Technical Datasheet

INEOS Composites

DERAKANE™ 510A-40 Epoxy Vinyl Ester Resin

DERAKANE 510A-40 epoxy vinyl ester resin is a brominated bisphenol-A based vinyl ester, designed to offer the maximum degree of fire retardance(1) combined with enhanced chemical resistance and toughness. Since fire retardance is achieved without additives, chemical resistance is maintained and visual inspection of fabricated articles is not impaired. It offers the highest bromine content of any DERAKANE resin.

DERAKANE 510A-40 resin provides outstanding resistance to caustic alkalis, hypochlorite bleaching chemicals and hot water, as well as corrosion resistance similar to DERAKANE 411 resin series. Laminates made with DERAKANE 510A-40 resin have achieved a flame spread of <25 (ASTM E84) without any additives.

(1) The degree of retardance achieved in properly formulated cured products made of these resins is most frequently quantified by the ASTM E-84 tunnel test. This is a controlled test which compares flammability characteristics of one material to another, but may not be predictive of behavior in a real fire situation. DERAKANE epoxy vinyl eswter resins are organic materials and will burn under the right conditions of heat and oxygen supply.

APPLICATIONS AND USE

DERAKANE 510A-40 resin is the preferred choice where the highest fire retardance is required and is the standard recommendation for external fire retardance layer on FRP equipment. DERAKANE 510A-40 resin is used extensively in FRP ductwork, stacks and stack liner applications, handling mixtures of air and hot gases of potentially flammable liquids. It can be used with filament winding, hand lay-up, spray-up, pultrusion, and resin transfer molding techniques.

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

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TYPICAL LIQUID RESIN PROPERTIES

Property[2] at 25°C (77°F)	Value	Unit
Dynamic Viscosity	400	mPas (cps)
Kinematic Viscosity	325	cSt
Styrene Content	38	%
Density	1.23	g/ml

(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 tables provide typical geltimes for MEKP. This and other information are available at www.derakane.com.

MEKP Cure System

Typical geltimes[3] using NOROX (ME)KP-925H[4] catalyst (MEKP) and Cobalt Naphthenate-6%[5] (Co-nap6%), Dimethylaniline (DMA) and 2,4-Pentanedione (2,4-P).

Geltime at 18°C (65°F)	MEKP (phr)[6]	Co-nap6% (phr)	DMA (phr)
15 +/- 5 minutes	2.50	0.30	0.25
30 +/- 10 minutes	2.00	0.30	0.10
50 +/- 15 minutes	1.25	0.30	0.05

Geltime at 24°C (75°F)	MEKP (phr)	Co-nap6% (phr)	DMA (phr)
15 +/- 5 minutes	2.00	0.30	0.05
30 +/- 10 minutes	1.25	0.30	-
50 +/- 15 minutes	1.00	0.20	-

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Geltime at 30°C (85°F)	MEKP (phr)	Co-nap6% (phr)	DMA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.50	0.20	0.05	-
30 +/- 10 minutes	1.25	0.20	-	-
50 +/- 15 minutes	1.25	0.20	-	0.05

(3) Thoroughly test any other materials in your applications before full-scale use. Geltimes may vary due to the reactive nature of these materials. Always test a small quantity before formulating large quantities.
(4) NOROX(ME)KP 925 H, Registered trademark of United Initiators. (ME) used in NA name, but not elsewhere. NOROX(ME)KP 925 H or equivalent low hydrogen peroxide content MEKP. Use of other MEKP catalysts or additives may result in different gel times.
(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 resin molding compound

TYPICAL MECHANICAL PROPERTIES

Casting Properties

Property(1) of clear casting(7) at 25°C (77°F)	Value (SI)	Method	Value (US)	Method
Tensile Strength	86 MPa	ISO 527	12,300 psi	ASTM D638
Tensile Modulus	3400 MPa	ISO 527	490 kpsi	ASTM D638
Tensile Elongation at Yield	4-5%	ISO 527	4-5%	ASTM D638
Flexural Strength	150 MPa	ISO 178	21,700 psi	ASTM D790
Flexural Modulus	3600 MPa	ISO 178	520 kpsi	ASTM D790
Heat Distortion Temperature(8)	110°C	ISO 75	230°F	ASTM D648
Barcol Hardness	40	EN 59	40	ASTM D2583

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

Laminate Properties

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Properties[1] of 6 mm (1/4in.) 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 kpsi	ASTM D3039
Flexural Strength	164 MPa	ISO 178	23,800 psi	ASTM D790
Flexural Modulus	7600 MPa	ISO 178	1100 kpsi	ASTM D790
Glass Content	40%	ISO 1172	40%	ASTM D2584

(9) Cure schedule: 24 hours at room temperature and 6 hours at 80°C (175°F); laminate construction of 6 mm (1/4")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).

CERTIFICATES AND APPROVALS

The manufacturing, quality control and distribution of products, by INEOS Composites, comply with one or more of the following programs or standards: ISO 9001, ISO 14001 and OHSAS 18001.

STANDARD PACKAGE

208 Liter (55 Gallon) Non-Returnable Drum
Net Wt. 230 kgs (507 Lbs.)
Dot Label Required: Flammable Liquid

STORAGE

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 INEOS Composites's Bulk Storage and Handling Manual for Polyesters and Vinyl Esters. A copy of this may be obtained from INEOS Composites at +1.614.790.3333 or 800.523.6963.

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COMMERCIAL WARRANTY	Six 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 INEOS Composites assumes legal responsibility. Any warranties, including warranties of merchantability, fitness for use 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 INEOS Composites, INEOS Composites makes no warranty or representation regarding the results which may be obtained by the user. It shall be the sole responsibility of the user to determine the suitability of any of the products mentioned for the user's specific application. INEOS Composites requests that the user reads, understands and complies with the information contained herein and the current Material Safety Data Sheet.
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