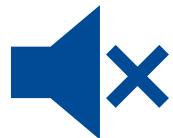


# Welcome

## 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 Agents
- Lupragen® – PU Catalysts
- Metal Working Fluids
- Pharma Ingredients
- Agriculture
- Over 100 unique products

## Agenda

About BASF Intermediates

Tech Spotlight:  
Lupragen® N 208

Live Q&A

## Speaker



### **Dr. Yannick Matt**

**2018 – 2021:** PhD in Chemistry

**2021 – today:** Lab Team Leader,  
Polycondensation & Addition  
Specialties

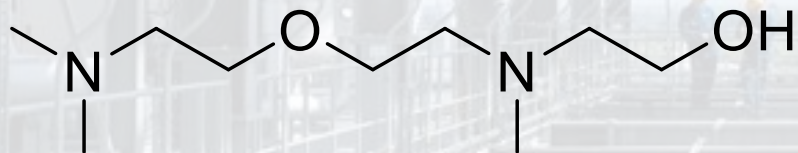
**2024 – today:** Lab Team Leader,  
Chemical Intermediates  
Application Laboratory



We create chemistry

# Intermediates Tech Spotlight

## Low VOC Blowing PU Catalyst: Lupragen® N 208



We create chemistry

# Market Trends in the PU Industry

## Current Trends

- Driven by regulatory pressure
- Low VOC
  - Reactive catalysts // higher purity
- Less toxic amines
  - Replacements // higher purity
- HFO stability
  - Replacements

## Requirements on the catalyst















- Replacements with similar performance
- Reactive 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

BASF Name	PU Catalyst Type	Chemical Structure	Chemical Name
Lupragen® N 100	DMCHA		N,N-Dimethylcyclohexylamine
Lupragen® N 101	DMEOA		N,N-Dimethylethanolamine
Lupragen® N 105	NMM		N-Methylmorpholine
Lupragen® N 106	DMDEE		2,2'-Dimorpholinodiethylether
Lupragen® N 107	DMAEE		Dimethylaminoethoxyethanol
Lupragen® N 201	TEDA / DPG		Triethylenediamine 33% sol. in dipropyleneglycol
Lupragen® N 203	TEDA / MEG		Triethylenediamine 33% sol. in monoethyleneglycol
Lupragen® N 205	BDMAEE		Bis(2-dimethylaminoethyl)ether
Lupragen® N 206 <small>(only available in Asia)</small>	BDMAEE / DPG		Bis(2-dimethylaminoethyl)ether 70% sol. in dipropyleneglycol
Lupragen® N 208	HE-TMAEE		N,N,N'-trimethyl-N'-hydroxyethyl-bisamino ethylether
Lupragen® N 400	TMAEEA		N,N,N'-Trimethylaminoethylethanolamine
Lupragen® N 500	TMHDA		N,N,N',N'-Tetramethyl-1,6-hexanediamine
Lupragen® N 600	S-Triazine		1,3,5 Tris(dimethylaminopropyl)-hexahydro-s-triazine
Lupragen® N 700	DBU		1,8-Diazabicyclo-5,4,0-undecene-7
Lupragen® API	API		N-(3-Aminopropyl)imidazole
Lupragen® DMI	DMI		1,2-Dimethylimidazole

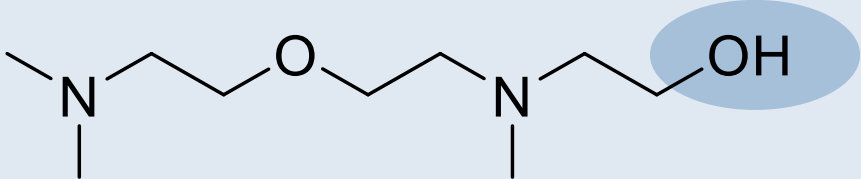
## Catalysts for low VOC applications

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

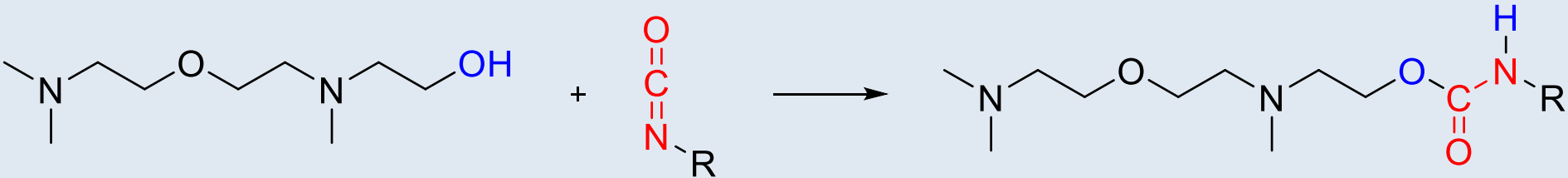
**Reactive Catalysts**

**New  
reactive, low VOC Catalyst**

# Lupragen® N 208: Hydroxyethyl-TMAEE



- Hydroxyethyl-trimethylaminoethylether (HE-TMAEE)
  - ▶ Derivative of BDMAEE with a reactive hydroxy group
  - ▶ N 208 is incorporated into the PU framework → low emissions from foam



High performance blowing catalyst

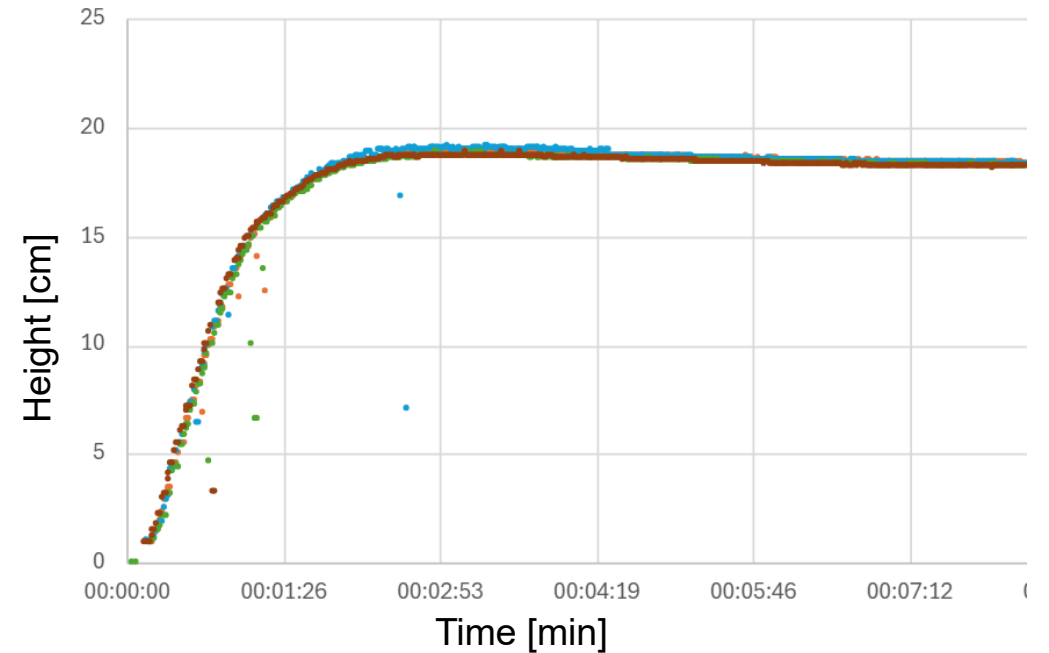
Comparable to competitors – ready for drop in

High Purity

Low VOC

# Lupragen® N 208: Foam Performance

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

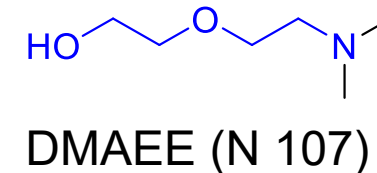
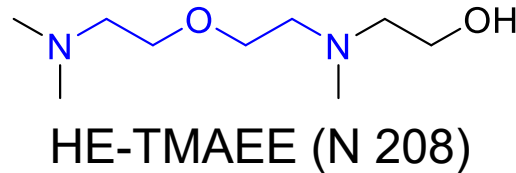
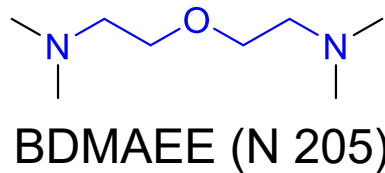


Catalyst	Cream Time [s]	Half height of cup [s]	Upper edge of cup [s]	Finish foam [s]	Foam Height [cm]	Height after 10 min [cm]	Conditions
Lupragen N 208	14	31	54	161	18,9	18,4	21 °C, 23% rel. humid., 1017 mbar
Competitor A	14	30	48	154	18,9	18,4	22 °C, 26% rel. humid., 1008 mbar
Competitor B	15	30	51	177	18,9	18,3	22 °C, 27% rel. humid., 1010 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® N 208: Foam Performance

- Comparison to structural relatives BDMAEE and DMAEE
- Performance: BDMAEE > HE-TMAEE > DMAEE

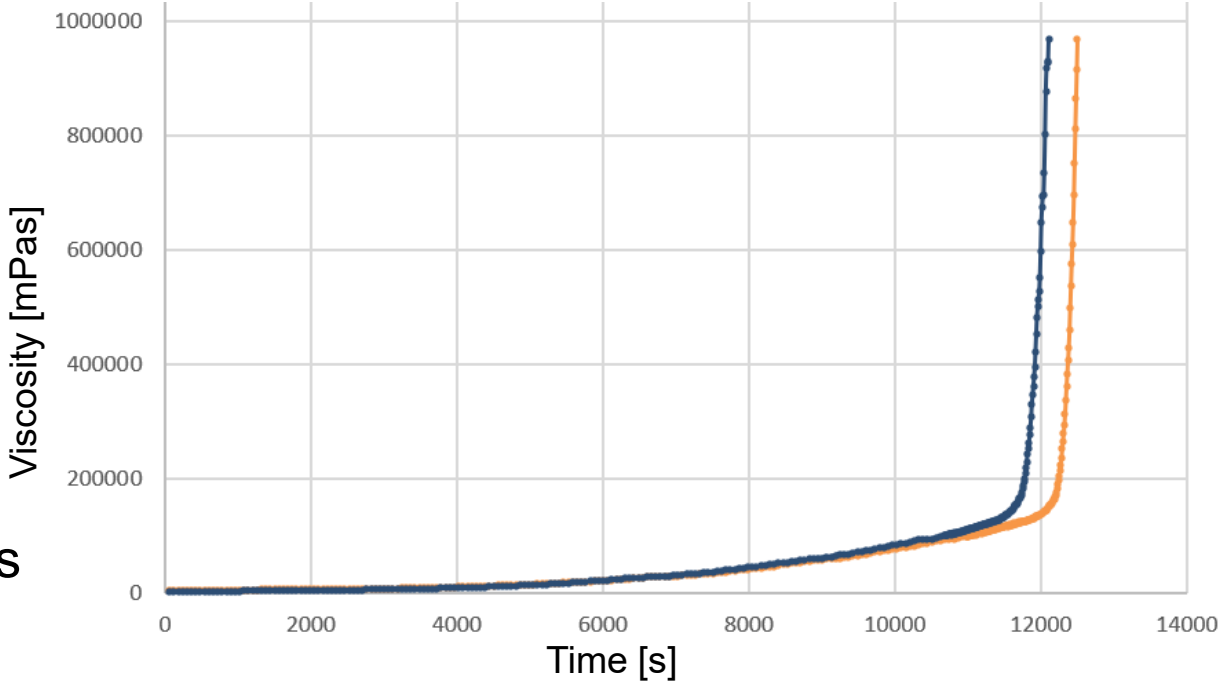


Catalyst	Cream Time [s]	Half height of cup [s]	Upper edge of cup [s]	Finish foam [s]	Foam Heigh [cm]	Height after 10 min [cm]	Conditions
BDMAEE N 205	7	10	18	73	18,9	18,5	23 °C, 50% rel. humid., 1012 mbar
HE-TMAEE N 208	14	31	54	161	18,9	18,4	21 °C, 23% rel. humid., 1017 mbar
DMAEE N 107	25	60	95	264	19,5	19,2	21 °C, 65% rel. humid., 978 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® N 208: Gel Test

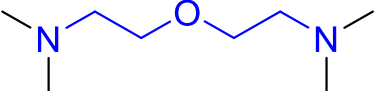
- Viscosity increase in a PU gel system
- Rheometer in enclosure
  - ▶ Flooding with dry air
  - ▶ Low humidity for long tests
- Samples comparable with minor differences



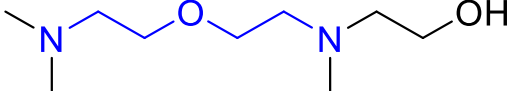
Catalyst	Gel Time [min]	Δ Gel Time [min]	Max. Temperature
Lupragen N 208	189	5	~ 35 °C
Competitor A	202	4	
Competitor B	215	3	

*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.*

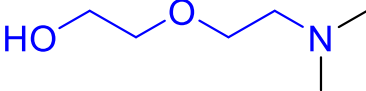
# Lupragen® N 208: Gel Test



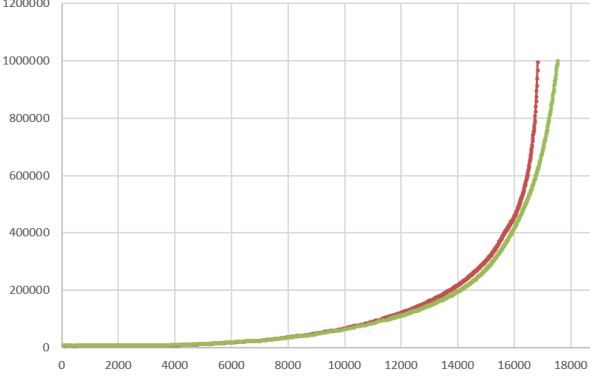
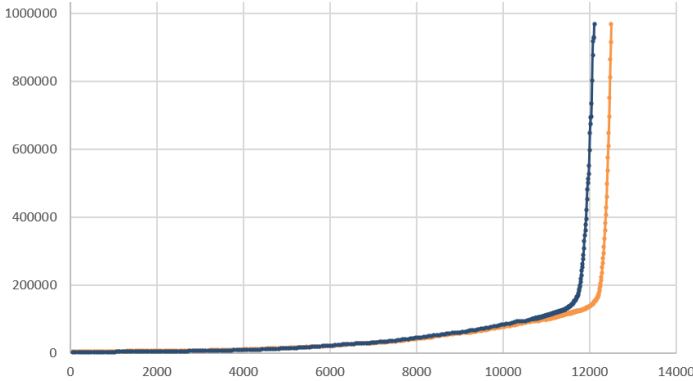
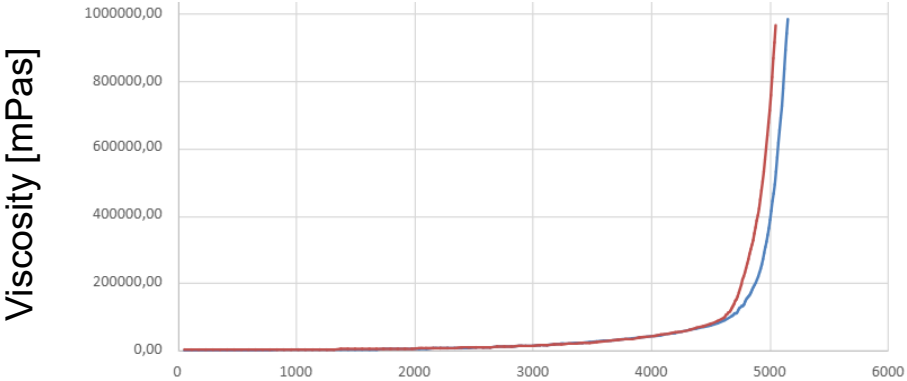
BDMAEE (N 205)



HE-TMAEE (N 208)



DMAEE (N 107)



Time [s]

Catalyst	Gel Time [min]	Δ Gel Time [min]	Max. Temperature
BDMAEE (N205)	83	1	~ 40 °C
HE-TMAEE (N 208)	189	5	~ 35 °C
DMAEE (N 107)	271	2	~ 36 °C

*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® N 208: Purity analysis via GC

Component	Lupragen N 208	Competitor A*	Competitor B*
<b>HE-TMAEE</b>	99.49%	97.33%	94.31%
Sum of others	0.51%	2.67%	5.69%
<b>Sum</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Light-boiling fraction BASF GC Method Peaks < <b>HE-TMAEE</b>	0,43%	0,99%	2,88%

Lupragen N 208 has a very high purity & low amount of (light-boiling) side components  
→ favorable for low VOC applications

# Lupragen® N 208: Applications

- Rigid, semi-rigid & soft foams
- Used in applications where emissions are critical
  - ▶ Consumer in close contact or enclosed spaces



- Mattresses
- Automotive: Car seats, Dashboards, Armrests
- Upholstery/Furniture: Sofa, Pillows, Chairs
- Clothing (e.g. bras)

- Motorcycle helmet (padding)
- Baby and child products: Strollers, changing mats, child seats
- Headphones

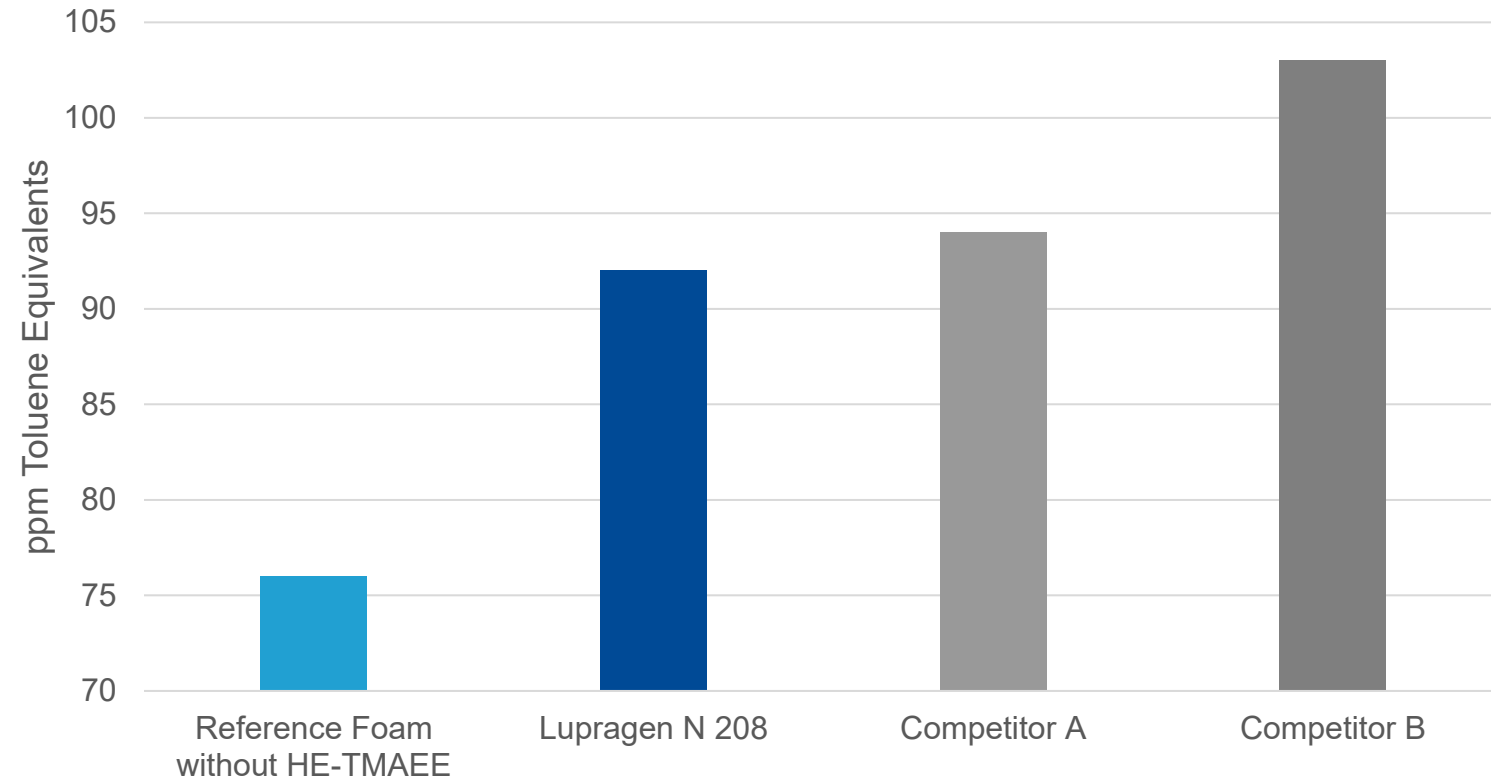


# Lupragen® N 208: Thermodesorption Test VDA 278 - VOC

- Soft Foam Recipe
- Thermodesorption Test
  - ▶ In-house testing
  - ▶ Conditioning: 7 days @ RT
  - ▶ Desorption 90 °C for 30 min
  - ▶ GC-MS analysis

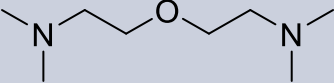

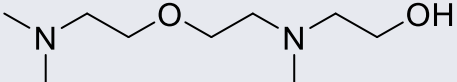

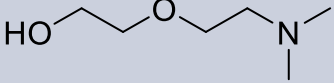

Lupragen N 208 showed lowest emission  
→ Ideal choice for critical applications!

VDA 278 - VOC Results



*Recipe: Component A (93,7 parts Lupranol 2095, 2 parts Lupranol 2048, 0,3 parts foam stabilizer, 0,6 parts gel catalyst, 3,2 parts water and 0,2 parts HE-TMAEE) is mixed with Component B (BASF Iso 135/144) with Index 95.*

# Lupragen® N 208: Hazards & Labeling

Catalyst	Hazard number*	Hazard category	Boiling point* / Vapor pressure**	Pictogram*
BDMAEE 	H311 H314 H302+H322	Acute Tox. 4 (oral) Acute Tox. 4 (Inhalation) Acute Tox. 3 (dermal) Skin Corr./Irrit. 1B Eye Dam./Irrit. 1	188 °C ~53 Pa (20°C) Non-reactive	
Lupragen N 208 	H314 H302 H412	Acute Tox. 4 (oral) Skin Corr. 1B Eye Dam. 1 Aquatic Chronic 3	263 °C ~0,63 Pa (20 °C) Reactive	
DMAEE 	H312 H314	Acute Tox. 4 (dermal) Skin Corr. 1C Eye Dam. 1	204 °C ~12,6 Pa (20 °C) Reactive	

- Favorable toxicological profile
- High boiling point & low vapor pressure

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

\*\*Calculated based on BASF vapor pressure measurements.

# Lupragen® N 208: Availability and Sourcing

## ■ Packaging

- ▶ Bulk
- ▶ 190 kg Drums
- ▶ Others on request

## ■ Samples

- ▶ 0,4 kg & 5,5 kg

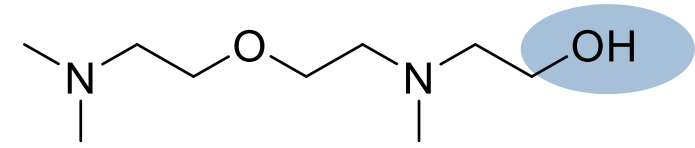
## ■ Registration

- ▶ EU ✓
- ▶ Switzerland ✓
- ▶ USA & Canada ✓
- ▶ China ✓
- ▶ Japan ✓
- ▶ New Zealand & Philippines ✓





## 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, OQEMA and Quimidroga; NA: Azelis





# Lupragen® N 208: Overview



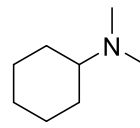
## Safety & Sustainability

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

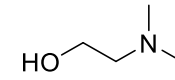
## Technical Properties

-  **Comparable performance** to competitors
-  **Blow performance** close to BDMAEE & stronger than DMDEE
-  **High purity**
-  **Low amount of light-boiling** components

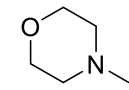
Polyurethane catalyst HETMAEE now available in BASF quality: Lupragen® N 208



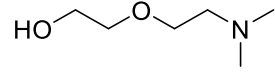
Lupragen® N 100



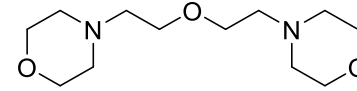
Lupragen® N 101



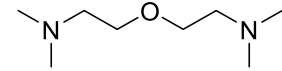
Lupragen® N 105



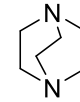
Lupragen® N 107



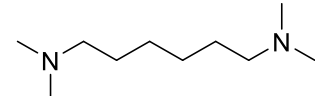
Lupragen® N 106



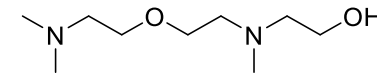
Lupragen® N 205



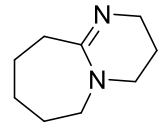
Lupragen® N 201 / 203



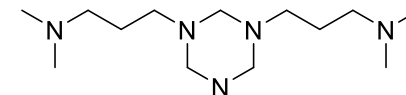
Lupragen® N 500



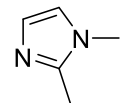
Lupragen® N 208



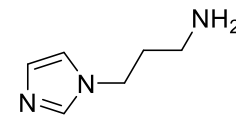
Lupragen® N 700



Lupragen® N 600



Lupragen® DMI

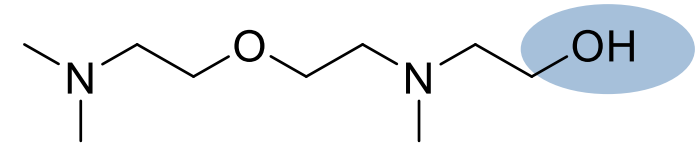


Lupragen® API

## Lupragen® N 208 & Brochure

Comprehensive  
guide for your  
decisions





## Safety & Sustainability



**Reactive, low VOC** catalyst



**Regulatory** driven emission values



**Favorable** hazard profile



Increasing **renewable energy** supply at Verbund Site LU allows for low PCF

## Technical Properties



**Comparable performance** to competitors



**Blow performance** close to BDMAEE & stronger than DMDEE



**High purity**



**Low amount of light-boiling** components

Polyurethane catalyst HETMAEE now available in BASF quality: Lupragen® N 208

# Thank you for your time

Upcoming on Intermediates Academy: **Tech Spotlight**



## **Branched TETA alternatives**

**Date:** Wednesday, September 23, 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