November 8, 2012
Toyobo Co., Ltd.

Toyobo Announces the Development of "BREATHLEATHER®"

An Artificial Leather for Automotive Seats Based on Toyobo's Tactile Sense Measuring Technology

Toyobo has successfully created a tactile sense measuring technology for quantifying comfortability. Recently, using this technology, Toyobo has also developed BREATHLEATHER®, which is an artificial leather for automotive seats that does not feel "sticky."

1. Background for the Development of BREATHLEATHER®

Toyobo has been developing human sensation measuring technology to quantify skin sensations since the latter half of the 1970s based on devices to quantify skin sensations. To apply this technology to automotive uses, Toyobo conducted surveys of consumers to determine the tactile sensations required for automotive seats. As a consequence of these activities, Toyobo has determined that consumers prefer that the outer layers of automotive seat materials have the following sets of characteristics: (a) not sticky, soft, and dry or (b) not sticky and soft as well as are soft and smooth.

Creating a tactile sense measuring technology that makes use of a skin model (a device developed by Toyobo) and KES*, Toyobo has developed both artificial leathers that have the properties of "not sticky, soft, and dry" and those that are "not sticky and soft as well as are soft and smooth." The new artificial leather BREATHLEATHER® was developed by combining Toyobo's technologies for specialty organic polymers and tactile sense measuring with the coating technology of Toyobo Group company Toyo Cloth Co., Ltd.

*KES stands for the Kawabata Evaluation System, which is used to quantify the texture of cloth, and is available on the market to measure five physical properties of cloth: namely, surface, bending, compression, shear, and stretching.

2. Features of BREATHLEATHER®

(a) BREATHLEATHER® provides leathers that are not sticky and have a dry feeling as well as those that are not sticky as well as are soft and smooth to

the touch through the formation of special outer layer skin surfaces that contain specialty organic polymer powders with superior moisture absorption and desorption properties as well as through regulation of the unevenness of the surface.

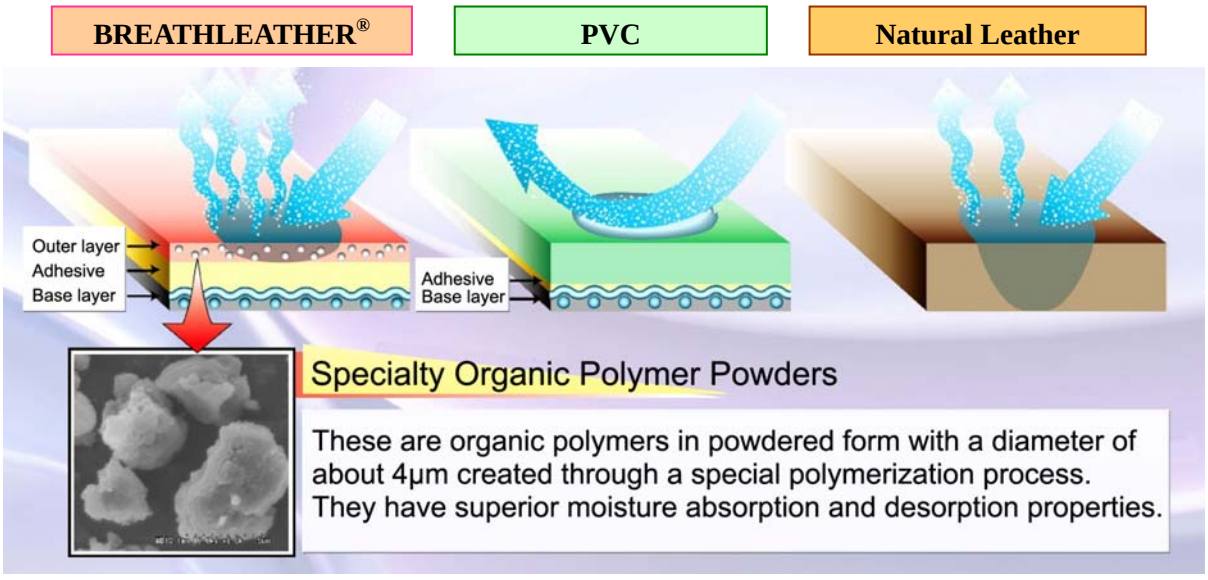
BREATHLEATHER®

(b) BREATHLEATHER® makes it possible to reduce the weight of the leather used in automotive seats by one-half in comparison with other artificial leather (polyvinyl chloride (PVC)) and by one-third compared with natural leather.

(c) BREATHLEATHER® also meets the requirements for durability and other physical properties required for automotive seats.

Structural Properties of Differing Seat Materials

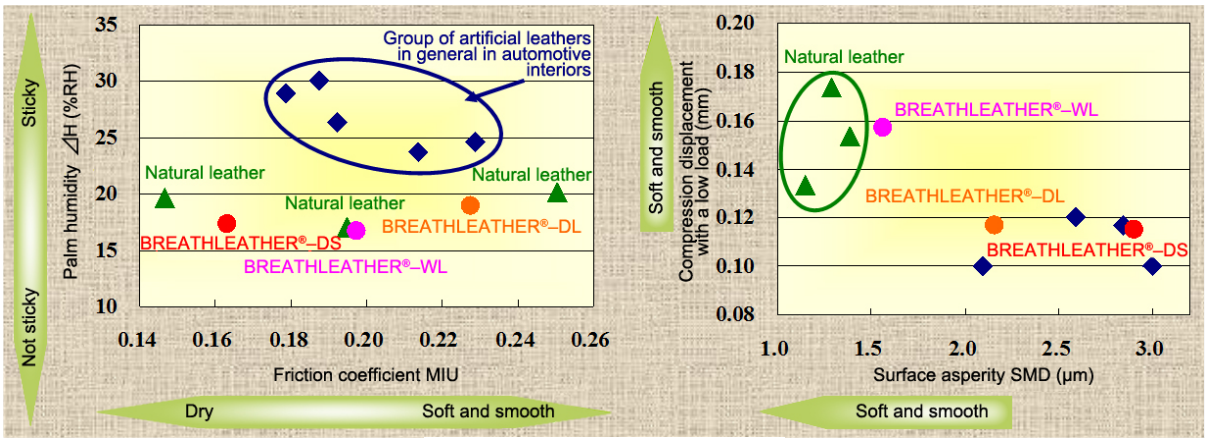
Specialty organic polymer powders, with superior moisture absorption and desorption properties, contained in the special outer surface of the materials, give BREATHLEATHER® a dry, more-satisfying feeling.



3. Explanation of Toyobo's Tactile Sense Measuring Technology

As a result of the preparation of a sense map using Toyobo's tactile sense measuring technology, compared with other artificial leather used in automotive seats, such as PVC, which is in general use for this application, BREATHLEATHER® does not have a feeling of stickiness because of the low rise in palm humidity due to the application of a skin model. In addition, the three types of artificial leather in Toyobo's new BREATHLEATHER® lineup have the following properties. BREATHLEATHER®–DS, the dry type, has a

dry feeling because of its lower friction coefficient. On the other hand, BREATHLEATHER®–WL and BREATHLEATHER®–DL, the two soft and smooth types, give a sensation of softness and smoothness because of their higher friction coefficient. BREATHLEATHER®–WL in particular, which has specifications that make it suitable for luxury car seats, offers a large compression displacement with a low load as well as a small surface asperity, thereby providing a feeling of softness and smoothness.



Tactile Sense Map

4. Outlook

BREATHLEATHER® has already been adopted by non-Japanese automotive manufacturers, and Toyobo aims to expand its usage in automotive applications more widely.

In addition, Toyobo will not restrict the use of BREATHLEATHER® to automotive applications but expand it to all types of uses, with the aim of attaining annual sales of ¥1 billion.

Supplementary Information

1. Sensation Measuring Technology

With the goal of “adopting a scientific approach to measuring comfort,” since the latter half of the 1970s, Toyobo has been developing its human sensation measuring technology and applying it to develop various devices to quantify skin sensations. As part of these activities, Toyobo developed its original “perspiring mannequins” named TOM®III and SAM®. In addition, Toyobo has been working on the

Perspiring mannequin TOM®III

development of technologies for psychological and physiological measurement to assess psychological states using physiological measures and on simulation technology to predict the pressure exerted by clothing on wearers using numerical computation technology.

2. Tactile Sense Measuring Technology

Recently, making use of a skin model (a device developed by Toyobo) and KES (please see reference on page 1), Toyobo has devised a technology for tactile sense measurement.

The skin model is the same perspiration-emitting, hot plate model device used in Toyobo's perspiring mannequin SAM®. This device was used to show that when the degree of increase in palm humidity, represented by H (the degree of increase in the humidity in the space between the hot plate and the test material), is low and the friction coefficient, as measured by the KES, is also low, then this indicates a "not sticky, dry sensation." The device was also used to make it clear that when the degree of increase in the palm humidity is low and the friction coefficient is large, this indicates a "not sticky as well as soft and smooth sensation." In addition, this device also enabled Toyobo to understand that a soft and smooth sensation requires a large compression displacement with a low load as well as a small surface asperity.

In addition, it is possible to assess softness through measures of bending properties of the material.

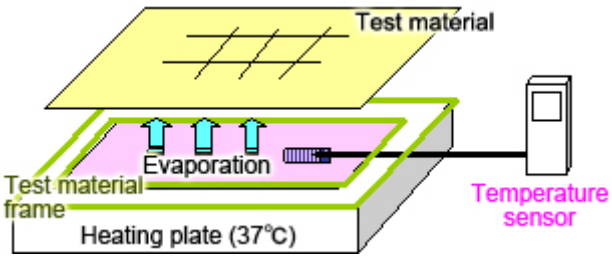
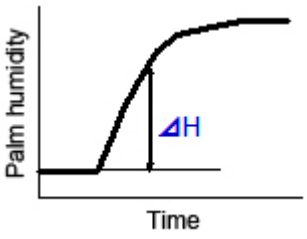


Diagram of the Skin Model



Palm Humidity Graph

For more information, contact:
The Toyobo Public Relations Group
pr_g@toyobo.jp