ADVANCED COMPOSITES

HIGH PERFORMANCE FABRICS FOR STRUCTURAL INTEGRITY

BGF Industries, Inc.
a PORCHER INDUSTRIES company

TECHNICAL FABRICS FOR GLOBAL INDUSTRY

A Legacy of Innovation

BGF Industries, a Porcher Industries company, has been manufacturing fiberglass and other high performance fabrics for an ever-growing range of applications since 1941. Our heritage as an innovator and developer of quality fabrics extends back even further to 1885, when Porcher Industries was renowned for its fine woven silk goods. Since then, Porcher Industries and its related group companies have grown to become global leaders in the manufacture of woven and nonwoven technical textiles made from fiberglass, carbon, aramid and other high performance fibers for many industries including Filtration, Automotive, Construction, Composites, Electronics and Marine. Today, the diverse capabilities of the Porcher Groupe continue to expand in order to provide our partners in the worldwide marketplace the latest in innovation, technology and service.

Over these past 100+ years, we've earned a reputation as a company of firsts:

- the first weaver of broad glass fabrics
- the first company to develop a patented process for heat-cleaning fabrics that improves the physical properties of composites
- the first company to develop warp sizes that allow for weaving with low twist single yarns
- the first finisher with in-house techniques that improve interfacial bonding of resins to glass
- the first weaver to develop unidirectional fabrics
- the first company to develop a product using "DE" filaments to improve composite arrangements
- the first in the industry to launch an internet presence — www.bgf.com
- the first to offer an integrated business-to-business program (B2BGF) providing customers improved business communications

Advanced Composite Fabrics

BGF engineers composite fabrics to meet the specific needs of individual customers. Three different fibers are utilized: Fiberglass, Kevlar® and Carbon. Fiberglass is nonflammable, nontoxic and rigid, and eliminates a weight penalty. The impact-resistant properties of Kevlar® allow a measure of toughness in the composite. Carbon delivers the ultimate stiffness as well as reduced weight. Each fiber's unique characteristics are considered in the development of reinforcement fabrics. Then BGF's finish technology creates a bond between the specific fabric and our customer's resin system. The resulting composite fabric meets or exceeds military, aerospace and other appropriate specifications.

Applications

- Aircraft interiors—glass, carbon
- Primary and secondary structures—glass, carbon, Kevlar®
- Ducting—Kevlar®, glass
- Helicopter rotor blades—glass
- Radomes—glass
- Avionics—glass
- Brake linings—glass
- Transportation/automotive—carbon
- Tooling—carbon

Quality & Service

Our commitment to quality continues throughout the process with our extensive, modern distribution system. In fact, BGF has successfully upgraded its ISO registration to 9001:2000, which requires us to plan and manage the processes necessary for the continual improvement of our quality management system. And BGF offers customers B2BGF, an integrated business-to-business communications program providing customers with easy online access to their order status, shipment details, invoices, certifications, sales history and more.

Quick Response for Smooth Operations

BGF understands the importance of on-time deliveries. Our manufacturing and customer service teams have the flexibility to react quickly to your critical requirements and will follow your order through every step in the process. We have backup systems in place to ensure accurate and timely deliveries so that your operation continues to run smoothly.

Call us at 800-476-4845 to discuss your advanced composite fabric needs. We'll use our experience, innovation and commitment to quality to add strength and integrity to your product.

ADVANCED COMPOSITE FABRICS

BGF produces many unique fabrics with hybrid yarn systems, as well as by co-weaving and co-mingling two or more yarn types. BGF's capabilities include hybrid fabrics containing two or more fiber types; high modulus fabrics woven to decrease crimping; high temperature finishes that withstand the process conditions of PEEK, PPS, PRM-15 and others; enhanced wet-out finishes and fabrics that are easier to impregnate for void-free composites; and improved drapeability for contour composites.

GLASS FABRICS

- Meets Military Specification MIL-Y-1140, MIL-C-9084, AMS-3824 and other appropriate specifications as required.
- "E" and "S2" compositions.
- Available in greige and finished states.

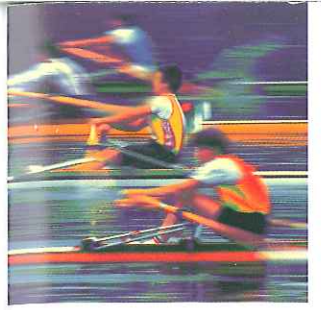
Style	120	1543	1581	6781	7781
Glass Composition	"E"	"E"	"E"	"S2"	"E"
Warp Yarn	D450 1/2	G75 1/2	G150 1/2	G75 1/0	DE-75 1/0
Filling Yarn	D450 1/2	D450 1/2	G150 1/2	G75 1/0	DE-75 1/0
Yarn Count (WxF/inch)	60 x 58	48 x 30	57 x 54	57 x 54	57 x 54
Weave Pattern	4HS	4HS	8HS	8HS	8HS
Tensile Strength (WxF, lbs/inch)	135 x 124	600 x 60	350 x 340	450 x 420	350 x 340
Weight (oz/sq yard)	3.16	8.75	8.90	8.95	8.95
Thickness (mils)	3.5	9.0	9.0	9.0	9.0

Finishes

Selecting the right finish ensures fabric performance and durability. The finishing process cleanses the fabric by removing binders and warp sizes. Then a coupling agent is chosen for compatibility with the polymeric resin. The result is enhanced wet-out and clearer laminates, requisites for optimum performance in composite materials.

The following finishes and compatible resins are standard. Other finishes are available upon request.

460	High tensile strength finish compatible with epoxy resin for missile and aircraft applications.
497A	A finish that can undergo addition or condensation reactions with polymeric resin. Finish is compatible with epoxy, polyimide, phenolic and polyester resins.
504	Volan Chrome complex finish compatible with polyester and epoxy resins.
538	Soft A-1100 Silane finish compatible with phenolic, epoxy and polyimide resins.
550	Combination of Volan and Silane coupling agents compatible with polyester and epoxy finishes.
558	A finish based on Z-6040 Silane compatible with epoxy resins.
627	A finish based on A-174 Silane compatible with a polyester and vinyl resins.
770B	A proprietary finish developed to produce high strength "S" glass composites. Finish undergoes addition type reactions with polymeric resins. Only finish approved for the AWACS radome. Finish is also applied to "E" glass fabric.



ARAMID FABRICS

- Meets Aerospace Material Specification AMS 3902 and other appropriate specifications as required.
- Available in greige or scoured (618) formats.
- Greige fabrics coated with spin finish and warp size.
- Scoured fabrics cleansed of spin finish and warp size for improved compatibility.

Style	5120	5124	5181	5281	5285
Kevlar®	"49"	"49"	"49"	"49"	"49"
Warp & Filling Yarns (Denier*)	195	195	380	1140	1140
Yarn Count (WxF/inch)	34 x 34	34 x 34	50 x 50	17 x 17	17 x 17
Weave Pattern	Plain	4HS	8HS	Plain	4HS
Tensile Strength (WxF, lbs/inch)	200 x 200	250 x 250	700 x 700	650 x 650	650 x 650
Weight (oz/sq yard)	1.80	1.80	5.00	5.00	5.00
Thickness (mils)	4.0	4.0	9.0	10.0	10.0

* In accordance of AMS 3901 latest revision except Kevlar 29.

CARBON FABRICS

- Satisfies Boeing Material Specifications BMS 9-8, as well as other major airframe manufacturers' specifications.
- Uses carbon yarns from precursor of PAN and Pitch.

Style	3K-70-P	3K-70-CS	3K-135-8H	6K-135-5H	94140
Precursor	PAN	PAN	PAN	PAN	PAN
Warp & Filling Yarns	3K	3K	3K	6K	12K
Yarn Count (WxF/inch)	12 x 12	12 x 12	24 x 24	12 x 12	10 X 10
Weave Pattern	Plain	4HS	8HS	5HS	2 X 2 Twill
Aerial Weight (gms/sq meter)	193	185	370	370	670

Carbon fabrics are not covered by ISO standards at this time.

Kevlar® is a Dupont registered trademark.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