AMERICAS

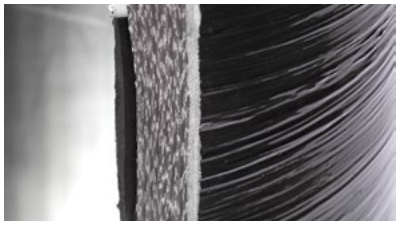
Epoxy Curing Agents

Diluents | Accelerators | Adhesion Promoters
Specialty Resins | Additives







EVONIK
Leading Beyond Chemistry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Contents

This Product Guide is intended to familiarize you with various properties and applications information on Evonik Corporation's epoxy curing agents, resins, diluents, modifiers, and specialty resin. If you'd like more detailed information, please contact Evonik Corporation at **800-345-3148, crosslinkersprodinfo@evonik.com**. Or visit our web site at **www.evonik.com/crosslinkers**

About Us

EVONIK EPOXY CURING AGENTS AND SPECIALTY RESINS

Evonik offers a full line of high-quality, performance-oriented epoxy curing agents and modifiers for a wide variety of applications, including industrial coatings, civil engineering and construction, adhesives, and composites. We also offer high-performance specialty resins for waterborne coatings applications.

These products are produced at state-of-the-art manufacturing facilities located in the U.S.A, England, Germany, Japan, China, and Singapore. In addition we maintain numerous stocking points throughout the world.

Our experienced technical specialists have an in-depth understanding of your market requirements and are able to provide the right level of technical service and support you need.

Product Group

Property Summary

PRODUCT GROUP	GENERAL PROPERTIES
ALIPHATIC AMINES	Wide range of products with differing properties. High reactivity, fast cure at ambient or low temperatures. Relatively moisture insensitive. Reasonable color and color retention. Good chemical resistance, particularly to solvents. For heat-cure applications, good elevated-temperature performance, very good chemical resistance, and electrical and mechanical properties.
AMIDOAMINES	Range of amidoamines of differing reactivities. Low viscosity. Exhibit very good adhesion, particularly to concrete. Good cure under humid conditions. Modified amidoamines can offer faster cure speed and improved chemical resistance.
CYCLOALIPHATIC AMINES	Cure at low temperatures under damp conditions. Good film properties (e.g., excellent gloss). Resistant to amine blush and water spotting. Excellent color and color stability. Good adhesion and very good chemical resistance. Range of cure times and pot lives. For heat-cure applications, good elevated-temperature performance, very good chemical resistance, and electrical and mechanical properties.
POLYAMIDES	Ambient cure, low toxicity, good flexibility and toughness with high viscosity, long pot life and good water/corrosion resistance. Polyamide adducts provide good compatibility (without induction period) and better cure under adverse conditions than standard polyamides. Modified polyamides can offer faster cure speed, lower viscosity and improved chemical resistance.
WATERBORNE CURING AGENTS	Range of curing agents offering different cure speeds for use with various epoxy resins. Low VOC. Low color. Nonflammable. Easy to clean and apply. Good adhesion, especially to damp concrete. Good abrasion resistance.
EPOXY RESIN DILUENTS AND MODIFIERS	Diluents—viscosity reduction for improved ease of application, improved pigment/filler wetting and improved application properties. Modifiers—flexibilization, toughening, improvement of water resistance and adhesion improvement.
LATENT CURING AGENTS	Includes one-component products that may be used alone or as accelerators for dicyandiamide products.
DICYANDIAMIDE	Dicyandiamide is a latent curing agent providing greater than six months' one-package stability. Available in several physical forms and particle sizes.
ACCELERATORS AND CATALYSTS	This category includes: tertiary amines, which cure an epoxy resin by catalytically induced anionic polymerization; imidazoles, which offer a pot life range from a few hours to six months and are excellent accelerators for other curing agents such as dicyandiamide and anhydrides; substituted ureas, which are low-toxicity replacements for Monuron and Diuron as accelerators for dicyandiamides; and acid-blocked amine accelerators, also used primarily as accelerators.
BORON TRIFLUORIDE	Boron Trifluorides, or BF_3, are amine complexes with a range of pot lives, activation temperatures and curing times. Very high heat distortion temperatures and very good chemical resistance.
POLYCARBAMIDE TECHNOLOGY	Amine curing agent technology for curing polyisocyanate resins. Amicure® IC series of products are specifically designed for use with polyisocyanate resins and other standard HDI trimer based polyisocyanates. Clear and pigmented coatings based upon Amicure® IC curing agents exhibit very rapid hardness development, excellent low temperature cure, very good color and UV stability and excellent surface appearance.
ADHESION PROMOTERS	Full line of adhesion promoters for use with both PVC and acrylic based plastisol systems.

General Performance Comparison

COLOR AND COLOR STABILITY	VISCOSITY	POT LIFE	LOW-TEMPERATURE CURE	SURFACE FILM APPEARANCE	FILM FLEXIBILITY	ADHESION	CHEMICAL RESISTANCE		
							ACIDS	SOLVENTS	WATER
EXCELLENT	LOW	LONG	GOOD	GLOSS	EXCELLENT	EXCELLENT	EXCELLENT	VERY GOOD	EXCELLENT
Polycarbamide Technology*	Polycarbamide Technology*		Polycarbamide Technology*	Polycarbamide Technology*					
Cyclo-aliphatic-A	Cyclo-aliphatic	Amidoamine Polyamide	Aliphatic-MB	Cyclo-aliphatic-MB	Polyamide	Polyamide	Cyclo-aliphatic	Aliphatic	Polyamide
Aliphatic-A	Amidoamine		Cyclo-aliphatic-MB	Cyclo-aliphatic-A Aliphatic-MB	Amidoamine	Amidoamine Cyclo-aliphatic-MB	Aliphatic	Cyclo-aliphatic	Amidoamine
Cyclo-aliphatic-MB Aliphatic-MB		Cyclo-aliphatic-A	Cyclo-aliphatic-A Aliphatic-A		Polycarbamide Technology*	Aliphatic-MB			Cyclo-aliphatic
	Aliphatic			Polyamide	Cyclo-aliphatic	Cyclo-aliphatic-A			
Amidoamine Polyamide		Cyclo-aliphatic-MB Aliphatic-A	Polyamide	Amidoamine		Aliphatic-A	Amidoamine	Polyamide	
	Polyamide	Aliphatic-MB	Amidoamine	Aliphatic-A	Aliphatic	Polycarbamide Technology*	Polyamide	Amidoamine	Aliphatic
		Polycarbamide Technology*							
POOR	HIGH	SHORT	POOR	GREASE	FAIR	MODERATE	FAIR	POOR	VERY GOOD

Note: This chart applies to general product types. Evonik Corporation offers a variety of products in each line to give improved performance.
* For use with polyisocyanate resins.

WORKING EXAMPLES USED FOR ABOVE SIMPLISTIC COMPARISON:

Polyamide–Ancamide® 350A Curing Agent
Amidoamine–Ancamide® 506
Cycloaliphatic-A–Ancamine® 1618 Curing Agent
Cycloaliphatic-MB–Ancamine® MCA
Aliphatic-A–Ancamine® 1608
Aliphatic-MB–Ancamine® 1856
Polycarbamide Technology—Amicure® IC-221 Curing Agent

KEY

A= Adduct-type
MB= Mannich base-type

Ancamine® Aliphatic Amines

Selection Chart

ANCAMINE® 2814 Amine
Good balance of physical properties
Good color
Rapid development of properties

ANCAMINE® 1784 Amine
Longest pot life
Low viscosity
Low blush

ANCAMINE® 2422 Amine
Plasticizer free
Highest chemical resistance
Best selection for heat cure

ANCAMINE® 2836 Amine
Good chemical resistance
Corrosion resistance
Plasticizer free

LONGER POT LIFE

LOWER VISCOSITY

HIGHER CHEMICAL RESISTANCE

ANCAMINE® 2765 Amine
Fast cure speed
Hot water resistance
Compatible with multifunctional resins

ANCAMINE® 2432 Amine
Best balanced properties
Excellent chemical resistance
Good low-temperature cure

BIS A FREE

HIGHER FLEXIBILITY

ANCAMINE® 1856 Amine
Best cure under cold/damp conditions
Good chemical resistance

ANCAMINE® 2390 Amine
Flexible and fast
Good surface appearance

BETTER BLUSH RESISTANCE

LOWER TEMPERATURE CURE

ANCAMINE® 2739 Amine
Low emissions
Moisture vapor barrier

ANCAMINE® 2609 Amine
Low viscosity
Improved surface appearance

GREATER FLEXIBILITY

ANCAMINE® 2803 Amine
Fast cure at ambient and low temp
High mechanical strength

ANCAMINE® 2800 Amine
Long potlife
Fast cure

FASTER CURE

SUNMIDE® CX1151
Fast cure, low temperature
Excellent solvent and chemical resistance
Good corrosion protection

LOW TEMPERATURE

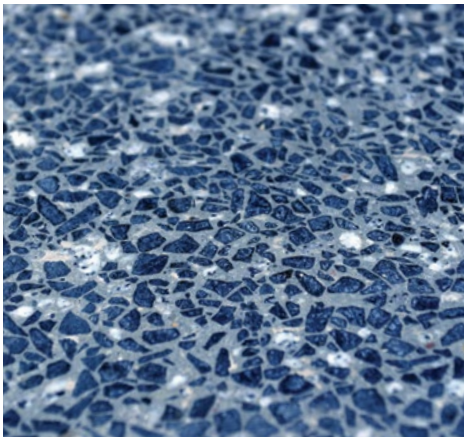
ANCAMINE® 2811 Amine
Fast cure, low temperature
Excellent solvent and chemical resistance
Good corrosion protection

HAPS FREE VERSION

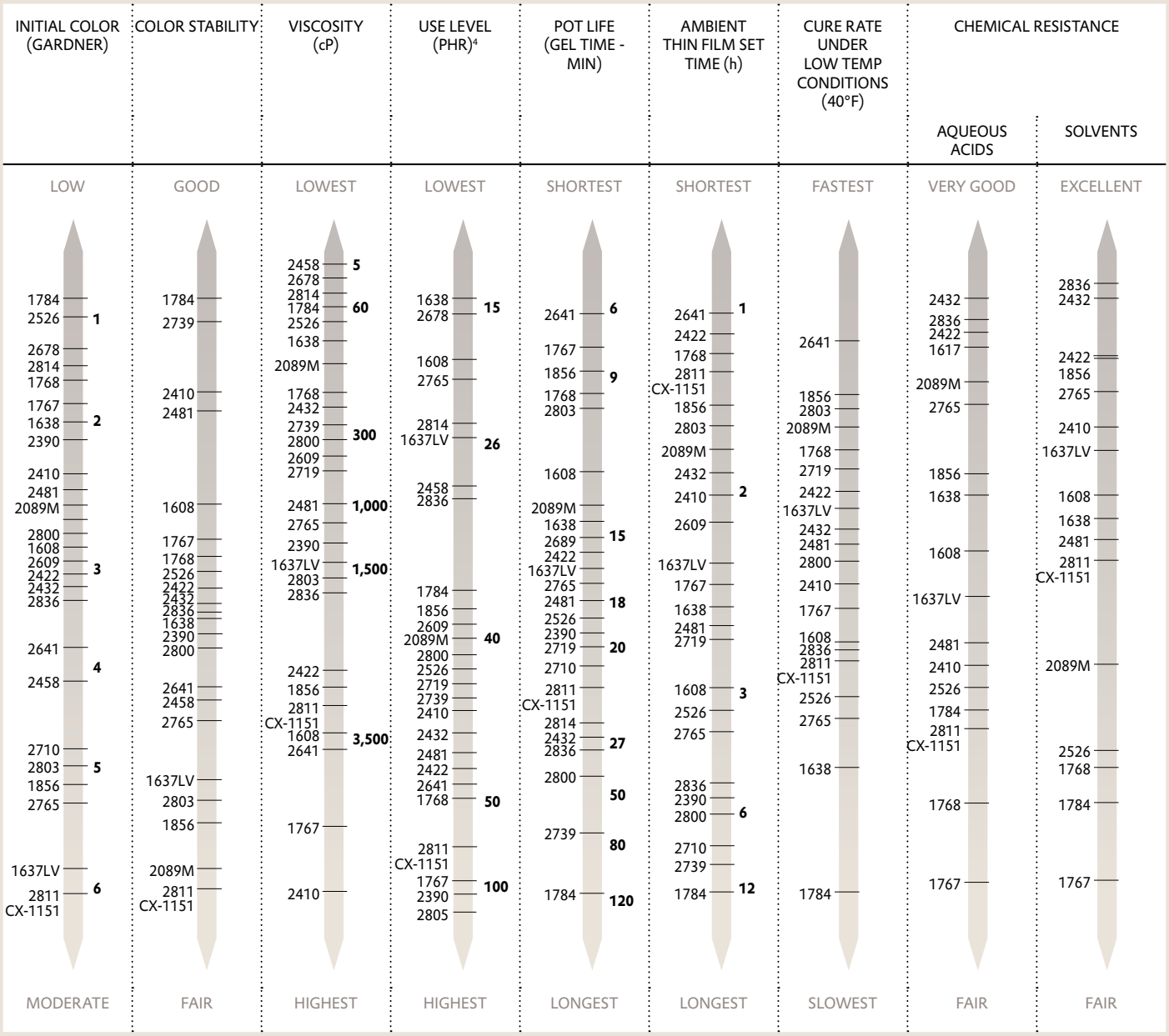
ANCAMINE® 2738 Amine
Solvent free coatings
Benzyl alcohol free

ALIPHATIC AMINES–MODIFIED
PRINCIPAL APPLICATIONS

Aliphatic amines find use in civil engineering (e.g., patch repair systems, flooring), high-solids coatings, adhesives, wet lay-up laminating, small electrical encapsulation and are used to accelerate other amine curing agents.



Performance Comparison (select products shown)



Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® AD	Adduct	6	1,500	1.08	485	107	60	6	1.0	127	ambient temp
ANCAMINE® T	Adduct	1	300	1.03	1,145	36	20	18	4.0	128	ambient or elevated temp
ANCAMINE® T-1	Adduct	1	1,500	1.07	885	47	25	12	3.0	128	ambient temp
ANCAMINE® 1608	Adduct	3	3,500	1.08	800	44	20	14	3.0	128	ambient temp
ANCAMINE® 1637	Mannich Base	6	4,000	1.09	750	50	26	14	1.5	130	ambient temp
ANCAMINE® 1638	Modified Amine	2	100	1.03	1,070	31	15	15	2.5	127	ambient or elevated temp
ANCAMINE® 1767	Modified Amine	2	6,000	0.970	310	180	100	7	2.5	103	ambient temp
ANCAMINE® 1768	Modified Amine	2	220	0.971	630	95	50	10	1.5	130	ambient temp
ANCAMINE® 1769	Adduct	1	600	1.01	965	48	25	30	4.0	126	ambient or elevated temp
ANCAMINE® 1784	Modified Amine	1	50	0.950	315	86	40	120	12	116	ambient temp
ANCAMINE® 1856	Mannich Base	5	3,000	1.12	460	73	40	9	1.8	132	ambient temp
ANCAMINE® 1916	Adduct	4	6,000	1.09	840	43	25	23	4.0	131	ambient temp
ANCAMINE® 2071	Modified Amine	4	700	1.018	506	95	50	8	2.0	132	ambient temp
ANCAMINE® 2089M	Modified Amine	2	100	1.00	395	75	40	15	2.0	126	ambient temp
ANCAMINE® 2390	Modified Amine	2	1,200	0.982	213	204	107	19	4.0	128	ambient temp
ANCAMINE® 2410B75	Adduct Solution	2	11,000	1.05	340	114	60	30	2.0	122	ambient temp
ANCAMINE® 2422	Modified Amine	3	2,000	1.12	665	49	26	NA	NA	NA	ambient or elevated temp
ANCAMINE® 2432	Modified Amine	3	300	1.10	368	88	46	27	2.0	131	ambient temp
ANCAMINE® 2458	Modified Amine	4	5	0.875	NA	55	30	NA	NA	NA	ambient temp

ALIPHATIC AMINES—MODIFIED

	Comments	Principal Applications
	Very fast cure. Cures in cold, damp conditions and gives excellent adhesion to a variety of substrates. A phenol-free version (Ancamine® 2641) is available. DOT noncorrosive.	Adhesives; concrete repair; accelerator for other amines.
	Good color and reduced level of skin irritation relative to most aliphatic polyamines.	Wet lay-up laminating; tooling; adhesives; patch repair kits. FDA-compliant with 21CFR 175.105.[8]
	An accelerated version of Ancamine® T curing agent that can provide a faster thin film cure and reduced sensitivity to moisture during cure.	Wet lay-up laminating; tooling; adhesives; patch repair kits.
	Good balance of chemical and solvent resistance. Compatible with multifunctional epoxy resins for improved hot chemical and water resistance.	High-solids and solvent-free coatings; tank linings; adhesives; accelerator for amidoamines. FDA-compliant with 21CFR 175.105 (with restrictions) and 21CFR 175.300.[8]
	Cures down to 35°F under adverse conditions. Good resistance to solvents. Good compatibility with epoxy novolacs. Low viscosity version of Ancamine 1637LV also available.	Laminates; adhesives; accelerator for other amines.
	Combines low viscosity with good chemical resistance.	Trowelable flooring; grouts; accelerator and viscosity reducer for other amines. Compliant with 21CFR 175.105 (with restrictions) and 21CFR 175.300.[8]
	Fast cure and not highly moisture sensitive. Ancamine® 1767 provides low modulus and high flexibility.	Trowelable flooring; fast-setting adhesives; repair mortars; accelerator for other amines.
	Low shrinkage, low-vapor pressure and low skin irritation potential. Yields a good combination of mechanical and electrical properties. DOT noncorrosive.	Electrical potting and castings; wet lay-up laminating; tooling; adhesives.
	Longest pot life of aliphatic amines offered, low viscosity and good color stability. Gives low blush and exudation, and good flexibility. May be accelerated with other curing agents.	High-solids and solvent-free coatings; flooring; laminates; castings.
	Best cure under cold, damp conditions with rapid development of hardness. Has very good chemical resistance, and low blush and exudation.	Concrete repair materials; flooring; accelerator for other curing agents.
	Provides rigidity and high physical strength.	Heat-resistant coatings; FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Fast cure under cold, damp conditions. Bonds well to a variety of substrates.	Metal and concrete adhesives; repair mortars; accelerator for other amines.
	Low-viscosity product for rapid cure at low temperatures. Developed to enable high-gloss films with much better resistance to carbamation than other aliphatic amines, even under high humidity. Accelerator for cycloaliphatic amines.	Solvent-free and high-solids coatings; concrete patching compounds; accelerator for other amines; crack injection. FDA-compliant with 21CFR 175.105.[8]
	A flexibilized curing agent which allows a one-to-one mix ratio in epoxy formulations. High elongation, tear resistance and toughness.	Applications where greater flexibility, toughness and elongation are required such as crack bridging, secondary containment membranes and impact-resistant coatings.
	Highly monodispersed adduct of ethylenediamine and LER with low residual resin for easier handling and formulating. Rapid dry time and good chemical resistance.	Chemically-resistant, high-solids coatings and tank linings; curing agent component FDA-compliant with 21CFR 175.105 and 21CFR 175.300 (with restrictions).[8]
	Plasticizer free and multi functional curing agent designed for optimal chemical resistance at ambient and elevated temperature.	Chemically-resistant coatings, tank linings and secondary containment linings. FDA-compliant with 21CFR 175.105.[8]
	Outstanding resistance to a wide range of chemicals. A fast-curing amine with good working life. Rapid development of properties at low temperature. Phenol-free and low viscosity. Good cathodic disbondment resistance.	Chemically-resistant coatings, mortars and secondary containment linings; also used as an accelerator for high-solids coatings and flooring. FDA-compliant with 21CFR 175.105.[8]
	A low-viscosity ketimine curing agent that allows significant pot life extension in formulated systems. Achieves performance similar to unmodified amines and amine adducts, and achieves typical pot life of 7-8 hours in high-solids coatings and adhesives.	High-solids marine and industrial maintenance coatings. Adhesives and industrial flooring applications. Can combine with other curing agents to lower viscosity and extend pot life.

NA - Not Applicable

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® 2481	Modified Amine	2	1,000	1.03	415	90	47	18	2.7	131	ambient temp
ANCAMINE® 2526	Modified Amine	1	70	0.98	440	87	46	19	3.3	134	ambient temp
ANCAMINE® 2557	Adduct	1	360	1.02	1,030	47	25	31	2	130	ambient or elevated temp
ANCAMINE® 2609	Mannich base	3	350	1.01	400	75	40	15	2	130	ambient temp
ANCAMINE® 2638	Adduct	2	2,000	1.01	334	96	51	45	3.5	117	ambient or elevated temp
ANCAMINE® 2641	Modified Amine	4	3,500	1.04	578	91	48	6	1	135	ambient temp
ANCAMINE® 2678	Modified Amine	<2	35	0.97	1,300	30	16	29	2.25	130	ambient or elevated temp
ANCAMINE® 2710	Adduct	5 max	3,000-5,000	>1.05	800	42	22	18	7	130	ambient temp
ANCAMINE® 2719	Mannich Base	14	400	1.03	360	75	40	20	2.5	133	ambient temp
ANCAMINE® 2738	Modified amine	6	100-200	1	525-575	85	50	150	13	NA	2-7 days
ANCAMINE® 2739	Adduct	3	350	1.04	560	95	50	45	10	129	ambient temp
ANCAMINE® 2746	Modified Aliphatic	4	370	0.96	305	92	50	34	7	124	ambient temp
ANCAMINE® 2765	Addduct	5	850-1350	1.08	850-1350	44	20	15	4	NA	2-7 days
ANCAMINE® 2785	Modified Amine	<4	2000-5500	1.04	600-630	97	48	3-7	1	–	ambient temp
ANCAMINE® 2800	Adduct	<5	250-650	1.03	350-550	80-90	40-45	30	6	130	ambient temp
ANCAMINE® 2803	Mannich Base	<8	1300-1900	1.05	230-290	176-188	90-110	10	2	–	ambient temp
ANCAMINE® 2811	Phenaklamine	18	1700-3400	1.02	172	255	134	26	1:45	43	2-7 days
ANCAMINE® 2814	Modified Amine	<2	25-75	0.98	700-850	40-50	20-25	35	NA	130	ambient temp
ANCAMINE® 2836	Modified Amine	3	1500 - 5000	0.97	575-590	55	29	43*	3.5	133	7 days@ ambient temp

* When cut with 40% Benzyl alcohol

ALIPHATIC AMINES–MODIFIED

Comments	Principal Applications
Rapid cure and development of physical properties ambient and low temperatures. Yields formulations with good blush resistance. Low color.	Flooring and high-solids coatings. Concrete adhesives and repair mortars. Can be used as a sole curing agent or as an accelerator for other amines.
A low-viscosity modified aliphatic amine allows fast cure, provides some flexibility.	Flooring and industrial adhesives. Can be combined with other curing agents to lower viscosity and increase reactivity.
Low shrinkage. Yields a good combination of mechanical and electrical properties.	Electrical potting and castings; wet lay-up laminating; tooling; adhesives.
Low-viscosity product that gives rapid cure at low temperatures. Gives films with much better resistance to carbamation than other aliphatic amines, even under high humidity. Accelerator for cycloaliphatic amines.	Solvent-free and high-solids coatings; concrete patching compounds; accelerator for other amines; crack injection.
Aliphatic amine adduct offers excellent toughness and thermal shock resistance.	Structural adhesives, electrical potting and encapsulation; other high-performance applications.
Phenol-free version of Ancamine® AD. Fastest cure of the aliphatics. Effective accelerator for polyamides and amidoamines.	Adhesives; concrete repair; accelerator for other amines.
Low-viscosity, fast-curing polyamine with excellent mechanical properties for composite and adhesive applications, a better alternative to ethyleneamines.	Adhesives and composites or as an accelerator for other amines.
Exhibits a fast set with liquid and solid epoxy resins. A medium-viscosity product used in solvent free and/or high-solids coatings where resistance to gasoline, ethanol and oxidizing acid is required.	Applications include high-build coatings and chemically-resistant tank linings.
Fast cure, low temperature cure, excellent chemical resistance, nonyl-phenol free	Protective and industrial coatings, and moisture tolerant coatings.
Benzyl alcohol free curing agent for solvent free coatings and flooring formulations	Emission complaint coatings and flooring systems
Low emission, good UV resistance, long pot life, good cure speed, best-in-class blush and moisture resistance, excellent mechanical properties.	Protective coating, flooring, and construction applications including moisture vapor barriers.
Moderately reactive curing agent. Low viscosity, rapid cure, relatively water insensitive.	Solvent-free, high solids coatings, wet lay-up laminating for composites, flooring.
Bis A and plasticizer free curing agent for solvent free caoting formulations . It provides good solvent and alcohol resistance.	Solvent free caotings, laminates , adhesives and accelerator for other curing agents
Rapid thin film cure. Low temperature cure. Can be used as an accelerator for other amine-based curing agents.	Solvent-free coatings, patch repair compounds, adhesives. Oil and gas pipelines.
Low emissions, long pot life, fast cure speed. Moisture vapor barrier. Excellent mechanical properties.	Protective coating, flooring, and construction applications including moisture vapor barrier.
Flexible, high elongation with high hardness and fast cure speeds. Elastic properties with fast recovery after deformation.	Flooring applications; repair and bonding applications including crack bridging, deck membranes and joint sealants.
High performance phenalkamine, fast cure at low temperature. Offers excellent solvent and chemical resistance as well as water and corrosion potection.	Metal and concrete primers. Heavy duty industrial, OEM coatings. HAPS free
Alkyl phenol-free, very low viscosity product with low color, low loading, and rapid development of properties. Good balance of physical properties.	Heavily filled flooring applications especially terrazzo flooring.
Ancamine® 2836 curing agent provides a long working life and yields formulations with excellent chemical resistance. It provides crosslinkable system with high glass transition temperature (Tg) development and can be used as a co-curative to improve the Tg values.	Chemically-resistant coatings, tank linings, adhesive applications with high Tg development.

NA - Not Applicable

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] Min @ 77°F, 150 G mix	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® 2850	Modified amine	≤ 5	450 - 650	1.01	370-435	68-76	35-40	25-35	3	135	Ambient
ANCAMINE® 2914UF	Modified Amine	<5	500-1500	1.08	485-525	95	50	8 [1]	5.3	122	ambient temp
SUNMIDE® CX-1151	Phenalkamine	<18	2620	1.02	175	225	135	NA	9.0	NA	ambient temp
ANCAMINE® R	Adduct	4	6,500	0.980	195	222	115	60	6	113[10]	ambient temp

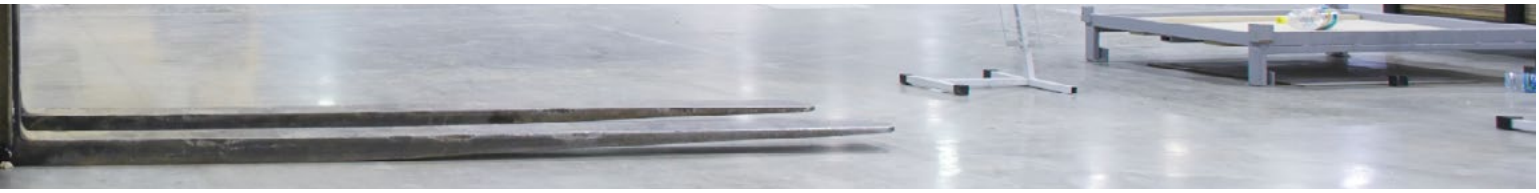
Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h@ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® 1922A	Diethylene glycol di (aminopropyl) ether	1	10	1.00	507	55	29	57	NA	117	ambient or elevated temp
ANCAMINE® AEP	Aminoethyl-piperazine	1	10	0.984	1,297	43	23	19	NA	128	ambient or elevated temp
ANCAMINE® DETA	Diethylenetriamine	1	<10	0.948	1,640	21	11	25	3.8	129	ambient temp
ANCAMINE® TEPA	Tetraethylene-pentamine	2	80	0.996	1,340	31	16	35	NA	132	ambient temp
ANCAMINE® TETA	Triethylenetetramine	1	20	0.984	1,435	27	14	30	3.5	129	ambient temp

1 Gel time for Ancamine® 2914UF was measured for a 20-gram mix

ALIPHATIC AMINES–MODIFIED

	Comments	Principal Applications
	Meets perm rating < 0.1 per ASTM F-3010. Fast cure at ambient and low temperature. Outstanding adhesion to both dry and damp concrete. Very low VOC and emissions.	Moisture vapor barrier coatings, flooring, and construction applications
	Ultra-fast set time and rapid property development at room temperature in adhesive applications. Allows end users to improve the production throughput. Zero VOC and phenol-free epoxy curing agent that can achieve very fast cure.	Structural adhesives or as an accelerator for other amines.
	High performance phenalkamine. Fast cure at low temperature. Offers excellent solvent and chemical resistance as well as water and corrosion protection.	Metal and concrete primers. Heavy duty industrial, marine service, flooring.
	Adheres and cures well when applied under water. Can be accelerated with other amines to give harder, faster cures. Presence of water will accelerate cure.	Underwater coatings, grouts, adhesives, and mortars; splash-zone compounds.

NA - Not Applicable



ALIPHATIC AMINES–UNMODIFIED

	Comments	Principal Applications
	For exceptional toughness, resiliency, thermal shock resistance and outstanding impact resistance. Good electrical properties. High purity grade also available.	Structural adhesives; electrical potting and encapsulation for aerospace, automotive and other high-performance applications. FDA-compliant with 21CFR 175.105.[8]
	Rapid gel and initial cure at room temperature to B-stage. A post-cure for rigid castings with very high impact resistance. System requires modification with flexibilizers, aliphatic epoxies or plasticizers for full cure at room temperature.	Civil engineering adhesives; trowelable flooring and decoupage; small electrical pottings and encapsulation; an accelerating co-curing agent for other amines.
	Low-equivalent-weight, high nitrogen content curing agent for epoxy resins.	Occasionally used for flooring, solution coatings and encapsulation. Ancamine, DETA, TETA and TEPA are FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Higher molecular weight ethyleneamine. Lower vapor pressure than other ethyleneamines.	
	Higher molecular weight ethyleneamine. Lower vapor pressure than DETA.	

NA - Not Applicable

Ancamide® Amidoamines

Selection Chart

ANCAMIDE® 2426 Amidoamine

Very good blush resistance
Long pot life
Good color stability

ANCAMIDE® 2886 Amidoamine

Excellent chemical and blush resistance
Good film formation
Excellent adhesion to concrete

ANCAMIDE® 2443 Amidoamine

Lowest viscosity
Surface tolerant
Excellent modifier for polyamides
Plasticizer free

HOT CHEMICAL/
HOT OLEIC ACID RESISTANCE

IMPROVED SURFACE APPEARANCE

ANCAMIDE® 2386/2396 Amidoamines

LOWER VISCOSITY

LONGER POT LIFE

Best balanced properties
Good chemical resistance
Lower temperature cure

ANCAMIDE® 2447 Amidoamine

Longest pot life
Good flexibility
Good corrosion resistance

CONVENTIONAL
AMIDOAMINES

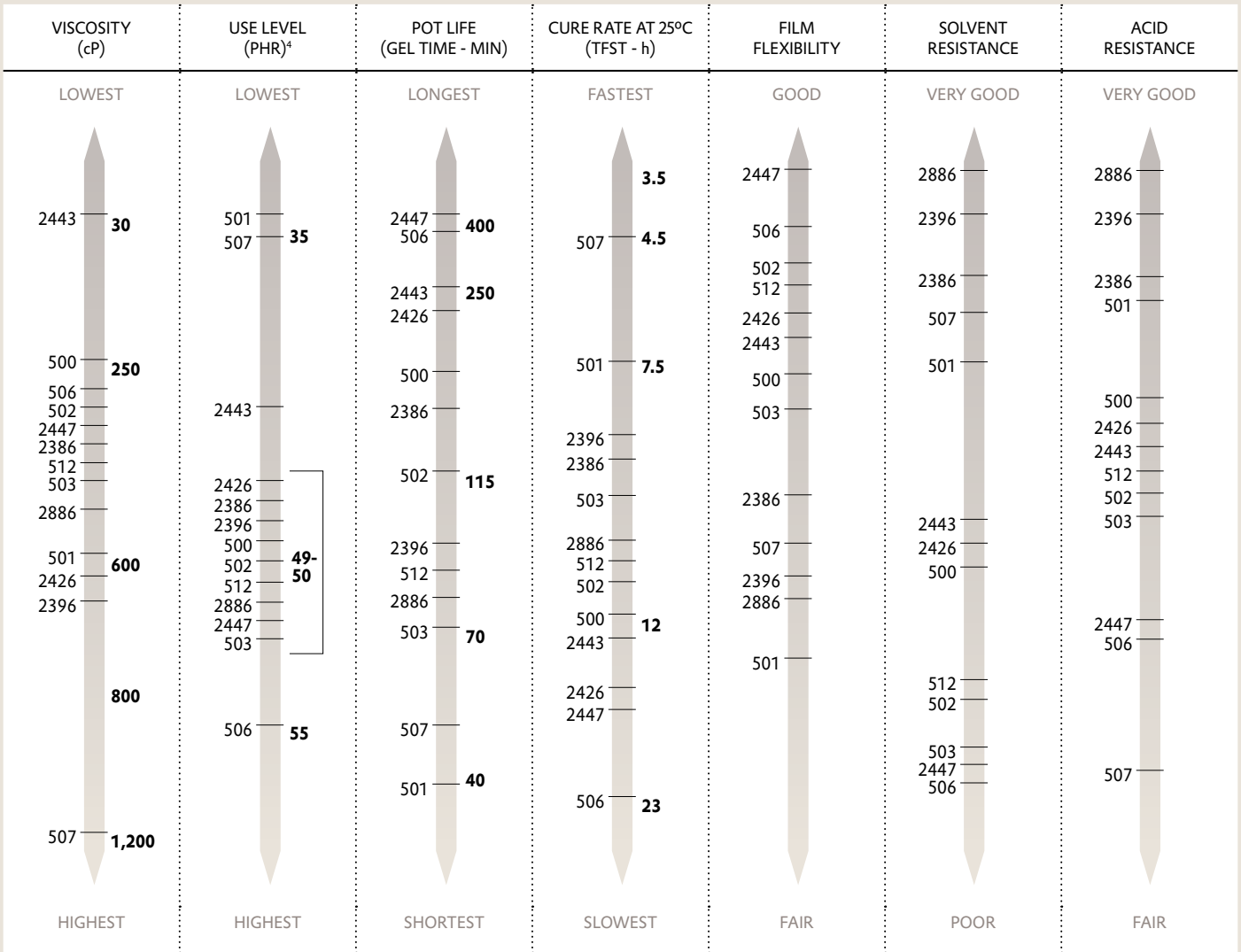
ANCAMIDE® 503 Amidoamine

Low viscosity
Moderate pot life

AMIDOAMINES
PRINCIPAL APPLICATIONS

Amidoamines find use in civil engineering (e.g., concrete bonding, crack injection, flooring, tile grouts, etc.), high-solids coatings, adhesives, electrical encapsulation, and wet lay-up laminating.

Performance Comparison (select products shown)



Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMIDE® 500	Amide/Imidazoline	7	250	0.950	445	90	50	135	12	113[10]	ambient temp
ANCAMIDE® 501	Modified Amide/ Imidazoline	7	600	0.980	550	68	35	40	7.5	116[10]	ambient temp
ANCAMIDE® 502	Amide/ Imidazoline	7	300	0.950	450	90	50	115	12	113[10]	ambient temp
ANCAMIDE® 503	Amide	6	350	0.950	500	90	50	70	9.0	119[10]	ambient temp
ANCAMIDE® 506	Imidazoline/ Amide	7	250	0.940	420	105	55	385	23	113[10]	ambient temp
ANCAMIDE® 507	Adduct	6	1,200	0.990	600	65	35	44	4.5	127[10]	ambient temp
ANCAMIDE® 512	Amide/Imidazoline	<10	300-450	0.93	400-500	100-110	50	96	11	150	ambient temp
ANCAMIDE® 2137	Adduct	7	1,800	1.039	300	150	70	27	3.0	112[10]	ambient temp
ANCAMIDE® 2349	Modified Amide/ Imidazoline	7	800	0.980	585	68	35	45	7.5	131	ambient temp
ANCAMIDE® 2386	Modified Amide/ Imidazoline	8	340	1.000	364	93	49	135	8.5	123	ambient temp
ANCAMIDE® 2396	Modified Amide/ Imidazoline	8	680	0.993	350	93	49	102	8.5	137	ambient temp
ANCAMIDE® 2426	Modified Amide/ Imidazoline	8	650	0.952	380	93	49	245	14	115	ambient temp
ANCAMIDE® 2443	Modified Amide/ Imidazoline	7	30	0.970	530	86	45	250	12	133	ambient temp
ANCAMIDE® 2447	Amidoamine	5	320	0.942	380	95	50	395	15	115	ambient temp
ANCAMIDE® 2781	Amidoamine	<12	80-120	0.92	245	104	55	400-500	NA	140	ambient and elevated temp
ANCAMIDE® 2886	Modified Amide/ Imidazoline	<11	350-500	1.02	300-450	100-110	50	83	11	122	ambient temp

	Comments	Principal Applications
	Low viscosity, moderate pot life. Noncritical mixing ratio. Good adhesion to concrete. Used alone or with other curing agents (e.g., Ancamine® 1608, 1768 or 2432) to adjust cure rate and other properties.	Concrete primers and coatings; grouts; concrete repair; flooring; riverstone mortars; electrical encapsulation; tooling; general-purpose adhesives; FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Modified, accelerated version of Ancamide® 500. Cures under humid conditions. Very good adhesion to concrete. Exhibits good chemical resistance.	Trowelable flooring; concrete coatings and primers; patching compounds; concrete adhesives.
	Faster cure version of Ancamide® 500.	Trowelable flooring; concrete repair; grouts; structural composites. FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Faster gel time and thin-film cure time than either Ancamide® 500 or 502.	Concrete coatings, flooring; concrete repair; tile grouts. FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Highest imidazoline content of amidoamine offering for long pot life and good through cure with very little exotherm. In high-solids coatings, often mixed with cycloaliphatic curing agents.	Civil engineering applications where longer pot life than Ancamide® 500 is desirable; wet lay-up laminates; electrical encapsulation; high-solids coatings; pot life extender for cycloaliphatic amine curing agents; structural composites. FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Fast cure with good water resistance for use alone or with polyamide adducts such as Ancamide® 700-B-75.	High-solids, anticorrosive coatings; concrete patching and flooring mortars; adhesives and patch kits. FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Non-TEPA-based amidoamine, low viscosity, relatively long pot life, non-critical mix ratio.	Trowelable flooring, concrete repair, grouts, concrete primers and coatings, structural composites.
	Good resistance to blush and exudation. Good flexibility, reverse impact resistance, and non-critical loading (70-100 PHR).	High-solids coatings; adhesives; sealants and putties; flexible cable-jointing compounds; coatings and primers for concrete.
	DOT noncorrosive version of Ancamide® 501. High strength and modulus. Good adhesion to concrete. Good chemical resistance.	Civil engineering applications; concrete adhesives; trowelable flooring; concrete primers; machinery grouts.
	Long pot life with good thin-film set time. Excellent film formation, blush resistance and good low-temperature cure compared with standard amidoamines. Very good solvent and corrosion resistance.	High-performance marine, maintenance and machinery coatings; tank linings; allows high-solids or 100% solids formulations for base coats or primers.
	Excellent adhesion to cold, damp concrete. High strength and modulus, and the best chemical resistance of the amidoamine offerings. Less amine blush than standard amidoamines.	Concrete primers and bonding agents; self-leveling and trowelable flooring, tile grouts and chemically-resistant grouts.
	A plasticizer-free curing agent. Long pot life with excellent blush resistance. Excellent hardness development and good resistance to aqueous reagents. Good color stability.	High-solids and 100% solids coatings and primers; FDA-compliant with 21 CFR 175.300[8] for applications such as brewery tank linings and potable water applications (see Ancamide® 2426 data sheet for specific FDA guidelines and restrictions).
	A very low-viscosity, plasticizer-free amidoamine with long pot life and good blush resistance. Develops good adhesion to concrete and rusty metal. Exhibits excellent humidity and corrosion resistance.	Penetrating primer clearcoats for poorly prepared surfaces; 100% solids, conventionally-sprayed coatings.
	Low viscosity, long pot life, excellent corrosion resistance. Can be used as a modifier to extend pot life, reduce viscosity or impart flexibility. Can be used in combination with other amidoamines for grout applications.	Concrete primers, flooring, crack injection and grouts. FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Longer pot life, high thermal and mechanical properties with low exotherm.	CIPP, larger casting and electrical potting compounds, filament winding.
	Excellent chemical resistance, especially to hot oleic acid, blush resistance and good film formation, excellent adhesion to concrete.	Tile grouts, trowelable flooring and self-leveling flooring, particularly chemical resistant floorings in food preparation areas.

NA - Not Applicable

Ancamine® Cycloaliphatic Amines

Selection Chart

ANCAMINE® 2748 Amine
Chemical resistance

BEST CHEMICAL RESISTANCE

ANCAMINE® 2280 Amine
Excellent overall chemical resistance
Blush and waterspot resistance
Low-temperature cure

FASTER CURE

ANCAMINE® 2519 Amine
Lower loading industry standard
Fast cure at ambient and low temperatures
Good carbamation resistance

ANCAMINE® 2726 Amine
Best balanced properties
Good color stability
Moderate carbamation resistance
Good chemical resistance

IMPROVED CHEMICAL RESISTANCE

BETTER COLOR STABILITY

ANCAMINE® 2579 Amine
Better UV resistance
High aesthetics

ANCAMINE® 2143 Amine
Very good solvent resistance
Good color and color stability
Good film formation, even at low temperature

BETTER BLUSH RESISTANCE

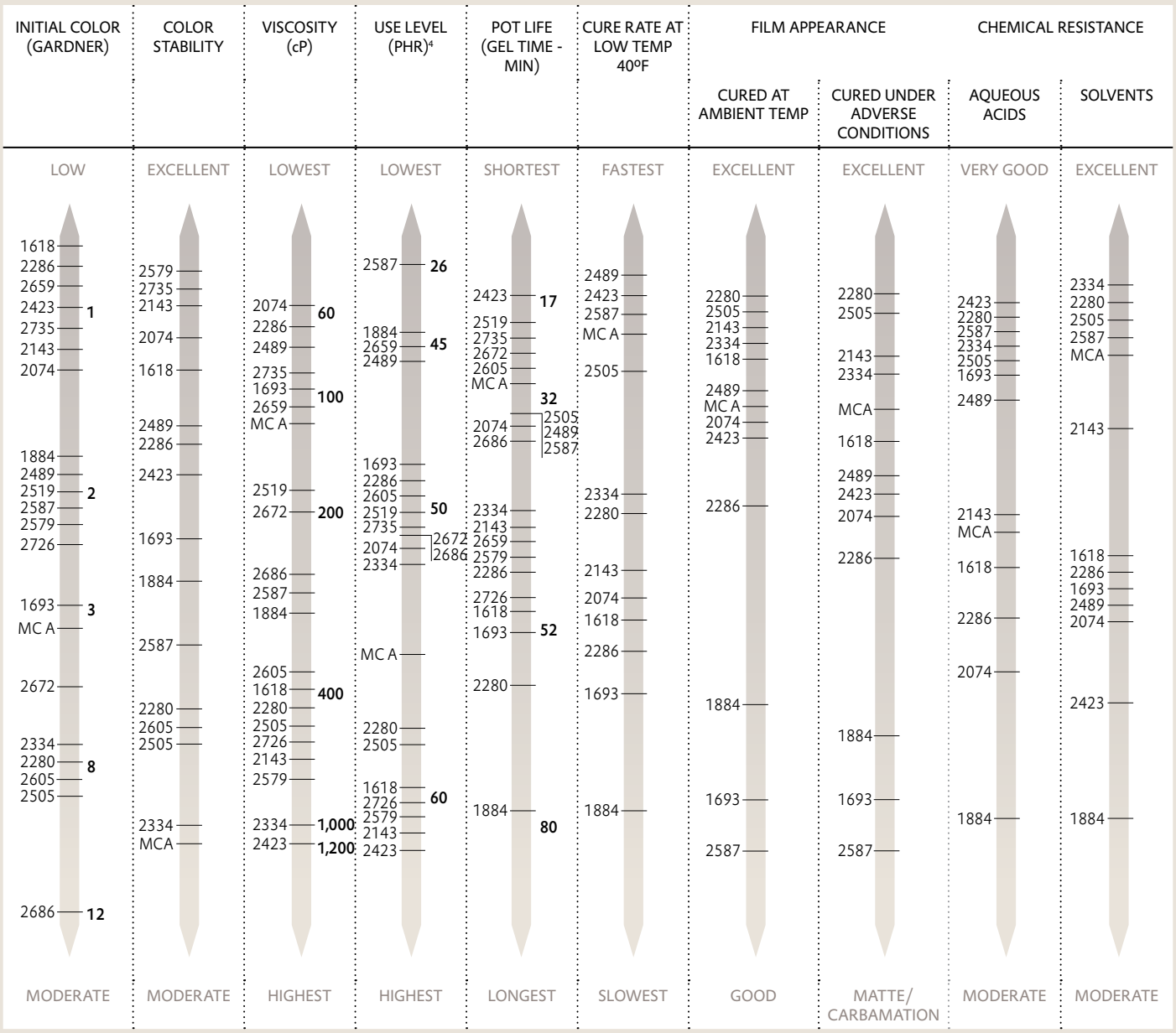
ANCAMINE® 2735 Amine
Low color, low yellowing, low viscosity
Fast cure
Good carbamation resistance

FASTER CURE

CYCLOALIPHATIC AMINES
PRINCIPAL APPLICATIONS

Modified cycloaliphatic amines find use in solvent-free and high-solids coatings, flooring, chemically resistant linings and secondary containment. Unmodified cycloaliphatics are used in adhesives, electrical encapsulation, wet lay-up laminating, and filament winding.

Performance Comparison (select products shown)



Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® MCA	Mannich Base	3	150	1.03	305	101	55	32	6.5	111	ambient temp
ANCAMINE® 1618	Adduct	1	400	1.03	272	113	60	50	5.5	123	ambient temp
ANCAMINE® 1693	Adduct	3	100	1.04	310	96	50	52	9	121	ambient temp
ANCAMINE® 1884	Adduct	2	320	1.04	360	86	45	80	9	123	ambient temp
ANCAMINE® 1895	Adduct	1	1,200	1.02	410	75	40	15	3.5	130	ambient temp
ANCAMINE® 2072	Mannich Base	3	200	0.998	350	102	55	23	4	125	ambient temp
ANCAMINE® 2074	Adduct	1	60	0.996	345	92	50	32	4.5	124	ambient temp
ANCAMINE® 2143	Adduct	1	600	1.03	255	115	60	42	7.0	123	ambient temp
ANCAMINE® 2280	Modified Amine	8	450	1.06	250	110	58	50	6.0	122	ambient temp
ANCAMINE® 2286	Adduct	1	60	1.01	325	95	50	40	6	123	ambient temp
ANCAMINE® 2334	Modified Amine	14	1,180	1.09	294	94	50	42	2	NA	ambient or elevated temp
ANCAMINE® 2423	Adduct	1	1,200	1.02	269	120	60	17	3.5	126	ambient temp
ANCAMINE® 2489	Amine Adduct	2	80	1.04	360	83	44	32	3.0	118	ambient temp
ANCAMINE® 2505	Modified Amine	8	495	1.05	270	110	58	31	3.5	126	ambient temp

CYCLOALIPHATIC AMINES—MODIFIED

	Comments	Principal Applications
	Fast curing, even in cold (40°F), damp conditions and under water. Excellent adhesion to cold, damp concrete. Good chemical resistance. Resistant to carbamation (water spotting). Nonylphenol-free version available (Ancamine® 2072).	Industrial flooring mortars; concrete repair mortars; concrete bonding.
	Good color and color stability to produce high-gloss, non-blushing films with good chemical resistance.	Solvent-free and high-solids coatings; gel coats; self-leveling flooring. FDA-compliant component of adhesives under 21CFR 175.105.[8] Also compliant with 21CFR 175.125 and 21CFR 175.300 (with restrictions).[8]
	Very good chemical resistance, especially to acids, organic solvents and alcohols. Low viscosity.	Solvent-free and high-solids coatings; secondary containment coatings; tank linings. FDA-compliant with 21CFR 175.105 (with restrictions).[8]
	Long pot life. Bonds to damp concrete.	Solvent-free and high-solids coatings; grouts; exterior patching mortar and overlay binder.
	Cures down to 35-40°F. Provides films with high gloss and hardness.	High-solids and solvent-free coatings; flooring.
	Nonylphenol-free version of Ancamine® MCA to produce hard films that cure at low temperatures under conditions of high humidity.	Industrial coatings; industrial flooring; mortars.
	Very low viscosity with good color and color stability. Can provide good film flexibility and bonds well to damp concrete.	Self-leveling flooring; grouts; thermal shock-resistant flooring; repair mortars.
	Excellent color and color stability, combined with films exhibiting high-gloss and non-blushing characteristics. Good resistance to carbamation at both ambient and low temperatures (40-50°F). Very good solvent resistance.	Solvent-free and high-solids coatings; self-leveling flooring; tile grouts.
	Great resistance to carbamation, even when cured under adverse conditions, including high humidity. Great overall chemical resistance, particularly against mineral acids and solvents. DOT noncorrosive.	Industrial flooring; high-solids coatings; chemically-resistant mortars and tank linings; secondary containment. FDA-compliant with 21CFR 175.105 (with restrictions).[8]
	Very low viscosity with good color.	Self-leveling flooring; flooring mortars; concrete repair materials.
	High chemical resistance, particularly versus hot oils.	Industrial flooring, high-solids coatings, chemically-resistant mortars.
	Rapid development of physical properties at ambient and low temperatures. Good solvent resistance. High strength and modulus.	Self-leveling and trowelable flooring; mortars and grouts; high-solids coatings.
	Low color and low viscosity. Very low mixed viscosity allows higher filler loading and/or reduced need for diluents. Very rapid cure at ambient or low temperatures.	Decorative and industrial flooring. Chemically resistant high-solids coatings. Mortars and grouts. Concrete sealers and primers.
	Rapid property development at ambient or low temperatures. Very good chemical resistance, waterspot resistance, and resistance to amine blush.	Industrial flooring and secondary containment linings. Chemically resistant mortars and high-solids coatings.

NA - Not Applicable

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMINE® 2519	Adduct	2	190	1.05	310	95	50	23	3.5	122	ambient temp
ANCAMINE® 2579	Adduct	2	600	1.04	280	115	61	40	5.5	122	ambient temp
ANCAMINE® 2587	Modified Amine	2	295	1.06	642	50	26	31	2.6	144	ambient temp
ANCAMINE® 2605	Modified Amine	8	260	1.03	380	95	50	38	4	134	ambient temp
ANCAMINE® 2659	Adduct	< 1	100	1.0	340	86	45	45	6	130	ambient temp
ANCAMINE® 2672	Modified Amine	5 max	100-300	1.06	280-320	95	50	30	5	130	ambient temp
ANCAMINE® 2686	Modified Amine	12 max	100-400	1.0	290-330	95	50	35	4	130	ambient temp
ANCAMINE® 2726	Adduct	2 max	300-600	1.03	240-290	115	60	40-50	7	130	ambient temp
ANCAMINE® 2735	Modified Amine	1	<100	0.99	290	95	50	24	4.5	130	ambient temp
ANCAMINE® 2748	Adduct	10	2275	1.08	344	94	50	50	7	132	ambient temp
ANCAMINE® 2749	Adduct	8	275	1.08	395	76	40	49	5	124	ambient temp
ANCAMINE® 2764	Adduct	1	100	1.03	270	106	55	38	6	126	ambient temp
ANCAMINE® 2791	Modified Amine	8	70-100	1.00	495-540	54	28	84	15	123	ambient and elevated temp
ANCAMINE® 2870	Modified Cycloaliphatic	<2	80-160	0.99	380-410	68-76	35-41	35	3.5	130	ambient temp
ANCAMINE® 2903	Mannich base	>1	115	1.02	577	44	24	190	NA	320	elevated temp
ANCAMINE® 2904	Cycloaliphatic amine blend	1	40-50	0.99	608	42	23	140	NA	325*	elevated temp

CYCLOALIPHATIC AMINES–MODIFIED

	Comments	Principal Applications
	Low-viscosity adduct offers moderate to good carbamation resistance and rapid property development at 50°F.	Chemically resistant high-solids and solvent-free coatings, industrial floorings, accelerator for other curing agents.
	Excellent yellowing resistance; designed to provide good chemical resistance and physical properties.	Solvent-free and high-solids coatings, self-leveling floors.
	Excellent resistance to solvents and high temperatures.	Pipe coatings, flooring, tank linings and secondary containment.
	Low-viscosity cycloaliphatic amine; provides very good cost-performance balance.	Concrete primer and flooring.
	Low-color, low-viscosity product intended for ambient or low-temperature curing. High gloss films give good chemical resistance.	Used in flooring and floor coatings, maintenance coatings, tank linings, and secondary containment linings.
	Low viscosity, excellent chemical and corrosion resistance and good blush resistance. Nonyl phenol and Bisphenol A free.	High-solids coatings; chemically resistant mortars and tank linings; secondary containment. Primers and sealers for concrete.
	Broad balance of chemical resistance and surface appearance properties; provides high mechanical build, rapid cure, is particularly suitable for lower temperature use.	Industrial flooring; high-solids coatings; chemically resistant mortars and tank linings; secondary containment.
	Good color and color stability. Use to produce high-gloss, non-blushing films with good chemical resistance.	Solvent-free and high-solids coatings; gel coats; self-leveling flooring.
	Excellent yellowing resistance; designed to provide good chemical resistance and physical properties as well as low-viscosity and fast cure.	Solvent-free and high-solids coatings, self-leveling floors, particularly where low-yellowing, low-viscosity and fast cure are required.
	Provides industrial coatings with the best chemical resistance of the cycloaliphatic amines.	Chemical resistant coatings, grouts, mortars, including wastewater, secondary containment and other demanding applications.
	100% solid industrial coatings	Chemical resistant coatings, grouts, mortars.
	Low viscosity, good cure speed at ambient and low temp, good carbamation resistance, good yellowing resistance, good chemical resistance, and high final gloss.	High solids and solvent free epoxy primers and coatings, industrial self-leveling flooring.
	Excellent curing agent for high temp and high chemical resistance epoxy coatings. Recommended for use with LER under normal conditions and Novolac/BisF epoxy resins for harsher conditions. Performs well in Atlas cell test.	Heavy duty industrial, marine, oil and gas pipelines. Applications where cold wall effect can impact coating performance.
	Low viscosity product with low color, low loading with high chemical resistance, good resistance to blush.	Light color castings, chemical resistant flooring and tank linings.
	Exhibits longer pot life than conventional cycloalipathic amines. Excellent chemical resistance and high temperature tolerance with good balance of mechanical properties make it very useful for oil and gas applications. Use as a co-curing agent for aromatic amines and polyether amines.	Fiber-reinforced composites made using filament winding, resin transfer molding.
	Heats cure liquid epoxy resins at lower (~100°C) temperatures than typical cycloaliphatic amines with moderate pot life and rapid curing. Cured product exhibits excellent chemical resistance, high mechanical strength and high temperature tolerance.	Fiber-reinforced composites made by resin infusion, filament winding, resin transfer molding.

NA - Not Applicable *DSC-second scan ISO cured at 60°C for 1 hr. and 150°C for 2 hrs.

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)*	Typical Cure Schedule
VESTAMIN® PACM	Methylene-di (cyclohexyl-amine)	1	80	0.96	526	52.5	28	180	NA	318	elevated temp
AMICURE® 101	Non-MDA aromatic amine	6	120	1.00	580	48.5	26	185	NA	311[10]	elevated temp
ANCAMINE® 2049	3,3'-Dimethyl-methylenedi-(cyclohexylamine)	2	120	0.947	458	60	32	400	NA	324	elevated temp
ANCAMINE® 2167	Polycyclo-aliphatic amine	3	210	0.975	520	53	28	210	NA	327	elevated temp
ANCAMINE® 2264	Polycyclo-aliphatic amine	9	2,600	1.00	502	54	29	195	NA	327	elevated temp
ANCAMINE® 2450	Cycloaliphatic amine blend	8	350	0.967	680	42	25	90	NA	335	elevated temp

CYCLOALIPHATIC AMINES–UNMODIFIED

	Comments	Principal Applications
	Low-color, low-viscosity alternative to aromatic diamines, for comparable properties with improved fracture toughness.	Filament winding; wet lay-up laminating; casting; RIM; pultrusion for general industrial, tooling and automotive applications. Compliant with 21CFR 175.105 (with restrictions).[8]
	Aromatic amine; low viscosity, non-staining and MDA-free. Exhibits lower exotherm and higher heat resistance than MDA.	Filament-wound pipe; electrical encapsulation; tooling; large castings; adhesives.
	Low color with longer pot life than other cycloaliphatic amines with comparable mechanical properties to aromatic diamines.	Casting; potting encapsulation; wet lay-up laminating and filament winding for tooling, electrical and general industrial applications.
	Low-viscosity alternative to aromatic diamines with improved tensile strength, toughness and elongation.	Co-curing agent for filament winding; casting; potting; wet lay-up laminating for tooling and general industrial applications.
	Moderate-viscosity alternative to aromatic diamines providing high glass transition temperature, good toughness and good chemical resistance.	Co-curing agent for filament winding; RTM; casting; potting for tooling, electrical and general industrial applications. FDA-compliant with 21CFR 175.105 (with restrictions).[8]
	Low viscosity with good glass transition temperature.	Filament winding; wet lay-up laminating; potting compounds.

NA - Not Applicable *Glass transition temperature after elevated-temperature cure.

Ancamide® Polyamides

Selection Chart

ANCAMIDE® 2353 Polyamide
Very good barrier properties
Improved blush resistance
Low temperature cure
Chemical resistance

ANCAMIDE® 2634 Polyamide
Excellent barrier properties
High cathodic protection
Broad application temperature
Excellent hot water resistance

ANCAMIDE® 910 Polyamide
Outstanding flexibility and peel strength
Excellent thermal shock resistance

IMPROVED SOLVENT RESISTANCE

IMPROVED BARRIER PROPERTIES

IMPROVED THERMAL SHOCK RESISTANCE

ANCAMIDE® 2832 Polyamide
Top coat dive back resistance
Excellent intercoat adhesion
Good corrosion resistance

RAPID RECOAT

ANCAMIDE® 2050 Polyamide
Industry solvent-free standard
High corrosion resistance
Good physical properties

LOW VOC

ANCAMIDE® 2769 Polyamide
100% true solids
Lower viscosity
Plasticizer free

FAST THROUGH CURE

CONVENTIONAL POLYAMIDES

LONGER OVERCOAT

ANCAMIDE® 2652 Polyamide
Excellent overcoat window
High barrier properties
Moderate viscosity

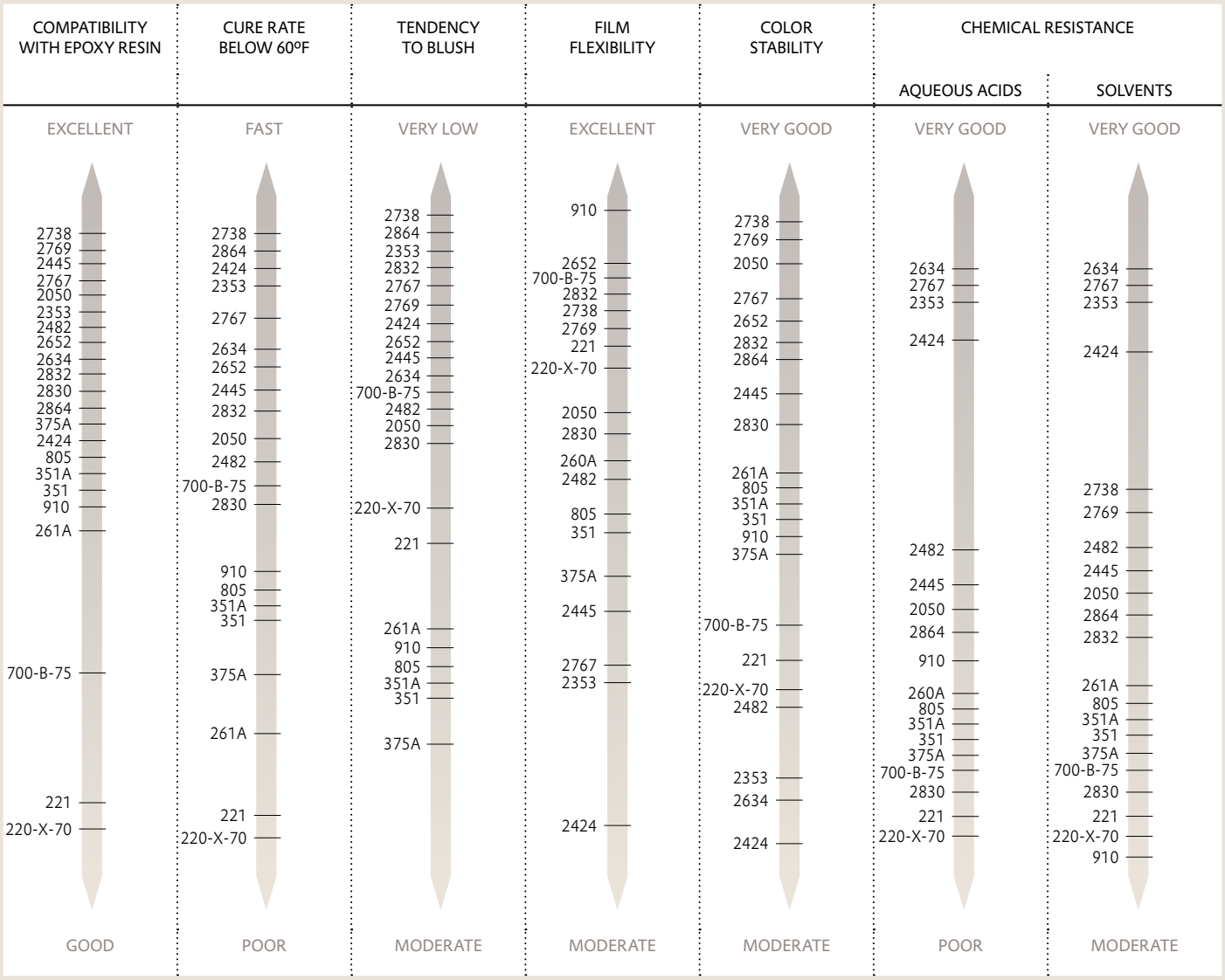
ANCAMIDE® 2864 Polyamide
Excellent blush resistance
Fast mechanical property development
Good corrosion resistance

ANCAMIDE® 351A/261A/221 Polyamides
Good corrosion resistance
Flexible
Plasticizer-free

POLYAMIDES
PRINCIPAL APPLICATIONS

Polyamides find use in solventborne, two-pack coatings (e.g., primers and finishes), coal tar epoxy coatings, adhesives, putties, sealants, cable jointing and electrical encapsulation.

Performance Comparison (select products shown)



Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMIDE® 220	Amide	7	330,000	0.970	245	185	50[9]	pot life and thin film set times are largely dependent upon the selected solvents		NA	ambient temp
ANCAMIDE® 220-IPA-73	Amide Solution	7	2,100	0.940	180	253	70[9]			NA	ambient temp
ANCAMIDE® 220-X-70	Amide Solution	7	1,100	0.940	170	264	70[9]			NA	ambient temp
ANCAMIDE® 221	Amide	9 max	43,000 at 40°C	0.99	205-235	185	50[9]	pot life and thin film set times are largely dependent upon the selected solvents		NA	ambient temp
ANCAMIDE® 221 IPA73	Amide Solution	8	1200-2800	0.92	145-165	253	70[9]			NA	ambient temp
ANCAMIDE® 221-X-70	Amide Solution	9 max	1000-2500	0.94	145-165	264	70[9]			NA	ambient temp
ANCAMIDE® 260A	Amide/ Imidazoline	7	40,000	0.960	350	120	65	120	10	NA	ambient temp
ANCAMIDE® 261A	Amide/ Imidazoline	7	35,000-45,000	0.96	320-380	120	65	75	7	NA	ambient temp
ANCAMIDE® 260TN	Amide/ Imidazoline	7	35,000	0.960	350	120	65	270	10	NA	ambient temp
ANCAMIDE® 350A	Amide/ Imidazoline	7	11,000	0.970	380	100	55	200	11	124[10]	ambient temp
ANCAMIDE® 351A	Amide/ Imidazoline	8 max	10,000-20,000	0.97	344	100	50-55	150	10	124[10]	ambient temp
ANCAMIDE® 375A	Amide/ Imidazoline	7	2,450	0.960	400	100	50	170	12	124[10]	ambient temp
ANCAMIDE® 400	Amide	7	1,600	0.970	405	95	50	65	9.5	122[10]	ambient temp
ANCAMIDE® 700-B-75	Adduct Solution	7	5,000	0.960	240	170	90	2-24 h in solution	Touch dry on evaporation of solvents	NA	ambient temp
ANCAMIDE® 702-B-75	Adduct Solution	8 max	4,000-8,000	0.96	230-260	170	90	2-24 h in solution	Touch dry on evaporation of solvents	NA	ambient temp
ANCAMIDE® 805	Polyamide	7	2,300	0.99	420	124	66	60	6.5	158	ambient temp

	Comments	Principal Applications
	Standard high viscosity polyamide formulated to provide high flexibility and long pot life. Cure can be accelerated with up to 5 PHR of Ancamine® K54	Solventborne maintenance coatings; primers, sealers and coatings for concrete; FDA-compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Ancamide® 220-IPA-73 is a 73wt% solution of Ancamide® 220 in isopropanol.	FDA-compliant with 21CFR 175.105.[8]
	Ancamide® 220-X-70 is a 70wt% solution of Ancamide® 220 in xylene.	Solventborne maintenance coatings. Primers, sealers and paint for concrete. FDA-compliant with 21CFR 175.105 and 21CFR 175.300 (with restrictions).[8]
	Standard high-viscosity polyamide formulated to provide high flexibility, long pot life and good overall properties with solid epoxy resin. Cure can be accelerated with up to 5 PHR of Ancamine® K54.	Solventborne maintenance coatings. Primers, sealers and paint for concrete.
	Ancamide® 221-IPA-73 is a 73wt% solution of Ancamide® 221 in isopropanol.	Solventborne maintenance coatings. Primers, sealers and paint for concrete.
	Ancamide® 221-X-70 is a 70wt% solution of Ancamide® 221 in xylene.	Solventborne maintenance coatings. Primers, sealers and paint for concrete.
	Standard medium-viscosity polyamide. 1:1 volume ratios with standard liquid epoxy resin possible. Improved reactivity, chemical resistance, and/or reduction in viscosity may be achieved by blending with aliphatic curing agents or amidoamines.	Coatings; sealants; adhesives; coal-tar extended coatings. FDA-compliant with 21CFR 175.105 (with restrictions) and 21CFR 175.300.[8]
	DOT non-corrosive version of Ancamide® 260A.	Coatings; sealants; adhesives; coal-tar-extended coatings. FDA-compliant with 21CFR 175.105.[8]
	Higher imidazoline version of Ancamide® 260A for improved resin compatibility.	Coatings; sealants; adhesives; coal-tar-extended coatings.
	Standard high imidazoline content polyamide. Lower viscosity than Ancamide® 220 or 260A.	High-solids coatings; adhesives; sealants and putties; see Ancamide® 220 for FDA status. Compliant with 21CFR 175.105 (with restrictions) and 21CFR 175.300.[8]
	Standard high imidazoline content polyamide. Lower viscosity than Ancamide® 221 or 261A; improved toughness over Ancamide® 350A.	High-solids coatings; adhesives; sealants and putties.
	Lower-viscosity version of Ancamide® 350A.	Low-VOC coatings; concrete repair and grouts; adhesives. Compliant with 21CFR 175.105 (with restrictions) and 21CFR 175.300.[8]
	Special polyamide with low viscosity and faster cure. Compatible with epoxy resins without induction. Good hot water resistance when blended with cycloaliphatics. Blended with ATBNs in adhesives.	Coatings; adhesives; sealants; putties; electrical potting.
	Polyamide adduct. Good adhesion and cure under adverse conditions such as high humidity, low temperature, and poor surface preparation. No induction period required. 75% solids in butanol. Viscosity may be reduced by blending with amidoamines.	High-solids, anti-corrosive coatings for marine/industrial use; approved for use in U.S. Navy Specification MIL-P-24441/Ships/Coatings. Compliant with 21CFR 175.105.[8]
	Polyamide adduct. Good adhesion and cure under adverse conditions. No induction period required. 75% solids in butanol. Viscosity may be reduced by blending with amidoamines.	High-solids, anti-corrosive coatings for marine/industrial use. Compliant with 21CFR175.105 (with restrictions).[8]
	High-performance polyamide offering a cost-effective method of achieving high-solids/low-VOC, ambient-cure epoxy coatings. Developed to provide low viscosity, good flexibility, fast dry times, excellent barrier properties, and good film appearance.	Ultra-high-solids marine, industrial maintenance and OEM coatings. Adhesives and sealants. Concrete primers and paints.

NA - Not Applicable

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Gel Time[5] (Min @ 77°F, 150 G mix)	Thin Film Set Time[6] (h @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
ANCAMIDE® 910	Polyamide	6	6,000	0.99	118	230	110-125	120	8	77	ambient temp
ANCAMIDE® 2050	Adduct	7	4,000	1.02	225	150	70	100	7.0	108[10]	ambient temp
ANCAMIDE® 2353	Modified Polyamide	9	3,000	1.01	330	114	60	65	4.5	131	ambient temp
ANCAMIDE® 2424	Modified Polyamide	9	14,000	1.00	327	114	60	60	3.0	129	ambient temp
ANCAMIDE® 2444	Adduct	8	5,950	1.02	180	124	65	72	4.5	131	ambient temp
ANCAMIDE® 2445	Polyamide Adduct	7	5,200	1.03	210	133	70	89	5.5	90	ambient temp
ANCAMIDE® 2482	Modified Polyamide	7	5,500	0.97	370	125	60-65	130	7.0	172 after 2 h @ 160°F	ambient or elevated temp
ANCAMIDE® 2634	Amide Solution	7	1,700	0.96	335	90	48	130	7	240	ambient temp
ANCAMIDE® 2652	Adduct Solution	8+	2,000	0.99	132	250	90-130	140	5	NA	ambient temp
ANCAMIDE® 2767	Modified Polyamide	7	2100	1.08	340	114	60	57	5	142	ambient temp
ANCAMIDE® 2769	Modified Polyamide	10	100-160	0.97	400-440	150	65-80	120	9		2-7 days
ANCAMIDE® 2830	Modified Polyamide	9	3000-6000	1.01	215	162	85	36	6.5	33	2-7 days
ANCAMIDE® 2832	Modified Polyamide	7	500-2000	1.02	340	156	82	29	1.75	47	
ANCAMIDE® 2864	Modified Polyamide	8	1200-2500	1.04	315	135	65	32	4	NA	2-7 days
ANCAMIDE® 3200	Adduct	10	1500	1.01	270	115	61	80	10	141	ambient temp
ANCAMIDE® 3201	Adduct	10	1000	1.03	310	115	61	40	10	136	ambient temp

	Comments	Principal Applications
	Outstanding flexibility and peel strength, excellent thermal shock resistance and good electrical properties. Lower viscosity than conventional polyamides. DOT noncorrosive.	Electronic potting and encapsulation compounds, general-purpose, two-component adhesives, coatings, civil engineering and composites applications. FDA-compliant with 21CFR 175.105 (with restrictions).[8]
	With liquid epoxy resin, it can achieve high gloss, flexibility, hardness and reverse impact resistance comparable to traditional solvent-cut polyamide/solid epoxy resin systems. No induction required. Non-critical loading (70-100 PHR).	High-solids coatings; primers and coatings for concrete; sealants and putties; pool paints.
	Excellent high-gloss film formation and fast dry with no induction time. Cures down to 40°F. Develops hard films with very good solvent and corrosion resistance. Good for cathodic disbondment resistance. Best chemical resistance of polyamides.	High-solids marine and maintenance coatings; concrete primers and coatings; pipeline coatings.
	Rapid development of adhesive strength with excellent adhesion to metal or plastic. Low-temperature cure and excellent environmental resistance. Can reduce or eliminate the need for accelerators.	Two-component structural adhesives for metal or plastic where rapid development of handling strength is required.
	Excellent high-gloss film formation and fast dry with no induction time. Cures down to 40°F. Provides good corrosion resistance.	High-solids marine and maintenance coatings; concrete primers and coatings.
	A low-viscosity polyamide that exhibits fast cure at low temperatures (down to 40°F). Low residual amine content. Exhibits high gloss with excellent hardness and flexibility. Non-critical loading (70-100 PHR).	High-solids, anti-corrosive coatings for marine and industrial maintenance use; military equipment coatings.
	Low viscosity without external plasticizers for high filler loading. Good flexibility and adhesion to metals and plastics. Excellent environmental resistance. Low cost-in-use.	Two-component ambient- or heat-cured adhesives for metal, plastics or wood bonding. Adhesives applications where high filler loading with good handling is needed.
	High corrosion resistance, hot water resistance, cathodic disbondment resistance. Can be formulated for low-temperature cure, ambient cure, or heat cure. Cost effective.	High-solids marine and maintenance coatings.
	Special polyamide adduct specifically developed to provide coatings offering long overcoatability with epoxy and alternative resin technology. Can provide excellent corrosion resistance and good for cathodic disbondment resistance. Flexible loadings with standard epoxy resins.	High-solids marine and maintenance coatings. Pipeline coatings where cathodic protection is used.
	Fast dry time, good low temperature cure, high solvent resistance, good corrosion resistance, high gloss, excellent hardness development, zero induction time.	High-solids coatings, marine and maintenance coatings, concrete primers, coatings and bonding agents, adhesives.
	100% solids contains no plasticizer and exhibit very low viscosity. This allows for formulation of solvent free or high-solids coatings. No Induction time. Excellent adhesion to poorly prepared substrates.	High-solids coatings, sealants, adhesives
	Modified polyamide that does not require induction time, Excellent corrosion protection.	Industrial coatings, general protective coatings
	Rapid through cure, fast return to service, outstanding intercoat adhesion, outstanding top coat dive back resistance.	Fast return to service in factory applied ambient cure systems in protective and refinish coatings
	Fast through cure. Fast mechanical property development, good corrosion resistance, Low temperature cure.	Fast return to service in field applied systems in marine and protective coatings.
	Excellent adhesion to damp substrates, good corrosion protection, rapid property development.	High-solids coatings, marine and protective coatings.
	Fast property development, good adhesion to damp substrates, corrosion resistance.	Primers, coatings for wet and high humid application areas, high-solids coatings for corrosion protection.

NA - Not Applicable

Anquamine® Waterborne Curing Agents

Selection Chart

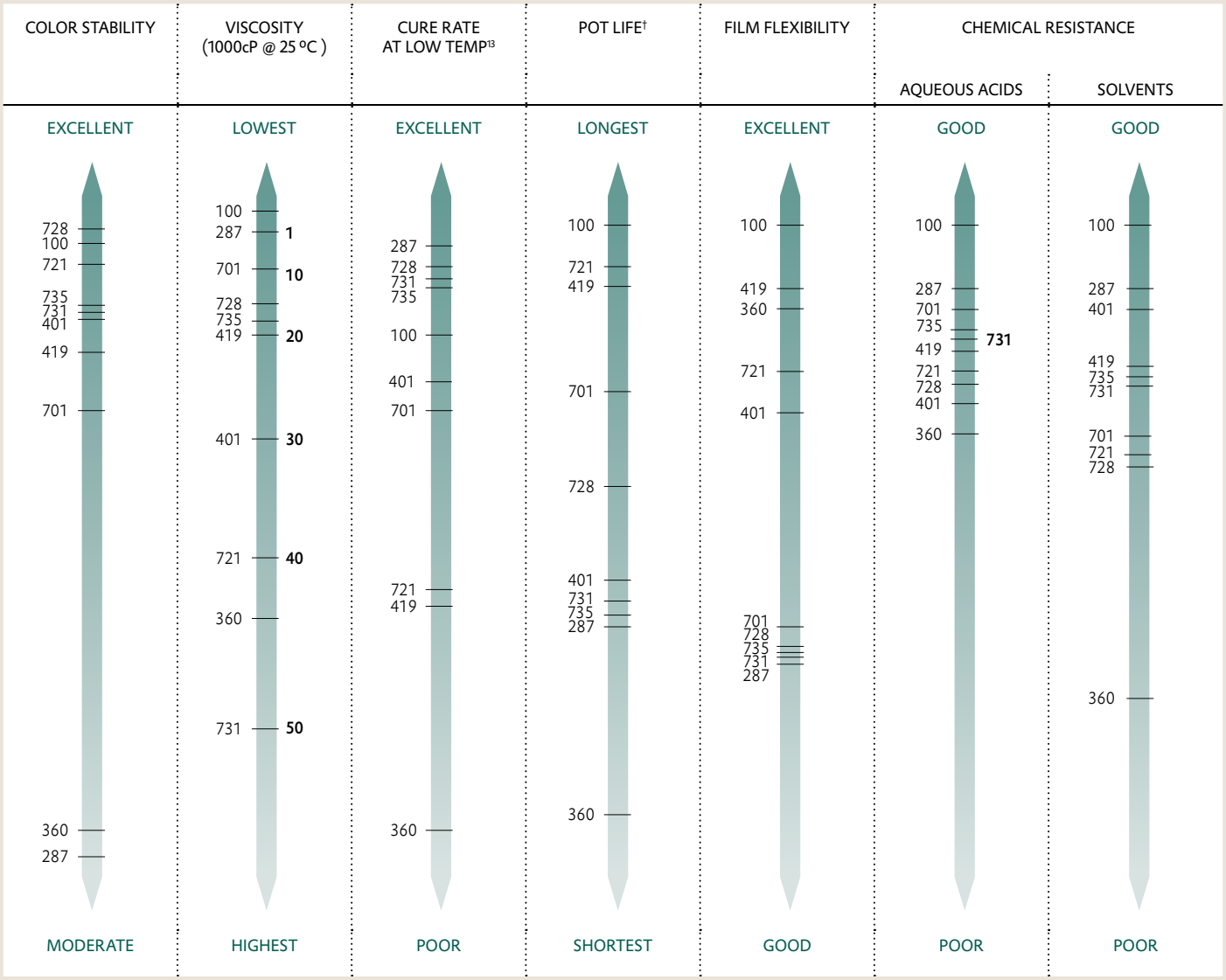
	Standard Primer	Penetrating Primer	Standard Concrete Paint	Transparent Sealer	Institutional	Self-Leveling Flooring	Tile Grout / Adhesive	Thermal Shock Flooring	OEM Primer	PC/Marine
	PRIMER		THIN FILM			THICK FILM			METAL	
CURING AGENTS FOR USE WITH LIQUID EPOXY RESIN										
ANQUAMINE® 287		+++						+++		
ANQUAMINE® 360	+		+							
ANQUAMINE® 401	+									
ANQUAMINE® 701	+		+			+	+		+	+
ANQUAMINE® 721	+++		+++						+++	+++
ANQUAMINE® 728	+++		+++							
ANQUAMINE® 731						+++	+++			
ANQUAMINE® 735	+					+++	+++			
ANQUAMINE® 100			+	+++	+++					
CURING AGENTS FOR USE WITH SOLID RESIN DISPERSION (such as Ancarez® AR555 Resin)										
ANQUAMINE® 401	+		+						+++	
ANQUAMINE® 419									+++	+++
ANQUAMINE® 728	+++		+++							
ANQUAMINE® 100			+	+++	+++					

+++ Primary Recommendation + Alternative Recommendation (Blank) May or may not be acceptable

WATERBORNE CURING AGENTS
PRINCIPAL APPLICATIONS

Waterborne epoxy curing agents find use in protective and industrial concrete coatings, self-leveling and mortar floors and tile grouts, steel coatings with liquid resin and high molecular weight resin emulsions, and anti-corrosive primers for OEM and light duty applications. Increasingly, waterborne epoxy systems are being used in protective coating applications.

Performance Comparison (select products shown)



†Resin dependent. With Anquamine® 401, for example, solid and semi-solid resin emulsions can give pot lives in excess of 5 hours.

Curing Agent	Epoxy Resin Used	Coalescing Agents Needed	Typical VOC Level (lb/gal)	Recommended Substrate	Typical Application
ANQUAMINE® 100	Liquid Epoxy Resin, Ancarez AR-555	Yes	1.0-1.8	Concrete or Metal	Topcoat
ANQUAMINE® 287	Liquid Epoxy Resin	No	0	Concrete	Primer
ANQUAMINE® 360	Liquid, Emulsified Liquid	No	0	Concrete	Topcoat, Concrete Primer, Sealer
ANQUAMINE® 401	Liquid, Semi-Solid Dispersion, Solid Dispersion, Ancarez AR-555	Yes	0-1.8	Concrete, Metal	Topcoat, Concrete Primer
ANQUAMINE® 419	Solid Dispersion, Ancarez AR-555	Yes	1.2-1.8	Metal, Concrete	Metal Primer, Topcoat
ANQUAMINE® 701	Liquid	No	0	Concrete, Metal	Self-Leveling Floor, Metal Primer, Topcoat
ANQUAMINE® 721	Liquid Epoxy Resin	No	0-1	Concrete, Metal	Concrete, Primer, Topcoat, Wall Coatings
ANQUAMINE® 728	Liquid Epoxy Resin, Ancarez AR-555	No	0	Concrete, Metal	Topcoat, Primer
ANQUAMINE® 731	Liquid Epoxy Resin	No	0	Concrete	Self-Leveling Floor
ANQUAMINE® 735	Liquid Epoxy Resin	No	0	Concrete	Self-Leveling Floor

WATERBORNE CURING AGENTS

	Primer Salt Fog (h)	Chemical Resistance	Pot Life (h)	Indicator of End of Pot Life	Stain Resistance	14-Day Pencil Hardness
	>500@ 3 mil DFT	Moderate	1 with Liquid Resin and >4 with AR-555	Viscosity Increase with Liquid Resin, Loss of Coalescence with AR-555	Excellent	F
	NA	Moderate	1	Rapid Viscosity Increase	Good	NA
	1,000+	Good	1.5-2	Viscosity Increase	Good	2H
	1,800+	Good	1 with Liquid Resin and >4 with AR-555	Loss of Coalescence	Good	H-2H
	3,000+	Moderate	4-6	Loss of Coalescence	Very Good	HB
	1,000	Good	2-4	Viscosity Increase	Good	2H
	750	Good	1-3	Rapid Viscosity Increase	Good	3H-6H
	Not Tested	Good	1-2 with liquid resin and 1 with AR-555	Loss of Coalescence	Excellent	3H-6H
	NA	Good	0.5-1	Rapid Viscosity Increase	Good	NA
	NA	Good	0.5-1	Rapid Viscosity Increase	Good	NA

NA - Not Applicable

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level[3] (PHR)[4]	Thin Film Set Time[6] (h @ 77°F)	Typical Cure Schedule
ANQUAMINE® 100	Aqueous Dispersion of Modified Aliphatic Amine	dispersion	200	1.05	100	350	140-180 w/LER; 15-30 w/SED	3.0	ambient temp
ANQUAMINE® 287	Aqueous Solution of Modified Aliphatic Amine	12	1,000	1.08	155-175	240	125	2.0	ambient temp
ANQUAMINE® 360	Aqueous Solution of Modified Polyamide	14	30,000-50,000	1.05	210	280	100-150	6.0	ambient temp
ANQUAMINE® 401	Aqueous Solution of Modified Aliphatic Amine	12	30,000	1.09	255	200	65-80 w/LER; 15-30 w/SED	3.0	ambient temp
ANQUAMINE® 419	Aqueous Solution of Modified Aliphatic Amine	7	8,000-14,000	1.09	150-190	284	25-32*	2.5	ambient temp
ANQUAMINE® 701	Aqueous Emulsion of Modified Aliphatic Amine	emulsion	5,000-10,000	1.08	130-165	300	140-170	2.5	ambient temp
ANQUAMINE® 721	Aqueous Solution of Modified Aliphatic Amine	5	40,000	1.05	150-190	275	140-180	5.5	ambient temp
ANQUAMINE® 728	Aqueous Solution of Modified Cycloaliphatic and Heterocycloaliphatic Amines	5	5,000-15,000	1.07	160-220	250	125-130 w/ LER 34 w/SED	2.5	ambient temp
ANQUAMINE® 731	Aqueous Solution of Modified Aliphatic Amine	5	50,000	1.06	175	200	100	N/A	ambient temp
ANQUAMINE® 735	Aqueous Solution of Modified Aliphatic Amine	5	5,000-15,000	1.06	240	200	100	N/A	ambient temp

*Anquamine® 419 with solid epoxy dispersion. (ANC AR555)
**Thin film set times depend on the type of epoxy resin used. Reported values are dry-to-touch.

WATERBORNE CURING AGENTS

	Comments	Principal Applications
	Designed to provide a clear film at high builds such as 10 mils more more. Exhibits high gloss and superior stain resistance. Can be used with liquid and solid epoxy resin to give fast dry with long pot life.	Floor and wall coatings; heavy duty maintenance and institutional coatings
	Formulated to provide zero-VOC formulations that offer rapid dry time and excellent adhesion to green concrete as well as old concrete. Formulations with lower % solids allow excellent penetration into concrete.	Primer/sealer for green concrete; primer for new and old concrete.
	Capable of emulsifying and curing epoxy resins at room temperature without added surfactants. Designed for use where absence of organic solvents is desired. DOT noncorrosive.	Waterborne coatings and sealers for concrete walls and floors; concrete primers; anti-graffiti coatings.
	Exhibits rapid dry time with excellent hardness development and good corrosion resistance. Provides high-gloss films with excellent gloss retention. This, combined with excellent stain resistance, makes it ideal for institutional coatings. Can be used with liquid epoxy resin, or solid and semi-solid dispersions.	Floor and wall coatings; concrete primers; industrial maintenance; marine and general metal topcoats and primers.
	Designed for use with solid epoxy resin dispersions to give fast dry times, and excellent corrosion and humidity resistance. Exhibits good gloss and good gloss retention. Excellent adhesion to steel makes it an ideal product for metal primers. Can also be used on concrete where improved humidity resistance is required.	Industrial maintenance and marine primers and topcoats; general metal and transportation primers.
	Formulated to provide superior performance for a wide range of applications. Developed primarily for use with liquid epoxy resins to formulate systems with zero-VOC content and without resin emulsifiers.	High-gloss to matte top coats, food/potable water contact coatings (benzyl alcohol-free), self-leveling and trowelable flooring, grouts and putties, institutional coatings, anticorrosive and high-build coatings.
	Product can be formulated to low or zero VOC. Offers good pot life, good dry speed, and good emulsion stability even at low solids. Cured coatings exhibit high gloss, a balance of hardness and flexibility, and very good adhesion to concrete and metal.	Concrete primers, top coats, and wall coatings; metal primer.
	Designed for use with both liquid epoxy resin and solid epoxy resin dispersions. With solid resin dispersion, it provides extremely fast dry time at below ambient temperature and high humidity. Can be coated up to 23 mil wet in one pass. Excellent aesthetics.	Concrete primers, top coats, and wall coatings; metal primers.
	Developed primarily for use with liquid epoxy resins. Capable of formulating systems with zero-VOC content and without resin emulsifiers.	Self-leveling and trowelable flooring, grouts and putties.
	Developed primarily for use with liquid epoxy resins. Capable of formulating systems with zero-VOC content and without resin emulsifiers	Self-leveling and trowelable flooring, grouts and putties.

NA - Not Applicable
See product bulletins for special values of starting point formulations.

WATERBORNE EPOXY RESINS

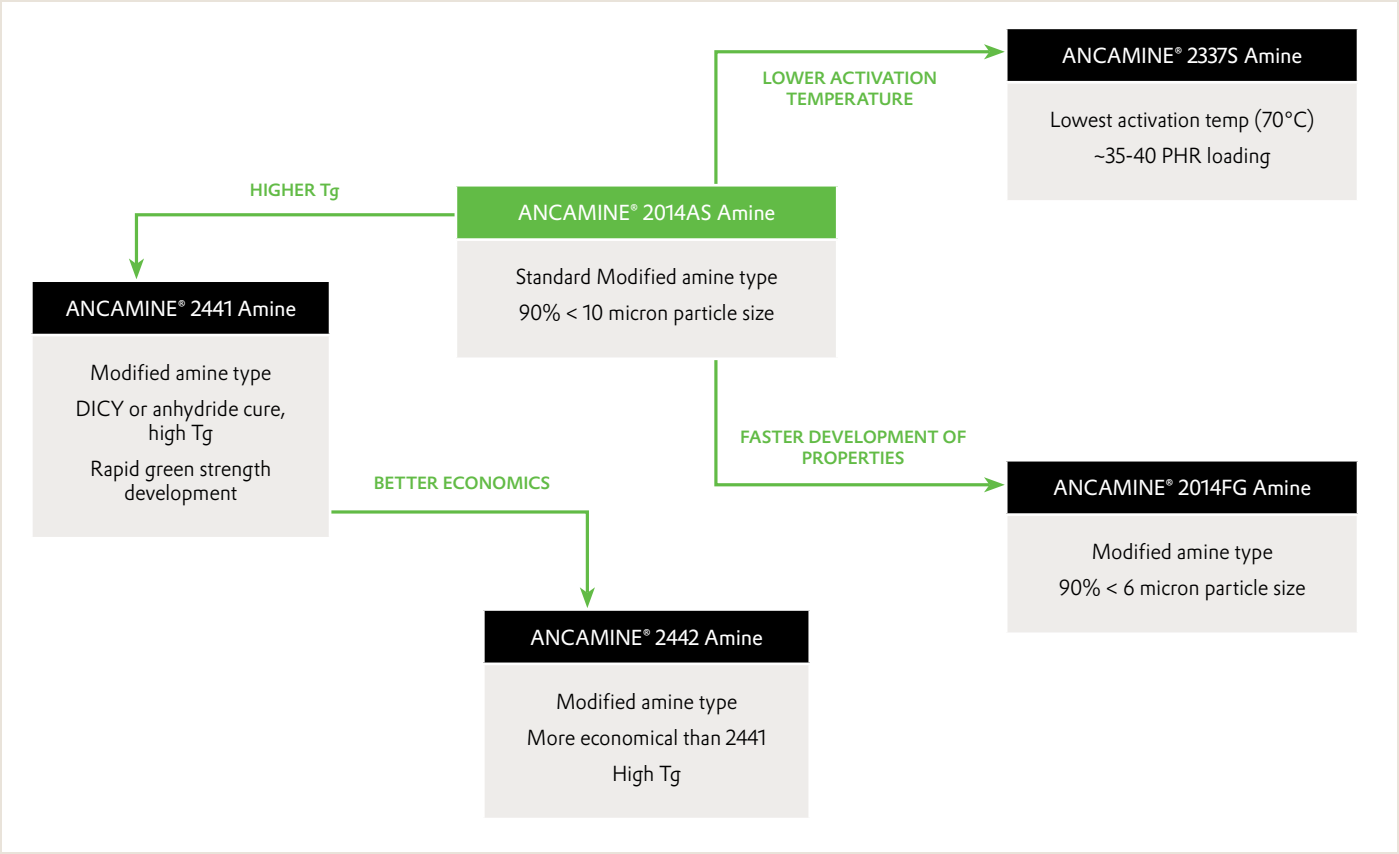
Resin	Type	Solids Content (wt %)	VOC Content (lb/gal)	Viscosity (cP @ 77°F)	Flash Point (°C)	Specific Gravity (@ 77°F)	Epoxy Equiv wt EEW (g/eq)[3]	Comments	Principal Applications
ANCAREZ AR462	Liquid Epoxy Emulsion	61	0	200	>249	1.07	325	Waterborne liquid epoxy resin emulsion delivered at 61% solids in water. The pre-emulsified resin provides for easier mixing with the curing agent for two component ambient cure systems. The resin can be used with Anquamine® curing agents.	Two-component, ambient-cure epoxy coatings for OEM, industrial maintenance and transportation coatings; floor sealers and paints, anticorrosive primers, mid-coats and topcoats; and institutional applications.
ANCAREZ AR555 specialty resin	Solid Epoxy Dispersion	55	0	200	>249	1.09	550*	Waterborne solid epoxy resin dispersion delivered at 55% solids in water. Shown to deliver equal or superior performance to conventional solid resin dispersions, but at a lower cost. Enables the formulation of low-odor, zero-VOC systems.	Two-component, ambient-cure epoxy coatings for OEM, industrial maintenance and transportation coatings; floor sealers and paints, anticorrosive primers, mid-coats and topcoats; and institutional applications.

NA - Not Applicable
* 550 EEW is as received. EEW is 330 on a solids basis.


NO STEP
NO STEP
NO STEP
NO STEP

Ancamine® Curing Agents & Accelerators for One Part System – Modified Amines

Selection Chart



PRINCIPAL APPLICATIONS

One-component epoxy curing agents and accelerators find use in automotive underbody coatings, powder coatings, paste and film adhesives, high performance aerospace composites, pre-pregs, structural laminates, microelectronics, and electrical insulation compounds.

Curing Agent	Appearance	Melt Temp (°F)	Amine Value (mg KOH/g)	Equivalent WT/{H}	Use Level (PHR)[4]	Glass Transition Temp (°F)[7]	Typical Cure Schedule
ANCAMINE® 2014AS	White Powder	205	184	52	25	230 30min @ 300°F	elevated temp
ANCAMINE® 2014FG	White Powder	205	184	52	25	230 30min @ 300°F	elevated temp
ANCAMINE® 2337S*	Light Yellow Powder	145- 172	260	85.5	45	158 30min @ 240°F	elevated temp
ANCAMINE® 2441	Off-White Powder	265	290	38	20	238	elevated temp
ANCAMINE® 2442	Off-White Powder	NA	50-65	38	20	NA	elevated temp

* All 1K products may be used alone or as accelerators to a dicyandiamide, with the exception of Ancamine® 2337S, which cannot be used as an accelerator for dicyandiamide.

NA - Not Applicable

CURING AGENTS & ACCELERATORS FOR ONE PART SYSTEM – MODIFIED AMINES

	Comments	Principal Applications
	Micronized powder with an average particle size of <10 microns, easily dispersed in liquid epoxy resin. Latent curing agent and dicyandiamide cure accelerator with extremely long shelf stability in undiluted resins and excellent reactivity. Can cure rapidly above its activation temperature (167°F).	One-component adhesives, including induction-cured adhesives; potting and casting; prepregs; film adhesives; accelerator for dicyandiamide.
	Finer version of Ancamine® 2014AS with 90% particle size <6microns. Developed to provide faster development of properties. Finer particles reduce the formulation shelf stability when used as a sole curing agent.	
	Micronized powder with an average particle size of 10 microns. Latent curing agent with rapid reactivity above 158°F and rapid development of green strength. A2337S is used as a co-accelerator with other accelerators e.g., Ancamine® 2441 or 2442 when used with DICY.	One-component adhesives, including induction-cured adhesives; potting; coatings; hot-melt prepregs.
	A modified polyamine for use as a latent curing agent or as an accelerator for DICY or anhydrides. Providing low activation temperature, fast green strength development, good shelf life and high glass transition temperature.	Used in one-component heat-cured adhesives as the sole curing agent or DICY accelerator. Powder coatings. Potting compounds, coatings, hot-melt prepregs, and as an accelerator for anhydrides.
	Modified aliphatic amine used as a latent curing agent or an accelerator for DICY. Developed to provide excellent balance of low activation temperature, good shelf stability, and high glass transition temperature.	One-component, heat-cured adhesives as a sole curing agent or DICY accelerator. Powder coatings, potting compounds, coatings, hot melt prepregs, and as an accelerator for anhydrides.

Curing agent	Appearance	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Molecular Weight	Latency*	Use Level[3] (PHR)[4]	Glass Transition Temp[7] (°F)	Gel Time (min, 150 g mix)	Typical Cure Schedule
CUREZOL® C17Z HARDENER	White Powder	NA	MP 187-190°F	NA	306	6 days	3-5	312[10]	13 @ 212°F	elevated temp
CUREZOL® 1B2MZ	Pale Yellow Liquid	6	700	1.07	172	10 h	4-6	310[10]	5 @ 212°F	elevated temp
CUREZOL® 2MA OK	White Powder	NA	MP >480°F	NA	384	6-12 mo	5	293	108 @212°F 200g mix	elevated temp
CUREZOL® 2MZ-AZINE	Fine White Powder	NA	MP 480°F	NA	219	30-40 days	6-8	313[10]	30 @ 212°F	elevated temp
CUREZOL® 2PHZ-PW	Light Pink Powder	NA	MP 415-491°F	NA	204	100-150 days	5-10	374	8 @ 302°F	elevated temp
CUREZOL® 2PHZ7/10	Yellow-Pink Powder	NA	MP 420°F	NA	204	110 days	5-10	313[10]	8 @ 302°F	elevated temp
CUREZOL® 2P4MZ	White Powder	NA	MP 325-360°F	NA	158	3 days	3-6	309	NA	elevated temp
IMICURE® AMI-1 curing agent	Pale Yellow Liquid	NA	NA	1.04	82	8 h	2-4	NA	NA	elevated temp
IMICURE® AMI-2	Pale Yellow Powder	NA	MP 284°F	NA	82	3.5 h	1-4	300[10]	2 @ 212°F 200g mix	elevated temp
IMICURE® EMI-24®	Pale Yellow Liquid	8	6,500	0.990	110	9 h	1-4	313[10]	4 @ 212°F	elevated temp
IMICURE® IMIDAZOLE	White Powder	NA	MP 194°F	NA	68	9 h	1-4	297	3 @ 212°F	elevated temp

* Latency as given on this page 44 is defined as the time required for a 200 g mass of liquid epoxy resin mixed with curing agent to gel at room temperature (~77°F).

CURING AGENTS & ACCELERATORS FOR ONE PART SYSTEM – IMIDAZOLES

	Comments	Principal Applications
	Accelerator for dicyandiamide (DICY), anhydride and phenolic curing agents.	Structural adhesives; molding powders; powder coatings; structural laminates.
	Liquid with high reactivity. Effective low-viscosity accelerator for anhydrides.	Casting, potting and encapsulation in electrical and electronic applications.
	Best combination of latency and low-temperature cure. Accelerator for dicyandiamide, anhydride and phenolic curing agents.	Electrical and electronic insulation; solder-resistant inks; structural adhesives.
	Accelerator for dicyandiamide and anhydride curing agents.	Electronic applications such as solder-resistant inks and insulating powders; structural adhesives.
	A substituted imidazole that can be used as an epoxy curing agent or as an accelerator for dicyandiamide and anhydride curing agents.	Surface-mounted electronic adhesives; electrical encapsulation and transfer molding powders. Electric and electronic parts, paints, adhesives, and construction composite materials.
	Accelerator for dicyandiamide and anhydride curing agents.	Surface-mounted electronic adhesives; electrical encapsulation and transfer molding powders; intermediate in manufacture of curing agents by reaction through methylol groups.
	Accelerator for dicyandiamide, anhydride and phenolic curing agents.	Electrical laminates; molding compounds; potting compounds.
	Accelerator for dicyandiamide, anhydride and phenolic curing agents.	Prepreg composites; adhesives; electronic encapsulation.
	Accelerator for dicyandiamide, anhydride and phenolic curing agents.	Electrical laminates; powder coatings; molding powders; structural adhesives.
	High-reactivity, medium-viscosity liquid used alone or to accelerate dicyandiamide or anhydride cures. May solidify as a result of thermal or mechanical shock. Gradual warming above 115°F returns material to a stable liquid form.	Filament winding; electrical laminates; molding powders; structural adhesives.
	Accelerator for dicyandiamide, anhydride and phenolic curing agents.	Prepreg composites; adhesives; electronic encapsulation.

NA - Not Applicable

Curing agent	Physical Form	Melting Point (°F)	Use Level[3] (PHR)[4]	DSC Activation Temp (°F)	Heat Deflection Temp[10] (°F)	Typical Cure Schedule
AMICURE® UR	White Powder	268	0.5-3.0 parts with 4-8 parts dicyandiamide	284	270	30 min @ 356°F
AMICURE® UR2T	White Powder	360-374	0.5-3.0 parts with 4-8 parts dicyandiamide	284	270	1-2 h @ 355°F
AMICURE® UR 7/10	White Powder	130-133	0.5-3.0 parts with 4-8 parts dicyandiamide	284	270	1-2 h @ 356°F
AMICURE® UR 10/30	White Powder	130-133	0.5-3.0 parts with 4-8 parts dicyandiamide	284	270	1-2 h @ 356°F

CURING AGENTS & ACCELERATORS FOR ONE PART SYSTEM – SUBSTITUTED UREAS

Comments	Principal Applications
Substitute for chlorophenyl ureas; co-curing accelerator for dicyandiamide-cured epoxy resins. Exceptional latency and rapid cure above activation temperature.	One-component paste and film adhesives; high-performance composites; prepregs.
Substitute for chlorophenyl ureas; co-curing accelerator for dicyandiamide-cured epoxy resins. Faster green strength adhesion build than Amicure® UR. Also used at lower loadings than Amicure® UR for comparable acceleration.	
Fine ground version of Amicure® UR, 90% less than 10 micron particle size. Rapid cure above activation temperature.	One-component paste and film adhesives; high-performance composites, especially in aerospace applications.
Fine ground version of Amicure® UR, 90% less than 30 micron particle size. Rapid cure above activation temperature.	One-component paste and film adhesives; high-performance composites, especially in automotive applications.

NA - Not Applicable Note: Substituted urea latency is formulation dependent.

Curing agent	Physical Form	Melting Point (°F)	Use Level[3] (PHR)[4]	Latency (mo)	DSC Activation Temp (°F)	Heat Deflection Temp[10] (°F)	Typical Cure Schedule
AMICURE® CG-NA	Granular	405-412	4-8	6	330	250	30 min @ 356°F
AMICURE® CG-325G	<44 Micron Powder	405-412	4-8	12	330	250	30 min @ 356°F
AMICURE® CG-1200G	11 Micron Powder	405-412	4-8	6	330	250	30 min @ 356°F
DICYANEX® 1400B CURING AGENT	<10 Micron Powder	405-412	4-8	12	330	250	30 min @ 356°F

CURING AGENTS & ACCELERATORS FOR ONE PART SYSTEM – DICYANDIAMIDES

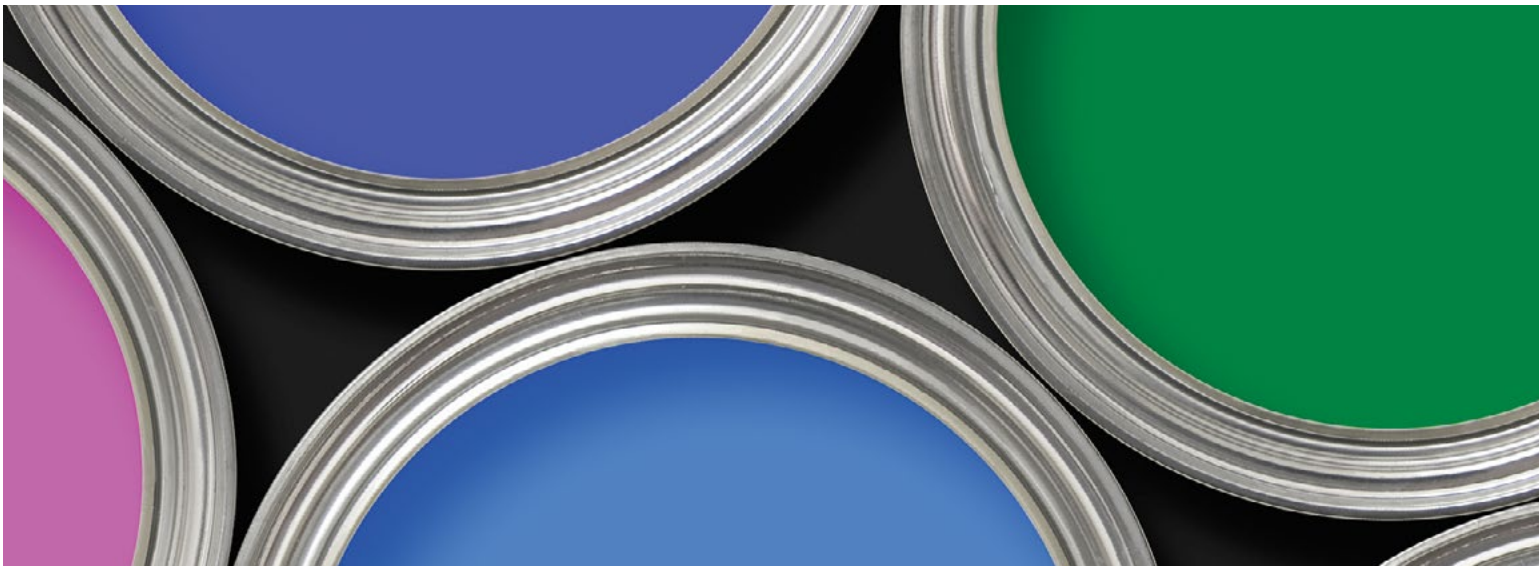
	Comments	Principal Applications
	Unpulverized dicyandiamide with no inert flow control agent.	Electrical laminates; adhesives and powder coatings, where the total resin system is pulverized prior to extrusion. Compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Dicyandiamide pulverized to 90% less than 44 micron particle size. Contains 1.5% of an inert flow control additive. Dicyandiamide pulverized to 90% less than 30 micron particle size.	Structural laminates; one-component adhesives. Compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Dicyandiamide pulverized to 90% less than 30 micron particle size. Contains 1.5% of an inert flow control additive.	Structural adhesives, powder coatings; structural laminates including solvent-free prepregs. Compliant with 21CFR 175.105 and 21CFR 175.300.[8]
	Dicyandiamide pulverized to 90% less than 10 micron particle size. Contains 3% of an inert flow control additive.	Structural adhesives, powder coatings; structural laminates including solvent-free prepregs. Compliant with 21CFR 175.105 and 21CFR 175.300.[8]

NA - Not Applicable

Note: Ancamine® 2014AS and Ancamine® 2014FG are excellent accelerators for dicyandiamide. (See Latent Curing Agents section.)

Curing agent	Appearance	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Molecular Weight	Latency	Use Level[3] (PHR)[4]	Glass Transition Temp[7] (°F)	Gel Time (min, 150 g mix)	Typical Cure Schedule
ANCAMINE® 1110	Pale Brown Liquid	6	20	1.03	370	NA	1-15	NA	100	ambient temp
ANCAMINE® 2910	Amber Liquid	Max 8	30-60	0.93	137	10 h	20	202	600-700 min at 25 °C	ambient and elevated temp
ANCAMINE® K54	Amber Liquid	6	200	0.980	630	NA	1-15	NA	45	ambient temp
ANCAMINE® K61B	Amber Liquid	5	700	0.970	230	NA	10-12	72[10]	35 @ 149°F	elevated temp
AMICURE® DBU-E	Light Yellow Liquid	1	14	1.11	152	NA	1-5	NA	NA	elevated temp

Curing agent	Appearance	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Use Level (PHR)[4]	Latency	DSC Onset Temp (°F)	HDT	Gel Time (min, 150 g mix)	Typical Cure Schedule
ANCHOR® 1040 AMINE	Orange-Red Liquid	12	20,000	1.13	7-12[11]	6-10 wk	212	266	4 h @ 266°F	elevated temp
ANCHOR® 1115	Dark Liquid	17	1,700	1.15	5-10[11]	6-10 wk	205	275	4 h @ 284°F	elevated temp



TERTIARY AMINES

	Comments	Principal Applications
	Dimethylaminomethylphenol. Reduced-reactivity variant of Ancamine® K54.	Concrete adhesives and coatings in combination with polysulfide and polymercaptan curing agents; electrical castings in combination with anhydrides.
	Long pot life with good low temperature (65 ºC) cure conversion. Low peak exotherm during cure.	CIPP, electrical potting and encapsulation, filament wound pipe and larger composite casting.
	2,4,6-Tri(dimethylaminomethyl)phenol. Efficient activator for epoxy resins cured with a wide variety of hardener types including polyamide, amidoamines, polymercaptans and anhydrides.	Coatings; flooring; adhesives; castings; potting; encapsulation. FDA-compliant with 21CFR 175.105 and 21CFR 175.300 (with restrictions).[8]
	2-Ethylhexanoic acid salt of Ancamine® K54. Extended pot life version designed to give less exothermic cure. DOT noncorrosive.	Small- and medium-sized castings; potting; impregnation varnishes. Compliant with 21CFR 175.105 and 21CFR 175.300 (with restrictions).[8]
	High-purity, electronic grade of 1,8-diazabicyclo [5.4.0] undec-7-ene. Highly efficient accelerator for phenolic novolac and other epoxy cures, including those cured with anhydrides. Amicure® DBU-E has a low tendency to yellow over time, making it ideal for LED applications.	Electrical encapsulation; transfer molding powders.

BORON TRIFLUORIDE: AMINE COMPLEXES

	Comments	Principal Applications
	These liquid grades are modified amine complexes of BF_3 with reduced hygroscopicity and good solubility in epoxy resins. They vary in latency and activation temperature. Cured mechanical properties and heat resistance properties are dependent upon the chosen grade, concentration and post-cure schedule employed. Complexes exhibit opposite behavior with non-standard epoxies, such as glycidyl esters, and cycloaliphatic and alkyl epoxides, that gel within minutes to hours at room temperature.	In prepregs with solid or liquid epoxy resins; molding powders.
		Same as Anchor® 1040 but also used in heat-cure insulating varnishes.

NA - Not Applicable

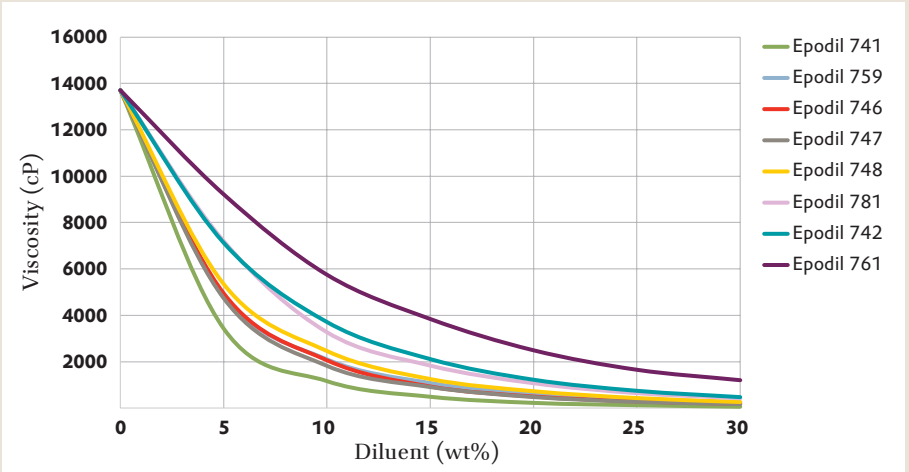
REACTIVE DILUENTS AND EPOXY RESIN MODIFIERS

Reactive diluents are formulated to reduce the viscosity of typical epoxy resins for improved handling and ease of application — without significant impact in final properties.

Epoxy resin modifiers are used to provide improvements in physical properties, such as toughness, flexibility, and elongation.

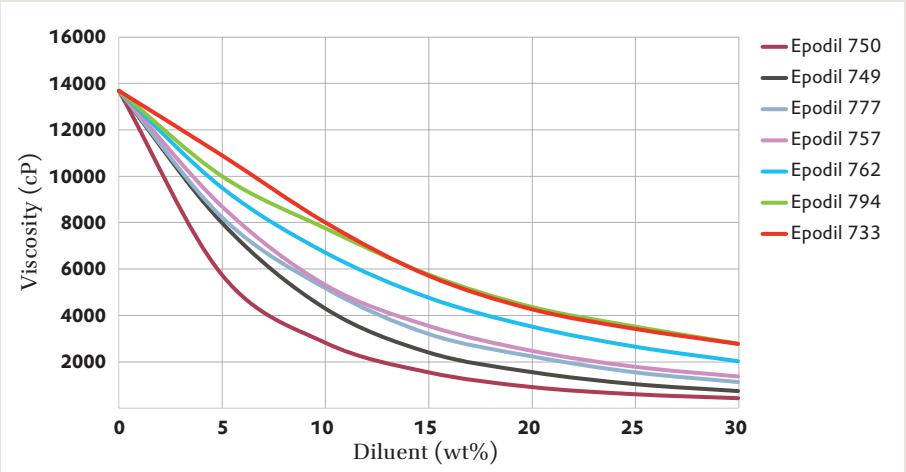
DILUTION EFFICIENCY WITH STANDARD LIQUID EPOXY RESIN

Epodil® mono-functional diluents

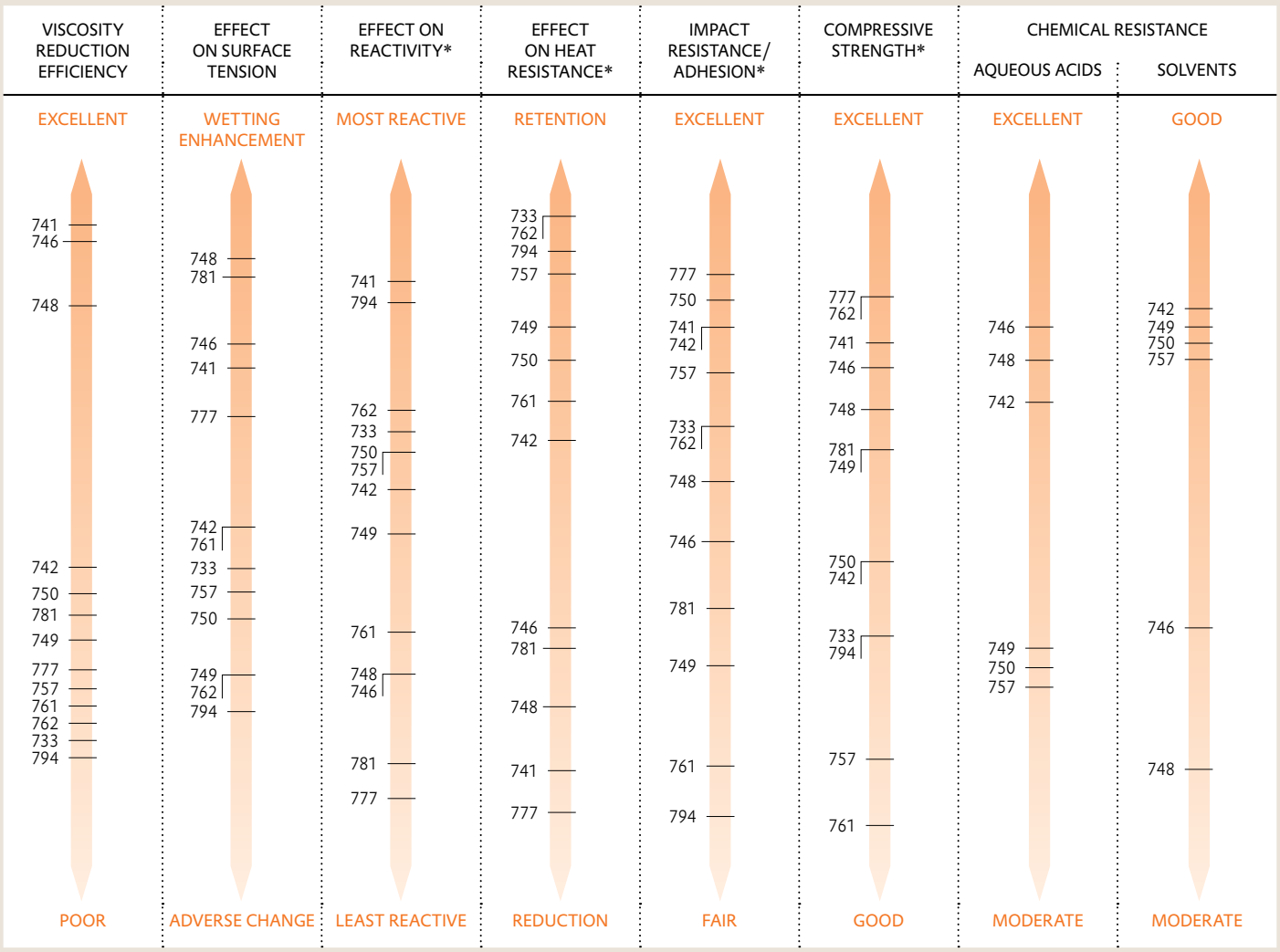


DILUTION EFFICIENCY WITH STANDARD LIQUID EPOXY RESIN

Epodil® di- and multifunctional diluents



Performance Comparison (select products shown)



*Using LER with 12.5 wt% diluent and Ancamine® 1618 curing agent at a 1:1 stoichiometry.

Diluent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Wt per Epoxide (EEW)	Moisture Content (% max)	Residual ECH (ppm, max)	Hydrolyzable Chloride (wt%, max)
EPODIL® 733	Glycerol Trigylcidyl Ether	60 APHA	200-300	1.24	148	0.1	8	0.3
EPODIL® 741	Butyl Glycidyl Ether	1	2	0.91	150	0.2	10	0.1
EPODIL® 742	Cresyl Glycidyl Ether	2	12	1.08	182	0.2	25	0.1
EPODIL® 746	2-Ethylhexyl Glycidyl Ether	2	9	0.91	220	0.1	10	0.1
EPODIL® 748	Alkyl (C12–C14) Glycidyl Ether	1	12	0.89	290	0.1	10	0.1
EPODIL® 749	Neopentyl Glycol Diglycidyl Ether	1	18	1.04	138	0.2	10	0.1
EPODIL® 750	1,4-Butanediol Diglycidyl Ether	1	18	1.10	130	0.2	10	0.3
EPODIL® 757	1,4-Cyclohexanedimethanol Diglycidyl Ether	2	65	1.10	166	0.2	10	0.2
EPODIL® 761	p-Tertiary Butyl Phenol Glycidyl Ether	2	24	1.03	224	0.1	200	0.5
EPODIL® 762	Trimethylol Propane Triglycidyl Ether	60 APHA	90-180	1.17	141	0.1	8	0.3
EPODIL® 781	Neodecanoic Acid Glycidyl Ester	50 APHA	6	0.95	250	0.1	200	0.3
EPODIL® 794	Resorcinol Diglycidyl Ether	2*	100 @ 104 °F/40 °C	1.21 @ 104 °F/40 °C	126	0.1	200	1.0

* Product may crystallize at room temperature storage, resulting in turbidity, haziness or separation. Warming will re-establish clarity.

Diluent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Equivalent Weight	Moisture Content (% max)	Typical Cure Schedule
ANCAREZ 2364	Acrylate-Functional Urethane Resin	<2	30,000	1.10	470	NA	ambient temp
EPODIL® LV5	Hydrocarbon Resin	2 max	50	1.02	NA	0.2	ambient temp

REACTIVE DILUENTS

Comments	Principal Applications
Provides high crosslinking density and physical property enhancement.	Adhesives; composites.
The best glycidyl ether for viscosity reduction with good retention of properties. High vapor pressure.	Tooling; electrical applications; flooring; highly filled coatings. Compliant with 21CFR 175.105 (with restrictions).[8]
Good chemical resistance, especially against acids and solvents. Good maintenance of physical performance. Low volatility. Moisture tolerant. Assists in water displacement.	Tooling; electrical applications; coatings; flooring.
Less toxic, less irritating substitute for Epodil® 741 with only a slight reduction in dilution efficiency. Low volatility makes it suitable for high-temperature cure.	Flooring and mortars; potting.
General-purpose diluent. Low toxicity and low vapor pressure. Slows reactivity. Good viscosity reduction. Improves flexibility. Improves adhesion to non-polar surfaces.	Flooring and mortars; coatings. Compliant with restrictions on all of the following: 21CFR 175.105, 21CFR 175.300, 21CFR 176.180, and 21CFR 177.1650.[8]
Low volatility. Low reduction in physical properties and reactivity.	Civil engineering applications; electrical potting and encapsulation. Compliant with 21CFR 175.105 (with restrictions).[8]
Good dilution efficiency of difunctional glycidyl ethers. Low volatility. Minimal impact on reactivity.	Electrical potting, casting and encapsulation. Compliant with 21CFR 175.105 (with restrictions).[8]
Good maintenance of physical properties combined with moderate dilution efficiency. Good creep resistance.	Laminates; civil engineering applications.
Excellent compatibility with epoxy resin. Good retention of physical properties.	Coatings; flooring; mortars.
Alternative for Epodil® 733.	Adhesives; composites.
Performance alternative for Epodil® 748.	Coatings; flooring; mortars.
Combines excellent compatibility with retention of physical properties.	Coatings, structural applications such as potting and encapsulation.

EPOXY RESIN MODIFIERS

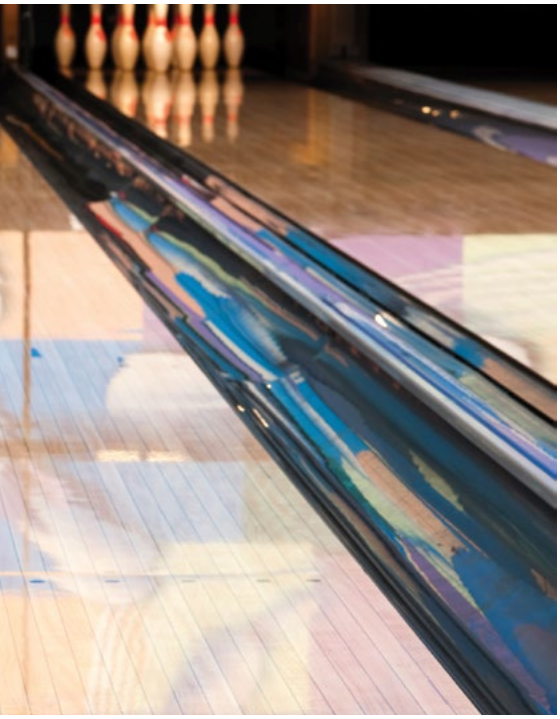
Comments	Principal Applications
100% reactive flexibilizer for epoxy systems. For use with epoxy resin on "A" side of formulation for high elongation, tear resistance and toughness while maintaining high strength and hardness. Excellent retention of properties at low temperatures, and good moisture resistance.	Applications where greater flexibility, toughness and elongation are required such as crack bridging, secondary containment membranes and impact-resistant coatings. Compliant with 21CFR 175.105.[8]
Improves adhesion to most substrates, including oily metal, at addition levels of 5-10 PHR. Minimal effect on HDT and chemical resistance up to 15 PHR. Low toxicity. Improves trowelability of epoxy mortars. Add to resin or curing agent.	Solvent-free coatings and flooring; general-purpose, low-toxicity diluent; improves trowelability of epoxy mortars; may be incorporated in epoxy resin or hardener components; used to adjust mix ratios. Compliant with 21CFR 175.105.[8]

NA - Not Applicable

POLYCARBAMIDE TECHNOLOGY

Amine curing agent technology for curing polyisocyanate resins. Amicure® IC series of products are specifically designed for use with polyisocyanate resins and other standard HDI trimer based polyisocyanates for industrial and institutional flooring. Clear and pigmented coatings based upon Amicure® IC curing agents exhibit very rapid hardness development, excellent low temperature cure, very good color and UV stability and excellent surface appearance.

Curing Agent	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Specific Gravity (@ 77°F)	Amine Equivalent Weight	Use Level (PHR)[4]	Viscosity Build (min @77°F, to 12,000 cP)	Thin Film Tack Free Time (min @ 77°F)	Thin Film Through Cure (h, @ 77°F)	Glass Transition Temp[7] (°F)	Typical Cure Schedule
AMICURE® IC-20	Polycarbamide	<2	500-1500	1.06	276-282	130-140	10	20-30	1	NA	ambient temp
AMICURE® IC-40	Polycarbamide	<2	500-1500	1.06	288-295	130-140	180-240	480-600	24	NA	ambient temp
AMICURE® IC-166	Polycarbamide	1	1000-2000	1.13	267	NA	16-20	20	0.5	NA	NA
AMICURE® IC-186	Polycarbamide	1	1000-2000	1.09	268	NA	50-60	120	2.75	NA	NA
AMICURE® IC-221	Modified Amine	≤215 APHA	350	1.06	376	185-195	22	45	2.5	118	ambient temp
AMICURE® IC-321	Modified Amine	≤215 APHA	225	1.05	379	185-195	55	102	6-7	104	ambient temp
AMICURE® IC-322	Modified Amine	≤215 APHA	105	1.08	379	190	60	75	7	104	ambient temp



	Category	Comments	Principal Applications
	Polycarbamide	Rapid property development at ambient and low temperature, excellent aesthetics and UV durability, great abrasion and chemical resistance, solvent free. Can be formulated with slow cure Amicure® IC40 to tailor the balance of cure speed and working time, and viscosity.	Commercial, industrial and decorative flooring; direct to metal coatings, protective coatings, OEM and refinish coatings.
	Polycarbamide	Slow cure, excellent aesthetics and UV durability, great abrasion and chemical resistance, solvent free. Can be formulated with ultra fast cure Amicure® IC20, solvents and plasticizer to tailor the balance of cure speed and working time, and viscosity.	Commercial, industrial and decorative flooring; direct to metal coatings, protective coatings, OEM and refinish coatings.
	Polycarbamide	Rapid property dvelopment. Ultra fast cure. Can be used to modify the cure speed of slower polycarbamides.	Direct to metal coatings, protective coatings, OEM coatings.
	Polycarbamide	Rapid property development, long potlife. Can be spray applied using conventional and airless spray.	Direct to metal coatings, protective coatings, OEM and refinish coatings.
	Polycarbamide	Excellent aesthetics and UV durability. Rapid property development at ambient and low temperature; great abrasion and chemical resistance. Solvent free.	Commercial, industrial, and decorative flooring.
	Polycarbamide	Excellent aesthetics and UV durability. Rapid property development at ambient temperature; Longer working time; great abrasion and chemical resistance. Solvent free.	Commercial, industrial, and decorative flooring.
	Polycarbamide	Low gloss finish (satin) can be achieved with the addition of recommended matting agent. Excellent aesthetics and UV durability. Rapid property development at ambient temperature. Low viscosity and long working time; great abrasion and chemical resistance.	Commercial, industrial, and decorative flooring.

NA - Not Applicable

High Performance Waterborne Urethane Coatings Resins

HYBRIDUR® Polymer Dispersions are a line of anionically stabilized urethane-acrylic hybrid polymers from Evonik Corporation. These innovative materials have been found to exhibit excellent wetting, adhesion, barrier and film properties when used in air dry, baked or crosslinked high-performance coatings on a wide variety of metal, wood, plastic and previously painted substrates. HYBRIDUR® dispersions offer the formulator a cost-effective alternative to standard polyurethane dispersions (PUDs) without sacrificing performance, and enhanced performance properties over blends of PUDs and acrylic emulsions in coatings for primer, topcoat, and clear coat applications.

HYBRIDUR® dispersions are easy to formulate and offer rapid dry times. They provide the same ease of use and VOC compliance of typical waterborne dispersions with the added benefits of outstanding barrier properties, durability and UV resistance in both air dry and baked systems.

These hybrid polymers are prepared by a proprietary process technology that leads to an intimacy of interaction between the polyurethane and acrylic structures that cannot be achieved by blending. They are targeted for use in high-performance, VOC-compliant coatings and ink applications.

Selection Chart

HYBRIDUR® 878	HYBRIDUR® 870
Wood/hard plastic/ metal or concrete	Flexible substrates

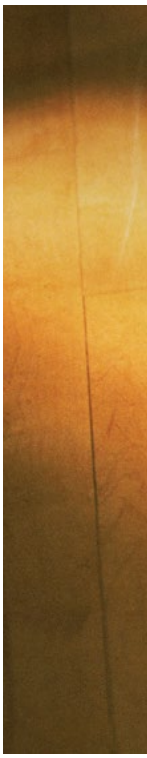
NMP-FREE

HARD ← → SOFT

CONTAINS NMP

HYBRIDUR® 580	HYBRIDUR® 570
Wood or Hard Plastic	Metal or Concrete

HYBRIDUR® 540
Wood or Hard Plastic Solvent/scuff resistant



Resin	Solids (%)	Viscosity Brookfield (cP)	pH	Freeze-Thaw Stability Cycles	Mechanical Stability	Hot Box Stability	Density (lb/gal)	Particle Size	Particle Charge	VOC lb/gal (g/L)
HYBRIDUR® 540	40	50-250	7.5-9.0	10+	Good	Good	8.7	Colloidal	Anionic	0.54 (60)
HYBRIDUR® 570	40-42	50-150	7.5-8.5	10+	Good	Good	8.6	Colloidal	Anionic	1.35 (150)
HYBRIDUR® 580	40-42	50-150	7.5-8.5	10+	Good	Good	8.7	Colloidal	Anionic	1.35 (150)
HYBRIDUR® 870	40	<150	7.5-9.0	5	Good	Good	8.7	Colloidal	Anionic	0.25 (30)
HYBRIDUR® 878	40	<150	7.5-8.5	5	Good	Good	8.7	Colloidal	Anionic	0.20 (24)

	Comments	Principal Applications
	Anionically stabilized urethane-acrylic hybrid polymers. Exhibit excellent wetting, adhesion, barrier and film properties when used in air dry, baked or crosslinked high performance coatings.	Wood or hard plastic applications. Offer high solvent and scruff resistance.
		Metal or concrete applications
		Wood or hard plastic applications. Compliant with 21CFR 175.105.[8]
	NMP FREE. Anionically stabilized urethane-acrylic hybrid polymers. Exhibit excellent wetting, adhesion, barrier and film properties when used in air dry, baked or crosslinked high performance coatings.	Metal, concrete or more flexible applications. Compliant with 21CFR 175.105.[8]
		Metal, concrete or more rigid applications. Compliant with 21CFR 175.105.[8]

NA - Not Applicable

Adhesion Promoters for PVC & Acrylic Plastisols

The Evonik Corporation's Nourybond® binding agent product line is the broadest range of high-performance adhesion promoters for automotive PVC and acrylic plastisols in the world. The Nourybond® polyamidoamine and blocked isoyanate technologies provide solutions to the most demanding performance requirements.

Resin	Type	Color[1] (Gardner)	Viscosity[2] (cP @ 77°F)	Amine Value (mg KOH/g)	Recommended Loading (parts)	Typical Cure Schedule
NOURYBOND® 272	Modified Polyamidoamine	10	15,000-35,000	185-250	1-4	30 min @ 130°C
NOURYBOND® 276	Modified Polyamidoamine	10	8,000-28,000	110-135	1-2	30 min @ 120°C
NOURYBOND® 289	Blocked Isocyanate	<2	30,000-50,000	NA	4-6	30 min @ 120°C
NOURYBOND® 290	Blocked Isocyanate	2	2,000-6,000	NA	3-4	40 min @ 126°C
NOURYBOND® 301	Modified Polyamidoamine	< 12	1,000-1,500 @ 75°C	380-400	0.5-2.0	30 min @ 130°C
NOURYBOND® 346	Modified Polyamidoamine	< 12	1,000-3,000	280-330	0.5-2.0	30 min @ 130°C
NOURYBOND® 368	Modified Polyamidoamine	< 12	2,000-8,000	225-245	0.5-2.0	30 min @ 130°C

	Comments	Principal Applications
	Provides adhesion to a wide variety of automotive electrodeposition primers.	Underbody coatings and nonvisible seam sealers used in the manufacture of automobiles, trucks and buses.
	Provides adhesion to a wide variety of automotive electrodeposition primers after low-temperature bake. Excellent color stability and low viscosity.	Anti-chip primers, visible seam sealers and low-bake PVC plastisols used in the manufacture of automobiles, trucks and buses.
	Provides adhesion to automotive electrodeposition primers. Excellent color stability, superior plastisol rheological performance and wet-on-wet paint capability.	Visible seam sealers and anti-chip primers used in the manufacture of automobiles, trucks and buses.
	Blocked isocyanate adhesion promoter for PVC and acrylic plastisols, used in conjunction with small amount of polyamidoamine adhesion promoter.	Automotive sealants applied to visible areas, anti-chip primers. Low-bake temperatures, excellent plastisol rheological performance, high tensile strength.
	Provides adhesion to a wide variety of automotive electrodeposition primers.	Underbody coatings, nonvisible seam sealers, and anti-chip primers used in the manufacture of automobiles, trucks and buses.
	Provides adhesion to a wide variety of automotive electrodeposition primers.	Underbody coatings and sealers, and nonvisible seam sealers used in the manufacture of automobiles, trucks and buses.
	Provides adhesion to a wide variety of automotive electrodeposition primers.	Underbody coatings and sealers and nonvisible seam sealers used in the manufacture of automobiles, trucks and buses.

NA - Not Applicable

Additives for Epoxy Systems

Evonik Corporation provides a diverse line of additives for the formulation of epoxy systems. Substrate wetting, defoaming and dispersion additives are common to many coating formulations, and other additives can be found at www.coating-addtives.com, including surface control, antistatic, rheology modification, anti-settling, and many more for a full range of effects and functionality.

SUBSTRATE WETTING

Substrate wetting agents are specialty surface active products designed to provide consistent wetting of different surfaces and eliminate defects such as retraction, edge pull, craters, fish-eyes, orange peel and poor leveling. Evonik Corporation's TEGO® Wet, TEGO® Twin, and SURFYNOL® lines of surfactants and superwetters offer a full range of performance for all formulation types, substrates, and application methods.

DEFOAMING/DEAERATION

Defoamers and deaerators are formulated additives designed to eliminate or reduce macro- and micro-foam during production, manufacture and application and prevent voids or bubbles in the finished product. Evonik Corporation's TEGO® Foamex and Airex lines of defoamers and deaerators offer a wide range of performance and foam control chemistries for all formulation types and application methods.

WETTING AND DISPERSING

Wetting and dispersing additives provide stabilization of pigments and other solids in coating formulation, enabling the optimization of rheology, color development and color stability. Evonik Corporation's TEGO® Dispers line of wetting and dispersing additives offer performance for all system types providing the formulation of stable, low viscosity dispersions and direct grinds.

LEVELING AND FLOW

Surface control additives are designed to optimize coating surface properties for improvement of appearance, elimination of poor leveling and defects such as craters and orange peel, as well as offer other attributes such as slip and anti-scratch properties. Evonik Corporation's TEGO® Flow and Glide additives provide excellent performance for the mitigation and control of surface properties in all epoxy coating applications.

MATTING

Evonik Corporation's line of ACEMATT® matting agents provides efficient and effective control of sheen and gloss properties in all types of epoxy coatings

Additive	Waterborne	Solventborne	100% solids	Activity
DEFOAMERS/DEAERATORS				
AIRASE® 4500	+++		+	100%
AIRASE 8070	+++	+	+	100%
TEGO® FOAMEX 810	+++	+	+	100%
TEGO® AIREX 901W	+++			100%
TEGO® AIREX 900		+	+++	100%
TEGO® AIREX 922		+	+++	100%
TEGO® AIREX 931		+++	+	~ 1%
TEGO® AIREX 944		+++	+++	100%
TEGO® AIREX 990		+++	+++	100%
WETTING AGENTS				
SURFYNOL® 420	+++	+++	+++	100%
TEGO® WET 270	+++	+++	+++	100%
DYNOL™ 980	+++	+	+++	100%
TEGO® TWIN 4100	+++	+++		100%
FLOW AND LEVELING				
TEGO® FLOW 425	+++	+++	+++	100%
TEGO® GLIDE 450	+++	+++	+++	100%
TEGO® GLIDE 496	+++	+++	+++	100%
TEGO® GLIDE B 1484		+++	+++	100%
ANTISTATIC				
TEGO® ADDID 230	+++	+++	+++	100%
MATTING				
ACEMATT® TS-100	+++	+++	+++	
ACEMATT® 3300	+++	+++	+++	
ACEMATT® OK 520	+++	+++	+	
PIGMENT DISPERSION				
TEGO® DISPERS 652	+	+++	+++	100%
TEGO® DISPERS 670		+++	+	40%
TEGO® DISPERS 685		+++	+++	100%
TEGO® DISPERS 1010		+++	+++	100%
TEGO® DISPERS 755W	+++			40%
ZETASPERSE® 3800	+++			40%
ZETASPERSE® 179	+++			70%

+++ Primary Recommendation + Alternative Recommendati

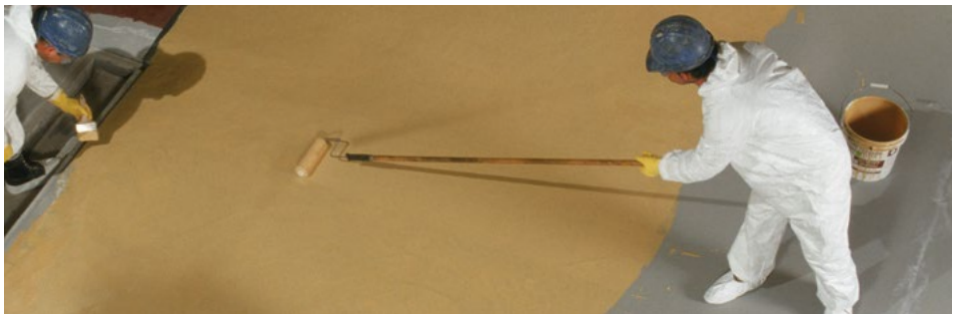
SPECIALTY ADDITIVES FOR EPOXY SYSTEMS

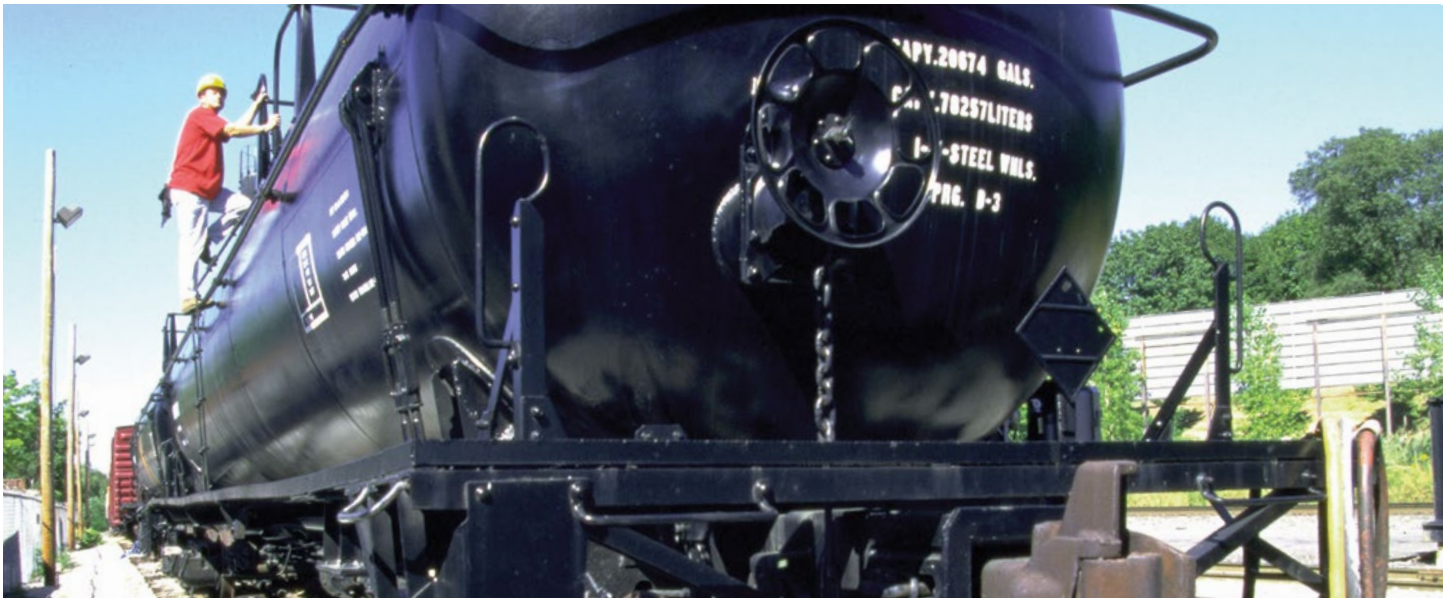
	Chemical Description	Attributes
	organic based concentrate, contains hydrophobic particles	Effective defoaming with a good balance of compatibility for all applications.
	polyether siloxane copolymer	Effective micro-foam control and highly suitable for spray applications. Recommended for medium- to high-viscosity formulations.
	polyether siloxane copolymer, contains fumed silica	Universal grind stage defoamer preventing micro and macro foam.
	polyether siloxane copolymer, contains fumed silica	Effective micro-foam control and highly suitable for spray applications. Recommended for high-viscosity formulations.
	organo-modified polysiloxane, contains fumed silica	Highly suitable for high build and high-viscosity applications for fast and efficient foam break. Excellent for 2k epoxy coatings.
	formulation based on deaerating polymers, silicone free	Silicone free deaerator with excellent compatibility and strong defoaming. Ideal for high-build epoxy coatings. Efficient in low-shear applications.
	solution of a fluorosilicone in diisobutylketone	Suitable for a broad range of coating systems for inhibition of foam stabilization. Excellent in flooring applications.
	formulation based on deaerating organic polymers, with a tip of silicone	Suitable for a broad range of coating systems with excellent defoaming of micro and macro-foam. Ideal for high solid and 2k solvent-free formulations.
	formulation based on deaerating organic polymers, with a tip of silicone	Excellent for crater-sensitive applications and clear coats. Highly compatible deaerator for all application types
	ethoxylated acetylenic based gemini surfactant	Suitable for all applications, providing wetting and foam control. Excellent compatibilizer and leveling agent for 100% epoxy systems.
	polyether siloxane copolymer	Suitable for all applications, providing excellent anti-crater properties with flow promotion
	polyether siloxane copolymer	Suitable for all applications, providing exceptional dynamic substrate wetting and good flow and leveling properties.
	siloxane-based gemini surfactant	Highly compatible and suitable for all applications, providing substrate wetting and anti-crater effects.
	polyether siloxane copolymer	Highly compatible flow and anti-crater additive
	polyether siloxane copolymer	Flow promotion, leveling and strong slip properties for all coating types.
	polyether siloxane copolymer	Anti-crater, leveling, and slip effect properties without compromising recoatability and compatibility for all coating types
	polyether siloxane copolymer	Flow promotion, leveling and deaeration properties in solvent-free and solventborne coatings. Excellent in 2k epoxy flooring coating systems.
	Formulation of solid salts and quaternary nitrogen compounds	Solvent-free anti-static additive used to increase the conductivity of coating formulations. Very good compatibility even at high dosages. Excellent suitability for clear coatings
	untreated thermal silica	Highly efficient matting for a broad range of coating types. Very high transparency.
	after-treated thermal silica	Strong matting efficiency with high transparency and soft-feel effect. Suitable for a broad range of applications.
	wax-treated, precipitated silica	Medium particle sized precipitated silica with very high compatibility for a broad range of industrial coatings
	concentrate of a fatty acid derivative	Viscosity reduction and dispersion of inorganic pigments. Excellent for elimination of color float in epoxy coatings
	solution of a high molecular weight polymer	Fast pigment wetting, newtonian flow behavior and outstanding viscosity reduction for all kinds of pigments
	high molecular weight polymer	Suitable for solventborne and 100% solids formulations. Stabilization of all pigment types.
	high molecular weight polymer	Outstanding color development for 100% solids epoxy flooring formulations.
	aqueous solution of a copolymer with groups of high pigment affinity	Suitable for the dispersion of all types of pigments in waterborne coatings.
	aqueous solution of a copolymer with groups of high pigment affinity	Suitable for the dispersion of all types of pigments in waterborne coatings.
	alcohol ethoxylate	Steric stabilizing additive for all types of pigments in waterborne coatings. Particularly effective in highly filled and high viscosity systems.

ion (Blank) May or may not be acceptable NA - Not Applicable

PRODUCT INDEX

EPOXY ADDITIVES





SPECIALTY ADDITIVES

Product Trademarks/Owners

Amicure®
Airase®
Ancamide®
Ancamine®
Ancarez
Anchor®
Anquamine®
Carbowet®
Curezol®*
Dicyanex®
Dynol™
Epodil®
Hybridur®
Imicure®
Nourybond®
Sunmide®
Surfynol®
ZetaSperse®

Evonik Corporation

* Curezol® is a registered trademark of Shikoku Chemical Corporation.

FOOTNOTES

1. ASTM D1544–80.
2. Brookfield viscosity. ASTM D2196-10.
3. Concentration with standard, undiluted, liquid Bisphenol A epoxy, EEW 182–192, e.g., Epon® 828 resin (Hexion), DER 331 resin (Olin).
4. PHR: part by weight per 100 parts by weight of epoxy resin.
5. Gel time or pot life in 150 g mass in air at 77°F for room temperature cures. Shelf life or working life at 77°F in case of elevated temperature cures.
6. Film applied immediately after mixing using BK dry time recorder. Similar to cotton-free or touch-dry time in conventional coatings.
7. Glass transition temperature (Tg) per ASTM D3418-82. A stoichiometric amount of curing agent has been used with Bisphenol A (EEW=190) epoxy resin and cured for 7 days at 25°C and 50% relative humidity except for the unmodified cycloaliphatic amines (p 24) which used Epon® 826 (EEW=179–186) resin. Measurement has been done by differential scanning calorimetry (DSC) using a heating rate of 10°C/minute.
8. Use of ingredient may be limited by function or type of food or drink. Refer to regulations. FDA compliance is dependent upon curing under conditions such that the nature and/or amount of extractables conform to the limits specified. FDA is particularly concerned with one-time-use containers. Evonik Corporation makes no claim or warranty with respect to any aspect of FDA compliance. Formulator, fabricator and/or user of the finished article is urged to become familiar with the specific regulations. Please see our publication number 125-06-013-GLB for food contact information. Contact Evonik Corporation for further assistance.
9. With standard, solid Bisphenol A epoxy, EEW 450–575, e.g., Epon® 1001F resin (Hexion), DER® 661 resin (Olin) or Araldite® GT 7071 resin (Huntsman).
10. Heat deflection temperature (HDT) to ASTM D648 at 264 psi after curing 7 days at 77°F only for room temperature curing systems. Longer cure times and particularly higher temperature post-cures yield much higher values. Results given for elevated-temperature (E.T.) curing systems are based on various E.T. cure schedules.
11. Typical concentration range. Data given based on Anchor® 1040 curing agent (10 PHR), Anchor® 1115 curing agent (7.5 PHR).
12. Cure schedule will depend on accelerator used with dicyandiamide.
13. ASTM D1640

NA = Not Applicable.

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