Technical Datasheet

Ashland Performance Materials

DERAKANE® EPOXY VINYL ESTER

DERAKANE® 510 C-350 Epoxy Vinyl Ester Resin

DERAKANE 510C-350 resin is a brominated vinyl ester resin that offers a high degree of fire retardance(1) while providing the excellent chemical resistance and toughness typical of DERAKANE resins. Optimum fire retardance is achieved when antimony compounds are added to the resin. DERAKANE 510 C-350 resin provides resistance to a wide range of acids, alkalis, bleaches and organic compounds for use in many chemical processing industry applications.

DERAKANE 510C-350 resin contains only 35 percent styrene, resulting in reduced styrene emissions.

(1) The fire retardancy and flame spread data were obtained from controlled and/or small scale bench tests and the results apply specifically to the specimens tested, in the manner tested. They are not necessarily perdictive of product performance in a real fire situation. DERAKANE resins are organic materials and the fabricated products constructed from them will burn under the right conditions of heat and oxygen supply. This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

APPLICATIONS AND USE

Equipment fabricated with DERAKANE 510C-350 resin resists mechanical and chemical damage which enables it to be used in various caustic environments such as sodium hypochlorite, chlorine dioxide and alkaline hydrogen peroxide. It is also suitable for equipment specified to handle mixtures of air and hot gases, building panels, and flooring compounds where a degree of fire retardance is required. It is also recommended for use in FRP ductwork, stacks and stack-liner applications.

DERAKANE 510C-350 resin is designed for ease of fabrication using hand lay-up, spray-up, filament winding, compression molding, resin transfer molding techniques and pultrusion.

Laminates made with DERAKANE 510 C-350 resin have been certified to meet ASTM E-84 flame spread "Class 2" rating (less than 75). With the use of antimony synergists, Class 1 ratings can be achieved.(1)

Recommendations for specific services and environments can be provided by contacting us at derakane@ashland.com.

TYPICAL LIQUID RESIN PROPERTIES

Property(2) at 25°C (77°F)	Value	Unit
Dynamic Viscosity	400	mPa·s (cps)
Kinematic Viscosity	350	cSt
Styrene Content	35	%
Density	1.14	gm/ml

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(2) Properties are typical values, based on material tested in our laboratories. Results may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

TYPICAL CURING CHARACTERISTICS

The following table provides typical(2) gel times for methyethylketone peroxide (MEKP). Other information is available at www.derakane.com.

Typical gel times(3) using NOROX(4) MEKP-925H, Cobalt Naphthenate-6% (CoNap6%)(5), Dimethylaniline (DMA), and 2,4-Pentanedione (2,4-P).

Gel time at 15°C (59°F)	MEKP (phr(6))	CoNap6% (phr)	DMA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.50	0.30	0.10	-
30 +/- 10 minutes	1.50	0.20	0.05	-
60 +/- 15 minutes	1.25	0.30	0.05	0.04

Gel time at 20°C (68°F)	MEKP (phr)	CoNap6% (phr)	DMA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.25	0.30	0.05	-
30 +/- 10 minutes	1.25	0.30	0.05	0.04
60 +/- 15 minutes	1.25	0.30	0.05	0.06

Gel time at 25°C (77°F)	MEKP (phr)	CoNap6% (phr)	DMA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.25	0.20	0.05	-
30 +/- 10 minutes	1.25	0.20	0.05	0.04
60 +/- 15 minutes	1.25	0.20	0.05	0.06

Gel time at 35°C (95°F)	MEKP (phr)	CoNap6% (phr)	DMA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.25	0.20	0.05	0.03
30 +/- 10 minutes	1.25	0.20	0.05	0.07
60 +/- 15 minutes	1.25	0.20	0.05	0.11

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(3) Thoroughly test any other materials in your application before full-scale use. Gel times may vary due to the reactive nature of these products. Always test a small quantity before formulating large quantities.
(4) Registered trademark of Norac Inc; NOROX MEKP-925H methylethyketone peroxide or equivalent low hydrogen peroxide content MEKP. Use of other MEKP or additives may result in different gel time results.
(5) Use of cobalt octoate, especially in combination with 2,4-P can result in 20-30% slower gel times.
(6) phr=parts per hundred

TYPICAL MECHANICAL PROPERTIES

Casting Properties

Property[2] of a clear casting[7] at 25°C (77°F)	Value (SI)	Method	Value (US)	Method
Tensile Strength	86 MPa	ISO 527	12,000 psi	ASTM D638
Tensile Modulus	3200 MPa	ISO 527	460 ksi	ASTM D638
Tensile Elongation, Yield	5-6%	ISO 527	5-6%	ASTM D638
Flexural Strength	150 MPa	ISO 178	22,000 psi	ASTM D790
Flexural Modulus	3400 MPa	ISO 178	490 ksi	ASTM D790
Heat Distortion Temperature[8]	105°C	ISO 75	220°F	ASTM D648
Glass Transition Temperature, Tg[2]	120°C	ISO 11359-2	250°F	ASTM D3419
Barcol Hardness	35	EN59	35	ASTM D2583

(7) Cure schedule: 24 hours at room temperature and 2 hours at 120°C (250°F)
(8) Maximum stress: 1.8 MPa (264 psi)

Laminate Properties

Property[2] of 6 mm (¼in.) laminate[9] at 25°C (77°F)	Value (SI)	Method	Value (US)	Method
Tensile Strength	113 MPa	ISO 527	16,400 psi	ASTM D3039
Tensile Modulus	10,300 MPa	ISO 527	1490 ksi	ASTM D3039
Flexural Strength	164 MPa	ISO 178	23,800 psi	ASTM D790
Flexural Modulus	7600 MPa	ISO 178	1100 ksi	ASTM D790
Glass Content	40%	ISO 1172	40%	ASTM D2584

(9) Cure schedule: 24 hours at room temperature; 6 hours at 80°C (175°F). ASTM C582 Type II laminate construction, nominal 6 mm (¼")is V/M/M/Wr/M/Wr/M where V=Continuous veil glass, M=Chopped strand mat 450 g/m^2 (1.5 oz/ft^2) and Wr=Woven roving 800 g/m^2 (24 oz/yd^2).

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CERTIFICATES AND APPROVALS	The manufacturing, quality control and distribution of products, by Ashland Performance Materials, comply with one or more of the following programs or standards: Responsible Care, ISO 9001, ISO 14001 and OHSAS 18001.
STANDARD PACKAGE	210 Liter (55 Gallon) Non-Returnable Drum Net Wt. 205 kgs (452 lbs.) DoT Label Required: Flammable Liquid
STORAGE	This resin contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn. Drums - Store at temperatures below 25°C (77°F). Storage life decreases with increasing storage temperature. Avoid exposure to heat sources such as direct sunlight or steam pipes. To avoid contamination of product with water, do not store outdoors. Keep sealed to prevent moisture pick-up and monomer loss. Rotate stock. Bulk - See Ashland's Bulk Storage and Handling Manual for Polyesters and Vinyl Esters. A copy of this may be obtained from Ashland Performance Materials at +1.614.790.3333 or 1.800.523.6963.
COMMERCIAL WARRANTY	Four months from date of manufacture, when stored in accordance with the conditions stated above.
Notice	All information presented herein is believed to be accurate and reliable, and is solely for the user's consideration, investigation and verification. The information is not to be taken as an express or implied representation or warranty for which Ashland assumes legal responsibility. Any warranties, including warranties of merchantability or non-infringement of intellectual property rights of third parties, are herewith expressly excluded. Since the user's product formulations, specific use applications and conditions of use are beyond the control of Ashland, Ashland makes no warranty or representation regarding the results which may be obtained by the user. It shall be the responsibility of the user to determine the suitability of any of the products mentioned for the user's specific application. Ashland requests that the user reads, understands and complies with the information contained herein and the current Material Safety Data Sheet.

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Ashland is committed to the continuous evolution of technology and service solutions that promote health, safety and environmental protection around the world.

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