FABRICS & BAGGING

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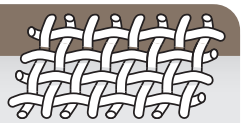
FIBERGLASS CLOTH

Weave Types

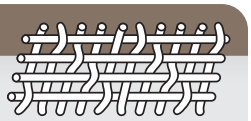
Freeman fiberglass fabrics are the finest quality materials manufactured by BGF and are used to construct laminate plastic parts and tooling with both epoxy and polyester resins. Typically available by the yard and in full rolls.

Plain



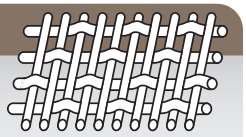
- The most commonly used weave pattern
- Warp and filling threads cross alternately
- Generally the least pliable but also the most stable

Triple Plain



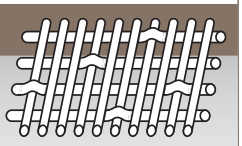
- This special weave features very good drapability and conforms readily to contoured plains

Twill



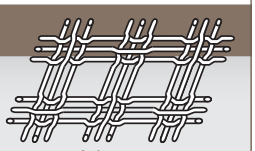
- Basic weave characterized by a diagonal rib, or twill line
- Each end floats over at least two or more consecutive picks enabling a greater number of yarns per unit area than a plain weave, while not losing a great deal of fabric stability
- Looks different on one side than on the other

Satin



- Fabric face is almost all warp or filling floats produced in the repeat of the weave
- One filling thread floats over three or more warp threads, then under one
- Often used to reinforce plastics due to high bidirectional strength
- Most drapeable of weave patterns and conforms very easily around most contoured surfaces
- Most satin weaves are either 4, 5, 8, or 12 Harness Satins and are typically utilized in the composites industry

Leno



- Locking type weave in which two or more warp threads cross over each other and interlace with one or more filling threads
- Primarily prevents shifting of fibers in open-weave fabrics

Specifications

Style	Weight (oz./yd.²)	Weave	Thickness (in.)	Yarn Desc. (Warp)*	Yarn Desc. (Fill)*	Yarns/In. (Ends x Picks)	Breaking Strength Warp (lb./in.)	Breaking Strength Fill (lb./in.)	Finish**
106	0.72	Plain	0.0013	ECD 900 1/0	ECD 900 1/0	56 x 56	45	40	643
120	3.12	4 Harness Satin	0.005	ECD 450 1/2	ECD 450 1/2	60 X 58	105	87	504 Volan
1522	3.64	Plain	0.006	ECG 150 1/2	ECG 150 1/2	24 X 22	65	60	504 Volan
3733	5.75	Plain	0.008	ECG 37 1/0	ECG 37 1/0	18 X 18	150	115	504 Volan
7533	5.90	Plain	0.009	ECG 75 1/2	ECG 75 1/2	18 X 18	110	100	504 Volan
2532	7.00	Plain	0.011	ECG 25 1/0	ECG 25 1/0	16 X 14	150	100	504 Volan
7532	7.10	Plain	0.010	ECG 75 1/3	ECG 75 1/3	16 X 14	135	100	627 Silane
7725	8.50	2x2 Twill	0.010	ECG 75 1/0	ECG 75 1/0	54 X 18	-	-	504 Volan
1581	8.75	8 Harness Satin	0.010	ECG 150 1/2	ECG 150 1/2	57 X 54	198	175	504 Volan
7781	8.71	8 Harness Satin	0.009	ECDE 75 1/0	ECDE 75 1/0	57 X 54	242	231	504 Volan
7500	9.64	Plain	0.015	ECG 37 1/2	ECG 37 1/2	16 X 14	235	215	504 Volan
7544	18.23	2 End Plain	0.021	ECG 37 1/2	ECG 37 1/4	27 X 14	450	390	504 Volan
7587	20.10	Mock Leno	0.030	ECG 37 1/2	ECG 37 1/2	39 X 21	420	215	504 Volan
1597	38.00	Triple Plain	0.039	ECG 37 1/4	ECG 37 1/4	30 X 30	700	600	504 Volan

**E = E Glass C = Continuous filament D = 5 micron diameter DE = 6 micron diameter G = 9 micron diameter H = 10 micron diameter*

***504 Volan and 627 Silane are compatible with epoxies and polyesters.*

BEST SELLERS
fiberglass cloth

6 oz. Fiberglass Cloth (#7533)
- Well-suited for various lightweight, general-purpose applications
- Ideal for small craft boat building, reinforcing, sheathing/waterproofing, and lightweight tooling

10 oz. Fiberglass Cloth (#7500)
- Most popular medium-weight fabric
- Excellent balance of cost, weight, and strength
- Versatility: popular for tooling, sandwich core panels, FRP boat construction, waterproofing and other high-strength layup applications

18 oz. Fiberglass Cloth (#7544)
- Higher glass-to-resin ratio: the plain weave is less "open" than a mock leno weave
- Used in place of multiple layers of a medium-weight fabric where a rapid build-up is required
- Ideal for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers

20 oz. Fiberglass Cloth (#7587)
- Easier to wet-out: heavy-duty with a mock leno weave that is more "open" than a plain weave,
- Used in place of multiple layers of a medium-weight fabric where a rapid build-up is required
- Ideal for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers

38 oz. Fiberglass Cloth (#1597)
- Our heaviest fiberglass cloth, featuring a triple plain weave
- Used with epoxy in applications where a very strong, rapid build-up is required or to reinforce wood
- Ideal for flat or slightly curved shapes, and/or as back-up layers behind lighter surfacing layers

Availability: *sold in full rolls shipped with a +/- 10% length variance per manufacturer. Billed by exact length shipped. See www.freemansupply.com/products/fabrics-bagging or QR Code on page 40 for our complete product offering.*

OTHER FIBERGLASS REINFORCEMENTS

Fiberglass Strand
These ¼" loose strands are ideal for use with Repro Laminating Resin or epoxy laminating resins where a faster layup is required, Fiberglass Strand is also easier to apply than cloth around irregular areas.

Availability: *5 lb. or 50 lb. boxes.*

Fiberglass Stitchmat
Also referred to as Biaxial Mat, Stitchmat is a heavy, 18 oz. woven roving, stitched to a light ¾ oz. fiberglass mat. Used mainly with polyester laminating resins for building laminate strength and thickness, the mat helps hold the roving together during cutting and laminating.

Availability: *sold by the yard.*

Fiberglass Tapes (8.75 oz.)


These plain weave fiberglass tapes are used with or without fiberglass cloth to laminate plastic tooling for exact duplication applications. These tapes are manufactured with hemmed edges and a heavy 8.75 oz./yd.^{2}, 627 silane finish fiberglass cloth stitched to a ¾ oz./yd.^{2} mat. The mat helps hold the fiberglass together during cutting and laminating.

Availability: *sold in full rolls.*

CARBON FIBER & KEVLAR®

Carbon Fiber is one of the strongest and stiffest reinforcement materials available. It easily justifies its premium price when used in high-performance applications.

Kevlar® fiber is known for its superior resistance from impact, fatigue, wear, and tear. These fabrics are made with Kevlar® 49, the structural grade for composite reinforcement (as opposed to Kevlar® 29, the ballistic grade material). Kevlar® is a registered trademark of DuPont.

***Availability:** all materials listed are sold by the yard.*

Specifications

Style	Weight (oz./yd.²)	Weave	Yarn Desc. (Warp)*	Yarn Desc. (Fill)*	Yarns/In. (Ends x Picks)
Carbon Fiber					
#94901	5.7	Plain	3K	3K	12 x 12
#94933	6.2	2x2 Twill	3K 33 MSI	3K 33 MSI	13 x 13
#94910	11.2	2x2 Twill	6K 33 MSI	6K 33 MSI	12 x 12
#94900	11.2	5 Harness Satin	6K 33 MSI	6K 33 MSI	12 x 12
#94140	19.75	2x2 Twill	12K 33 MSI	12K 33 MSI	10 x 10
Tapes	8.8	Plain	12K T700	G150 Fiberglass	11 x 8
Kevlar					
#5285	5	4 Harness Satin	1140 Denier Kevlar®	1140 Denier Kevlar®	17 x 17

**MSI = million lb./in.² T700= intermediate modulus*

3K Carbon Fiber – Plain Twill Weave (#94901)

Warp	3K
Fill	3K
Construction (Ends x Picks)	12 x 12
Weight	5.7

This is our lightest carbon fiber cloth. It features a plain weave (the one over and one under pattern gives it a checkerboard appearance) that is commonly used by manufacturers of lightweight aerodynamic parts. While not as drapable as the 2x2 twill weave, it is easier to handle.

3K Carbon Fiber – 2x2 Twill Weave (#94933)

Warp	3K
Fill	3K
Construction (Ends x Picks)	13 x 13
Weight	6.2

This is our lightest carbon fiber cloth that features the popular 2x2 twill weave (the 'two over, two under' pattern gives a diagonal appearance) that many recognize as "the look" of carbon fiber. This weave also makes it more drapable, yet more delicate to handle.

6K Carbon Fiber – 2x2 Twill Weave (#94910)

Warp	6K
Fill	6K
Construction (Ends x Picks)	12 x 12
Weight	11.2

A medium weight carbon fiber features the popular 2x2 twill weave but because it is not as drapable as the 3k carbon cloth, it is more often used in structural applications.

6K Carbon Fiber – 5HS Weave (#94900)

Warp	6K
Fill	6K
Construction (Ends x Picks)	12 x 12
Weight	11.2

This medium-weight cloth features a five-harness satin weave, giving it higher drapability than the 6K 2x2 twill weave.

12K Carbon Fiber – 2x2 Twill Weave (#94140)

Warp	12K 33 MSI
Fill	12K 33 MSI
Construction (Ends x Picks)	11 x 11
Weight	19.75

This heavy-duty carbon fiber cloth features the popular 2x2 twill weave, giving it adequate drapability for its size. While more difficult to form than lighter carbon cloths, this fabric enables rapid buildup, making it ideally suited for the construction of flat parts with high strength and stiffness requirements.

Unidirectional Carbon Fiber Tapes

Warp	12K
Fill	G150 Fiberglass
Construction (Ends x Picks)	11 x 8
Breaking Strength	135 lb./in. (both directions)
Weight	8.8

These tapes are made from flat filaments of carbon (not twisted, like yarns), and provide the strength and stiffness of carbon fiber in one direction only, thus enabling the maximum precision in orientation.

5 oz. Kevlar® Cloth (Style 5285)

Finish	Standard
Warp	1140 Denier Kevlar®
Fill	1140 Denier Kevlar®
Construction (Ends x Picks)	17 X 17 (per inch)
Breaking Strength	650 lb. / in. (both directions)
Thickness	0.001 in.

This standard weight Kevlar® fabric is in 4-harness satin weave form, which provides greater conformability for working with irregular shapes and in corners.

PREPREG MATERIALS

We offer a broad range of prepreg composite materials including epoxy, polyester, and cyanate, reinforced with fiberglass, carbon, or aramid fibers. These materials are commonly used in primary and secondary aircraft structures and aircraft interiors, as well as automotive and tooling applications.

For more information or to place an order for these materials, please contact our Customer Service department via myorder@freemansupply.com or by phone at (800) 321-8511. Please note geographic restrictions may apply.

MIA VACUUM BAGGING SUPPLIES

Mia Vacuum Bag and Release Film

This green polyolefin film can be used both as the vacuum bag as well as an effective release film. It has a temperature resistance to 285°F, making it ideal for polyester, vinylester, epoxy, and phenolic resins. This film is 0.002" thick, features 400% elongation, and has an indefinite shelf life.

Mia Stitch Peel Ply Fabric

This nylon fabric is used in the laminating process and placed directly against the back side of a laminated tool. This provides a rough surface that may be readily bonded to, thus saving valuable time in sanding or abrading the surface. It also has "red tracers" to easily identify the peel ply after the part is cured, minimizing the risk of forgetting to remove the peel ply.

Mia Perforated Release Film

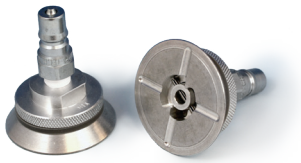
This polyolefin film contains uniformly spaced perforations. These 0.015" holes, staggered on ¼" centers, permit the excess resin from the laminate to flow through the film and be absorbed in the bleeder cloth. This film is 0.002" thick with a 0.14% open area, offers 400% elongation, and has an indefinite shelf life.

Mia Breather / Bleeder Fabric

This multi-purpose product may be used as a bleeder to absorb excess resin, as well as a breather to permit even air flow over the tool surface. This polyester product is white in color, weighs 4 oz./yd.^{2}, and is suitable for a maximum temperature of 375°F.

Availability: *all of our Mia Vacuum Bagging fabrics are sold by the yard.*

Mia Bagging Hardware



Mia Vac Valve is a premium-quality vacuum valve made from machined aluminum and comes complete with base, silicone seal, and pressure plate for quick and easy installation. Male ¼" NPT threads.

Mia Vac Gauge is a liquid-filled gauge with a range of adjustment from 30" Hg to -5" Hg. Large 2.5" diameter face with male ¼" NPT threads.

Mia Quick Disconnect is sold as two separate items and may be purchased individually. Both are made from plated steel to provide years of service. Temperature resistance to 500°F.

Mia Sealant Tape is designed to secure the bagging film to the tool surface. This yellow synthetic rubber provides an excellent sealing surface while still being able to be removed cleanly from metal or composite surfaces. Good up to 400°F, this product is sold in rolls ⅛" thick x ½" wide x 25' long.