

November 5<sup>th</sup>, 2020

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## **Aiming to Spread Used Disposable Diaper Recycling Systems - Developed New Recycling Technology for Superabsorbent Polymers -**

NIPPON SHOKUBAI CO., LTD. (Headquarters: Osaka, Japan, President: Yujiro Goto, hereinafter "Nippon Shokubai"), LiveDo Corporation (Headquarters: Osaka, Japan, President: Takao Kusumi), and Total Care System (Headquarters: Fukuoka, Japan, President: Takeshi Cho) are jointly developing a variety of various technologies to promote the spread of systems that recycle disposable diapers, the use of which continues to increase. These three companies have recently developed new recycling technologies for superabsorbent polymers (SAPs) in used diapers. The technology can be applied to a wide variety of SAPs distributed worldwide.

At the 2015 UN Summit, the 2030 Agenda for Sustainable Development was adopted, setting out 17 Sustainable Development Goals (SDGs) and 169 targets with a deadline of 2030. The recycling of used disposable diapers can contribute to the SDGs in a variety of ways.

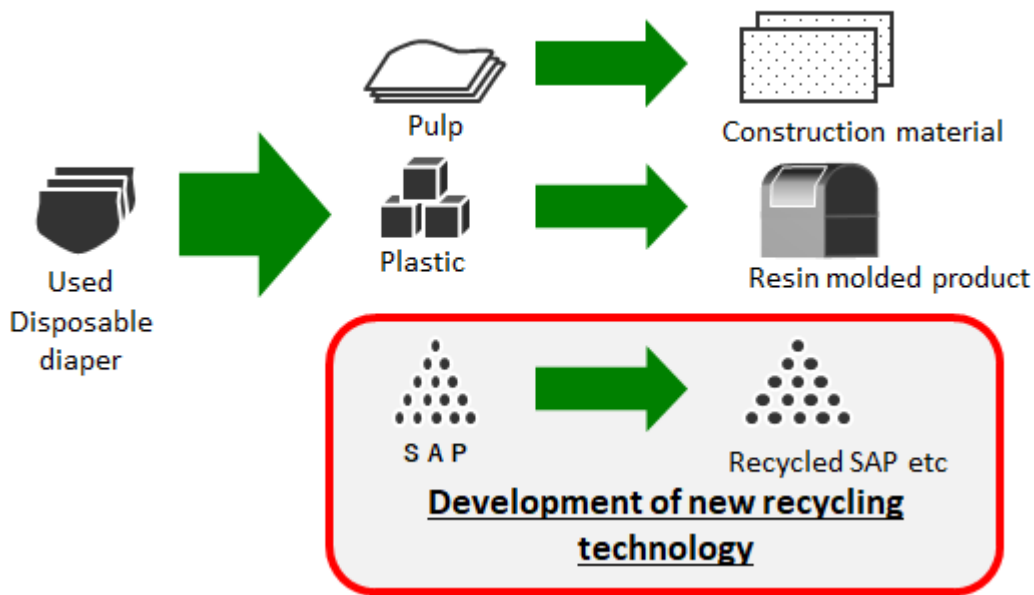
On March 31, 2020, the Ministry of the Environment released the Guidelines for Recycling Used Disposable Diapers. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is also aiming to establish a guideline for the acceptance of used disposable diapers into the sewage system based on the New Sewerage Vision Acceleration Strategy. Recycling of used disposable diapers, the amount of which continues to increase, is thus expected to be promoted.

Total Care System was the first in Japan to build a recycling system for used disposable diapers, one of the few in the world, and it has been in business for 15 years. Disposable diapers are mainly composed of pulp, plastic, and SAP. The recycled pulp has been effectively used as a raw material for building materials (e.g., exterior and interior wall materials), and plastic has been thermally recovered as solid fuel. Currently, research and development of material recycling are underway.

Nippon Shokubai, which has the world's largest market share (based on production volume\*) of SAPs, joined the initiative in November 2018 to explore recycling technologies for SAPs, which had remained a challenge, and succeeded in developing new recycling technologies through joint research by three companies: major disposable diaper manufacturer LiveDo Corporation and Total Care System.

\*Based on research by Nippon Shokubai in 2019

■ Recycling of used disposable diapers



The recycling process for used disposable diapers used to face the challenge that SAPs, which would be swollen from absorbing urine, reduced the recovery rate of paper pulp, or even if SAPs were recovered, they were difficult to reuse because of the significant decrease in performance.

Three companies jointly developed the following technologies to overcome this challenge.

- Technology to increase the recovery rate of paper pulp through processing SAP that had been swollen from absorbing urine, to improve the separation from paper pulp.
- Recovery technology that minimizes SAP performance degradation

These technologies are designed to reduce energy consumption during recycling and to protect the water quality of rivers and other bodies of water. They can also be applied to all SAPs produced by Nippon Shokubai, as well as to various SAPs around the world.

In addition to raising these technologies to a practical level, the three companies, which are a raw material manufacturer, a disposable diaper manufacturer, and a recycling business, plan to work together to develop and commercialize materials and products that are easy to recycle and new recycling technology for used disposable diapers.

■ Roles of the three companies

Nippon Shokubai	Development of materials that are easy to recycle and related processing technologies
LiveDo Corporation	Development of disposable diapers that are easy to recycle and related processing technologies
Total Care System	Examination and development of facilities and processing conditions suitable for recycling



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About NIPPON SHOKUBAI Co., Ltd.:

Since 1941, Nippon Shokubai has grown up its business with unique catalyst technology. Nippon Shokubai has supplied, for example, ethylene oxide, acrylic acid, automobile catalysts, process catalysts and so on. Among all, our global market share of superabsorbent polymers is the largest in the world now. Nippon Shokubai is a global chemical company operating under its corporate mission "TechnoAmenity-Providing affluence and comfort to people and society with our unique technology."

<https://www.shokubai.co.jp/en/>

About LiveDo Corporation:

LiveDo Corporation is conducting its business as a company that supports each individual's vitality in both the care and cure fields. In the nursing care and life care businesses, the company manufactures and sells adult disposable diapers under the Refre brand and boasts one of the highest market shares in Japan for facility and hospital use. In the area of the cure and medical fields, the company manufactures and sells surgical kits for use in hospital operating rooms, and its market share has been increasing in recent years.

<https://www.livedo.jp>

About Total Care System:

The company constructed the Love Forest Omuta Plant to recycle disposable diapers through the water solubilization process in Omuta Eco-Town in Fukuoka, Japan, in 2004. The plant started operation in 2005. Total Care System was the first in Japan to build a recycling system for disposable diapers, one of the few in the world. The company has recently started to cooperate with Toppan Printing Co., Ltd., and Sumitomo Heavy Industries Environment Co., Ltd., with the aim of constructing a model plant based on a self-contained material recycling system.

<http://www.totalcare-system.co.jp>

\*All product and service names mentioned in this news release are trademarks or registered trademarks of their respective companies.

\*The information in this news release is current as of the date of the announcement. The information is subject to change without prior notice.

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