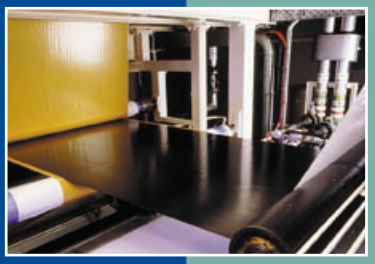
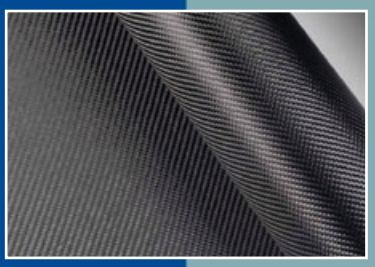
# HexForce® and HexPly® Industrial Selector Guide





HEXCEL®

## About HEXCEL

Hexcel is the largest US producer of carbon fibre; the world's largest weaver of structural fabrics; the number one producer of composite materials such as prepregs, film adhesives and honeycomb; and a leading manufacturer of composite parts and structures.

As the most vertically integrated supplier in the industry Hexcel manufactures the full spectrum of advanced material solutions. This means that we can offer enhanced design flexibility and support to our customers worldwide.

Hexcel's research and technology function supports our businesses worldwide with a highly developed expertise in materials science, textiles, process engineering and polymer chemistry.

Hexcel has pioneered the development of prepregs for over 60 years. The HexPly® trademark is renowned in high performance industries.

With in-house weaving capabilities for the manufacture of unidirectional and woven reinforcement fabrics in glass, carbon and aramid fibres and hybrids - all marketed under the HexForce® brand name - Hexcel provides customers with a total package of composite solutions.

Our global technical support team is on hand to assist with material selection, processing, and can provide training to those who are new to composites technology.

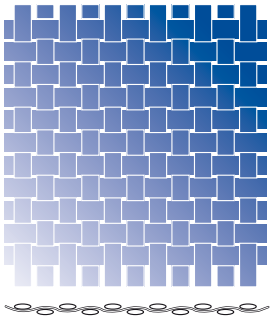
## What are the different fabric styles?

The fabrics consist of at least two threads which are woven together: the warp and the weft.

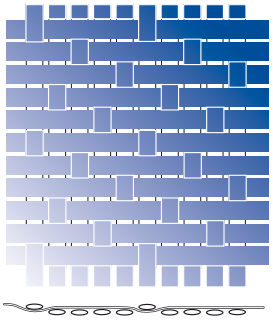
The weave style can be varied according to crimp and drapeability. Low crimp gives better mechanical performance because straighter fibres carry greater loads; a drapeable fabric is easier to lay up over complex forms.

There are four main weave styles:

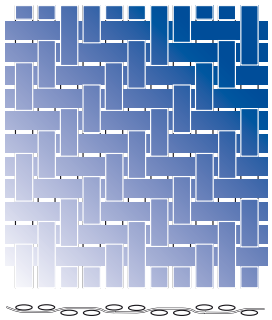
**PLAIN WEAVE**
Low drapeability/high crimp



**SATIN WEAVE**
(4, 5, 8, 11)
Good drapeability/low crimp



**TWILL WEAVE**
(2/1, 3/1, 2/2)
Average drapeability/
average crimp



**NON CRIMP FABRICS**
Unidirectional layers assembled and stitched
Average drapeability/no crimp

NCF

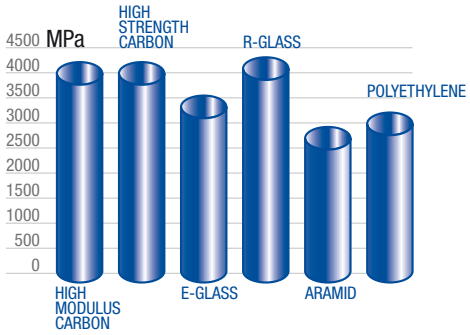


NC2®

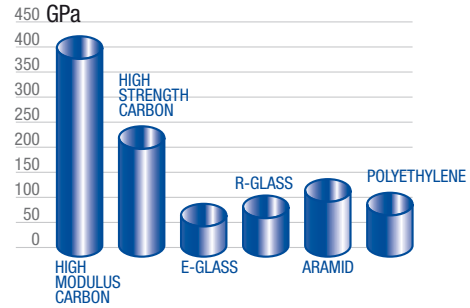
## What are the fibre properties?

The fibre reinforcements provide composites with mechanical performance: excellent stiffness and strength, as well as good thermal, electric and chemical properties, while offering significant weight savings over metals.
The range of fibres is extensive. The graphs below highlight the main criteria for fibre selection.

Tensile Strength



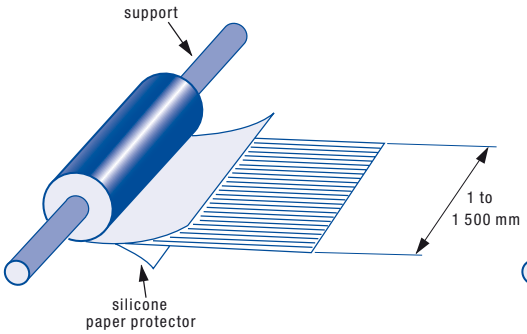

Tensile Modulus



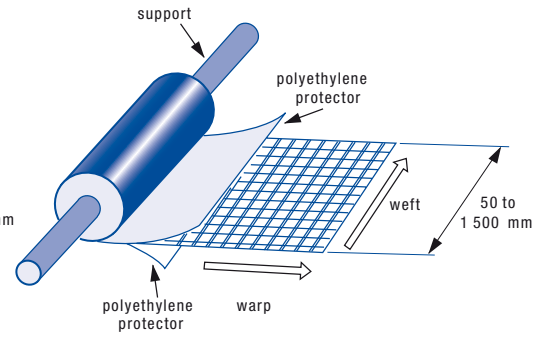

## What is a prepreg?

A prepreg consists of a combination of a matrix (or resin) and fibre reinforcement. It is ready to use in the component manufacturing process. It is available in:

**UNIDIRECTIONAL (UD)** form (one direction of reinforcement)
**FABRIC** form (WOVEN, NCF, NC2®).




■ Unidirectional reinforcement




■ Fabric reinforcement

## What is the role of the matrix ?

The role of the matrix is to support the fibres and bond them together in the composite material. It transfers any applied loads to the fibres, keeps the fibres in their position and chosen orientation. The matrix also gives the composite environmental resistance and determines the maximum service temperature of a prepreg. When selecting prepregs the maximum service temperature is one of the key selection criteria for choosing the best prepreg matrix.

## How do different matrices compare in terms of temperature/mechanical performance?

Matrices can be conveniently classified according to service temperature as follows:

Type: **Epoxy**
Service Temperature: **60-80°C**

Characteristics: Best compromise beetween mechanical performance and ease of processing.

Type: **Epoxy**
Service Temperature: **100°C**

Characteristics: Highly toughened epoxy systems usually exhibit good adhesion for honeycomb bonding.

Type: **Phenolic**
Service Temperature: **80-100°C**

Characteristics: Excellent fire, smoke and toxicity properties (FST).

Type: **Epoxy**
Service Temperature: **130-200°C**

Characteristics: Toughened epoxy systems aiming for maximum hot wet properties.

Type: **Bismaleimides (BMI) and polyimides**
Service Temperature: **260°C**

Characteristics: Long cure cycles needed to obtain best properties. Temperature resistance main priority, while preserving handling and toughness qualities.

# Index of recommended products

**HexForce® Fabrics and HexPly® Matrix**

## Sports and leisure

### HexForce® Fabrics

| | market | fibre | weight gsm | page |
|---|---|---|---|---|
| T0470 | Tubular structure | Polyamid High tenacity | 83 | p9 |
| 01510 | Surf & Kite surf | E-Glass | 125 | p8 |
| 01522 | Surf & Kite surf | E-Glass | 125 | p8 |
| NBB00 HR1270 0160 | Surf & Kite surf | Carbon HS | 160 | p7 |
| G0882 | Helmets | Carbon /Aramid | 170 | p9 |
| 20967 | Windsurf | Aramid | 175 | p8 |
| 01022 | Tubular structure | E-Glass | 190 | p8 |
| 43192 | Windsurf | 3K Carbon HS | 193 | p6 |
| 43194 | Helmets | 3K Carbon HS | 193 | p6 |
| 48200 | Windsurf | 12K Carbon HS | 200 | p6 |
| 01035 | Helmets | E-Glass | 200 | p8 |
| 01184 | Surf & Kite surf | E-Glass | 202 | p8 |
| 01266 | Surf & Kite surf | E-Glass | 202 | p8 |
| 00471 | Surf & Kite surf | E-Glass | 206 | p8 |
| 01102 | Windsurf | E-Glass | 300 | p8 |
| 01103 | Windsurf | E-Glass | 300 | p8 |
| 01031 | Tubular structure | E-Glass | 315 | p8 |
| 01017 | Tubular structure | E-Glass | 430 | p8 |
| 48661 | Helmets | 12K Carbon HS | 660 | p6 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| ES15 | Very fast cure for press processing – No tack | **85°C Tg** | p10 |
| M49 | Transparent resin with flexible curing process | **125°C Tg** | p10 |
| M32 | Very fast cure for press processing | **100°C Tg** | p10 |
| M10 | Very flexible curing process. Good performance in wet conditions | **125°C Tg** | p10 |
| ES/EH84 | Specifically suitable for tubular applications | **95°C Tg** | p10 |
| M52 | Fast cure for press processing with extremely good transparency | **95°C Tg** | p10 |

## Automotive

### HexForce® Fabrics

| | market | fibre | weight gsm | page |
|---|---|---|---|---|
| T0470 | Racing cars | Polyamid High tenacity | 83 | p9 |
| 41090 | Racing cars | 1K Carbon HS | 90 | p6 |
| 41120 | Racing cars | 1K Carbon HS | 120 | p6 |
| G0882 | Racing cars | Carbon /Aramid | 170 | p9 |
| 43200 | Racing cars | 3K Carbon HS | 200 | p6 |
| 46201 | Racing cars | 6K Carbon HM | 200 | p6 |
| 46202 | Racing cars | 6K Carbon HM | 200 | p6 |
| 46200 | Racing cars | 6K Carbon IM | 200 | p6 |
| 73210 | Racing cars | Carbon /Aramid | 210 | p9 |
| 48280 | Racing cars | 12K Carbon IM | 290 | p6 |
| 46280 | Racing cars | 6K Carbon IM | 290 | p6 |
| 48302 | Racing cars | 12K Carbon HS | 300 | p6 |
| 48385 | Racing cars | 12K Carbon HS | 385 | p6 |
| 48661 | Racing cars | 12K Carbon HS | 660 | p6 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M9.1F/M9.6F/M9.6/FLT | Extremely flexible curing process, low exotherm for thick components | **125°C Tg** | p10 |
| M35-4 | Toughened high performance system with flexible autoclave cure | **150°C Tg** | p10 |
| M47 | High performance system for autoclave process | **130°C Tg** | p10 |
| M10 | Very flexible curing process, good performance in wet conditions | **125°C Tg** | p10 |
| M76 | Very tough system with high service temperature | **150°C Tg** | p10 |
| M49 | Transparent resin with flexible curing process | **125°C Tg** | p10 |
| M52 | Fast cure for press processing with extremely good transparency | **95°C Tg** | p10 |

## Medical

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| 41090 | 1K Carbon HS | 90 | p6 |
| 00120 | E-Glass | 105 | p8 |
| 43192 | 3K Carbon HS | 193 | p6 |
| 43194 | 3K Carbon HS | 193 | p6 |
| 43245 | 3K Carbon HS | 245 | p6 |
| 43285 | 3K Carbon HS | 285 | p6 |
| 46301 | 6K Carbon HS | 295 | p6 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M10 | Very flexible curing process. Good performance in wet conditions | **125°C Tg** | p10 |
| ES/EH84 | Specifically suitable for tubular applications | **95°C Tg** | p10 |

## Aesthetic parts

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| 73156 | Carbon /Aramid | 155 | p9 |
| 73158 | Carbon /Aramid | 157 | p9 |
| G0882 | Carbon /Aramid | 170 | p9 |
| 43192 | 3K Carbon HS | 193 | p6 |
| 43194 | 3K Carbon HS | 193 | p6 |
| 43199 | 3K Carbon HS | 200 | p6 |
| 43200 | 3K Carbon HS | 200 | p6 |
| 01035 TEXALIUM® | E-Glass | 200 | p9 |
| 73210 | Carbon /Aramid | 210 | p9 |
| SE001 1270 TF925 TEXALIUM® | E-Glass | 225 | p9 |
| SE010 1270 TF925 TEXALIUM® | E-Glass | 225 | p9 |
| SE005 1270 TF925 TEXALIUM® | E-Glass | 235 | p9 |
| SE007 1270 TF925 TEXALIUM® | E-Glass | 260 | p9 |
| SE013 1270 TF925 TEXALIUM® | E-Glass | 260 | p9 |
| G1174 | 3K Carbon HS | 285 | p6 |
| 01102 TEXALIUM® | E-Glass | 300 | p9 |
| 01102 BLACKWEAVE® | E-Glass | 300 | p9 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M52 | Fast cure for press processing with extremely good transparency | **95°C Tg** | p10 |
| M49 | Transparent resin with flexible curing process | **125°C Tg** | p10 |

## Doctor Blades and rollers

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| NLT00 HR1270 0200 | Carbon HS | 200 | p7 |
| NLT00 HR1270 0400 | Carbon HS | 400 | p7 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M48 | Toughened high performance system for high service temperature | **200°C Tg** | p10 |
| THERMOPLASTICS / PEEK-PPS | For extremely high temperature resistance | | |

## Marine

### HexForce® Fabrics

| | market | fibre | weight gsm | page |
|---|---|---|---|---|
| T0470 | Marine one off / Recreational Marine | Polyamid High tenacity | 83 | p9 |
| 41090 | Recreational Marine | 1K Carbon HS | 90 | p6 |
| 20914 | Recreational Marine | Aramid | 175 | p8 |
| 48192 | Marine one off / Recreational Marine | 12K Carbon HS | 193 | p6 |
| 43194 | Marine one off | 3K Carbon HS | 200 | p6 |
| NBB00 HR1270 0200 | Marine one off / Recreational Marine | Carbon HS | 200 | p7 |
| NLT00 HR1270 0200 | Marine one off / Recreational Marine | Carbon HS | 200 | p7 |
| 01035 | Recreational Marine | E-Glass | 202 | p8 |
| 01102 | Recreational Marine | E-Glass | 300 | p8 |
| 48299 | Marine one off | 12K Carbon HS | 300 | p6 |
| 48300 | Marine one off | 12K Carbon HS | 300 | p6 |
| 48302 | Marine one off | 12K Carbon HS | 300 | p6 |
| NBB00 HR1270 0300 | Marine one off / Recreational Marine | Carbon HS | 300 | p7 |
| NLT00 HR1270 0300 | Marine one off / Recreational Marine | Carbon HS | 300 | p7 |
| 01113 | Recreational Marine | E-Glass | 390 | p8 |
| NBB00 HR1270 0400 | Marine one off / Recreational Marine | Carbon HS | 400 | p7 |
| NBB00 HR1270 0400 | Marine one off / Recreational Marine | Carbon HS | 400 | p7 |
| NLT00 HR1270 0400 | Marine one off / Recreational Marine | Carbon HS | 400 | p7 |
| MBB00 C 1270 410 | Marine one off / Recreational Marine | 12K Carbon HS | 410 | p7 |
| 48600 | Marine one off | 12K Carbon HS | 600 | p6 |
| MBB00 C 1270 600 | Marine one off / Recreational Marine | 12K Carbon HS | 600 | p7 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M34 | Low temperature curing system for vacuum process | **80°C Tg** | p10 |
| M10 | Very flexible curing process, good performance in wet conditions | **125°C Tg** | p10 |
| M52 | Fast cure for press processing with extremely good transparency | **95°C Tg** | p10 |

## Tooling

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| 41090 | 1K Carbon HS | 90 | p6 |
| 48194 | 12K Carbon HS | 194 | p6 |
| 43199 | 3K Carbon HS | 200 | p6 |
| 43200 | 3K Carbon HS | 200 | p6 |
| 01035 | E-Glass | 202 | p8 |
| 01102 | E-Glass | 300 | p8 |
| 01113 | E-Glass | 390 | p8 |
| 48600 | 12K Carbon HS | 600 | p6 |
| 48661 | 12K Carbon HS | 660 | p6 |

## Wind Energy

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| T0470 | Polyamid High tenacity | 83 | p9 |
| MLBB0 E 1260 1175-2 | Glass 1200tex /300tex | 1175 | |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M9.1F/M9.6F/M9.6/FLT | Extremely flexible curing process, low exotherm for thick components | **125°C Tg** | p10 |
| M34 | Low temperature curing system for vacuum process | **80°C Tg** | p10 |

## Rail

### HexPly® Matrix

| | | | |
|---|---|---|---|
| 250CB | Phenolic system with good fire performance | | p10 |
| M34 | Low temperature curing system for vacuum process | **80°C Tg** | p10 |

## Models

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| 01080 | E-Glass | 48 | p8 |
| 00235 | E-Glass | 80 | p8 |
| 41090 | 1K carbon HS | 90 | p6 |
| 00120 | E-Glass | 105 | p8 |
| 41120 | 1K carbon HS | 120 | p6 |

## Light aircraft - Glider

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| T0470 | Polyamid High tenacity | 83 | p9 |
| 00235 | E-Glass | 86 | p8 |
| 01039 | E-Glass | 160 | p8 |
| NBB00 HR1270 0160 | Carbon HS | 160 | p7 |
| G1175 | 3K Carbon HS | 175 | p6 |
| 43192 | 3K Carbon HS | 193 | p6 |
| 43194 | 3K Carbon HS | 193 | p6 |
| NBB00 HR1270 0200 | Carbon HS | 200 | P7 |
| 01102 | E-Glass | 300 | p8 |
| 01113 | E-Glass | 390 | p8 |

## Civil Engeenering

### HexForce® Fabrics

| | fibre | weight gsm | page |
|---|---|---|---|
| 48200 | 12K Carbon HS | 200 | p6 |
| 48299 | 12K Carbon HS | 300 | p6 |

### HexPly® Matrix

| | | | |
|---|---|---|---|
| M34 | Low temperature curing system for vacuum process | **80°C Tg** | p10 |
| 250CB | Phenolic system with good fire performance | | p10 |
| M10 | Very flexible curing process, good performance in wet conditions | **125°C Tg** | p10 |
| M9.1F/M9.6F/M9.6/FLT | Extremely flexible curing process, low exotherm for thick components | **125°C Tg** | p10 |

# HS CARBON FABRICS

HexForce® product data

| Weight gsm | Style | Weave | Weight rate Warp | Weft | Fibre count Warp yarns/cm | Weft picks/cm | Reinforcement yarn Warp | Weft | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **BALANCED FABRICS** - HIGH STRENGTH FIBRES | | | | | | | | | | |
| 90 | **41090** | PLAIN | 50 | 50 | 6.7 | 6.7 | 1K HS | 1K HS | 102 | 0.09 |
| 120 | **41120** | PLAIN | 50 | 50 | 9 | 9 | 1K HS | 1K HS | 100/150 | 0.10 |
| 160 | **G1175** | PLAIN | 50 | 50 | 4 | 4 | 3K HR | 3K HR | 100/140 | 0.16 |
| 193 | **43192** | PLAIN | 51 | 49 | 5 | 4.8 | 3K HS | 3K HS | 100 | 0.20 |
| 193 | **43194** | TWILL 2X2 | 51 | 49 | 5 | 4.8 | 3K HS | 3K HS | 100 | 0.20 |
| 193 | **48192** | PLAIN | 50 | 50 | 1.2 | 1.2 | 12K HS | 12K HS | 127 | 0.20 |
| 193 | **48194** | TWILL 2X2 | 50 | 50 | 1.2 | 1.2 | 12K HS | 12K HS | 127 | 0.20 |
| 200 | **43199** | PLAIN | 50 | 50 | 5 | 5 | 3K HS | 3K HS | 125 | 0.20 |
| 200 | **43200** | TWILL 2X2 | 50 | 50 | 5 | 5 | 3K HS | 3K HS | 125 | 0.20 |
| 240 | **46241** | PLAIN | 50 | 50 | 3 | 3 | 6K HS | 6K HS | 110 | 0.24 |
| 245 | **43245** | TWILL 2X2 | 50 | 50 | 6 | 6 | 3K HS | 3K HS | 100 | 0.25 |
| 285 | **G1174** | TWILL 4X4 | 50 | 50 | 7.2 | 7.2 | 3K HS | 3K HS | 100 | 0.29 |
| 285 | **43285** | TWILL 2X2 | 50 | 50 | 7 | 7 | 3K HS | 3K HS | 100 | 0.29 |
| 285 | **46281** | PLAIN | 50 | 50 | 3.5 | 3.5 | 6K HS | 6K HS | 120 | 0.29 |
| 285 | **46285** | TWILL 2X2 | 50 | 50 | 3.5 | 3.5 | 6K HS | 6K HS | 120 | 0.29 |
| 295 | **46301** | PLAIN | 50 | 50 | 3.7 | 3.7 | 6K HS | 6K HS | 100 | 0.30 |
| 295 | **46302** | TWILL 2X2 | 50 | 50 | 3.7 | 3.7 | 6K HS | 6K HS | 100 | 0.30 |
| 300 | **48301** | PLAIN | 50 | 50 | 1.9 | 1.9 | 12K HS | 12K HS | 127 | 0.30 |
| 300 | **48302** | TWILL 2X2 | 50 | 50 | 1.9 | 1.9 | 12K HS | 12K HS | 127 | 0.30 |
| 385 | **48385** | TWILL 2X2 | 50 | 50 | 2.4 | 2.4 | 12K HS | 12K HS | 125 | 0.40 |
| 400 | **48400** | PLAIN | 50 | 50 | 2.5 | 2.5 | 12K HS | 12K HS | 120 | 0.41 |
| 600 | **48600** | TWILL 2X2 | 50 | 50 | 3.7 | 3.7 | 12K HS | 12K HS | 130 | 0.62 |
| 660 | **48661** | TWILL 2X2 | 50 | 50 | 4 | 4 | 12K HS | 12K HS | 125 | 0.66 |
| **UNIDIRECTIONAL FABRICS** - HIGH STRENGTH FIBRES | | | | | | | | | | |
| 200 | **48200** | UD PW | 99 | 1 | 2.5 | 1.6 | 12K HS | HEAT SET | 0.61 | 0.20 |
| 300 | **48299** | UD PW | 99 | 1 | 3.75 | 1.6 | 12K HS | HEAT SET | 0.61 | 0.30 |
| 300 | **48300** | UD PW | 99 | 1 | 3.7 | 3 | 12K HS | EC5 11 | 100 | 0.32 |
| 530 | **48520** | UD LOUIS 2X2 POWDERED | 94 | 6 | 6.2 | 4.4 | 12K HS | EC9 68 | 100 | 0.55 |

# HM CARBON FABRICS

HexForce® product data

| Weight gsm | Style | Weave | Weight rate Warp | Weft | Fibre count Warp yarns/cm | Weft picks/cm | Reinforcement yarn Warp | Weft | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **INTERMEDIATE MODULUS FIBRES** | | | | | | | | | | |
| 200 | **46200 W** | TWILL 2X2 | 50 | 50 | 4.5 | 4.5 | IM7 6K | IM7 6K | 100 | 0.21 |
| 290 | **46280 W** | SATIN 5 | 50 | 50 | 6.5 | 6.5 | IM7 6K | IM7 6K | 100 | 0.28 |
| 290 | **48200 JA** | TWILL 2X2 | 50 | 50 | 3 | 3 | IM9 12K | IM9 12K | 100 | 0.21 |
| 290 | **48280 JA** | 5 HS | 50 | 50 | 4.15 | 4.18 | IM9 12K | IM9 12K | 100 | 0.28 |
| **HIGH MODULUS FIBRES** | | | | | | | | | | |
| 200 | **46201** | PLAIN | 50 | 50 | 4.5 | 4.5 | M46JB 6K | M46JB 6K | 100 | 0.21 |
| 200 | **46202** | TWILL 2X2 | 50 | 50 | 4.5 | 4.5 | M46JB 6K | M46JB 6K | 100 | 0.21 |
| 280 | **G1168** | 5H SATIN | 49 | 51 | 6 | 6.5 | M46J 6K | M46J 6K | 100 | 0.30 |

# NC2® MULTIAXIAL FABRICS

HexForce® product data

| Weight gsm | Style | Fibre orientation | Ply areal weight gsm | Reinforcement yarn | Stitching gsm | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|
| **HS CARBON FIBRES** | | | | | | | |
| 160 | **NLT00 HR1270 0160** | 0° / 90° | 80 | HS CARBON | 6 | 127 | 0.16 |
| 160 | **NBB00 HR1270 0160** | + 45° / - 45° | 80 | HS CARBON | 6 | 127 | 0.16 |
| 200 | **NLT00 HR1270 0200** | 0° / 90° | 100 | HS CARBON | 6 | 127 | 0.20 |
| 200 | **NBB00 HR1270 0200** | + 45° / - 45° | 100 | HS CARBON | 6 | 127 | 0.20 |
| 300 | **NLT00 HR1270 0300** | 0° / 90° | 150 | HS CARBON | 6 | 127 | 0.30 |
| 300 | **NBB00 HR1270 0300** | + 45° / - 45° | 150 | HS CARBON | 6 | 127 | 0.30 |
| 400 | **NLT00 HR1270 0400** | 0° / 90° | 200 | HS CARBON | 6 | 127 | 0.40 |
| 400 | **NBB00 HR1270 0400** | + 45° / - 45° | 200 | HS CARBON | 6 | 127 | 0.40 |
| 600 | **NLT00 HR1270 0600** | 0° / 90° | 300 | HS CARBON | 6 | 127 | 0.60 |

Please contact us for triaxial and quadriaxial applications using NC2®.

# NCF MULTIAXIAL FABRICS

HexForce® product data

| Weight gsm | Style | Fibre orientation | Ply areal weight gsm | Reinforcement yarn | Stitching gsm | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|
| **HS CARBON FIBRES** | | | | | | | |
| 410 | **MBB00 C 1270 410** | + 45° / - 45° | 205 | HS 12K | 6 | 127 | 0.40 |
| 600 | **MBB00 C 1270 600** | + 45° / - 45° | 297 | HS 12K | 6 | 127 | 0.60 |

# POWDERING

HexForce® product data

| Ref | Compatibility | Storage at Room Temprature | Preforming | Applicable for | Temperature of injection | Curing Temperature of Resin System |
|---|---|---|---|---|---|---|
| **POWDERING** | | | | | | |
| HP03 | PU & EPOXY | 1 YEAR | STARTING AT 80°C, RECOMMENDED 100°C | LRI | < 45°C | > 50°C |
| E01 | EPOXY | UP TO 1 YEAR | STARTING AT 80°C, RECOMMENDED 100°C | RTM/LRI | NO RESTRICTION | ANY |

| Options | Advantages | Compability |
|---|---|---|
| **POWDERING** | | |
| EPOXY POWDERING | PREFORMING/STABILIZATION | EPOXY |
| CUT AND SEALED EDGES | AVOID FRAYING | EPOXY |

POWDERING: All fabrics can be on 1 or 2 sides epoxy powdered in order to facilitate preforming and dimensional stabilization
CUTTING: All fabrics can be slitted into tapes with sealed edges in order to avoid fraying

# E GLASS FABRICS

HexForce® product data

| Weight gsm | Style | Weave | Weight rate Warp | Weft | Fibre count Warp yarns/cm | Weft picks/cm | Reinforcement yarn Warp | Weft | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **BALANCED FABRICS** | | | | | | | | | | |
| 25 | **00106** | PLAIN | 50 | 50 | 22 | 22 | EC5 5.5 | EC5 5.5 | 110/127 | 0.02 |
| 48 | **01080** | PLAIN | 56 | 44 | 24 | 19 | EC5 11 | EC5 11 | 110/128 | 0.04 |
| 70 | **02112** | PLAIN | 52 | 48 | 16 | 15 | EC7 22 | EC7 22 | 126 | 0.05 |
| 86 | **00235** | PLAIN | 49 | 51 | 12 | 12.5 | EC9 34 | EC9 34 | 105 | 0.06 |
| 105 | **00120** | 4H SATIN | 51 | 49 | 24 | 23 | EC5 11X2 | EC5 11X2 | 120 | 0.08 |
| 106 | **02116** | PLAIN | 51 | 49 | 24 | 23 | EC7 22 | EC7 22 | 126 | 0.08 |
| 125 | **01510** | PLAIN | 65 | 35 | 11.5 | 6.3 | EC9 34X2 | EC9 68 | 70 | 0.09 |
| 125 | **01522** | PLAIN | 53 | 47 | 9.6 | 8.5 | EC9 34X2 | EC9 34X2 | 65/80 | 0.09 |
| 160 | **01717** | PLAIN | 52 | 48 | 11.8 | 10.7 | EC9 68 | EC9 68 | 82/164 | 0.12 |
| 162 | **01039** | TWILL 2X2 | 51 | 49 | 11.8 | 11.5 | EC9 68 | EC9 68 | 100 | 0.12 |
| 202 | **01035** | TWILL 2X2 | 50 | 50 | 14 | 14 | EC9 68 | EC9 68 | 120 | 0.15 |
| 202 | **07628** | PLAIN | 59 | 41 | 17 | 11.8 | EC9 68 | EC9 68 | 127 | 0.15 |
| 202 | **01266** | PLAIN | 60 | 40 | 8.9 | 6 | EC9 136 | EC9 136 | 80/130 | 0.15 |
| 204 | **01184** | PLAIN | 51 | 49 | 7.4 | 7.2 | EC9 68X2 | EC9 136 | 80 | 0.15 |
| 206 | **00471** | PLAIN | 51 | 49 | 7.4 | 7.2 | EC9 68X2 | EC9 68X2 | 65/80 | 0.15 |
| 300 | **01102** | TWILL 2X2 | 50 | 50 | 7 | 7 | (EC9 68)X3 | (EC9 68)X3 | 80/100/124 | 0.23 |
| 300 | **01103** | PLAIN | 50 | 50 | 7 | 7 | (EC9 68)X3 | (EC9 68)X3 | 80/124 | 0.23 |
| 300 | **07581** | 8H SATIN | 51 | 49 | 22 | 21 | EC9 68 | EC9 68 | 127 | 0.23 |
| 390 | **01113** | TWILL 2X2 | 53 | 47 | 5.9 | 6.6 | (EC9 68)X5 | (EC9 136)X2 | 100/125 | 0.30 |
| **UNIDIRECTIONAL FABRICS** | | | | | | | | | | |
| 190 | **01022** | UD 4H SATIN | 80 | 20 | 22 | 10.5 | EC9 68 | EC9 34 | 100 | 0.14 |
| 315 | **01031** | UD 4H SATIN | 87 | 13 | 19.5 | 11 | EC9 136 | EC9 34 | 100 | 0.24 |
| 430 | **01017** | UD PLAIN | 90 | 10 | 5.7 | 6.3 | EC9 136X5 | EC9 68 | 120 | 0.33 |

# FINISH FOR E GLASS FABRICS

HexForce® product data

| Matrix | Descripion | EPOXY | POLYESTER | VINYLESTER | PHENOLIC |
|---|---|---|---|---|---|
| Finish | | | | | |
| TF 950 - Z 6040 | Epoxy Silanne | ■ | | | ■ |
| Z 6224 | Chloride free amino silanne | ■ | ■ | | |
| TF 970 | Amino silanne | ■ | ■ | ■ | |
| A 1100 | Amino silanne | ■ | | | ■ |
| VOLAN A | Chromium coupling agent | ■ | | | ■ |

# ARAMID FABRICS

HexForce® product data

| Weight gsm | Style | Weave | Weight rate Warp | Weft | Fibre count Warp yarns/cm | Weft picks/cm | Reinforcement yarn Warp | Weft | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **BALANCED FABRICS** | | | | | | | | | | |
| 175 | **20967** | PLAIN | 51 | 49 | 6.7 | 6.5 | HM 1210 | HM 1210 | 120 | 0.20 |
| 175 | **20968** | TWILL 2X2 | 51 | 49 | 6.7 | 6.5 | HM 1210 | HM 1210 | 120 | 0.20 |
| 175 | **20914** | 4H SATIN | 51 | 49 | 6.7 | 6.5 | HM 1210 | HM 1210 | 120 | 0.20 |

# SPECIALITIES

## HexForce® product data

| Weight gsm | Style | Weave | Weight rate Warp | Weight rate Weft | Fibre count Warp yarns/cm | Fibre count Weft picks/cm | Reinforcement yarn Warp | Reinforcement yarn Weft | Standard Width cm | Thickness mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **POLYAMID PEEL PLY** | | | | | | | | | | |
| 83 | **T0470** | PW | 58 | 42 | 19 | 14 | PA66 235 | PA66 235 | * | 0.06 |
| 100 | **T0098** | PW | 58 | 42 | 19 | 14 | PA66 235 | PA66 235 | 100 | 0.08 |
| **AESTHETIC GLASS FABRICS** | | | | | | | | | | |
| 202 | **1035 TEXALIUM®** | TWILL 2X2 | 50 | 50 | 14 | 14 | EC9 68 | EC9 68 | 120 | 0.15 |
| 300 | **1102 TEXALIUM®** | TWILL 2X2 | 50 | 50 | 7 | 7 | (EC9 68)X3 | (EC9 68)X3 | 80 | 0.23 |
| 300 | **1102 BLACKWEAVE®** | TWILL 2X2 | 50 | 50 | 7 | 7 | (EC9 68)X3 | (EC9 68)X3 | 100 | 0.23 |
| 225 | **SE001 TEXALIUM®** | SPECIAL | 47 | 53 | 17.7 | 14.7 | EC9 68 | EC9 68 | 127 | 0.17 |
| 225 | **SE010 TEXALIUM®** | SPECIAL | 47 | 53 | 17.7 | 14.7 | EC9 68 | EC9 68 | 127 | 0.17 |
| 235 | **SE005 TEXALIUM®** | SPECIAL | 47 | 53 | 17.7 | 16.2 | EC9 68 | EC9 68 | 127 | 0.18 |
| 260 | **SE007 TEXALIUM®** | SPECIAL | 47 | 53 | 17.7 | 17.4 | EC9 68 | EC9 68 | 127 | 0.20 |
| 260 | **SE013 TEXALIUM®** | SPECIAL | 47 | 53 | 17.7 | 19.9 | EC9 68 | EC9 68 | 127 | 0.20 |
| **INJECTEX® E GLASS FABRICS** | | | | | | | | | | |
| 295 | **21186 1200** | TWILL 2X2 | 50 | 50 | 22.2 | 5.5 | EC9 68 | EC9 68X4 | 120 | 0.22 |
| 315 | **EB315 E 1200** | TWILL 2X2 POWDERED | 50 | 50 | 22.2 | 5.5 | EC9 68 | EC9 68X4 | 120 | 0.24 |
| 400 | **21180 1200** | 3X / FORMABLE | 50 | 50 | 14.8 | 14.8 | EC11 136 | EC9 68X2 - EC11 136 | 100 | 0.31 |
| 420 | **EF420 E 1000** | 3X / FORMABLE POWDERED | 50 | 50 | 14.8 | 14.8 | EC11 136 | EC9 68X2 - EC11 136 | 100 | 0.32 |
| 1000 | **21156 1200** | 3X / FORMABLE | 51 | 49 | 16.3 | 15.5 | EC13 300 | RO 320 | 120 | 0.77 |
| 1030 | **E1030 E 1200** | 3X / FORMABLE POWDERED | 51 | 49 | 16.3 | 15.5 | EC13 300 | RO 320 | 120 | 0.78 |
| **INJECTEX® CARBON FABRICS** | | | | | | | | | | |
| 200 | **GB201 D 1070** | PW POWDERED | 50 | 50 | 4.7 | 4.7 | 3H HS | 3K HS | 107 | 0.20 |
| 390 | **GB390 D 1040** | 5H SATIN POWDERED | 50 | 50 | 4.7 | 4.7 | 6K HS | 6K HS | 104 | 0.40 |
| 600 | **GF630 N 1000** | 3X / FORMABLE POWDERED | 50 | 50 | 7.4 | 7.4 | 6K HS | 6K HS | 100 | 0.60 |
| 630 | **48601 C 1300** | TWILL 2X2 | 50 | 50 | 3.75 | 3.75 | 12K HS | 12K HS | 130 | 0.60 |
| **ARAMID CARBON HYBRIDS** | | | | | | | | | | |
| 155 | **73156** | PLAIN | 45-14 | 19-22 | 3.4 | 1.4 | 3K HS | 3K HS | 120 | 0.18 |
| | | | | | 1.6 | 2.8 | AR HM 1270 | AR HM 1270 | | |
| 157 | **73158** | SPECIAL | 91 | 4-5 | 7.1 | 1.6 | 3K HS | AR HM 420 | 100 | 0.18 |
| | | | | | | 3.2 | | AR HM 215 | | |
| 170 | **G0882** | TWILL 2X1 | 37-13 | 22-28 | 3.3 | 1.8 | 3K HS | 3K HS | 80 | 0.19 |
| | | | | | 1.8 | 3.3 | AR HM 1270 | AR HM 1270 | | |
| 210 | **73210** | TWILL 2X2 | 22-28 | 22-28 | 2.2 | 2.2 | 3K HS | 3K HS | 122 | 0.24 |
| | | | | | 4.4 | 4.4 | AR HM 1270 | AR HM 1270 | | |
| 245 | **73230** | TWILL 3X1 | 60 | 40 | 7.1 | 7 | 3K HS | AR HM 1270 | 100 | 0.28 |

* 180 - 160 - 130 - 120 - 90 - 50 - 30 - 20 - 10 - 5

# HexPly® Matrix

| HexPly® Resin System | Dry Tg Onset (DMA) °C (°F) | Typical Cure Cycle Temp °C (°F) | Time (mins) | Cure Process Autoclave/ Press | Vacuum Only | Self Adhesive |
|---|---|---|---|---|---|---|
| **EPOXY** | | | | | | |
| **ES15** | 85 (185) | 120 (250) | 9 | X | | |
| **M34** | 80 (180) | 75 (165) | 480 | X | X | X |
| **M32** | 100 (210) | 120 (250) | 9 | X | | |
| **M9.1F/M9.6F/M9.6/FLT /** | 125 (255) | 120 (250) | 30 | X | X | |
| **M10** | 125 (255) | 120 (250) | 60 | X | X | |
| **M35-4** | 150* (302) | 135 (275) | 90 | X | | |
| **M76** | 150* (302) | 135 (275) | 180 | X | | X |
| **M47** | 130* (295) | 135 (275) | 90 | X | | |
| **M52** | 95 (203) | 120 (250) | 15 | X | | |
| **M49** | 125 (255) | 120 (250) | 90 | X | X | |
| **M48** | 200 (392) | 180 (356) | 120 | X | | |
| **ES/EH84** | 95 (200) | 120 (250) | 90 | X | | |
| **PHENOLIC** | | | | | | |
| **250CB** | | 135 | 90 | X | | X |

* higher Tg can be obtained with post cure cycle

| Flow | | Self Extinguishing | Outlife at room temperature (days) | Storage at -18°C (0°F) (months) | Market |
|---|---|---|---|---|---|
| Controlled | High | | | | |
| X | | | 7 | 6 | Sport & Leisure (skis, snowboards…) |
| X | | X | 10 | 12 | Rail and Marine |
| X | | | 7 | 6 | Sport & Leisure (skis, snowboards…) |
| | X | | 42 | 12 | Wind Energy, Marine, automotive, general industrial |
| | X | | 60 | 12 | Wind Energy, Automotive and Marine, sporting goods, Medical, general industrial |
| X | | | 60 | 12 | High performance car |
| X | | | 21 | 12 | High performance car |
| X | | X | 30 | 12 | High performance car |
| X | | | 24 | 12 | Marine, high performance car, sporting goods,aesthetic parts, general industrial |
| | X | | 30 | 12 | Automobile, sporting goods, aesthetic parts, general industrial |
| X | | | 30 | 12 | Doctor blades and rollers |
| X | | | 30 | 14 | Sporting goods, medical |
| X | | X | 60 | 12 | Rail, civil engeenering |

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