CYCOM® 970 EPOXY RESIN SYSTEM

CYCOM® 970 is a controlled flow, 179°C (355°F) curing epoxy resin with 195°C (383°F) dry glass transition temperature. CYCOM® 970 is excellent for producing nonporous, void-free honeycomb sandwich structures as well as laminates.

CYCOM® 970 has adjustable tack and is available as a unidirectional tape, fabric or roving. The prepreg is formulated for autoclave processing. Recommended cure is two hours at 179°C (355°F). No post-cure is required for dry service capability. CYCOM® 970 can be impregnated via solution technique on the majority of available fibers and fabrics.

Features and Benefits

- Shelf Life 9 months at -12°C (10°F), 10 days at 23°C (73°F)
- Controlled Flow, essential for honeycomb sandwich structures
- Adjustable Tack
- Autoclave Processing
- 195°C (383°F) dry and 142°C (288°F) wet Glass transition temperature,
- 179°C (355°F) Cure Temperature
- Available in a broad range of fibers and forms (tape, fabric, and roving)

APPLICATIONS

Structural aircraft components requiring honeycomb sandwich panels.

RECOMMENDED BAGGING

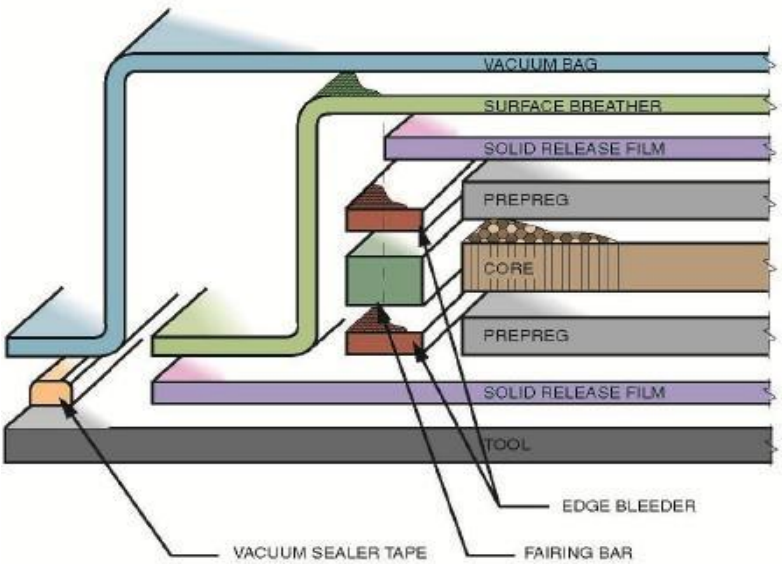


Figure 1: CYCOM 970 Typical Sandwich Layup/Bagging

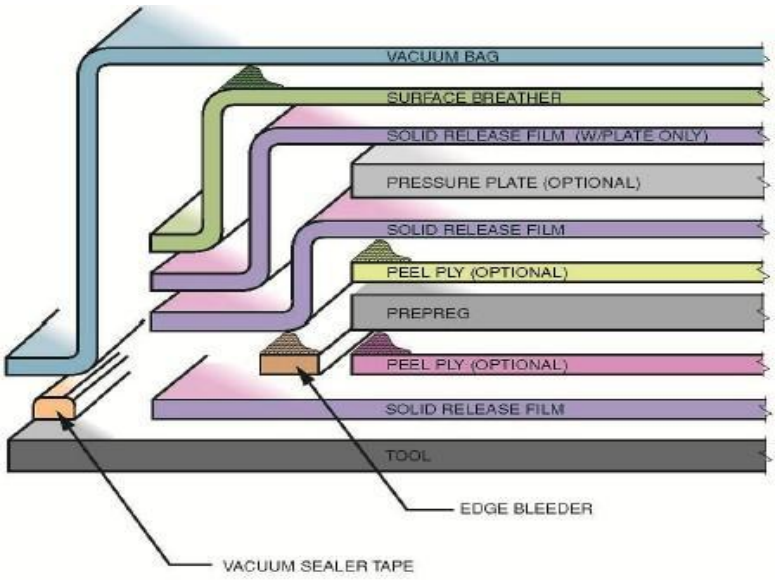
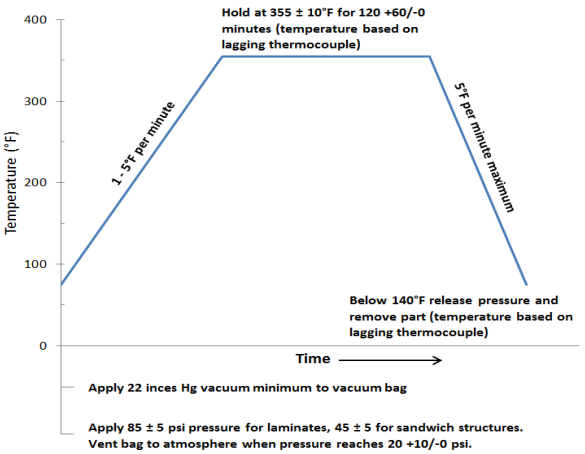


Figure 2: CYCOM 970 Typical Laminate Layup/Bagging

CURE CYCLE

Parameter	Units
Vacuum	0.745 Bar minimum; released after pressure reaches 20 psi (1.4 Bar)
Pressure[1]	6 - 7 bar
Ramp rate	(0.5 - 3)°C/minute
Cure temperature	179 ± 5°C
Hold time	(120 +60/-0) minutes
Cooling rate	3°C/min max
Cooling	to below 60°C under pressure

[1] 3 Bar for sandwich laminates



PHYSICAL PROPERTIES

Property		Test Method
Cured resin density:	1.24 g/cm^3	ISO 1183
T_g dry:	195°C	EN6032
T_g wet[1]:	142°C	

[1] 70°C/85% R.H.

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PREPREG

MECHANICAL PROPERTIES

Property	Condition	Test Method	CYCOM 970/ T300 12K NT (CCF)[1,7]	CYCOM 970/ T300 12K NT(CCF)[2,7]	CYCOM® 970A/T650-35 6K 24" STL[10]	CYCOM 970-44-CCF3K ST-P-193[3,8]	CYCOM970-38%-3K T650-P-193[4,5]	CYCOM 970/ PWC T300 3K ST (CCF)[6,7]
0° TS, MPa (ksi)	RT/Dry	ASTM D3039 EN2561 B EN2597 B	1634 (2367)	1613 (234)	2143 (311)	644 (93.4)	809 (117)	724 (105)
	90°C/Wet		1592 (231)	1524 (221)	1869 (271)	698 (101)	908 (132)	-
0° TM, GPa (Msi)	RT/Dry	ASTMD3039 EN2561 B EN2597 B	122 (17.7)	122 (17.7)	145 (21.0)	52.7 (7.64)	809 (117)	60.0 (8.7)
	90°C/Wet		123 (17.9)	122 (17.7)	142 (20.6)	53.6 (7.77)	758 (110)	-
90° TS, MPa (ksi)	RT/Dry	EN2597 B (ASTM D3039)	91.7 (13.3)	91.0 (13.2)	65.3 (9.47)	613 (88.9)	66.4 (9.63)	687 (99.7)
	90°C/Wet		35.9 (5.2)	34.5 (5.0)	39.2 (5.69)	663 (96.2)	66.6 (9.66)	-
90° TM, GPa (Msi)	RT/Dry	EN2597 B (ASTM D3039)	7.58 (1.1)	7.58 (1.1)	8.35 (1.21)	51.9 (7.53)	64.0 (9.28)	57.9 (8.4)
	90°C/Wet		3.44 (0.5)	3.44 (0.5)	5.08 (0.737)	50.5 (7.32)	65.0 (9.43)	-
0° CS, MPa (ksi)	RT/Dry	EN2850 B (ASTM D6641)	1351 (195)	1358 (197)	1468 (213)	659 (95.6)	821 (119)	765 (111)
	90°C/Wet		820 (119)	869 (126)	989 (143)	449 (65.1)	554 (80.4)	462 (67.0)
0° CM, GPa (Msi)	RT/Dry	EN2850 B (ASTM D6641)	108 (15.7)	107 (15.5)	123 (17.8)	47.0 (6.82)	59.5 (8.63)	54.5 (7.9)
	90°C/Wet		-	-	120 (17.4)	46.1 (6.69)	60.7 (8.80)	-
90° CS, MPa (ksi)	RT/Dry	EN2850 B (ASTM D6641)	-	-	265 (38.4)	538 (78.0)	755 (110)	669 (97.0)
	90°C/Wet		-	-	152 (22.0)	423 (61.4)	524 (76.0)	406 (58.9)
90° CM, GPa (Msi)	RT/Dry	EN2850 B (ASTM D6641)	-	-	10.2 (1.48)	46.6 (6.76)	58.1 (8.43)	53.1 (7.7)
	90°C/Wet		-	-	6.92 (1.00)	44.7 (6.48)	58.1 (8.43)	-
IPSS, MPa (ksi)	RT/Dry	EN6031 (ASTM D3518)	-	-	130 (18.9)	122 (17.7)	124 (18.0)	-
	90°C/Wet		-	-	88.2 (12.8)	83.0 (12.0)	81.8 (11.9)	-
IPSM, GPa (Msi)	RT/Dry	EN6031 (ASTM D3518)	-	-	4.06 (0.589)	3.88 (0.563)	4.05 (0.587)	-
	90°C/Wet		-	-	2.29 (0.332)	2.52 (0.365)	2.62 (0.380)	-
ILSS, MPa (ksi)	RT/Dry	EN2563 (ASTM D2344)	-	-	106 (15.4)	77.6 (11.3)	79.7 (11.6)	-
	90°C/Wet		-	-	53.3 (7.73)	42.4 (6.15)	49.89 (7.22)	-
CAI@30J, MPa (ksi)	RT/Dry	EN 6038 (ASTM D7136 D7137)	-	-	193 (28.0)	208 (30.2)	205 (29.7)	-
	90°C/Wet		-	-	1809) (26.1)	175 (25.4)	-	-
Flatwise Tension, MPa (ksi)	RT/Dry	EN6062 (ASTM C297)	4.92 (0.713)	-	-	4.37 (0.634)	-	5.28 (0.766)
Sandwich Flexure, N (lbf)	RT/Dry	EN6061 (SAE-AMS- STD)	-	-	-	1878 (422)	-	1343 (302)
G1c, J/m^2 (in-lb/in2)	RT/Dry	EN6033 (D6671, D5528)	255 (1.5)	221 (1.3)	375 (2.21)	632 (3.72)	696 (4.09)	612 (3.6)

[1] RC=38%, FAW= 145gsm, Fibre dominating properties normalised to CPT 0.154mm

[2] RC=38%, FAW= 190gsm, Fibre dominating properties normalised to CPT 0.202mm

[3] Fibre dominating properties normalised to CPT 0.232mm

[4] Wet conditioning at 70°C/80% R.H.

[5] Fibre dominating properties normalised to CPT 0.204mm

[6] RC=40%, FAW= 193gsm, Fibre dominating properties normalised to CPT 0.216mm

[7] Wet conditioning at 71±5°C (160 ± 10°F) soak in water for 14 days

[8] Wet conditioning at 70°C/85% R.H.

[9] Test temperature 70°C

[10] RC=35%, FAW= 124gsmm, Fibre dominating properties normalised to CPT 0.124mm

PRODUCT FORMS

CYCOM® 970 is available in Unidirectional tape and PW fabric prepreg forms in a wide variety of widths; please contact a Syensqo Customer Service representative.

STORAGE

Storage Life is 270 days minimum from date of manufacture stored at -12°C or below in a sealed container. Handling Life is 10 days minimum if stored at 23°C.

EXOTHERM

CYCOM® 970 prepregs are reactive formulations which can undergo severe exothermic heat up during the initial curing process if incorrect curing procedures are followed.

Great care must be taken to ensure that safe heating rates, dwell temperatures and lay-up/bagging procedures are adhered to, especially when moulding solid laminates in excess of 10mm (0.4in) thickness. The risk of exotherm increases with lay- up thickness and increasing cure temperature. It is strongly recommended that trials, representative of all the relevant circumstances, are carried out by the user to allow a safe cure cycle to be specified. It is also important to recognise that the model or tool material and its thermal mass, combined with the insulating effect of breather/bagging materials can affect the risk of exotherm in particular cases.

HEALTH & SAFETY

Please refer to the product SDS for safe handling, personal protective equipment recommendations and disposal considerations.