

Technical Bulletin

JEFFLINK[®] 136 Diamine

JEFFLINK[®] 136 diamine, is a cycloaliphatic bis(secondary amine) chain extender for light-stable polyurea, polyurethane and hybrid spray elastomer and coating systems where a slower reaction of amines is desirable.

APPLICATIONS

- In light-stable aliphatic polyurea and polyurethane systems as slow reactivity chain extender
- In aromatic polyurea and polyurethane systems to partially, or completely, replace traditional secondary aromatic diamine chain extenders
- In the B-component mostly used in combination with JEFFAMINE[®] polyetheramines

BENEFITS

- Low viscosity and low colour liquid. Low odour.
- Improved controlled cure-rate with isocyanates: extended gel time but with short tack-free time, allowing for faster film property development
- The extended gel time provides improved processability (flow, levelling), which improves the adhesion and allows for the production of smooth coating surfaces
- Provides good colour and UV stability of the coating
- Provides good physical properties
- Low equivalent weight
- Moisture insensitive

SALES SPECIFICATIONS

<u>Property</u>	<u>Specifications</u>	<u>Test Method*</u>
Appearance	Clear and substantially free of suspended matter	ST-30.1
Colour, Pt-Co	60 max.	ST-30.12
Total amine content, meq/g	6.95 - 7.3	ST-5.22
Primary amine, %	5 max.	ST-5.34
Water, wt. %	0.2 max.	ST-31.53, 6

*Methods of Test are available from Huntsman Corporation upon request.

ADDITIONAL INFORMATION

Regulatory Information

Classification	Amines, liquid, corrosive, N.O.S (alicyclic amine)
CAS Number	90530-15-7
Europe, EC Number	292-053-3

Typical Physical Properties

Amine equivalent weight, g/eq	~ 139
Viscosity, mPa.s, 25 °C (77 °F)	1000
Density, g/ml (lb/gal), 25 °C	0.99 (8.26)
Flash point, PMCC, °C (°F)	> 100 (212)
Boiling range, °C (°F)	> 200 (>392)
pH	8.5-11
Vapour pressure, mmHg (hPa), 50 °C	3.75 (5)

Table 1: Performance Properties of JEFFLINK® 136 Diamine Chain Extender and Other Typical Aliphatic Chain Extenders in an Aliphatic Polyurea Spray Formulation

Formulation, pbw (parts by weight)	1	2	3	4
A-side				
IPDI-JEFFAMINE® SD-2001 amine ¹ quasi-prepolymer, 16% NCO	100	100	100	100
B-side				
JEFFAMINE® T-3000 amine	60	60	60	50
JEFFAMINE® T-403 amine	4	4	4	4
JEFFAMINE® D-400 amine				6
JEFFLINK® 136 diamine	36			
JEFFLINK® 754 diamine		36		
PolyClear™ 136 / Baxxodur™ PC136 extender			36	
Clearlink® 1000 extender				40
Ratio iso/amine v/v	1:1	1:1	1:1	1:1
Index	117	110	117	114
Spray gel, seconds	13.5-14.5	5-6.5	13-14	9.5-11.5
Tack free, seconds	68-72	150-160	64-70	70-84
Surface appearance	Smooth	Textured	Smooth	Smooth
Surface gloss 20°/60°	85/85	56/55	85/85	85/85
Tensile strength at break, MPa (psi)	18.2 (2645)	12.3 (1780)	18.8 (2730)	17.8 (2590)
Elongation at break, %	477	444	466	438
Tear strength, N/mm (lb _f /in)	83.4 (477)	57.2 (327)	80.3 (459)	89.9 (514)
Shore D hardness (10 sec) ²	48	35	46	46
Thickness, mm (mil)	2.6 (104)	3.5 (140)	2.5 (98)	2.3 (91)
Taber abrasion (H18, 1kg, 1000 cycles), mg	393	414	419	337
% Water absorption after 1 days ³	2.1	1.7	2.4	1.5
% Water absorption after 7 days ³	3.2	2.2	3.1	2.1

¹ JEFFAMINE® SD-2001 amine is a semi-commercial product.

² Hardness determination reading is made 10 seconds after the presser foot is in contact with the specimen.

³ Specimen were aged and conditioned for 7 days prior to immersion in dionized water.

Table 2: Performance Properties of JEFFLINK® 136 Diamine Chain Extender and Other Typical Aromatic Chain Extenders in an Aromatic Polyurea Spray Formulation

Formulation, pbw (parts by weight)	1	2	3	4
A-side				
SUPRASEC® 2054 isocyanate, 15% NCO	100	100	100	100
B-side				
JEFFAMINE® D-2000 amine	52	52	52.5	50
DETDA extender	16	16	15.5	10
UNILINK® 4200 extender	16	11	5	-
JEFFLINK® 136 diamine	-	5	11	24
Pigment paste (60% TiO ₂ in D-2000)	16	16	16	16
Ratio iso/amine 1/1 v/v	1:1	1:1	1:1	1:1
Index	109	109	109	109
Spray gel, seconds	6	5	4	2
Tack free, seconds	9	9	9	3-4
Tensile strength at break, MPa (psi)	24.2 (3510)	23.8 (3450)	19.9 (2890)	19.2 (2785)
Elongation at break, %	365	363	387	450
Angle tear strength, N/mm (lb _f /in)	76.1 (435)	82.7 (472)	82.9 (474)	74.1 (423)
Shore A hardness (10 sec) ¹	97	98	98	98
Shore D hardness (10 sec) ¹	49	50	49	47
Taber abrasion (H18, 1kg, 1000 cycles), mg	220	180	240	150

¹ Hardness determination reading is made 10 seconds after the presser foot is in contact with the specimen.

TOXICITY AND SAFETY

JEFFLINK® 136 diamine should be considered hazardous, having the potential to cause severe burns to the skin and damage to eyes and to be harmful if inhaled or swallowed. Chemical type goggles with face shield and chemical resistant, impervious, gloves must be worn when handling this product. When handling large quantities subject to splashes and spills, impervious suits and rubber boots must also be worn.

Should accidental contact occur, flush the eyes thoroughly with water for at least 15 minutes and get immediate medical attention. In case of skin contact, immediately wash the exposed area with soap and plenty of water. If drenched, remove any contaminated clothing under a safety shower. Wash clothing before further use. In normal operations, the vapour pressure of this product is sufficiently low, such that significant concentrations would not be present in the work-place atmosphere. However, supplied air respiratory protection is recommended for cleaning up large spills, or for entry into confined spaces. For additional information on the toxicity and safe handling of this product, consult the Material Safety Data Sheet (Safety Data Sheet in Europe) prior to use of this product.

HANDLING AND STORAGE

JEFFLINK[®] 136 diamine may be stored under air at ambient temperatures for extended periods. A nitrogen blanket is suggested for all storage, however, to reduce the effect of accidental exposure to high temperatures and to reduce the absorption of atmospheric moisture and carbon dioxide.

Cleanout of lines and equipment containing JEFFLINK[®] 136 diamine can be accomplished using warm water and steam. In the event of spillage of this product, the area may be flushed with water. The proper method for disposal of waste material is by incineration with strict observance of all federal, state, and local regulations.

AVAILABILITY

JEFFLINK[®] 136 diamine is available in research samples, and in 202 L (55-gallon) drums of 200 kg (440 pounds) net weight. Samples are available in North America and Asia by contacting our sample department at 1-800-662-0924. Samples in other locations, including Europe, are available by contacting any Huntsman Corporation sales office.

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