

QUALITY PERFORMS.



Urethane Prepolymers for demanding Tire and Wheel applications.

X Adiprene®
Urethane Prepolymers

X Vibrathane®
Urethane Prepolymers

QUALITY WORKS.

LANXESS
Energizing Chemistry

WE MAKE IT EASY TO MAKE THINGS TOUGH

LANXESS Urethane Systems is a world leader in hot cast prepolymers. Our specialized polyurethane systems know-how, global production capability, decades of technical experience and application expertise enable us to provide solutions tailored to meet our customers' needs.

The tire and wheel industry requires high performance materials due to stringent demands on the final application. LANXESS has decades of experience in this market sector with strong technical competence including material characterization, wheel design expertise, analytical testing and application performance testing.

Key Applications

LANXESS deliver solutions to diverse tire and wheel markets, including recreational wheels, industrial press-on wheels and off road tires.

Through a constant focus on materials innovation and design expertise, we partner with manufacturers, OEMs and end-users to deliver innovative solutions to meet challenging application needs.

Recreational

- Amusement park wheels
- Leisure equipment wheels

Industrial

- Elevator wheels
- Forklift wheels
- Industrial truck caster wheels

Agriculture

- All-terrain vehicles (ATV) wheels
- Utility vehicles (UTV) wheels
- Lawn mower wheels

Off Road

- Mining, construction, military tires





Leading R&D and Applications development Capability

LANXESS has extensive technical and analytical knowledge, with special testing and modeling capabilities for specific tire and wheel applications.

- Finite element analysis (FEA)
- CAD modeling software
- Closed solution calculations
- Solid tire failure model (wheel model)
- Dyno testing
- Physical testing capability
- DMA
- Fatigue resistance analysis

RECREATIONAL SEGMENT

Amusement Park Wheels

Wheels utilized within amusement park applications normally require polyurethane elastomers with exceptional dynamic performance.

Key Requirements

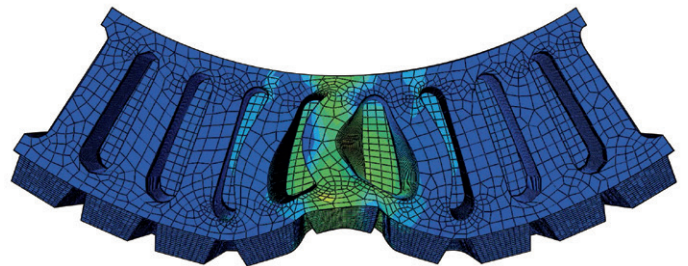
- Strong bonding
- Hysteresis resistance
- Fatigue resistance
- Wear resistance

Our technical experts can evaluate your high dynamic wheel application and help you choose the best material for your application.

Reliable, High Performance Products

Adiprene® and Vibrathane® urethane prepolymers are known industry-wide for their high quality and performance on the job, delivering outstanding abrasion resistance, toughness and load-bearing capability. LANXESS Urethane Systems is on the leading edge of urethane technology, expanding performance, and extending part life in demanding mechanical applications and in harsh chemical and thermal environments.

LANXESS offers a wide range of conventional, Low Free (LF) isocyanate, and blocked technologies that enable high performance and processing ease, which makes Adiprene® and Vibrathane® urethane systems an excellent choice to replace steel, plastics, rubber, and other elastomers in high performance applications. Our deep know-how in blocked systems and curing options enables processing in both factory and field settings.



INDUSTRIAL SEGMENT

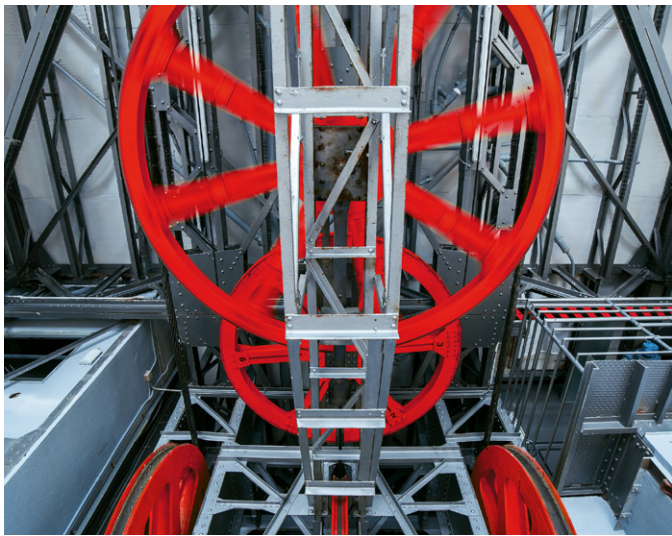
Elevator Wheels

Key Requirements

- Wear resistance
- Load capability
- Easy processing

LANXESS offers prepolymers with exceptional wear resistance that provides extended part lifetime.

Our high quality production standards provide consistency during processing for reliable elastomers.



Caster Wheels

Key Requirements

- Wear resistance
- Cost versus performance balance
- Cut and tear resistance

Using our proprietary wheel model we can evaluate materials and applications to optimize design, material, and wheel capabilities.

Our technical experts can help you select the best material for your applications.



Forklift Wheels

Key Requirements

- Fatigue resistance
- Hysteresis resistance
- Wear resistance
- Flat spot resistance
- Cut and tear resistance

For heavy loads, long runs and fast speeds, aggressive high cut and tear applications, our technical experts can evaluate your end use application with our proprietary wheel model which uses DMTA, fatigue and contact pressure data to predict performance and lifetime of a wheel.

With a large portfolio of best in class dynamic, fatigue, abrasion resistance, and cut and tear resistant materials, LANXESS has the tools to help you succeed.

AGRICULTURAL SEGMENT



ATV, UTV, ZTR Lawn Mowers, Sprayer Tires and Wheels

Solid polyurethane wheels can be used to replace rubber tires in some agricultural applications.

Key Requirements

- Differentiated wheel design
- Fatigue resistance
- Wear resistance
- High load and speed capability
- Cost versus performance
- Cut and tear resistance

We can support your innovation with a large range of materials providing a good balance between cost and performance versus rubber material.

When improved performance is needed, LANXESS has a wide portfolio to take your products to the next level.

Our experts can help you choose the best materials using tools such as DMTA, fatigue testing, cut and tear testing, and abrasion testing.

OFFROAD SEGMENT

Mining, Construction, Military Tires

Solid polyurethane wheels can be used to replace rubber tires in offroad applications.

Key Requirements

- Wheel design support (replacing rubber)
- Wear resistance
- Cost versus performance
- Hysteresis resistance
- Ride comfort
- Puncture resistance

We can support your innovation with a large range of materials providing a good balance between cost and performance versus rubber material.



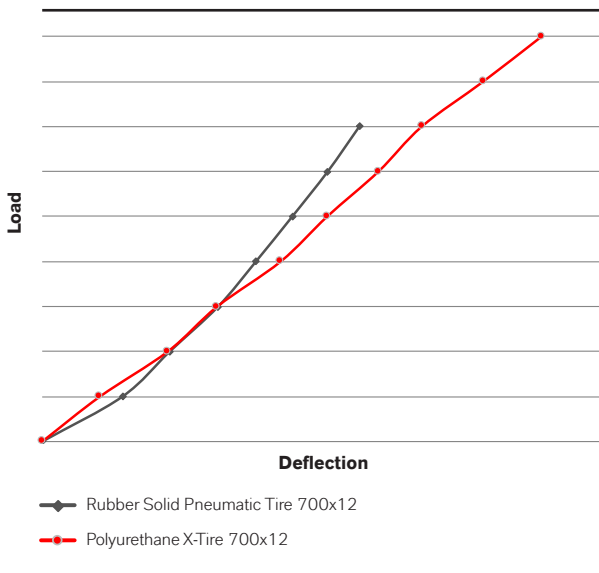
INNOVATION ACTIVITIES

STRUCTURED WHEEL TO REPLACE THE RUBBER TIRE

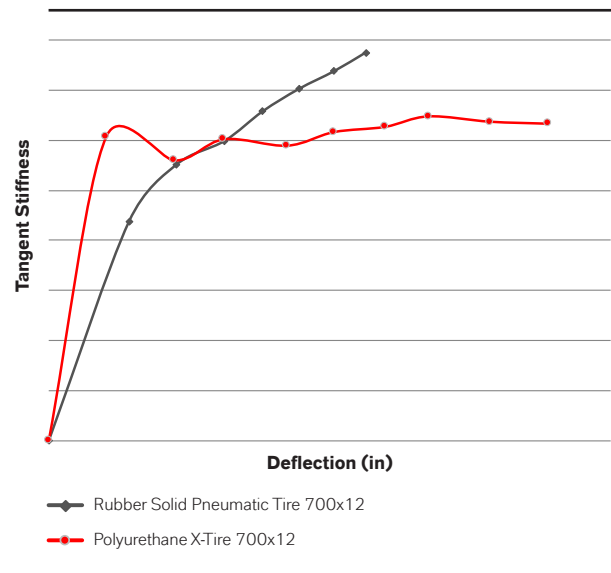
- Innovation based on LANXESS's proprietary "X"-structure urethane tire.
- Structured wheel combines all the benefits of solid pneumatic tires with the higher abrasion resistance of polyurethanes and the increased cushioning of pneumatic tires to deliver longer lifetime and increased ride comfort for harsh environment operations.
- Our experts at LANXESS have design and finite element analysis (FEA) capabilities which can help take your engineering team and end products to the next level.
- We combine chemistry know-how with mechanical expertise and understand how to translate that knowledge into end use performance.



Load vs. Deflection



Tangent Stiffness vs. Deflection



We support your innovation and help you to be successful through our application expertise

Raw Materials

Our most important priority is to support your innovation and help you to be successful. With decades of urethane chemistry and formulation expertise, we understand the synergy between the part design and the physical properties of urethane needed to achieve optimal performance.

Our broad materials toolbox includes:

- **Isocyanates:** TDI, MDI, pPDI, HDI, IPDI, H₁₂MDI
- **Low monomer isocyanates:** LF TDI, LF MDI, LF HDI, LF pPDI, LF IPDI
- **Polyols:** polyester, PTMEG, PPG, PCL, PC
- **Curatives:** diamines, diols, triols, and specialty formulated curatives
- **Additives:** catalysts, antioxidants, plasticizers, flame retardants, fillers

Processing

We offer strong technical support that can help you solve any issue regarding the production of wheels and tires.

Formulation

Our deep expertise in prepolymer formulation enables us to custom design a prepolymer system using the best combination of raw materials to meet your specific application needs, and we offer part and tool design and processing guidance to help you make flawless parts.

Wheel Design

We have developed a proprietary model for wheel design that provides you wheel design and part life guidance considering wheel dimensions, application requirements, environmental conditions, and the inherent flex life and heat build-up properties of the urethane material. This engineering support creates value for both our customers and their end users.





LANXESS Deutschland GmbH

Business Unit Urethane Systems
Kennedyplatz 1
50569 Köln
Germany
Tel: +44 161 875 3568

ure.lanxess.com

This information and our technical advice – whether verbal, in writing or by way of trials – is subject to change without notice and given in good faith but without warranty or guarantee, express or implied, and this also applies where proprietary rights of third parties are involved. Our advice does not release you from the obligation to verify the information currently provided - especially that contained in our safety data and technical information sheets - and to test our products as to their suitability for the intended processes and uses. The application, use and processing of our products and the products manufactured by you on the basis of our technical advice are beyond our control and, therefore, entirely your own responsibility. Our products are sold in accordance with the current version of our General Conditions of Sale and Delivery. Edition 04/2018

©2017 LANXESS. Adiprene, Vibrathane, LANXESS and the LANXESS Logo are trademarks of LANXESS Deutschland GmbH or its affiliates. All trademarks are registered in many countries in the world.