

Product Information

Vipel Corrosion Resistant Bisphenol A, Epoxy Vinyl Ester Resins

TYPICAL PROPERTIES OF CURED RESIN* (1)

Test	Units of Measure	Nominal	Test Method
Tensile Strength,	psi/MPa	12,800/88	ASTM D 638
Tensile Modulus,	psi/GPa	470,000/3.2	ASTM D 638
Tensile Elongation,	%	6.6	ASTM D 638
Flexural Strength,	psi/MPa	21,800/150	ASTM D 790
Flexural Modulus,	psi/GPa	530,000/3.7	ASTM D 790
Heat Distortion Temp. °F/°C @ 264 psi		232/111	ASTM D 648
Barcol Hardness, Ultimate		34	ASTM D 2583

TYPICAL LIQUID RESIN PROPERTIES* (2) see back page

VERSION	VISCOSITY, Cps	THIX INDEX	GEL TIME, minutes	GEL TO PEAK EXOTHERM, minutes	PEAK EXOTHERM, F/°C	SPECIFIC GRAVITY	STYRENE CONTENT, %
F013-AAA-00	350 ¹	NA	23 ²	18	359/182	1.04	45
F013-AAB-00	450 ¹	NA	23 ²	18	350/177	1.05	43
F013-LBX-00	400 ¹	NA	25 ³	12	322/162	1.04	43
F013-LCX-00	500 ¹	NA	30 ⁴	20	329/165	1.05	42
F013-HHH-00	3200 ⁴	NA	16 ⁵	10	302/150	1.08	33

- 1) 77°F/25°C Brookfield RV viscosity spindle 2 at 20 rpm
- 2) 77°F/25°C Gel time with 0.1% cobalt 6%, 0.1% DMA and 1.25% MEKP
- 3) 77°F/25°C Gel time with 0.2% cobalt 6%, 0.05% DMA and 1.25% MEKP
- 4) 77°F/25°C Gel time with 0.5% cobalt 6%, and 1.5% MEKP
- 5) 77°F/25°C Brookfield RV viscosity spindle 3 at 20 rpm
- 6) 77°F/25°C Gel time with 0.25% cobalt 6% and 1.25% MEKP

*Typical properties are not to be construed as specifications.

DESCRIPTION

AOC's Vipel F013 series is a bisphenol A epoxy-based vinyl ester resin dissolved in styrene. The Vipel F013 series is ideally suited for use in hand lay-up, spray-up, filament winding and pultrusion processes where outstanding mechanical properties and excellent resistance to chemicals and heat are required.



BENEFITS

Versatile

Wide formulating capabilities allow for use in many processes and for optimization of cost/performance.

Unique composition produces a tough and versatile resin with excellent crack and craze resistance in molded parts.

Vipel F013 is suitable for moldings that are subjected to particularly high static or dynamic loads, such as pipe, tanks, duct work and flooring applications. Vinyl ester resins have excellent resistance to sustained heat.

Corrosion Resistant

Vipel F013 highly resistant to hydrogen peroxide, and alkalis, and performs well in various stages of hypochlorite and chlorine production. Refer to AOC for corrosion resistance information or for questions regarding suitability of a resin to any particular chemical environment.

Food and Drug

All resins in this datasheet are manufactured from raw materials that are listed in FDA regulation Title 21 CFR 177.2420. It is the fabricator's responsibility to also be sure that the final composite is well cured. All composites used for FDA applications should be post cured at 180°F/82°C for at least 4 hours. After post curing it should be washed with soap and water and rinsed.

Vipel® F013 Series Bisphenol A Epoxy Vinyl Ester Resins

VIPEL F013 -A AND L SERIES GEL TIMES 1.25% MEKP AT 25°C/77°F

* 2,4-Pentandione
** N, N-Diethylaniline
*** N, N-Dimethylaniline

Formulation	2,4-P * %	Gel Time minutes	Gel to Peak minutes	Peak Exotherm °F/°C
0.1% Cobalt 6%	0	45	42	326/163
	0.025	58	37	334/168
	0.05	125	43	323/162
	0.075	224	60	313/156
	0.1	259	67	311/155
0.1% Cobalt 6% 0.1% DEA**	0	34	27	333/167
	0.025	49	32	333/167
	0.05	94	35	319/160
	0.075	179	45	153/308
	0.1	245	51	303/151
0.1% Cobalt 6% 0.1% DMA***	0	23	18	359/182
	0.025	35	18	351/177
	0.05	66	28	346/174
	0.075	117	32	333/167
	0.1	173	35	321/161

PERFORMANCE GUIDELINES

A. Keep full strength catalyst levels between 1.0% - 2.0% of the total resin weight.

B. Maintain shop temperatures between 65°F/18°C and 90°F/32°C and humidity between 40% and 90%. Consistent shop conditions contribute to consistent gel times and will help the fabricator make a high quality part.

C. Finished part surfaces that have been cured at room temperature in contact with air should be relatively tack free. They may not, however, be fully cured and are thus not as resistant to chemicals as a fully cured part. If no further laminating is planned, a 10% solution of 5% paraffin wax solution (MP 115-118°F/46-48°C) in styrene may be added to the last resin layer to provide a tack free surface.

D. Optimum cure and performance may be obtained by post curing room temperature cured laminates for two hours at 158-212°F/70-100°C.

E. Room temperature curing by means of cobalt acceleration should be completed with low hydrogen peroxide content MEKP catalyst to minimize foaming.

SAFETY

See appropriate Material Safety Data Sheet for guidelines.

ISO 9001:2000 CERTIFIED

The Quality Management Systems at every AOC manufacturing facility have been certified as meeting ISO 9001:2000 standards. This certification recognizes that each AOC facility has an internationally accepted model in place for managing and assuring quality. We follow the practices set forth in this model to add value to the resins we make for our customers.

STORAGE STABILITY

This product is stable for seven months from the date of manufacture when stored in the original containers, away from direct sunlight or other UV light sources and at or below 25°C.

After extended storage, some drift may occur in the product viscosity and gel time.

FOOTNOTES

(1)

Based on tests of Vipel F013-AAA-00 at 77°F/25°C, and 50% relative humidity. All thixotropic resins should be mixed well prior to use. The use of thixotropy degrades the corrosion performance of a resin in some chemical environments such as sodium chloride. All tests on unreinforced cured resin. Castings were post cured.

(2)

The gel times shown are typical but may be affected by catalyst, promoter, inhibitor concentration, resin, mold, and shop temperature. Variations in gelling characteristics can be expected between different lots of catalysts and at extremely high humidities. Pigment and/or filler can retard or accelerate gelation. It is recommended that the fabricator check the gelling characteristics of a small quantity of resin under actual operating conditions prior to use.



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