

Polyurethanes

What are Polyurethanes, also known as PU or PUR?

Polyurethane stands for a variety of plastics (**POLY**mers) based on urethane.

The name “urethane” stands for a particular chemical compound. It refers to the two different elements appearing in this very compound: **UR**ea and **ETHAN**ol.

You will find solid, micro-cellular and cellular PUR in rigid as well as in flexible material.

Mostly plastics get their shape from molten granules, which are extruded, into tools.

PUR is different. In general it comes in two – preferably liquid – basic reactants /components which are to be mixed intensively with appropriate machines to allow them to react.

These components are known polyol and isocyanate.

One of the components – usually the polyol – contains additives for speeding up the reaction.

Still liquid in the beginning the two homogenised components are filled into cavities.

You will find continuous conveying systems and also discontinuous productions where the material is injected or poured into boxes / moulds.

Depending on the constitution of the main components and the composition of the additive packages polyurethanes with a wide range of properties result.

PUR foam

For making a PUR foam either highly volatile fluids and/or water is used.

The fluids evaporate with the reaction heat and blow the foams up.

Water and isocyanate react chemically. One of the reaction products is carbon dioxide which makes the foam rise. Foam Construction only uses water based systems.

For high quality furniture cushioning high resilient or visco-elastic flexible moulded foams with densities between 45 – 90 kg/m³ with hardnesses between 1 and 6 kPa are used.

PUR – no risk for man nor for the environment

On one hand PUR raw materials, predominantly polyols (formulations) and diisocyanates, have been in use since decades for the production of polyurethane (PUR) articles. Some of these PUR raw materials are classified and labelled as dangerous substances (or preparations).

On the other hand fully cured PUR articles – produced according to the state of art – are cross-linked polymers of high molecular weight. These PUR polymers - under usual use conditions - are chemically inert and virtually not bio-available.

This is confirmed by the experience of many years in the industry. And this is easily understood, because the reactive PUR raw materials are no longer existing as such in the PUR articles. They have been transformed by chemical reactions into the PUR polymer. Additives potentially used in production are firmly “encapsulated” in the PUR polymer. They are thereby effectively immobilised or slowed down in migration or emission sufficiently to cause no harm any longer.