Product Overview

E-765 Epoxy Prepregs

Park's E-765 is tough 121°C cure prepreg system designed to replace 176°C cure systems in aircraft structural applications. FAA-approved Design Allowable Databases are available upon request.

Key Features & Benefits

- Designed to replace first generation 176°C cure systems.
- Wide cure temperature process window of 121°C to 176°C
- Exhibits very low void content, i.e., <2% after vacuum cure.
- Superior fiber property translation.
- 82°C Wet service temperature after ~121°C cure
- Good tack and drape characteristics for 3 weeks at room temperature

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Product Forms

- Available on a wide variety of reinforcements including fiberglass and carbon
- Carbon and glass broadgoods up to 152 cm wide
- Available as unidirectional carbon tape
- Compatible with autoclave, vacuum bag/oven or press cure processes

Applications / Qualifications

- Primary Aircraft Structures
  - Fuselage
  - Wing
  - Control Surfaces
- Secondary Aircraft Structures
  - Aircraft Frames
  - Doors
  - Shelves
  - Bulkheads

Design Allowable Database

B Basis Lamina Allowables

- 3KPW T-300 Carbon - 195gsm
- 6K5HS T-300 Carbon – 370gsm
- 7781 Fiberglass – 295gsm
- T-700 Uni-directional Tape – 150-300gsm

Laminate (notched) Allowables

- 3KPW T-300 Carbon - 195gsm
- 6K5HS T-300 Carbon – 370gsm
- T-700 Uni-directional Tape – 150-300gsm

Global Availability

For Information about Park's materials:

North America

Waterbury, CT	+1.203.755.1344
Newton, KS	+1.316.281.6231
Asia Pacific	+656.861.7117
Europe	+33-562-985290

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Technical Datasheet

E-765 Epoxy Prepregs

Prepreg and Laminate Physical Properties FAA A&B Basis Lamina

Reinforcement	T700 Uni Tape	3K PW	6K 5HS	7781 E-Glass
Fiber Areal Weight (gsm)	150	193	370	303
Resin Solids (%)	35±3	38±3	40±3	38
Volatile Content (% Max)	1.0	1.0	1.0	1.0
Flow – 135°C @ 103 kPa (%)	13±7	15±6	16±6	15±6
Tack	Medium	Medium	Medium	Light-Medium
Tg (dry, by DMA)	165° C / 330°F			
Gel time @ 135°C (min)	4	4	4	4
Cure per ply thickness (cm)	.015	.020	.038	.023

Prepreg and Laminate Physical Properties

Reinforcement	12K 2x2 Twill	12K 2x2 Twill	12k 2x2 BW	120 E-Glass
Fiber Areal Weight (gsm)	370	670	635	107
Resin Solids (%)	40 +/- 3	40 +/-3	35 +/-3	45
Volatile Content (% Max)	1.0	1.0	1.0	1.0
Flow – 135°C @ 103 kPa (%)	18±6	18±6	18±6	26
Tack	Light -Medium	Light-Medium	Light -Medium	Medium
Tg (dry, by DMA)	165° C / 330°F			
Gel time @ 135°C (min)	2 - 6	2 - 6	2 – 6	4
Cure per ply thickness (cm)	0.038	0.056	0.058	0.013

Selected Laminate Electrical Properties

Reinforcement	Frequency	Dielectric Constant (Dk)	Loss Tangent (Df)
E-765 w/ E-Glass	9.375 GHz	4.5	0.020
E-765 w/ Quartz	9.375 GHz	3.4	0.015

Sandwich Panel Properties

Reinforcement	Property	Test Method	Mean Value
E-765 w/ T300 3KPW	Climbing Drum Peel	ASTM-D-1781	Bag Side: 19 mm-N/mm Tool Side: 19 mm-N/mm
	Flatwise Tensile Strength	ASTM-C-297	7150 kPa

All test data provided are typical values and not intended to be specification values. For review of critical specification tolerances, please contact a Park representative directly. Park reserves the right to change these typical values as a natural process of refining our testing equipment and techniques.

Technical Datasheet

E-765 Epoxy Prepregs

Laminate Mechanical Properties - FAA A&B Basis Lamina

Reinforcement	T700 Uni Tape	T300 3K PW	T300 6K 5HS	T300 6K 5HS	7781 E-Glass
Fiber Areal Weight (gsm)	150	193	370	370	300
Cure Type	Vacuum/Oven	Vacuum/Oven	Vacuum/Oven	Autoclave	Vacuum/Oven
Tensile Strength, 0° (MPa)					
-54°C Dry	2551	641	614	627	503
21°C Dry	2551	621	593	593	448
82°C Dry	2406	641	676	683	421
82°C Wet	2296	662	--	586	345
ASTM-D-3039-95					
Tensile Modulus (GPa)					
-54°C Dry	130	58.6	65.5	68.3	26.9
21°C Dry	129	56.5	64.1	64.1	25.5
82°C Dry	126	54.5	62.1	63.4	24.8
82°C Wet	128	55.2	--	61.4	23.4
ASTM-D-3039-95					
Compressive Strength (MPa)					
-54°C Dry	1455	752	876	862	586
21°C Dry	1241	662	786	793	503
82°C Dry	1220	531	572	565	421
82°C Wet	737.8	393	--	310	359
SACMA 1-94					
Compressive Modulus (GPa)					
-54°C Dry	123	53.8	71.0	69.6	28.3
21°C Dry	125	53.1	60.7	61.4	26.2
82°C Dry	127	51.7	61.4	60.7	25.5
82°C Wet	124	51.7	--	58.6	25.5
SACMA 1-94					
Short Beam Shear (MPa)					
-54°C Dry	120	74.5	--	--	67.6
21°C Dry	88.9	71.7	75.2	77.9	55.9
82°C Dry	64.8	57.9	--	--	48.3
82°C Wet	39.3	35.2	--	--	32.4
ASTM-D-2344					
Beam Shear, V-notched (MPa)					
-54°C Dry	177	146	--	143	163
21°C Dry	138	130	--	125	131
82°C Dry	108	98.6	--	103	105
82°C Wet	73.8	84.1	--	71.7	82.0
ASTM-D-5379-93					

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Technical Datasheet

E-765 Epoxy Prepregs

Laminate Mechanical Properties

Reinforcement	6K 4HS IM7	T700 12K 2x2 Twill	34-700 12K 2x2 Twill	T700 12K BW	120 E-Glass
Fiber Areal Weight (gsm)	203	370	670	635	105
Cure Type	Autoclave	Vacuum/Oven	Autoclave	Vacuum/Oven	Vacuum/Oven
Tensile Strength, 0° (MPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	903	841	676	786	365
82°C Dry	--	--	--	--	--
82°C Wet	--	--	--	--	--
ASTM-D-3039-95					
Tensile Modulus (GPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	75.8	57.9	71.0	71.0	16.5
82°C Dry	--	--	--	--	--
82°C Wet	--	--	--	--	--
ASTM-D-3039-95					
Compressive Strength (MPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	758	738	696	565	434
82°C Dry	607	--	--	--	--
82°C Wet	531	--	--	--	--
SACMA 1-94					
Compressive Modulus (GPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	65.5	55.8	71.7	57.2	17.9
82°C Dry	62.1	--	--	--	--
82°C Wet	76.5	--	--	--	--
SACMA 1-94					
Short Beam Shear (MPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	71.0	60.7	--	53.1	64.1
82°C Dry	64.1	--	--	--	--
82°C Wet	50.3	--	--	--	--
ASTM-D-2344					
Beam Shear, V-notched (MPa)					
-54°C Dry	--	--	--	--	--
21°C Dry	62.1	--	--	--	--
82°C Dry	52.4	--	--	--	--
82°C Wet	47.6	--	--	--	--
ASTM-D-5379-93					

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E-765 Epoxy Prepregs

Prepreg Storage Life

Tack Life: 21 days @ 24°C
Out Life: 30 days @ 24°C
Shelf Life: 6 months @ -18°C

Note: The following guidelines are provided to assist Park material users with general recommendations for successful processing. The recommendations are for general review purposes only and process adjustments may be required to achieve optimum results in your specific manufacturing environment.

Autoclave Cure Cycle

- Apply 610 Torr vacuum (minimum) for a minimum of 1 hour before cure
- Apply 276 kPa -690 kPa autoclave pressure, vent vacuum when pressure reaches 103 – 138 kPa
- Increase from room temperature to 82°C +/- 5°C at a rate of 1-3°C/min (maximum)
- Hold product at 82°C for 60 minutes
    - Increase hold time to 120 minutes for laminate > 0.318 cm thick
- Ramp product temp to 132°C at 2 – 3° C/min
- Hold product at 132°C for 120 minutes
- Cool to 66°C at 2 – 5°C/min prior to releasing autoclave pressure

Vacuum/Oven Cure Cycle

- Apply 610 Torr vacuum (minimum) for a minimum of 1 hour before cure
- Increase from room temperature to 82°C +/- 5°C at a rate of 1-3°C/min (maximum)
- Hold product at 82°C for 60 minutes
    - Increase hold time to 120 minutes for laminate > 0.318 cm thick
- Ramp product temp to 132°C at 2 – 3° C/min
- Hold product at 132°C for 120 minutes
- Cool to 66°C at 2 – 5°C/min

Thick Laminate Cure Cycle

- Slower ramp rate and multiple dwell times below 88°C are critical to remove excess energy from the system and avoid dangerous exotherms.
- Contact your Park representative to discuss specific part process requirements to optimize processing of E-765.
- Failure to properly control the exotherm can lead to a potential safety hazard and/or degradation of final material performance.