

**Solution for comfortable sleep:
Development of Raw Materials for Urethane Foam for Bedding with
Excellent Breathability**

Sanyo Chemical Industries, Ltd. (Head Office: Higashiyama-ku, Kyoto City; Representative Director, President & CEO: Akinori Higuchi) has developed “SANNIX FA-817C” and “SANNIX FA-817T” as raw materials for urethane foam. The newly developed materials enable urethane foam to have low resilience and excellent breathability and retain its softness at low temperatures. Low-resilience foam is used for overlaid mattresses, pillows, and other bedding because of its excellent body pressure dispersion. Through this development, we will be able to improve sleep quality by imparting functions such as breathability and flexibility at low temperatures to bedding materials.

[Background of development]

Sleep helps in recovering from mental and physical fatigue; therefore, it is important for maintaining health and enhancing study and work performance. However, recently, people do not get sufficient sleep or the quality of sleep is reduced because of changes in lifestyle. Thus, the importance of sleep, which is closely related to health and work productivity, is seen in a different light.

To improve the quality of sleep, the bedding must provide various functions, such as maintaining a natural sleep posture and making a person easily roll over, dispersing the pressure that concentrates on the lower back and back, and maintaining appropriate temperature and humidity. These functions are associated with the hardness, cushioning, body pressure dispersion, warmth retention, and breathability of the mattress. Thus, mattresses with characteristics associated with each function have been developed.

One type of such mattresses uses low-resilience urethane foam. A low-resilience mattress is excellent for fitting to the body and dispersing body pressure. It is used not only as the main mattress but also as an overlaid mattress for ordinary mattresses as well as pillows. However, low-resilience mattresses tend to have poor breathability, resulting in stuffiness because of perspiration. It is difficult to balance good breathability and low resilience. In addition, improving breathability makes the mattress hard at low temperatures, which causes discomfort while sleeping in winter.

We developed SANNIX FA-817C and SANNIX FA-817T as raw materials for soft polyurethane foam with optimized molecular design to realize a low-resilience mattress that provides good breathability without hardening at low temperatures.

[Outline of technology]

Soft polyurethane foam contains polyol and polyisocyanate as the main constituents. It is widely used in products such as furniture (e.g., sofas), automobile cushions, and clothes in addition to being used in bedding such as mattresses and pillows.

The newly developed SANNIX FA-817C and SANNIX FA-817T are polyols for soft polyurethane foam. Soft polyurethane foam composed of these materials has excellent breathability and is able to reduce stuffiness because of perspiration while providing excellent low resilience at room temperature. In addition, unlike existing materials, it does not become hard at low temperatures because of the low temperature dependence of foam hardness.

The low resilience of foam was previously maintained mainly via methods such as reducing the molecular weight of polyols per functional group (by reducing hydroxyl equivalents) to improve viscosity. However, foams obtained by these methods have low breathability, which was an issue. We successfully improved breathability while maintaining body pressure dispersion, for example, by appropriately combining polyols with an ester group and other materials. Further, we performed an optimal design at the molecular level such that the temperature-dependence of foam hardness is reduced; the newly developed foam does not harden at low temperatures.

◆Breathability: 50 cc/cm²/s, which is an improvement of 300% or more compared to our previous product.

(In the case of hardness of 30–55 N/314 cm² and density of 40–70 kg/m³)

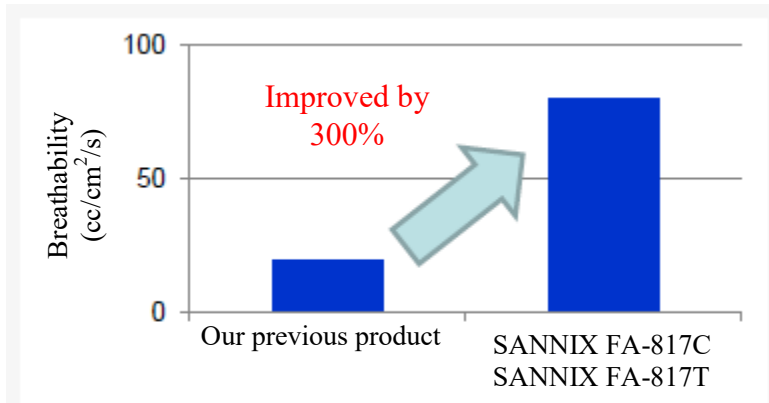


Figure 1 Comparison of breathability between foams using the previous polyols and “SANNIX FA-817C, 817T”

- ◆Hardness: The hardness at low temperatures decreased by approximately 30% compared to our previous product.

(If the hardness at 25°C is assumed to be 1, then the hardness at 0°C of the previous product and new product is 5 and 3.6, respectively.)

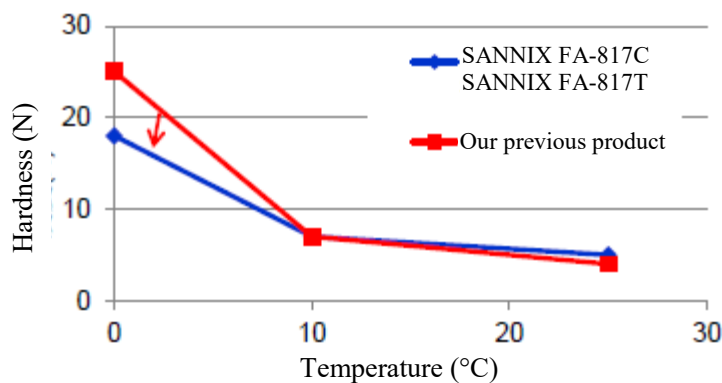


Figure 2 Comparison of temperature dependence of hardness between foams using the previous polyols and “SANNIX FA-817C, 817T”

[Future plans]

We will widely deploy SANNIX FA-817C and -817T foams both in Japan and overseas, contributing to comfortable sleep and thus aiding healthy living. Furthermore, we will continue to provide solutions to address various needs using sophisticated polyurethane foams.

About Sanyo Chemical

Sanyo Chemical established in 1949 in Kyoto, Japan, is a global manufacturer and seller of performance chemicals. Beginning as a manufacture of soap and texture agents we have since diversified our product portfolio to meet the needs of the market, Today, we feature over 3,000 different types of products and have established an international presence. Our portfolio of chemicals spans a variety of industries and types, from automotive components to daily-use electronics, as well as cosmetics and medical equipment, all with the aim of creating ore safe and environmentally friendlier offerings, improving lives and societies across the world. We aim to contribute to realize a sustainable society through our corporate activities.

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