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New innovative highperformance hardeners from Covestro: efficiency, sustainability and more

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A SERIES OF INNOVATIVE HIGH-PERFORMANCE HARDENERS ARE THE NEW CONTRIBUTION TO MORE EFFICIENT, SUSTAINABLE AND RELIABLE POLYURETHANE COATINGS.

DESMODUR[®] eco N 7300

DESMODUR[®] N 3580

BAYHYDUR® 2858 XP



First hardener with 70% renewable content for more sustainable PU coatings at same high performance level.



High functional hardener for very fast curing, perfect adhesion, excellent film resistance and selfhealing properties.



Ready to use universal hardener for demanding 2K water-based PU applications when easy handling and versatility matters.

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DESMODUR® eco N 7300



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Renewable raw materials

Much more than just a "nice to have" for sustainable marketing





Product differentiation Improve performance

Biobased Pentamethylene Diisocyanate (PDI)



A new building block for polyurethane chemistry

- The first isocyanate with significant biocontent: 71% renewable carbon*
- Produced very efficiently from biomass combining biotechnological and chemical processes, e.g. energy efficient gas phase technology
- First diisocyanate in 30 years to be fully developed and scaled-up
- The corresponding derivatives are similar to hexamethylene diisocyanate (HDI) based ones, yet offer some advantages

High performance enabled by nature

* Confirmed by radiocarbon method ¹⁴C measurement according to ASTM-D6866 standard

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6

High performance enabled by nature

The first biobased polyurethane crosslinker

 DESMODUR[®] eco N 7300: first PDI derivative launched April 2015 at the European Coatings Show

BCF

RBE UND LAC

AWARDS 2015

WINNER Sustainable Innovation Supplie

• Full REACH registration to be completed in 2016

erion Go

Covestro Deutschland AG

- Development of technology platform based on PDI
- Innovation multi-awarded:

Winner of the

AWARD 2015







Desmodur[®] eco N 7300

Product Data & Characteristics



Polyisocyanate	Based on	Solids (%)	NCO (%)	Viscosity (mPa.s)	Color value (Hazen)
Desmodur [®] eco N 7300	PDI	100	≈ 21,5	≈ 9200	≈ 30
Desmodur [®] N 3300	HDI	100	21,8 ± 0,3	3000 ± 750	≤ 40

- Desmodur[®] eco N7300 is a near drop-in to HDIpolyisocyanurates like Desmodur[®] N3300
- The viscosity in standard solvents is comparable



Desmodur[®] eco N 7300 vs. HDI-trimer

Near drop-in with upside potential







Desmodur[®] eco N 7300 vs. HDI-trimer

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Desmodur[®] eco N 7300

Multiple applications









You can potentially use **Desmodur® eco N 7300** wherever HDI trimers are used











100 % performance

eco less emissions

70 % bio-based

High performance enabled by nature

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DESMODUR® N 3580



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Desmodur[®] N 3580

To speed-up your system



DESMODUR N 3580	6- functional	500 mPas (80% in BA)
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- High functional
- Elastic
- Improves scratch resistance
- Self-healing capability.
- Increased chemical resistance
- Fast curing



Fast curing = increased process efficiency

Desmodur® N 3580 in ACE, industrial and auto refinish coatings



Drying performance of clearcoats Influence of hardener, drying at ambient temperature

Commercial AR clearcoat formulation

Desmodur® N3390 viscosity (90%BA/SN) 550 mPas, functionality ~3,5 Desmodur® N3790 viscosity (90%BA) 1800 mPas, functionality ~4,1 3790 3580 Desmodur® N3580 viscosity (80%BA) 500 mPas, functionality ~6



Improved mechanical and chemical resistance

Desmodur[®] N 3580 in plastic coatings



- + 33% higher initial hardness vs. standard crosslinker
- No impression marks after packaging (early mechanical resistance)

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 Improved chemical resistance: Ethanol containing gasoline



Scratch resistance and self healing clear coat Desmodur[®] N 3580 for high functionality and high elasticity







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BAYHYDUR® 2858 XP



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Bayhydur[®] 2858 XP

When ready to use crosslinker and performance matter





Bayhydur[®] 2858 XP is a universal crosslinker providing broad compatibility with different dispersions for high-performance wood coatings

You can increase your production efficiency with this **ready-to-use** crosslinker, supplied at 70% in PGDA.

Satisfy your customers need for low odor, low emissions and robust coating materials!

Excellent miscibility with PUD

Bayhydur[®] 2858 XP is an ideal crosslinker for flooring coatings

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Glossy 2K parquet formulation based on Bayhydrol UH 2593/1 (fatty-acid modified PUD) Mixing ratio: 10% of B component on A component.

Bayhyhdur	Bayhydur 2858 XP	
Crosslinker s.f	70% in PGDA	
Miscibility	4-5 ★	
Sand dry (T1)	approx. 15'	
Fully dry (T4)	approx. 42'	
Pendulum hardness (s,König), 1 / 7d at RT	105 / 170 🔶	
Water resistance 24 h	5	
Ethanol resistance 5' / 30'	5 ★	
Black heel mark resistance (BHMR)	4	
Abrasion Taber CS10 mg loss after rev (10 N load)	35 mg loss	

5=very good, 1=very bad







Complaint indoor air quality systems easier

Bayhydur® 2858 XP helps to fulfill indoor air quality regulations

Indoor air quality test according AgBB Scheme 2012

2K WB parquet coating based on Bayhydrol® UH 2593/1 and Bayhydur® 2858 XP 3 layers on oak 120 g/m² wet, 6 h between layers, without sanding, 3 d preconditioning

TVOC

Limits 3 d TVOC \leq 10 mg/m³, 28 d TVOC \leq 1,0 mg/m³



Sum R Limits 28 d R≤ 1







Very high chemical resistance

Bayhydur[®] 2858 XP in furniture coatings



White pigmented 2K formulation for furniture based on Bayhydrol A 2651 NCO:OH ratio: 1,5

Bayhyhdur	Bayhydur 2858 XP		
Crosslinker supply form	70% in PGDA		
Miscibility	5 ★		
Sand dry (T1)	approx. 25'		
Fully dry (T4)	approx. 4 h 40'		
Pendulum hardness (s,König), 1 / 7d at RT	135 / 160		
Water resistance - 24h	5 ★		
Coffee resistance - 16h	5		
Red wine resistance - 6h	5		
Ethanol resistance - 1h	5		



5=very good, 1=very bad Chemical resistances according DIN 12720, 120 g/m² wet on melamine, dried overnight at 50°C

Higher film thickness with great surface Bayhydur® 2858 XP in more robust furniture coatings







Surface defects in the coating layer



Coating layer is able to release entrapped air



Perfect surface, without surface defects



Clear glossy 2K formulation based on Bayhydrol A 2651

Wet film	Bayhydur 2858 XP	Standard hardener	
thickness	70% in PGDA	70% in MPA	
200 µm	0	1 S1	
300 µm	0	2 S1	
400 µm	1 S1	3 S1	
500 µm	3 S1	4 S1	

ISO 4628-2: 0= no bubbles, 5=many bubbles; S1=small bubbles; S5= big bubbles





RELIABILITY VERSATILITY **EASY HANDLING IMPORTANT FOR THE INDUSTRY**

Clear

Pigmented

Miscibility

Long pot-life

High film thickness

On-site

Industrial

Low emissions

Low odour

Ready-to-use



Only with best hardeners you get best coatings





Forward-looking statements

This presentation may contain forward-looking statements based on current assumptions and forecasts made by Covestro AG. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Covestro's public reports, which are available on the Covestro website at <u>www.covestro.com</u>.

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