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RESINS | GEL COATS | COLORANTS

**VIPEL® F013 SERIES
BISPHENOL-A EPOXY
VINYL ESTER RESIN**



Product Information

BISPHENOL-A, EPOXY VINYL ESTER RESINS (HIGHER STYRENE CONTENT VERSION)

Typical Cast Mechanical Properties ¹

Test	Unit of Measure	Nominal	Test Method
Tensile Strength	psi/MPa	12,800/88	ASTM D638 / ISO 527-1
Tensile Modulus	psi/GPa	470,000/3.2	ASTM D638 / ISO 527-1
Tensile Elongation	%	6.6	ASTM D638 / ISO 527-1
Flexural Strength	psi/MPa	21,800/150	ASTM D 790 / ISO 178
Flexural Modulus	psi/GPa	530,000/3.7	ASTM D 790 / ISO 178
Heat Distortion Temp.	°F/°C@264 psi	232/111	ASTM D648 / ISO 75-A
Barcol Hardness, Ultimate		34	ASTM D2583 / EN 59

Typical Liquid Properties²

Versions	Viscosity, cps	Thix Index	Gel Time, Min	Gel to Peak	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-AAC-00	450 ¹	NA	25 ⁶			1.04	44
F013-AUV-00	350 ¹	NA	23 ²	18	359/182	1.04	45
F013-LBX-00	400 ¹	NA	25 ³	12	162	1.04	43
F013-LCX-00	500 ¹	NA	30 ⁵	20	165	1.05	42
F013-HHH-00	3200 ¹	NA	16 ²	10	302/150	1.08	33

NA- Not applicable

- 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 Cadox M-50a
- 3) 77°F/25°C Gel time with 0.25% cobalt 6%, and 1.25% MEKP
- 4) 77°F/25°C Brookfield RV viscosity spindle 3 at 20 rpm
- 5) 25°C Gel time with 0.25% cobalt 12% and 1.50% MEKP-900
- 6) 6-100g @ 20°C, 1.5 grams NL49P and 3 grams Butanox M60

*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. The Vipel F013 Series offers the best resistance to hot caustic solutions.

APPLICATION

Vipel F013 Series is suitable for moldings that are subjected to particularly high static or dynamic loads such as pipes, tanks, duct work and flooring applications.

BENEFITS

Versatile

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

Version F013-AUV-00 contains UV stabilizer. This version is not approved for FDA applications.

Corrosion Resistant

Vipel F013 Series is highly resistant to hydrogen peroxide, and alkalis, and performs well in various stages of hypochlorite and chlorine production.

Food and Drug

All resins in this datasheet are manufactured from raw materials that are listed in FDA regulation Title 21 CFR 177.2420.



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

Formulation	2, 4-P * %	Gel Time Minutes	Gel to Peak Minutes	Peak Exotherm °F/°C
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

Notes: Do not decrease Aniline below DMA 0.1% or DEA 0.2%

0.2% Diethyl Aniline may be substituted for 0.1% DMA

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.

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 77°F/25°C.

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

SAFETY

See the appropriate Safety Data Sheet for guidelines.

ISO 9001:2008 CERTIFIED

The Quality Management Systems at every AOC manufacturing facility have been certified as meeting ISO 9001:2008 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.

FOOTNOTES

(1.) Based on tests of F013-AAA-00 at 77°F/25°C and 50% relative humidity. All thixotropic resins should be mixed well prior to use. All tests on unreinforced cured resin. Castings were prepared using 1% BPO and post cured 1 hour at 93°C, 1 hour at 116°C, and 2 hours at 138°C.

(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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AOC World Headquarters
955 Highway 57 East, Collierville, TN 38017

+01 901.854.2800

AOC-Resins.com

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SALES CONTACTS

NORTH AMERICA
Toll free: +1 866 319 8827
northamerica@aoc-resins.com

LATIN AMERICA
+01 863 815 5016
latinamerica@aoc-resins.com

MIDDLE EAST
+44 1206 390415
middleeast@aoc-resins.com

EUROPE
+44 1206 390415
europa@aoc-resins.com

AOC UK LTD.
+44 01206 390400
salesUK@aoc-resins.com

INDIA
+44 1206 390415
india@aoc-resins.com

ASIA/AUSTRALIA
+44 1206 390415
asia@aoc-resins.com

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