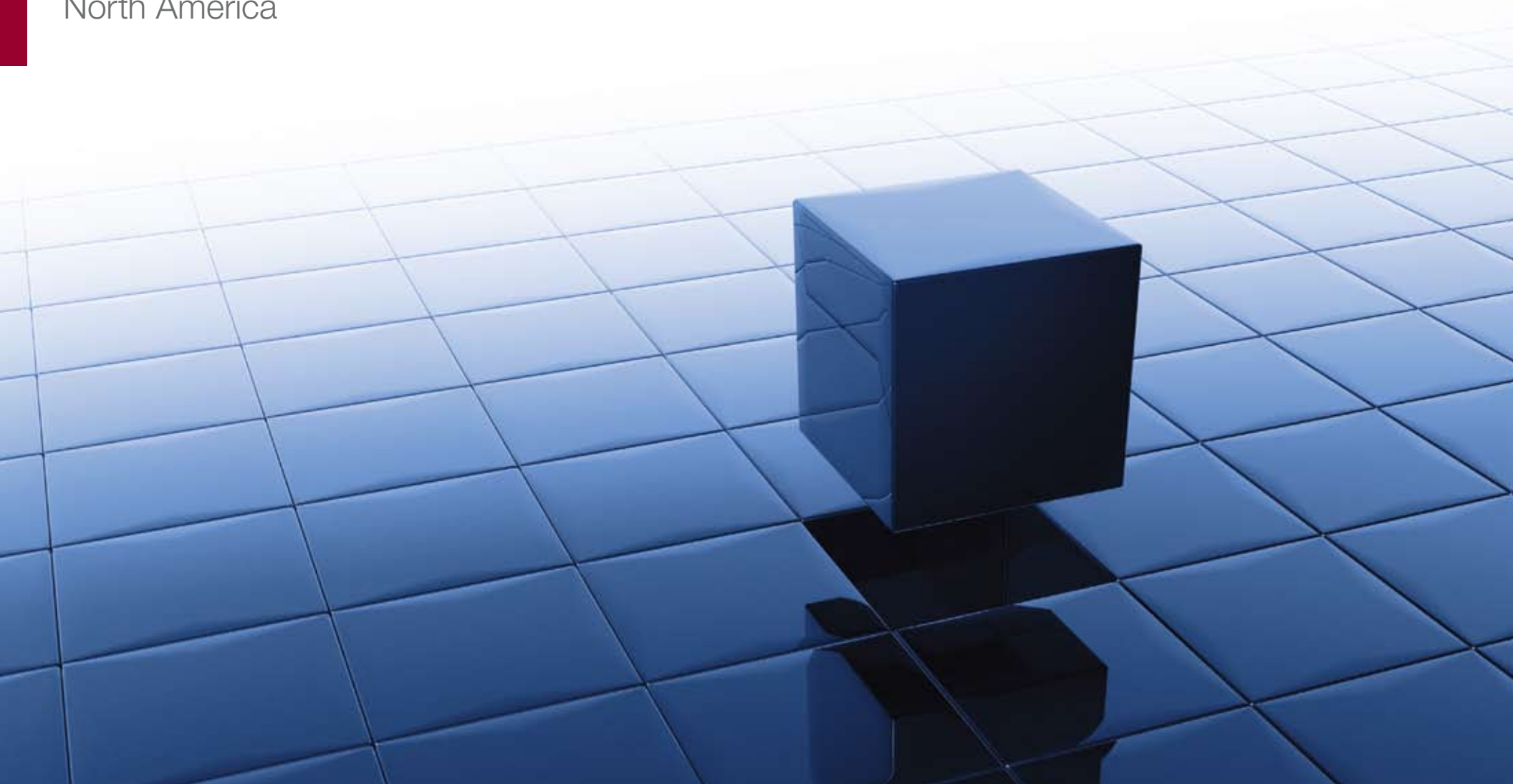
HUNTSMAN

Enriching lives through innovation

Advanced Materials

High Performance Components

North America



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Introduction

Huntsman is a world-leading producer of thermoset resins for the structural composite, adhesive, electronic, coating and construction markets. The thermoset resin chemistries offered by Huntsman include epoxy resins, epoxy reactive diluents, curing agents and crosslinkers for epoxy resins, benzoxazines, cyanate esters, polyimides and bismaleimides. Typical service temperatures for these products can range from room temperature to as high as 350°C.

The Araldite® and Tactix® epoxy resins produced by Huntsman are supplied in a range of viscosities, functionalities and epoxy equivalent weight for a wide range of industrial applications. Araldite® epoxy resins are typically based on bisphenol-A, bisphenol-F, tetrabromobisphenol-A, phenol novolacs, cresol novolacs, amino phenol, methylene dianiline and isocyanuric acid. Tactix® epoxy resins are based on bisphenol-A, tri(hydroxyphenyl) methane and dicyclopentadiene.

The maximum achievable cured Tg and the temperature range required to achieve a viscosity of 1,000 cP are shown in the figures below for various types of resins.

Aradur® curing agents are supplied in liquid or solid form and can be used in conjunction with all the epoxy resins to achieve a broad range of thermal, mechanical and electrical properties. Aradur® curing agents may be based on polyamides, aliphatic amines, cycloaliphatic amines, aromatic amines, anhydrides and novolacs.

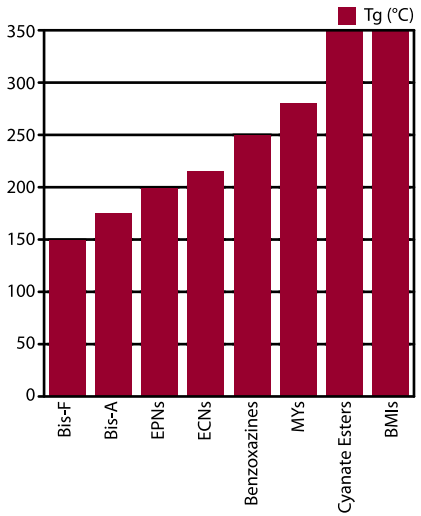
The figures below compare the Tg and the cure temperature of various types of Aradur® curing agents when used with a bisphenol-A based liquid epoxy resin (i.e. Araldite® GY 6010 resin).

AroCy® cyanate ester resins can provide high glass transition temperature (Tg = 170 – 350°C), low water absorption and low dielectric properties. They are typically used in aerospace applications, high-speed circuit boards, electronic chip adhesives and encapsulants, and syntactic foams. AroCy® cyanate ester resins are based on bisphenol-E, bisphenol-M or phenol novolac.

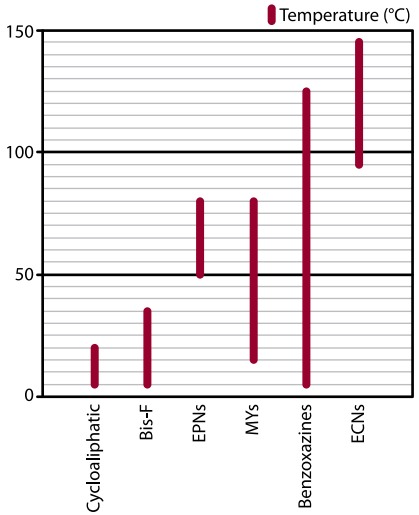
Kerimid® and Matrimid® resin systems provide outstanding heat performance (Tg = 220 – 350°C), excellent mechanical properties at both ambient and elevated temperatures, and low coefficient of thermal expansion. They are typically used for aerospace structures, high-speed circuit board substrates and high-performance adhesives. Kerimid® and Matrimid® resins are based on polyimide and bismaleimide chemistries.

Araldite® benzoxazine resins represent a new addition to the comprehensive Huntsman product offering for advanced composites and high-performance coating systems. Araldite® benzoxazine resins can provide some unique combinations of thermal, mechanical and electrical properties.

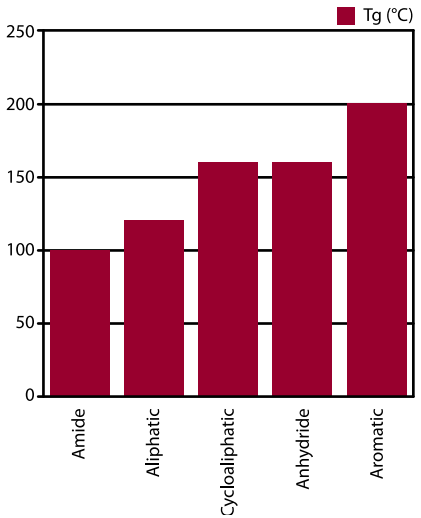
Resin Tg (Data)



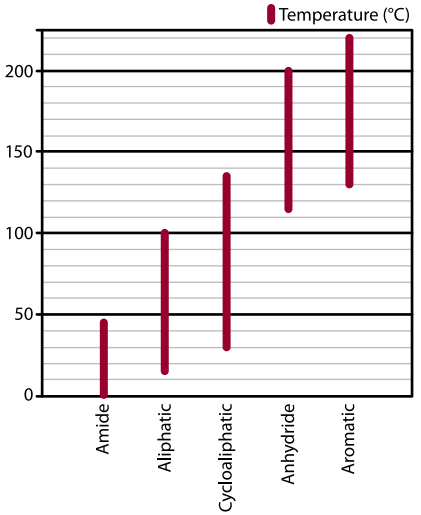
Temperature for 1,000 cp Overview



Hardener Tg Overview with Araldite® GY 6010



Hardener Curing Temperature Overview



Section 1

Bisphenol-A Based Epoxy Resins

1.1 – Unmodified Liquid Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm3)]	Color [Gardner]	Comments/Applications
Araldite® GY 2600	11,000 – 14,000	184 – 188	9.8 (1.17)	≤ 1	Unmodified bisphenol-A based liquid epoxy resin. For use in automotive coatings or other applications requiring an epoxy resin with a low hydrolyzable chlorine content.
Araldite® GY 6010	11,000 – 14,000	182 – 192	9.8 (1.17)	≤ 1	Standard bisphenol-A based liquid epoxy resin.
Araldite® GY 6020	16,000 – 20,000	185 – 200	9.8 (1.17)	≤ 1	High-viscosity bisphenol-A based liquid epoxy resin.
Araldite® MY 790-1	4,000 – 5,500	170 – 175	9.8 (1.17)	≤ 1	Distilled bisphenol-A based liquid epoxy resin, with very low chloride content.
Araldite® LY 1556	11,000 – 13,000	182 – 192	1.17	≤ 1	Liquid bisphenol-A epoxy resin for composite systems.
Tactix® 123	4,400 – 5,600	172 – 176	9.8 (1.17)	≤ 1	High-purity, low-viscosity bisphenol-A based liquid epoxy resin.

1.2 – Modified Liquid Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [Gardner]	Comments/Applications
Araldite® GY 502	2,100 – 3,600	222 – 238	9.4 (1.13)	≤ 3	Bisphenol-A liquid epoxy resin modified with dibutyl phthalate.
Araldite® GY 506	500 – 700	175 – 189	9.4 (1.13)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 507	500 – 700	180 – 192	9.5 (1.14)	≤ 3	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 508	2,000 – 5,000	390 – 425	9.4 (1.13)	≤ 5	Bisphenol-A liquid epoxy resin modified with a difunctional reactive diluent.
Araldite® GY 509	500 – 700	189 – 200	9.3 (1.12)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 512	900-1,150	178-190	9.7 (1.16)	≤ 3	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 6004	5,000 – 6,800	178 – 196	9.7 (1.16)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.

Section 1

Bisphenol-A Based Epoxy Resins *(continued)*

1.2 – Modified Liquid Epoxy Resins *(continued)*

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [Gardner]	Comments/Applications
Araldite® GY 6005	7,500 – 9,500	182 – 196	9.7 (1.16)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9413	600 – 900	195 – 205	9.2 (1.10)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9513	525 – 675	196 – 205	9.1 (1.09)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9580	1,600 – 2,000	188 – 198	9.2 (1.10)	≤ 3	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9613	2,100 – 2,500	188 – 197	9.4 (1.13)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9615	3,100 – 3,900	188 – 200	9.2 (1.10)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent.
Araldite® GY 9667	500 – 700	196 – 212	9.2 (1.10)	≤ 1	Bisphenol-A liquid epoxy resin modified with a monofunctional reactive diluent with low tendency to crystallize.
Araldite® LY 1564	1,200 – 1,400	161 – 173	9.6 (1.15)	≤ 2	Modified low viscosity bisphenol-A based liquid epoxy resin for filament winding and resin transfer molding applications.

1.3 – Unmodified Solid Epoxy Resins

Product	Softening Point [ºC]	Epoxide Eq. Weight [EEW, g/eq]	Melt Viscosity @ 150°C, [cP]	Color [1] [Gardner]	Comments/Applications
Araldite® CT 6060	60 – 75	450 – 530	D – G [2]	≤ 2	Semi solid unmodified bisphenol-A based epoxy resin. For use in casting, electrical encapsulating, laminating and adhesives applications.
Araldite® GT 6063	90 – 97	640 – 730	1,500 – 3,400	≤ 1	Unmodified bisphenol-A solid epoxy resin. Specifically designed for powder coatings. Exceptional flow and leveling.
Araldite® GT 6084	95 – 105	875 – 1,025	R – T [2]	N/A	Solid bisphenol-A based epoxy resin designed for the production of epoxy esters.

[1] At 25°C, 40% in butylcarbitol
[2] Gardner Holdt Viscosity, 40% in butylcarbitol

Section 1

Bisphenol-A Based Epoxy Resins *(continued)*

1.3 – Unmodified Solid Epoxy Resins *(continued)*

Product	Softening Point [°C]	Epoxide Eq. Weight [EEW, g/eq]	Melt Viscosity @ 150°C, [cP]	Color [1] [Gardner]	Comments/Applications
Araldite® GT 6097	125 – 135	2,000 – 2,500	X – Z1 [2]	≤ 3	High molecular weight epoxy resin for use in solvent-based industrial coatings in conjunction with urea, melamine or phenolic crosslinkers. Also used to control the melt viscosity of powder coating formulations.
Araldite® GT 6243	110 – 120	1,200 – 1,400	W – Z [2]	≤ 3	High melt viscosity “6-type” solid resin. Designed for high quality industrial coatings and thick film powder coatings.
Araldite® GT 6248	75 – 85	505 – 560	800 – 1,500	≤ 1	Low molecular weight solid epoxy resin.
Araldite® GT 7013	85 – 92	650 – 725	2,200 – 3,200	≤ 1	Standard low molecular weight solid epoxy resin for epoxy / polyester hybrid and epoxy powder coatings.
Araldite® GT 7014	86 – 96	725 – 775	3,100 – 4,700	≤ 1	Low molecular weight solid epoxy resin for use in decorative powder coating applications. Improved edge coverage as compared to Araldite® GT 7013.
Araldite® GT 7071	65 – 75	450 – 530	D – G [2]	≤ 2	Unmodified “1-type” solid epoxy resin for use in solvent-borne systems.
Araldite® GT 7072	75 – 85	600 – 700	600 – 1,500	≤ 1	Low molecular weight epoxy resin. For use in conjunction with higher molecular weight epoxy resins to improve flow and leveling properties.
Araldite® GT 7074	97 – 110	935 – 1,175	3,000 – 6,000 [3]	≤ 1	Intermediate molecular weight epoxy resin for use in powder coatings with outstanding flexibility and impact resistance.
Araldite® GT 7097	113 – 123	1,500 – 2,000	W – Z [2]	≤ 3	Standard “7-type” solid epoxy resin for use in conjunction with urea-formaldehyde, melamine-formaldehyde or phenolic resoles for packaging and coil coating applications.
Araldite® GT 9013	83 – 90	650 – 725	1,600 – 2,600	≤ 1	Standard unmodified solid epoxy resin with improved flow properties as compared to Araldite® GT 7013.
Araldite® GT 9545	95 – 105	875 – 1,025	1,100 – 2,100 [3]	≤ 2	Intermediate molecular weight epoxy resin for use in powder coating formulations requiring outstanding storage stability under adverse conditions.
Araldite® GT 9654	75 – 85	500 – 562	800 – 1,800	≤ 1	“1-type” solid epoxy resin supplied in flakes. For use in ambient cure solvent-borne systems or as a modifier for standard powder coating resins.

[1] At 25°C, 40% in butylcarbitol [2] Gardner Holdt Viscosity, 40% in butylcarbitol
[3] Melt viscosity @ 175°C

1.4 – Modified Solid Epoxy Resins

Product	Softening Point [°C]	Epoxide Eq. Weight [EEW, g/eq]	Melt Viscosity @ 150°C, [cP]	Color [1] [Gardner]	Comments/Applications
Araldite® GT 6259	76 – 86	385 – 476	500 – 2,000	≤ 4	Epoxy cresol novolac modified solid epoxy resin. For use in powder coatings with good thermal and chemical resistance properties.
Araldite® GT 7220	85 – 92	500 – 546	1,000 -2,500	≤ 2	Epoxy phenol novolac modified solid epoxy resin. Improved thermal and chemical resistance properties as compared to standard unmodified bisphenol-A solid epoxy resins.
Araldite® GT 7255	106 – 113	775 – 855	2,400 – 4,000	≤ 2	Epoxy phenol novolac modified solid epoxy resin. Improved thermal and chemical resistance properties as compared to standard unmodified bisphenol-A solid epoxy resins.
Araldite® LT 1522	90 – 110	1,560 – 1,820	1,600 – 5,500 [1]	N/A	CTBN rubber modified solid epoxy resin based on bisphenol-A. For use in adhesives, prepregs, molding compounds or powder coatings.

1.5 – Epoxy Resin Solutions

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [4] [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [Gardner]	Solids Content [%]	Comments/Applications
Araldite® GZ 471 X-75	Z3 – Z5 [5]	450 – 530	9.0 (1.08)	≤ 3	74 – 76	Low molecular weight solid epoxy resin supplied at 75% non-volatiles in xylene. For formulating two-component industrial maintenance coatings.
Araldite® GZ 488 N-40	V – Y [5]	3,750 – 5,500	8.0 (0.96)	≤ 5	39 – 41	Very high molecular weight epoxy resin supplied at 40% non-volatiles in a blend of propylene glycol monomethyl ether acetate / methyl ethyl ketone / cyclohexanone. This resin provides outstanding adhesion, flexibility and toughness and is designed for formulating heat-cured industrial coatings.
Araldite® GZ 488 V-32	Y – Z2 [5]	3,750 – 5,500	8.4 (1.01)	≤ 3	31 – 33	Very high molecular weight epoxy resin supplied at 32% non-volatiles in propylene glycol monomethyl ether acetate. It provides outstanding adhesion, flexibility and toughness and is designed for formulating heat-cured industrial coatings.

[1] At 25°C, 40% in butylcarbitol
[4] On solids
[5] Gardner Holdt Viscosity

1.5 – Epoxy Resin Solutions *(continued)*

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [4] [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [Gardner]	Solids Content [%]	Comments/Applications
Araldite® GZ 540 X-90	Z4 – Z6 [5]	233 – 278	9.4 (1.13)	≤ 3	89 – 91	Liquid epoxy resin supplied at 90% non-volatiles in xylene. For formulating high solids, two-component architectural and industrial maintenance coatings.
Araldite® GZ 571 KX-75	Z1 – Z4 [5]	450 – 530	9.0 (1.08)	≤ 3	74 – 76	Low molecular weight solid epoxy resin supplied at 75% non-volatiles in xylene / methyl isobutyl ketone. For formulating two-component industrial maintenance coatings.
Araldite® GZ 571 T-75	Z2 – Z4 [5]	450 – 530	9.1 (1.09)	≤ 5	74 – 76	Low molecular weight solid epoxy resin supplied at 75% non-volatiles in toluene. For formulating two-component industrial maintenance coatings.
Araldite® GZ 6097 PM-55	Z4 – Z7 [5]	2,000 – 2,500	9.1 (1.09)	≤ 3	54 – 56	High molecular weight solid epoxy resin supplied at 55% non-volatiles in propylene glycol monomethyl ether acetate. For the formulation of heat-cured industrial coatings in combination with urea, melamine or phenolic based crosslinkers.
Araldite® GZ 7071 OX-65	V – X [5]	455-525	8.8 (1.05)	≤ 2	64 – 66	Low molecular weight solid epoxy resin supplied at 75% non-volatiles in Aromatic 100 / xylene. For the formulation of two-component industrial maintenance coatings.
Araldite® GZ 7071 PM-75	Z4 – Z6 [5]	450 – 575	9.1 (1.09)	≤ 3	74 – 76	Low molecular weight solid epoxy resin supplied at 75% non-volatiles in propylene glycol monometheyl ether. For the formulation of two-component industrial maintenance coatings.
Araldite® GZ 7488 V-40	3,000 – 6,000	> 6,600	8.4 (1.01)	≤ 4	39 – 41	Very high molecular weight epoxy resin supplied at 40% non-volatiles in propylene glycol monomethyl ether acetate. For use in the formulation of heat-cured industrial coatings with outstanding adhesion, flexibility and toughness.
Araldite® GZ 9625 W-90	Z2 – Z6 [5]	230 – 280	9.2 (1.10)	≤ 3	89 – 91	Liquid epoxy resin supplied at 90% non-volatiles in n-butanol. General purpose epoxy resin solution for the formulation of ambient cure, two-component epoxy systems.
Araldite® GZ 9749 OX 65	T – V [5]	450 – 500	8.8 (1.05)	≤ 2	64 – 66	Low molecular weight solid epoxy resin supplied at 65% non-volatiles in Aromatic 100 / propylene glycol monomethyl ether.

[4] On solids
[5] Gardner Holdt Viscosity

Section 2

Bisphenol-F Based Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [1] [Gardner]	Comments/Applications
Araldite® GY 281	5,000 – 7,000	159 – 172	10.0 (1.20)	≤ 4	Unmodified bisphenol-F based liquid epoxy resin. Offers better chemical resistance (to organic solvents in particular) than standard bisphenol-A based liquid epoxy resin.
Araldite® GY 282	3,300 – 4,100	164 – 172	9.9 (1.19)	≤ 2	Medium-viscosity unmodified bisphenol-F based liquid epoxy resin. For use in adhesives, filament winding, casting, pultrusion, RTM, coatings and construction applications.
Araldite® GY 285	2,000 – 3,000	164 – 172	9.9 (1.19)	≤ 5	Low-viscosity unmodified bisphenol-F based liquid epoxy resin. For use in adhesives, filament winding, casting, pultrusion, RTM, coatings and construction applications.
Araldite® PY 306	1,200 – 1,600	156 – 167	10.0 (1.20)	≤ 1	High-purity, low-viscosity unmodified bisphenol-F based liquid epoxy resin. For use in adhesives, filament winding, casting, pultrusion, RTM, electrical and electronic applications.
Araldite® PY 302-2	6,500 – 8,000	170 – 177	9.8 (1.17)	≤ 3	Non-crystallizing bisphenol-A/F based liquid epoxy resin blend. For use in ambient-cure coating and construction applications.
Araldite® PY 313	850 – 1,150	180 – 192	9.6 (1.15)	≤ 2	Non-crystallizing bisphenol-A/F based liquid epoxy resin blend modified with a monofunctional reactive diluent. For use in coating and construction applications.

[1] At 25°C, 40% in butylcarbitol

Section 3

Multifunctional Epoxy Resins

3.1 – Epoxy Phenol Novolacs (EPN)

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Color [Gardner]	Comments/Applications
Araldite® EPN 1138	20,000 – 50,000 [7]	175 – 182	10.2 (1.22)	≤ 2	Epoxy phenol novolac with high functionality. Suitable for applications such as coatings, filament winding, casting and pultrusion applications where superior heat and chemical resistance are required.
Araldite® EPN 1138 MAK-80	600 – 1,200	175 – 181	9.2 (1.10)	≤ 2	Araldite® EPN 1138 solution supplied at 80% non-volatiles in methyl n-amyl ketone. For applications requiring heat and chemical resistance.
Araldite® EPN 1138 N-85	600 – 1,600	175-181	9.2 (1.10)	≤ 2	Araldite® EPN 1138 supplied at 85% non-volatiles in methyl ethyl ketone.
Araldite® EPN 1139	1,100-1,700 [7]	172 – 179	10.2 (1.22)	≤ 2	Epoxy phenol novolac suitable for coatings, filament winding, casting and pultrusion applications.
Araldite® EPN 1179	1,100 – 1,700 [7]	172 – 179	10.0 (1.20)	≤ 3	Epoxy phenol novolac suitable for coatings, filament winding, casting and pultrusion applications.
Araldite® EPN 1180	20,000 – 50,000 [7]	175 – 182	10.0 (1.20)	≤ 2	Epoxy phenol novolac with high functionality. Suitable for use in coatings, filament winding, casting and pultrusion applications where superior heat and chemical resistance are required.
Araldite® EPN 1180 X-80	1,200 – 2,000	175 – 182	9.8 (1.18)	≤ 2	Araldite® EPN 1180 supplied at 80% non-volatiles in xylene. For coating applications requiring high heat and chemical resistance.
Araldite® EPN 9850	20,000 – 26,000	168 – 178	10.0 (1.20)	≤ 3	Low-viscosity epoxy phenol novolac resin specifically designed for the formulation of ambient cure high solids and solvent free coatings and floorings with good heat and chemical resistance.
Araldite® EPN 9880	18,000-25,000 [7]	171 – 185	10.0 (1.20)	≤ 5	Modified epoxy phenol novolac resin for use in chemical resistant lining and coating applications.
Araldite® EPN 9881	7,500-9,500 [7]	175 – 185	10.0 (1.20)	≤ 5	Modified epoxy phenol novolac resin for use in chemical resistant lining and coating applications.

[7] At 52°C

3.1 – Epoxy Phenol Novolacs (EPN) *(continued)*

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Color [Gardner]	Comments/Applications
Araldite® GY 289	7,000 – 11,000	167 – 175	9.9 (1.19)	≤ 5	Low-viscosity epoxy phenol novolac designed for the formulation of high solids or solvent-free chemical resistant coatings and linings.
Araldite® PY 307-1	30,000 – 50,000	169 – 179	10.0 (1.20)	≤ 4	Epoxy phenol novolac resin suitable for the formulation of protective coatings with good heat, solvent and chemical resistance. Also suitable for filament winding, casting and pultrusion applications.

3.2 – Epoxy Cresol Novolacs (ECN)

Product	Softening Point [ºC]	Epoxide Eq. Weight [EEW, g/eq]	Melt Viscosity @ 150ºC, [cP]	Color [1] [Gardner]	Comments/Applications
Araldite® ECN 1273	68 – 78	217 – 233	400 – 800	≤ 6	Epoxy cresol novolac with a functionality of 4.8. For high-temperature adhesives, electrical and laminating products.
Araldite® ECN 1280	75 – 85	213 – 233	800 – 1,400	≤ 6	Epoxy cresol novolac with a functionality of 5.1. For high-temperature adhesives, coatings, electrical and laminating products. Suitable for use in combination with an unmodified solid bisphenol-A epoxy resin in powder coating formulations to improve chemical and scratch resistance.
Araldite® ECN 1299	85 – 100	217 – 244	1,400 – 4,000	≤ 6	Epoxy cresol novolac with functionality of 5.4; highest melting ECN. Suitable for the formulation of powder coatings systems with high temperature and chemical resistance.
Araldite® ECN 9511	32 – 42	200 – 227	N/A	≤ 7	Epoxy cresol novolac with functionality of 2.7.

[1] At 25°C, 40% in butylcarbitol

3.3 – Glycidyl Amines Based Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Comments/Applications
Araldite® MY 0500	2,000 – 5,000	105 – 115	Trifunctional epoxy resin based on para-aminophenol. Performance additive for bisphenol-A resins. For use in rapid-cure adhesives, laminates, or other structural composite applications requiring high-heat deflection temperature.
Araldite® MY 0510	550 – 850	95 – 107	High-purity, low-viscosity trifunctional epoxy resin based on para-amino phenol. Improved stability. Enhances the performance of bisphenol-A resin. For use in rapid-cure adhesives, laminates, or other structural composite applications requiring high-heat deflection temperature.
Araldite® MY 0600	7,000 – 13,000	102 – 110	Trifunctional epoxy resin based on meta-aminophenol. For use in adhesives, laminates or other structural composite applications requiring high-modulus, high hot-wet performance and toughness.
Araldite® MY 0610	1,000 – 6,000	95 – 102	High-purity, low-viscosity trifunctional epoxy resin based on meta-aminophenol. For use in adhesives, laminates or other structural composite applications requiring high-modulus, high hot-wet performance and toughness.
Araldite® MY 720	7,000 – 19,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline. Excellent high temperature, chemical and radiation resistance. Used for high-performance structural composites, adhesives, laminates and high energy radiation resistant compound.
Araldite® MY 721	3,000 – 6,000 [8]	111 – 117	Tetra-functional epoxy resin based on methylene dianiline.
Araldite® MY 725	1,500 – 2,500 [8]	105 – 117	Lowest viscosity, tetrafunctional epoxy resin based on methylene dianiline. Used for high-performance composites, adhesives, laminates and high-energy radiation resistant components.
Araldite® MY 9512	11,000 – 13,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline.
Araldite® MY 9612	10,000 – 12,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline.
Araldite® MY 9634	13,000 – 15,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline.
Araldite® MY 9655	7,000 – 10,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline.
Araldite® MY 9663	17,000 – 19,000 [8]	117 – 134	Tetra-functional epoxy based on methylene dianiline.

[8] At 50°C

3.4 – Miscellaneous Multifunctional Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Comments/Applications
Araldite® MY 0816	1,500 – 2.500 [8]	144 – 151	Difunctional epoxy resin based on 1,6 naphtalene diepoxy. Moderate viscosity. Suitable for applications requiring high glass transition temperatures.
Araldite® PT 810	N/A	100 – 108	Powder coating grade triglycidyl isocyanurate (TGIC). Softening point (88-98°C).
Tactix® 556	1,000 – 1,500 [10]	225 – 240	Dicyclopentadiene-based epoxy. Very low moisture pickup. Recommended for adhesives and composites used at elevated temperatures.
Tactix® 742	25 – 60 [11]	150 – 170	Trifunctional epoxy with excellent Tg and thermal stability.
Tactix® 756	N/A	250 – 275	Dicyclopentadiene-based epoxy. Very low moisture pickup. Recommended for adhesives and composites used at elevated temperatures. Softening point (78-90°C).

[8] At 50°C
[10] At 85°C
[11] At 150°C

Section 4
Brominated Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [4] [EEW, g/eq]	Comments/Applications
Araldite® CY 8043	3,000 – 4,200	222 – 239	Liquid brominated epoxy resin (23 – 26% bromine). 100% solids.
Araldite® LT 8049	N/A	322 – 417	Solid brominated epoxy resin containing approximately 50% bromine. For use in electrical laminates to achieve the desired fire resistance properties.
Araldite® LZ 8001 A-80	1,200 – 2,500	410 – 460	Bisphenol-A epoxy at 80% solids in acetone (18-21% bromine). For use in the manufacture of thin laminates, prepregs and rigid laminates for flame retardant printed wiring boards.
Araldite® LZ 8213 N-70	50 – 250	450 – 525	A high-performance non-DICY cured laminating system that offers high Tg and very good moisture resistance.

Section 5
Cycloaliphatic Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Comments/Applications
Araldite® CY 179	100 – 600	130 – 143	A cyclic di-epoxy carboxylate, low-viscosity liquid epoxy. For high temperature outdoor electrical and casting applications and filament winding applications.
Araldite® CY 184	700 – 1,000	144 – 172	Low-viscosity cycloaliphatic epoxy recommended for use in the manufacture of medium and high-voltage electrical insulating components.
Araldite® CY 192	430 – 660	150 – 167	Low-viscosity cycloaliphatic epoxy resin designed for casting, potting and vacuum pressure impregnation applications.
Araldite® CY 5622	3,000 – 5,000	179 – 187	Hydrophobic liquid modified cycloaliphatic epoxy resin (diglycidylester). It is designed for use in outdoor medium and high-voltage applications that must perform under humid and severe climatic conditions such as apparatus components, pin/post insulators, bushings, instrument transformers and sensors.
Araldite® CY 9729	300 – 500	181 – 193	Low-viscosity cycloaliphatic epoxy recommended for use in the manufacture of medium and high-voltage electrical insulating components. Indoor and outdoor applications.

[4] On solids

Section 6
Waterborne Epoxy Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [4] [EEW, g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Solids Content [%]	Particle Size [µm]	Comments/Applications
Araldite® PZ 3901	7,000 – 20,000	515 – 555	9.0 (1.08)	53.5 – 56.5	< 1 (50%)	Solid “1-type” epoxy resin dispersion. Excellent stability, small particle size, good chemical resistance. For use in industrial maintenance coatings on both metal and concrete substrates.
Araldite® PZ 3921	300 – 750	610 – 680 [6]	9.0 (1.08)	49 – 51	0.8 – 1.3 (Median)	Modified “1-type” solid epoxy dispersion at lower solids and viscosity.
Araldite® PZ 3961-1	400 – 750	490 – 550	9.2 (1.10)	51 – 55	≤ 1	Epoxy resin emulsion of a solid “1-type” epoxy resin that offers a good combination of properties for ambient or forced cure coatings on metal. Can also be used for concrete. Metal coatings based on this emulsion show rapid dry time, good adhesion, flexibility and corrosion resistance. Can be used with a variety of Aradur® waterborne epoxy curing agents to formulate coatings with low volatile organic compounds (VOC) content and a wide range of end properties.
Araldite® PZ 3903-2	8,000 – 20,000	715 – 800	9.0 (1.08)	53 – 58	< 2 (Mean)	“3-type” solid epoxy resin dispersion. Very good stability, small particle size, excellent adhesion. For use in fiber-sizing, textiles and non-woven applications.
Araldite® PZ 3907-1	8,000 – 20,000	1,800 – 2,200	9.0 (1.08)	52 – 55	< 2 (90%)	Solid “7-type” epoxy resin dispersion. Excellent abrasion resistance, flexibility, adhesion and chemical resistance.
Araldite® PZ 323	N/A	222 – 250	9.6 (1.15)	75 -80	< 2	Araldite® PY 307-1 based epoxy phenol novolac emulsion. Good abrasion resistance, toughness, and chemical resistance. For use in adhesives, fiber-sizing, textiles, abrasives, and paper treatment applications.

[4] On solids
[6] As supplied

Section 7

Epoxy Reactive Diluents

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Color [Gardner]	Comments/Applications
Araldite® DY 026	< 15	108 – 118	9.2 (1.10)	≤ 2	Electronic-grade aliphatic difunctional epoxy (1,4 butanediol diglycidyl ether).
Araldite® DY 3601	42 – 52	385 – 405	8.6 (1.03)	≤ 3	Low-viscosity, polypropylene glycol-based epoxy resin. Enhances flexibility and impact resistance.
Araldite® DY-A	1 – 4	202 – 235	7.6 (0.91)	≤ 1	Aliphatic monofunctional epoxy reactive diluent (2-ethylhexyl glycidyl ether). Excellent dilution efficiency.
Araldite® DY-C	50 – 100	153 – 167	9.2 (1.10)	≤ 2	Cycloaliphatic difunctional epoxy reactive diluent (cyclohexanedimethanol diglycidylether). Gives moderate viscosity reduction with minimal loss of properties.
Araldite® DY-CNO	30 – 70	416 – 588	8.1 (0.97)	≤ 13	Monofunctional epoxy reactive diluent based on cashew nut shell liquid (CNSL). Low volatility.
Araldite® DY-D	15 – 25	117 – 125	9.2 (1.10)	≤ 2	Aliphatic difunctional epoxy reactive diluent (1,4 butanediol diglycidyl ether). Excellent viscosity reducer with good physical retention properties.
Araldite® DY-E	≤ 15	280 – 315	7.4 (0.89)	≤ 1	Aliphatic monofunctional epoxy reactive diluent (C_{12} – C_{14} glycidyl ether). Efficient viscosity and surface tension reducer.
Araldite® DY-G	4 – 12	277 – 323	7.1 (0.85)	≤ 2	Aliphatic monofunctional epoxy reactive diluent (C_{12} – C_{13} glycidyl ether).
Araldite® DY-J	≤ 15	220 – 250	7.5 (0.90)	≤ 1	Aliphatic monofunctional epoxy reactive diluent (C_8 – C_{10} glycidyl ether). Very effective viscosity reducer for general purpose use.
Araldite® DY-K	5 – 25	167 – 189	9.0 (1.08)	≤ 2	Aromatic monofunctional epoxy reactive diluent (cresyl glycidyl ether). Low volatility and good chemical resistance.
Araldite® DY-N	10 – 18	125 – 145	8.9 (1.07)	≤ 1	Aliphatic difunctional epoxy reactive diluent (neopentyl glycol diglycidylether).
Araldite® DY-P	20 – 28	222 – 244	8.9 (1.07)	≤ 3	Aromatic monofunctional epoxy reactive diluent (p-tertiarybutylphenol glycidyl ether). Low volatility and good chemical resistance.
Araldite® DY-T	100 – 300	111 – 143	9.3 (1.12)	≤ 3	Aliphatic trifunctional epoxy reactive diluent (trimethylolpropane triglycidylether). Excellent resistance to organic solvents.

Section 8
Toughened / Flexibilized Resins

Product	Viscosity @ 25°C, [cP]	Epoxide Eq. Weight [EEW, g/eq]	Comments/Applications
Araldite® LT 1522	1,600-5,500 [1]	1,560 – 1,820	CTBN rubber modified solid epoxy resin based on bisphenol-A. For use in adhesives, prepregs and molding compounds.
Araldite® PY 4122	700 – 1,400	310 – 390	Low-viscosity, unmodified, tough, flexible epoxy with excellent workability. For use as a modifier in high-solids coatings requiring toughness, adhesion, corrosion and abrasion resistance. Suitable for composite and casting applications.
Flexibilizer DY 965	4,400 – 12,800 [12]	558 – 667 [13]	Polyurethane polyol for high-impact resistance. Improves adhesion to metals and for dust-free electronics.
Tactix® 695	1,500 – 5,500 [14]	335 – 410	Single-phase toughened epoxy.
XU 3508	11,000 – 15,000	185 – 205	Liquid toughened epoxy resin based on bisphenol-A. Used for filament winding, pultrusion and adhesives applications.

Section 9
AroCy® Cyanate Ester Resins

Product	Viscosity @ 25°C, [cP]	Comments/Applications
AroCy® L-10	70 – 110	Bisphenol-E based lowest-viscosity cyanate ester. For use in filament winding, RTM, and pultrusion applications. May also be used as a viscosity modifier for other cyanate ester systems.
AroCy® XU 366	100 – 1,000 [15]	Bisphenol-M based lowest-cure temperature (121°C) cyanate ester. Exceptional dielectric properties. Uses include microwave antennas, radomes, structural and electronic-grade adhesives.
AroCy® XU 371	300 – 600 [16]	Novolac-based cyanate ester. For use in high-temperature composites and adhesives, where Tg in excess of 300°C is required.
AroCy® XU 378	600 – 1,000 [16]	Bisphenol-M based lowest cure temperature (121°C) cyanate ester. Exceptional dielectric properties. Uses include microwave antennas, radomes, structural and electronic-grade adhesives.

[1] At 25°C, 40% in butylcarbitol
[12] Poise at 40°C
[13] Hydroxyl equivalent weight
[14] At 70°C
[15] At 65ºC
[16] At 82ºC

Section 10

Polyimide Resins

10.1 – Kerimid® Polyimide Resins

Product	Viscosity @ 25°C, [cP]	Gel Time @ 171°C [min.]	Solids Content [%]	Comments/Applications
Kerimid® 701 A A-70	3,600 max	200 – 450	69 – 71	Non-MDA polyimide solution for applications requiring high service temperature (e.g., printed circuit board, laminates, high-performance composites). Supplied at 70% non-volatiles in acetone.
Kerimid® 701 A N-70	1,300 – 3,600	150 – 450	69 – 71	Non-MDA polyimide solution for use in high-temperature circuit boards. Supplied at 70% non-volatiles in methyl etheyl ketone.
Kerimid® 701 C	50 – 150	N/A	35 – 37	A polyimide laminating product for use in conjunction with Kerimid® 701 A to achieve superior thermal performance as well as UL 94 V-1 flammability performance.
Kerimid® 701 D	60 max	N/A	30 – 34	Non-halogen containing component for Kerimid® 701 A.
Kerimid® 701-1 B	20 – 80	N/A	43 – 45	A polyimide laminating product for use in conjunction with Kerimid® 701 A to achieve UL 94 V-O flammability performance.
Kerimid® 8292 N-75	1,000 – 6,000	200 – 300	74 – 76	Non-MDA polyimide resin solution for use in high-temperature circuit boards. Supplied at 75% non-volatiles in methyl etheyl ketone.
Kerimid® 8292 NPM 60	100 – 600	350 – 500	59 – 64	Non-MDA polyimide resin solution for use in high-temperature circuit boards. Supplied at 60% non-volatiles in methyl etheyl ketone and propylene glycol monomethyl ether.

Section 10

Polyimide Resins *(continued)*

10.2 – Matrimid® Polyimide Resins

Product	Viscosity @ 25°C, [cP]	Appearance	Comments/Applications
Matrimid® 2292	100 max	Clear Yellow Liquid	Low-viscosity resin for use as a reactive diluent for epoxy, bismaleimide or polyimides. Provides excellent mechanical properties at ambient or elevated temperatures.
Matrimid® 5218	N/A	Yellow Powder	Soluble thermoplastic polyimide powder. Very high glass transition temperature. Excellent high temperature properties for use in structural composites and adhesives.
Matrimid® 5292 A-2	N/A	Beige Powder	4,4 Bismaleimidodiphenylmethane. Use with Matrimid® 5292 B to optimize processing, toughness and performance.
Matrimid® 5292 B	12,000 – 20,000	Amber Liquid	O,O'- Diallyl bisphenol-A hardener. Use with Matrimid® 5292 A-2 to optimize toughness, processing and performance.
Matrimid® 9725	N/A	Yellow Powder	Micropulverized version of Matrimid® 5218.

10.3 – Rhodeftal® Polyimide Resins

Product	Viscosity @ 25°C, [cP]	Appearance	Solids Content [%]	Comments/Applications
Rhodeftal® 200 ES	2,500 – 4,000	Brown Liquid	27 – 29	Polyamide-imide (PAI) used for the formulation of heat-resistant coatings, lubricants, adhesives and impregnation varnishes. Suitable for service temperatures in the 430°F–480°F (200°C–250°C) range. Good dielectric properties, chemical resistance and adhesion properties at elevated temperatures. Compatible with epoxy resins to produce very flexible systems.

Section 11

Benzoxazine Thermoset Resins

11.1 – Benzoxazine Resins

Product	Viscosity @ 125°C, [cP]	Melting Point [°C]	Gel Time @ 220°C [sec.]	Comments/Applications
Araldite® MT 35600	50 – 500	58 – 70	250 – 550	Bisphenol-A based benzoxazine thermoset resin. Can be homopolymerized or co-reacted with an epoxy or phenolic resin resulting in polymers with high-temperature resistance, high modulus, low water absorption and high dimensional stability.
Araldite® MT 35700	500 – 2,500 [24]	55 – 65	200 – 450	Bisphenol-F based benzoxazine thermoset resin. Can be homopolymerized or co-reacted with an epoxy or phenolic resin resulting in polymers with high-temperature resistance, good flammability resistance (UL94 V1), high modulus, low water absorption and high dimensional stability.
Araldite® MT 35800	8,000 – 12,000	98 – 103	100 – 450	Phenolphthalein based benzoxazine thermoset resin. Can be homopolymerized or co-reacted with an epoxy or phenolic resin resulting in polymers with high temperature resistance, good flammability resistance (UL94 V0), thermal stability and low smoke generation.
Araldite® LZ 8280 N 75	100 – 400	N/A	380 – 420	Bisphenol-F based benzoxazine supplied at 75% non-volatiles in acetone for the production of electrical laminates and prepregs.
Araldite® LZ 8282 N 70	500 – 3,000 [17]	N/A	250 – 350	Single component, ready-to-use benzoxazine resin supplied as a solution in methyl ethyl ketone and n-butanol 70% solids content. For use in the manufacture of halogen-free, high-temperature resistant electrical laminates and prepregs.

11.2 – Benzoxazine Catalysts

Product	Appearance	Melting Point [°C]	Acid Value [mgKOH/g]	Comments/Applications
Accelerator DT 300	White crystals	154 – 156	N/A	Effective for the homopolymerization of benzoxazine resins and for epoxy/benzoxazine-based formulations. Can be used to lower cure temperature or shorten the cure cycle.
Accelerator DT 310	White crystals	127 – 134	600 – 650	Effective for the homopolymerization of benzoxazine resins and for epoxy/benzoxazine-based formulations. Can be used to lower cure temperature or shorten the cure cycle.

[17] At 25°C
[24] At 100°C

Section 12

Epoxy Curing Agents

12.1 – Aliphatic Amine Based

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23°C [minutes]	Color [1] [Gardner]	Comments/Applications
Aradur® 21	<10	40	7.2 (0.87)	21	51	≤ 1	Trimethyl hexamethylene diamine (TMD)
Aradur® 76	1,100 – 1,900	250	8.1 (0.97)	133	40	≤ 6	Formulated polyamine hardener. For the formulation of two-component flexible membranes, adhesives, flooring and sealants.
Aradur® 356	1,000 – 2,500	65	8.1 (0.97)	35	37	≤ 3	Suitable for industrial maintenance coatings, tank linings, pipe coatings and flooring. Phenol-free version of Aradur® 837.
Aradur® 837	2,700 – 3,700	76	8.2 (0.98)	35	22	≤ 3	Suitable for the formulation of two-component wood, concrete and metal coatings, linings and flooring. Accelerator for polyamides. Good chemical resistance.
Aradur® 943	3,000 – 5,000	38	8.9 (1.07)	20	15	≤ 6	Suitable for tank linings and chemical processing equipment. Excellent resistance to organic solvents (especially alcohols and gasoline) and hydrochloric acid.
Aradur® 956-2	290 – 500	47	8.5 (1.02)	25	31	≤ 4	Suitable for adhesives, casting, potting, tooling, laminating and coatings.
Aradur® 3227	950 – 1,350	157	8.0 (0.96)	84	14	≤ 2	Polyetheramine-based hardener. Used in fast cure, two-component epoxy repair mortars, construction adhesives, coating and flooring applications.
Aradur® 3275	200 – 400	250	8.3 (0.99)	133	183	≤ 6	Polyetheramine-based hardener. Low-viscosity flexible hardener for use in flexible membranes, adhesives, flooring and sealants. Benzyl alcohol and nonyl phenol free.
Aradur® 3293	500 – 650	140	8.1 (0.97)	75	47	≤ 3	Polyetheramine-based hardener. Used for decoupage applications. For use in two-component ambient cure epoxy systems with good gloss, flexibility and surface properties.
Aradur® 3958	85 – 130	31	8.3 (0.99)	16	13	≤ 4	Low-viscosity, high-reactivity hardener. For use in the formulation of construction adhesives, repair mortar and crack injection systems. May also be used to accelerate slower curing hardeners.

[1] At 25°C, 40% in butylcarbitol
[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 12

Epoxy Curing Agents *(continued)*

12.2 – Cycloaliphatic Amine Based

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23ºC [minutes]	Color [1] [Gardner]	Comments/Applications
Aradur® 22	< 8	34	8.8 (1.05)	18	n.d.	≤ 2	m-Xylene diamine (MXDA)
Aradur® 42	10 – 20	42	7.7 (0.92)	22.5	n.d.	≤ 1	Isophorone diamine (IPDA)
Aradur® 43	290 – 450	115	8.5 (1.02)	60	40	≤ 4	For solvent-free coatings and mortars with good chemical resistance.
Aradur® 43 S	550 – 850	115	8.8 (1.05)	60	19	≤ 4	Fast cure version of Aradur® 43.
Aradur® 46	130 – 230	95	8.6 (1.03)	50	39	≤ 3	Suitable for solvent-free coatings and mortars with good chemical resistance and surface properties.
Aradur® 46 S	220 – 320	95	8.9 (1.07)	50	22	≤ 3	Fast cure version of Aradur® 46. Good through-cure properties down to 5ºC.
Aradur® 48 S	45 – 75	75	8.8 (1.05)	40	25	≤ 8	Suitable for solvent-free coatings, self-leveling flooring and epoxy mortars.
Aradur® 265-1	Z1 – Z5 [5]	94	9.0 (1.08)	50	49	≤ 10	Suitable for chemical storage tanks and chemical process equipment.
Aradur® 355	D – L [5]	48.5	8.6 (1.03)	26	27	≤ 7	Suitable for tank linings, refineries, flooring, cargo ship tanks and secondary containment.
Aradur® 847	150 – 300	75	8.4 (1.01)	40	35	≤ 2	Coatings and flooring with good chemical resistance.
Aradur® 2954	100 – 140	60	7.8 (0.93)	35 [19]	35 – 45 [20]	≤ 2	Cycloaliphatic amine for use in combination with modified liquid epoxy resins for reaction transfer molding, filament winding, pultrusion and wet lay up applications.
Aradur® 2963	30 – 70	85	8.3 (0.99)	45	35	≤ 2	Used for mortars and floor repair systems, sewage treatment plants, commercial and industrial flooring.

[1] At 25°C, 40% in butylcarbitol
[5] Gardner Holdt Viscosity
[18] With Araldite® GY 6010 Liquid Epoxy Resin
[19] With Araldite® LY 1564 Epoxy Resin
[20] With Araldite® LY 1564 Epoxy Resin at 80°C

12.2 – Cycloaliphatic Amine Based *(continued)*

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23ºC [minutes]	Color [1] [Gardner]	Comments/Applications
Aradur® 2964	40 – 70	93	8.3 (0.99)	50	32	≤ 2	Used for mortars and floor repair systems, sewage treatment plants, commercial and industrial flooring.
Aradur® 2965	100 – 300	94	8.8 (1.05)	50	21	≤ 4	Very low viscosity hardener for floorings with good chemical resistance and surface properties. Excellent blushing resistance even at low temperatures.
Aradur® 2973	900 – 1,400	85	9.0 (1.08)	45	37	≤ 7	For the formulation of chemical-resistant, heavy-duty coatings and flooring systems.
Aradur® 2975	350 – 750	115	8.4 (1.01)	60	60	≤ 1	Used for solvent-free coatings and floorings. Good chemical resistance and surface properties.
Aradur® 2994	30 – 80	87.5	8.5 (1.02)	46	22	≤ 2	Low-viscosity, high-reactivity hardener for use as an accelerator for slower curing amine hardeners in flooring applications.
Aradur® 3208	80 – 150	75	8.4 (1.01)	40	13	≤ 3	Low-viscosity, high-reactivity hardener providing excellent surface properties when cured at low temperatures. For use in crack injection systems or as an accelerator for other amine hardeners.
Aradur® 3210	70 – 145	72	8.4 (1.01)	38	23	≤ 3	Low-viscosity hardener for use in coating and flooring systems requiring fast cure, and good chemical resistance.
Aradur® 3218	130 – 210	75	8.4 (1.01)	40	19	≤ 2	Low-viscosity, rapid-curing hardener with good resistance to carbarnation at low temperatures and high humidity.
Aradur® 3246	800 – 1,200	57	9.3 (1.11)	31	16	≤ 6	Low-viscosity, modified polyamine hardener designed for rapid curing epoxy systems. In combination with a liquid epoxy resin, such as Araldite® GY 6010, this hardener provides high chemical resistance, especially to organic acids.
Aradur® 3374	50 – 75	92	8.3 (0.99)	50	42	≤ 1	Low-viscosity, low color hardener for use in coatings and flooring systems requiring good surface appearance properties and good color stability.

[1] At 25°C, 40% in butylcarbitol

[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 12

Epoxy Curing Agents *(continued)*

12.3 – Amidoamine and Polyamide Based

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23ºC [minutes]	Color [Gardner]	Comments/Applications
Aradur® 283	Z1 – Z4 [5]	133	8.3 (0.99)	70 – 100	226 @ 70 phr	≤ 8	Modified polyamidoamine suitable for flooring and high-solids marine and maintenance primers and coatings.
Aradur® 360	J – S [5]	134	7.8 (0.93)	60 – 80	207 @ 80 phr	≤ 8	Modified polyamidoamine suitable for the formulation of high-solids or solvent-free coatings and marine and maintenance primers.
Aradur® 450	700 – 2,000	115	8.4 (1.01)	60	69	≤ 10	Formulated polyamidoamine hardener designed specifically for the formulation of two-component epoxy primers for damp or wet concrete. Also suitable for metal substrates.
Aradur® 450 S	450 – 1,400	115	8.6 (1.03)	60	39	≤ 10	Faster curing version of Aradur® 450.
Aradur® 115-2	50,000 – 70,000 [25]	115 – 240	8.1 (0.97)	60 – 100	600 @ 80 phr	≤ 8	Standard, high-molecular weight polyamide typically used in combination with “type 1” epoxy resins for industrial maintenance and trade sales coatings.
Aradur® 115-2 X-70	V – Z [5]	160 – 340	7.8 (0.93)	60 – 100 (z)	200 @ 100 phr	≤ 8	Solution of Aradur® 115-2 supplied at 70 wt.% non-volatiles in xylene.
Aradur® 115-2 I-73	1,400 – 3,200	160 – 340	7.7 (0.92)	60 – 100 (z)	240 @ 100 phr	≤ 8	Solution of Aradur® 115-2 supplied at 73 wt.% non-volatiles in isopropyl alcohol.
Aradur® 125-2	8,000 -12,000 [25]	100 – 150	8.1 (0.97)	50 – 80	148 @ 65 phr	≤ 8	Standard polyamide for use with “type 1” epoxy resins for industrial maintenance and trade sales coatings.
Aradur® 140-2	3000 – 6000 [25]	70 – 115	8.1 (0.97)	35 – 60	303 @ 50 phr	≤ 11	Medium-viscosity, standard polyamidoamine suitable for high-solids or solvent-free industrial and general purpose coatings.
Aradur® 955-2	500 – 900	65	8.2 (0.98)	35	45	≤ 9	Modified polyamidoamine for use in coatings, flooring, potting and wet lay-up applications. Curing under high relative humidity is possible.

[5] Gardner Holdt Viscosity

[18] With Araldite® GY 6010 Liquid Epoxy Resin

[25] At 40ºC

12.3 – Amidoamine and Polyamide Based *(continued)*

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23ºC [minutes]	Color [Gardner]	Comments/Applications
Aradur® 3282-1	900 – 1,900	115	8.4 (1.01)	60	104	≤ 10	Benzyl alcohol-free and nonyl phenol-free, medium-viscosity hardener for the formulation of surface tolerant primers for metal or concrete substrates.
Aradur® 9130	250 – 500	95	8.3 (0.99)	50	226	≤ 9	Low-viscosity polyamidoamine for use in flooring and coatings.
Aradur® 9140	300 – 500	92	7.9 (0.95)	50	139	≤ 9	Low-viscosity polyamidoamine for use in flooring and coatings.
Aradur® 3376	90 – 140	112	7.9 (2.95)	60	215	≤ 8	Low-viscosity modified polyamidoamine.

12.4 – Phenalkamine and Mannich Based

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25ºC [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23ºC [minutes]	Color [Gardner]	Comments/Applications
Aradur® 14	400 – 600	75	8.3 (0.99)	40	16	≤ 5	Mannich-based. For use in solvent-free coatings and epoxy mortars. Low sensitivity to moisture. High reactivity.
Aradur® 3440	1,000 – 3,000	80	8.3 (0.99)	43	30	≤ 17	Low-temperature cure marine and maintenance coatings.
Aradur® 3441	10,000 – 35,000	130	8.3 (0.99)	60 – 80	54 @ 60 phr 48 @ 70 phr 37 @ 80 phr	≤ 17	Low-temperature cure marine and maintenance coatings.
Aradur® 3442	1,000 – 5,000	125	8.2 (0.98)	55 – 70	82 @ 55 phr 37 @ 70 phr	≤ 17	Low-temperature cure marine and maintenance coatings.

[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 12

Epoxy Curing Agents *(continued)*

12.4 – Phenalkamine and Mannich Based *(continued)*

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Density @ 25°C [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Gel Time [18] 100g @ 23°C [minutes]	Color [Gardner]	Comments/Applications
Aradur® 3447	1,000 – 5,000	125	8.2 (0.98)	55-70	40 @70 phr	≤ 17	Fast-cure hardener for use in the formulation of two-component epoxy systems capable of curing at temperatures down to 32°F. Unique combination of low temperature cure capability and long pot life.
Aradur® 3460	2,000 – 5,000	120	9.2 (1.10)	55 – 65	112 @ 65 phr	≤ 17	Suitable in the formulation of low-temperature cure marine and maintenance coatings. Good resistance to blushing and exudation. Long pot life.

12.5 – Aromatic Amine Based

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Melting Point [°C]	Comments/Applications
Aradur® 976-1	N/A	63	176 – 180	4,4'-diaminodiphenyl sulfone (DDS). Excellent high temperature and chemical resistance. For use in adhesives, PWB laminates, prepregs, composites applications. (Gel time with Araldite® GY 6010, 3 hours @ 100°C).
Aradur® 5200	50 – 350	45	N/A	Low-viscosity aromatic amine for adhesive, filament winding and RTM applications. (Gel time with Araldite® GY 6010, 8 hours @ 35°C).
Aradur® 9664-1	N/A	63	176 – 180	Micronized 4,4'-diaminodiphenyl sulfone (DDS). Excellent high temperature and chemical resistance. For use in adhesives, PWB laminates, prepregs, composites, powder coatings applications.
Aradur® 9719-1	N/A	63	165 – 175	Micronized 3,3'-diaminodiphenyl sulfone (DDS). Excellent high temperature and chemical resistance. For use in adhesives, PWB laminates, prepregs, composites applications.

[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 12

Epoxy Curing Agents *(continued)*

12.6 – Anhydride

Product	Viscosity @ 25°C, [cP]	Molecular Weight	Specific Gravity @ 25°C [lb/gal, (g/cm)]	Comments/Applications
Aradur® 906	175 – 275	178	10.3 (1.23)	Nadic methyl anhydride for high Tg composites and potting applications.
Aradur® 917	50 – 80	166	10.1 (1.21)	Methyl tetrahydrophthalic anhydride for high-temperature, industrial composite applications for filament winding, RTM and pultrusion.
Aradur® HT 907	40 – 50 @ 40°C	154	1.36 – 1.40	Hexahydrophtalic anhydride for medium- and high-voltage electrical casting systems.
Aradur® HY 1102	70 @ 20 °C	168	1.16	Methyl hexahydrophtalic anhydride for high Tg, medium- and high-voltage electrical impregnation systems.
Aradur® HY 1235	70 – 80	N/A	1.18 – 1.20	Anhydride-based hardener designed for the formulation of medium- to high-voltage electrical insulating systems for use under severe climatic conditions.

12.7 – Waterborne

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [6] [g/eq]	Density @25°C [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Color [Gardner]	Solids Content [%]	Comments/Applications
Aradur® 39	12,000 – 20,000	335	8.9 (1.07)	150 – 200	≤ 5	49 – 51	Polyamine adduct in water. For use in VOC-free coatings and flooring curing at low temperatures. Fast dry and cure.
Aradur® 340	18,000 – 23,000	210	8.7 (1.04)	110	≤ 12	49 – 51	Polyamidoamine adduct in water. For use in primers and topcoats for concrete and metals. Good flexibility.
Aradur® 3805	Z – Z4 [5]	270	9 (1.08)	144	≤ 9	59 – 61	Waterborne polyamine hardener supplied at 60% solids in a mixture of 2-propoxyethanol, acetic acid and water. For use in the formulation of two-component waterborne coatings for concrete and metal substrates.

[5] Gardner Holdt Viscosity
[6] As supplied
[18] With Araldite® GY 6010 Liquid Epoxy Resin

12.7 – Waterborne *(continued)*

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [6] [g/eq]	Density @25°C [lb/gal, (g/cm³)]	Typical Mix ratio [18] [g/100g]	Color [Gardner]	Solids Content [%]	Comments/Applications
Aradur® 3984	5,000 – 15,000	150	8.83 (1.06)	75-85	≤ 8	78 – 82	Polyamine adduct in water. For use in the formulation of zero or low VOC two-component waterborne epoxy coatings and flooring systems. Provides excellent flexibility when formulated with a “1-type” solid epoxy dispersion, such as Araldite® PZ 3901. Good compatibility with colorants. Good chemical resistance.
Aradur® 3985	1,000 – 6,000	265	8.74 (1.05)	140	≤ 6	53 – 57	Polyamine adduct in water. For use in the formulation of zero VOC two-component waterborne epoxy coating and flooring systems with a visible end of pot life and thick films.
Aradur® 3985-S	3,000 – 8,000	265	8.74 (1.05)	140	≤ 6	54 – 56	Faster cure version of Aradur® 3985
Aradur® 3986	15,000 – 35,000	415	8.82 (1.06)	222	≤ 6	39 – 41	Modified Polyamine adduct in water. For use in the formulation of fast-curing, two-component waterborne epoxy systems with good yellowing resistance. Provides excellent anti-corrosion properties when formulated with a “1-type” solid epoxy dispersion, such as Araldite® PZ 3961-1.

[6] As supplied
[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 12

Epoxy Curing Agents *(continued)*

12.8 – Waterborne Applications

Product	Concrete				Thick Film			Metal	
	Standard Primer	Paint	Clear Sealer	DIY Garage Floor	Thermal Shock Flooring	Self-Leveling	Tile Grout/ Adhesive	Primer	Direct-to-Metal
Aradur® 39	■	■	■	■					
Aradur® 340	■						■	■	■
Aradur® 3805	■	■	■	■					
Aradur® 3984	■	■	■					■	■
Aradur® 3985	■				■	■	■		
Aradur® 3985 S	■				■	■	■		
Aradur® 3986								■	■

■ Primary recommendation ■ Alternative recommendation

12.9 – Miscellaneous

Product	Viscosity @ 25°C, [cP]	Gel Time 100g @ 23ºC [minutes]	Melting Point [ºC]	Cure Schedule	Comments/Applications
Aradur® 940	250,000 – 600,000	170 [18]	N/A	N/A	Dispersion of Aradur® 9506 in liquid bisphenol-A epoxy resin. Six month latency when stored at 20ºC. Excellent adhesion, good mechanical properties, highly reactive at 100ºC. For use in one pack adhesives, tooling, vinyl plastisols and dipping compounds.
Aradur® 2844	N/A	5 – 10 [21]	139 – 143	N/A	O-tolyl biguanide. For adhesive and powder coating applications.
Aradur® 3365	1,000 – 4,000	N/A	N/A	30 min. @ 177 ºC, 60 sec. @ 300 ºC	Etherified resole based on bisphenol-A solution supplied as 70% non-volatiles in n-butanol. Suitable for the formulation of chemical and solvent-resistant, heat-cured coatings. Also suitable for the formulation of FDA-compliant coatings.
Aradur® 3380-1	N/A	18 [21]	95 – 110	20 min. @ 170 ºC, 5 min. @ 220 ºC	Anhydride-based crosslinker for use in FDA-compliant coating applications.
Aradur® 9506	N/A	35 [22]	N/A	30 min. @ 135 ºC	Latent modified polyamide hardener. Excellent shelf life with a six-month latency when stored at 20ºC. Excellent adhesion, good mechanical properties, highly reactive at 100ºC. For use in one pack adhesive, tooling, vinyl plastisols, dipping compounds.
Aradur® 9690	800 – 1,200 @ 150ºC	50 [23]	100 – 110	20 min. @ 165ºC	O-cresol novolac hardener. For use in high-temperature resistant molding compounds and powder coatings.
XB 3086 Hardener	N/A	12 – 19 [21]	84 – 94	N/A	Phenolic hardener / accelerator for low-temperature cure or fast-cure epoxy powder coatings.
XB 3123 Hardener	N/A	1-5 [21]	180 – 250	N/A	Heterocyclic amine. May be used as a latent accelerator for anhydride and amine-cured epoxy systems or as a latent catalytic curing agent for epoxy resins.

[18] With Araldite® GY 6010 Liquid Epoxy Resin
[21] With Araldite® GT 7013 Epoxy Resin
[22] With Araldite® LY 1556 Epoxy Resin
[23] With Araldite® ECN 1299 Epoxy Resin

Section 13
Curing Accelerators

13.1 – Liquid Accelerators

Product	Viscosity @ 25°C, [cP]	H+ Active Equivalent [g/eq]	Typical Mix ratio [18] [g/100g]	Comments/Applications
Accelerator DY 062	< 10	N/A	0.5 – 10	Benzyl dimethyl amine (BDMA). Compatible with anhydride, polyamide and polyamine hardeners.
Accelerator DY 070	< 50	N/A	N/A	Heterocyclic amine. May be used with anhydride hardeners to improve their reactivity in filament winding, pultrusion and RTM systems.
Accelerator DY 073-1	5 – 15	N/A	N/A	Latent amine-based accelerator for use in anhydride cured casting and impregnating epoxy systems.
Accelerator 960-1	120 – 150	N/A	0.5 – 10	Tertiary amine accelerator. For use as a curing accelerator for ambient cure epoxy systems.
Accelerator 2950	2,000 – 6,000	75	39	Accelerator and co-hardener. Compatible with a wide range of epoxy hardeners for the formulation of fast-cure and low-temperature cure epoxy coating and flooring systems.
Accelerator 3130	10 – 100	N/A	1 – 3	For use in ambient-cured epoxy systems to speed up the cure at ambient or low temperatures. Not compatible with all epoxy hardeners.

[18] With Araldite® GY 6010 Liquid Epoxy Resin

Section 13

Curing Accelerators *(continued)*

13.2 – Solid Accelerators

Product	Melting Point [ºC]	H+ Active Equivalent [g/eq]	Typical Mix ratio [18] [g/100g]	Comments/Applications
Aradur® 835	N/A	~200	15	Solid aliphatic amine adduct. For use in low-temperature cure or fast-cure powder coatings. Suitable for the formulation of FDA-compliant coatings. Viscosity: 600 – 1,200 cps @ 25ºC. [26]
Aradur® 3088	85 – 105	-	1 – 4	Solid epoxy amine adduct. For use in powder coating applications either as a catalytic crosslinker or as an accelerator for other epoxy hardeners such as dicyandiamide.
Accelerator DT 3126-2	100 – 110	-	1 – 4	Accelerator for epoxy-polyester hybrid and polyester-TGIC powder coatings. Suggested use level: 1 to 4 wt. % for hybrids and 1 to 2 wt. % for TGIC based systems.
Aradur® 3261-1	105 – 115	-	5 – 8	Solid epoxy amine adduct with high reactivity for low-temperature or fast-cure powder coatings. May be used as an accelerator or as a catalytic curing agent for epoxy resins.
Accelerator DY 9577	25 – 31	-	0.1 to 5.0	Boron trichloride amine complex. Good latency up to 80ºC. High reactivity above 120ºC. For use in casting, encapsulation, filament winding, pultrusion, molding, and electrical tape applications. 0.1 to 1.0 PHR when used as an accelerator or 1.0 to 5.0 PHR when used as a latent catalytic curing agent.
XB 3123 Hardener	180 – 250	-	1-5 [21]	Heterocyclic amine. May be used as a latent accelerator for anhydride and amine-cured epoxy systems or as a latent catalytic curing agent for epoxy resins.

[18] With Araldite® GY 6010 Liquid Epoxy Resin
[21] With Araldite® GT 7013 Epoxy Resin
[26] 40% solution in n-butanol/xylene (50/50)

Section 14
Matting Agents

Product	Melting Point [ºC]	H+ Active Equivalent [g/eq]	Comments/Applications
Matting Agent DT 125-1	110 – 125	N/A	Color stable matting agent for semi gloss epoxy-polyester hybrids and polyester-TGIC powder coating formulations. Recommended use level is 1 to 3 wt.% on binder. Suitable for gloss reduction down to 50%.
Matting Agent DT 3329-1	105 – 117	N/A	Color stable matting agent for semi gloss epoxy-polyester hybrids and polyester-TGIC powder coating formulations. Suitable for gloss reduction down to 30%. Ideal for white and light colors.
Matting Agent DT 3357	N/A	95 – 100	Color stable matting hardener for epoxy and epoxy-polyester hybrids powder coatings. Suitable for gloss reduction down to 5%. Non-yellowing and suitable for both light and dark colors.
Matting Agent DT 3360	120 – 135	N/A	Color stable, wax-free matting agent for semi gloss epoxy-polyester hybrids powder coating formulations. Suitable for gloss reduction down to 15%. Suitable for both light and dark colors.

Section 15
Miscellaneous Products

Product	Epoxide Eq. Weight [EEW, g/eq]	Specific Gravity @ 25ºC [lb/gal, (g/cm)]	Comments/Applications
Modifier DW 1765	625 – 833	7.5 (0.89)	Additive for solvent-free ambient cured epoxy systems. Effective at low concentration to greatly reduce or eliminate blushing and exudation. May also help improve early water spotting resistance. Not suitable for solvent-borne systems. Suggested use level 0.2 to 2.0 wt.% on the epoxy resin.

FDA Status

According to the Food & Drug Administration Code of Federal Regulations, Title 21, Part 175.300, and FDA interpretations of this regulation, cured coatings formulated with the epoxy resins, hardeners and accelerators listed below “may safely be used as the food contact surface of article intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food.” Coatings are to be applied as a continuous film over a metal substrate, or for repeated food-contact use, over any suitable substrate as a continuous film that serves as a functional barrier between the food and the substrate. Limitations on use are footnoted.

Products which conform to FDA listings in Parts 175.105 (adhesives) and 177.2420 (cross-linked polyesters) are also shown below, with footnotes for the appropriate reference to limitations on allowance.

We recommend that you read and understand the appropriate regulation (21 CFR 175.300, 2121 CFR 175.105, or 21 CFR 177.2420) before using these products.

Liquid Epoxy Resins

Araldite® GY 502 (3)
Araldite® GY 2600
Araldite® GY 6010
Araldite® GY 6020
Araldite® GY 9513 (1)
Araldite® GY 9615 (1)
Araldite® GY 9667 (1)
Araldite® PY 258
Araldite® PY 4122 (1)

Bisphenol-F & Novolac Epoxy Resins

Araldite® ECN 1273
Araldite® ECN 1280
Araldite® ECN 1299
Araldite® EPN 1138
Araldite® EPN 1138 A-85 (2)
Araldite® EPN 1179
Araldite® EPN 1180
Araldite® EPN 9840
Araldite® EPN 9850
Araldite® EPN 9880
Araldite® GY 281
Araldite® GY 282
Araldite® GY 285
Araldite® PY 302-2
Araldite® PY 307-1

Waterborne Epoxy Resins

Araldite® PZ 3903-2
Araldite® PZ 3907-1 (2)

Epoxy Resin Solutions[2]

Araldite® GZ 471 X-70
Araldite® GZ 471 X-75
Araldite® GZ 488 N-40
Araldite® GZ 488 V-32
Araldite® GZ 540 X-90
Araldite® GZ 571 KX-75
Araldite® GZ 571 T-75
Araldite® GZ 597 KT-55
Araldite® GZ 6097 PM-55
Araldite® GZ 7071 PM-75
Araldite® GZ 7488 V-40

Solid Epoxy Resins

Araldite® GT 6063
Araldite® GT 6084
Araldite® GT 6097
Araldite® GT 6243
Araldite® GT 6248
Araldite® GT 6259
Araldite® GT 6450
Araldite® GT 6609
Araldite® GT 6610
Araldite® GT 6703
Araldite® GT 7004
Araldite® GT 7013
Araldite® GT 7014
Araldite® GT 7071
Araldite® GT 7072
Araldite® GT 7074
Araldite® GT 7097
Araldite® GT 7220
Araldite® GT 7226
Araldite® GT 7255
Araldite® GT 9013
Araldite® GT 9014
Araldite® GT 9135
Araldite® GT 9496
Araldite® GT 9545
Araldite® GT 9654

Polyamide Curing Agents

Aradur® 115-2 X-70 (2)
Aradur® 115-2
Aradur® 115 I-73
Aradur® 125-2
Aradur® 140-2
Aradur® 360 (3)
Aradur® 9130

Other Curing Agents

Aradur® 3365 (2), (5)
Aradur® 3441
Aradur® 3442
Aradur® 42
Aradur® 835
Aradur® 9690

Other Products

Araldite® DY-E
Araldite® PT 810 (7)
Aradur® 3380-1
Accelerator 960-1 (4)

Limitations

1) For use only in coatings that are intended for contact with dry bulk foods at room temperature.

2) Solvents are not covered by FDA and must be removed in the final coatings.

3) For use only in coatings for containers having a capacity of 1,000 gallons or more when such containers are intended for repeated use in contact with alcoholic beverages containing up to 8% of alcohol by volume.

4) For repeated use only (see 21 CFR 175.300 paragraph (c) (3) or (4) for specific data).

5) Conforms to listings in 21 CFR 175.300 only after the phenolic component has been reacted with Bisphenol-A diglycidyl ether resin.

6) For use in adhesives as components of articles intended for food contact, subject to provisions of 21 CFR 175.105.

7) For use only in coatings contacting bulk quantities of dry food with no free fat or oil on the surface, as specified in 21 CFR 177.2420(a)

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Global Presence – 13 Manufacturing Sites

HUNTSMAN

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Please note that not all products are produced in North America.

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