Fachverband Schaumkunststoffe und Polyurethane e.V.

PUR Hypersoft Foam

Technical Specialist Group PUR Flexible Foam

HYP20170208 • As at 08.02.2017

Introductory remarks

Within the foam families, there is a wide range of variants of PUR flexible foams, which can be optimally used for certain functions and applications with regard to their respective properties. PUR hypersoft foam has developed as a speciality for high-quality, resilient and extremely soft comfort applications.

The following description is intended to define the term hypersoft foam more precisely by distinguishing it from standard PUR flexible foam in terms of both the raw materials used and the properties that characterise it.

The information in the product description PUR flexible foam as well as the material data sheet of the Technical Specialist Group PUR Flexible Foam also apply in full to PUR hypersoft foam.

The term hypersoft foam

As the term hypersoft foam (hyper = beyond...) indicates, the hardness level of this foam class is significantly below the level that can be used for mattress cores and load-bearing foam pads. At the same time, this PUR foam is extremely resilient and supple.

There are two variants of hypersoft foam, which are manufactured by two different processes:

- **by using a so-called hypersoft polyol**
- **by means of a special process in which carbon dioxide is dosed during the foaming process (without hypersoft polyol)**

Chemical characterisation

The raw materials for PUR, which are generally produced on the basis of mineral oil, are reacted with the use of certain additives. This produces the gas carbon dioxide, which causes the mixture to foam. The individual formulation (main raw materials, additives and processing parameters) determines the properties of the finished foam – each quality has its own composition.

From a chemical point of view, PUR hypersoft foam as well as PUR standard flexible foam is made from diisocyanate and polyalcohols in an exothermic polyaddition reaction using catalysts, stabilizers and auxiliaries. The hypersoft polyol mentioned above is characterised by the fact that more than 60% of it is composed of special C_2 building blocks, and contains almost exclusively primary OH groups at the end of the chain.

Characteristic properties

PUR hypersoft foam can be distinguished from standard PUR foams in terms of pore structure and hardness distribution as well as air permeability and elongation at break.

1. Pore structure and hardness distribution

Depending on the manufacturing process, the pore structure of hypersoft foams can resemble

a) the structure of cold foams or
b) of standard flexible foams.

For a) the cells form as roughly irregular during the foaming process.
For b) a regular cell structure develops.

In both cases, particularly soft foams with compressive stresses below 2.0 kPa or indentation hardness below 80 N are produced.

The hardness distribution in the block cross section is evenly low.

2. Air permeability

Hypersoft foams have a high air permeability and thus promote moisture transport within the material. This property provides a pleasant climate for upholstery and mattresses and considerably reduces the risk of heat accumulation.

3. Elongation at break

Hypersoft foams of variant a) are generally characterised by a very high elongation at break. Hypersoft foams of variant b) do not have this characteristic or do not have a comparable characteristic.

Fields of application

Due to its good comfort properties (soft, resilient, supple), PUR hypersoft foam is particularly suitable for the production of mattress toppers and cushions. In high-quality upholstered furniture, this foam is used as a covering layer between the supporting foam and the upholstery material. It thus serves as a soft comfort zone and stretches the upholstery fabric to its origi-nal shape after use.

Another application of PUR hypersoft foam is as filling in duvets and quilts.

This DOCUMENT was developed in the Specialist Association Foamed Plastics and Polyurethanes by the Technical Specialist Group PUR Flexible Foam.

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