

## Product Information

# Vipel Fire Retardant Epoxy Novolac, Vinyl Ester Resin

### TYPICAL CAST MECHANICAL PROPERTIES\* (1) see back page

Test	Unit of Measure	Nominal	Test Method
Tensile Strength,	psi/Mpa	13,400/92.4	ASTM D 638
Tensile Modulus	psi/Gpa	540,000/3.7	ASTM D 638
Elongation	%	3.6	ASTM D 638
Flexural Strength	psi/Mpa	23,000/159	ASTM D 790
Flexural Modulus,	psi/Gpa	570,000/3.9	ASTM D 790
Heat Distortion Temperature °F/°C		289/143	ASTM D 638
Barcol Hardness		42	ASTM D 2583

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

### TYPICAL LIQUID RESIN PROPERTIES of Vipel K095-AAA-00\* (2) see back page

Versions	Viscosity, cps	Thix Index	Gel Time, Min	Gel To Peak, Min	Peak Exotherm, °F/°C	Specific Gravity	Styrene Content, %
K095-AAA-00	250 <sup>1</sup>	NA	25 <sup>2</sup>	9	395/202	1.17	35

1) 77°F/25°C Brookfield RV viscosity spindle 2 at 20 rpm

2) 77°F/25°C Gel time with 0.2% Cobalt 6%, 0.025% DMA and 1.25% MEKP

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

### FLAMMABILITY PROPERTIES (ASTM E-84 TUNNEL TEST)

% Antimony Trioxide	Flame Spread	Smoke Developed
-	25	300

\*\*Laminate Construction

2 plies of 2.0 ounce per square foot (600 grams per square meter) fiber glass chopped strand mat  
Fiberglass content - 30%

Laminates were post cured at 212°F/100°C for 3 hours.



### DESCRIPTION

The Vipel K095-AAA-00 is a fire retardant epoxy novolac vinyl ester resin dissolved in styrene. Vipel K095-AAA-00 is ideally suited for use in hand lay-up, spray-up, and filament winding processes where outstanding mechanical properties and resistance to solvents, oxidizing environments, chemicals and good thermal mechanical properties is required.

### BENEFITS

#### Corrosion

The epoxy novolac-based backbone chemistry provides resistance to organic solvents and good resistance to acids and alkalis. 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.

#### Fire Retardancy

Vipel K095-AAA-00 meets ASTM E 84 class I requirements for flame spread and smoke development neat.

#### Heat Temperature Resistance

Vipel K095-AAA-00 has excellent thermal mechanical properties.

#### Processability

Vipel K095-AAA-00 is suitable for filament winding and hand lay up processes.

CHP\* GEL TIMES FOR NON PROMOTED VIPEL® K095-A SERIES RESINS

	10 - 20 Minutes			20 - 40 Minutes			40 - 60 Minutes		
	65/18	77/25	95/35	65/18	77/25	95/35	65/18	77/25	95/35
Temperature, °F/°C									
Cobalt-6%, %		0.4	0.3	0.4	0.3	0.2	0.3	0.2	0.2
DMA		0.1	0.05	0.2	0.05	0	0.05	0	0
2,4 - Pentanedione		0	0	0	0	0.05	0	0	0.1
CHP, %		1.50	1.50	2.00	1.50	1.00	1.50	1.00	1.00
Gel Time, minutes		20	16	35	30	30	49	45	49
Total Time, minutes		34	25	53	48	54	83	85	78
Peak Temperature, °F/°C		391/ 199	409/ 209	383/ 195	378/ 192	373/ 189	359/ 182	346/ 174	369/ 187

\*90% Active CHP was used.

Mechanical Properties of Vipel Laminates at Different Temperatures				
Temperature, °F/°C	Tensile Strength, psi/MPa	Tensile Modulus, psi/GPa	Flexural Strength, psi/MPa	Flexural Modulus, psi/GPa
77/25	23,500/162	1,860,000/12.8	30,000/207	1,600,000/11
200/93	24,500/169	1,660,000/11.4		
250/121	22,000/152	1,560,000/10.8	26,000/179	1,100,000/7.6
300/149	20,000/138	1,100,000/7.6	15,000/103	700,00/4.8
350/177	12,600/87	943,000/6.5	4,500/31	400,000/2.8
Laminate construction: VMMRM RRM V-glass veil, M-chopped strand mat 1.5 oz per square foot (450 g/m <sup>2</sup> ), R-Woven Roving 24 oz per square yard (814 g/m <sup>2</sup> ). Laminates were 0.25 inches (6.4 mm) thick and post cured at 212°F (100°C) for 5 hours.				

# Vipel® K095-AAA-00 Epoxy Novolac Vinyl Ester Resin

## PERFORMANCE GUIDELINES

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

**B.** Maintaining shop temperatures between 65°F/18°C and 90°F/32°C and humidity between 40% and 90% will help the fabricator make a high quality part. 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 six 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 appropriate Material Safety Data Sheet for guidelines.

## APPLICATION GUIDELINES

Halogen containing resins are generally less resistant to UV light than general purpose resins. Fabricators are advised to conduct their own tests to determine the suitability of using Vipel K095-AAA-00 resins for outdoor applications.

## 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.

## FOOTNOTES

### (1)

Based on tests of Vipel K095-AAA-00 at 77°F/25°C and 50% relative humidity. All tests performed on unreinforced cured resin castings. Thixotropic components, if applicable, are excluded from casting samples. 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 fillers 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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