

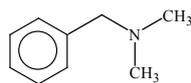
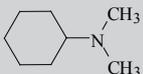
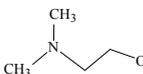
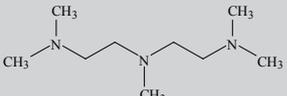
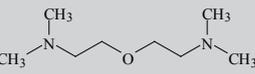
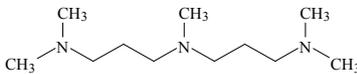
HUNTSMAN

Enriching lives through innovation

Polyurethane
Additives

JEFFCAT[®] amine catalysts

The large and growing family of JEFFCAT[®] amine catalysts from Huntsman Performance Products provides solutions to a wide range of urethane applications including polyether and polyester foams, coatings, elastomers, and high-modulus urethane plastics. The unique industry-leading low emission JEFFCAT[®] amine catalyst product range results from the value of Huntsman's advanced technologies and 40-plus years of experience with urethane catalysts and addresses the environmental, health and safety aspects of polyurethane foam production and usage in many application area including automotive, furniture & bedding and spray foams.

JEFFCAT [®] catalysts	Description	Typical Properties					Typical Applications					
		OH Number, mgKOH/g †	Viscosity, cSt at 25°C	Boiling Point, °C	Flash Point, °C	Specific Gravity 20/20°C	Flexible Foam			Microcellulars, Elastomers, RIM, FRIM	Rigid Foam, Packaging Foam	Coatings, Adhesives
							Ester	Ether	HR Molded			
GENERAL PURPOSE CATALYSTS												
BDMA	 Benzyltrimethylamine	n.d.	1	181	54 TCC	0.90	●			●	●	●
DMCHA	 N,N-dimethylcyclohexylamine Widely used catalyst for all types of rigid foams.	n.d.	1	160	40 PMCC	0.85					●	
DMEA	 N,N-dimethylethanolamine	629	4	135	41 TCC	0.89		●	●		●	
PMDETA	 Pentamethyldiethylenetriamine Especially useful as catalyst for HCFC/ water-blown rigid foams.	n.d.	2	201	77 DIN 51758	0.83					●	
TD-33A	33% TEDA in dipropylene glycol	558	104	180*	91 PMCC	1.03		●	●	●	●	●
TDBDO	25% TD-100 in 75% 1,4-butanediol (BDO)	934	123	205	102	1.03				●		
TDEG	33.3% TD-100 in monoethylene glycol	1206	n.d.	185*	107 ASTM D93	1.09				●		
Z-80	N,N,N',-tris(3-dimethylaminopropyl)- amine : It acts as a low odor gel catalyst, designed mainly for use in rigid polyurethane foams.	n.d.	10	285	124 PMCC	0.85		●	●	●	●	●
Z-140	Low odor balanced catalyst with excellent postcure characteristics.	n.d.	14	> 300	132 PMCC	0.93		●	●	●	●	
ZF-20	 Bis-(2-dimethylaminoethyl)ether : A very strong, highly efficient blowing catalyst.	n.d.	1	189	64 DIN 51755	0.85		●	●		●	
ZF-22	70% ZF-20 in dipropylene glycol	251	4	188*	73 TCC	0.90		●	●		●	
ZF-54	Delayed-action catalyst made up of ZF-22 partially neutralized with formic acid. Provides excellent cure and flow as co-catalyst.	340	67	n.d.	73 PMCC	1.10		●	●			
ZR-40	 N,N,N',N'',N'''-pentamethyl-dipropylenetriamine : Very useful in cold-molded HR foams. Low odor catalyst with a good balance between gel and blow.	n.d.	3	227	92 PMCC	0.83		●	●	●	●	●

† theoretical OH Number including polyol, amine, acid and water functionalities

* initial boiling point

n.d. not determined

JEFFCAT® catalysts	Description	Typical Properties					Typical Applications					
		OH Number, mgKOH/g †	Viscosity, cSt at 25°C	Boiling Point, °C	Flash Point, °C	Specific Gravity 20/20°C	Flexible Foam			Microcellulars, Elastomers, RIM, FRIM	Rigid Foam, Packaging Foam	Coatings, Adhesives
							Slabstock		Mold-			
							Ester	Ether				
LOW EMISSION CATALYSTS / REACTIVE CATALYSTS												
DMAPA	Used in a variety of polyurethane foam applications.	549	1	135	29 TCC	0.82		●		●	●	
DPA	Low emission catalyst with good gelation and flowability.	514	145	> 210 *	90 TCC	0.95		●	●	●	●	
LE-15	This is reactive amine catalyst blend. This product strongly promotes the blowing reaction and is formulated to permit its easy introduction into polyurethane foam formulations.	566	40	235	120 PMCC	0.99		●	●		●	
LE-60	Reactive blowing catalyst used in foams requiring low emissions.	384	3	174	81 PMCC	0.89		●	●			
LE-220	High potency, low odor gel catalyst designed to replace JEFFCAT® TD-33A. Used in a wide variety of flexible and rigid PU formulations with excellent processing latitude.	225	3	112	53 PMCC	0.85		●	●			
LE-310	Low emission gel catalyst which can replace JEFFCAT® TD-33A on an equivalent part basis. Can be used in a wide variety of flexible slabstock and high resiliency (HR) foam grades.	514	37	118 *	57 PMCC	0.93		●	●	●	●	
LED-103	Reactive, acid blocked, low emissions type blowing catalyst that offers improved material handling, low-corrosion, and phase stability in fully formulated B-side flexible molded foams.	2405	104	100 *	>188 PMCC	1.05		●		●	●	
LED-204	Reactive, acid blocked, low emissions, low-corrosion type gelling catalyst used in all types of flexible molded foams.	2555	1856	100 *	>188 PMCC	1.10		●	●	●	●	
S-117	This is a formulated strong blowing catalyst for low- and medium-density spray foams. The product is a non-fugitive catalyst because it contains reactive hydroxyl groups which react into the foaming matrix, thus minimizing catalyst odor in finished foams.	320	11	205	122 PMCC	0.95					●	
Z-110	Used in a variety of polyurethane foam applications.	384	8	208	88 PMCC	0.91		●	●		●	
Z-130	Low emission reactive gel catalyst.	299	3	222	88 PMCC	0.84		●	●	●	●	●
Z-131	Blend of low emission, reactive gelling amine catalysts.	407	32	235 *	94 PMCC	0.89		●	●	●	●	
ZF-10	Strong blowing catalyst that is highly efficient. Used in foams requiring low emission.	295	12	255	118 PMCC	0.95		●	●		●	
ZR-50	Low emission catalyst with exceptional balance and versatility.	229	17	290	141 PMCC	0.89		●	●	●	●	
ZR-70	For use mainly in spray and packaging foam applications.	421	8	201	93 TCC	0.96		●		●	●	

† theoretical OH Number including polyol, amine, acid and water functionalities * initial boiling point

JEFFCAT® catalysts	Description	Typical Properties					Typical Applications						
		OH Number, mgKOH/g †	Viscosity, cSt at 25°C	Boiling Point, °C	Flash Point, °C	Specific Gravity 20/20°C	Flexible Foam			Microcellulars, RIM, RRIM	Rigid Foam, Packaging Foam	Coatings, Adhesives	One-Component
							Slabstock		Mold-				
							Ester	Ether					
SPECIALTY AMINE CATALYSTS													
DM-70	Improves green strength and can be used for charcoal polyester-based flexible foams.	n.d.	7	151*	39 TCC	0.99	●	●	●			●	
DMDEE	2,2'-dimorpholinodiethylether : Very selective blowing catalyst. Provides a stable prepolymer system. Excellent for 1-K	n.d.	19	309	146 TCC	1.06	●	●	●			●	●
DMP	<chem>CN1CCN(C)CC1</chem> Dimethylpiperazine : Good catalyst in making polyester foams. Also promotes surface cure in different applications.	n.d.	n.d.	132	22 TCC	0.84	●	●	●			●	
NEM	<chem>CCN1CCOCC1</chem> N-ethylmorpholine : Promotes surface cure for flexible polyester foams and excellent processing in polyester-based flexible foams.	n.d.	1	138	32 DIN 51756	0.91	●		●			●	
NMM	<chem>CN1CCOCC1</chem> N-methylmorpholine : Good solubilizer in making polyester foams. Also useful in high rise rigid molded applications.	n.d.	1	116	13 DIN 51756	0.92	●		●			●	
BACK-END CURE CATALYSTS													
TAP	1-methyl-4-(2-dimethylaminoethyl)piperazine : Co-catalyst with excellent end-cure and helps on gelation with improved flow.	n.d.	n.d.	220	80 TCC	0.88	●		●	●	●		
TR-52	Back-end cure co-catalyst. Shortens the demold time of rigid foam systems.	760	<9000	n.d.	154 PMCC	1.13						●	
TR-90	1,3,5-tris(3-(dimethylamino)propyl)-hexahydro-s-triazine : Improved dimensional stability in many rigid foam systems. Useful as a co-catalyst in rigid spray foam.	n.d.	30	>200 ◊	132 PMCC	0.91				●	●		

† theoretical OH Number including polyol, amine, acid and water functionalities * initial boiling point ◊ with decomposition n.d. not determined

Auxiliary products

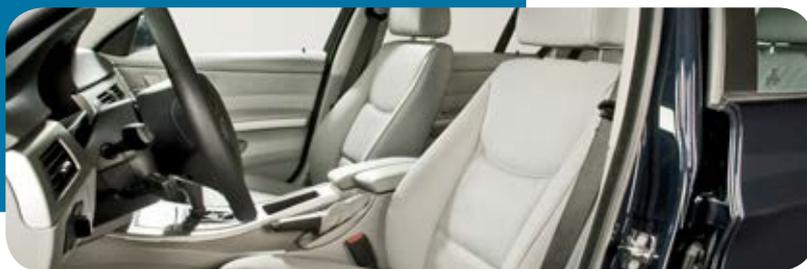
JEFFAMINE® polyetheramines and JEFFSOL® propylene carbonate

In RIM reaction injection molding technology, the use of JEFFAMINE® polyetheramines and JEFFSOL® propylene carbonate can improve various physical characteristics such as thermal, abrasion and impact resistance, tear strength, solvent stability and dynamic fatigue. Similar characteristics are also seen in more standard polyurethane foam systems.



Jurong Plant, Singapore

JEFFADD™ additives



JEFFADD™ additives	Description	Typical Properties					Typical Applications					
		OH Number, mgKOH/g †	Viscosity, cSt at 25°C	Boiling Point, °C	Flash Point, °C	Specific Gravity 20/20°C	Flexible Foam		Microcellulars, Elastomers, RIM, FRIM	Rigid Foam, Packaging Foam	Coatings, Adhesives	
							Ester	Ether				HR Molded
Aldehyde Scavenger												
FM 505	Formaldehyde scavenger, can be used to reduce formaldehyde emission in PU foam.	n.d.	60	330	>150CC	0.98		●	●		●	
Cell Opener												
FM 200	Improves the cell openness & comfort of the foam. It can be used in flexible polyurethane foams utilising TDI or TM/MT technology.	32-36	1500 (max)	>300	250 CC	1.03		●	●		●	
Foam Modifier												
HD 201	Enhances the foam elongation properties while maintaining the foam hardness. It is an ideal choice to complement the elongation for the low-density or highly filled flexible foam.	56.1	248	>250	185 CC	0.99		●	●			
HD 401	Enhances the foam hardness and increases the load bearing properties of the foam while maintaining the tensile strength & elongation properties. Designed for low index and low-density flexible foams.	281	22	>260	163 CC	0.97		●	●			

† theoretical OH Number including polyol, amine, acid and water functionalities n.d. not determined

Infinite possibilities

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- 1,500 associates worldwide
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