

News Release



Dai Nippon Printing selects film for new packaging based on BASF polyamide to help drive the use of renewable resources

- **Biomass balance approach replaces fossil feedstock with renewable resources in initial stage of production**
- **Offers identical product performance while reducing greenhouse gas emissions**
- **Aims to certify integrated material management system for entire production process, from renewable feedstock through to polyamide film and packaging**

Tokyo, Japan – September 29, 2016 – Dai Nippon Printing Co., Ltd. (DNP), Japan's largest packaging converter, has adopted BASF's Ultramid® biomass balance polyamide 6 for its packaging products, using films produced by KOHJIN Film & Chemicals. The three companies collaborated on the initiative, including a plan to establish certification for the process. Through this approach, verified by TÜV SÜD, a third-party certification body, fossil feedstock needed to make the product is replaced with certified renewable raw materials at the beginning of the production process. This packaging solution marks the first commercial application of Ultramid biomass balance in Japan.

Biomass balance approach

According to the biomass balance approach, renewable raw materials are used as feedstock from the very beginning of production in BASF's integrated "Verbund" production system, and then allocated to the respective sales products. An independent certification issued by TÜV SÜD confirms the use of the required amount of renewable

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raw materials needed to produce the product. The certified products thus save fossil resources and help reduce greenhouse gas emissions. The formulation and quality of the products remain identical.

From bio-feedstock to finished product: aiming for certification of the entire production process

The integrated material management system used for the entire value chain, from renewable feedstock to the finished product, is an essential part of the biomass balance approach. BASF supplies Ultramid biomass balance to KOHJIN Film & Chemicals Co., Ltd. KOHJIN Film & Chemicals then produces film using BASF's polyamide 6, which is used by DNP to create an innovative packaging solution. With the goal to certify the entire process, BASF has already received TÜV SÜD certification, while KOHJIN Film & Chemicals and DNP are in the process of certification of the film and packaging. With this integrated material management system, regularly verified by third party audits, DNP will be able to confirm that 100 percent of the fossil feedstock required for the manufacturing of this product was replaced in the production site by renewable raw materials.

Hiroki Ishida, Vice President of BASF Japan said, "I am extremely happy that BASF was able to contribute to the development of this innovative packaging by the three companies. Ultramid biomass balance has made it possible to provide solutions that help save fossil resources and reduce overall greenhouse gas emissions, while maintaining the same performance. BASF will continue to work closely with our customers to develop next generation products for the sustainable development of the packaging industry."

Consumer demand has been increasing for packaging alternatives that make use of renewable raw materials. The precursor material for polyamide 6 is caprolactam, which cannot be produced directly from renewable resources. For this reason, until now, producers seeking bio-based packaging alternatives have had limited options. However, with the biomass balance approach, renewable resources such as bio-naphtha replace naphtha (a petroleum product) in the very first

steps of chemical production, for example at the steam cracker. BASF then utilizes its highly-efficient existing integrated production “Verbund” for all production steps. This includes the manufacture of caprolactam as the basis for polyamide 6. The share of renewable resources is then allocated to selected products including polyamide. BASF has offered Ultramid® biomass balance commercially since 2014.

Details regarding DNP’s film packaging and BASF’s biomass balance approach will be exhibited at TOKYO PACK 2016, held at Tokyo Big Sight from October 4 to October 7, 2016.

BASF’s polyamide based on biomass balance approach, can be used in the same way as conventional products, not only in films, but also in the engineering plastics, fibers, and monofilament industries.

About BASF in Japan

BASF started doing business in Japan in 1888. Activities cover four business segments including chemicals, performance products, functional materials & solutions and agricultural solutions. The main production sites are in Chigasaki (admixtures for concrete, construction materials), Kitatone (personal care ingredients), Totsuka (coatings), and Yokkaichi (thermoplastic polyurethanes and polymer dispersions). Admixture plants for the Construction Chemicals division are also located nationwide. BASF maintains a strong research and development presence in Japan including the BASF Asia Composite Center, established in the Yokohama Innovation Center (engineering plastics), and the Research and Development Laboratory and Application Technology Center for Battery Materials in Amagasaki. As of the end of 2015, BASF employed 1,209 employees in Japan, and achieved sales of about €1.5 billion to customers in Japan. For further information please visit: www.basf.com/jp.

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. The approximately 112,000 employees in the BASF Group work on contributing to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into five segments: Chemicals, Performance Products, Functional Materials & Solutions, Agricultural Solutions and Oil & Gas. BASF generated sales of more than €70 billion in 2015. BASF shares are traded on the stock exchanges in

Frankfurt (BAS), London (BFA) and Zurich (AN). Further information at www.basf.com.