

Vipel[®] CIPP Production Selection Guide

A tradition of superior performance



Vipel® Resins for CIPP

AOC Leadership from Start to Finish

Around the world, cured-in-place-pipe (CIPP) technology is giving new life to underground pipelines in need of repair. By eliminating the need to dig trenches, CIPP lowers costs, is completed faster, and has minimal or no effect on traffic, the environmental and civil infrastructure.

To ensure that new pipe liners will stand the test of time, more trenchless technology providers are turning to Vipel® CIPP resins from AOC. AOC helped pioneer the development of isophthalic polyester resin technology that sets the standard for CIPP rehabilitation. For applications involving more aggressive media and requiring higher properties, AOC is the global leader in vinyl ester resin innovation.

Vipel resins are manufactured using ISO 9001:2000-certified quality management systems and proprietary control technology for exacting batch-to-batch consistency. This manufacturing discipline translates into the repeatable handling characteristics that engineers seek to keep a job on schedule.

Once installed, CIPP projects made with Vipel resin build on the technology's decades-old history of exceptional corrosion resistance and long-term durability. Vipel CIPP resins have passed requirements established by ASTM test procedures F1216, D5813-95, C581 and D2990.

Like all technologies that feature the Vipel name, the CIPP resins in this guide are backed by the AOC Corrosion Team, the world's foremost network of technical support and expertise for corrosion-resistant composite manufacturing and fabrication.



*Before repair with
Vipel® technology*



*After repair with
Vipel® technology*



Vipel® L704-AAP Series

High Molecular Weight Isophthalic Polyester for CIPP

Typical Liquid Resin Properties¹

Property	Value
Viscosity ²	5,600 cps
Thix Index 2/20	4.0
Color	Opaque
Specific Gravity @ 77°F/25°C	1.11
Non-Volatiles	60%
Gel Time ³ @ 140°F/60°C	12 minutes
Pot Life ³ @ 77°F/25°C	45 hours

Typical Cast Resin Mechanical Properties⁴

Property	U.S.	Metric	Test Method
Tensile Strength	13,500 psi	93.1 MPa	ASTM D638
Tensile Modulus	600,000 psi	4.1 GPa	ASTM D638
Tensile Elongation	3.0%	--	ASTM D638
Flexural Strength	23,300 psi	161 MPa	ASTM D790
Flexural Modulus	630,000 psi	4.3 GPa	ASTM D790
Heat Distortion Temperature @ 264 psi/1.82 MPa	212°F	100°C	ASTM D648
Barcol Hardness	40	--	ASTM D2583

1) Typical liquid properties are not to be construed as specifications. Liquid properties tests were conducted at @ 77°F/25°C.

2) The viscosity test was conducted using an RVF Brookfield Spindle #4 @ 20 rpm.

3) For gel time and pot life analysis, the resin was formulated with 1.0% Perkadox® 16 Di-(4-tert-butyl-cyclohexyl) peroxydicarbonate and 0.5% Trigonox® KSM curing agent mixture (Perkadox and Trigonox are registered trademarks of Akzo Nobel Chemicals Inc.). The gel time shown is typical but may be affected by catalyst, promotor and inhibitor concentrations and resin, mold and shop temperature.

4) Typical cast properties are not to be construed as specifications. Cast properties tests were conducted at @ 73°F/23°C and 50% relative humidity. Castings were heat-gelled at 140°F/60°C, and castings were post cured for 5 hours at 212°F/100°C.



Vipel® L010-PPA Series

Bisphenol A Epoxy-Based Vinyl Ester for CIPP

Typical Liquid Resin Properties¹

Property	Value
Viscosity ²	5,000 cps
Thix Index 2/20	4.3
Color	Opaque
Specific Gravity @ 77°F/25°C	1.07
Non-Volatiles	58%
Gel Time ³ @ 140F°/60°C	38 minutes
Pot Life ³ @ 77°F/25°C	24 hours

Typical Cast Resin Mechanical Properties⁴

Property	U.S.	Metric	Test Method
Tensile Strength	13,800 psi	95 MPa	ASTM D638
Tensile Modulus	540,000 psi	3.7 GPa	ASTM D638
Tensile Elongation	4.6%	--	ASTM D638
Flexural Strength	22,000 psi	151 MPa	ASTM D790
Flexural Modulus	570,000 psi	3.9 GPa	ASTM D790
Heat Distortion Temperature @ 264 psi/1.82 MPa	234°F	112°C	ASTM D648
Barcol Hardness	40	--	ASTM D2583

- 1) Typical liquid properties are not to be construed as specifications. Liquid properties tests were conducted at @ 77°F/25°C.
- 2) The viscosity test was conducted using an RVF Brookfield Spindle #4 @ 20 rpm.
- 3) For gel time and pot life analysis, the resin was formulated with 1.0% Perkadox® 16 Di-(4-tert-butyl-cyclohexyl) peroxydicarbonate and 0.5% Trigonox® KSM curing agent mixture (Perkadox and Trigonox are registered trademarks of Akzo Nobel Chemicals Inc.) The gel time shown is typical but may be affected by catalyst, promoter and inhibitor concentrations and resin, mold and shop temperature
- 4) Typical cast properties are not to be construed as specifications. Cast properties tests were conducted at @ 73°F/23°C and 50% relative humidity. Castings were heat-gelled at 140°F/60°C, and castings were post cured for 5 hours at 212°F/100°C.



Vipel® L704-FAH Series

High Molecular Weight Isophthalic Polyester for CIPP

Typical Filled Liquid Resin Properties¹

Property	Value
Viscosity ²	6,200 cps
Thix Index 2/20	2.7+
Color	Opaque
Specific Gravity @ 77°F/25°C	1.255
Non-Volatiles	59%
Gel Time ³ @ 140°F/60°C	10 minutes
Pot Life ³ @ 77°F/25°C	30 hours

Typical Cast Resin Mechanical Properties⁴

Property	U.S.	Metric	Test Method
Tensile Strength	8,000 psi	58 MPa	ASTM D638
Tensile Modulus	730,000 psi	5 GPa	ASTM D638
Tensile Elongation	2.0%	--	ASTM D638
Flexural Strength	12,300 psi	83 MPa	ASTM D790
Flexural Modulus	750,000 psi	5.2 GPa	ASTM D790
Heat Distortion Temperature @ 264 psi/1.82 MPa	207°F	97°C	ASTM D648
Barcol Hardness	40	--	ASTM D2583

- 1) Typical liquid properties are not to be construed as specifications. Liquid properties tests were conducted at @ 77°F/25°C.
- 2) The viscosity test was conducted using an RVF Brookfield Spindle #4 @ 20 rpm.
- 3) For gel time and pot life analysis, the resin was formulated with 1.0% Perkadox® 16 Di-(4-tert-butyl-cyclohexyl) peroxydicarbonate and 0.5% Trigonox® KSM curing agent mixture (Perkadox and Trigonox are registered trademarks of Akzo Nobel Chemicals Inc.). The gel time shown is typical but may be affected by catalyst, promoter and inhibitor concentrations and resin, mold and shop temperature.
- 4) Typical cast properties are not to be construed as specifications. Cast properties tests were conducted at @ 73°F/23°C and 50% relative humidity. Castings were heat-gelled at 140°F/60°C, and castings were post cured for 5 hours at 212°F/100°C.



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About AOC

AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic systems for composites and cast polymers. AOC is the North American leader in resins for corrosion-resistant applications such as CIPP. Vipel® resins are manufactured in ISO 9001:2000-certified facilities that use proprietary process control technology for ensuring batch-to-batch consistency.

Every Vipel shipment is backed the industry's most knowledgeable and dedicated technical support team. The AOC Corrosion Team actively participates in trade associations that advance the use of corrosion-resistant composite technologies. For more information about AOC materials, service and commitment to CIPP industry growth, e-mail bbogner@aoc-resins.com, phone (630) 665-2675 or visit www.corrosionresins.com on the Internet.

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