



HexPly® 954-3

350°F (177°C) curing cyanate matrix

Product Data

Description

HexPly® 954-3 is a 350°F (177°C) curing cyanate resin with excellent resistance to moisture absorption, outgassing and microcracking. HexPly® 954-3 is formulated for autoclave or press molding using a standard cure of two hours at 350°F (177°C). Glass transition temperature can be maximized by post curing at 450°F (232°C). The recommended lay-up procedure is HSP-L3. The recommended cure procedure is HSP-C1 or HSP-C2.

Typical applications for HexPly® 954-3 include primary and secondary space structures and other applications where dimensional stability is critical.

Features

- Low moisture absorption
- Excellent resistance to microcracking
- Low outgassing
- Very low minimum viscosity
- Attractive electrical properties
- 350°F (177°C) cure
- Available on broad range of fibers and in forms including tape and fabric, and tow
- Autoclave or press mold processable

Typical Neat Resin Properties

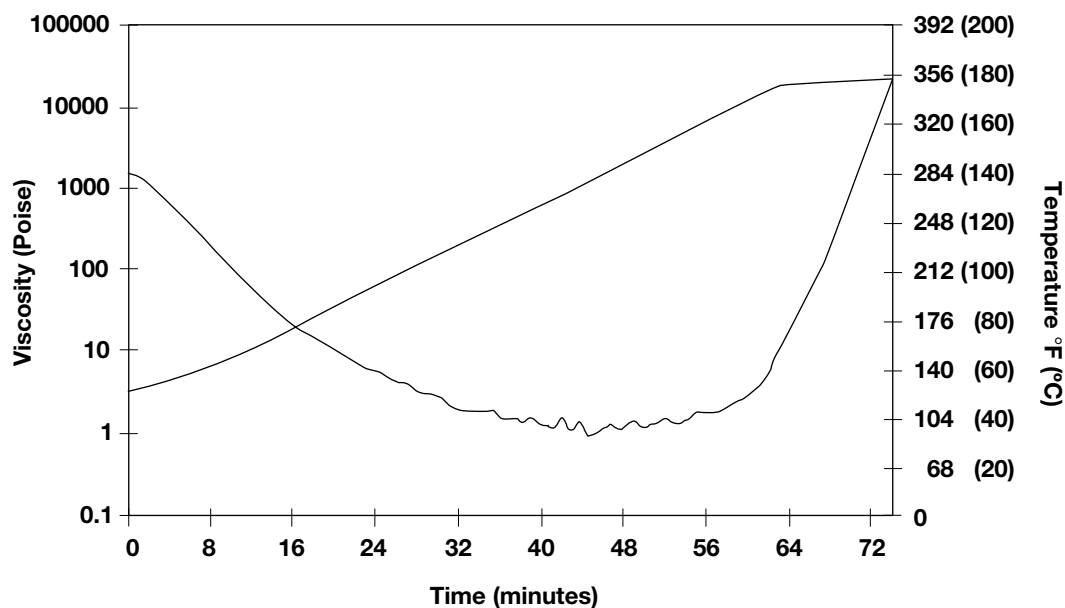
Properties	RT	325°F (163°C)	325°F Wet
Tensile Strength, ksi MPa	8.2 57		
Tensile Modulus, Msi GPa	0.4 2.8		
Tensile Ult. Strain, %	2.4		
Flex Strength, ksi MPa	17.3 119	12.6 87	11.2 77
Flex Modulus, Msi GPa	0.43 3.0	0.33 2.3	0.30 2.1
Tg (DMA- δ), °C no post cure with post cure	206 258		
Density, g/cc	1.19		
CTE, µin/in °F	30.6		

Notes: (1) Post-cured 2 hours at 450°F (232°C)
(2) Wet = 7 day immersion at 160°F (71°C)

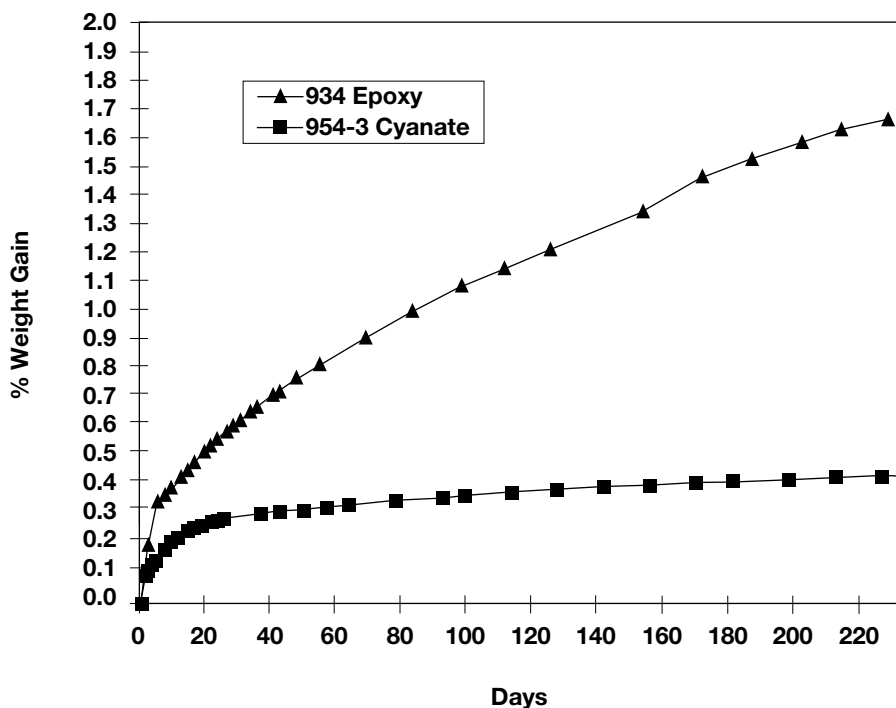


HexPly® 954-3 Product Data

HexPly® 54-3 Viscosity Profile [Ramp to 350°F (177°C) and hold]



HexPly® 954-3 Neat Resin Moisture Absorption at RT/50% RH (compared to 934 epoxy)



The data tested has been obtained from carefully controlled samples considered to be representative of the product described. Because the properties of this product can be significantly affected by the fabrication and testing techniques employed and since Hexcel does not control the conditions under which its products are tested and used, Hexcel cannot guarantee that the properties listed will be obtained with other processes and equipment.

Dimensional Stability

	954-3 ¹	954-3 ²
Hygrostrain, ppm	18.9	108
Water Absorption, %	0.18 ³	0.70 ⁴
CME, ppm %	105	155

Notes: Hygrostrain divided by %M = CME

Pseudo-isotropic P75 laminates; 30% RC

¹R. Brand and E. Derby; SPIE conf, 1690, 309. April 1992 (Composite Optics, Inc.)

²C. Blair and J. Zakrzewski, SPIE Conf. 1690, 300. April 1992 (Lockheed MSC)

³55% RH/EQ

⁴50% GH/EQ

HexPly® 954-3 Resin Outgassing

	954-3	ASTM LIMITS
Total Mass Loss, %	0.20	1.0
Volatile Condensable Mat'l	0.01	0.1
Water Vapor Recovered	0.04	—

Notes: Tested per ASTM E 595

HexPly® 954-3 Neat Resin Dielectrical Properties

Dielectric Properties	RT	325°F (163°C)
Unconditioned		
Dielectric Constant (Dk)	2.73	2.73
Loss Tangent (Df)	0.006	0.008
Moisture Conditioned* (1)		
Dielectric Constant (Dk)	2.85	2.85
Loss Tangent (Df)	0.01	0.02

Notes: Moisture Conditioned: 160°F (71°C) and 95% RH for 140 days.

Resin specimens cured at 350°F (177°C) for 2 hours and post-cured at 428°F (220°C) for 2 hours.

Tested to STM 2520D at 10.0 GHz.

Typical Mechanical Properties (Various Fibers)

Property	Fibers (Average Values)					
	G80-600	M55J	M60J	YSH-60A	K13C-2U	K1100
0 Tensile Strength, ksi MPa	323 2227	334 2303	312 2151	332 2289	267 1841	190 1310
0 Tensile Modulus, Msi GPa	44 303	47 324	53 365	57 391	78 538	82 565
90 Tensile Strength, ksi MPa	5.7 39	5.0 35	— —	4.7 32	3.0 20	— —
90 Tensile Modulus, Msi GPa	0.80 5.5	0.90 6.2	— —	5.6 38	0.73 5.1	— —
0 Comp. Strength, ksi MPa	131 903	138 951	134 924	69 476	53 366	39 269
0 Comp. Modulus, Msi GPa	43 296	44 306	50 343	49 335	76 525	82 565
0 IL Shear Strength, ksi MPa	10.5 72	11.6 80	11.3 78	9.4 65	6.9 47	3.4 23

Notes: 0 degree tensile and compression values are normalized to 60% fiber volume.

All testing performed at RT.



Thermal Cycle Evaluation

Materials	0 Cycles # cracks/in.	10 Cycles # cracks/in.	50 Cycles # cracks/in.	100 Cycles # cracks/in.
954-3/M55J, 0°	0	0	0	0
954-3/M55J, 90°	0	0	1.25	1.25

Notes: Laminate configuration is (45, -45, 0, 90)_{4S}

Thermal cycle: -250°F (-157°C) to 250°F (121°C) at 20°F/min, 5 minutes hold.

Important

Hexcel Corporation believes, in good faith, that the technical data and other information provided herein is materially accurate as of the date this document is prepared. Hexcel reserves the right to modify such information at any time. The performance values in this data sheet are considered representative but do not and should not constitute specification minima. The only obligations of Hexcel, including warranties, if any, will be set forth in a contract signed by Hexcel or in Hexcel's then current standard Terms and Conditions of Sale as set forth on the back of Hexcel's Order Acknowledgement.

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- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Special Process Honeycombs
- Reinforced Fabrics

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