



## NTPT GF736 TOUGHENED EPOXY 80° CURING ADHESIVE FILM DATA SHEET

### INTRODUCTION

GF736 is a toughened epoxy adhesive film, with excellent tack and drape characteristics, supplied on a paper backer either in an unsupported format or with an embedded ultra-lightweight glass carrier to aid handling.

GF736 offers many advantages for bonding composite laminates, either to other laminates, or to structural cores, including; consistent bond-line thickness and weight, high strain to failure, high toughness, handling convenience, controlled flow and a 6 week out-life at ambient temperature (18-22°C/64-72°F)

### PRODUCT FEATURES

- Toughened adhesive film for good shear strength and peel strength
- Controlled flow for maximum bond integrity
- Lloyd's Register Certified (work in progress)
- 80°C (176°F) minimum temperature cure
- Designed for bonding monolithic structures as well as prepreg skins to honeycomb and other commonly used core materials (please check with NTPT's Technical team for specific advice on using GF736 for core bonding)
- Compatible with NTPT prepreg systems TP 736LT and TP 510



## PRODUCT FORMAT

Product Name	Resin System	Area Weight (g/m <sup>2</sup> )	Width (mm)	Supported
GF736/50g/400mm	GF736	50	400	No
GF736/75g/400mm	GF736	75	400	No
GF736/100g/400mm	GF736	100	400	No
GF736/150g/400mm	GF736	150	400	No
GF736/150g/G25/400mm				Yes
GF736/250g/G25/400mm	GF736	250	400	Yes
GF736/400g/G25/400mm	GF736	400	400	Yes

Custom weights and further ultralight weight film options are also available, according to certain minimum volume requirements being fulfilled, please contact NTPT to discuss.

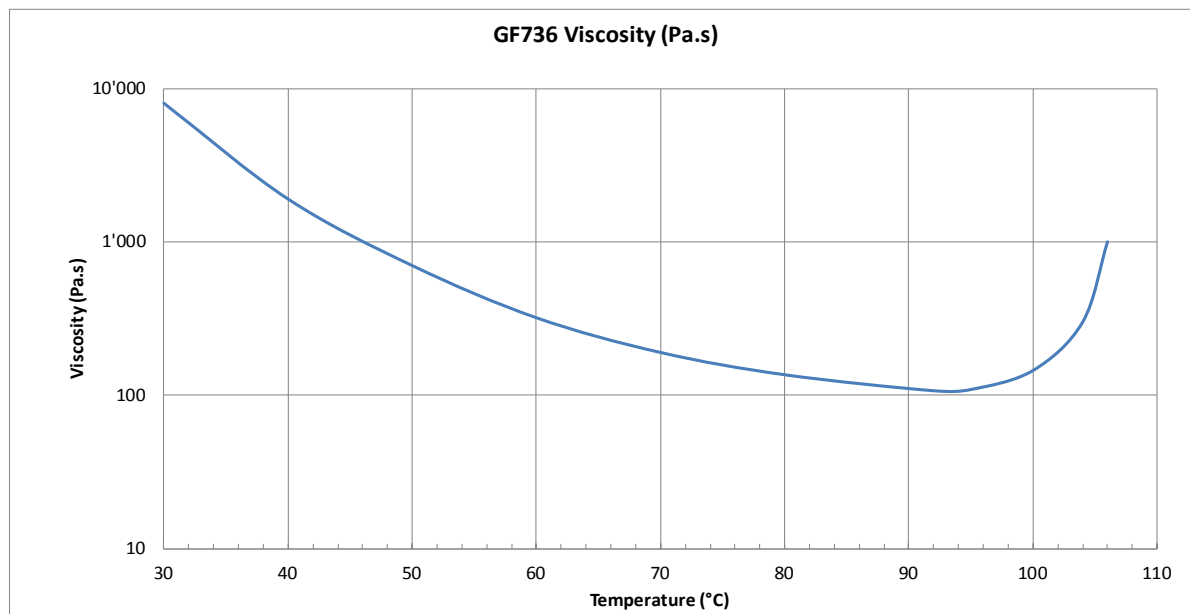
### Note:

G25 is our standard film reinforcement to augment the handling characteristics of the product.

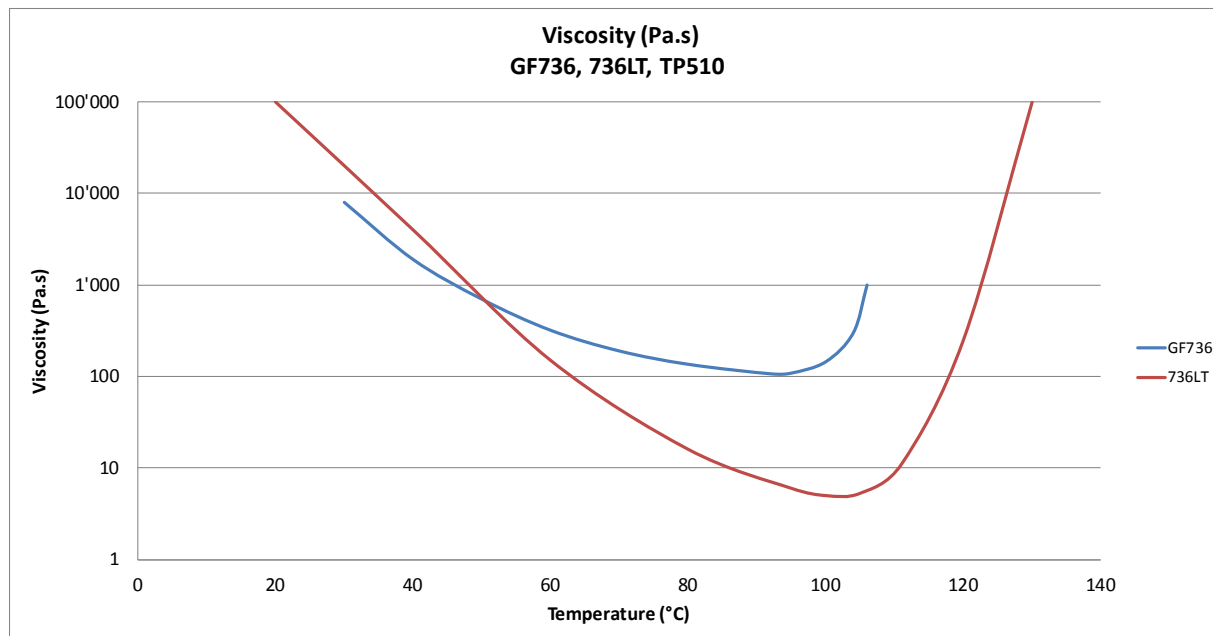
## TYPICAL CHARACTERISTICS

### Rheology

GF736 resin viscosity profile conducted at 1°C (1.8°F) per minute.



Minimum viscosity: 107Pa.s at 92°C (198°F).



## TYPICAL CHARACTERISTICS

### Mechanical test

Cured adhesive mechanical properties (SI)

Property		Symbol	GF736								Test Standard
Cure Cycle		12hrs/80°C(176°F)				1hrs/120°C(176°F)					
Adhesive film weight		75g/m²		250g/m²		75g/m²		250g/m²			
Lap shear strength on steel	τsteel	TBA	Mpa	37.9	Mpa	36.0	Mpa	35.8	Mpa	BS5350 C5	
Cleavage strength on steel	σCLEAVage	11.8	Mpa	11.7	Mpa	12.1	Mpa	12.2	Mpa	BS5350 C1	
Climbing drum peel at @0°	σPEEL	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	BS5350 C13	
Climbing drum peel at @90°	σPEEL	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	BS5350 C13	
Flatwise tensile on Nomex (4.8mm cells, 96Kg/m³)	σFlatT	TBA	Mpa	TBA	Mpa	TBA	Mpa	TBA	Mpa	TBA	
		TBA		100% Nomex Failure		TBA		TBA			

Cured adhesive mechanical properties (Imperial)

Property	Symbol	GF736								Test Standard
Cure Cycle		12hrs/80°C(176°F)				1hrs/120°C(176°F)				
Adhesive film weight		75g/m²		250g/m²		75g/m²		250g/m²		
Lap shear strength on steel	τsteel	TBA	Ksi	5.49	Ksi	5.22	Ksi	5.19	Ksi	BS5350 C5
Cleavage strength on steel	σCLEAVage	1.71	Ksi	1.70	Ksi	1.75	Ksi	1.75	Ksi	BS5350 C1
Climbing drum peel at @0°	σPEEL	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	BS5350 C13
Climbing drum peel at @90°	σPEEL	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	TBA	N/75.5mm	BS5350 C13
Flatwise tensile on Nomex (4.8mm cells, 96Kg/m³)	σFlatT	TBA	Ksi	TBA	Ksi	TBA	Ksi	TBA	Ksi	TBA
		TBA		100% Nomex Failure		TBA		TBA		

Oven cured using standard vacuum bag processing techniques.

**Note:** This data is preliminary. GF736 full characterization is in progress. More data coming soon.



## INSTRUCTIONS FOR USE

### Core bonding

Various core materials can be used with the GF736 adhesive film system, including certain foams - provided that special procedures are followed - and also honeycombs.

#### Nomex or aluminum honeycomb cores

##### **1. Core to First Skin**

For bonding honeycomb into place on to a cured laminate, a minimum of a 250g film should be used, with extra resin film used where there are any steps, wrinkles or unevenness in the laminate or core material surface profile. Apply the film over the laminate with the paper side uppermost, then remove the release paper. Bed in the honeycomb core to the film and splice the core segments with a wrap of at least two layers of film applied to each honeycomb edge. After positioning all the core pieces, vacuum the core in place using at least -0.8 bars vacuum and cure the adhesive film for a minimum of 4 hours at 85°C (185°F). The full cure required will be achieved when the outer skin is cured and bonded into place, using one of the cure cycles below.

##### **2. Second Skin to Core**

One procedure is to co-cure the outer skin together with the core bond. For this, a single layer of 250g adhesive film should be rolled over the honeycomb surface, and bedded well into the cells. In this way it should be possible to reposition any misplaced prepreg plies, without disturbing the adhesive layer. With a controlled flow system such as 736LT, care should be taken to ensure that excess resin is not removed from the adhesive interface, by using a fine microporous release film. It is also critical when using this process that adequate precautions are taken to perforate the skin to allow air removal from the Nomex prior to gelation (e.g through the use of a spikey roller). Failure to do so may result in skin blow off (contact North Thin Ply Technology Technical Services for details).

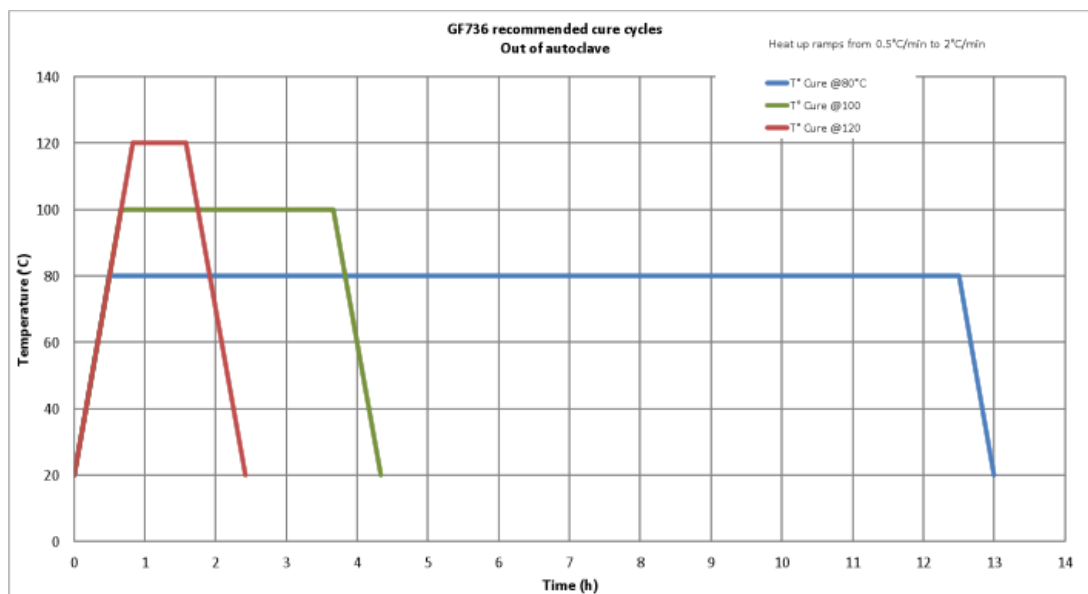
#### \*Foam Core Materials

Due to the wide variety of foams available and the cure temperatures involved, special procedures have been developed which must be carefully followed when using foam core materials with GF736. For details of these processes, please contact NTPT's Technical Service or sales team. Use of GF736 with untreated foams is not recommended due to potential inhibition of cure in the adhesive film.

## INSTRUCTIONS FOR USE

### Cure cycles

For full cure of GF736 to be achieved, one of the following cure cycles is recommended. If GF736 is being co-cured with a prepreg skin, then the cure cycle used for GF736 will also be that of the prepreg in the laminate. Where required cure cycle of the prepreg being used and the GF736 is different, then whichever cure is the longest should be applied.



Hot plate gel time at 130°: 2'30"

### Minimum cure time and temperature

Recommended minimum cure is 12 hours at 80°C (176°F) using vacuum bag processing.

Property	Oven / Vacuum bag					Test Standard
Typical Ramp Rate	1-2°C (2-4°F) per minute					-
Cure Temperature	80°C (176°F)	90°C (194°F)	100°C (212°F)	110°C (230°F)	120°C (248°F)	-
Cure Dwell Time	12 hours	6 hours	3 hours	90 minutes	60 minutes	-
Cure Pressure	-1bar (14.5 Psi)					-
Dry T <sub>g1</sub> (DMA)	99°C / 210°F					ISO 6721 (DMA)

## GENERAL INFORMATION

### Storage

When stored sealed & out of direct sunlight.

Storage Temperature		Value	Unit
-18°C	0°F	24	Months
+18-22°C	+64-72°F	6	Weeks

All prepreg materials should be stored in a freezer when not in use to maximize their useable life, since the low temperature reduces the reaction of resin and catalyst to virtually zero. However, even at -18°C (0°F), the temperature of most freezers, some reaction will still occur. In most cases after some years, the material will become unworkable.

When not in use GF736 products should be maintained at -18°C (0°F). To avoid contamination on their surfaces, allow rolls to reach room temperature before unwrapping.



When GF736 is being handled when frozen, extra care should be taken as the film, especially in the unsupported format, is brittle. If rolls are dropped and mis-handled etc. then the film may shatter into pieces rendering it unusable.

### Health and safety

GF736 contains epoxy resins which can cause allergic reaction. When uncured, GF736 should be handled with appropriate gloves. When cured, a composite laminate made of GF736 should be cut, drilled or machined in a room equipped with an exhaust ventilation and filtration system, by operators wearing protective cloth and masks. Refer to the product Safety Data Sheet for further information.

### Notice and disclaimer

All advice, instruction or recommendation is given in good faith but the Company only warrants that advice in writing is given with reasonable skill and care. No further duty or responsibility is accepted by the Company. All advice is given subject to the terms and conditions of sale (the Conditions) which are available on request from the Company.

The Company strongly recommends that Customers make test panels and conduct appropriate testing of any goods or materials supplied by the Company to ensure that they are suitable for the intended planned application. Such testing should include testing under conditions as close as possible to those to which the final component may be subjected. The Company specifically excludes any warranty of fitness for purpose of the goods other than as set out in writing by the Company. The Company reserves the right to change specifications and prices without notice and Customers should satisfy themselves that information relied on by the Customer is that which is currently published by the Company on its website. Any queries may be addressed to NTPT's Sales Department.