PRODUCT BULLETIN

December 2023

DION® 9800 Series

Urethane Modified Vinyl Ester Resin

DESCRIPTION

The DION® 9800 Series of resins are premium urethane modified vinyl ester resins with many unique features. The urethane modification creates a tough, resilient polymer that combines outstanding chemical resistance and high temperature performance with excellent laminating properties. DION® 9800 Series resins have exceptional wetting characteristics with carbon and aramid fibers as well as conventional glass fibers. They can be made thixotropic using regular (non hydrophobic) grades of fumed silica, and will not foam when used with standard MEKP initiators. DION® 9800 Series resins are especially formulated for hand lay-up, spray-up, pultrusion, (except version 10), and filament winding.

BENEFITS & FEATURES

- Batch-to-batch consistency and uniformity from production utilizing Statistical Process Control (S.P.C) & Statistical Quality Control (S.Q.C) techniques
- Urethane modified vinyl ester polymer results in tough, impact resistant laminates with high temperature resistance
- Improved mechanical properties and corrosion resistance
- Reduced air entrapment due to non-foaming with MEKP initiators
- No need for expensive treated silicas. Compatible with standard grades of fumed silica
- Provides flexibility by not requiring the addition of dimethylaniline in a pre-accelerated versions (9800-05A and 9800-10)

PROPERTIES – LIQUID

Property[1]	Unit	9800-05	9800-05A	9800-10[8]
Appearance	-	Clear	Clear	Opaque/Purple
NVM	%	54.0	54.0	51.6
Viscosity	cps	400[2]	400[2]	850[6]
Thix Index	-	-	-	2.5 (Min)
Gel Time	minutes	20.0[3]	35.0[5]	20[7]
Total Time to Peak	minutes	32.5	55.0	-
Peak Exotherm	°C/°F	156/312	156/312	105/221
Modified SPI Gel Time	minutes	15.0[4]	-	-
SPI Cure	minutes	4.5	-	-
SPI Peak Exotherm	°C/°F	190/374	-	-
Styrene Content	%	-	-	48.0 (Max)
Acid Number	-	-	-	8.0 (Max)
Weight per Gallon	lbs/gal	-	-	8.60
Specific Gravity	g/cm^3	1.045	1.045	1.032
Flash Point (Seta Closed Cup)	°C/°F	32/89	32/89	-

1) All properties at 25°C/77°F unless otherwise noted
2) Brookfield Viscometer LVF Spindle #2 at 30 RPM
3) Promotion: 0.8 g of 6% cobalt + 0.2 g of DMA per 200.0 g of resin; Initiator: 2.5 g of Arkema Luperox® DDM-9 per 100.0 g of resin
4) Initiator: 0.5 g of TBPO per 100.0 g of resin
5) Promotion: 0.8 g of 6% cobalt per 200.0 g of resin; Initiator: 2.5 g of Arkema Luperox® DDM-9 per 100.0g of resin
6) Brookfield Viscometer RV Spindle #2 at 20 RPM
7) 0.63 cc DDM-30 per 50 g resin
8) Version 10 not recommended for pultrusion

PROPERTIES – PHYSICAL

Property[1]	Unit	Neat Resin Casting[2]	Test Method
Tensile Strength	psi	12,000	ASTM D 638
Tensile Modulus	psi	470,000	ASTM D 638
Tensile Elongation	%	3.1	ASTM D 638
Flexure Strength	psi	23,000	ASTM D 790
Flexure Modulus	psi	600,000	ASTM D 790
Heat Deflection Temperature	°C/°F	120/248	ASTM D 648
Hardness, Barcol Model 934-1	HB	44	ASTM D 2583

1) Physical properties were determined using internal Polynt test methods that are similar to those listed above.
2) Initiator type and ratio: Lupersol A-98 @ 1% + 1% styrene; Cure conditions: gel overnight 16 hrs. @ 130°F; Post-cure conditions: 2 hrs. @ 180°F, 2 hrs. @ 250°F

TYPICAL LAMINATE PROPERTIES

Temperature(°C/°F)	Tensile Strength (psi)	Flexure Strength (psi)	Flexure Modulus (psi)
25/77	20,000	26,000	1,010,000
65/150	20,000	26,000	870,000
93/200	20,000	23,000	740,000
121/250	13,000	19,000	580,000
149/300	9,000	7,000	320,000

APPLICATION

GUIDELINES FOR INITIATOR AND PROMOTER ADDITIONS

DION® 9800 resins are formulated for use with methyl ethyl ketone peroxide (MEKP) initiator systems. They can also be used with benozoyl peroxide. The DION® 9800-05 resin requires the addition of cobalt octoate or naphthenate, and dimethylaniline (DMA) to obtain optimal cure with MEKP systems.

DION® 9800-05 is unpromoted and requires the addition of cobalt octoate or cobalt naphthenate along with DMA.

DION® 9800-05A is pre-accelerated with DMA and requires only cobalt octoate or cobalt naphthenate for MEKP cure. DION® 9800-10 is pre-promoted with both DMA and cobalt napthenate.

DION® 9800 resins respond well to most initiators, and unlike conventional vinyl ester resins, do not foam when initiated with MEKP. When fabricating thick sections using DION® 9800 resins, high levels of DMA should be avoided since they can result in a very high peak exotherm. Use of cumene hydroperoxide initiator has been shown to significantly reduce exotherm while developing a rapid cure in thick laminates sections.

DION® 9800-05

Temperature (°C/°F)	Gel Time (Minutes)			
	15-25	20-30	30-40	40-50
4/40	-	-	0.2% DMA 0.7% Co 6% 2.4% MEKP	-
10/50	-	-	0.1% DMA 0.6% Co 6% 1.8% MEKP	0.1% DMA 0.6% Co 6% 1.2% MEKP
15/60	-	0.1% DMA 0.6% Co 6% 2.4% MEKP	0.1% DMA 0.6% Co 6% 1.8% MEKP	0.1% DMA 0.6% Co 6% 1.2% MEKP
24/75	0.1% DMA 0.4% Co 6% 1.8% MEKP	0.1% DMA 0.4% Co 6% 1.4% MEKP	0.1% DMA 0.4% Co 6% 1.2% MEKP	-
32/90	0.1% DMA 0.3% Co 6% 1.2% MEKP	0.1% DMA 0.2% Co 6% 1.2% MEKP	0.1% DMA 0.2% Co 6% 0.9% MEKP	-

DION® 9800-05A

Temperature (°C/°F)	Gel Time (Minutes)					
	15-25	20-30	30-40	40-50	50-60	60-70
4/ 40	-	-	0.1% DMA 0.7% Co 6% 2.4% MEKP	-	-	-
10/ 50	-	-	0.1% DMA 0.6% Co 6% 1.8% MEKP	0.1% DMA 0.6% Co 6% 1.0% MEKP	-	-
15/ 60	-	-	- 0.6% Co 6% 1.8% MEKP	-	-	- 0.6% Co 6% 1.2% MEKP
24/ 75	-	- 0.4% Co 6% 1.8% MEKP	- 0.4% Co 6% 1.2% MEKP	-	- 0.4% Co 6% 0.9% MEKP	-
32/ 90	- 0.4% Co 6% 1.2% MEKP	-	- 0.3% Co 6% 1.2% MEKP	-	- 0.3% Co 6% 1.0% MEKP	-

CUMENE HYDROPEROXIDE (CHP) INITIATOR

	DION® 9800-05	DION® 9800-05A
CHP (%)	3.0	3.0
Cobalt 6%(1) (%)	0.5	0.5
Gel time (min)	75	90

1) Caution: excessive cobalt promoter can inhibit cure and degrade corrosion resistance. Do not use more than 0.5% of cobalt 6% or 0.25% of cobalt 12%. If using cobalt octoate (12%), use half of the amount indicated in the chart for cobalt 6%.

SUGGESTED TOPCOAT FORMULATION

Components(2)	Parts(2)
DION® 9800-05	100
10% Paraffin Wax Solution	2.0
DMA	0.3
6% Cobalt Naphthenate	0.5
Tween 20	0.3
Fumed Silica	1.5
MEKP	1.7

2) The formula above will produce a topcoat with a gel time of approximately 15 minutes at 24°C/75°F

Refer to Polynt's Composites Applications Guide ("Cookbook") for equipment and application recommendations. Each user must determine the suitability of this product to his/her particular mode of operation and intended end-use application. A Polynt representative will be available to assist in the proper selection of all Polynt products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of DION® 9800 Series is 180 days (for DION® 9800-10 shelf life is 120 days) from the date of manufacture from Polynt. To maximize usage life and maintain optimum properties, resins and gel coats should be stored in the original closed container at temperatures below 23°C/73°F and away from ignition sources and sunlight. Keep containers sealed to prevent moisture pick-up and monomer loss.

SAFETY & WARRANTY

To receive a copy of our safety and warranty information, please email safetyandwarranty@polynt.com.