

Welcome

General House-Keeping



Audio Muted and Camera Switched Off



Questions & Answers (Q&A Enabled)



Recording and Presentation Deck will be shared via email

BASF Intermediates Division – Specialty Amines

About Us

- Baxxodur® – Epoxy Curing Agent
- Lupragen® – PU Catalysts
- Metal Working Fluids
- Pharma Ingredients
- Agriculture
- Over 100 unique products

Agenda

About BASF Intermediates

Tech Spotlight:
Lupragen® BisDMAPU

Live Q&A

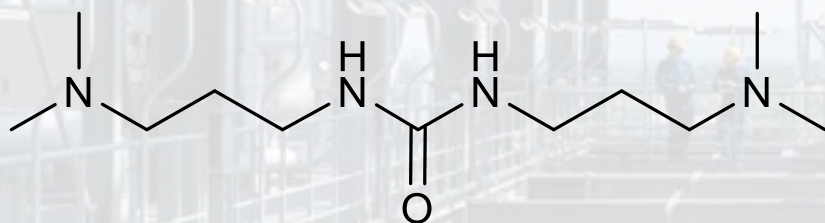
Speaker



Dr. Kai Oliver Siegenthaler
2004 – 2007: PhD in Chemistry
2021 – today: Team Leader,
Biodegradation Research
2024 – today: Lab Team Leader,
Chemical Intermediates
Application Laboratory

Intermediates Tech Spotlight

Low VOC Balanced PU Catalyst: Lupragen® BisDMAPU



Market Trends in the PU Industry

Current Trends

- Driven by regulatory pressure
- Low VOC
 - Low/no emission catalysts // higher purity
- Less toxic amines
 - Replacements // higher purity
- HFO stability
 - Replacements

Requirements on the low-VOC catalyst

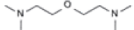
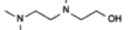
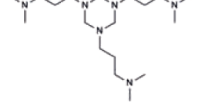
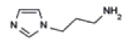
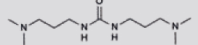
- Replacements with similar performance
- Availability of a variety of catalyst profiles
- Catalyst to fulfill low VOC label criteria

VOC: Definition & Labels

- VOC = Volatile organic compounds
 - ▶ All organic compounds that evaporate at room (or slightly elevated) temperature
 - ▶ Facilitated by: Low boiling point and/or high vapor pressure
 - ▶ Effect scales with surface area of the respective products
- No uniform definition of VOC available
 - ▶ WHO/EU: Substance with boiling point $< 250\text{ }^{\circ}\text{C}$
 - ▶ EU: Vapor pressure of $> 10\text{ Pa @ } 20\text{ }^{\circ}\text{C}$
- Several certification labels with different criteria and focus on different goods
 - ▶ Blauer Engel, CertiPUR(-US), Eco-Label, EMICODE, OEKO-TEX,.....

n-Heptane in waterproofing sprays
Boiling Point: $98\text{ }^{\circ}\text{C}$
Vapor pressure: $4700\text{ Pa @ } 20\text{ }^{\circ}\text{C}$

Lupragen® Portfolio Overview

Lupragen®	PU Catalyst Type	Chemical Structure	Chemical Name	CAS-no.
N 100	DMCHA		N,N-Dimethylcyclohexylamine	98-94-2
N 101	DMEOA		N,N-Dimethylethanolamine	108-01-0
N 105	NMM		N-Methylmorpholine	109-02-4
N 106	DMDEE		2,2'-Dimorpholinodiethylether	6425-39-4
N 107	DMAEE		Dimethylaminoethoxyethanol	1704-62-7
N 201	TEDA in DPG		Triethylenediamine 33% sol. in dipropyleneglycol	280-57-9
N 203	TEDA in MEG		Triethylenediamine 33% sol. in monoethyleneglycol	280-57-9
N 205	BDMAEE		Bis(2-dimethylaminoethyl)ether	3033-62-3
N 206	BDMAEE / DPG		Bis(2-dimethylaminoethyl)ether 70% sol. in dipropyleneglycol	3033-62-3
N 208	HE-TMAEE		N,N,N'-Trimethyl-N'-(2-hydroxyethyl)bis(2-aminoethyl) ether	83016-70-0
N 400	TMAEEA		N,N,N'-Trimethylaminoethylethanolamine	2212-32-0
N 500	TMHDA		N,N,N',N'-Tetramethyl-1,6-hexanediamine	111-18-2
N 600	S-Triazine		1,3,5 Tris(dimethylaminopropyl)-hexahydro-s-triazine	15875-13-5
N 700	DBU		1,8-Diazabicyclo-5,4,0-undecene-7	6674-22-2
API	API		N-(3-Aminopropyl)imidazole	5036-48-6
BisDMAPU	BisDMAPU		1,3-Bis[3-(dimethylamino)propyl]urea	52338-87-1
DMI	DMI		1,2-Dimethylimidazole	1739-84-0

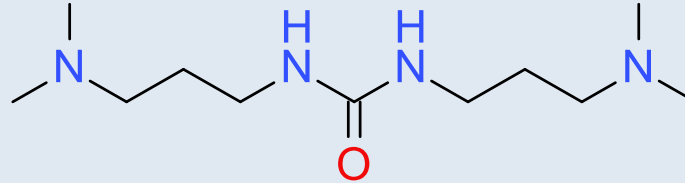
Catalysts for low VOC applications

Non-reactive
Boiling point 309 °C
Vapor pressure < 1 Pa (20°C)

Reactive Catalysts

**New
low VOC Catalyst**

Lupragen® BisDMAPU – At a glance



- Bis-Dimethylaminopropyl urea (BDMAPU, Bis-DMAPA urea)
- Two DMAPA moieties linked via a urea group
 - ▶ Urea group is relatively unreactive but provides high intermolecular forces
 - ▶ BisDMAPU has an extremely low vapor pressure → low emissions from PU („low VOC“)

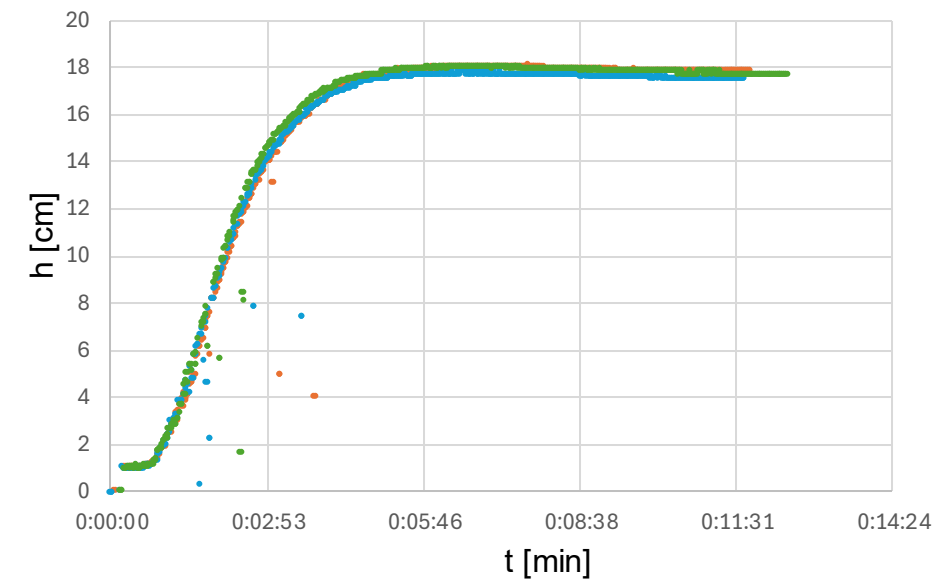
Low VOC

**Highly controllable,
balanced catalyst**

**BASF quality –
High purity**

Lupragen® BisDMAPU: Foam Performance

- Rigid foam system
- Ultrasound device for measurements
 - ▶ Data quality
 - ▶ Identification of outliers (e.g. improper mixing)
- BASF & competitor samples comparable

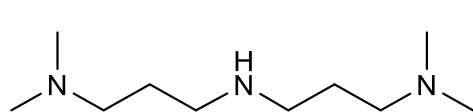


Catalyst	Cream Time [s]	Half height of cup [s]	Upper edge of cup [s]	Finish foam [s]	Foam Height [cm]	Height after 5 min [cm]	Conditions
Lupragen® BisDMAPU	36	83	127	308	18,8	18,6	23 °C, 71% r.h., 999 mbar
Competitor A	40	83	128	321	18,6	18,4	24 °C, 68% r.h., 998 mbar
Competitor B	39	87	131	327	18,7	18,5	23 °C, 70% r.h., 999 mbar

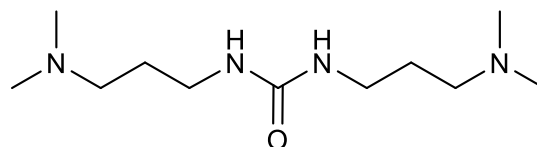
In a 500 mL plastic cup 15.06 g Component A (100 parts Lupranol 3300, 2 parts foam stabilizer, 1 part catalyst, 4 parts water) are mixed with 26.94 g Component B (Lupranat M 20 S) using a Lenart type disk.

Lupragen® BisDMAPU: Foam Performance

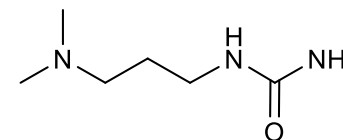
- Comparison to structural relatives BisDMAPA and DMAPU
- Foam Performance very similar: BisDMAPA ~ DMAPU ~ Lupragen® BisDMAPU



BisDMAPA



BisDMAPU



DMAPU

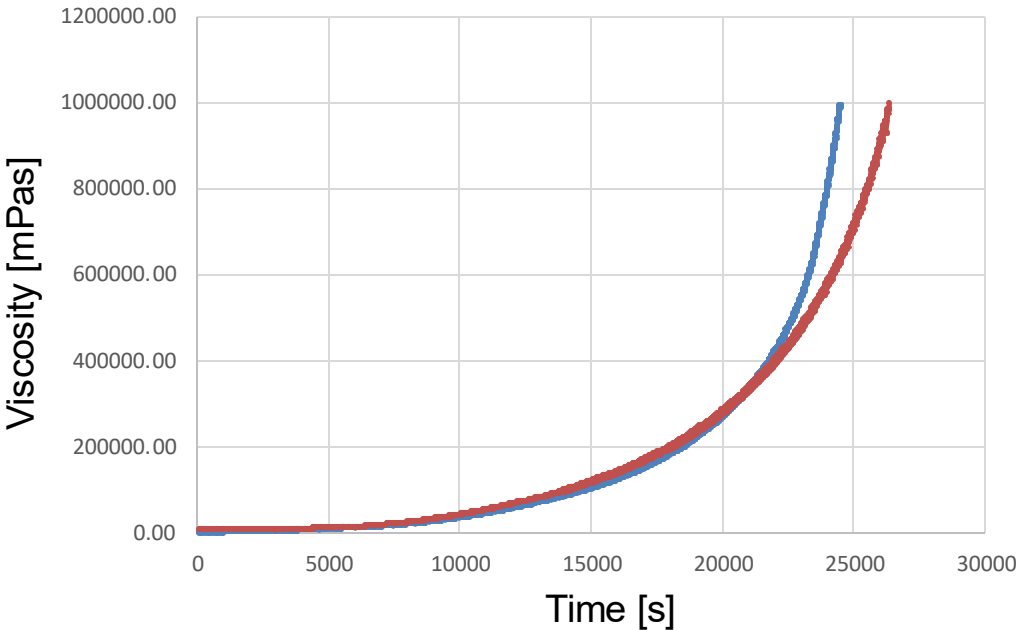
Catalyst	Cream Time [s]	Half height of cup [s]	Upper edge of cup [s]	Finish foam [s]	Foam Height [cm]	Height after 5 min [cm]	Conditions
BisDMAPA	41	98	143	304	18,6	18,4	21 °C, 27% r.h., 990 mbar
Lupragen® BisDMAPU	36	83	127	308	18,8	18,6	23 °C, 71% r.h., 999 mbar
DMAPU*	45	98	144	311	18,1	17,9	22 °C, 29% r.h., 989 mbar

* 73% DMAPU

In a 500 mL plastic cup 15.06 g Component A (100 parts Lupranol 3300, 2 parts foam stabilizer, 1 part catalyst, 4 parts water) are mixed with 26.94 g Component B (Lupranat M 20 S) using a Lenart type disk.

Lupragen® BisDMAPU: Gel Test

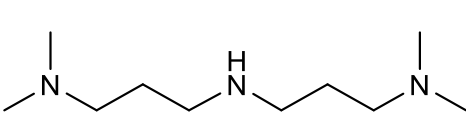
- Viscosity increase in a PU gel system
- Rheometer in enclosure
 - ▶ Flooding with dry air
 - ▶ Low humidity for long tests
- Slow gelling reaction, slight variability between sources



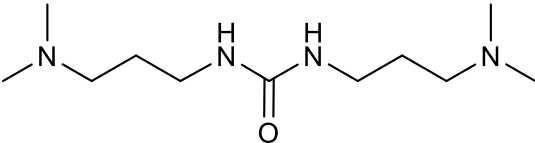
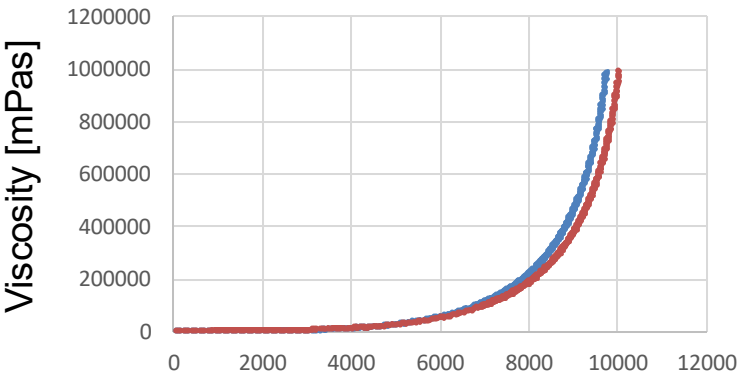
Catalyst	Gel Time [min]	Δ Gel Time [min]	Max. Temperature
Lupragen® BisDMAPU	382	5	34
Competitor A	364	6	32
Competitor B	320	1	37

In a 750 mL plastic cup 200.7 g Component A (200 parts Lupranol 1100/1 and 1 part catalyst) are mixed with 38.3 g Component B (Lupranat M 20 S) using a speed mixer. Viscosity development was measured with a DVNext Rheometer.

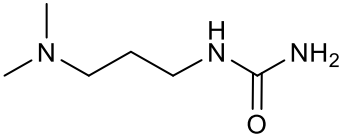
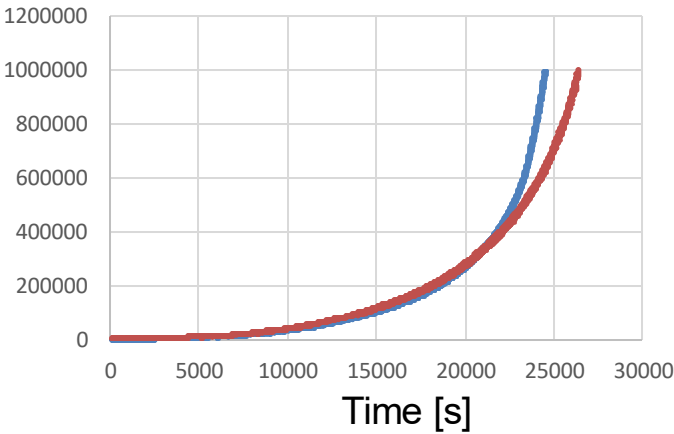
Lupragen® BisDMAPU: Gel Test



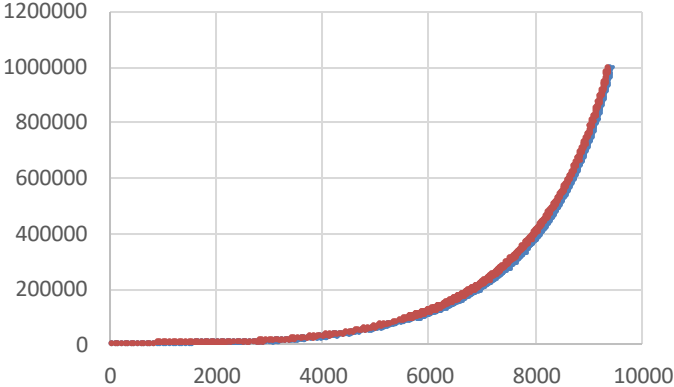
BisDMAPA



Lupragen® BisDMAPU



DMAPU

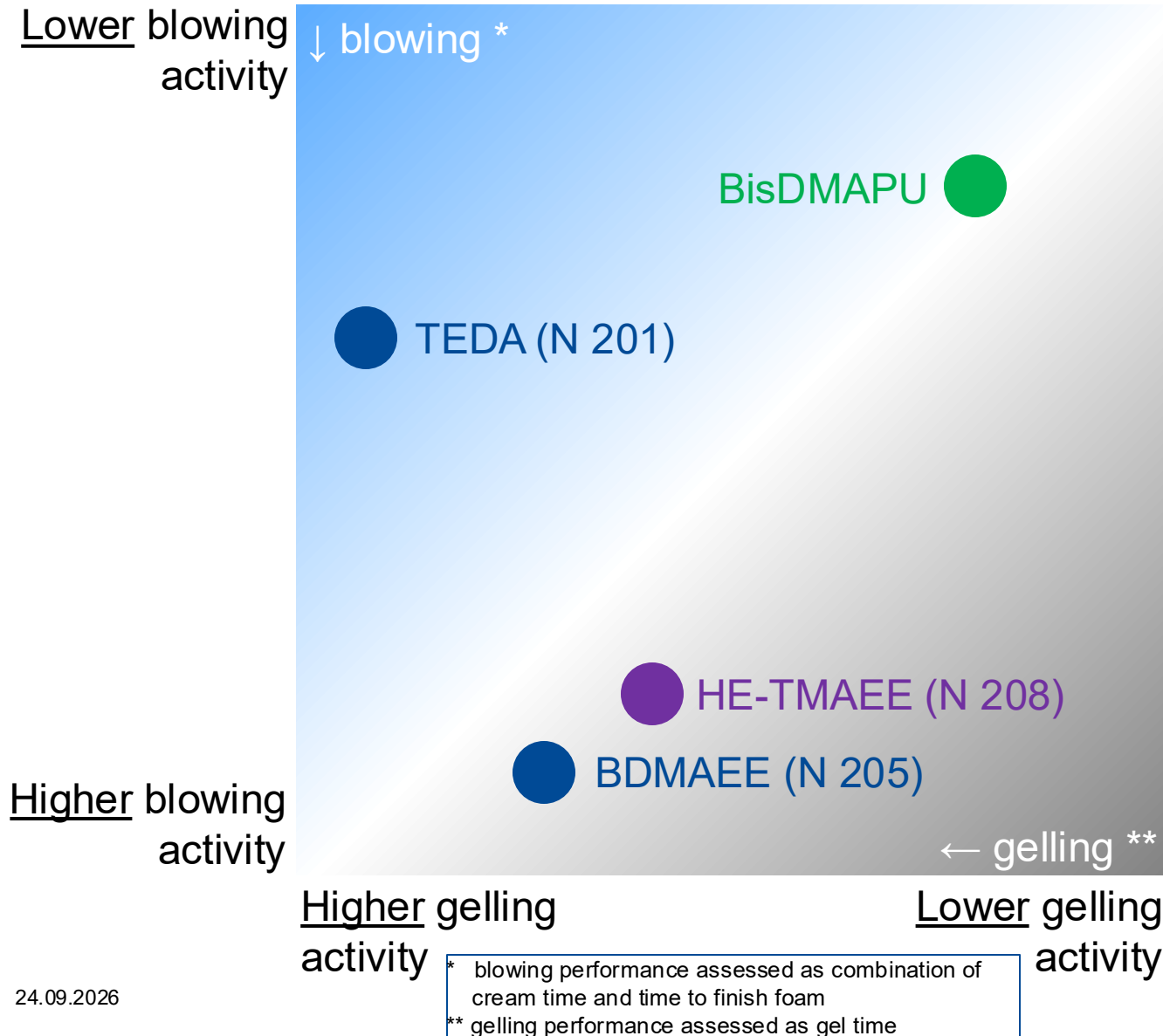


Catalyst	Gel Time [min]	Δ Gel Time [min]	Max. Temperature
BisDMAPA	157	3	37
Lupragen® BisDMAPU	382	5	34
DMAPU*	140	1	40

* 73% DMAPU

In a 750 mL plastic cup 200.7 g Component A (200 parts Lupranol 1100/1 and 1 part catalyst) are mixed with 38.3 g Component B (Lupranat M 20 S) using a speed mixer. Viscosity development was measured with a DVNext Rheometer.

BisDMAPU catalyst profile in comparison to common catalysts



- BisDMAPU complements Lupragen® portfolio
- Lupragen® BisDMAPU is a balanced catalyst
- Highly controlled blowing and gelling reaction

Lupragen® BisDMAPU: Purity analysis via ¹H-NMR

Component	Lupragen® BisDMAPU	Competitor A*	Competitor B*
Bis-DMAPU quantified by ¹ H-NMR	98.0%	95.3%	96.1%
Sum of others quantified by ¹ H-NMR	2.0%	4.7%	3.9%
Sum	100%	100%	100%

Lupragen® BisDMAPU has a very high purity
→ favorable for low VOC applications

Lupragen® BisDMAPU: Applications

- Flexible foams
- Used in applications benefitting from low VOC and low odor



Picture generated with Microsoft Copilot as an example

- Low-emission bedding foams
- Low-fogging automotive seating foams
- Low-odor furniture foams
- Indoor air quality compliant comfort foams
- Emission-controlled molded flexible foams

Lupragen® BisDMAPU: Hazards & Labeling

Catalyst	Hazard number*	Hazard category	Boiling point* / Vapor pressure**	Pictogram*
Lupragen® BisDMAPA pure - <i>more gelling</i> -	H314 H311 H302	Acute Tox. 4 (oral) Acute Tox. 3 (dermal) Eye Dam. 1 Skin Corr. 1C	235 °C ~4 Pa (20 °C) Reactive	
Lupragen® BisDMAPU	H318 H315 H412	Eye Dam. 1 Skin Irrit. 2 Aquatic Chronic 3	--- °C*** ~0,05 Pa (21 °C) Non-reactive	
Lupragen® N208 (HE-TMAEE) - <i>more blowing</i> -	H314 H302 H412	Acute Tox. 4 (oral) Skin Corr. 1B Eye Dam. 1 Aquatic Chronic 3	263 °C ~0,63 Pa (20 °C) Reactive	

- Favorable toxicological profile
- Very low vapor pressure

*Based on german SDS; please check local SDS before use.

**Calculated based on BASF vapor pressure measurements.

*** Boiling point above decomposition temperature

Lupragen® BisDMAPU: Availability and Sourcing

■ Packaging

- ▶ IBC
- ▶ 195 kg Drums
- ▶ Others on request

■ Samples

- ▶ 0,4 kg

■ Registration

- ▶ EU ✓
- ▶ Switzerland ✓
- ▶ USA & Canada ✓
- ▶ China ✓
- ▶ Japan ✓
- ▶ New Zealand & Philippines ✓
- ▶ UK & Turkey (pre-registered)

Contact

If you are interested in learning more – please reach out to your BASF Account Manager
Alternatively, the product is commercially available for sampling and purchase from
EU: BTC, Gamma Chimica, Imhoff & Stahl, Interpur, OQEMA and Quimidroga; NA: Azelis

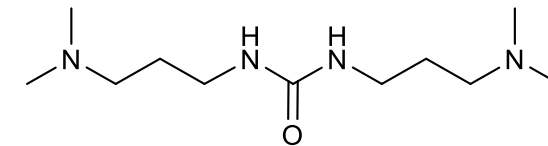
European amines on 100% renewable electricity

BASF's Intermediates division converts its entire European amines portfolio to 100 percent renewable electricity. Over 220 products produced across 15 plants in Ludwigshafen, Germany and Antwerp, Belgium are impacted.

This shift marks a further step within a broader initiative to incorporate more sustainable practices across the amines portfolio to support your sustainability transformation



Lupragen® BisDMAPU: Overview



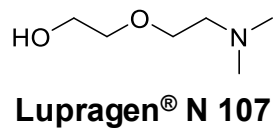
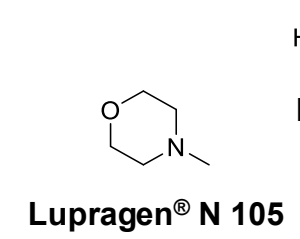
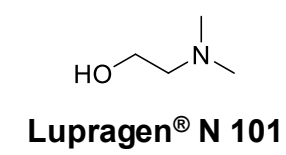
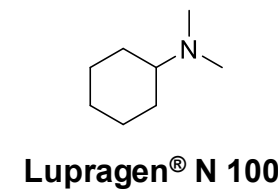
Safety & Sustainability

-  Highly controllable, balanced **low VOC** PU catalyst
-  **Regulatory** driven emission values
-  **Favorable** hazard profile
-  Increasing **renewable energy** supply at Verbund Sites in EU allows for low PCF

Technical Properties

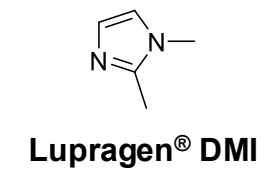
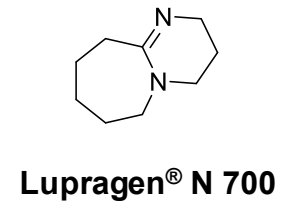
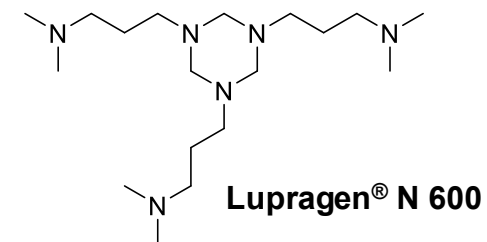
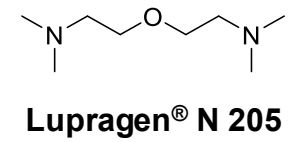
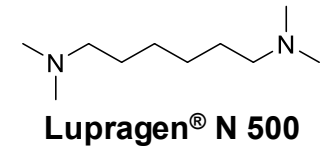
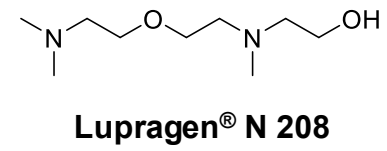
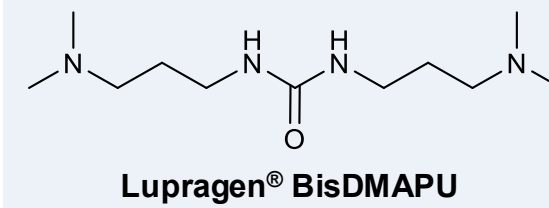
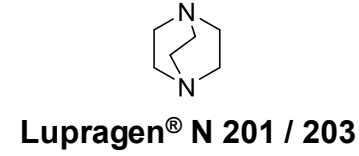
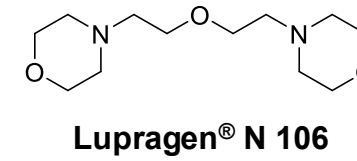
-  **Complements BASF portfolio** of PU cats (Lupragen®)
-  **Highly controllable balanced catalysis** – Blow performance close to BisDMAPA but offering longer gel time
-  **High purity**

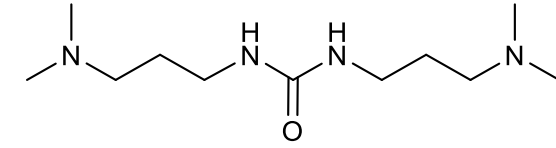
Polyurethane catalyst BisDMAPA-Urea is now available in BASF quality:
Lupragen® BisDMAPU



Lupragen® BisDMAPU & Brochure

Comprehensive
guide for your
decisions





Safety & Sustainability

-  Highly controllable, balanced **low VOC** PU catalyst
-  **Regulatory** driven emission values
-  **Favorable** hazard profile
-  Increasing **renewable energy** supply at Verbund Site LU allows for low PCF

Technical Properties

-  **Complements BASF portfolio** of PU cats (Lupragen®)
-  **Highly controllable balanced catalysis** – Blow performance close to BisDMAPA but offering longer gel time
-  **High purity**

Polyurethane catalyst BisDMAPA-Urea is now available in BASF quality:
Lupragen® BisDMAPU

Thank you for your time

Upcoming on Intermediates Academy: **Tech Spotlight**



Branched TETA alternatives

Date: Wednesday, December 9, 2026

Time: 3:00 PM - 3:45 PM (CET) / 9:00 AM - 9:45 AM (EST)

Platform: Teams Webinar

Get updates via our Intermediates Academy Website →





We create chemistry