



HexPly® F515

Resin Systems for Advanced Composites

Product Data

Description

HexPly® F515 is an advanced, industrial grade, modified epoxy formulation designed for either vacuum bag or autoclave curing to offer very high laminate strengths, coupled with increased fracture toughness. HexPly® F515 has a 250°F (121°C) cure.

Features

Uncured

- Good Tack and Drape Properties for Layup and Assembly Purposes
- Can Be Adapted for Use on Various Weaves and Fiber Reinforcements
- Controlled Flow
- Long Out-Time

Cured

- Excellent Tensile Translation for High Strain Graphite Fibers
- Specifically Designed for Tubular Composite Structures
- Self-Extinguishing Properties—Tested to Fed. Std. 406, Method 2021

Neat Resin Properties

Specific gravity	1.20 gm/cc
T _g dry (RDS)	255°F (124°C)
Heat generated during cure	92 cal/gm (385 kJ/kg)
Tensile strength	6.0 ksi (41 MPa)
Tensile modulus	0.45 msi (3.10 GPa)
Tensile strain	1.6%
Gel time at 275°F (135°C)	2–6 min

Cure Cycle

- Apply heat at 2–5°F/min up to 250 ± 10°F (1–3°C/min up to 121 ± 6°C).
- Hold for 90⁺¹⁵₋₀ minutes.
- Cool-down at 5°F/min (3°C/min) maximum rate.

Autoclave Cure Procedure*

- Apply vacuum of 22 in (74 kPa) Hg minimum.
- Apply 40 ± 10 psig (276 ± 69 kPa) pressure for laminates.
- Apply 25 ± 10 psig (172 ± 69 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.

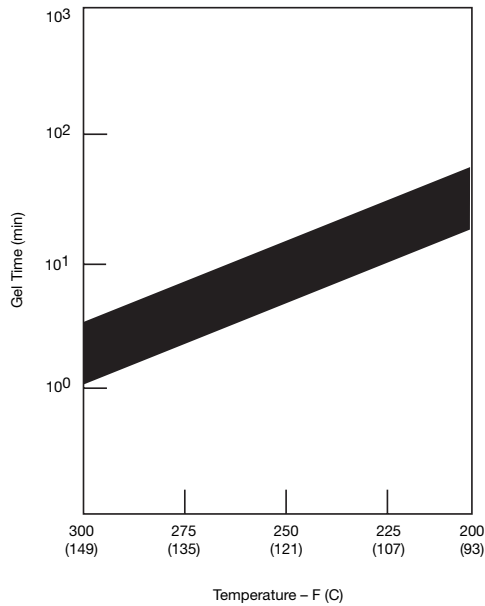
* For alternative cure procedures, contact your nearest Hexcel Sales Engineer.

** Typical for HRH® 10–1/8–8.0 honeycomb.

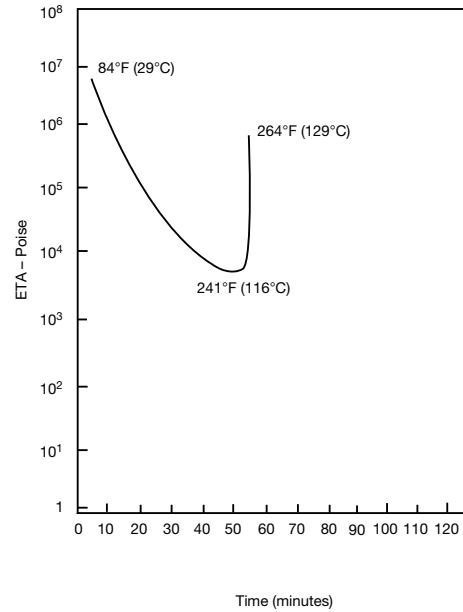


HexPly® F515 Product Data

Gel Time vs Temperature



Rheometrics Curve of F515 Resin
4°F (2°C)/min, 10 rad/sec,
RDS-7700, 50 mm Plates



Availability

Form	Hexcel Designation	Fiber	Fiber Areal Wt		Weave	Count Warp x Fill	Available Widths Standard Width, in (cm)
			g/m ²	oz/yd ²			
Carbon Fabrics	F3X282-42"-F515	STD MOD (33 MSI)	194	5.7	Plain	12.5 x 12.5	42", 604 (106.7, 152.4)
	F6X613-42"-F515 (33 MSI)	STD MOD (33 MSI)	370	11.0	5 Harness Satin	12 x 12	42", 604 (106.7, 152.4)
Glass Fabrics	120-38"-F515	450-1/2	115	3.2	Crowfoot MIL-C-9084 TYIII	60 x 58	38", 50", 60" (96.5, 127, 152.4)
	1581-38"-F515	150-1/2	303	8.9	8 Harness Satin MIL-C-9084 TYVIII A	57 x 54	38", 50", 60" (96.5, 127, 152.4)
	7781-38"-F515	75-1/0	303	8.9	8 Harness Satin MIL-C-9084 TYVIII B	57 x 54	38", 50", 60" (96.5, 127, 152.4)
Carbon Tapes	TXX095-12"-F515	Various	95		n/a	n/a	12", 3"-24" (30.5, 7.6-61)
	TXX120-12"-F515	Various	120				
	TXX145-12"-F515	Various	145				
	TXX200-12"-F515	Various	200				
Glass Tape	T2E285-12"-F515	E-Glass 1062	285		n/a	n/a	12"

Note: Alternatively, carbon, glass, and Kevlar® weaves may be used with the HexPly® F515 Resin System. Also, HexPly® F515 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. Consult your nearest Hexcel sales representative for additional information.

Mechanical Properties

Property	Unidirectional Carbon Tape					Glass Fabrics	
	T2C120 Toho® G30/500	TXX200 [STD MOD]	BXX120	T5A120 [IM6]	TSR9120 Toray® T700S	7781	1581
Flexural strength RT, ksi (MPa)	196 (1351)	226 (1558)	199 (1372)	243 (1675)	179 (1234)	90 (621)	78 (538)
Flexural modulus RT, msi (GPa)	15.7 (108.3)	18.2 (125.5)	14.5 (100)	21.7 (149.6)	14.7 (101.4)	3.4 (23.4)	3.2 (22.1)
Flexural strength 1/2 hr at 160°F (71°C), ksi (MPa)	194 (1338)	187 (1289)	170 (1172)	210 (1448)	–	70 (483)	65 (448)
Flexural modulus 1/2 hr at 160°F (71°C), msi (GPa)	17.0 (117.2)	18.1 (124.8)	14.2 (97.9)	21.7 (149.6)	–	3.2 (22.1)	3.0 (20.7)
Tensile strength RT, ksi (MPa)	280 (1931)	249 (1717)	228 (1572)	384 (2648)	360 (2482)	70 (483)	58 (400)
Tensile modulus RT, msi (GPa)	15.0 (103.4)	16.0 (110.3)	13.1 (90.3)	22.5 (155.1)	18.7 (129)	4.4 (30.3)	3.2 (22.1)
Tensile strength 1/2 hr at 160°F (71°C), ksi (MPa)	281 (1937)	215 (1482)	258 (1779)	310 (2137)	–	60 (414)	45 (310)
Tensile modulus 1/2 hr at 160°F (71°C), msi (GPa)	16.0 (110.3)	15.8 (108.9)	13.6 (93.8)	20.0 (137.9)	–	4.0 (27.6)	3.0 (20.7)
Compression strength RT, ksi (MPa)	168 (1158)	189 (1303)	181 (1248)	237 (1634)	220 (1517)	60 (414)	70 (483)
Compression modulus RT, msi (GPa)	15.5 (106.9)	17.1 (117.9)	13.4 (92.4)	20.0 (137.9)	17.6 (121)	4.0 (27.6)	3.4 (23.4)
Compression strength 1/2 hr at 160°F (71°C), ksi (MPa)	156 (1076)	168 (1158)	160 (1103)	205 (1413)	–	40 (276)	45 (310)
Compression modulus 1/2 hr at 160°F (71°C), msi (GPa)	13.5 (93.1)	16.3 (112.4)	13.1 (90.3)	–	–	3.1 (21.4)	3.2 (22.1)
Short beam shear strength RT, ksi (MPa)	13.4 (92.4)	12.6 (86.9)	12.6 (86.9)	11.9 (82)	13.1 (90)	3.6 (24.8)	4.2 (29)
Short beam shear strength 1/2 hr at 160°F (71°C), ksi (MPa)	11.0 (75.8)	10.1 (69.6)	10.5 (72.4x)	10.4 (71.7)	–	–	–
Barcol hardness	–	–	–	–	–	75 (517)	70 (483)
Long beam flexure RT, psi (kPa)	–	–	–	–	–	–	130 (896)
Flatwise tensile RT, psi (kPa)	–	–	–	–	–	–	800 (5516)
Drum peel strength in-lbs/in-width (m-kg/m-width)	–	–	–	–	–	–	4 (1.8)

B—designates the addition of 108 fiberglass scrim to the unidirectional tape.
 Unless otherwise designated, all carbon tape properties were derived from Courtaulds® 33–500 carbon fiber.

Reported property values are average 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.



Handling and Safety Precautions

Hexcel recommends that customers observe established precautions for handling 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. Material Safety Data Sheets (MSDS) have been prepared for all Hexcel products and are available to company safety officers on request from your nearest Hexcel Sales Office.

Storage

HexPly® F515 prepreg should be sealed in a polyethylene bag and refrigerated, preferably below 32°F (0°C). Following removal from refrigerated source, allow the prepreg to reach room temperature before opening the polyethylene bag to avoid moisture condensation. Shelf life: 6 months at 0°F (-18°C), 3 months at 40°F (4°C).

Shipping

Prepreg fabric and tape are generally shipped via refrigerated truck in sealed polyethylene bags.

Disposal of Scrap

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

Important

Hexcel Corporation believes, in good faith, that the technical data and other information provided herein is materially accurate as of the date this document is prepared. Hexcel reserves the right to modify such information at any time. The performance values in this data sheet are considered representative but do not and should not constitute specification minima. The only obligations of Hexcel, including warranties, if any, will be set forth in a contract signed by Hexcel or in Hexcel's then current standard Terms and Conditions of Sale as set forth on the back of Hexcel's Order Acknowledgement.

For more Information

Hexcel is a leading worldwide supplier of composite materials to aerospace and other demanding industries. Our comprehensive product range includes:

- Carbon Fiber
- RTM Materials
- Honeycomb Cores
- Continuous Fiber Reinforced Thermoplastics
- Carbon, Glass, Aramid and Hybrid Prepregs
- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Special Process Honeycombs
- Reinforced Fabrics

For US 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 click here: <http://www.hexcel.com/contact/salesoffices>.