

Lacquer Coat Type TOYAL LOTUS®



Hiroyuki Nishikawa,
 Converting Development Center,
 Processed Product Department,
 Foil Business Division,
 Toyo Aluminium K.K.



Opening up the lid of yogurt products

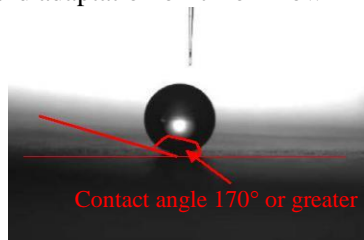
【 1. Introduction 】

The market for yogurt in Japan has reached 280 billion yen per year and around 1/3 of that total is soft yogurt. In the past, as we supplied lid material for yogurts to various users, the greatest requests for improvement that we received were for: (1) Hygienic lid materials that would stop the yogurt or other contents getting on the hands or clothing, and (2) Lid materials that could be disposed of cleanly with none of the contents remaining on the lid. Focus was placed on these two points during research and development work, and the result was the development of the “TOYAL LOTUS” product.

【 2. An outline of TOYAL LOTUS 】

TOYAL LOTUS is a “functional packaging material” that is water repellent. The mechanism for this water repellency is that a fractal structure which is the same as that of lotus leaves is formed on the surface of the packaging material by physicochemical treatment. This realizes super water repellency with a contact angle with water of 170° or greater. (Photograph 1.)

This is a technology that has already been used in products on the lid material (inside face) for yogurts. It is an innovative technology and there are great expectations for the application and adaptation of it from now onwards.



Photograph 1 Contact angle with water

【 3. Technical explanation 】

The fractal structure refers to the

3-dimensional network formed on the surface layer of the sealing face. Chemical and physical effects minimize the wettability of the surface and realize the super water repellency. As shown in the conceptual drawing in Figure 1, the super water repellent surface state is formed by forming a water-repellent film containing a minute amount of air at the micro-level on the sealant surface.

The main types of lid material for yogurts include the “Hot melt type,” the “Sealant film type” and the “Lacquer coat type.” This document explains the details of the lacquer coat type in particular.

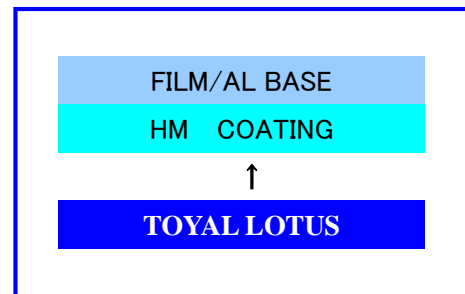


Fig. 1 Conceptual image of TOYAL LOTUS (HM type) cross-section

【 4. Lacquer coat type product structure 】

The lacquer coat type indicates the lid material for 4-pack type yogurts and it has become the main product for yogurts both within Japan and overseas.

As the quantities have tended to increase in recent years, it is thought that the effect of adding the water repellency function of TOYAL LOTUS to this lacquer coat type will be extremely great. It is also a technology that is attracting attention from overseas and there are expectations for the future extension of the product on an international level.

As shown in Figure 2, the basic structure from the outer layer is an paper, film, and then a lacquer coating.

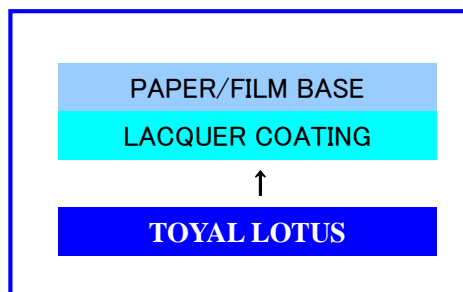


Fig. 2 Structure of the lacquer coat type

In order to add the water repellency, it is necessary to process the TOYAL LOTUS in the lacquer coat surface on the inside of the lid material.

The following are the items that must be considered as the various physical properties for the lid material for yogurts, etc.

- Water repellency
- Water repellency durability
- Opening strength
- UV irradiation resistance
- Sealing against foreign matter
- Peeling strength (puncture strength)
- Filling and packaging machine suitability
- Hot tack properties
- Residual solvent

These physical properties must be sufficiently considered in order to successfully develop a product and detailed data must be collected. Opening strength and sealing strength (puncture resistance) are shown as examples below (Fig. 3 and Fig. 4). The lid material processed with TOYAL LOTUS has slightly lower sealing strength than the current item, but it is a level suitable for practical use and not a problem.

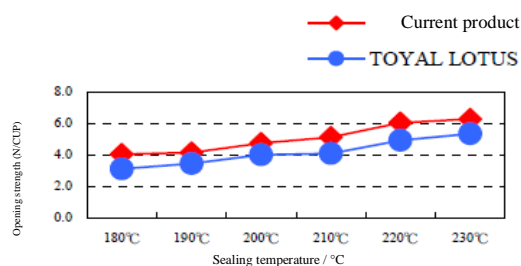


Fig. 3 Opening strength

Sealing conditions: T °C x 3 kg/cm² x 0.8 sec on PS container

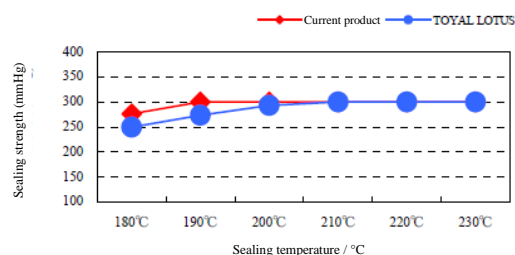


Fig. 4 Sealing strength

Sealing conditions: T °C x 3 kg/cm² x 0.8 sec on PS container

【 5. Summary 】

It has now been a few years since TOYAL LOTUS was launched on the market and many highly appreciated comments have been received regarding its use as a lid material for yogurts. These include that it is possible to dispose of the product in a very clean state and users being highly impressed by the way that what previously stuck all over the lid now just rolls off. From now onwards, product development will be continued so that the product may be extended to foods other than yogurt, such as puddings and jellies containing milk. There are also expectations of an extension to applications other than food lid materials, such as containers, bags and industrial materials, and further improvements and modifications will be made with the goal of making it a “global standard” product.



Next Report



Toyo Aluminium K.K.



Contact Us