

# QUALITY PERFORMS.



**Adiprene® Low Free Isocyanate  
Urethane Prepolymers**  
for Adhesives and Sealants

**X Adiprene® LF**  
Low Free Prepolymers

**QUALITY WORKS.**

**LANXESS**  
Energizing Chemistry

# LANXESS IS A LEADING INNOVATOR OF LOW FREE (LF) ISOCYANATE PREPOLYMERS FOR ADHESIVES AND SEALANTS

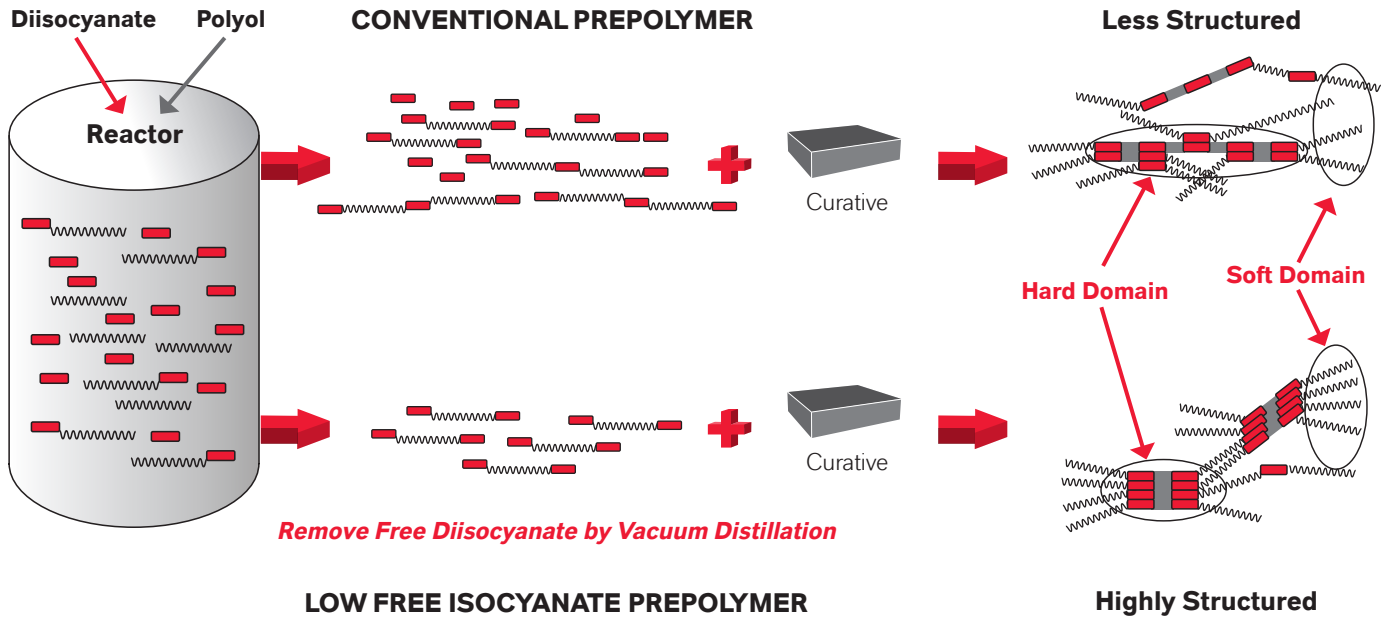
LANXESS Urethane Systems is a world leader in polyurethane systems for elastomers, coatings, adhesives and sealants with special focus on low free isocyanate, solvent-free and blocked systems. We provide our customers with decades of urethane chemistry know-how, comprehensive application expertise, and deep manufacturing experience.

## Benefits of Adiprene® LF prepolymers:

- Unsurpassed industrial hygiene
- Ease of use
- Excellent performance



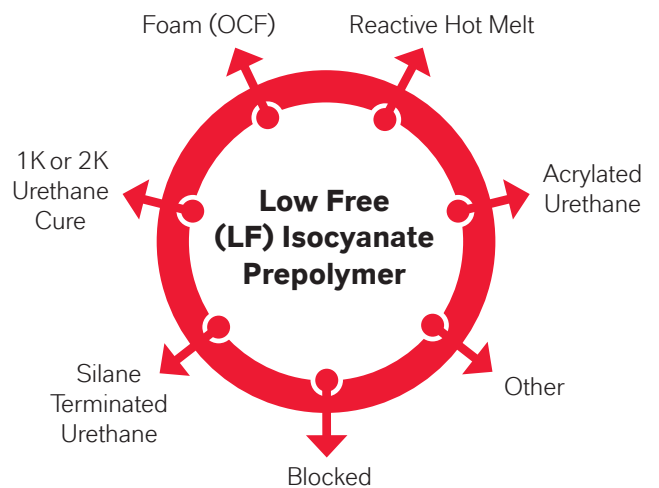
# LOW FREE (LF) ISOCYANATE URETHANE PREPOLYMERS RESULT IN HIGHLY STRUCTURED MORPHOLOGY FOR IMPROVED PERFORMANCE



Adiprene® LF prepolymers have a highly structured morphology to provide superior performance, including excellent toughness, fatigue resistance, and longer lifetimes when exposed to extreme conditions of temperature and chemicals. They are used in a diverse range of adhesives and sealant applications in construction, automotive, electrical, and packaging.

- Highly structured prepolymers can achieve **narrow molecular weight distribution** for control of viscosity and processing
- **A virtual crosslinked network** is formed – crystalline groups called hard domains form due to physical interactions from hydrogen bonding between the highly polar urethane and/or urea groups
- More **defined phase segregation** between hard and soft domains translates to better physical properties, indicated by tensile and tear strength, due to increased orientation and alignment under stress

## LF prepolymers are diverse building blocks



# NOVEL LOW FREE MDI PREPOLYMERS WITH <0.10% FREE ISOCYANATE IMPROVE INDUSTRIAL HYGIENE

**X Adiprene® LF**  
— Low Free Prepolymers

## Unsurpassed industrial hygiene

Adiprene® LF prepolymers have low free isocyanate content, <0.10%, for improved industrial hygiene during handling and processing. In adhesives and coatings, Adiprene® LF prepolymers enable formulators to eliminate the use of solvents and achieve final formulations with reduced hazard classifications.

- Urethane prepolymers available with levels of free isocyanate below 0.10% to address regulatory concerns
- Protects workers and users from potential exposure to free isocyanates
- Minimizes EH&S workload, and eliminates the handling of raw materials containing elevated levels of hazardous isocyanates
- Enables design of adhesives systems with reduced hazard classifications



**HEALTH**



**SAFETY FIRST**



**REGULATIONS**

## Low Free (LF) <0.10% isocyanate prepolymer product range

LANXESS offers industry-leading LF urethane prepolymers across a wide range of chemistries -- systems for every application.

- **LF MDI** – unmatched low levels <0.10% free isocyanate, excellent performance and easy processing
- **LF HDI & LF IPDI** – clear aliphatic prepolymers with good UV stability and weathering
- **LF pPDI** – extreme environments of heat, cold, and chemicals
- **LF TDI** – strong performance in a wide range of applications

### Broad toolbox for adhesives and sealants

Polyols	Polyester, PTMEG, PPG, PCL, PC
Isocyanates*	MDI, HDI, IPDI, pPDI, TDI, polyisocyanates
Curatives	Diamines, Diols, Triols
Additives	Catalysts, antioxidants, plasticizers, flame retardants, pigments and fillers

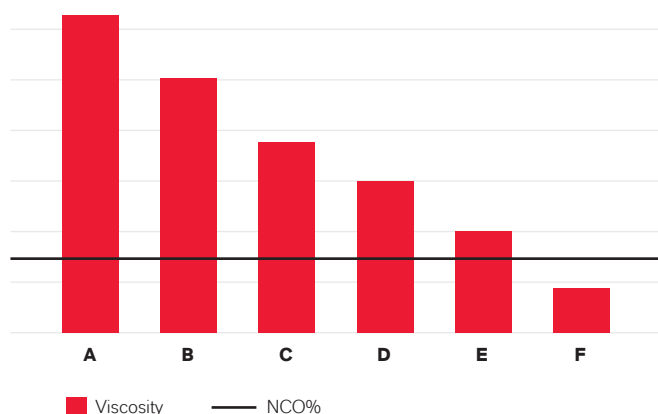
\*LANXESS does not produce or sell isocyanates

# LOW FREE (LF) ISOCYANATE URETHANE PREPOLYMERS CAN BE TAILORED FOR OPTIMUM PROCESSING

Adiprene® Low Free (LF) isocyanate prepolymers offer superior processing, very high productivity, and streamlined manufacturing. With the ability to achieve lower viscosity than conventional alternatives, they can minimize the use of solvents and blending steps. Lower viscosity, longer open time, consistent processing, and the use of catalysts enable very high productivity. They can be formulated as reactive hot melt adhesives, one component foam sealants, or ambient temperature adhesives.

## Ability to tailor viscosity to the needs of the application

- Target different viscosities without changing NCO content, using low free isocyanate formulation expertise
- Lower prepolymer viscosity at the same NCO content for easier processing, as required
- Consistent processing with less open time variability
- Tailored viscosity to enable ease of application (wetting, coverage rate)
- Control of viscosity lot to lot by controlling the morphology



# LANXESS URETHANE SYSTEMS IS LEADING WITH TECHNOLOGY AND INNOVATION

We provide our customers with decades of urethane chemistry know-how, comprehensive application expertise, and deep manufacturing experience. LANXESS scientists can provide custom formulations of Low Free (LF) isocyanate prepolymers to meet your specific requirements.



**Specialized provider of urethane systems, tailored to meet specific customer needs**



**Truly global and diverse coverage, offering quick and flexible responses to customer needs**



**Strong focus on sustainability with a broad portfolio providing performance, processing, and EH&S advantages**

As well as our innovative LF systems, LANXESS also offer a range of solvent-free and blocked urethane systems for a range of adhesive and sealant application needs. Talk to us about your requirements.

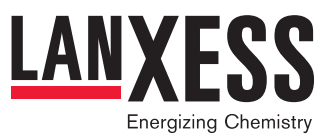
## Solvent-Free

- **Witcobond®** waterborne polyurethane dispersions (PUD) for adhesives, sealants
- **Royalbond®** urethane binding systems reduce solvents use in rebonded foam
- **Trixene®** SC urethane prepolymers are low viscosity – liquid at room temperature
- **Quasilan®** urethane prepolymers for formulating laminating adhesives, binders, athletic running tracks, playgrounds, industrial adhesives
- **Witcoflex®** hydrophilic polyurethanes are highly breathable and waterproof for sportswear and medical adhesives

## Blocked Systems

- **Adiprene®** BL prepolymers are blocked for easy use in abrasive binder formulations
- **Trixene®** BI blocked isocyanates
  - TDI prepolymers for formulating abrasive binders
  - Field applied blocked TDI prepolymers as epoxy flexibilizers





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