

### **Specialty Additives: the performance plus for chemical products**

They are the unsung stars of the industry. Though often used in negligible amounts, specialty additives play a major part in determining the properties – and ultimately the quality – of chemical products.

LANXESS is among the leading suppliers of specialty additives. They enhance the performance of chemical products, make them safer and even more colorful. These are the most important product groups at a glance:

#### **Flame retardant and plastics additives: greater safety for man and materials**

The trend toward greater energy efficiency is fueling the development of effective building insulation. The oil-based polystyrene panels frequently used at present are highly flammable, which is why effective flame retardance is essential in such applications. Brominated flame retardant additives interrupt the radical chain mechanisms that lead to a fire, thus preventing it from starting and spreading.

The rising demands on the products' health and environmental compatibility is shifting the market toward innovative, high-performance and sustainable brominated polymeric flame retardant additives, such as LANXESS's Emerald Innovation 3000.

International safety standards are also on the rise in the automotive sector, for instance in terms of fire safety in the car interior. Seat cushions, roof liners, rear decks and side liners frequently are made of polyurethane. In the event of fire, the flame must not spread horizontally at more than 102 millimeters per minute, enough time for a passenger to escape.

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## Background Information

Phosphorus-based flame retardant additives, such as Disflamoll and Levagard from LANXESS, form a kind of carbon shield on the material in the event of a fire. This prevents oxygen and heat from penetrating the underlying material layers and thus the fire from spreading. In the best case scenario, these additives even have a “self-extinguishing” effect and a fire is stopped dead in its tracks.

Other additive solutions from LANXESS also protect people. One example is phthalate-free plasticizers such as Mesamoll, a safe alternative for toys, food packaging, cables and other products made of PVC.

Numerous other high-quality additives and finishing chemicals improve the processability of polymer materials and the properties of the end products, including bonding agents that improve the adhesion of PVC coatings. Stabaxol-brand additives, for instance, are used to protect polymers in moist environments from hydrolysis and the premature aging associated with this process.

### **Lubricant additives: keeping machines moving**

The most important functions of lubricants are to reduce friction and wear, conduct heat and energy and protect materials against corrosion. Industrial lubricants are subject to tremendous demands that are continuously rising. They must withstand high pressures in power plant turbines and extreme temperatures in aircraft engines; they have to be safe for food production applications and even resist water in oil drilling on the high seas.

LANXESS markets an extensive line of lubricant additives and finished lubricants for industrial applications. In addition to single additives, ready-formulated additive packages for end customers play an important role. All the technical requirements of a lubricant and all the most important international standards and specifications can be met with a single additive package.

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LANXESS further offers balanced lubricants formulated with additives and base oils. Anderol is among the most well-known high-performance lubricants in the industry. It withstands extreme temperatures and tremendous pressures, reduces the need for machine maintenance, improves machine efficiency and extends their service life.

### **Rubber additives: for sustainable mobility and more**

LANXESS offers high-quality solutions for all the challenges of rubber processing. The company's rubber additives support the customized processing of rubber in all areas of application, from tires, profiles, hoses and cables to seals and drive components. LANXESS furthermore supports innovations in the tire industry. Various rubber additives in the product family are used to manufacture fuel-saving, "green" tires. They help tires to rolling better and more efficiently.

LANXESS's competence in additives is also expressed in application. For instance, the Rhenogran product line supports the safe and efficient incorporation of active ingredients in a rubber compound. The active ingredients being bound in a polymer matrix not only offers advantages in terms of occupational safety and health, thanks to less dust exposure in the processing plants, but also leads to greater efficiency in the compounding process because of pre-dispersion, meaning that the products contribute to sustainability and resource conservation.

### **Colorant additives: for a colorful world**

Colorant additives make the world more colorful, whether in paints for indoor or outdoor use, the housings of electrical and household appliances, PET bottles, cosmetics containers, or inkjet inks for industrial printing.

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Customers all over the world use high-quality colorants from LANXESS in a multitude of applications, from LCD displays to inks in writing instruments.

With its Macrolex and Bayplast product lines, LANXESS provides the basis for making various design ideas a reality. These products are characterized by high thermal stability and lightfastness. Virtually all Macrolex dyestuffs fulfill the strictest purity requirements. Suitability for food packaging is especially important. One example: beverages and cosmetic items are packaged less often today in glass and more in unbreakable, lightweight PET bottles. Macrolex meets the highest standards for these applications: almost all colorants under this brand meet the high standards of leading food agencies in Europe, the United States and Asia for coloring plastics for food contact applications.

A completely different area of application is crop protection products, which are generally dyed to enable visual marking and – in many cases – producer-specific color recognition. Treated seed has to be color-coded in order to prevent inadvertent use in food products. The agricultural industry imposes high purity and quality requirements on the dyes. All constituents must be recorded in country-specific registers and meet strict provisions regarding consistent composition. With its Solfort powdered pigment and Levanyl brand, LANXESS offers products for the agricultural industry that are closely tailored to these requirements.

LANXESS is a leading specialty chemicals company with sales of EUR 7.7 billion in 2016 and about 19,200 employees in 25 countries. The company is currently represented at 75 production sites worldwide. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. Through ARLANXEO, the joint venture with Saudi Aramco, LANXESS is also a leading supplier of synthetic rubber. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World) and FTSE4Good.

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### Forward-Looking Statements

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