HexPly® 8551-7 Epoxy Matrix

High Strength, Damage-Resistant, Structural Epoxy Matrix

Product Data

Description

HexPly® 8551-7 is an amine-cured, toughened epoxy resin system supplied with unidirectional graphite fibers. Typical reinforcement is continuous IM7 (intermediate modulus) graphite filaments. HexPly® 8551-7 was developed to operate in a temperature environment of up to 200ºF (93ºC). IM7/8551-7 is an extremely damage-resistant system, recommended for structural applications requiring high strength, stiffness, and damage tolerance. Conventional thermoset resin processing equipment and techniques can be used to process IM7/8551-7 prepreg tape.

Features

- Service Temperature up to 200ºF (93ºC)
- Extremely Damage-Resistant System
- 350ºF (177ºC) Cure

Neat Resin Properties

Density	1.272 gm/cc
T_g dry	315ºF (157ºC)
T_g wet	240ºF (116ºC)
Equilibrium moisture absorption	3.10%
Tensile strength	14.4 ksi
Tensile modulus	0.593 msi
Tensile strain	4.40%
Fracture toughness, K_{1C}	3.19 ksi $\sqrt{in}$
Strain energy release rate, G_{1C}	5.46 in-lb/in^2
Gel time at 350ºF (177ºC)	8–16 min
Minimum viscosity	~19 poise at 265–300ºF (129–149ºC)
Tack life at RT	40 days
Standard cure	2 hrs at 350ºF (177ºC)

Physical Properties

		Carbon Tape
Prepreg	% Resin content	34–40
	Areal weight GSM	90–190
	% Flow at	
	% Volatiles	1.0 max
Laminate	Cured thickness per ply (in)	Various
	% Fiber volume	60

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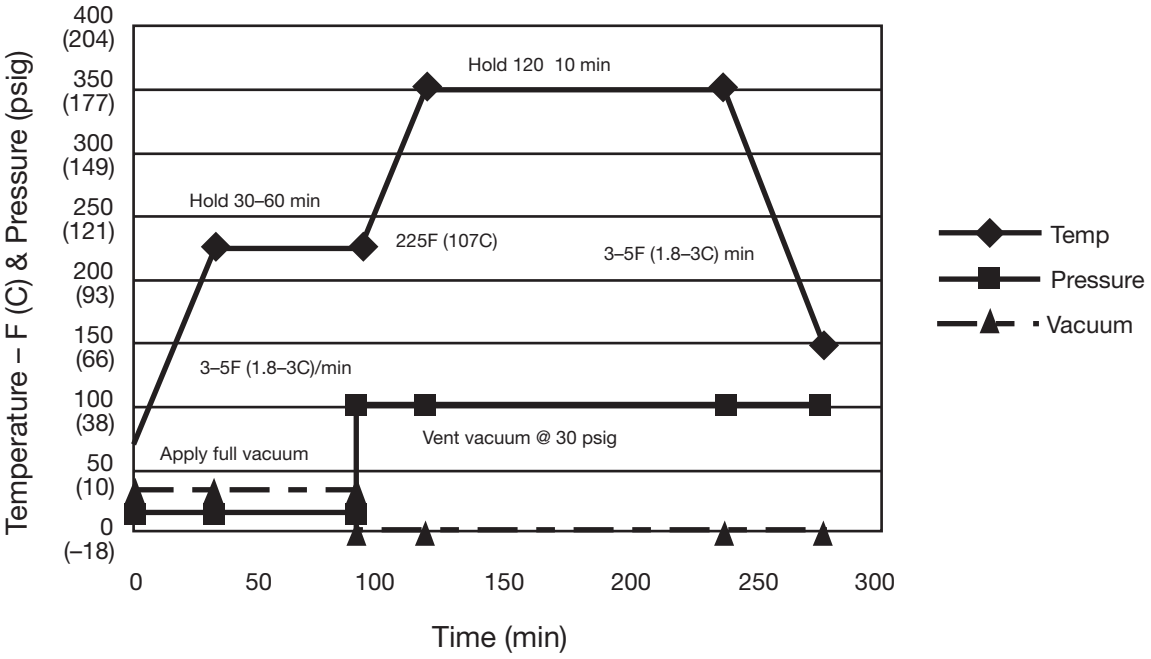
Mechanical Properties

Property	Temp °F (°C)	Condition	AS4	IM7
0° Tensile strength, ksi	77 (25)	Dry	315	400
0° Tensile modulus, msi	77 (25)	Dry	21.0	23
0° Tensile elongation, %	77 (25)	Dry	1.40	1.64
90° Tensile strength, ksi	77 (25)	Dry	–	11
90° Tensile modulus, msi	77 (25)	Dry	–	1.21
90° Tensile elongation, %	77 (25)	Dry	–	1.0
Quasi tensile strength, ksi	77 (25)	Dry	–	135
Quasi tensile strength, ksi	77 (25)	Dry	–	8.4
Quasi tensile strength, ksi	77 (25)	Dry	–	1.58
0° Compression strength, ksi	77 (25)	Dry	230	235
0° Compression strength, ksi	180 (82)	Dry	205	200
0° Compression strength, ksi	250 (121)	Dry	180	185
0° Compression strength, ksi	180 (82)	Wet	170	160
0° Compression modulus, msi	77 (25)	Dry	20	21.5
0° Compression modulus, msi	180 (82)	Dry	–	21
0° Compression modulus, msi	250 (121)	Dry	18.4	22.1
0° Compression modulus, msi	180 (82)	Wet	17.8	20.7
0° Compression modulus, msi	220 (104)	Wet	18.7	21.7
Compression after impact, ksi				
Unimpacted	77 (25)	Dry	–	85
After 500 in-inlb/in impact	77 (25)	Dry	–	67
After 1,500 in-inlb/in impact	77 (25)	Dry	44	50
After 2,000 in-inlb/in impact	77 (25)	Dry	–	47
After 2,500 in-inlb/in impact	77 (25)	Dry	–	44
After 3,000 in-inlb/in impact	77 (25)	Dry	–	33
Short beam shear, ksi	77 (25)	Dry	15.5	14.5
Short beam shear, ksi	180 (82)	Dry	12.3	11.5
Short beam shear, ksi	250 (121)	Dry	9.5	10
Short beam shear, ksi	180 (82)	Wet	12	10
Short beam shear, ksi	250 (121)	Wet	7.3	8.2
Short beam shear, ksi	265 (129)	Wet	–	5.8
0° Flexural strength, ksi	77 (25)	Dry	247	–
0° Flexural modulus, msi	77 (25)	Dry	17.9	–
In-plane ± 45 tensile shear strength, ksi	77 (25)	Dry	–	17.0
In-plane ± 45 tensile shear modulus, msi	77 (25)	Dry	–	0.85
Open hole compression strength, ksi	77 (25)	Dry	44	42
Open hole compression strength, ksi	180 (82)	Wet	38	37
Open hole compression strength, ksi	220 (104)	Wet	–	36

Cure Cycle



Cure Procedure

Autoclave

1. Apply full vacuum and 15 psig pressure.
2. Heat at 3–5ºF (1.8–3ºC)/minute to 225ºF (107ºC).
3. Hold at 225ºF (107ºC) for 30–60 minutes.
4. Raise pressure to 85–100 psig—vent vacuum when pressure reaches 30 psig.
5. Raise temperature to 350ºF (177ºC) at 3–5ºF (1.8–3ºC)/minute.
6. Hold at 350ºF (177ºC) for 120 ± 10 minutes.
7. Cool at 2–5ºF (1.2–3ºC) to 150ºF (66ºC) and vent pressure.

Storage

HexPly® 8551-7 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 prevent moisture condensation.

Shelf Life

12 months at 0°F (–18°C)

4 months at 40°F (4°C)

10 days at 70°F (21°C)

Shipping

Prepreg is usually shipped in a sealed polyethylene bag.

Disposal of Scrap

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

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.

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.

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**.