



# HexPly® F155

resin systems for advanced composites



## Product Data Sheet

### Description

HexPly® F155 is an advanced modified epoxy formulation designed for autoclave curing to offer very high laminate strengths, coupled with increased fracture toughness and adhesive properties. HexPly® F155 is a controlled flow epoxy resin for lamination and co-curing at 250°F (121°C) cure. HexPly® F155 will pass MIL-R-9300, co-cure as a honeycomb facing, and bond metal to metal.

### Features

#### Uncured

- Controlled flow in the basic formulation to offer balanced tool and bagside sandwich peels
- Good tack and drape properties for layup and assembly purposes
- Can be adapted for use on various weaves and fiber reinforcements
- Long out time

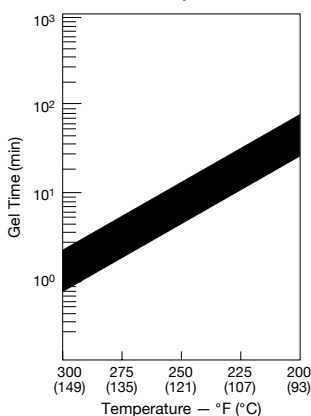
#### Cured

- High laminate strengths
- Good sandwich panel and metal-to-metal bonding
- Self-extinguishing properties

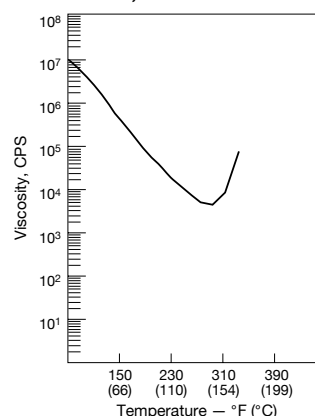
### Neat Resin Properties

Specific gravity	1.335
Tg dry	250°F (121°C)
Equilibrium moisture absorption	9.4%
Linear coefficient of thermal expansion	2.93 x 10 <sup>-5</sup> in/in/°F (5.27 x 10 <sup>-5</sup> cm/cm/°C)
Tensile strength	11.6 ksi (80 MPa)
Tensile modulus	0.47 msi (3.24 GPa)
Tensile strain	5.2%
Fracture toughness, K1C	1.50 ksi √in (1.65 MPa √m)
Strain energy release rate, G1C	4.18 in-lb/in <sup>2</sup> (0.73 kJ/m <sup>2</sup> )
Gel time @ 250°F (121°C)	4–10 min

**Gel Time vs Temperature**



**Rheometrics Curve of F155 Resin**  
4°F (2°C)/min, 10 rad/sec,  
RDS-7700, 50 mm Plates





## Availability

Form	Hexcel Designation	Fiber	Fiber Areal Wt. g/m <sup>2</sup>	Weave	Count Warp x Fill	Widths Available Standard Width, in (cm)
<b>Carbon Fabrics</b>	W3T282-42"-F155	T300 Toho®	194	Plain	12.5 x 12.5	42", 60" (106.7, 152.4)
	W3C282-42"-F155					
	F3T584-42"-F155 F3C584-42"-F155	T300 Toho®	370	8 Harness Satin	24 x 24	42", 60" (106.7, 152.4)
<b>Glass Fabrics</b>	120-38"-F155	450-1/2	115	Crowfoot MIL-C-9084 TYIII	60 x 58	38", 50", 60" (96.5, 127, 152.4)
	1581-38"-F155	150-1/2	303	8 Harness Satin MIL-C-9084 TYVIII A	57 x 54	38", 50", 60", 72" (96.5, 127, 152.4, 182.9)
	7781-38"-F155	75-1/0	303	8 Harness Satin MIL-C-9084 TYVIII B	57 x 54	38", 50", 60", 72" (96.5, 127, 152.4, 182.9)
<b>Kevlar® Fabrics</b>	K120-38"-F155	Kev. 49 195	61	Plain	34 x 34	38", 50", 60" (96.5, 127, 152.4)
	K285-38"-F155	Kev. 49 1140	170	Crowfoot	17 x 17	38", 50", 60" (96.5, 127, 152.4)
	K281-38"-F155	Kev. 49 1140	170	Plain	17 x 17	38", 50", 60" (96.5, 127, 152.4)
<b>Carbon Tapes</b>	TXX095-12"-F155	Various	95	n/a	n/a	12", 3"-24" (30.5, 7.6-61)
	TXX145-12"-F155		145			
	TXX190-12"-F155		190			
<b>Glass Tape</b>	T2E285-12"-F155	E-Glass 1062	285			
<b>Kevlar® Tape</b>	T7D150-12"-F155	Kev. 49 7100	150			

Note: Alternate carbon, glass, and Kevlar weaves may be used with the HexPly® F155 Resin System. Also, HexPly® F155 carbon tapes may be produced with various carbon fiber types and tow sizes. In designating carbon tape, the second digit represents tow size and the third digit represents fiber source. Contact the nearest Hexcel Sales Office for additional information.



**Physical Properties**

	Property	Kevlar Fabrics		Glass Fabrics		Carbon Tapes			Carbon Fabrics	
<b>Prepreg</b>	Material description	K120	K285	120	1581	95 g/m <sup>2</sup>	145 g/m <sup>2</sup>	190 g/m <sup>2</sup>	W3T282 or W3C282	F3T584 or F3C584
	% Flow @ 250°F 50 psi (121°C 345 kPa)	14–26	14–26	8–20	8–20	4–16	4–16	4–16	4–16	4–16
	% Resin content (dry)	54–60	49–55	42–48	36–40	38–40	38–40	38–40	40–44	40–44
<b>Laminate</b>	Cured thickness per ply, in (cm)	0.0045 (0.011)	0.0100 (0.0250)	0.0047 (0.012)	0.0104 (0.026)	0.0037 (0.0094)	0.0056 (0.014)	0.0074 (0.019)	0.0086 (0.022)	0.0150 (0.038)
	% Fiber volume	42	46	38	45	57	57	57	50	51

**Mechanical Properties**

Property	Temp. °F (°C)	Kevlar <sup>®</sup> 49 Fabrics		Glass Fabrics			Carbon Tapes			Carbon Fabric
		120	285	120	220	181	T3T095	T2C145	T2C190	W3T282
<b>Tensile strength, ksi (MPa)</b>	75 (24)	62 (427)	82.8 (571)	57.0 (393)	60.3 (416)	70 (483)	225 (1552)	266 (1834)	225 (1518)	123 (848)
<b>Tensile modulus, msi (GPa)</b>	75 (24)	3.9 (26.7)	4.4 (30.3)	3.0 (20.7)	3.0 (20.7)	3.4 (23.4)	18.3 (126.2)	18.3 (126.2)	18.1 (124.8)	8.4 (58)
<b>Tensile strain</b>	75 (24)	15,900	–	–	–	–	10,180	10,370	10,470	10,490
<b>Tensile strength, ksi (MPa)</b>	160 (71)	58 (400)	79.3 (547)	–	52.7 (363)	62 (427)	–	248 (1710)	226 (1558)	–
<b>Tensile modulus, msi (GPa)</b>	160 (71)	3.7 (25)	3.9 (26.9)	–	2.7 (18.6)	3.1 (21.4)	–	17.2 (119)	17.0 (117)	–
<b>Tensile strain</b>	160 (71)	–	–	–	–	–	–	–	–	–
<b>Tensile strength, ksi (MPa)</b>	200 (93)	–	–	46.3 (319)	47.9 (330)	57 (393)	–	–	–	–
<b>Tensile modulus, msi (GPa)</b>	200 (93)	–	–	2.6 (17.9)	2.6 (17.9)	2.9 (20)	–	–	–	–
<b>Tensile strain</b>	200 (93)	–	–	–	–	–	–	–	–	–
<b>Compression strength, ksi (MPa)</b>	75 (24)	32.0 (221)	37.9 (261)	64.4 (444)	71.9 (496)	75 (517)	168 (1158)	193 (1331)	170 (1172)	131 (904)



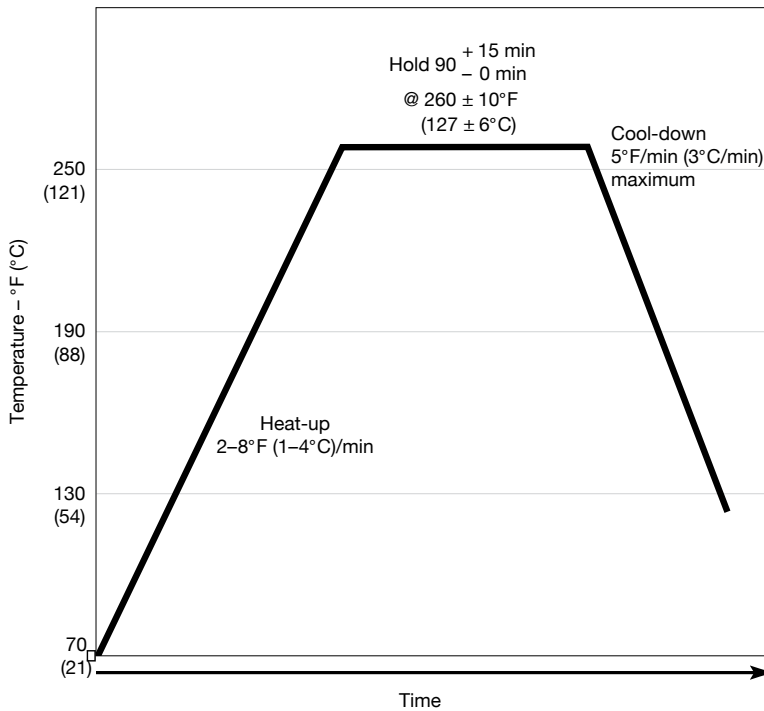
Property	Temp. °F (°C)	Kevlar® 49 Fabrics		Glass Fabrics			Carbon Tapes			Carbon Fabric
		120	285	120	220	181	T3T095	T2C145	T2C190	W3T282
<b>Compression modulus, msi (GPa)</b>	75 (24)	3.9 (26.9)	3.4 (23.4)	3.0 (20.7)	3.2 (22.1)	3.7 (25.5)	15.9 (109.6)	-	-	8.3 (57.2)
<b>Compression strength, ksi (MPa)</b>	160 (71)	24 (165)	28.3 (195)	-	57.4 (376)	58 (400)	134 (924)	170 (1172)	140 (965)	72.0 (496)
<b>Compression modulus, msi (GPa)</b>	160 (71)	3.0 (21)	3.4 (23.4)	-	3.0 (20.7)	3.4 (23.4)	-	16.5 (117)	-	-
<b>Compression strength, ksi (MPa)</b>	200 (93)	-	-	43.8 (302)	49.5 (341)	48 (331)	-	-	-	-
<b>Compression modulus, msi (GPa)</b>	200 (93)	-	-	2.8 (19.3)	2.7 (18.6)	3.2 (22.1)	-	-	-	-
<b>Compression interlaminar shear strength, ksi (MPa)</b>	RT	-	-	9.5 (61)	9.8 (63)	10 (68.9)	-	13.0 (89.6)	-	-
<b>Compression interlaminar shear strength, ksi (MPa)</b>	160 (71)	-	-	-	7.7 (53)	7 (48)	-	10.4 (71.7)	-	-
<b>Compression interlaminar shear strength, ksi (MPa)</b>	200 (93)	-	-	6.8 (47)	6.2 (43)	5.4 (37)	-	-	-	-
<b>Flatwise tensile strength, psi (kPa)</b>	75 (24)	800 (5516)	749 (5164)	846 (5833)	874 (6026)	780 (5378)	-	670 (4620)	-	940 (6481)
<b>Flatwise tensile strength, psi (kPa)</b>	160 (71)	600 (4137)	640 (4413)	-	799 (5509)	700 (4826)	-	-	-	-
<b>Flatwise tensile strength, psi (kPa)</b>	200 (93)	-	-	657 (4523)	659 (4544)	610 (4206)	-	-	-	-
<b>Long beam flexure, lb (kg)</b>	75 (24)	65 (29.5)	129 (58.6)	122 (55.5)	112 (50.9)	216 (98.2)	-	-	-	-
<b>Long beam flexure, lb (kg)</b>	160 (71)	5.5 (25)	107 (48.6)	-	104 (47.3)	177 (80.4)	-	-	-	-
<b>Long beam flexure, lb (kg)</b>	200 (93)	-	-	93 (42.3)	85 (38.7)	165 (75.1)	-	-	-	-
<b>Drum peel, in-lb/3" width (cm-kg/7.6 cm)</b>	75 (24)	8 (9.2)	29 (33)	11 (13)	14 (16)	14 (16)	-	-	-	-

All mechanical property values are based on the calculated fiber volume found on the previous table.

Reported property values are averages to which no statistical assurance should be associated. While Hexcel believes that the data contained herein are factual, the data are not to be taken as a warranty or representation for which Hexcel assumes legal responsibility. They are offered solely for your consideration, investigation, and verification.



## Cure Cycle



## Cure Procedure

- Apply vacuum of 22 inches (74 kPa) Hg minimum.
- Apply 85 + 15 – 0 psig (586 + 103 – 0 kPa) pressure for laminates.
- Apply 45 + 15 – 0 psig (310 + 103 – 0 kPa) pressure for sandwich.\*
- Vent vacuum bag to atmosphere when pressure reaches 20 psi (138 kPa).
- During cool-down when the part temperature falls below 140°F (60°C), pressure can be released and the test panel removed from the autoclave and debagged.

\*\* Typical for Hexcel HRH<sup>®</sup> 10 – 1/8 – 3.0 honeycomb.

## Storage

HexPly<sup>®</sup> F155 has a storage life of 180 days from date of receipt when stored at 10°F (-12°C), plus a handling life of 200 hours at 75°F (24°C) and mechanical life of 200 hours at 75°F (24°C) (*maximum, from date of manufacture*).



### **Shipping**

Prepreg fabric and tape are generally shipped in sealed polyethylene bags in insulated containers packed with dry ice.

### **Disposal of Scrap**

Disposal of this material should be in a secure landfill in accordance with state and federal regulations.

### **Corrosion of Potential**

A need for the management of corrosion potential is necessary when graphite composites are placed in contact with metallic honeycomb, skins, or fasteners.

### **Handling and Safety Precautions**

Hexcel recommends that customers observe established precautions for handling epoxy resins and fine fibrous materials. Operators working with this product should wear clean, impervious gloves to reduce the possibility of skin contact and to prevent contamination of the material.

Airborne graphite as a result of sawing, grinding, etc., can present electrical shorting hazards; refer to NASA Technical Memorandum 78652. Safety Data Sheets (SDS) have been prepared for all Hexcel products and are available to company safety officers on request from your nearest Hexcel Sales Office.

### **For more information**

Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets. Our comprehensive range includes:

- HexTow<sup>®</sup> carbon fibers
- HexForce<sup>®</sup> reinforcements
- HiMax<sup>®</sup> multiaxial reinforcements
- HexPly<sup>®</sup> prepregs
- HexMC<sup>®</sup>-i molding compounds
- HexFlow<sup>®</sup> RTM resins
- HexBond<sup>™</sup> adhesives
- HexTool<sup>®</sup> tooling materials
- HexWeb<sup>®</sup> honeycombs
- Acousti-Cap<sup>®</sup> sound attenuating honeycomb
- Engineered core
- Engineered products
- Polyspeed<sup>®</sup> laminates & pultruded profiles
- HexAM<sup>®</sup> additive manufacturing

For U.S. quotes, orders and product information call toll-free 1-800-688-7734. For other worldwide sales office telephone numbers and a full address list, please go to:

**<https://www.hexcel.com/contact>**

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