

Product Selection Guide

To Corrosion Resistant Vipel[®] Resins



Vipel® Corrosion Resin Selection Guide



Vipel® Product Selection Guide

Resin Type	Resin Series	Description
Bisphenol A Epoxy Vinyl Esters	F010	Good balance of corrosion resistance and processability. User friendly in both filament winding and hand lay-up applications.
	F013	Higher styrene content version of Vipel F010.
	F007	Lower VOC/HAP and higher heat distortion temperature version of Vipel F010.
	K022-AA	Fire retardant, brominated bisphenol-A epoxy vinyl ester. Excellent resistance to both acidic and alkaline environments, plus thermal mechanical properties. <i>Class I flame spread developed without synergists</i>
	K022-AC	Fire retardant, brominated bisphenol-A epoxy vinyl ester. Lower in specific gravity than Vipel K022-AA. Excellent resistance to both acidic and alkaline environments, plus thermal mechanical properties <i>Class I flame spread developed without synergists</i>
	K022-CC	Fire retardant brominated bisphenol-A epoxy vinyl ester. Excellent resistance to both acidic and alkaline environments, plus thermal mechanical properties. <i>Class I flame spread with 1.5% antimony trioxide</i>
	K022-CN	Fire retardant, brominated bisphenol-A epoxy vinyl ester. Used in the structural layer where resistance to acidic and caustic environments are needed. Contains antimony products <i>Class I flame spread</i>
	K023	Fire retardant, bisphenol-A epoxy vinyl ester (higher cross-linked). Low VOC/HAP with excellent resistance to oxidizing chemicals at elevated temperatures. <i>Class I flame spread developed without synergists</i>
Elastomeric Bisphenol A Epoxy Vinyl Ester	F017	Elastomeric bisphenol-A epoxy vinyl ester. For improved interlaminar adhesion and manufacturing composites that require extra flexibility.
Epoxy Novolac Vinyl Esters	F085	Exceptional organic solvent resistance with improved high temperature properties.
	F086	Higher heat distortion temperature version of F085.
	K095	Fire retardant, epoxy novolac vinyl ester. Recommended in pulp and paper industry for severe corrosion applications. <i>Class I flame spread and smoke developed without synergists</i>

AOC offers a wide range of proven Vipel® resin chemistries for the corrosion resistant equipment sector. Vipel® science includes formulations for special requirements such as elevated service temperatures, structural properties, flame retardance, low smoke, fuel storage and pipe relining. Review this guide to find the Vipel® corrosion-fighting resin that meets your demanding requirements for performance, processability and quality.

Resin Type	Resin Series	Description
Bisphenol A Fumerate Polyester	F282	Excellent resistant to both acidic and alkaline environments. High monomer content and rigid.
Chlorendic Acid Polyester	K190	Excellent resistant to both acidic and alkaline environments. High monomer content and rigid. <i>ASTM E 84 Class II Flame with 3% antimony trioxide</i>
Isophthalic Polyesters	F701	High molecular weight isophthalic/propylene glycol resin with broad chemical resistance at moderate temperatures and excellent processability.
	F713	High molecular weight, two stage terephthalic, unsaturated polyester resin with the wet out, cure and handling characteristics of general purpose resins.
	F737	Resilient isophthalic polyester. Designed for mild acidic environments.
	F739	Resilient isophthalic. Designed for mild acidic environments and extra resilience.
	F764	High cross-linked isophthalic polyester. Meets UL 1316 and UL 1746 parts II and III and Steel Tank Institute requirements.
	K733-A	Fire retardant halogenated isophthalic polyester. For mild corrosion applications such as hoods and ducts. <i>Class I flame spread without synergists</i>
	K733-B	Fire retardant halogenated isophthalic polyester. For mild corrosion applications such as hoods and ducts. <i>Class I flame spread with 1.5% antimony trioxide</i>
Terephthalic Polyester (High cross-linked)	F774	Meets UL 1316 and UL 1746 parts II and III and Steel Tank Institute requirements.

Vipel® Corrosion Resin Cross Reference

If you are considering or are using resins made by another manufacturer, use this reference to find the Vipel® technology for your application needs. Find the Vipel® resin that most nearly matches our competitors in the chart below. Confirm your selection with an AOC Corrosion Specialist before making any decision, since some environments may require an alternative. This list is only a guide.



Cross Reference to AOC Corrosion Resins

	AOC	ASHLAND		INTERPLASTIC	REICHHOLD
	Vipel®	DERAKANE®	Hetron® Aropol®	CoREZYN®	DION®
Bisphenol-A Epoxy Vinyl Ester	F010 F013*	411	922	8300	9100 9102
Bisphenol-A Epoxy Vinyl Ester (higher HDT)	F007	441	942	8360	
Elastomeric, Bisphenol-A Vinyl Ester	F017	8084		8550	9085
Fire Retardant Brominated Bisphenol-A Epoxy Vinyl Ester <i>Class I flame spread and smoke developed without the use of synergists **</i>	K022-AA	510A		8440	
Fire Retardant Brominated Bisphenol-A Epoxy Vinyl Ester <i>Class I flame spread without the use of synergists **</i>	K022-AC				
Fire Retardant Brominated Bisphenol-A Epoxy Vinyl Ester <i>Class I flame spread with the use of synergists **</i>	K022-CC	510C	FR992	VE8450	FR9300
Fire Retardant Brominated Bisphenol-A Epoxy Vinyl Ester Contains antimony products <i>Class I flame spread **</i>	K022-CN		FR992SB	8440M-AT	
Fire Retardant Brominated Bisphenol-A Epoxy Vinyl Ester <i>Class I flame spread without the use of synergists and is infusible (low viscosity) **</i>	K022-E				
Fire Retardant Bisphenol-A Epoxy VE (higher cross linked) <i>Class I flame spread without the use of synergists **</i>	K023		FR998/35		
Epoxy Novolac Vinyl Ester	F085	470	970	8730	9400
Epoxy Novolac VE (higher HDT)	F086	470HT			
Fire Retardant Epoxy Novolac Vinyl Ester <i>Class I flame spread and smoke developed without the use of synergists **</i>	K095	510N			
Isophthalic Polyester (high cross-linked)	F764				
Isophthalic Polyester	F701		7241 7242	75-AQ-001, S & W 75-AQ-010, S & W 75-AQ-011	6631
Isophthalic Polyester (resilient)	F737		7334	75-AQ-610	6334
Fire Retardant Halogenated Isophthalic Polyester <i>Class I flame spread without the use of synergists **</i>	K733-A				FR7767
Fire Retardant Halogenated Isophthalic Polyester <i>Class I flame spread with the use antimony trioxide **</i>	K733-B		604T-20 99P		
Terephthalic	F713				
Terephthalic Polyester (high cross-linked)	F774				490
Chlorendic Acid Polyester <i>Class II Flame with 3% antimony trioxide**</i>	K190		197	16-DA-097	797
Bisphenol-A Fumarate Polyester	F282		700		382/6694

* F013 is a higher styrene content version of F010

** Tested according to ASTM E 84

Vipel® Corrosion & Fire Retardant Physical Properties

AOC is the new leader in vinyl ester corrosion-resistant and flame retardant resin technology. Building on its long expertise in the corrosion-resistant equipment sector, AOC has created a comprehensive line of Vipel® vinyl ester chemistries to take on the most demanding specifications. The expansion of the Vipel resin family reflects AOC's understanding that corrosion-resistant equipment fabrication involves complex issues that are best addressed with a range of resin options. Instead of pushing specifiers and manufacturers toward a limited range of resins we want to make, we can offer the chemistry that best meets their needs.



Vipel® Physical Properties of AOC Corrosion Resins

	Bisphenol A Epoxy Vinyl Ester		Low VOC Bisphenol A Epoxy Vinyl Ester	Elastomeric, Bisphenol A Epoxy Vinyl Ester	Epoxy Novolac Vinyl Ester	Enhanced Novolac Epoxy Vinyl Ester
	AOC	AOC	AOC	AOC	AOC	AOC
	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel
	F010	F013	F007	F017	F085	F086
Castings:						
Flexural Strength, psi/MPa	22,200/153	21,800/150	23,600/162	17,100/118	21,500/148	22,500/155
Flexural Modulus, psi/GPa	500,000/3.5	530,000/3.7	560,000/3.9	490,000/3.4	540,000/3.7	610,000/4.2
Tensile Strength, psi/MPa	12,800/88	12,800/88	13,800/95	10,600/73	11,200/77	12,000/83
Tensile Modulus, psi/GPa	460,000/3.2	470,000/3.2	520,000/3.6	490,000/3.4	540,000/3.7	550,000/3.8
Elongation, %	6.2	6.6	5.1	9.1	3.3	2.8
Heat Distortion Temperature, °F/°C	248/120	232/111	266/130	199/93	300/149	330/166
Barcol Hardness (934)	39	34	44	35	44	41
Liquid Properties:						
Specific Resin	F010-CNM-00	F013-AAB-00	F007-AAA-00	F017-AAA-00	F085-AAA-00	F086-AAA-00
Viscosity (Brookfield), cps	300	450	400	350	300	400
Specific Gravity	1.05	1.05	1.07	1.03	1.08	1.08
Styrene Content, %	40	43	32	40	34	37

Vipel® Physical Properties of AOC Fire Retardant Vinyl Esters Resins

	Bisphenol A Epoxy Vinyl Ester					High Cross Linked Bisphenol A Epoxy Vinyl Ester	Epoxy Novolac Vinyl Ester	Chlorendic	Isophthalic	
	AOC	AOC	AOC	AOC	AOC	AOC	AOC	AOC	AOC	AOC
	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel	Vipel
	K022-AA	K022-AC	K022-C	K022-CN	K022-E	K023	K095	K190	K733-A	K733-B
Castings:										
Flexural Strength, psi/MPa	21,300/147	21,300/147	20,700/143	20,100/138	21,500/149	17,500/121	23,000/159	16,000/110	17,400/120	18,000/124
Flexural Modulus, psi/GPa	550,000/3.8	530,000/3.7	530,000/3.7	560,000/3.9	540,000/3.7	600,000/4.1	570,000/3.9	550,000/3.8	600,000/4.1	580,000/4.0
Tensile Strength, psi/MPa	11,600/80	12,500/86	12,000/83	11,000/76	12,500/86	13,200/91	13,400/92	8,500/59	9,400/65	11,000/76
Tensile Modulus, psi/GPa	490,000/3.4	520,000/3.6	520,000/3.6	530,000/3.7	510,000/3.5	540,000/3.7	540,000/3.7	490,000/3.4	560,000/3.9	550,000/3.8
Elongation, %	4.0	4.7	4.5	3.0	4.5	4.3	3.6	2.4	1.9	2.4
Heat Distortion Temperature, °F/°C	246/119	241/116	234/112	237/114	237/114	265/129	289/143	280/138	194/90	205/96
Barcol Hardness (934)	41	39	40	34	39	46	42	45	40	44
Laminates:										
ASTM E 84 Flame Spread										
without Antimony Trioxide	20	25	30	10	25	15	25		20	
with 1.5% Antimony Trioxide			20							15
with 3% Antimony Trioxide								35		
Liquid Properties:										
Specific Resin	K022-AAA-00	K022-ACA-00	K022-CCC-00	K022-CNC-00	K022-EBB-00	K023-AAA-00	K095-AAA-00	F190-BPT-15	F733-APT-20	F733-BPT-20
Viscosity (Brookfield), cps	400	450	450	450	225	250	250	500/2*	500/2.0*	450/2.0*
Specific Gravity	1.25	1.15	1.15	1.16	1.12	1.29	1.17	1.15	1.26	1.21
Styrene Content, %	38	39	39	39	43	28	35	39	39	39

* First reading is Brookfield LV spindle 3 at 60 rpm, the second reading is at 6 rpm.

** First reading is Brookfield RV spindle 2 at 2 rpm, the second reading is at 20 rpm.

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The World of AOC

AOC is a leading producer of unsaturated polyester and vinyl ester resins and is the world leader in innovative resin technology. AOC manufactures its products in facilities strategically located throughout North America and Europe. AOC owned facilities are ISO 9001:2000 certified and use AOC's proprietary process control technology to guarantee batch to batch consistency.

From isophthalic polyesters, and terephthalics, to epoxy novolac and bisphenol A vinyl esters, AOC offers local availability, worldwide, of a broad range of proven Vipel resins through its network of distributors and plants. Please contact the AOC Corrosion Specialists for Vipel resins that meet your corrosion resistant specifications, and put the technology and service of the AOC Corrosion Team to work for you.

www.corrosionresins.com

The internet's best resource on corrosion-resistant composites.

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