

NB301



MITSUBISHI RAYON
CARBON FIBER & COMPOSITES

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

Typical applications

Sporting Goods
Marine
Medical
Industrial Manufacturing

Out life

30 days at 70°F (21°C)

Shelf life

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

Description

NB301 is a 250°F (121°C) to 300°F (149°C) cure, toughened, controlled flow epoxy resin system that has been the industry standard for over 25 years. Versatile processing, excellent mechanical properties, and long out time make NB301 suitable for a variety of applications, including large scale structures where layup requirements can take days or weeks.

Benefits/features

- Excellent mechanical properties
- Moderate tack
- Good toughness
- Controlled flow
- Flexible processing

Application

NB301 is suited for structural applications in sporting goods, marine, medical, and industrial manufacturing.

NB301 can be supplied with most commercially available fibers (carbon, quartz, aramid, S-glass, E-glass, etc.) in both woven as well as unidirectional tape. 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).

Variants

- 301-1: Increased tack
- 301-D: Decreased tack
- 301-5: Snap cure (3 minutes at 300°F, 10 minutes at 275°F)
- 301-T: Clearer aesthetics

Recommended processing conditions

NB301 is typically cured at 250°F to 300°F (121°C - 149°C) depending on part size and complexity. With extended cure times, larger scale structures can be cured as low as 195°F-220°F (90°C-104°C). 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).

Technical Data Sheet

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

Property	Value
Gel Time @ 275°F (135°C), minutes	3 – 5
Specific Gravity	1.22
T _g (DMA, E'), °C (°F)	120 (248)
CTE, ppm/°C	70 ± 10 (below T _g)
Tensile Strength, ksi (MPa)	8.3 (57)
Tensile Modulus, Msi (GPa)	0.46 (3.1)
Flexural Strength, ksi (MPa)	14.6 (100)
Flexural Modulus, Msi (GPa)	0.50 (3.4)

Outgassing properties tested in accordance with ASTM E595

Property	Resin	NCT301 LT G145 35%RC
Average value TML (Total Mass Loss)	0.49%	0.19%
Average value WVR (Water Vapor Recovered)	0.38%	0.12%
Percent CVC (Collected Volatile Condensable Materials)	<0.01	<0.01%

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

TR50S Uni Carbon 34%RC, autoclave cured, 60psi, 90 minutes at 275°F, normalized to 60%FV

Property	Test Method	RT
0° Tensile strength, ksi (MPa)		373 (2570)
0° Tensile modulus, Msi (GPa)		20.4 (140)
90° Tensile strength, ksi (MPa)	ASTM D3039	9.19 (63.7)
90° Tensile modulus, Msi (GPa)		1.26 (8.68)
0° Compressive strength, ksi (MPa)		228 (1570)
0° Compressive modulus, Msi (GPa)		20.7 (142)
90° Compressive strength, ksi (MPa)	ASTM D695mod	38.6 (266)
90° Compressive modulus, Msi (GPa)		1.45 (10.0)
0° Flexural strength, ksi (MPa)		244 (1680)
0° Flexural modulus, Msi (GPa)	ASTM D790	18.1 (124)
90° Flexural strength, ksi (MPa)		22.7 (156)
0° Short Beam Shear strength, ksi (MPa)	ASTM D2344	13.9 (95)
±45° IPS Strength @5% Strain, ksi (MPa)		7.1 (48)
±45° IPS Modulus, Msi (GPa)	ASTM D3518	0.53 (3.6)



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Technical Data Sheet

34-700 Uni Carbon 35%RC, autoclave cured, 60psi, 90 minutes at 275°F, normalized to 60%FV

Property	Test Method	RT
0° Tensile strength, ksi (MPa)		344 (2370)
0° Tensile modulus, Msi (GPa)		19.4 (133)
Strain at peak, %	ASTM D3039	3.41
Poisson's ratio		0.289
0° Compressive strength, ksi (MPa)		244 (1680)
0° Compressive modulus, Msi (GPa)	SACMA 1R-94	19.5 (134)
0° Flexural strength, ksi (MPa)		249 (1710)
0° Flexural modulus, Msi (GPa)	ASTM D790	19.8 (136)
0° Short Beam Shear strength, ksi (MPa)	SACMA 8R-94	14.0 (96.5)

37-800 Uni Carbon 34%RC, autoclave cured, 60psi, 90 minutes at 275°F, normalized to 60%FV

Property	Test Method	RT
0° Tensile strength, ksi (MPa)		408 (2813)
0° Tensile modulus, Msi (GPa)	ASTM D3039	21.2 (146)
0° Compressive strength, ksi (MPa)		217 (1496)
0° Compressive modulus, Msi (GPa)	ASTM D695mod	19.1 (131)
0° Flexural strength, ksi (MPa)		226 (1558)
0° Flexural modulus, Msi (GPa)	ASTM D790	18.2 (125)
0° Short Beam Shear strength, ksi (MPa)	ASTM D2344	13.9 (95)

HR40 Uni Carbon 31%RC, autoclave cured, 85psi, 30 minutes at 170°F, then 120 minutes at 255°F, normalized to 60%FV

Property	Test Method	RT
0° Tensile strength, ksi (MPa)		371 (2550)
0° Tensile modulus, Msi (GPa)	ASTM D3039	34.1 (235)
0° Compressive strength, ksi (MPa)	SACMA 1R-94	159 (1090)
0° Flexural strength, ksi (MPa)		226 (1550)
0° Flexural modulus, Msi (GPa)	ASTM D790	30.4 (209)
0° Short Beam Shear strength, ksi (MPa)	SACMA 8R-94	12.7 (87.5)

TRH50 Uni Carbon 35%RC, autoclave cured, 80psi, 90 minutes at 275°F, normalized to 60%FV

Property	Test Method	RT
0° Tensile strength, ksi (MPa)		442 (3040)
0° Tensile modulus, Msi (GPa)	ASTM D3039	21.7 (149)
0° Compressive strength, ksi (MPa)	ASTM D695mod	240 (1650)
0° Flexural strength, ksi (MPa)		250 (1720)
0° Flexural modulus, Msi (GPa)	ASTM D790	21.1 (145)
90° Flexural strength, ksi (MPa)	ASTM D790	19.8 (136)
0° Short Beam Shear strength, ksi (MPa)	ASTM D2344	13.3 (91.7)

7781 E-Glass fabric 39%RC, autoclave cured, 30psi, 90 minutes at 260°F, normalized to 60%FV

Property	Test Method	RT	RT _{wet} *
0° Tensile strength, ksi (MPa)	ASTM D638 Type II	91.9 (633)	74.0 (510)
0° Tensile modulus, Msi (GPa)		4.6 (31)	5.0 (34)
0° Compressive strength, ksi (MPa)	ASTM D695mod	84.2 (580)	77.9 (537)
0° Compressive modulus, Msi (GPa)		4.5 (31)	4.5 (31)
0° Flexural strength, ksi (MPa)	ASTM D790	137 (944)	108 (774)
0° Flexural modulus, Msi (GPa)		5.4 (37)	4.9 (33)
0° Short Beam Shear strength, ksi (MPa)	SACMA 8R-94	10.3 (71.0)	8.3 (57)

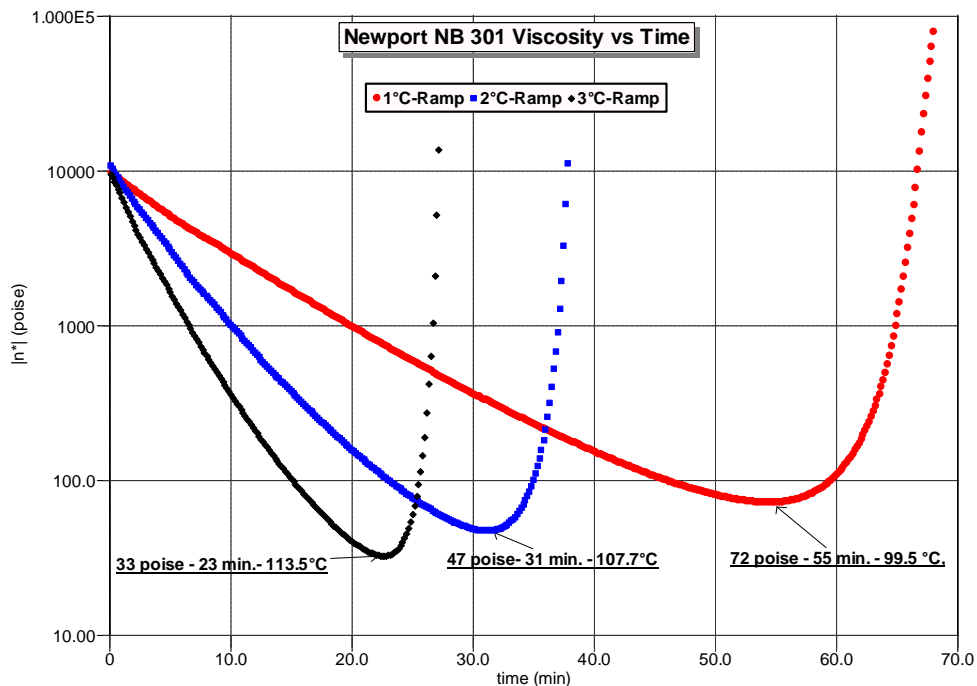
*Wet conditioning = 2 hour water boil, weight gain = 0.25%

Innega™S 2x2 Twill 50%RC, autoclave cured, 58psi, 90 minutes at 275°F, normalized to 60%FV

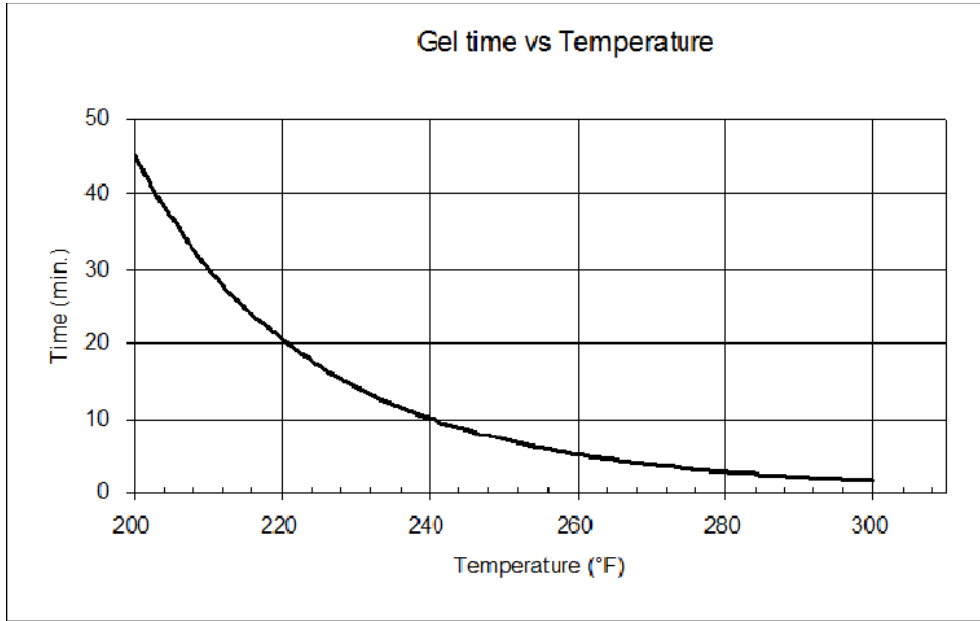
Property	Test Method	RT
0° Tensile strength, ksi (MPa)	ASTM D3039	24.3 (167)
0° Tensile modulus, Msi (GPa)		0.529 (3.64)
0° Compressive strength, ksi (MPa)	ASTM D695mod	2.94 (20.2)
0° Flexural strength, ksi (MPa)	ASTM D790	6.26 (43.1)
0° Flexural modulus, Msi (GPa)		0.464 (3.20)
90° Flexural strength, ksi (MPa)	ASTM D790	5.29 (36.4)
0° Short Beam Shear strength, ksi (MPa)	SACMA 8R-94	0.63 (4.34)

Viscosity Profile

TA - AR2000 parallel plate rheometer



Gel Curve



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