POLYURETHANE ADDITIVES FOR FLEXIBLE POLYETHER FOAM

SILICONE SURFACTANTS
CATALYSTS
PERFORMANCE ADDITIVES
COLOR PASTES

SOUTHEAST ASIA
AUSTRALIA
NEW ZEALAND

EVONIK
Leading Beyond Chemistry

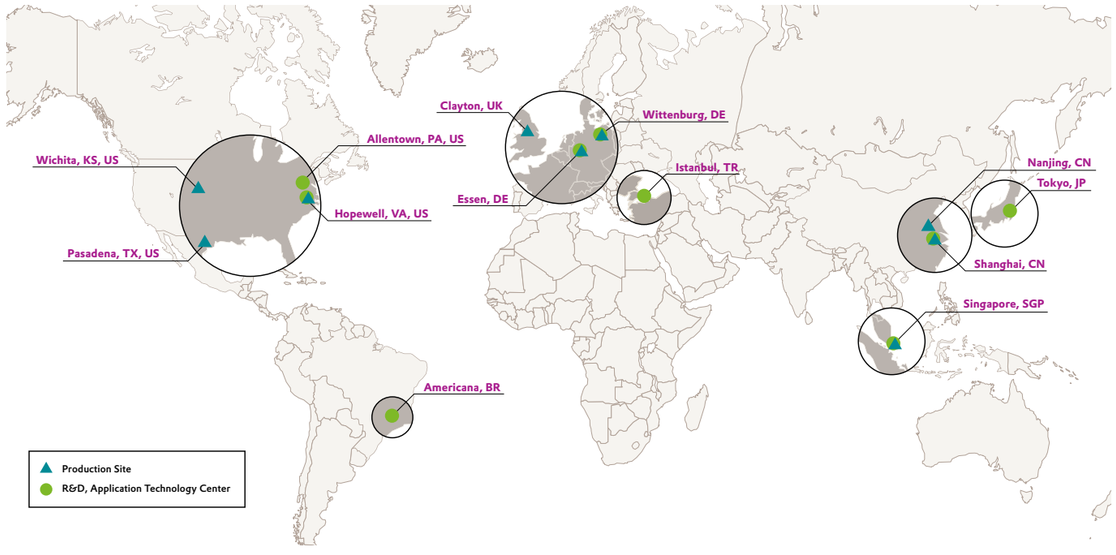
EVONIK –
Enhancing comfort in polyurethane foams

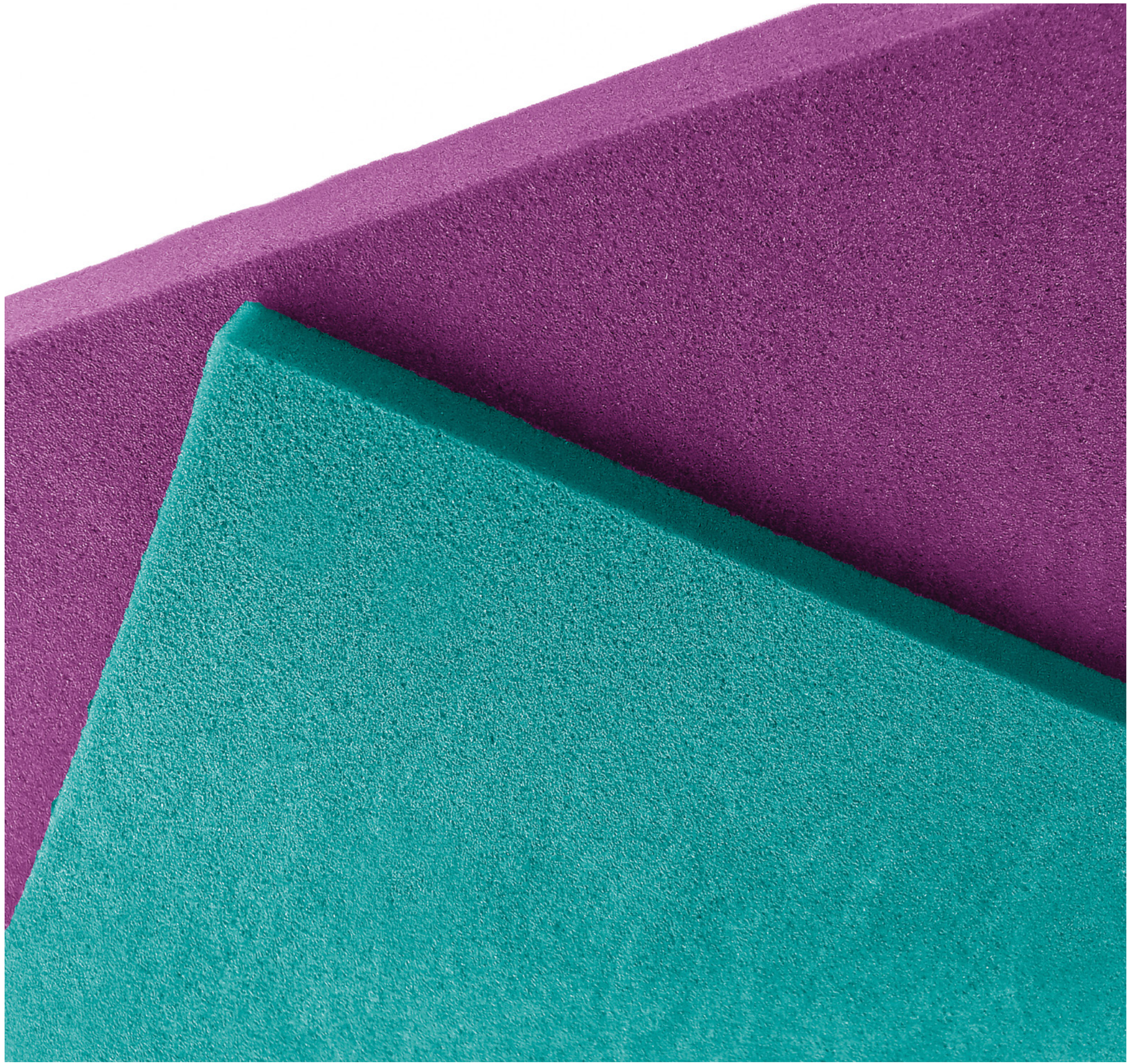
To meet specific customer demands and increasingly stringent market requirements, you need a reliable partner that provides you with customized solutions.

Over the decades, we've provided additives that deliver maximum efficiency and outstanding workability in formulations, but also solutions that answer the most specific needs.

OUR POLYURETHANE ADDITIVES SUPPORT YOU IN:

- **Stabilizing foam structure**
- **Improving foam recovery after compression**
- **Boosting foam yield**
- **Reducing VOC emissions in foam**





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OUR EXTENSIVE RANGE OF ADDITIVES ARE COVERED BY 5 BRANDS:

TEGOSTAB®
Foam stabilizers/surfactants

KOSMOS®
Metal catalysts

TEGOCOLOR®
Color pastes

DABCO®
Amine catalysts and performance additives

ORTEGOL®
Special additives like crosslinkers, softeners, compression set enhancers, etc

FAST ONLINE SERVICES TO SUPPORT YOU WHEN YOU NEED IT MOST

EXPLORE PU takes our online service offering to the next level; a more personalized experience, with fast access to support from our polyurethane experts, wherever you are in the world.

SILICONE SURFACTANTS

Our TEGOSTAB® range offers VOC-optimized surfactants that have a cyclic siloxane (D4, D5 and D6) content of <0.1% weight in total.

Certain product grades are further improved to minimize cyclic siloxane level down to <0.03% weight, supporting formulators to meet stringent IKEA IOS Mat 0010 V15 emission targets, whilst still producing high quality foam.

SILICONE SURFACTANTS

For conventional polyether block foam

Our large variety of silicone surfactants are efficient stabilizers, even for special applications that enable the production of fine and regular cell structures over a wide range of densities.

TEGOSTAB®	KEY FEATURES	STABILIZER POTENCY	DENSITY RANGE	NUCLEATION EFFICIENCY	PROCESSING LATITUDE	ULTRA-LOW CYCLICS[1]
B 8123	Highest potency for ultra-low densities	••••	EL – M	•••	••	✓
B 8195 NEW	Broad processing latitude for medium density foams, smooth surface, and improved compression set performance	••	L – M	•••	•••	✓
B 2470	Broad processing with fine cell structure	••	L – M	•••	•••	✓
B 8228	High potency for medium density foams, good density distribution and high resilience	•••	L – M	••	••	✓
BF 2370	Outstanding processing latitude, very open foam with fine cell structure and excellent hand-feel, for foams used in bras and filter foams	••	M – H	••••	••••	
B 2375 NEW	Ultra-low cyclic surfactant with broad processing latitude for medium-high density with open cell structures Suitable for specialty foams	••	M – H	•••	•••	✓
B 4900	Wide processing latitude for broad density range with open cell structure, high filler foams Suitable for CO_2 foaming and VPF technology	••	M – H	•••	••••	
B 8295 NEW	Ultra-low cyclic surfactant with broad processing latitude with fine cell structure	••	M – H	•••	•••	✓
B 8002	Extremely broad processing latitude for high density. Suitable for high density TDI VE foams/in-soles	•	H	••	••••	
B 8005 NEW	Ultra-low cyclics surfactant with broad processing latitude for high density and TDI VE	•	H	•••	•••	✓
B 8297 NEW	Ultra-low cyclic surfactant with medium to high potency and broad processing latitude with fine cell structure	•••	L – H	•••	•••	✓

(1) D4, D5 and D6 content <0.03% weight (in total)

EL = Extremely Low
L = Low
M = Medium
H = High

• = Low performance or narrow processing latitude
•• = Medium performance or medium processing latitude
••• = High performance or wide processing latitude
•••• = Very high performance or very wide processing latitude

SILICONE SURFACTANTS
For universal foam

Universal silicone surfactants combine high activity with medium FR properties. They are suitable to produce foams with FR requirements like Cal 117 and MVSS 302. Generally foamers use these surfactants for their conventional foam grades too.

TEGOSTAB®	KEY FEATURES	STABILIZER POTENCY	DENSITY RANGE	NUCLEATION EFFICIENCY	PROCESSING LATITUDE	ULTRA-LOW CYCLICS[1]	FLAME RETARDANT PERFORMANCE
B 8110	High potency with good cell structure	•••	EL – M	••••	•••	✓	••
B 8158	Broad processing latitude especially for more hydrophobic polyols including NOP						
	Suitable for CO_2 foaming	•••	L – M	•••	•••	✓	••
B 8244	Ultra-low cyclics surfactant for excellent density distribution and fine cell in quality-demanding foams, including automotive and flame lamination	•••	M – H	••••	•••	✓	••
B 8164	Ultra-low cyclics surfactant for broad processing latitude for high quality demanding foam and soft foams						
	Suitable for box and continuous foaming	••	M – H	•••	•••	✓	••

(1) D4, D5 and D6 content <0.03% weight (in total)

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•••• = Very high performance or very wide processing latitude

SILICONE SURFACTANTS
For flame retardant foam

Flame retardant silicone surfactants are particularly well-suited for the production of flame retardant foam grades, since they enhance the efficiency of the flame retardants by their minimized contribution to the flammability on the foam.

TEGOSTAB®	KEY FEATURES	CRIB V CERTIFIED	STABILIZER POTENCY	DENSITY RANGE	NUCLEATION EFFICIENCY	PROCESSING LATITUDE	ULTRA-LOW CYCLICS[1]	FLAME RETARDANT PERFORMANCE
B 8239	Excellent flammability test performance; fine and regular cell structure	✓	•••	L – M	••	••	✓	••••
B 8239 F	Excellent flammability test performance; pinhole-free cell structure. Recommended for foam grades for flame lamination processes.	✓	•••	L – M	••	••	✓	••••
B 8258	For FR applications with broad processing	✓	••	L – H	•••	•••	✓	•••

(1) D4, D5 and D6 content <0.03% weight (in total)

EL = Extremely Low
L = Low
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H = High

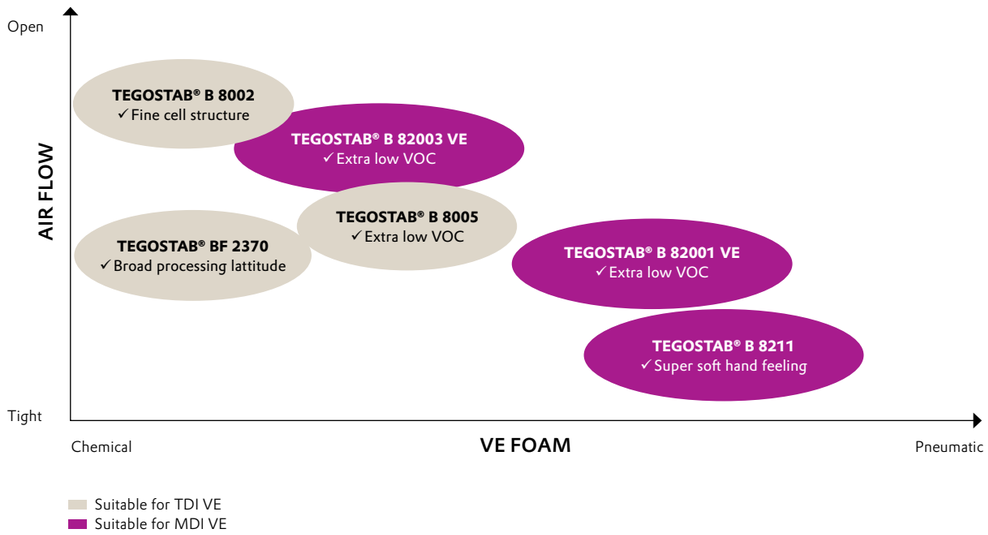
• = Low performance or narrow processing latitude
•• = Medium performance or medium processing latitude
••• = High performance or wide processing latitude
•••• = Very high performance or very wide processing latitude

SILICONE SURFACTANTS
For MDI/TDI viscoelastic foam

Viscoelastic foam is characterized by a delayed recovery after deformation and a low resilience. With the snug and cosy feeling, its application in mattresses, topper pads and pillows is well-appreciated in the market.

The selected TEGOSTAB® products are silicone surfactants qualified for and dedicated to the usage in MDI/TDI viscoelastic foam grades.

OVERVIEW OF MDI/TDI VISCOELASTIC SURFACTANTS



INTRODUCING TEGOSTAB® B 82001 VE

TEGOSTAB® B 82001 VE is a surfactant designed to produce fine, pneumatic cell foams.

- Fine and tight cell structure without shrinkage
- VOC-optimized with cyclic siloxane (D4, D5 and D6) content <0.1% weight in total (ideal for meeting IKEA IOS Mat 0010 V 15 specifications)
- Suitable for combustion modified viscoelastic flexible foams
- Non-hydrolysable

SILICONE SURFACTANTS
For high resilience slabstock foams

These surfactants are specifically designed to cover different cell-regulating and -stabilising potencies based on varying formulation ingredients, such as polymer content in the polyol, cross-linker level, and the portion of isocyanate other than TDI 80.

TEGOSTAB®	ACTIVITY	PROCESSING LATITUDE	POLYOL	MDI	TDI	LOW VOC
B 8681	•	•••	SAN/PHD/PIPA	••	•••	
B 8707 LF 2	••	••	SAN/PIPA	•••	•••	✓
B 8716 LF 2	•	•••	SAN/PHD/PIPA	••	•••	✓
B 8773 LF 2	••	••••	SAN/PHD/PIPA	••	•••	✓
B 8790 LF 2	••	•••	SAN/PHD/PIPA/NOP	••	•••	✓

• = Low activity or processing latitude
•• = Medium activity or processing latitude
••• = High activity or processing latitude
•••• = Very high activity or processing latitude

•• = Recommended
••• = Strongly recommended

✓ = Suitable

CATALYSTS

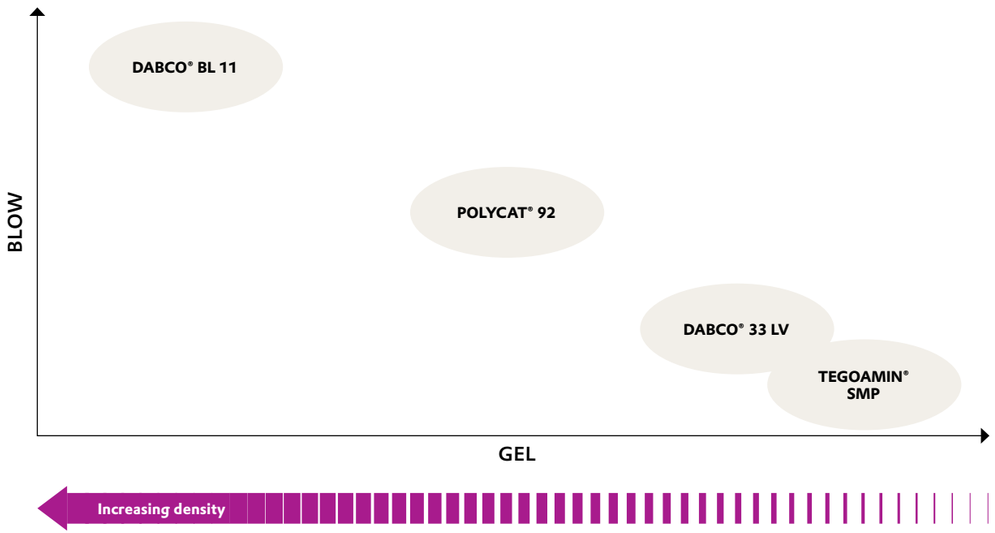
Our DABCO®, KOSMOS® and POLYCAT® brands cover an extensive range of high performing amine catalysts, metal catalysts and special catalysts.

TRADITIONAL CATALYSTS

Our carefully selected amine and metal catalysts are crucial in balancing between the various reactions during the polyurethane foam formation.

PRODUCT	DESCRIPTION
DABCO® 33 LSI	Low odor gel catalyst based on Triethylenediamine
DABCO® 33 LV	Standard gel catalyst based on Triethylenediamine in DPG
DABCO® 8154	Delayed action gel catalyst that helps improve foam curing
DABCO® BL 11	Strong urea reaction blow catalyst
DABCO® CS 90	Balanced amine catalyst with cell opening properties, recommended for high density conventional foam, HR and VE foams
KOSMOS® T 9	Stannous octoate
KOSMOS® T 900 NEW	Alternative to stannous octoate , offering improved EH&S
KOSMOS® 54	Co-catalyst for cold flow prevention in HR and visco foams
POLYCAT® 92	Optimized amine catalyst for maximum versatility
TEGOAMIN® SMP	Tertiary amine with outstanding catalytic properties, recommended for low density foams

TRADITIONAL CATALYST MAP

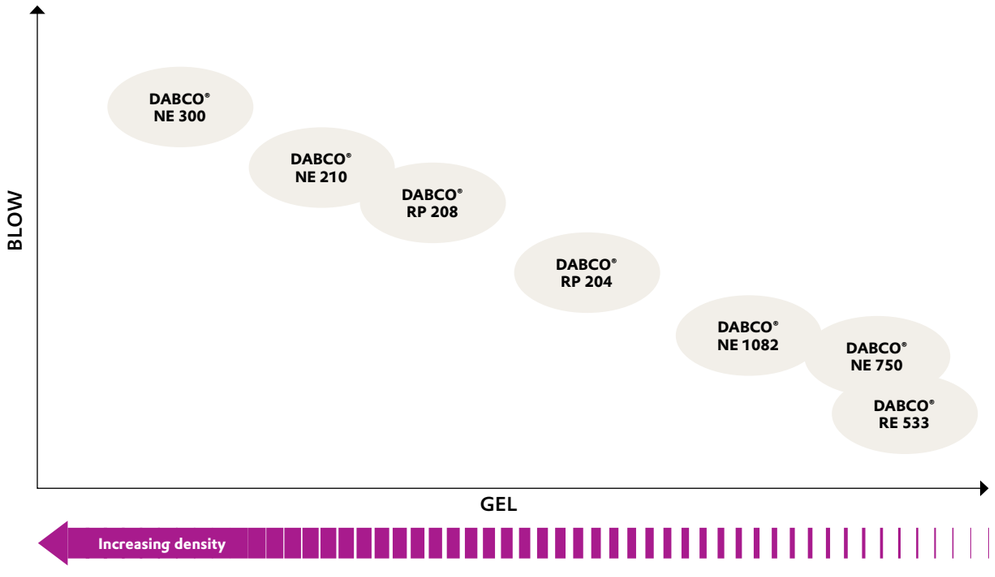


EMISSION-OPTIMIZED CATALYSTS

Our latest Negligible Emissions (NE) grades offer reduced emissions compared to traditional amines, resulting in lower exposure to VOC's for both workers and consumers.

PRODUCT	DESCRIPTION
DABCO® NE 210	Balanced low emission amine catalyst
DABCO® NE 300	Negligible emission, low odor reactive blowing catalyst
DABCO® NE 1082	Negligible emission reactive gelling catalyst
DABCO® NE 750	Negligible emission reactive gelling catalyst for production of foam with challenging curing
DABCO® RP 204	Emission-optimized and balanced catalyst
DABCO® RP 208	Negligible emission, low odor and balanced catalyst
DABCO® RE 533	Emission-optimized gel catalyst based on Triethylenediamine
KOSMOS® EF	Emission-optimized tin catalyst

EMISSION-OPTIMIZED CATALYST MAP

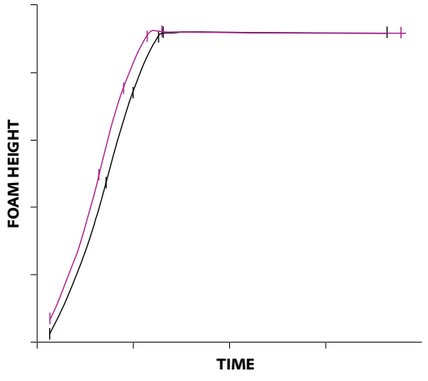


INTRODUCING DABCO ® NE 750

DABCO® NE 750 is an extra low-emission amine catalyst with outstanding gel selectivity

- Extremely high similarity of rise profile to DABCO® 33 LV
- Odor-optimized
- Lower tack-free time
- Ideal for fulfilling comfort industry labels like LGA, OEKOTEX, and automotive OEM specifications, including VDA 278
- Helps to pass PVC staining tests
- Recommended for viscoelastic, low index and soft foams

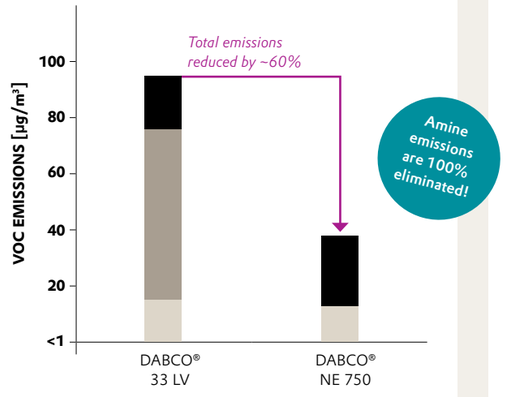
RISE PROFILE COMPARISON*



DABCO® NE 750
DABCO® 33 LV

* Use level at 0.2 pphp for conventional ether foam of density 21 kg/m³

VOC EMANATION CHAMBER TEST 23°C



Siloxanes
Amines
Others

PERFORMANCE ADDITIVES

The Performance Additives portfolio of Evonik can help formulators to improve processing and foam physical properties.

CROSSLINKERS AND CHAIN EXTENDERS	DESCRIPTION
ORTEGOL® CXT	Additive to reduce splits in low index and filler formulations. Also enhances the elongation properties of the foam.
ORTEGOL® G	Highly efficient crosslinker for flexible foams containing fillers
ORTEGOL® 204	Additive for cold flow prevention in HR and visco foams
ORTEGOL® 720	Crosslinker that improves compression sets and density/hardness distribution for HR slabstock foams
HARDENERS	
ORTEGOL® HA 1	Hardening additive with broad processing latitude
SOFTENERS	
ORTEGOL® FS 1	Softening additive to prevent splits in low index formulations and providing silky foam touch
ORTEGOL® FS 2	Softening additive to prevent splits in low index formulations; amine-free and odor-optimized
ORTEGOL® 310	Softening additive
EMULSIFIERS	
ORTEGOL® NOP	Emulsifier for blends of natural oil-based polyols and standard polyols

INTRODUCING ORTEGOL® CXT

A difunctional reactive additive for improved processing latitude of sensitive formulations

- Reduces splits in low index and filler formulations
- Supports the production of soft flexible slabstock by lowering the index
- Compatible with high levels of fillers or NOPs
- Partially substitutes for DEOA in HR foams
- Maintains consistent processing and improves quality in VE foams

INTRODUCING ORTEGOL® HA 1

A hardening additive for use in flexible polyether blockfoam

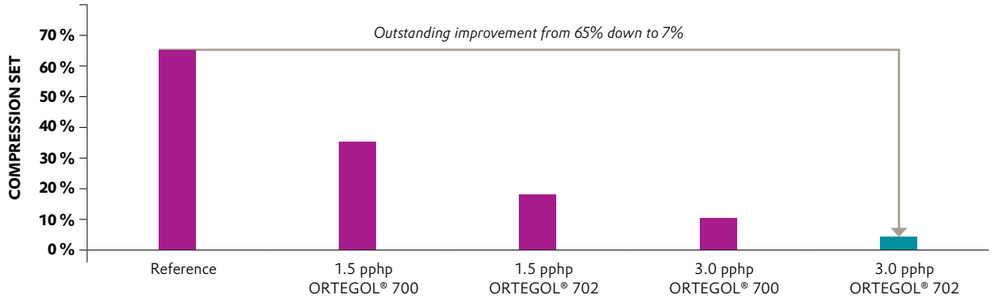
- Increases long-lasting foam hardness up to 25% with minimal impact on airflow and other physical properties
- Achieves ultra-hard foams (>10kPa) when used in combination with polymer polyol (POP)
- No formulation adjustments in most cases
- Saves cost by reducing the use of TDI and/or tin catalyst

COMPRESSION SET IMPROVERS	
ORTEGOL® 700	Improving foam recovery after compression and reducing curing time before compression
ORTEGOL® 702	Improving foam recovery after compression and reducing curing time before compression. Provides excellent recovery in demanding applications
ANTI-SCORCHERS	
ORTEGOL® AO 1	Antioxidant for scorch prevention
ORTEGOL® AO 2	Scorch prevention, for polyester foam
ORTEGOL® AO 7	Highly efficient antioxidant for scorch prevention, low VOC, also in high temparature automotive VOC tests
ANTISTATIC AGENTS	
ORTEGOL® AST	Antistatic additive
ORTEGOL® AST 2	Antistatic additive with reduced tendency for scorch
OTHER PROCESSING ADDITIVES	
DABCO® BA 100	Acid-based blocking agent for delaying cream time to reduce or eliminate pinholes in foams
DABCO ® PE 40	Strong compatibilizer for powder dispersions and polyol emulsions
ORTEGOL® BS 1	Wetting agent for rebonded foam production to reduce binder level
ORTEGOL® CC3	Coarse cell additive in Conventional, HR and VE foams
ORTEGOL® COM	Emulsifier for blends of high ethylene oxide and high propylene oxide containing polyols, and natural oil-based polyols and standard polyols
ORTEGOL® HPH 1	Additives to enhance the wetting of foam by liquids, especially water
ORTEGOL® HPH 2	Additives to enhance the wetting of foam by liquids, especially water
ORTEGOL® VCO	Cell opener for viscoelastic foams

INTRODUCING ORTEGOL® 700 & ORTEGOL® 702

- Superior foam recovery after prolonged compression
- Reduced curing time before compression
- Improved wet compression set
- Odor-optimized
- Emission-optimized; suitable for room temperature chamber tests

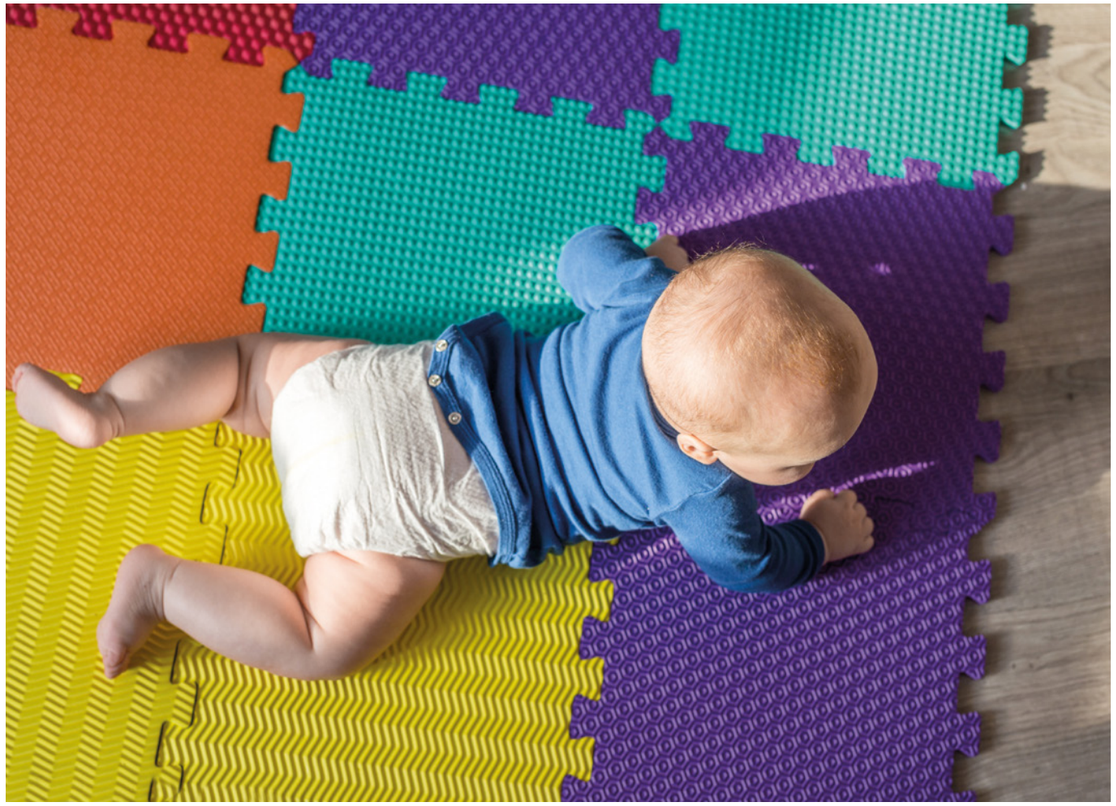
COMPRESSION SET WITH ORTEGOL® 700 & ORTEGOL® 702



ORTEGOL® 700 & ORTEGOL® 702 significantly improve compression set, with ORTEGOL® 702 particularly helpful in demanding applications.

COLOR PASTES

All of our TEGOCOLOR® color pastes provide strong and long-lasting color for decorative effects. They are required in low use levels and show minimal interference to the processing latitude of the overall formulation.

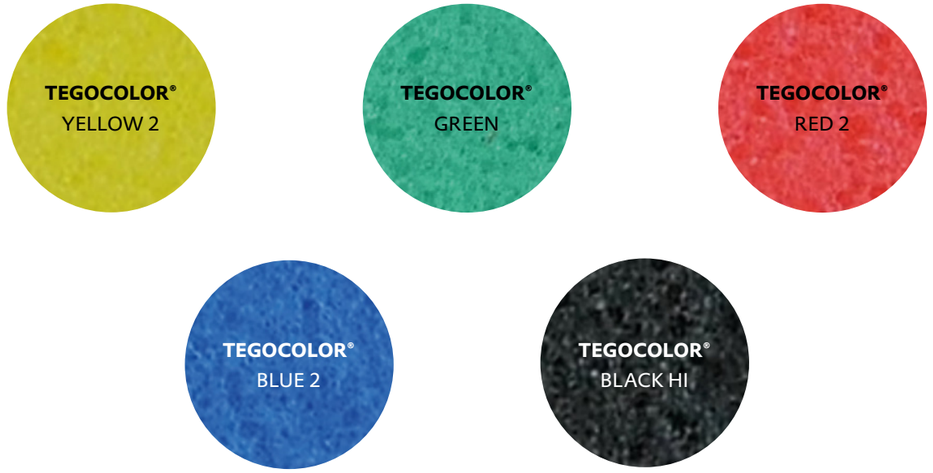


TEGOCOLOR®

Color pastes that offer key performance benefits of:

- Brilliant color
- Minimal VOC- and FOG-emanation
- Phthalate-free
- BHT-free

COLOR EXAMPLE



The colored foam samples above are images of foams made with 3.0 pphp TEGOCOLOR® products.

PIONEERING RESEARCH HUB IN SINGAPORE

Delivering innovative solutions to the flexible foam industry

Our new Asia technical service lab houses state-of-the-art equipment dedicated to:

- Developing new formulations
- Troubleshooting technical issues
- Facilitating your transition to the latest Evonik materials and technologies

OUR COMMITMENT

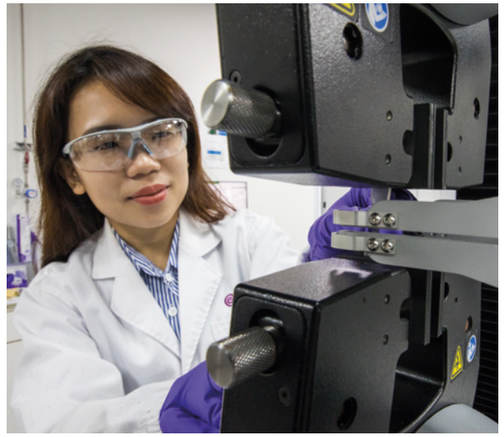
Evonik is committed to producing new additives that improve productivity, enhance performance and have a reduced impact on the environment and CO_2 footprint.
We have strict quality management processes in place as well as many diversity initiatives.

Our products are backed by a global network of support services:

- Local sales & technical service personnel, with in-depth industry knowledge and understanding of your needs
- Dedicated R&D centers of excellence
- Analytical labs
- Worldwide manufacturing and warehouse capabilities

SAFETY IS PARAMOUNT AT EVONIK

- Evonik is one of the safest chemical manufacturers globally.
- An industry leader in environmental, health and safety (EH&S) performance.
- Every employee is required to understand and adhere to our global EH&S policy, which is a condition of employment.



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PRODUCT NAME	FUNCTION	PAGE NUMBER
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To discuss your requirements for polyurethane additives for the comfort foam industry further, or to learn more about regional product availability.
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