles are concerned automotive industry, chemistry, automation, mining, textile, shipyards.