

PU elastomers based on low free (LF) prepolymers as an alternative to rubber

### **Durable star wheels for waste sorting**

- **Wear-, heat- and moisture-resistant**
- **License agreements with star wheels manufacturers in North America**
- **Major opportunities for use in separation plants and transport systems for other industries, too**

**Cologne** – LANXESS's Urethane Systems business unit has developed an alternative to synthetic rubber for producing star wheels for material separation plants and material transport. It is based on polyurethane (PU) elastomers produced from Adiprene Low Free (LF) prepolymers. The PU star wheels are not only characterized by a longer service life and excellent mechanical performance, but are also resistant to heat and moisture. In addition to the material, the constructive design of the star wheels also comes from LANXESS. It was developed based on product requirements, technical application and optimization algorithms using the CAD software Solidworks. This design is licensed. "We have already signed contracts with selected processors in North America to ensure that end customers of star wheels benefit from the highest level of quality and performance," says Michael Timm, global head of Marketing and Development at Urethane Systems.

#### **Doubled service life**

While the beginnings of the star wheel can be traced back to the reprocessing of old newspapers, they can now be used to separate paper from various household mixed waste (single-stream recycling). The plants used for the single-stream recycling process must be able to handle waste streams at speeds of up to 50 metric tons per hour. The star screen machines used in single stream material recycling facilities (MRFs) each consist of several steel axles on which the star

#### **LANXESS AG**

Contact:  
Michael Fahrig  
Corporate Communications  
Spokesperson  
Trade & Technical Press  
50569 Cologne  
Germany

Phone +49 221 8885-5041  
michael.fahrig@lanxess.com

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wheels are mounted. Each deck has its own star wheel arrangement depending on the screen size. In particular, the star wheels of the first screening decks are extremely subject to abrasion because they have to sort out heavier waste components at high running speeds. "A wheel version based on our Adiprene LF TDI prepolymer is used in the plants, which is twice as durable as a component made of rubber. The wheels can therefore be replaced less frequently, which saves material costs and extends the maintenance intervals of the plants," says Timm. The extreme wear resistance of the wheels is due to the high abrasion, tear and cut resistance of the PU elastomer.

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### **Optimal health, occupational safety and environmental protection**

Adiprene LF TDI is based on LF technology, which reduces the content of free TDI isocyanate (toluene diisocyanate) in the prepolymer to below 0.1 percent. It meets the highest ecological and industrial hygiene standards, allowing the processor to use the minimum amount of protective measures.

### **Controllable low viscosity, good demoldable characteristics**

Advantages also arise during processing. According to Timm, "The long pot life and low viscosities of the Adiprene LF prepolymer system allow controlled processing without the use of solvents. The viscosity can be controlled and specifically adapted to the application. In addition, the PU components are easy to demold, benefiting high productivity with minimal waste."

### **Application potential in agriculture, construction and forestry**

The use of Adiprene LF TDI is not limited to star wheels for waste recovery and recycling facilities. "We believe that the PU star wheels can also be used in agriculture, for example in harvesting systems or for handling mulch, peat, humus and compost," explains Timm. Further application opportunities arise in the construction industry,

including in the demolition of buildings, in forestry and in extremely fast production processes for food, beverages and health products.

LANXESS is a leading specialty chemicals company with sales of EUR 7.2 billion in 2018. The company currently has about 15,500 employees in 33 countries and is represented at 60 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World and Europe) and FTSE4Good.

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**LANXESS AG**

Contact:  
Michael Fahrig  
Corporate Communications  
Spokesperson  
Trade & Technical Press  
50569 Cologne  
Germany

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michael.fahrig@lanxess.com

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### Images



The PU star wheels based on Adiprene LF TDI are characterized by very high tear, abrasion and cut resistance and are resilient in humid and warm environments. Photo: LANXESS AG

### LANXESS AG

Contact:  
Michael Fahrig  
Corporate Communications  
Spokesperson  
Trade & Technical Press  
50569 Cologne  
Germany

Phone +49 221 8885-5041  
[michael.fahrig@lanxess.com](mailto:michael.fahrig@lanxess.com)

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