



LANXESS
Energizing Chemistry

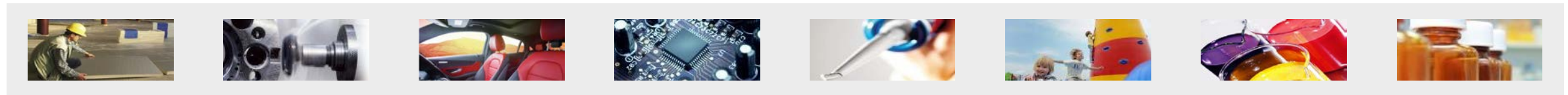
Polymer Additives – Our solutions at K 2022

Karsten Job, Head of Polymer Additives business unit

Düsseldorf, June 21, 2022

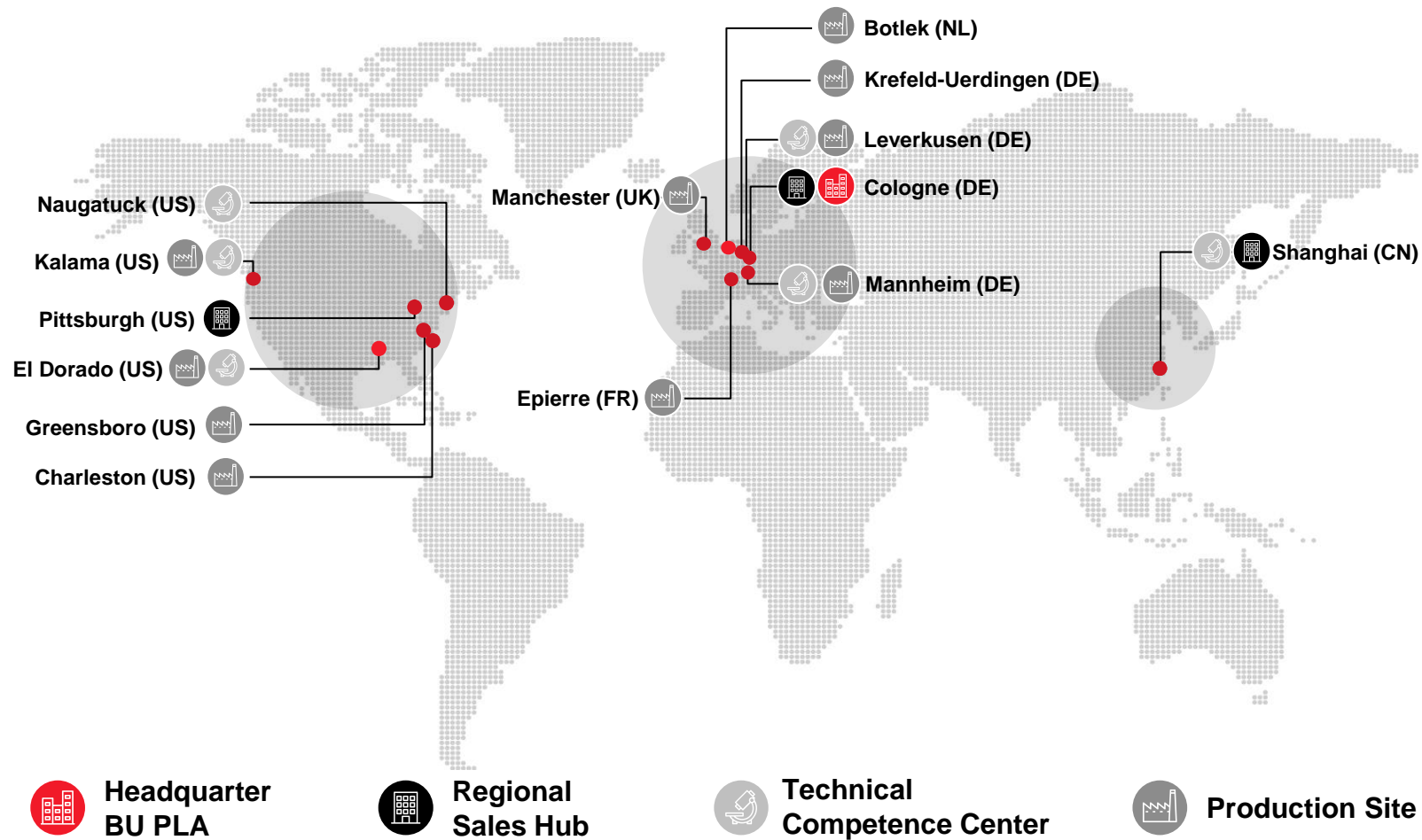
Business lines with a strong complementary portfolio and a strategic focus on specialties

Brominated flame retardants	Bromine performance products	Phosphorus flame retardants	Plasticizers and specialty additives	Colorant additives	Specialties and intermediates
<ul style="list-style-type: none"> Brominated flame retardants 	<ul style="list-style-type: none"> Bromine Fine chemicals and intermediates Clear brine fluids 	<ul style="list-style-type: none"> Phosphorus flame retardants 	<ul style="list-style-type: none"> Plasticizers Hydrolysis protection Other plastic additives 	<ul style="list-style-type: none"> Solvent dyes Colorants for inks High performance pigments Pigment preparations 	<ul style="list-style-type: none"> Phosphorus chemicals Water treatment products Other intermediates and specialties



End markets	End markets	End markets	End markets	End markets	End markets
<ul style="list-style-type: none"> Electronic appliances Insulations for the building industry Textiles 	<ul style="list-style-type: none"> Chemical and pharmaceuticals Oil and Gas 	<ul style="list-style-type: none"> Construction Automotive Polymers and plastics 	<ul style="list-style-type: none"> Construction Automotive Adhesives & sealants Polymers and plastics 	<ul style="list-style-type: none"> Packaging Electronic appliances Inkjet and stationary Automotive 	<ul style="list-style-type: none"> Agro chemicals I&I cleaners¹ Cooling and process water treatment

Polymer Additives – A truly global player with close customer proximity



- **Headquarters in Cologne**
- **10 production sites in 5 countries**
- **6 technical competence centers in 3 regions**
- **3 sales hubs in 3 regions**

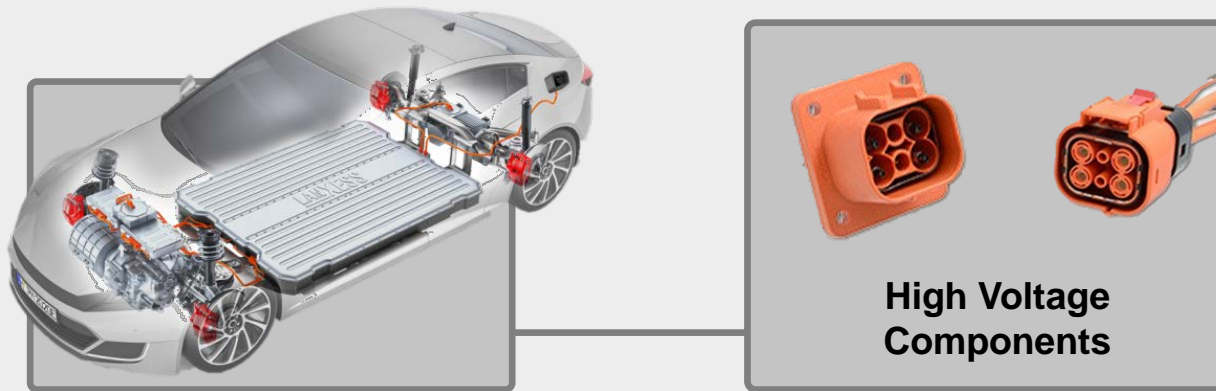
A High-Tech Soluble Dye for Brilliant Colors in Plastics and New Mobility

MACROLEX[®] Orange HT



MACROLEX Orange HT for E-mobility

Orange color as a safety feature in E-mobility



- High-tech soluble dye for brilliant colors in plastics
- Labeling of high voltage components
 - Safe handling in the main charging path of the battery
 - Important in the event of an accident and for maintenance

Orange HT meets requirements

- for PA and PBT
- Clear identification even after years:
 - Long-term color stability
 - Brilliant orange (RAL 2003)



Advantages of MACROLEX Orange HT

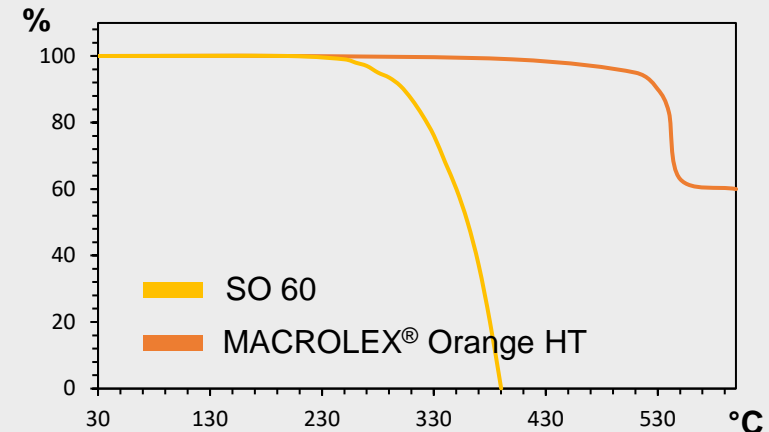
Overall outstanding fastness properties for demanding applications

- Outstandingly consistent coloristics
- Very brilliant
- High color strength
- Excellent heat stability, e.g., in PA
- Improved sublimation resistance
- High migration stability
- High light fastness
- High purity / halogen free

Heat stability in °C at 1/3 standard depth with 1% TiO₂ (DIN EN 12877)

PC	PA 6	PA 6.6	PET	PBT	PPS
360	310	300	320	300	340

Thermogravimetric analyses of vs. SO60, a similarly shaded orange dye for more common use. Sublimation point is defined as temperature with 5% loss of weight.



A new, Non-Halogen Flame Retardant for Engineering Thermoplastics

Emerald Innovation[®] NH 500

Emerald Innovation is a trademark of LANXESS Deutschland GmbH or one of its affiliates, registered in many countries of the world.



Emerald Innovation NH 500: Flame retardant for engineering thermoplastics:

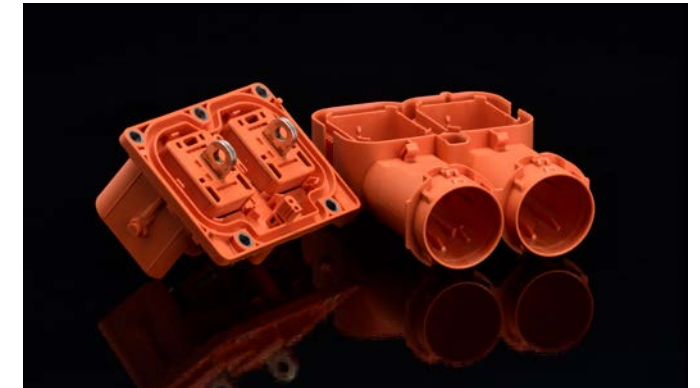
Description

- Flame Retardant
 - non-halogen
 - phosphorus containing
 - thermally stable

Appearance: White powder
PSD (D50) = 20-40 μm
Phosphorus content: 32 wt %
1% weight loss > 450 °C

Application & Properties

- Flame Retardant for polyamides
- e.g., for molded articles made of PA6, PA66, HTPA for the
- electrical and electronics industry
- Combines good flame-retardant properties with excellent dimensional stability in engineering thermoplastics



LANXESS has developed a new flame retardant solution for engineering thermoplastics

Emerald Innovation NH 500: Flame retardant properties – glass filled PA66

- Emerald Innovation NH 500 utilized in conjunction with 3 separate synergist options compared to typical reference formula utilized in the market today

Glass filled PA66 formulas	Reference	NH 500 + Synergist 1	NH 500 + Synergist 2	NH 500 + Synergist 3
UL-94 @ 0.8 mm	V-0	V-0	V-0	V-0
Glow Wire				
Glow Wire Flammability Index, 3 mm	960 °C	960 °C	960 °C	960 °C
Glow Wire Ignition temperature, 3 mm	775 °C	825-875 °C	875 °C	875 °C
HDT [°C @ 1.82 mPa] Heat Deflection Temperature	237	246	242	241

Emerald Innovation NH 500 meets both UL-94 V-0 and GWIT > 775 °C requirements

MODULAST® PUR

Modifier for Reactive PU Systems



Modulast PUR: Modifier for polyurethanes

Description

- Benzoate-based modifier
- Designed to enhance the performance and economy of reactive polyurethane applications
- High purity
- Consistent low residual hydroxyl content

Appearance: liquid

Viscosity: 94 mPas at 25°C

Hydroxyl number: < 2mg KOH/g

Acid number: < 0.1mg as benzoic acid

Application & Properties

- TPU
- CPU
- Urethane adhesives, sealants, and coatings
- Exceptional color and durability in the finished product, low odor, low VOC, and a high permanence



Modulast
PUR

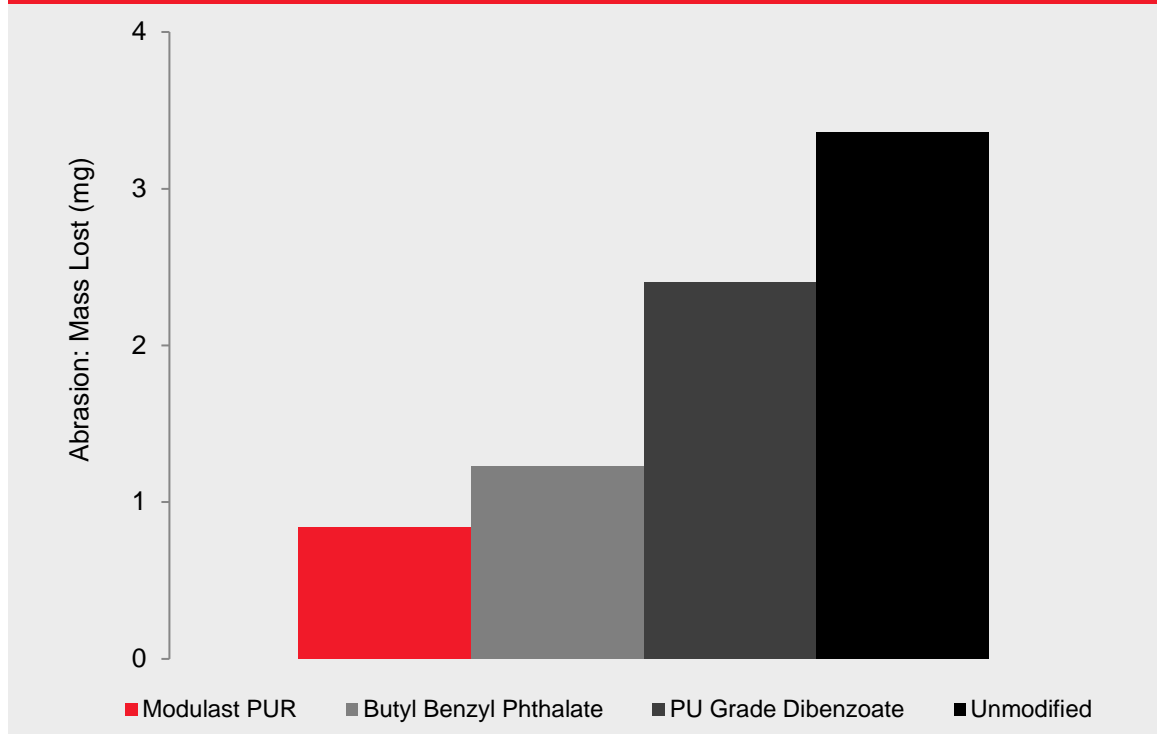
PU – Grade
competitor

No modifier

Modulast PUR provides benefits in color, compatibility, compression set and abrasion resistance

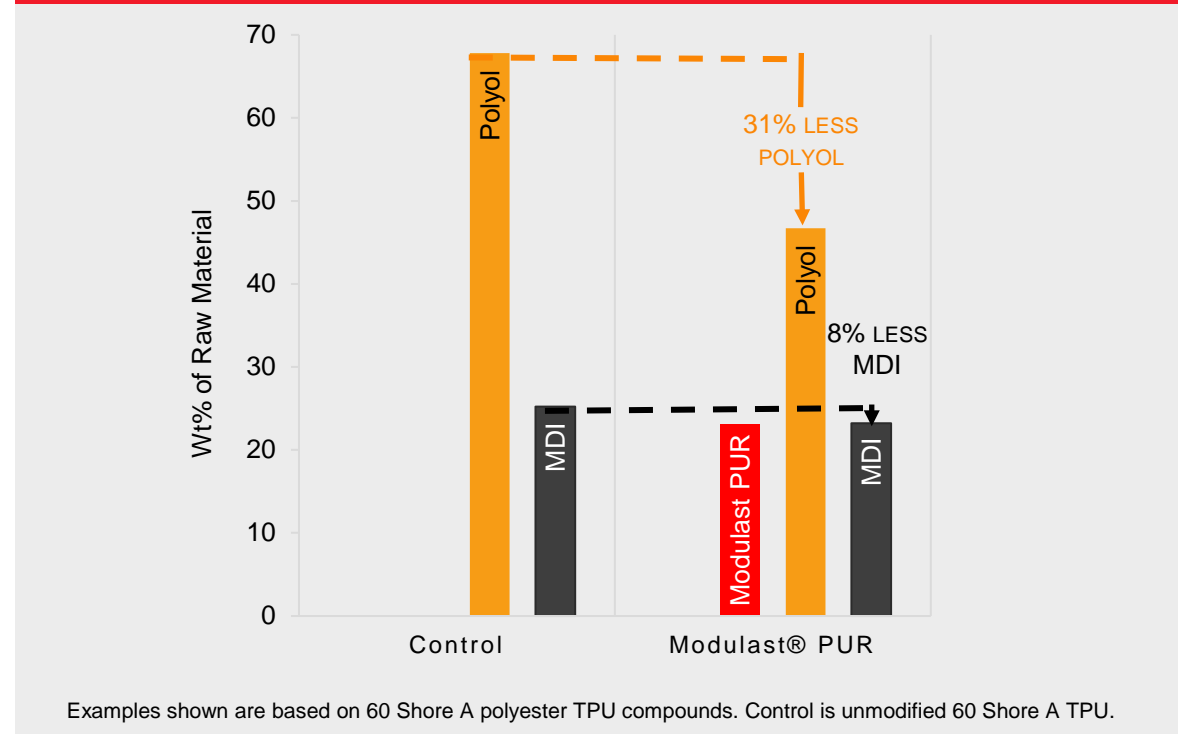
Modulast PUR: Tailored performance for polyurethanes

Improvement of abrasion resistance



Shows best abrasion resistance in our comparison

Savings by Using Modulast Modifiers in TPU



Examples shown are based on 60 Shore A polyester TPU compounds. Control is unmodified 60 Shore A TPU.

Allows reduction of constrained raw materials

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