

### E-765 Epoxy Prepregs

Park's E-765 is a toughened 270°F cure epoxy prepreg system designed to replace 350°F cure systems in many aircraft structural applications. Park's E-765-3K-PW, -6K-5HS and 7781 materials are AGATE approved. FAA-approved, B-Basis design allowable databases for AGATE materials are available upon request. Park has also developed AGATE approved material and process specifications which are also available upon request.

#### Key Features & Benefits

- Designed to replace first generation 350°F (176°C) cure systems.
- Wide cure temperature process window of 260°F to 350°F (lower cures are possible depending on the application)
- Exhibits low void content, e.g., <2% after oven/vacuum cure.
- Excellent fiber property translation.
- 180°F Wet service temperature after ~270°F cure
- Good tack and drape characteristics after 30 days at room temperature

#### Product Forms

- Available on a wide variety of reinforcements including fiberglass and carbon
- Various Fabrics per customer requirements (e.g., plain, harness and twill weaves)
- Unitape and glass broad goods up to 60 inches wide
- Compatible with autoclave, vacuum bag/oven or press cure processes

#### Applications / Qualifications

- Primary Aircraft Structures
  - Fuselage
  - Wing
  - Control Surfaces
- Secondary Aircraft Structures
  - Fairings
  - Doors
  - Radomes
  - Bulkheads

#### For Information about Park's materials:

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### E-765 Epoxy Prepregs

#### Nominal Prepreg and Laminate Physical Properties

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 – 275F @ 15psi (%)	18±6	20±6	20±6	20±6
Tack	Medium	Medium	Medium	Light-Medium
Tg (dry, by DMA, onset storage mod.)	150° C / 300°F			
Gel time @ 275F (min)	2 - 6	2 - 6	2 - 6	2 - 6
Cure per ply thickness (in.)	0.0056	0.0089	0.0152	0.0098

#### Nominal 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 – 275F @ 15psi (%)	20±6	20±6	20±6	20±6
Tack	Light - Medium	Light-Medium	Light -Medium	Medium
Tg (dry, by DMA)	165° C / 330°F			
Gel time @ 275F (min)	2 - 6	2 - 6	2 - 6	2 - 6
Cure per ply thickness (in.)	0.015	0.022	0.023	0.005

#### 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	4 in lb/in
	Flatwise Tensile Strength	ASTM-C-297	1000 psi

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.

### E-765 Epoxy Prepregs

#### Laminate Mechanical Properties - Carbon

Reinforcement	T700 Uni Tape	T300 3K PW	T300 6K 5HS	T300 6K 5HS
<b>Fiber Areal Weight (gsm)</b>	150	193	370	370
<b>Cure Type</b>	Vacuum/Oven	Vacuum/Oven	Vacuum/Oven	Autoclave
<b>Tensile Strength, 0° (Ksi)</b>				
-65°F Dry	370	93	89	91
70°F Dry	370	95	86	100
180°F Dry	349	93	98	100
180°F Wet	333	96	--	100
ASTM-D-3039-95				
<b>Tensile Modulus (Msi)</b>				
-65°F Dry	18.8	8.5	9.5	9.9
70°F Dry	18.7	8.2	9.3	9.3
180°F Dry	18.2	7.9	9.0	9.2
180°F Wet	18.6	8.0	--	8.9
ASTM-D-3039-95				
<b>Compressive Strength (Ksi)</b>				
-65°F Dry	211	109	127	125
70°F Dry	180	96	114	115
180°F Dry	177	77	83	82
180°F Wet	107	57	--	64
SACMA 1-94				
<b>Compressive Modulus (Msi)</b>				
-65°F Dry	17.9	7.8	10.3	10.1
70°F Dry	18.1	7.7	8.8	8.9
180°F Dry	18.4	7.5	8.9	8.8
180°F Wet	18.0	7.5	--	8.5
SACMA 1-94				
<b>Short Beam Shear (Ksi)</b>				
-65°F Dry	17	11	--	--
70°F Dry	13	10	11	12
180°F Dry	9	8	--	--
180°F Wet	6	5	--	--
ASTM-D-2344				
<b>In-plane Shear Strength, V-notched (Ksi)</b>				
-65°F Dry	26	21	--	21
70°F Dry	20	19	--	18
180°F Dry	16	14	--	15
180°F Wet	11	11	--	10
ASTM-D-5379-93				

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### E-765 Epoxy Prepregs

#### Laminate Mechanical Properties - Glass

Reinforcement	120 E-Glass	7781 E-Glass
<b>Fiber Areal Weight (gsm)</b>	107	300
<b>Cure Type</b>	Vacuum/Oven	Vacuum/Oven
<b>Tensile Strength, 0° (Ksi)</b>		
-65°F Dry	--	73
70°F Dry	53	65
180°F Dry	--	61
180°F Wet	--	50
ASTM-D-3039-95		
<b>Tensile Modulus (Msi)</b>		
-65°F Dry	--	3.9
70°F Dry	2.4	3.7
180°F Dry	--	3.6
180°F Wet	--	3.4
ASTM-D-3039-95		
<b>Compressive Strength (Ksi)</b>		
-65°F Dry	--	85
70°F Dry	63	73
180°F Dry	--	61
180°F Wet	--	52
SACMA 1-94		
<b>Compressive Modulus (Msi)</b>		
-65°F Dry	--	4.1
70°F Dry	2.6	3.8
180°F Dry	--	3.7
180°F Wet	--	3.7
SACMA 1-94		
<b>Short Beam Shear (Ksi)</b>		
-65°F Dry	--	10
70°F Dry	9	8
180°F Dry	--	7
180°F Wet	--	5
ASTM-D-2344		
<b>In-plane Shear Strength, V-notched (Ksi)</b>		
-65°F Dry	--	24
70°F Dry	--	18
180°F Dry	--	15
180°F Wet	--	11
ASTM-D-5379-93		

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### E-765 Epoxy Prepregs

#### Prepreg Storage Life

- Out Life: 30 days @ 75°F
- Shelf Life: 6 months @ 0°F
- Tack Life: 21 days @ 75°F

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 24" Hg vacuum (minimum) for a minimum of 1 hour before cure
- Apply 40 -100 psi autoclave pressure, vent vacuum when pressure reaches 15 – 20 psi
- Ramp product temp to 270-280°F at 1 – 5° F (0.05 – 3°C)/min
  - For Laminates > 0.125" thick, hold at 180°F for 60 minutes
- Hold product at 270-280°F for 110-130 minutes
- Cool to 150°F at 3 – 10°F/min prior to releasing autoclave pressure

#### Vacuum/Oven Cure Cycle

- Apply 25" Hg vacuum (minimum) for a minimum of 1 hour before cure
- Ramp product temp to 270-280°F at 1 – 5° F (0.05 – 3°C)/min
  - For laminates > 0.125" thick, hold at 180°F for 60 minutes
- Hold product at 270-280°F for 110-130 minutes
- Cool to 150°F at 3 – 10°F/min

#### Thick Laminate Cure Cycle

- Slower ramp rate and multiple dwell times below 190°F 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.

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