



Functions to Shape the Ideal Food Packaging Materials

SANYO
PRODUCT
TOPICS

Tooling material is used in various processes including design, trial production, and production of all types of industrial products, from an automobile model to convenience store lunch boxes.

This article introduces a product that realizes an ideal form for food packages for which demand has been on the increase in recent years.

Ready-made meal market has grown to annual sales of 10 trillion yen

In Japan, due to lifestyle changes in the recent years, the number of people who eat easy meals at home has increased; and the ready-made meal market, which includes take-outs and deliveries of boxed lunches and dishes, has been growing. Since the late 2000s, the market has continued to grow at a scale of approximately 2.7 billion US\$ (300 billion yen) per year to over 91 billion US\$ (10 trillion yen) per year by 2018. We assume that many people have used these services during the recent coronavirus crisis. In line with these movements, the demands for food packages are also increasing. As evidenced in convenience store lunch boxes, speed and design precision are considered more and more important. This is in addition to improvements in performance and demand for more complicated designs in terms of heat resistance and sealing property, even with continued diversification in product types and shortening of the product life cycle. Tooling materials support the development of these diverse products.

Tooling material with excellent workability and no deformation

Tooling material is mainly used for prototypes in new product development in industrial fields. Although prototypes used to be manufactured

using wood materials including natural wood, the wood was difficult to process because of the presence of grains and nodes. The process also took time as the prototypes were created manually by craftsmen. There were also defects such as elongation and shrinkage due to humidity and temperature, and large deformations such as warping and distortion. Meanwhile, tooling material is a product created by chemical synthesis; it is easier to carve than wood and can be processed by machine. It can be considered an optimal material for prototypes of food packages that have quick product cycles and a large number of varieties because it can be processed in a short time through a complex process and is not deformed by temperature or humidity. Due to these characteristics, tooling material is currently used in nearly 100% of the applications in this field.

Achievement of finer and more uniform quality with our special manufacturing method

The tooling material from Sanyo Chemical Industries is called “SANMODUR.” Compared to the products of other companies, this product is characterized by high finished precision as it has a finer and more uniform texture; and excellent cutting performance. It also undergoes little changes under heat, and has antistatic property added to prevent adherence of cutting powder.

This quality is facilitated by the “mechanical floss” and the “continuous pouring” methods, which are proprietary techniques that were developed by Sanyo Chemical Industries. Urethane is used as the basic material for tooling material. Water or foaming agent are added to make the product lightweight with utilization of the carbon dioxide gas that is generated in the reaction of the mixture of the raw materials polyol and isocyanate. In the “mechanical floss method,” a special mixer (mechanical floss machine) is used to disperse nitrogen gas mechanically into the polyol and isocyanate mixture to reduce the weight.



This is why smaller bubbles can be formed and products with finer texture can be manufactured. In addition, the product is prone to unevenness due to the temperature distribution in the general molding process. “SANMODUR” can be manufactured uniformly through the “continuous pouring method,” in which the mixture is poured and solidified continuously on the conveyor.

Furthermore, since Sanyo Chemical Industries also manufactures the raw material polyols, we have the advantage and opportunity of selecting the optimal raw material from the numerous materials in the lineup.

Addressing additional needs in fields that are closely related to our lives

“SANMODUR” is used in various fields other than food packages, such as the manufacture of models in the automotive field, and we have a wide variety of products suited to each

application. We are also the only manufacturer for tooling material that mainly consists of urethane resin, in Japan with a little over 60% market share. Our global share is approximately 20%.



Tooling materials

Furthermore, the demand for “SANMODUR” is expected to grow further even in the food packaging field where new areas are being added, including nursing care and food service. In the future, we will continue to create products that will help the society in fields that are closely related to life, while also responding to new needs.

■ Main physical properties of “SANMODUR” Series

Name of product	Application	Density (g/cm ³ , 25°C)	Hardness (Shore D)	Bending strength (MPa)	Linear expansion coefficient (×10 ⁻⁶ /°C)	Thermal deformation temperature (°C)	Surface roughness (μm)
		JIS K 7222	ASTM D2240	JIS K 6911	TMA	JIS K 6911	Our company's method*2
SANMODUR SX	Mock-up model Styling model Disposable type	0.27	31	6.4	50	60	15
SANMODUR MH-E*1		0.35	43	7.4	54	54	11
SANMODUR LC-M		0.40	40	10.0	47	80	13
SANMODUR MS-E*1		0.45	52	13.6	58	65	8
SANMODUR TW-E*1	Casting model Vacuum forming mold Inspection jig	0.75	64	25.0	47	95	4
SANMODUR NZ-M		0.90	80	46.0	29	140	3
SANMODUR HD-M		1.10	81	58.0	53	100	3
SANMODUR NV		1.13	74	32.0	52	93	3

*1 With antistatic effect

*2 The cutting surface of tooling material that was cut using a NC machine tool manufactured by IWAMA Co., Ltd. was measured using a non-contact three-dimensional surface roughness meter manufactured by KEYENCE CORPORATION.

Surface roughness refers to the mean value of the absolute values of roughness on the sample surface, and a smaller value indicates a smoother surface.

Please contact our company's sales representative when handling our company products. Also be sure to read the “Safety Data Sheet” (SDS) before use.

It is the responsibility of the user to determine the suitability and safety of the product for the application they choose.