

PVC and TPE Quality

Thermoplastic Elastomers

Elastic like rubber, yet not rubber!

Elastic, supple and flexible -these are the properties typical for rubber, a material known by everybody and part of everyday life in many forms.

Rubber is made from caoutchouc, a natural or synthetic product. Caoutchouc is a viscous plastic material, which is transformed into elastic rubber only by adding polymerizing substances such as sulphur or peroxide and subsequent heating. During this „vulcanization“ the thread-like caoutchouc molecules polymerize due to the build-up of chemical bonds between each other. This polymerization is the reason for the product's elasticity. The vulcanization can only be reversed by thermal destruction.

The **Thermoplastic Elastomers (TPEs)** show a completely different behaviour. As their name conveys, these materials turn plastic during heating (Greek: thermos = heat), when cooling, however, they revert to elastic behaviour again. In contrast to the **chemical polymerization** of rubber, in this case a **physical polymerization** occurs.

Considering their structure and behaviour, TPEs range between thermoplastics and elastomers. They can be processed as easily as thermoplastics and have the most important properties of rubber. Above all, TPEs are not a risk to the environment. In contrast to rubber, they can simply be recycled and re-processed.

In the mean time, there exists a plurality of TPE qualities for the most various applications such as the food handling industry which must comply with FDA quality standards.

PVC

PVC (polyvinyl-chloride) is the most important among all polymers. Its part in the German chlorine production amounts to about one quarter. It has been produced for more than 55 years.

The advantages of PVC are its stability as a material and its extremely good resistance against weather. It does not corrode, is hardly flammable and does not de-polymerize. Yet, the formation of dioxines during combustion is an extreme disadvantage.

Nowadays, PVC is mostly used in construction, medicine (in instruments, not drugs) and packaging. There is a difference made between hard PVC, used in pipes, profiles for windows and borders (ratio of PVC: 77-89%) and soft PVC, which is used in insulation, tubes, floors and edge protection profiles (ratio of PVC: 44-61%).

Sponge Rubber Varieties

Natural Rubber (NR)

Harvested as latex from the *Hevea brasiliensis*, polymerized with sulfur.

Temperature range: -40 to +70°C.

Advantages: Good elasticity and mechanical properties (tear and abrasion resistance, notch toughness, elasticity), no remaining deformation after strain, and high resistance to alternating bending.

Disadvantages: Medium to low resistance to oil, weather, and ozone, as well as thermal resistance; flammable.

Ethylene-Propylene-Diene Monomer (EPDM)

Synthetic caoutchouc, terpolymers (EPDM polymerized with sulfur).

Temperature range: -50 to +120°C dry conditions; with water and steam up to 130°C.

Advantages: Excellent weather resistance, as well as to aging, ozone, chemicals, hot water and steam; good resistance to polar fluids such as acetone, methanol etc., outstanding electrical insulation properties, low steam permeability, good thermal resistance, extremely low brittleness temperature.

Disadvantages: Low resistance to aliphatic and aromatic hydrocarbons (mineral oil, petrol, fuels); flammable.

Polychloroprene (CR)

Synthetic caoutchouc mostly polymerized with metal oxides, not sulfur.

Temperature range: -30 to +90°C, hot water not recommended.

Advantages: Good thermal resistance as well as to aging, weather, ozone, low flammability, high resistance to alternating bending, medium resistance against oil (higher than NR, lower than nitrile rubber; good mechanical properties and elasticity, but not as good as for NR; small deformation remaining.

Disadvantages: According to type of CR-Type, possibility of crystallization due to lasting cold.

Nitrile rubber (NBR)

Synthetic caoutchouc, Polyacryl-Nitrile-Butadiene rubber polymerized with sulfur.

Temperature range: -20 to +100°C with dry conditions, hardens with hot air, with oils up to +120°C, with water up to +80°C.

Advantages: High oil, petrol and thermal resistance, good mechanical toughness, low remaining deformation under pressure.

Disadvantages: Very low weather and ozone resistance, low elasticity, flammable

Colours

All cell rubber round and square cords are available in black and light grey.