PRODUCT BULLETIN

December 2021

DION® FR 7704 Series

Flame-Retardant Polyester Resins

DESCRIPTION

DION® FR 7704 Series are halogenated, low-viscosity, high-solids, general pupose flame-retardant polyester resins. These extensively-tested resins provide smooth surfaces, excellent fiberglass wet-out, and positive curing performance. DION® FR 7704 Series are ideal for a variety of general purpose flame-retardant composite applications. In addition, incorporation of aluminum trihydrate allows DION® FR 7704 resins to meet stringent smoke emission and smoke toxicity specifications.

BENEFITS & FEATURES

- Batch-to-batch consistency and uniformity from production utilizing Statistical Process Control (S.P.C) & Statistical Quality Control (S.Q.C) techniques
- Versions 7704-00, 7704-12, and 7704-35 comply with SCAQMD Rule 1162
- Components manufactured with DION® FR 7704 can meet a wide range of flame-retardant specifications including ASTM E-84 Class I Flame Spread with 1.7% antimony trioxide and Class II Flame Spread without antimony
- Can meet ASTM E-662 smoke specifications without MMA monomer or high ATH loadings and can meet Bombardier SMP 800-C Smoke Toxicity Test requirements with filled laminates
- Ideal for a variety of hood and duct applications needing corrosion resistance
- Reduces VOC emissions and exceeds SCAQMD Rule 1162 requirements due to high solids content
- Designed to permit two mold pulls per 8 hour shift and cures to a tack-free laminate surface with rapid, controlled curing characteristics
- Excellent fiberglass wet-out minimizes voids and resin-starved areas with easily maintained resin-to-glass ratios

PROPERTIES – LIQUID

Property[1]	Unit	FR 7704-00	FR 7704-12	FR 7704-35	FR 7704-75[4]
NVM	%	66.5	66.5	66.5	66
Viscosity[2]	cps	475	475	475	200
Thix Index	-	2.5 (minimum)	2.5 (minimum)	2.5 (minimum)	-
Gel Time[3]	minutes	19	8	35	-
Total Time to Peak	minutes	32	14	50	-
Peak Exotherm	°C/°F	149/301	158/316	148/298	-
Specific Gravity	-	1.235	1.235	1.235	1.235
Flash Point (Seta Closed Cup)	°C/°F	32/89	32/89	32/89	32/89

1) All properties at 25°C/77°F unless otherwise noted
2) Brookfield Viscometer LVF Spindle #3 at 60 RPM
3) 1.25 g of MEKP-900 per 100 g of resin
4) DION® FR 7704-75 is unpromoted

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PROPERTIES – PHYSICAL

Property[1]	Unit	Neat Resin Casting	Laminate[2]	Laminate Filled Formula #1[2]	Laminate Filled Formula #2[2]	Test Method
Tensile Strength	psi	6,000	12,000	10,000	11,000	ASTM D 638
Tensile Modulus	psi	530,000	1,000	2,000	2,000	ASTM D 638
Tensile Elongation	%	1.3	1.54	1.49	1.75	ASTM D 638
Flexure Strength	psi	10,000	24,000	20,000	20,000	ASTM D 790
Flexure Modulus	psi	510,000	1,250,000	1,000	2,000	ASTM D 790
Compression Strength	psi	17,000	29,000	26,000	22,000	ASTM D 695
Compression Modulus	psi	365,000	1,350,000	2,000	2,000	ASTM D 695
Heat Deflection Temperature	°C/°F	77/171	-	-	-	ASTM D 648
Hardness, Barcol Model 934-1	HB	40	50	70	71	ASTM D 2583
Linear Shrinkage, room temperature gel & cure	in/in	0.09650	-	-	-	-
Linear Shrinkage, room temperature gel & cure	in/in	0.01905	-	-	-	-
Water Absorption - 2 hours at 212°F - 24 hours at 73°F	 % gain % gain	 0.74 0.12	 0.66 0.0787	 - 0.0667	 - 0.0577	ASTM D 570
Izod Impact, Notched	ft-lb/in	0.24	16.6	11.50	12.60	ASTM D 256
Izod Impact, Unnotched	ft-lb/in	1.97	21.1	-	-	ASTM D 256

1) Physical properties were determined using internal Polynt test methods that are similar to those listed above
2) Glass Content: 30%

PROPERTIES - OTHER

Flammability Test Data

DION® FR polyester resins will burn if provided with a sufficient amount of heat and oxygen. The degree of flame-retardency of laminates prepared using DION® FR resins has been characterized using several standard ASTM test methods. Testing has been performed under strictly controlled conditions. The behavior of composites made using DION® FR resins may vary in an actual fire situation.

	DION® FR 7704 with 1.7% Antimony Trioxide 3-Ply, 1.5 oz. mat laminates
ASTM E-84 (Tunnel test)	• Flame Spread Index 15 (Class I)

	DION® FR 7704 with 3% Antimony Trioxide 3-Ply, 1.5 oz mat laminates	DION® FR 7704, no Antimony added 3-Ply, 1.5 oz mat laminates
ASTM E-84 (Tunnel test)	• Flame Spread Index 15 (Class I)	• Flame Spread Index 30 (Class II)
ASTM D635	• Average Time of Burning (ATB) 1 second • Average Extent of Burning (AEB) 8.2 mm	• Average Time of Burning (ATB) 3.9 seconds • Average Extent of Burning (AEB) 7.8 mm
UL94	• V-0 Rating	• V-0 Rating
FMVSS 302		• Passed – Laminate did not ignite
ASTM D1929	• Self-ignition temperature 393°C/ 740°F • Flash-ignition temperature 372°C/ 702°F	• Self-ignition temperature 432°C/ 810°F • Flash-ignition temperature 378°C/ 712°F
FAR, PART 25.853	• Passed horizontal and vertical tests	
FAR, PART 25.855	• Passed	• Passed

	Formula #1 DION® FR 7704-00(1)		Formula #2 DION® FR 7704-00(1)	
	DION® FR 7704-00, % Styrene monomer, % Aluminum Trihydrate, % (2)see below for specific ASTM E-662 ATH requirements that equate to 40%	57.5 2.5 40.0	DION® FR 7704-00, % Methyl methacrylate, % Aluminum Trihydrate, %	45.5 4.5 50.0
Bombardier SMP 800-C Smoke Toxicity Test	• Passed		• Passed	
FAR, PART 25.853			• Passed horizontal and vertical test	
FAR, PART 25.855	• Passed			
ASTM E-84 Tunnel Test			• Flame Spread Index 20 • Smoke Development Index 375 • Flame Spread Index 10 • Smoke Development Index 100 (with Fireblock™ 2330 PAWK745 Flame Retardant Gel Coat)	
ASTM E-162 Tunnel Test	• Flame Spread 10		• Flame Spread 10	
NBS Smoke Chamber ASTM E-662 (2)Aluminum Trihydrate: HUBER SB 336, % HUBER 632 , %	Test Time, min 1.5 4.0	Specific Optical Density (Ds) 5 160		
	67 33			

1) Filled formula composition

APPLICATION

GUIDELINES FOR INITIATOR AND PROMOTER ADDITIONS

	Gel Time (Minutes)			
MEKP 900 (% by weight)	60°F	70°F	80°F	90°F
1.0	66.0	36.0	29.0	17.0
1.5	25.0	18.0	15.0	9.5
2.0	18.5	13.0	11.5	7.0
2.5	16.5	11.5	10.0	6.5

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-Reichhold products available for commercial use.

SHELF LIFE & STORAGE

The shelf life of DION® FR 7704 Series 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.