

## DERAKANE™ MOMENTUM 411-200 Epoxy Vinyl Ester Resin

DERAKANE MOMENTUM 411-200 epoxy vinyl ester resin is based on a bisphenol-A epoxy resin that has been formulated for use in vacuum infusion applications and can be used in other end-use applications with a wide range of fabrication techniques. DERAKANE MOMENTUM 411-200 resin provides resistance to a wide range of acids, alkalis, bleaches and organic compounds for use in many chemical processing industry applications (please contact us before using thixotropic agents and fillers. Addition of thixotropic agents and fillers can compromise corrosion resistance).

The raw materials used in the manufacture of this resin are listed as acceptable in FDA regulation Title 21 CFR 177.2420 for repeated use in contact with food, subject to user's compliance with the prescribed limitations of that regulation.

Note: Contact us before using thixotropic agents and fillers. Addition of thixotropic agents and fillers can compromise corrosion resistance.

### APPLICATIONS AND USE

DERAKANE MOMENTUM 411-200 resin is recommended for fabricating storage tanks, vessels, ducts, and on-site maintenance projects, particularly in chemical processing and pulp and paper operations.

The resin is designed for ease of fabrication using vacuum infusion processes, but is suitable for hand lay-up, spray-up, filament winding, compression molding and resin transfer molding techniques, pultrusion and molded grating applications.

Equipment fabricated with DERAKANE MOMENTUM 411-200 resin tolerates heavy design loads without causing failure due to resin damage. This facilitates working with large weight-bearing equipment with confidence. The superior elongation and toughness properties provide fabricated equipment with better impact resistance and less cracking due to cyclic temperature, pressure fluctuations and mechanical shocks providing a safety factor against damage during process upsets or during shipping and installation.

Recommendations for specific services and environments can be provided by contacting us at [derakane@ineos.com](mailto:derakane@ineos.com).

# Technical Datasheet



## DERAKANE™ MOMENTUM 411-200 Epoxy Vinyl Ester Resin

### TYPICAL LIQUID RESIN PROPERTIES

Property <sup>(1)</sup> at 25°C (77°F)	Value	Unit
Dynamic Viscosity	210	mPas (cps)
Kinematic Viscosity	200	cSt
Styrene Content	48	%
Density	1.03	g/ml

(1) 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](http://www.derakane.com).

Warning: Addition levels of less than 0.05% cobalt 6% may cause undercure under certain conditions. Please contact INEOS Composites Technical Service for further details or if such low levels are envisaged.

### MEKP Cure System

Typical<sup>(1)</sup> geltimes<sup>(2)</sup> using NOROX<sup>(3)</sup> (ME)KP-925H catalyst (MEKP) and Cobalt Naphthenate or Octoate-6%<sup>(4)</sup> (Cobalt6%), Diethylaniline (DEA)<sup>(6)</sup> and 2,4-Pentanedione (2,4-P).

Geltime at 15°C (59°F)	MEKP (phr) <sup>(5)</sup>		Cobalt6% (phr)	
15 +/- 5 minutes	-		-	
30 +/- 10 minutes	1.50		0.30	
60 +/- 15 minutes	1.50		0.05	

  

Geltime at 20°C (68°F)	MEKP (phr)	Cobalt6% (phr)	DEA (phr)	2,4-P (phr)
15 +/- 5 minutes	1.25	0.30	0.10	-
30 +/- 10 minutes	1.25	0.06	-	-

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60 +/- 15 minutes	1.25	0.10	-	0.025
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Geltime at 25°C (77°F)	MEKP (phr)	Cobalt6% (phr)	2,4-P (phr)	
15 +/- 5 minutes	1.00	0.20	-	
30 +/- 10 minutes	1.00	0.05	0.005	
60 +/- 15 minutes	1.00	0.05	0.025	
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Geltime at 35°C (95°F)	MEKP (phr)	Cobalt6% (phr)	2,4-P (phr)	
15 +/- 5 minutes	1.00	0.05	0.02	
30 +/- 10 minutes	1.00	0.05	0.04	
60 +/- 15 minutes	1.00	0.05	0.06	

(2) 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.

(3) Registered trademark of United Initiators.; Norox (ME)KP-925H, (ME) only used in NA name, but not elsewhere. MEKP or equivalent low hydrogen peroxide content MEKP. Use of other MEKP catalysts or additives may result in different gel times.

(4) Use of cobalt octoate, especially in combination with 2,4-P can result in 20-30% slower gel times.

(5) phr = parts per hundred resin molding compound

(6) For pre-acceleration for prolonged storage (e.g. formulation of lining or flooring systems) either avoid DMA or DEA, or use DEAA (DiEthyl-AcetoAcetamide). For further information, please contact INEOS Composites.

TYPICAL CURED RESIN Casting Properties  
PROPERTIES

Property <sup>(1)</sup> of clear casting <sup>(7)</sup> 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 kpsi	ASTM D638
Tensile Elongation at Yield	5-6%	ISO 527	5-6%	ASTM D638

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Flexural Strength	150 MPa	ISO 178	22,000 psi	ASTM D790
Flexural Modulus	3400 MPa	ISO 178	490 kpsi	ASTM D790
Heat Distortion Temperature <sup>(8)</sup>	102°C	ISO 75	216°F	ASTM D648
Glass Transition Temperature, T <sub>g</sub> <sup>2</sup>	118°C	ISO 11357	245°F	ASTM D3418
Volume Shrinkage	8.0%	---	8.0%	---
Barcol Hardness	35	EN 59	35	ASTM D2583
Density	1.14 g/cm <sup>3</sup>	ISO 1183		

(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 <sup>(1)</sup> of 6 mm (1/4 in.) laminate <sup>(9)</sup> at 25°C (77°F)	Value (SI)	Method	Value (US)	Method
Tensile Strength	150 MPa	ISO 527	22,000 psi	ASTM D3039
Tensile Modulus	12,000 MPa	ISO 527	1700 kpsi	ASTM D3039
Flexural Strength	210 MPa	ISO 178	30,000 psi	ASTM D790
Flexural Modulus	8100 MPa	ISO 178	1200 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 6mm (1/4") is V/M/M/Wr/M/Wr/M where V=Continuous veil glass, M=Chopped strand mat 450 g/m<sup>2</sup> (1.5 oz/ft<sup>2</sup>) and Wr=Woven roving 800 g/m<sup>2</sup> (24 oz/yd<sup>2</sup>).

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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	Non-Returnable Drum with Net Weight of 205 Kg (452 lb) DOT Label Requirement: Flammable Liquid
COMMERCIAL WARRANTY	Nine months from the date of manufacture, when stored in accordance with the conditions stated above.
STORAGE	<p>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 containers sealed to prevent moisture pick-up and monomer loss. Mild mixing is recommended after prolonged storage. Rotate stock.</p> <p>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.</p> <p>All other conditions being equal, higher storage temperatures will reduce product stability and lower storage temperature will extend product stability.</p>
Notice	<p>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.</p> <p>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.</p>

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INEOS Composites requests that the user reads, understands and complies with the information contained herein and the current Material Safety Data Sheet.