

# COMPOSITE MATERIALS

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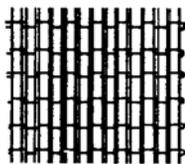


## RUTAN FIBERGLASS CLOTHS

The most basic structural material in building a composite aircraft is glass cloth. The use of glass in aircraft structures, particularly structural sandwich composites, is a recent development. Glass cloth is available commercially in hundreds of different weights, weaves, strengths and working properties. Very few of these, however, are compatible with aircraft requirements for high strength and light weight. Even fewer are suitable for the hand-layup techniques developed by Burt Rutan for the homebuilder. The glass cloth featured here has been specifically selected for the optimum combination of workability, strength and weight. Two types of glass cloth, a bi-directional cloth (RA7725BID) and a uni-directional cloth (RA7715 UND) are used. BID cloth has half of the fibers woven parallel to the selvage edge of the cloth and the other half at right angles to the selvage, giving the cloth the same strength in both directions. UND cloth has 95% of the glass fibers woven parallel to the selvage, giving exceptional strength in that direction and very little at right angles to it. BID is generally used for pieces which are cut at a 45° angle to the selvage, a bias cut, which enables the builder to lay BID into contours with very little effort and provides the needed shear and torsion stiffness for flying surfaces. UND is used in areas where the primary loads are in one direction, such as wing skins and spar caps. Multiple layers of glass cloth are laminated together to form the aircraft structure. Each layer of cloth is called a "ply".

**UNIDIRECTIONAL P/N RA7715**  
7 Oz. 38" Width Threads per inch:  
80L x 18W \$10.75 Lineal Yd.

Small Cross Fibers



Selvage Edge

Major Fiber Bundles



Selvage Edge

**BIDIRECTIONAL P/N RA7725**  
8.8 Oz. 38" Width Threads/inch:  
54L x 48W \$7.90 Lineal Yd.

Quantity Discount: 15% on 500 Yds or more. Yardage must be on one fabric for discount, not combined. Discount on larger quantities quoted on request

## BIDIRECTIONAL WOVEN KEVLAR - 120



Kevlar® 49 aramid fiber was introduced commercially in 1972 and is the Du Pont registered trademark for its new high strength, high modulus organic fiber. It combines high tensile strength (43,000 PSI) and high modulus (19 million PSI) with light weight and toughness superior to other reinforcing fibers for plastics. It is available in yarns and rovings which meet all FAA requirements for flammability. It shows no degradation in jet fuel, lubricating oils, water, salt water or high humidity. At cryogenic temperatures (-320°F.) performance is excellent with essentially no embrittlement or degradation of fiber properties. Kevlar 49 can offer both a significant weight saving and improved stiffness versus glass in addition to superior vibration damping and good impact resistance. A kayak made with Kevlar 49, for example, weighs about 18 pounds while the weight of a comparable boat made with glass would be over 30 pounds. The advantages over glass in small aircraft are similar - weight savings and improved impact resistance. Kevlar 49 is used in a number of parts on the Lockheed L-1011 because of weight savings of up to 30% compared to similar parts made of glass. One unusual benefit of Kevlar is its "quietness". A cowling made of Kevlar will be quieter and less sensitive to engine vibrations than its glass or graphite counterpart.

Although all of the processes used in combining resins with glass fiber are adaptable to Kevlar 49 with little or no modification. The vinyl estertype system is compatible, but the use of polyesters is not recommended because of poor bonding with Kevlar. The epoxy resin systems featured in this catalog are compatible with Kevlar 49 and have good wetting characteristics.

Kevlar 49 is stocked in three different fabric styles. Kevlar #120 is a very lightweight fabric, while #281 and #285 are identical except for the weaving pattern. Other weights and weaves of Kevlar are available on a special order basis. Be sure to specify the Kevlar style when ordering.

Part No.	Oz./Sq.Yd	Weight Width	Thickness	W x F	Weave	Breaking Strength Lbs/Inch		Price Per Lineal Yard
						Warp	Fill	
01-38100	1.8	38"	.0035"	34 x 34	Plain	260	250	\$29.85

Quantity Discount: 10% on 25-50 Yds. %; 15% on 50-100 Yds.; 20% on over 100 Yds.



### PRECISION SCISSORS

Straight-edge blades easily slide through the fabric and are sharpened to the tip for smaller or appliqué cuts. Grabs the fabric and cuts cleanly, with no material folding over the blades - even when cutting left-handed. Blades fully extend into the handles for durability and better cutting stability and pressure distribution. Exceptional accuracy and retains smooth blade movement, even in heavy-use environments. Straight blades made of stainless steel (Blades are not serrated). Good for cutting stitchwork, thread, cloth, leather, fabrics, films, sign and graphics material, vehicle wraps, and more.

P/N 01-01186 .....\$19.90



### OFFSET KEVLAR CUTTING SHEARS

Although Kevlar has many advantages over conventional fiberglass weaves, it is very difficult to cut. Special scissors have been developed to facilitate cutting. These scissors have a wear resistant coating which is metallurgically bonded to the steel substrate. The coating will not chip or peel off and can be sharpened. Model WR-10E-4 Shears.

P/N 01-00341 .....\$85.75



### INDUSTRIAL FABRIC SHEARS

Wiss No. 20W heavy-duty shears, ideal for cutting fiberglass cloth and all fabrics. Hot drop-forged steel.

Right Hand Shears.....P/N 01-00397 .....\$39.85  
Left Hand Shears .....P/N 01-00398 .....\$39.95



### FEATHERWEIGHT SCISSORS

Lightweight, durable, and reliable GINGHER® Scissors are lightweight, extremely sharp and comfortable. These 2-1/2 oz. scissors are perfect for use during the lay-up for a variety of purposes and can be soaked in acetone for easy clean up. We recommend saving one pair for only cutting Kevlar® and keeping a second pair for general use.

• These lightweight scissors weigh in at a comfortable 2-1/2 ounces  
• Use them to cut fiberglass, carbon fiber, and all bagging consumables  
• Cut dry or prepreg fabrics when prepping your project, or use them to cut wet fabrics during the lay-up process  
• Soak blades in acetone after use with wet fabrics and wipe down before storage  
• Scissors feature stainless steel blades with contoured nylon handles  
• An adjustable nut allows you to increase tension  
• Use with right or left hand  
• Scissors measure 8" overall.....P/N 01-00342 .....\$47.85