CYCOM® 2050

CYCOM® 2050 is an extremely tough medium temperature curing modified epoxy resin. Typical applications for CYCOM 2050 include any application where impact resistance and lightweight as well as versatile cure conditions are required.

CYCOM 2050 is formulated for lower temperature autoclave or press mould processing.

Features and Benefits

- 14 days out life at 21°C (70°F)
- 12 months storage at -18°C (0°F)
- Toughened epoxy uses "co-continuous" morphology
- Controlled flow
- Very high impact resistance
- 135°C (275°F) cure temperature
- DMA E′ onset Tg of 150°C (320°F) following 3 hour at 135°C (275°F) cure
- Excellent cured surface finish
- Available in a wide range of fibres and fabric weaves

RELATED DOCUMENTS

- De-bulking guidelines (TDS1036)
- Autoclave processing lay-up and bagging guidelines (TDS1037)

CURE CYCLE

Autoclave Cureheading

Vacuum bag pressure	Minimum of 980mbar (29"Hg)* †
Autoclave pressure	6.9 bar (100 psi)**
Ramp rate	2°C (3.6°F)/minute
Recommended cure cycle	3 hours at 135°C, +5/-0°C (275°F, +9/-0°F)
Cool down	Maximum of 3°C (5.4°F)/minute to 60°C (140°F)

*This is the ideal vacuum level, however, it is recognised that it is not always possible to attain. If in doubt, please contact our technical support staff for advice.

†If manufacturing complex shapes, the vacuum can be vented when the pressure reaches 2 bar (30psi) if there is a perceived risk of a bag burst and hence the need to avoid pressurised air going down the vacuum line.

**If producing sandwich panels, apply the maximum pressure allowable for the honeycomb type.

POST-CURE

Ramp rate	0.3°C (0.5°F)/minute
Post-cure cycle	2 hours at 177°C (351°F)*
Cool down	Maximum of 3°C (5.4°F)/minute to 60°C (140°F)

* Temperature must be measured by the lagging thermocouple attached to the part.

Notes:

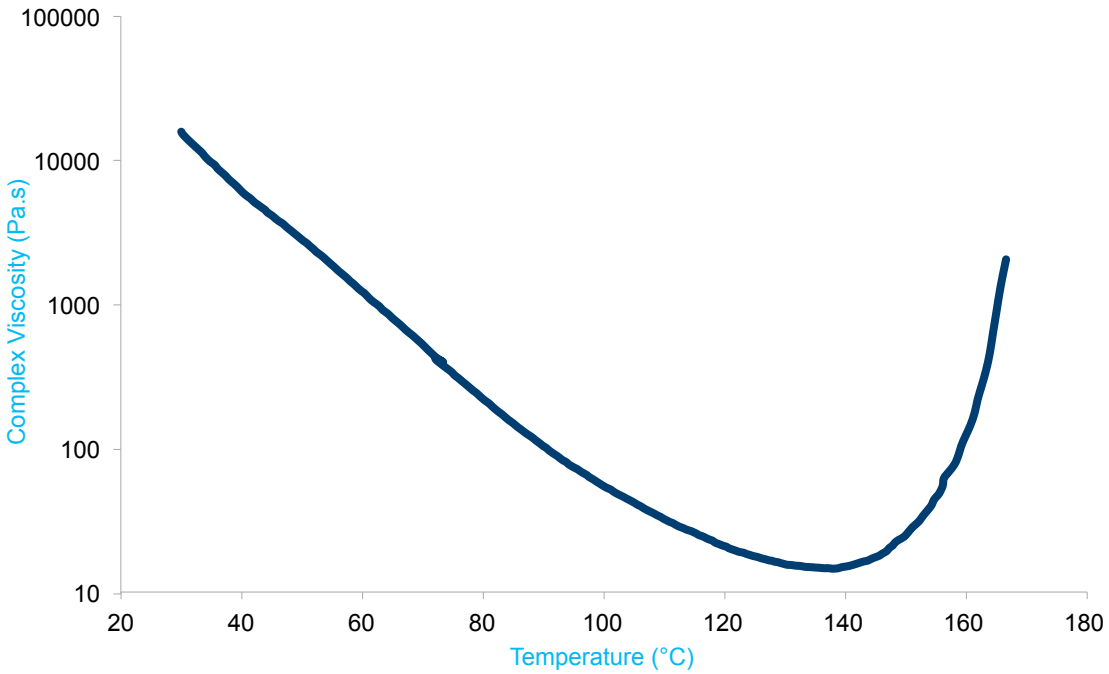
Parts may be loaded into a pre-heated oven or heated at 3°C (5.4°F)/minute to the initial cure temperature.

Large components should be adequately supported to avoid distortion.

PHYSICAL PROPERTIES

Test	Sample conditions	Results
Cured resin density	-	1.30 g/cm3
DMA E' onset Tg	3 hours at 135°C (275°F)	Dry – 150°C (302°F)

DYNAMIC VISCOSITY AT 2°C/MINUTE



MECHANICAL PROPERTIES

Material: CYCOM 2050- T1000 283g 5HS 40%Rw

Cure Cycle: 3 hours at 135°C (275°F)

Test Conditions: Room temperature, dry

Property	Test Method	Units	Result	
0° Tensile strength	ASTM D3039	MPa (ksi)	1535 (222.6)	
0° Tensile modulus		GPa (msi)	79.5 (11.53)	
0° Tensile Poisson's Ratio		-	0.04	
0° Tensile ultimate strain		%	1.93	
0° Compressive strength	ASTM D695 (mod)	MPa (ksi)	884 (128.2)	
0° Compressive modulus		GPa (msi)	70.3 (10.19)	
0° Compressive ultimate strain		%	1.26	
±45 In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	139 (20.16)	
±45 In-plane strength at 5% strain		MPa (ksi)	94.4 (13.69)	
±45 In-plane shear modulus (IPSM)		GPa (msi)	4.45 (0.65)	
0° Inter laminar shear strength (ILSS)	ASTM D2344-84	MPa (ksi)	89.0 (12.91)	
			120°C (248°F)	52.3 (7.58)

Data normalised to 55%Vf except for ILSS, IPSS and IPSM.

Notes:

Heanor NPI mechanicals listed. Existing Wrexham data (including Compression strength after impact [CSAI]) not included. Please contact our technical support staff for additional data.

TECHNICAL DATA SHEET

CYCOM® 2050

PREPREG

Material: CYCOM 2050- T1000 (12K) 140g 36%Rw

Cure cycle: 3 hours at 135°C (275°F)

Test conditions: Room temperature, dry

Property	Test Method	Units	Result	
0° Tensile strength	ASTM D3039	MPa (ksi)	3527 (511.4)	
0° Tensile modulus		GPa (msi)	168 (24.36)	
0° Tensile Poisson's Ratio		-	0.30	
0° Tensile ultimate strain		%	2.10	
90° Tensile strength		MPa (ksi)	60.3 (8.74)	
90° Tensile modulus		GPa (msi)	9.14 (1.33)	
90° Tensile Poisson's Ratio		-	0.02	
90° Tensile ultimate strain		%	0.04	
0° Compressive strength	ASTM D695 (mod)	MPa (ksi)	1682 (243.9)	
0° Compressive modulus		GPa (msi)	147 (21.3)	
0° Compressive ultimate strain		%	1.15	
90° Compressive strength		MPa (ksi)	278 (40.3)	
90° Compressive modulus		GPa (msi)	9.89 (1.43)	
90° Compressive ultimate strain		%	2.90	
±45 In-plane shear strength (IPSS)	ASTM D3518	MPa (ksi)	163 (23.6)	
±45 In-plane strength at 5% strain		MPa (ksi)	87.5 (12.7)	
±45 In-plane shear modulus (IPSM)		GPa (msi)	4.86 (0.70)	
0° Inter laminar shear strength (ILSS)	ASTM D2344-84	MPa (ksi)	108 (15.66)	
			120°C (248°F)	58.4 (8.47)

Data normalised to 55%Vf except for ILSS, IPSS and IPSM.

Notes:

Heanor NPI mechanicals listed. Existing Wrexham data (including Compression strength after impact [CSAI]) not included. Please contact our technical support staff for additional data.

AVAILABILITY

CYCOM 2050 prepregs are available with a wide variety of unidirectional and woven reinforcements.

STORAGE

Out life* at 21°C (70°F)	14 days
Storage at -18°C (0°F)	12 months from date of manufacture

*Out life refers to accumulated time out of the freezer before the part is cured.

Note:

The actual freezer storage life and out life are dependent on a number of factors, including; fibre type, format and application. For certain formats, it may be possible for the storage life and out life to be longer than stated. Please contact our technical support staff for advice.

EXOTHERM

CYCOM 2050 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 (0.40in) 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.

Please contact our technical support staff for further information on exotherm behaviour of this prepreg.

HEALTH & SAFETY

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