Hexcel tooling fabrics are high-performance carbon fiber fabrics which utilize Hexcel's proprietary PrimeTex™ fabric technology. This unique fabric architecture provides ribbon-like tow structure resulting in a homogenous laminar morphology significantly minimizing any resin-rich pockets normally seen in other tooling fabrics. Our PrimeTex™ fabric technology reduces interstitial spaces resulting in an enhanced tool surface aspect with smoother part reproduction and less post cure re-work of part surfaces. Hexcel tooling fabrics are available with M61, a high glass transition temperature (T_g) bismaleimide resin system based on Hexcel's high performance aerospace matrix technology specifically modified for rate-durable carbon tools.

Benefits

- PrimeTex™ fabrics have reduced resin-rich pockets resulting in higher durability and enhanced part quality

- High T_g resulting in high-rate tools for 350˚F cure.

- Available in either standard modulus or intermediate modulus 3, 6 and 12K fibers

- High fiber volume fraction

- Excellent tack and drape

- Excellent out-time
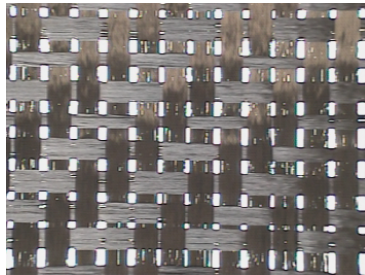
Regular weaving style (left) and PrimeTex™ (right) fabrics.

Uncured Prepreg Properties

Property	Value	Comment
Nominal Resin Content	38%	By Weight
Standard Fabric Areal Weights and Construction (Other AFW and styles available upon request)	196 g/m^2; 3K; Plain Weave 380 g/m^2; 6K; 8 Harness Satin 670 g/m^2; 12K; 5 Harness Satin	Available in AS4 and IM2 Fibers
Tack Life	20 days	Medium Tack
Minimum Viscosity	22.4 Poise	RDA
Out Life at 70˚F (21˚C)	30 days	
Storage Life	6 months after shipment	0˚F

HEXCEL®

Cured Laminate Properties

Property	Value	Comment
Cured Ply Thickness 196 g/m^2 380 g/m^2 670 g/m^2	0.0078 in (0.198 mm) 0.0150 in (0.381 mm) 0.0240 in (0.609 mm)	Based on nominal areal fiber weight.
T_g (Dry)	527˚F (275˚C)	DMTA, Post-Cured
Maximum Use Temperature	425˚F (218˚C)	Post-Cured
Coefficient of Linear Thermal Expansion	1.67 x 10^{-8}/˚C	TMA
Minimum Initial Cure Temperature	375˚F (191˚C)	Post-Cure Required at 425˚F (218˚C)

Cured Mechanical Properties

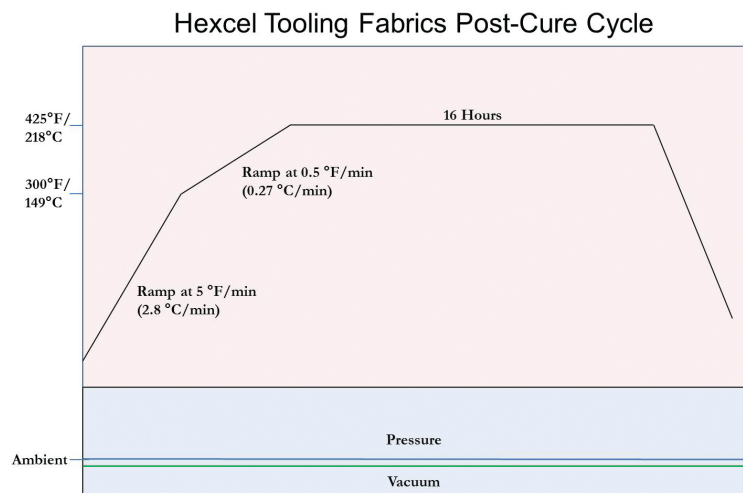| Laminate Property Units	Temperature˚F (˚C) & Condition	Value
Flexural Strength ksi (MPa)	75 (24) Dry 450 (232) Dry	151 (1041) 103 (711)
Flexural Modulus msi (GPa)	75 (24) Dry 450 (232) Dry	8.33 (57) 7.88 (54)
Short Beam Shear Strength ksi (MPa)	75 (24) Dry 450 (232) Dry 350 (177) Wet	9.95 (69) 7.35 (50.7) 5.02 (34.6)
CAI (270 in-lbs/in impact) ksi (MPa)	75 (24) Dry	30.4 (209)
Tensile Strength ksi (MPa)	75 (24) Dry	122 (841)
Tensile Modulus msi (GPa)	75 (24) Dry	8.1 (55.9)
Compression Strength ksi (MPa)	75 (24) Dry 450 (232) Dry 350 (177) Wet	114 (786) 77 (531) 59.4 (409.5)

HEXCEL®

Cure Cycle

Establish a minimum vacuum of 22 inHg (0.7 bar). Maximum allowed vacuum bag leak is 2 inHg (0.067 bar) in 10 minutes.

- Begin heating at 0.5-1 ˚F/minute (0.27-0.55 ˚C/minute) to 225˚F (107˚C).

- Increase pressure to 100±10 psi (6.89±0.69 bar).

- Dwell at 225±5˚F (107±2.8˚C) based on lagging thermocouple for 30+10/-0 minutes.

- Continue to heat 0.5-1 ˚F/minute (0.27-0.55 ˚C/minute) to 275˚F (135˚C).

- Dwell at 275±5˚F (135±2.8˚C) based on lagging thermocouple for 30+10 /-0 minutes.

- Continue to heat at 3-5 ˚F/minute (1.7-2.8 ˚C/minute) to 375˚F (191˚C).

- Dwell at 375±5˚F (191±2.8˚C) based on lagging thermocouple for 240 +30 /-0 minutes.

- Cool at a maximum of 5 ˚F/minute (2.3 ˚C/minute) to 120˚F (49˚C) before releasing pressure.

Hexcel Tooling Fabrics Cure Cycle

375°F/191°C — 240 minutes
Ramp at 3-5°F/min (1.7-2.8 °C/min)
275°F/135°C — 30 minutes
225°F/107°C — 30 minutes
Ramp at 0.5-7 °F/min (0.27-0.55 °C/min)
100 psi/7 bar — Pressure
Ambient 22 inHg/0.7 bar — Vacuum
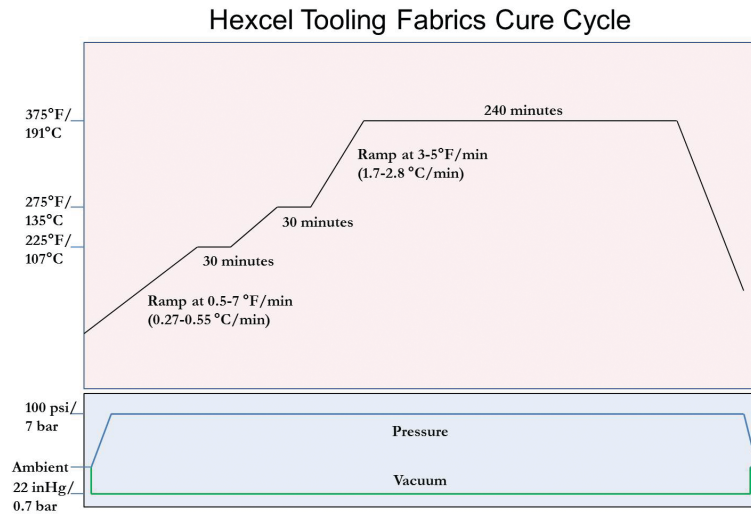
Post-Cure Cycle

- Begin heating the tool at a maximum of 5 ˚F/minute (2.8 ˚C/minute) to 300˚F (149˚C).

- When leading thermocouple reaches 300˚F±5˚F (149˚C±2.8˚C) reduce ramp rate to a maximum of 0.5 ˚F/minute (0.27 ˚C/minute) and continue heating to (218˚C) 425˚F.

- Cool at a maximum rate of 5 ˚F/minute (2.8 ˚C/minute) to 150˚F (65˚C) before removing from the oven.

- Allowed to open door at 240˚F (116˚C) based on a lagging TC to assist with cool down.

Hexcel Tooling Fabrics Post-Cure Cycle

425°F/218°C — 16 Hours
Ramp at 0.5 °F/min (0.27 °C/min)
300°F/149°C
Ramp at 5 °F/min (2.8 °C/min)
Ambient — Pressure / Vacuum

Storage and Handling

Store the product with the roll core sitting horizontally and support at core ends in its original (or equivalent) sealed packaging at 0°F (-18°C). Prevent condensation on the product by warming to room temperature before opening vapor barrier bag (reseal for subsequent storage). The usual precautions when handling uncured synthetic resins and fine fibrous materials should be observed. See Material Safety Data Sheet. The use of clean disposable impervious gloves provides protection for the operator and avoids contamination of material and components.

Safety Information

Obtain, read, and understand the Material Safety Data Sheet (MSDS) before use of this product.

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

For more information using Hexcel tooling fabrics, please see our Tooling Fabrics User Guide in the Resources>Technology Manuals section of www.hexcel.com.

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
- 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 1-866-556-2662 and 1-800-987-0658.
For other worldwide sales office telephone numbers and a full address list, please click here:
http://www.hexcel.com/contact/salesoffice