HUNTSMAN

Enriching lives through innovation

POLYURETHANE ADDITIVES

Americas

JEFFCAT® catalysts

Huntsman's large and growing family of unique JEFFCAT® catalysts brings strength, power, and speed to a wide range of urethane applications. The widespread use of these catalysts in making polyether and polyester foams, coatings, elastomers, and high-modulus urethane plastics attests to the value of our advanced technologies and our 50-plus years of experience with urethane chemicals.

JEFFCAT® catalysts	DESCRIPTION	Typical Properties					Typical Applications					
							Flexible Foam					
							Slabstock		Molded			
		OH Number, Mg KOH/g	Viscosity 78°F (25°C) cSt	Boiling Point, °C	Flash Point °F PMCC	Specific Gravity 68/68°F	Ester	Ether	HR Molded	Microcellulars, Elastomers, RIM, RRIM	Rigid Foam (PUR), Packaging Foam	Coatings, Adhesives
GENERAL PURPOSE CATALYSTS												
BDMA	Benzyldimethylamine	-	1	181	141	0.9	■				■	■
DMCHA	N,N-dimethylcyclohexylamine — Widely used catalyst for all types of rigid foams.	-	1	160	127	0.9		■	■		■	
DMCHA-LO	Low odor version of DMCHA.	-	1	160	127	0.9		■	■		■	
DMEA	N,N-dimethylethanolamine	629	4	135	113	0.9	■	■	■		■	
PMDETA	Pentamethyldiethylenetriamine — Especially useful as catalyst for HCFC/water-blown rigid foams.	-	2	201	194	0.8		■	■		■	
Z-80	N,N,N,-tris(3-dimethylaminopropyl-) amine — Strong, low odor gel catalyst used to accelerate initial and back-end curing. Used in a variety of polyurethane foam applications.	-	6	285	255	0.9		■	■	■	■	
ZF-20	Bis-(2-dimethylaminoethyl)ether — A strong, efficient blowing catalyst.	-	1	189	165	0.9		■	■		■	
ZF-22	70% ZF-20 in dipropylene glycol.	251	4	188*	170	0.9		■	■		■	
ZF-24	23% ZF-20 in dipropylene glycol.	644	36	204	213	1.0		■	■		■	
ZF-167	47% ZF-20 in dipropylene glycol.	444	44	n.d.	180	1.0		■	■		■	■
ZR-40	N,N,N',N",N"-pentamethyl-dipropylene triamine — Very useful in cold-molded HR foams. Low odor catalyst with a good balance between gel and blow.	-	3	227	208	0.8		■	■		■	■
BACK-END CURE CATALYSTS												
TAP	Co-amine catalyst with excellent end-cure and improved flowability.	n.d.	n.d.	220	80 TCC	0.88	■		■	■		
TR-90	1,3,5-tris(3-(dimethylamino)propyl)-hexahydro-s-triazine — Improved dimensional stability in many rigid foam systems. Useful as a cocatalyst in rigid spray foam.	-	30	>200 ◊	251	0.90				■	■	

* initial boiling point ◊ with decomposition n.d. not determined

LOW EMISSION CATALYSTS / REACTIVE CATALYSTS

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							Slabstock		Molded			
		OH Number, Mg KOH/g	Viscosity 78°F (25°C) cSt	Boiling Point, °C	Flash Point °F PMCC	Specific Gravity 68/68°F	Ester	Ether	HR Molded	Microcellulars, Elastomers, RIM, RRIM	Rigid Foam (PUR), Packaging Foam	Coatings, Adhesives
DPA	N-(3-dimethylaminopropyl)-N, N-diisopropanolamine — Low emission catalyst with good gellation and flowability.	514	145	>210*	284	1.0		■	■	■	■	
LE-15	Reactive amine catalyst blend. This product promotes the blowing reaction and is formulated to permit its easy introduction into polyurethane foam formulations.	566	40	235	248	1.0	■	■	■		■	
LE-30	Novel low emission, strong blowing amine catalyst for the isocyanate-water blowing reaction in polyurethane foams. It has a very low vapor pressure and can be used to replace high volatility, conventional amine catalysts.	-	4	241	313	0.9	■	■	■		■	
LE-35	Novel high potency, low odor amine blow catalyst which is diluted in a high molecular weight polyol to increase viscosity. It is a catalyst for the isocyanate-water blowing reaction in polyurethane foams.	16.8	138	233	302	1.00	■	■	■		■	
LE-220	High potency, low odor gel catalyst designed to replace JEFFCAT® TD-33A. Used in a wide variety of flexible slabstock and rigid PU formulations with an acceptable processing latitude.	225	2	112	127	0.90		■	■	■	■	
LE-225	High potency, low odor gel catalyst designed to replace JEFFCAT® TD-33A and is diluted in a high molecular weight polyol to increase viscosity. Used in a wide variety of flexible slabstock and rigid PU formulations with an acceptable processing latitude.	126	70	109	136	0.90		■	■		■	
LE-310	Reactive gel catalyst which can replace TD-33A on an equivalent part basis in most slabstock formulas. Can be used in a wide variety of flexible slabstock and high resiliency (HR) foam grades.	514	37	118*	158	0.90		■	■		■	
LE-340	Novel low odor and low emission gelling amine catalyst. Ideal for PU foam applications where PU foam odor is critical.	514	194	>210	135 PMCC	0.94		■	■	■	■	
LED-103	Reactive, acid blocked, low emissions type blowing catalyst that offers improved material handiling, low-corrosion, low formaldehyde containing and phase stability in fully formulated B-side flexible molded foams. In automotive applications, foams made with this catalyst exhibit lower vinyl staining, lower fogging, and lower emissions.	2405	104	100*	>370	1.10			■		■	
LED-104	Reactive, higher acid blocked, low emissions blowing amine catalyst. Offering improved material handling, low-corrosion, and phase stability in formulated PU systems.	2600	393	99	>107 PMCC	1.11		■		■	■	
LED-204	Reactive, acid blocked, low emissions, low-corrosion, and low formaldehyde containing type gelling catalyst used in all types of flexible molded foams. Reduces vinyl staining, fogging and emissions in automotive foams.	2555	1856	100*	>370	1.10			■	■	■	
S-117	Strong, low emission, blowing amine catalyst blend, designed for low to medium-density rigid spray formulated PU systems.	320	11	205	122 PMCC	0.95					■	

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							Flexible Foam					
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		OH Number, Mg KOH/g	Viscosity 78°F (25°C) cSt	Boiling Point, °C	Flash Point °F PMCC	Specific Gravity 68/68°F	Ester	Ether	HR Molded	Microcellulars, Elastomers, RIM, RRIM	Rigid Foam (PUR), Packaging Foam	Coatings, Adhesives
LOW EMISSION CATALYSTS / REACTIVE CATALYSTS *(cont'd)*												
S-711	Novel high potency low emission, low odor amine catalyst blend, designed for rigid spray formulated PU systems.	402	8	203*	90 PMCC	0.93					■	
Z-110	N,N,N'-trimethylaminoethyl-ethanol amine — Used in a variety of polyurethane foam applications.	384	8	208	195	0.90		■	■		■	
Z-130	1,3-propanediamine, N'-(3-(dimethylamino) propyl)-N,N-dimethyl — Low emission reactive gel catalyst.	299	3	222	206	0.80		■	■		■	■
Z-131	Novel all-reactive low emission gelling amine catalyst, having a low viscosity and high water solubility, contributing to its ease of handling while processing a broad range of PU foam grades.	407	32	235*	94 PMCC	0.89		■	■			
ZF-10	N,N,N'-trimethyl-N'-hydroxyethyl-bisamino ethylether — Efficient blowing catalyst for use in foams requiring low emissions.	295	12	255	261	1.00		■	■		■	
ZR-50	N,N-bis(3-dimethylaminopropyl)-N-isopropanolamine — Low emission catalyst with balance and versatility.	229	17	290	269	0.90		■	■	■	■	
ZR-70	2-(2-dimethylaminoethoxy) ethanol — For use in packaging foam applications.	421	8	201	206	1.00		■	■		■	
FLEXIBLE POLYESTER FOAM CATALYSTS												
DM-70	Improves green strength. Can be used for charcoal polyester based flexible foams.	-	7	151*	120	1.00	■	■	■			
NEM	N-ethylmorpholine — Promotes surface cure for flexible polyester foams and provides acceptable processing in polyester-based flexible foams.	-	1	138	95	0.90	■		■		■	
NMM	N-methylmorpholine — Good solubilizer in making polyesters foams. Also useful in high rise rigid molded applications.	-	1	116	70	0.90	■		■		■	
SPECIALTY AMINE CATALYSTS												
DMDEE	2,2'-dimorpholinodiethylether — Strong blowing catalyst. Provides a stable prepolymer system. Excellent for 1-K systems.	-	19	309	325	1.10	■	■	■			■
DMDLC	Used for 1-K moisture cure applications with critical color requirements.	-	20	309	332	1.10	■	■	■			■
DMP	Good balance amine catalyst, exhibiting good flowability and yielding PU foams with an open cell structure.	n.d.	n.d.	132	22 TCC	0.84	■	■	■		■	
H-1	Designed to have good stability with next generation hydrofluoroolefin (HFO) blowing agents, such as trans-1-chloro-3,3,3-trifluoropropene. Provides wide processing latitude with alternate blowing agent.	339	14	n.d.	248	1.10					■	
Z-65P	Formulated catalyst for accelerated cure in a medium molecular weight diol. Improves early compression set by increasing the cure speed of the catalyst package. Provides wide processing latitude with alternate blowing agent.	235	14	265	113	1.00		■				
ZF-53	Formulated catalyst made from TD-33A and ZF-22, designed for flexible slab foams.	481	37	150	186	1.00		■	■		■	
ZF-54	Delayed-action catalyst formulated with ZF-22 partially neutralized with formic acid. Provides cure and flow as co-catalyst.	597	67	n.d.	180	1.10		■	■			

* initial boiling point ◊ with decomposition n.d. not determined

JEFFADD® additives

JEFFADD® additives are tailor-made products designed to improve the performance and processing of polyurethane foams. Aldehyde scavengers in this product range are helping formulators and foam manufactures control the aldehyde emissions of polyurethane foams.

JEFFADD® additives	DESCRIPTION	Typical Properties					Typical Applications					
							Flexible Foam					
							Slabstock		Molded			
		OH Number, mgKOH/g ‡	Viscosity, cSt at 25°C	Boiling Point, °C	Flash Point, °C	Specific Gravity 20/20°C	Ester	Ether	HR Molded	Microcellulars, Elastomers, RIM, RRIM	Rigid Foam, Packaging Foam	Coatings, Adhesives
ALDEHYDE SCAVENGER												
AS-53	Formulated aldehyde scavenger, can be used to reduce formaldehyde emissions in PU foam.	530	295	148	130	1.10		■	■		■	
AS-76	Effectively reduces the formaldehyde emission without compromising the acetaldehyde levels. Contains a freezing point of -18ºC, allowing for improved performance under stringent temperatures.	3624	n.d.	100*	does not flash PMCC	1.09		■	■		■	

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

Auxiliary products

JEFFAMINE® polyetheramines

In polyurea technology, the use of JEFFAMINE® polyetheramines 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. The typically-used materials are JEFFAMINE® D-2000 and JEFFAMINE® T-5000 amines.

JEFFAMINE® polyetheramines, due to their fast reaction with isocyanates, provide a quick, un-catalyzed exotherm in the foam. This phenomenon can be termed a thermo-kick. This effect is most helpful in cold ambient temperatures or where heat losses have to be overcome, such as with cold substrates, molds and highly-filled systems. The rapid primary amine/isocyanate reaction can also be utilized when it is beneficial to build cross linking and thixotropy quickly into the system. The thermo-kick is strongest with a low molecular weight diamine such as JEFFAMINE® D-230 or JEFFAMINE® D-400 amine, whilst JEFFAMINE® T-403 amine will give a greater degree of cross-linking and a quicker thixotropic effect, as a result being tri-functional and highly branched.

JEFFSOL® carbonates

Huntsman has developed a range of carbonates which can be used in the polyurethane industry. JEFFSOL® PC propylene carbonate acts as a solvent for both isocyanate and polyols. It can be used as a compatibiliser for systems, as an effective viscosity depressant, or as cleaning solvent.

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About Huntsman

Huntsman Corporation is a publicly traded global manufacturer and marketer of differentiated and specialty chemicals with 2023 revenues of approximately $6 billion. Our chemical products number in the thousands and are sold worldwide to manufacturers serving a broad and diverse range of consumer and industrial end markets. We operate more than 60 manufacturing, R&D and operations facilities in approximately 25 countries and employ approximately 6,000 associates within our continuing operations. For more information about Huntsman, please visit the company's website at www.huntsman.com.

Huntsman Performance Products

Performance Products brings together innovation and world-leading process technologies to produce components used to formulate products that enhance people's lives. Our leading global positions in the manufacture and sale of amines, maleic anhydride and carbonates enable us to serve diverse consumer and industrial end markets, including energy, automotive and transportation, coatings and adhesives, construction and infrastructure, electronics, and industrial manufacturing. With 10 manufacturing facilities in North America, Europe, the Middle East and Asia, we produce and sell over 250 products to over 850 global customers, and provide extensive technical service support. The division had 2023 revenues of USD 1.2 billion.

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