

product **bulletin**

EPI-CURE™ Curing Agent 3164*

Introduction

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

Features

- 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 exudate
- Useful as formulating tool in blending with other curing agents to impart desired properties

Typical Properties

The properties below are typical values and are not to be construed as sales specifications.

Amine hydrogen equivalent weight (AHEW)	256
Amine value	230 - 250
Viscosity, cP, 25 °C	7,000 - 12,000
Color, Gardner	<12
Density, (lb/gal)	8.2
Flash point, Setaflash, °F	>200

General Information

EPI-CURE 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.



RESOLUTION

PERFORMANCE PRODUCTS

*Formerly Epoxy Research Curing Agent RSC-2728, also formerly Developmental Curing Agent DPC-3164.

General Information (cont.)

The superior toughness and flexibility provided by EPI-CURE Curing Agent 3164 in comparison with standard "polyamide" curing agents such as EPI-CURE 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 EPI-CURE Curing Agent 3164 are also shown in Table 2.

Table 1/Properties of systems cured with EPI-CURE™ Curing Agent 3125 and other "Flexibilizing" curing agents (comparative data)

Composition (parts by weight)	1	2	3	4	5	6	7	8	9
Resin									
EPON™ Resin 828					80			80	75
EPON Resin 8132	100	100	100	100		100			
EPON Resin 58134							100		
EPON Resin 58034								20	
HELOXY™ Modifier 61					20				
HELOXY Modifier 505									25
Curing agent									
EPI-CURE™ Curing Agent 3125 ¹	67	114	200	275	180				
EPI-CURE Curing Agent 3055							42		
EPI-CURE Curing Agent 3072								32	
EPI-CURE Curing Agent 3046									42
EPI-CURE Curing Agent 3266						133			
Handling properties at 25 °C									
Resin viscosity, cP	600	600	600	600	600	600	45,000	6,775	2,340
Curing agent viscosity, cP						500	225	700	200
Gel time, min, 100 gram mass							133	49	245
Mechanical properties at 25 °C²									
Tensile strength, 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, x10 ³ psi	251	44	0.16	0.04	0.36	154	313	346	253
Tear strength, lb/in	97	399	35	13	157	74	103	109	106
Notched Izod impact, lb/in					10.7		0.6	0.6	0.8
Lap shear strength, psi³									
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

¹Viscosity 10,000 cP, ASTM D 445 at 40 °C.

²Systems cured 24 hours at 25 °C plus 2 hours at 100 °C.

³ASTM D 1002

Table 2/Properties of EPON™ Resins 828 and 815C cured with EPI-CURE Curing Agent 3164 and EPI-CURE Curing Agent 3163

Composition (parts by weight)	1	2	3	4
EPON™ Resin 828	100		100	
EPON Resin 815C		100		100
EPI-CURE™ 3163	195	198		
EPI-CURE 3164			136	138
Handling properties at 25 °C				
Resin viscosity, cP	12,500	600	12,500	600
Curing agent viscosity, cP	145,000	145,000	8,200	8,200
Blend viscosity, cP	92,000	30,500	8,400	3,900
Gel time, 100 gr, min	45	53	49	82
Mechanical properties at 25 °C¹				
Tensile strength, 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, lb/in	934	521	1017	153
Taber abrasion, mg loss/1000 cycles	33	49	29	37
Izod impact, ft-lb/in notch	0.8	23.0	1.4	19.6
Izod impact, ft-lb/in un-notch	11.6	Did Not Break	15.2	Did Not Break
Shore "D" hardness, 24 Hrs	66	38	24	–
2 Days	68	43	52	6
7 Days	72	57	72	42
Lap shear strength, psi²				
Al-Al, 7 days ambient cure	1,160	1,608	1,002	951
Al-Al, 16 hr amb + 2 hr at 100 °C	3,068	2,060	3,003	932
Oily Steel, 7 days ambient cure	732	1,303	653	843
Oily Steel, 16 hr amb + 2 hr at 100 °C	2,598	1,854	2,189	936
Peel strength,³ 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

¹Systems cured 24 hours at 25 °C plus 2 hours at 100 °C.

²ASTM D 1002

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

Storage

Although stable at room temperature in an unopened container, this material will become darker in color with exposure to the atmosphere.

Resolution Performance Products

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