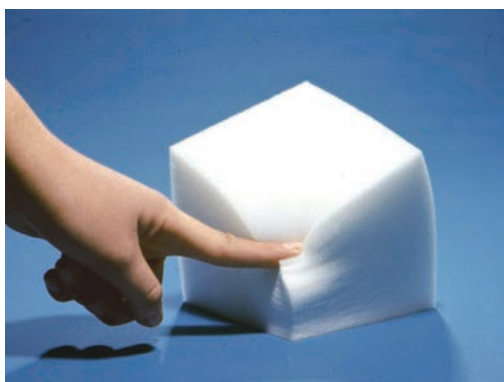




Cushion Characteristics for Comfortable Ride

SANYO
PRODUCT
TOPICS

Drivers and passengers sit for a long time in automotive seats while driving a car. In order to make the ride more comfortable, it is necessary to have an appropriate cushioning function that absorbs vibrations and provides moderate resilience. In this article, we will introduce the polyurethane foam for automotive seats that enables comfortable cushioning.



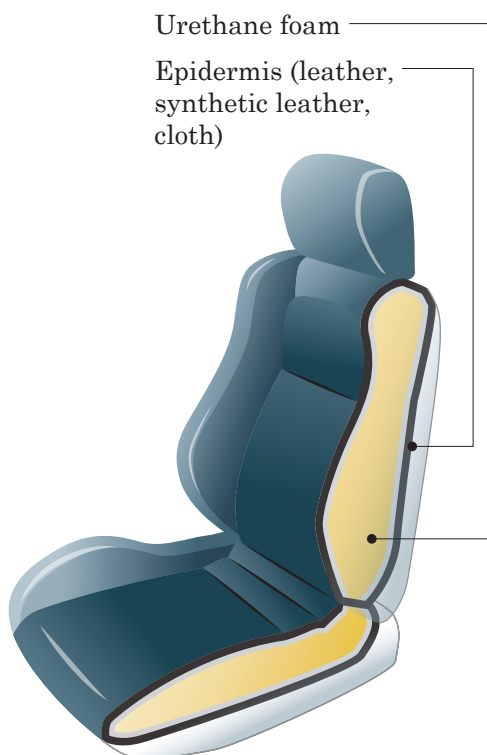
Surface of urethane foam

The relationship between ride comfort and vibration

It is not an overstatement to say that the ride comfort of a car is determined by the car seat. In addition to absorbing vibrations transmitted from the road and car body, automotive seats have various other functions such as maintaining comfortable posture, dispersion of seat pressure, fit, air permeability, durability, and so on, which create a comfortable ride.

Early automotive seats were made of springs combined with horsehair or shroud, and the surface was covered with genuine leather or other material. It served to absorb the impact of the road and soften the contact of the body with the seat surface. It was later replaced by polyurethane foam and other materials, and since the 1980s, development has been underway to provide a more comfortable ride, especially by reducing vibrations around 6 Hz, which humans feel uncomfortable, and relieving discomfort.

■ Cross section of car seat



Vibrations are absorbed by the shifting of the molecules of the vibrating object as they flow. The property of shifting in this way is called “viscosity”. Soft materials such as gels and rubbers have high vibration-absorbing properties, so they are used in anti-tip mats, seismic isolators for buildings, and so on.

Cushion Characteristics created by viscosity and elasticity

In addition to vibration absorption, an appropriate resilience is necessary to improve ride comfort. Cushioning is a function that is satisfied by both vibration absorption and resilience. Comfortable cushioning is created by the balance between viscosity, which absorbs vibration, and elasticity, which resumes to its original state like a spring.

A car seat should not be too soft or too hard. If it is too soft, your body will sink into it, causing poor posture, back pain and fatigue. A seat

that is just soft enough to fit your body, but not too hard, will increase the surface that comes in contact with your body, distribute your weight, and support your body, making you less tired.

Today's automotive seats use polyurethane foam to provide cushioning. Because it is porous, it is light and can be easily formed into various shapes. There are two types of polyurethane foam, flexible and rigid, and the flexible foam is used for automotive seats because it returns to its original shape after being deformed by weight. Polyurethane foam is made by adding a foaming agent (water) to polyol and polyisocyanate, and then mixing and foaming.

Polyurethane foam has been used in automotive seats since around 1958. In the 1960s, Sanyo Chemical was the first company in Japan to produce polyols (PPG*), the raw material for polyurethane foam. At that time, foams for automotive seats were made by slicing the finished foam and laminating it together, but nowadays, molding method is the mainstream.

*PPG: polypropylene glycol

Needs for further comfort and environmental friendliness

In recent years, there has been a growing need for new functions to further improve the comfort of polyurethane foam for automotive seats. One of these is the ability to maintain posture and hold the body in place even after long hours of driving, and to prevent the body from shifting even when centrifugal force is applied in curves. Developments have been made to improve hold, such as controlling the foaming of polyurethane foam to create a seat with a softer surface layer and a harder lower layer.

In addition, health and environmental considerations are becoming more and more important. The reduction of VOCs

(volatile organic compounds) is an important issue in the closed space of the car, and there is a growing need for low VOC polyurethane foam.

Sanyo Chemical's Products Demonstrate High Reactivity in addition to VOC Reduction

Sanyo Chemical has been involved in the development of polyols for polyurethane foams since early on, and currently offers a wide range of environmentally friendly products with high reactivity. Typical examples include the "SANNIX" series of polyether polyols, which are available in a variety of molecular weights, and the "SHARPFLOW" high solid polymer polyol.

Sanyo Chemical will continue to develop polyurethane foam materials that enhance comfort and environmental friendliness to meet the needs of our customers.

■ Polyether polyols of Sanyo Chemical for flexible polyurethane foam

Product name	Composition	Features
SANNIX	Propylene oxide adducts of polyfunctional (f=2-6) polyols (*) Some products are ethylene oxide adducts.	Available in a wide range of molecular weights
SHARPFLOW	Polymer Polyol	High solid polymer polyol used to improve the hardness and air permeability of slabstock polyurethane foam.
SANFOAM	Mixture of polyether polyols and additives	Formulated product of polyols with catalysts and other additives, which can be used in combination with appropriate isocyanate.

*There are some PPG of ethylene oxide adduct

Please contact the sales representative of our company when handling our company's products. It is also necessary to read the "Safety Data Sheet" (SDS) in advance. It is the responsibility of the user to determine the suitability and safety for the intended use.