

## Technical Data Sheet

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### EPIKURE™ Curing Agent 3164

#### Product Description

EPIKURE™ Curing Agent 3164 is a proprietary oligomeric polyamine curing agent for structural applications. Epoxy resins cured with EPIKURE Curing Agent 3164 can produce films, castings, or adhesive joints with a high degree of toughness and flexibility.

#### Benefits

- Imparts highly flexible properties
- Improved toughness compared to conventional polyamines
- Improved combinations of elongation, strength, modulus, abrasion resistance, and tear resistance in comparison with those given by other "flexibilizing" curing agents
- Strong low temperature properties of cured formulations
- Good adhesion to a variety of substrates
- Resistant to surface blush and amine exudates
- Useful as formulating tool in blending with other curing agents to impart desired properties

#### Sales Specification

Property	Units	Value	Test Method/Standard
Amine value	mg/g	230-250	ASTM D2896
Viscosity at 25°C	cP	7,000-11,000	ASTM D2196
Color	Gardner	12	ASTM D1544

#### Typical Properties

Property	Units	Value	Test Method/Standard
Equivalent weight	AHEW	256	
Density	lbs/gal	8.2	ASTM D1475
Flash point, Setflash	°F	>200	

#### General Information

EPIKURE Curing Agent 3164 is a proprietary oligomeric polyamine curing agent designed for use with epoxy resins to produce films, castings or adhesive joints with a high degree of toughness and flexibility. It is supplied as a solvent-free liquid.

The superior toughness and flexibility provided by EPIKURE Curing Agent 3164 in comparison with standard "polyamide" curing agents such as EPIKURE Curing Agent 3125, as well as a selection of other curing agents for "flexible" or "toughened" epoxy systems, is apparent from a comparison of Tables 1 and 2. This toughness and flexibility is achievable over a wide stoichiometric range. Some chemical resistance data for systems cured with EPIKURE Curing Agent 3164 are also shown in Table 2.

**Performance Properties**

Table 1 / **Properties of systems cured with EPIKURE Curing Agent 3125 and other "Flexibilizing" curing agents**

<b>Composition</b>	<b>Method</b>	<b>Units</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Resin											
EPON™ Resin 828										80	75
EPON Resin 8132							80				
EPON Resin 58134			100	100	100	100		100	100		
EPON Resin 58034										20	
HELOXY™ Modifier 61							20				
HELOXY Modifier 505											25
Curing agent											
EPIKURE Curing Agent 3125 <sup>1</sup>			67	114	200	275	180				
EPIKURE Curing Agent 3055									42		
EPIKURE Curing Agent 3072										32	
EPIKURE Curing Agent 3046											42
EPIKURE Curing Agent 3266								133			

**Handling Properties @ 25°C**

Viscosity, Resin	cP	600	600	600	600	600	600	45,000	6,775	2,340	
Viscosity, Curing agent	cP							500	225	700	200
Gel Time, 100 gram mass	min.							133	49	245	

**Mechanical properties @ 25 °C<sup>2</sup>**

Tensile Strength	D638	psi	4,350	2,610	99	25	308	168	6,666	7,674	5,646
Tensile Elongation at break		%	13	98	111	208	121	149	5.1	3.4	15
Tensile Modulus		ksi	251	44	0.16	0.04	0.36	154	313	346	253
Tear strength	D624	lb/in	97	399	35	13	157	74	103	109	106
Izod impact, notched	D256	lb/in						10.7	0.6	0.6	0.8
Lap shear strength		psi <sup>3</sup>									
Al-Al, 7 days ambient cure								1,032	1,831	550	1,524
Al-Al, 16 hr amb + 2 hr at 100 °C								1,615	1,833	866	2,625
Oily steel, 7 days ambient cure								1,166	1,617	599	1,589
Oily steel, 16 hr amb + 2 hr at 100 °C								2,130	1,608	774	2,233

<sup>1</sup>Viscosity 10,000 cP, ASTM D 445 at 40 °C.

<sup>2</sup>Systems cured 24 hours at 25 °C plus 2 hours at 100 °C.

<sup>3</sup>ASTM D 1002

Table 2/ **Properties of EPON Resins 828 and 815C cured with EPIKURE Curing Agent 3164 and EPIKURE Curing Agent 3163**

<b>Composition</b>	<b>Method</b>	<b>Units</b>	<b><u>1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>
EPON Resin 828			100		100	
EPON Resin 815C				100		100
EPIKURE Curing Agent 3163			195	198		
EPIKURE Curing Agent 3164					136	138

**Handling Properties @ 25°C**

Viscosity, Resin	cP	12,500	600	12,500	600
Viscosity, Curing agent	cP	145,000	145,000	8,200	8,200
Viscosity, Blend	cP	92,000	30,500	8,400	3,900
Gel Time, 100 gram mass	min.	45	53	49	82

**Mechanical properties @ 25 °C<sup>1</sup>**

Tensile Strength	D638	psi	4,354	1,470	3,782	332
Tensile Elongation at break		%	169	240	189	260
Tensile Modulus		psi	218,000	8,112	213,000	168
Tear strength	D624	lb/in	934	521	1017	153
Taber abrasion		mg loss/ 1000 cycles	33	49	29	37
Izod impact, notch		ft-lb/in	0.8	23.0	1.4	19.6
Izod impact, un-notch	D256	ft-lb/in	11.6	Did Not Break	15.2	Did Not Break
Hardness, Shore D		24 hrs	66	38	24	–
		2 days	68	43	52	6
		7 days	72	57	72	42
<b>Lap shear strength</b>						
Al-Al, 7 days ambient cure		psi <sup>2</sup>	1,160	1,608	1,002	951
Al-Al, 16 hr amb + 2 hr at 100 °C		psi <sup>2</sup>	3,068	2,060	3,003	932
Oily steel, 7 days ambient cure		psi <sup>2</sup>	732	1,303	653	843
Oily steel, 16 hr amb + 2 hr at 100 °C		psi <sup>2</sup>	2,598	1,854	2,189	936
Peel strength <sup>3</sup> Alum-Alum		lb/in	14	9.4	8.8	9.5
Water resistance		24 hrs	1.00	1.81	0.42	1.01
		7 days	2.90	4.81	1.40	2.56

<sup>1</sup>Systems cured 24 hours at 25 °C plus 2 hours at 100 °C.

<sup>2</sup>ASTM D 1002

<sup>3</sup>ASTM D 1867, 180 (Peel Adhesion, 20 inches/minute)

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Available in bulk and drum quantities.

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