

4030



250-300°F (121-149°C) Cure Epoxy Resin System

Meets FAR 25.853 Appendix F – Parts I, IV, and V

Typical applications

Aerospace
Aircraft interiors

Out life

30 days at 70°F (21°C)

Shelf life

3 months at 40°F (4°C)
6 months at 0°F (-18°C)

Description

4030 is a 250°F (121°C) to 300°F (149°C) cure, and toughened modified epoxy resin system designed for use in applications requiring a high level of flame retardancy. 4030 meets the requirements of FAR 25.853 Appendix F, Parts I, IV, V. With no odor and VOC-free processing, it is an ideal replacement for traditional phenolic systems. Additionally, 4030 has mechanical properties in the same range as traditional epoxy systems, a limitation of most fire retardant thermoset polymers available.

Benefits/features

- Flame retardant
- Excellent mechanical properties
- Meets FAR 25.853 Appendix F, Part I (a)(1)(i), and (a)(2)(iii) flammability requirements
- Meets FAR 25.853 Appendix F, Part IV heat release requirements
- Meets FAR 25.853 Appendix F, Part V smoke emission requirements

Variants

- 4030-5: Snap cure (press cure, 15 min. at 250°, 60 min. post cure at 300°F)
- 4030-D: Decreased tack

Application

4030 is suitable for a wide range of flame retardant applications, and is specifically formulated for aircraft interior applications where flame retardance, smoke density, and heat release requirements must be met. Flexible and fast processing makes this resin system a perfect choice for high volume manufacturing utilizing compression, bladder, or autoclave molding.

4030 can be supplied with most commercially available fibers (carbon, quartz, aramid, S-glass, E-glass, etc.) in both woven form (designated as NB) as well as unidirectional tape (designated as NCT).

Woven fabrics are available in standard commercial widths up to 60 inches (1.5 m). Unitape widths up to 39 inches (1 m) are available in standard fiber weights ranging from 70 – 300 gsm (0.014 – 0.060 psf).

Recommended processing conditions

4030 can be cured at temperatures from 250°F (121°C) to 300°F (149°C), depending on part size and complexity. Low, medium, and high pressure molding techniques may be used for curing. Recommended cure cycle is 50 psi (345 kPa), 3°F (1.7°C)/min. ramp to 275°F (135°C), hold for 60 minutes, cool to <140°F (60°C).



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CARBON FIBER AND COMPOSITES

Technical Data Sheet

Neat resin [values are average and do not constitute a specification]

Property	Value
Gel time @ 275°F (135°C), minutes	5 – 8
Specific gravity	1.47
T _g (DMA, E), °C (°F)	130 (266)

Mechanical data [values are average and do not constitute a specification]

34-700 Uni carbon, 300gsm, 36%RC, autoclave cured, 60psi, 90 minutes at 275°F, norm. to 60%FV

Property	Test method	RT
0° Tensile strength, ksi (MPa)		345 (2370)
0° Tensile modulus, Msi (GPa)		21.2 (146)
Poisson's ratio	ASTM D3039	0.273
90° Tensile strength, ksi (MPa)		7.99 (55.1)
90° Tensile modulus, Msi (GPa)		1.45 (10.0)
0° Compressive strength, ksi (MPa)		245 (1680)
0° Compressive modulus, Msi (GPa)	ASTM D695mod	19.0 (131)
90° Compressive strength, ksi (MPa)		38.7 (266)
90° Compressive modulus, Msi (GPa)		1.56 (10.7)
0° Flexural strength, ksi (MPa)		250 (1720)
0° Flexural modulus, Msi (GPa)	ASTM D790	20.4 (140)
90° Flexural strength, ksi (MPa)		12.5 (86.2)
90° Flexural modulus, Msi (GPa)		1.50 (10.3)
Short beam shear strength, ksi (MPa)	ASTM D2344	14.7 (101)
±45° IPS Strength @5% strain, ksi (MPa)	ASTM D3518	10.8 (74.4)
±45° IPS Modulus, Msi (GPa)		0.696 (4.80)

TR50S Uni carbon, 150gsm, 36%RC, autoclave cured, 60psi, 90 minutes at 275°F, norm. to 60%FV

Property	Test method	RT
0° Tensile strength, ksi (MPa)		345 (2370)
0° Tensile modulus, Msi (GPa)		21.8 (150)
Poisson's ratio	ASTM D3039	0.255
90° Tensile strength, ksi (MPa)		8.10 (55.0)
90° Tensile modulus, Msi (GPa)		1.45 (10.0)
0° Compressive strength, ksi (MPa)		250 (1720)
0° Compressive modulus, Msi (GPa)	ASTM D695mod	19.3 (133)
90° Compressive strength, ksi (MPa)		39.3 (271)
90° Compressive modulus, Msi (GPa)		1.54 (10.6)
0° Flexural strength, ksi (MPa)		280 (1930)
0° Flexural modulus, Msi (GPa)	ASTM D790	19.9 (137)
90° Flexural strength, ksi (MPa)		19.0 (131)
90° Flexural modulus, Msi (GPa)		1.50 (10.3)
Short beam shear strength, ksi (MPa)	ASTM D2344	16.3 (112)
±45° IPS Strength @5% strain, ksi (MPa)	ASTM D3518	10.7 (73.7)
±45° IPS Modulus, Msi (GPa)		0.700 (4.82)



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Technical Data Sheet

7781 E-glass fabric, 38%RC, autoclave cured, 60psi, 90 minutes at 275°F, normalized to 60%FV

Property	Test method	RT
0° Tensile strength, ksi (MPa)		65.1 (448)
0° Tensile modulus, Msi (GPa)	ASTM D3039	4.76 (32.8)
Poisson's ratio		0.125
0° Compressive strength, ksi (MPa)		117 (806)
0° Compressive modulus, Msi (GPa)	ASTM D695mod	5.01 (34.5)
0° Flexural strength, ksi (MPa)		120 (827)
0° Flexural modulus, Msi (GPa)	ASTM D790	7.13 (49.1)
Short beam shear strength, ksi (MPa)	ASTM D2344	8.05 (55)

Flame retardance data [values are average and do not constitute a specification]

FAR 25.853 Appendix F, 34-700 24K Uni carbon, 38-40%RC, G145

Part I a1i and a2iii			
60-Second vertical flame test	Requirements	Results	
Self-extinguish, time after flame removal	15 sec. max	<1 sec.	
Average burn length	6" max	2.7"	
Self-extinguish drip time	3 sec. max	0 sec.	
45° Flame test	Requirements	Results	
Self-extinguish, time after flame removal	15 sec. max	2.4 sec.	
Average afterglow time	10 sec. max	0 sec.	
Flame penetration	none	none	
Part IV (OSU Heat release rate)			
Results at various thicknesses	Requirements	0.017"	0.034"
Heat release rate @2 min. (kW-min/m ²)	65 max	33	53
Peak heat release rate (kW/m ²)	65 max	48	56
Time to peak heat (sec)	n/a	23	37
Part V (Smoke emission)			
Results at various thicknesses	Requirements	0.019"	0.039"
4 minutes, optical density (D max)	200 max.	64	116

Toxicity data [values are average and do not constitute a specification]

NCT4030 TR50S G290 43±2% Carbon unitape laminate with 0.060" (0.15cm) thickness per Boeing Document No. D6-51377 (Test method BSS 7239, Rev. A)

	CO	HCN	HF	HCl	SO ₂	NO _x
Results (ppm)	40	2	ND	ND	ND	2
Max. allowed (ppm)	3500	150	200	500	100	100

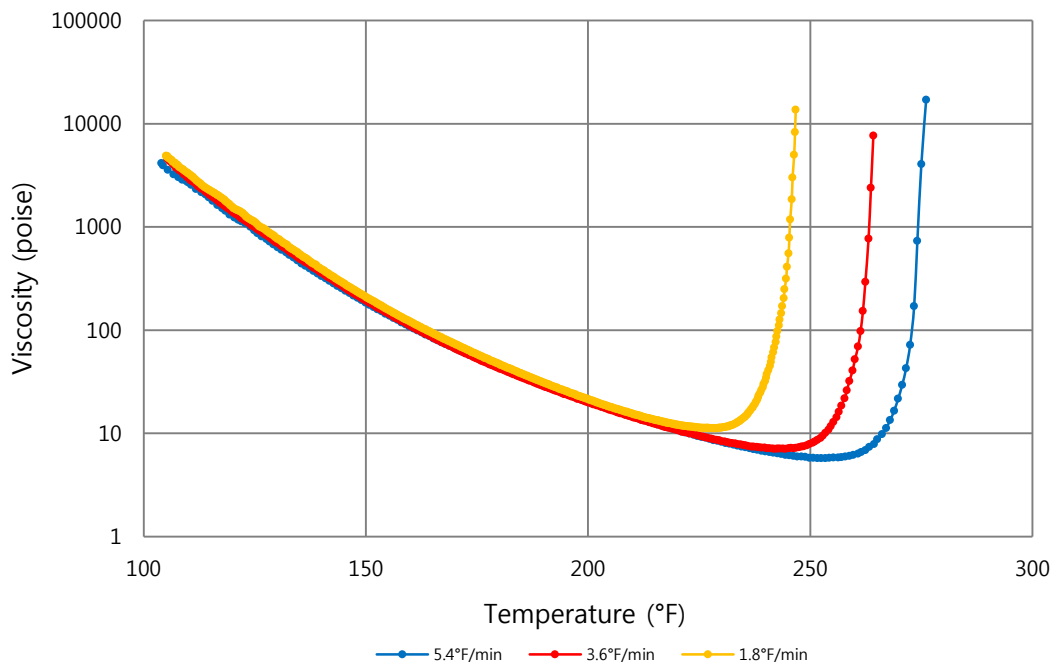
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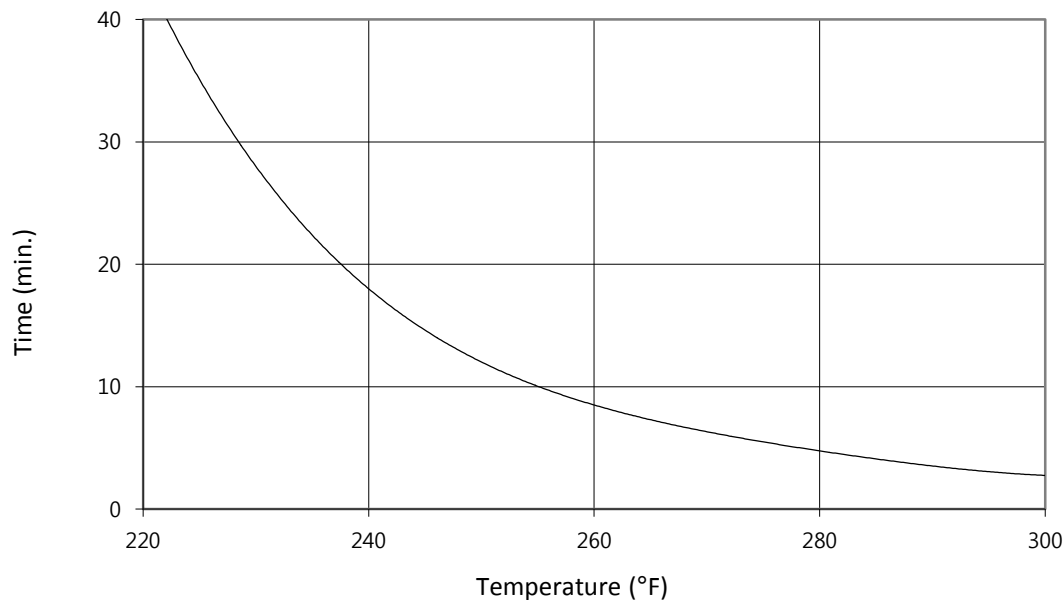


4030 Viscosity vs. temperature

TA - AR2000 parallel plate rheometer



Gel time vs. temperature



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