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# VIPEL® F085 SERIES EPOXY NOVOLAC VINYL ESTER RESIN

# Product Information

## CORROSION RESISTANT, EPOXY NOVOLAC VINYL ESTER RESIN

### Typical Cast Mechanical Properties [1]

| Test | Unit of Measure | Nominal | Test Method |
|---|---|---|---|
| Tensile Strength | psi/MPa | 11,200/77 | ASTM D 638 |
| Tensile Modulus | psi/GPa | 540,000/3.7 | ASTM D 638 |
| Tensile Elongation | % | 3.3 | ASTM D 638 |
| Flexural Strength | psi/MPa | 21,500/148 | ASTM D 790 |
| Flexural Modulus | psi/GPa | 540,000/3.7 | ASTM D 790 |
| Heat Distortion Temp. | °F/°C@264 psi | 300/149 | ASTM D 648 |
| Barcol Hardness | | 44 | ASTM D2583 |

### Typical Liquid Properties[2]

| Versions | Viscosity, cps | Thix Index | Gel Time, Min | Gel to Peak | Peak Exotherm (°F/°C) | Specific Gravity | Styrene Content, % |
|---|---|---|---|---|---|---|---|
| F085-AAA-00 | 300[1] | NA | 15[2] | 5 | 400/204 | 1.08 | 33 |
| F085-CAA-00 | 200[1] | NA | 15[2] | 7 | 420/216 | 1.07 | 35 |
| F085-HAA-00 | 1800[3] | NA | 14[4] | 3 | 380/193 | 1.11 | 25 |

*1) 25°C Brookfield RV viscosity spindle 2 at 20 rpm*
*2) 25°C Gel time with 0.3% cobalt 6%, 0.05% DMA and 1.5% MEKP-925H*
*3) 25°C Brookfield RV viscosity spindle #3 at 20 rpm*
*4) 82°C SPI gel with 1.0% BPO*

**Typical properties are not to be construed as specifications.*

## DESCRIPTION

AOC's Vipel F085 series is an epoxy novolac vinyl ester resin dissolved in styrene.

## APPLICATION

The Vipel F085 series is ideally suited for applications where outstanding mechanical properties and resistance to chemicals, oxidation and heat are required.

## BENEFITS

**Corrosion Resistant**
Vipel F085 offers excellent resistance to acidic and mild alkaline environments. Performs well in a wide range of acidic oxidants and solvents. Vipel F085 is generally resistant to liquids and vapors at higher temperatures than standard bisphenol-A epoxy vinyl ester resins.

The Vipel F085 series is well suited for use in the field of chlorine-alkali electrolysis. Refer to AOC's "Corrosion Resistant Resin Guide" for corrosion resistance information or for questions regarding suitability of a resin to any particular chemical environment, contact AOC.

**Mechanical Properties**
Vipel F085 series is suitable for moldings that are subjected to particularly high static and dynamic loads. It is resistant to internal stress cracking under high loading.

**Versatile**
Suitable for various fabricating methods such as hand lay-up, filament winding, etc.

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### Room Temperature CHP Cure Systems (Parts by Weight 100 Parts F085 –A, B, and C)

| Temperature | Cobalt 6% | DMA* | CHP** | Gel Time | Gel to Peak | Peak Exotherm |
|---|---|---|---|---|---|---|
| °F/°C | % | % | % | min | min | °F/°C |
| 65/18 | 0.4 | 0.2 | 2 | 23 | 8 | 394/201 |
| | 0.3 | 0.15 | 1 | 34 | 11 | 390/199 |
| | 0.3 | 0.1 | 1 | 39 | 14 | 374/199 |
| | 0.3 | 0.05 | 1 | 46 | 19 | 361/183 |
| | 0.15 | 0.05 | 1 | 64 | 27 | 358/181 |
| | | | | | | |
| 77/25 | 0.4 | 0.2 | 1.5 | 17 | 6 | 402/206 |
| | 0.3 | 0.05 | 1.5 | 29 | 13 | 377/192 |
| | 0.4 | 0.15 | 1.5 | 21 | 8 | 397/203 |
| | 0.2 | 0 | 1 | 50 | 28 | 347/175 |
| | | | | | | |
| 93/35 | 0.4 | 0.2 | 2 | 19 | 6 | 408/209 |
| | 0.3 | 0 | 1 | 36 | 19 | 358/181 |
| | 0.3 | 0.05 | 1 | 30 | 9 | 384/196 |
| | 0.3 | 0.15 | 2 | 22 | 7 | 404/207 |
| | 0.3 | 0.1 | 2 | 25 | 7 | 400/204 |
| | 0.15 | 0 | 1 | 43 | 18 | 367/186 |

* N, N-Dimethylaniline

** Cumene hydroperoxide 90% active

### High Temperature Tensile Properties

| Temperature | CAST PROPERTIES | | ASME RTP-1 LAMINATE PROPERTIES* | |
|---|---|---|---|---|
| °F/°C | Tensile Strength, psi/MPa | Tensile Modulus, psi/ GPa | Tensile Strength, psi/MPa | Tensile Modulus, psi/GPa |
| 77/25 | 11,200/77 | 540,000/3.7 | 27,000/186 | 2,000,000/13.8 |
| 150/66 | 10,000/69 | 460,000/3.2 | 24,800/171 | 2,000,000/13.8 |
| 200/93 | 8,000/55 | 370,000/2.6 | 21,600/149 | 1,750,000/12.1 |
| 250/121 | 5,300/37 | 320,000/2.2 | 21,500/148 | 1,680,000/11.6 |
| 275/135 | 4,000/28 | 248,000/1.7 | 19,500/134 | 1,420,000/9.8 |
| 300/149 | 1,900/13 | 50,700/0.35 | 17,500/121 | 1,350,000/9.3 |
| 325/163 | | | 18,000/124 | 1,050,000/7.2 |

* VMM, MRMRM, V-glass veil, M -chopped strand glass 450 grams per square meter mat, R-Woven Roving 814 grams per square meter . Laminates were 6.3 mm thick and post cured at 149°C for 2 hours. Glass content is 38.2%

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### 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.

### 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 F085-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 82°C, 1 hour at 93°C, 1 hour at 116°C, 1 hour at 138°C and 5 hours at 166°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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**Pub. F085 Series**
**Effective Date: April, 2017**




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