

QUALITY PERFORMS.



Blocked Isocyanates
for urethane surface coatings

X Trixene®
Blocked Isocyanates

QUALITY WORKS.

LANXESS
Energizing Chemistry

LANXESS IS A LEADING INNOVATOR OF TRIXENE® BLOCKED SYSTEMS FOR URETHANE SURFACE COATINGS

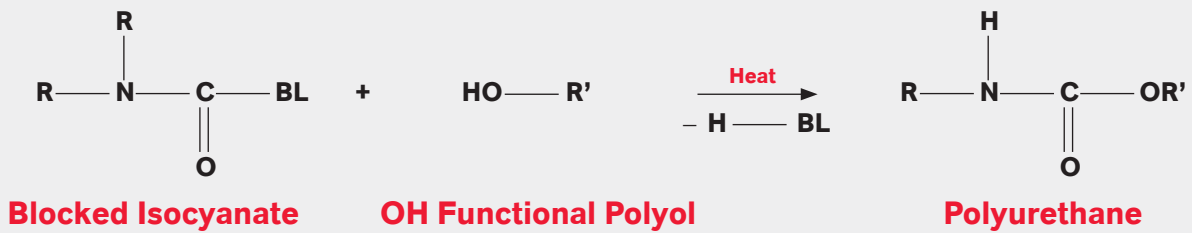


LANXESS, a world leader in polyurethane systems offers blocking technology to enable 1K formulations for crosslinking and adhesion promotion in coating and adhesive applications. Heat cured systems overcome compounding limitations and can help to reduce energy consumption or processing time and provide a safer working environment.

Benefits of 1K blocked systems

- Easy formulation
- Superior processing and high productivity
- No handling of free isocyanates

Heat Curing Mechanism



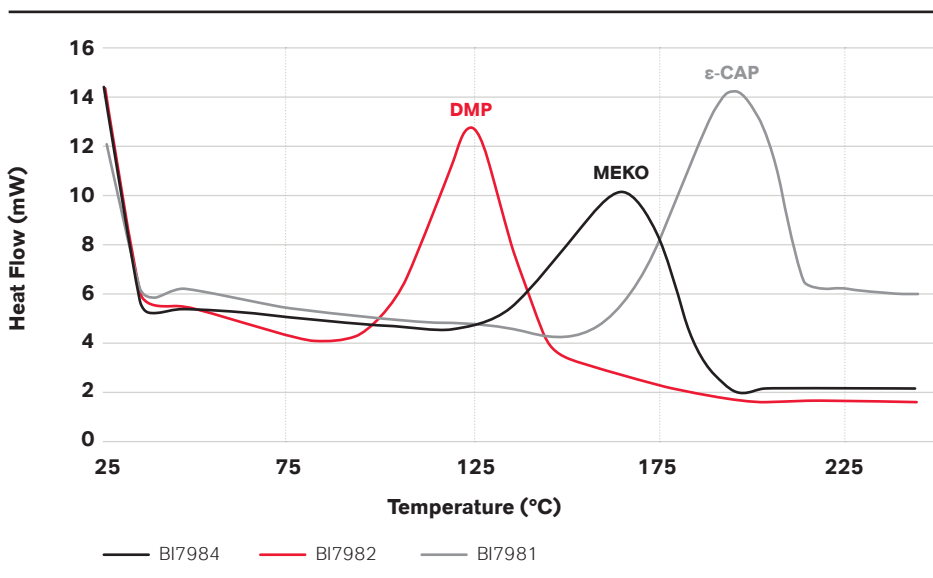
Temperature and processing conditions influence the choice of blocked isocyanate. Deblocking takes place under specific curing conditions and allows the isocyanate to react with the polyol component.



DIFFERENTIATED OFFER OF TRIXENE® BLOCKED ISOCYANATE CROSSLINKERS TO MEET CUSTOMER REQUIREMENTS

Heat cure applications require different unblocking temperatures, depending on the type of substrate. LANXESS' broad portfolio of Trixene® blocked crosslinkers delivers a range of characteristics to suit application parameters, allowing tailoring of coating properties. Our technical team has specific expertise in the formulation and production of high performance DMP, hybrid and water-based blocked isocyanates.

Comparative Blocking Agent



Deblocking Temperatures

Blocking Agent	Temp (°C)
DMP	124
MEKO	165
ε-CAP	196
DEM*	90-100

*DEM is not shown in the graph as it follows a different unblocking mechanism, requiring more refined evaluation.

DMP blocked isocyanates for reduced volatility

LANXESS pioneered and patented the use of DMP in blocked isocyanate systems, with proven advantages over other blocking technologies:

- Better resistance to chemical and environmental attack
- Improved color stability and resistance to yellowing, particularly on overbake and UV exposure
- Reduced energy usage due to lower unblocking temperature and/or shortened dwell time
- Reduced VOC emissions and less pinholing of coatings due to lower volatility of blocking agent

HYBRID blocked isocyanates for greater formulation freedom

Designed in combination with malonate co-crosslinkers to deliver the following benefits:

- Reduced tendency of DEM blocked isocyanates from crystallizing upon standing
- Improved compatibility with OH functional resins

WATER-BASED blocked isocyanates to meet regulatory demands

Trixene® Aqua products include latent crosslinkers and adhesion promoters which are multifunctional blocked isocyanates dispersed in water, delivering the following characteristics:

- Compliant with increasingly demanding regulations on VOC
- For use with water-based coating systems like polyurethane dispersions

TRIXENE® BLOCKED ISOCYANATES

TARGET THE NEEDS OF HIGH PERFORMANCE COATINGS APPLICATIONS

LANXESS is at the forefront of blocked isocyanate technology and our products designed as solvent-borne, water-based and 100% solids meet the requirements of high performance coatings formulations in a wide range of application areas.

Can and Coil Coatings



Trixene® blocked crosslinkers offer highly flexible coatings with superior durability, weather resistance and easy processing for the can and coil coating industry.

Trixene® BI 7982 is an aliphatic blocked crosslinker for coil coating formulations; due to its chemical structure formulators can prepare coatings with high durability, weathering stability and high build.

Benefits

- Storage stability for 1K formulations
- High flexibility
- Reduced yellowing

Transportation Coatings



Trixene® blocked crosslinkers enable formation of flexible coatings with high impact resistance and adhesion on a variety of substrates, solving the needs of the transportation industry.

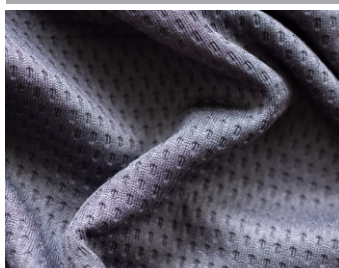
Trixene® BI 7961 is an aliphatic blocked crosslinker, due to its good adhesion and impact resistance it is optimized for very flexible metal substrates.

Trixene® BI 7992 offers fast turnaround due to lowest unblocking temperature and good compatibility with hydroxyl-functional resins.

Benefits

- Excellent compatibility and high reactivity
- Enhanced chemical resistance
- Lowest deblocking temperature

Textile Coatings



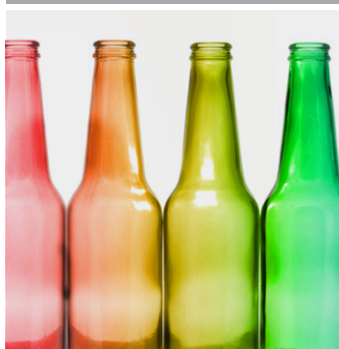
Trixene® Aqua blocked crosslinkers offer highly flexible coatings with low unblocking temperature for the textile coating industry.

Trixene® Aqua BI 220 is a water-based crosslinker for 1K stoving coatings for fiber impregnation, enhancing adhesion, tensile strength and washout under severe stress conditions.

Benefits

- Low VOC (water-based)
- Low unblocking temperature
- Washout resistance, durability

Glass and Packaging Coatings



Trixene® Aqua blocked crosslinkers are used to enhance glass coatings, giving the desired protection and aesthetic appearance.

Trixene® Aqua BI 201 is a water-based crosslinker to formulate 1K glass coating formulations with improved impact and chemical resistance and excellent color retention.

Trixene® Aqua BI 202 is a MEKO free high temperature unblocking crosslinker, which can be used in glass fiber sizing, offering improved strand integrity, reduced fuzz formation and compatibility to polyamide.

Benefits

- Improved scratch resistance
- Enhanced impact resistance
- Chemical resistance

TRIXENE® BLOCKED ISOCYANATES OFFER SIGNIFICANT BENEFITS OVER TRADITIONAL CROSSLINKERS

Our range of solvent-borne grades serve mainly as crosslinkers for hydroxyl-functional resins (polyester, urethane, acrylic etc.). They are typically formulated into 1K coatings that are dried and cured under factory stoving conditions, e. g. for OEM metal components used in the automotive and consumer goods industries.

Trixene® Blocked Isocyanates - solvent-borne systems

Trixene® Product	Isocyanate Type	Blocking Agent	Viscosity at 25°C (mPa·s)	Equiv. Wt. (as supplied)	Solids (%)	Solvent	Application
Aromatic Blocked							
BI 7641	TDI prepolymer	DMP	6,250	744	60	PMA/Xylene	Transportation, coil, leather
BI 7642	TDI prepolymer	MEKO	25,000	737	60	PMA/Xylene	Coil, transportation, primer/base coat
BI 7675	TDI prepolymer	MEKO	<2,500	858	65	PMA	Abrasive binder
Aliphatic Blocked							
BI 7951	IPDI trimer	DMP	3,500	539	65	C9 Aromatic/BA	Transportation and coil coating
BI 7960	HDI biuret	DMP	1,100	410	70	PM/ethyl acetate	Coil and electrodeposition
BI 7961	HDI biuret	DMP	2,250	410	70	C9 Aromatic	Coil and electrostatic
BI 7963	HDI biuret	DEM	4,500	477	70	PM	Low temperature curing or higher reactivity
BI 7982	HDI trimer	DMP	600	410	70	PM	Transportation and coil coating
BI 7984	HDI trimer	MEKO	2,000 – 4,000	373	74 – 76%	Naphtha 100	Transportation and coil coating
Hybrid Aliphatic Blocked							
BI 7991	HDI biuret	DMP/DEM	2,000	456	70	PM	Transportation and coil coating
BI 7992	HDI trimer	DMP/DEM	1,500	456	70	PM	Transportation and coil coating

Data provided in the table above is characteristic of the product grade, and does not constitute a specification. Further information is given in technical and material safety data sheets for individual Trixene® BI products. Samples, supplementary data, formulating advice and papers/presentations giving further details of our blocked isocyanate chemistry can be supplied on request.

TRIXENE® AQUA BLOCKED ISOCYANATE DISPERSIONS DESIGNED FOR WATER-BASED 1K SYSTEMS

Our range of water-based blocked isocyanate dispersions can be used as crosslinkers and adhesion promoters for coatings and finishes on flexible and hard substrates. The **Trixene® Aqua** range offers a wide pH latitude including anionic and nonionic types, which are easy to formulate with good compatibility to a range of aqueous auxiliaries and other additives. These products can be used together with our water-based **Witcobond®** polyurethane dispersions (PUD) to formulate 1K coatings with improved chemical resistance, coating adhesion, and robustness.

Trixene® Aqua Blocked Isocyanates - water-based systems

Trixene® Aqua Product	Particle Type	pH Range (as supplied)	Viscosity at 25°C (mPa·s)	Equiv. Wt. (as supplied)	Solids (%)	Application
BI 120	Non Ionic	5 - 8	10 - 200	984	40	Textiles and fibers adhesion promoter
BI 200	Anionic	7 – 8	100	933	40	Textiles and general coatings
BI 201	Anionic	7 – 9	300	840	40	Textiles and general coatings
BI 202	Anionic	7 – 9	250	894	40	Glass, glass fibers, adhesion promotion
BI 220	Non Ionic	5 – 8	100	1000	40	Textiles, leather, glass, paper
BI 522	Non Ionic	5 - 8	10 - 200	1252	40	Coatings, improved chemical resistance

Data provided in the table above is characteristic of the product grade, and does not constitute a specification. **Trixene® Aqua BI** grades include a co-solvent to have better coalescence and compatibility in the coating formulation. Further information is given in technical and material safety data sheets for individual **Trixene® BI** products. Samples, supplementary data, formulating advice and papers/presentations giving further details of our blocked isocyanate chemistry can be supplied on request.

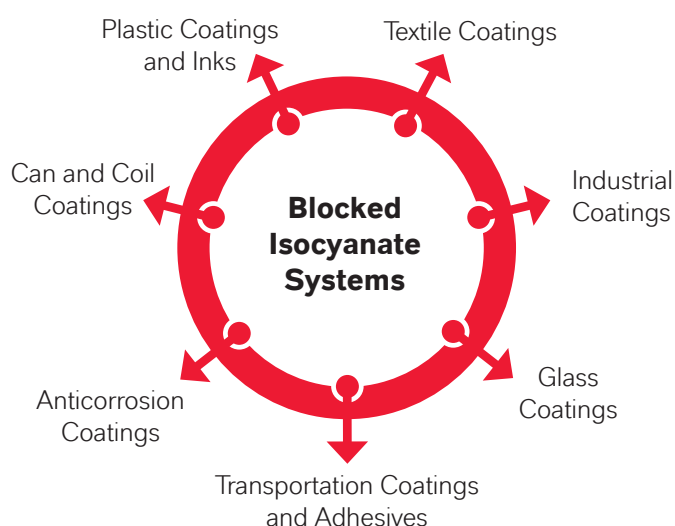
BLOCKED ISOCYANATE SYSTEMS FOR A RANGE OF COATINGS APPLICATIONS

LANXESS is at the forefront of blocked isocyanate technology and our products designed as solvent-borne, water-based and 100% solids meet the requirements of high performance coatings formulations in a wide range of application areas.

Advantages

- Broad portfolio covering all industry needs
- Easy and efficient processing for high performance coatings
- Tailored solutions for customer needs
- Easy formulation and no pot life limitations
- No handling of free isocyanates

Blocked Systems for diverse applications



DEDICATED R&D EFFORT FOCUSES ON THE HEALTH, SAFETY AND ENVIRONMENTAL IMPACT OF POLYURETHANE TECHNOLOGY

Our primary aim is to minimize hazards associated with free isocyanates, reduce VOC emissions and to lower the energy requirements of typical manufacturing processes that use our materials. In addition to standard **Trixene® BI** grades, we have a number of experimental products at different stages of evaluation.



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 can provide custom formulations, contact us about your requirements.

In addition to **Trixene®** and **Trixene® Aqua** blocked isocyanates, LANXESS also offer blocked prepolymer systems, **Witcobond®** polyurethane dispersions and **Adiprene® LF** and **Trixene®** products which are innovative Low Free (LF) isocyanate prepolymer systems for a range of elastomers, coatings, adhesives and sealants.



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



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