COMPOSITE MATERIALS

EPOXY INFORMATION

In recent years the term "epoxy" has become a household word. "Epoxy" is a general term for a vast number of specialized resin/hardener system, the same as "aluminum" is a general term for a whole family of specialized metal alloys. Just as the aluminum in the spar of a high performance aircraft is vastly different from the "aluminum" pots and pans in your kitchen, the "epoxy" in your aircraft is vastly different from the hardware store variety. Epoxy is the adhesive matrix that keeps the plies of load-carrying glass cloth together. Epoxy alone is weak and heavy. It is important to use it properly so that the full benefits of its adhesive capability are obtained without unnecessary weight. An "epoxy system" is made up of a resin and a hardener tailored to produce a variety of physical and working properties. The mixing of resin with its hardener causes a chemical reaction called curing, which changes the two liquids into a solid. Different epoxy systems produce a wide variety of solids ranging from extremely hard to very flexible. Epoxy systems also vary greatly in their working properties, some are very thick, slow pouring liquids and others are like water. Some epoxy systems allow hours of working time and others harden almost as fast as they are mixed. A single type of resin is sometimes used with a variety of hardeners to obtain a number of different characteristics. In short, there is no universal epoxy system, each has its own specific purpose and while it may be the best for one application, it could be the worst possible in another use. The working and strength characteristics of an epoxy system are dependent on the resin, the hardener and on the amount of each in a given mixture. Epoxy systems are engineered for a specific ratio of resin and hardener. It is quite important that the proper mixture be obtained. An accurate balance or ratio pump must be used to accomplish this. Epoxy resin and hardener are mixed in small batches, usually 6 ounces or less, even in the largest layup. The reason for small batches is that, in large batches, as the hardening reaction progresses, heat is generated which speeds the reaction, which causes even more heat, which ends up in a fast reaction called an exotherm. An exotherm will cause the cup of epoxy to get hot and begin to thicken rapidly. If this occurs, throw it away and mix a new batch. The small volume batch avoids the exotherm. For a large layup, you will mix many small batches rather than a few large ones. With this method you can spend many hours on a large layup using epoxy that has a working life of only a few minutes. If the epoxy is spread thin as in a layup, it will remain only a few degrees above room temperature. However, in a thick buildup or cup, the low surface area to mass ratio will cause the epoxy to retain its heat, increasing its temperature. This results in a faster cure causing more heat. This unstable reaction is called an exotherm. Exotherm temperatures can easily exceed the maximum allowable for foam (200°) and damage the foam-to-glass bond. Unwaxed paper cups are used for mixing and measuring resin and hardener. DO NOT use waxed cups; the wax will contaminate your epoxy. Mixing is done by stirring with a stick, being careful not to spill any. If you spill part of an unmixed cup, the ratio of resin and hardener may be inaccurate and it should not be used. Mix each cup for a least one minute. You should spend 80% of your mixing time stirring the cup and 20% scraping the sides to assure complete mixing. Do not mix with a brush. The bristles can soak up the hardener, changing the ratio. Use a tongue depressor or wood stick. The working temperature has a substantial effect on the pot life and cure time. Very hot conditions will cause the cure to speed up. In cold working conditions the cure will be delayed and if it is cold enough, epoxy may not cure at all. Working temperatures must be between 70° and 100°. A range of 75° to 85° is best. Cold epoxy results in increased time required to do a layup, since it takes longer to "wet" and to squeegee the cloth. A layup at 70° F may take almost twice the time as at 80° F. On most layups (except for joining foam cores) it is best to have 75° to 85° F room temperature and 90° to 100° F epoxy. Resin and hardener can be kept warmer than room temperature by keeping it in a cabinet with a small light bulb on. DO NOT store your resin or hardener on a cold floor if you plan to use it within the next several hours. If you let your shop get cold between working periods, keep some resin and hardener in the warmest place of your house for use on the next layup. Sometimes epoxy hardener will have solids form in the bottom of the bottle. If this happens do not use the hardener. All of the hardener must be liquid before it is used. To use this hardener it is necessary to heat it up and stir or shake it slightly. To do this heat some water on your kitchen stove in a large pan with the hardener in the pan of water. Move the bottle around to be certain not to melt the plastic container. When the water has just started to boil pull the hardener out and slosh it around. This should dissolve all of the sediment in the bottom. If not put it back in the water for a few minutes and then shake it again. Save your mixing cups, as they can be used as a quality check of your epoxy. After a day or two take a sharp knife point or scribe and scratch at the face of the epoxy in the cured cup. If the epoxy cured properly the scribe will make a white scratch mark. If the epoxy has not cured, the scribe will make a dull ridge, indicating a soft surface. If this occurs the epoxy is not cured, either due to inadequate time or temperatures, or bad mixing or bad epoxy. Temperature is very important in working with epoxy. If you are working in a garage in the winter, the room must be heated up well in advance of the start of your layup. The foam blocks are a very good insulator and so it can take as long as four hours for the foam to warm completely to room temperature. Start heating your work area and all materials well in advance of starting your layup.

EZPOXY SYSTEM

Developed to replace safe-t-poxy; EZ-Poxy offers the same handling and physical properties to include ease of use, long pot life, rapid cure and good room temperature curing properties. Mix ratio: Weight: 100 resin to 44 hardener, Volume: 100 resin to 47 hardener. Hardener EZ83 - offers a pot life of 2 hours, tack free time 4 hours and cures time 24 hours. Hardener EZ84 - offers a pot life of 2 hours, tack free time 8 hours and cure time of 3 days if both hardeners are at tempertures of 25 degree C or 77 degree F. Store resin and hardener at 60 degree to 100 degree F in a dry place sealing tightly after use. If crystallized during storage, vent container and heat to 125-145 degree until crystals dissolve. Stir well after product is liquefied. Always mix thoroughly to ratio stated for product, using immediately. Do not mix below 65 degree. As with all epoxies, work in well ventilated areas using gloves, eye and clothing protection avoiding contact to skin and eyes. Wash all clothes after use as products may cause skin and respiratory allergic reactions. Order Quart resin to Pint hardener, Gallon resin to 1/2 Gallon hardener, 5 gallon resin to 2-1/2 gallon hardener. HAZARD FEE REQUIRED FOR RESINS AND HARDENERS IN ALL SIZES.

DESCRIPTION	QUANTITY	USE WITH	PART NUMBER	PRICE
RESIN	QUART	PINT HARDENER	**EZ10-QT**	**18.05**
RESIN	GALLON	1/2 G HDR	**EZ10-G**	**61.31**
RESIN	5 GALLON	2-1/2 G HDR	**EZ10-5G**	**263.83**
83 HARDENER	PINT	QUART RESIN	**EZ83-PT**	**11.28**
83 HARDENER	1/2 GAL	GALLON RESIN	**EZ83-1/2G**	**34.19**
83 HARDENER	2-1/2 GAL	5 GAL RESIN	**EZ83-2-1/2G**	**191.20**
84 HARDENER	PINT	QUART RESIN	**EZ84-PT**	**10.42**
84 HARDENER	1/2 GAL	GALLON RESIN	**EZ84-1/2G**	**37.75**
84 HARDENER	2-1/2 GAL	5 GAL RESIN	**EZ84-2-1/2G**	**169.84**

MGS EPOXY SYSTEM

The 285 and 335 systems are especially suited for homebuilders because of their shelf lives, excellent workability, adjustable cure rates and excellent static and dynamic strength characteristics. Both systems are available with fast or slow hardeners which can be blended with each other in any proportion to provide the desired working life and cure cycle. Unfavorable low temperature and high humidity will not effect the quality of the product. MGS resins do not contain aromatic amines. The 285 system has higher physicals than the 335 and will achieve a higher Tg after post curing. While the 335 is more viscus than the 285, after mixing with appropriate hardeners, their viscosities are comparable. Technical data available. No MDA.

285 SYSTEM: 1 Gallon resin, plus 2 quarts hardener.
Pot life: Fast - 40 min., Slow - to 4 hrs., Max. Tg: 195° - 230°F
Mixing: Volume - 100 parts resin with 50 parts hardener, Weight 100:40
335 SYSTEM: 1 Gallon resin, plus 1.8 quarts hardnener.
Pot life: Fast - 15 min., Slow - to 6 hrs., Max Tg: 160° - 180°F
Mixing: Volume - 100 parts resin with 45 parts hardener, Weight: 100:38

NOTE: PURCHASE 2 UNITS OF HARDENER FOR EACH GALLON OF RESIN.

SYSTEM	DESCRIPTION	QUANTITY	PART NUMBER	PRICE
285	RESIN	1.0 GALLON	**L285**	**126.97**
285	FAST HARDENER	1.0 QUART	**H285F**	**30.99**
285	SLOW HARDENER	1.0 QUART	**H287S**	**36.51**
335	RESIN	1.0 GALLON	**L335**	**88.97**
335	FAST HARDENER	0.9 QUART	**H335F**	**30.83**
335	SLOW HARDENER	0.9 QUART	**H340S**	**28.99**

COMPOSITE MATERIALS

WEST SYSTEM BRAND

The professional choice for building and repair needs. The West System is the result of over 20 years of epoxy research and boat construction. Over the years, the formula has been adjusted to provide maximum shelf life. If the containers are properly sealed and kept from temperature extremes, West System resin and hardener should remain usable for many years. The 105 resin will exhibit a slight increase in viscosity over time, and will therefore, require extra care when mixing with hardener. It is always wise to make a small test sample before committing time and materials to a big project. **POT LIFE VS. WET LAY-UP TIME POT LIFE** - Also called working life, the period of time during which an epoxy resin, after mixing with a hardener, remains workable and suitable for use. Its length depends on the type of hardener, mixing temperature, mixing quantity, pot shape (larger surface area helps to extend pot life), etc.**WET Layup TIME** - also called assembly time, the time interval between the spreading of the glue on the bonding surface (wood, fiberglass, metal, etc.) and the application of pressure via vacuum, clamping or weights and/or heat to the assembly. It also depends on what kind of hardener is used, the ambient temperature of the adhesive, the thickness of the glue line and the number of layers to be laminated. In general, the wet layup time is about double the length of the pot life with 100g mixing quantities, if the epoxy is applied immediately after thorough mixing.

ESTIMATING COATING COVERAGE
WEST SYSTEM 105 RESIN 205 or 206 HARDENER

QUANTITY OF MIXED EPOXY	SATURATION COAT POROUS SURFACES	BUILDUP COATS NONPOROUS SURFACES
A GROUP 1.2 qt.(1.15L)	90-105 sq.ft (8.5-10m)	120-135 sq.ft (11-12.5m2)
B GROUP 1.2 gal.(4.55L)	350-405 sq.ft. (32-37m2)	462-520 sq.ft. (43-48m2)
C GROUP 5.29 gal. (20L)	1530-1785 sq.ft (142-165 m2)	2040-2300 sq.ft (190-213 m2)

FOR MORE DETAILED COVERAGE ESTIMATES REFER TO THE WEST SYSTEM TECHNICAL MANUAL #002-950

WEST SYSTEM TECHNICAL MANUAL

The original wood and epoxy construction manual, revised in 1988. Includes detailed instructions and information on all aspects of West System epoxy usage and many helpful tips on building techniques and tools. Soft cover, 32 pages.

DESCRIPTION	PART NUMBER	PRICE
TECHNICAL MANUAL	**002-950**	**0.00**

423 GRAPHITE POWDER

This 423 graphite powder is mixed with West System Brand Epoxy to produce a low-friction coating, commonly used on rudders, centerboards, and bottoms of racing craft that are dy-sailed. It is used in combination with 406 Filler for the repair of worn bearing surfaces. It is also used in combination with 404 Filler as a black colorant to create a UV resistant adhesive for teak veneer installations. Coverage: approximately 160 fl oz of mixed epoxy when mixed at 10% by volume. 160 fl oz of epoxy will coat 450-500 sq ft of non-porous surface.

SIZE	USE WITH	PART NUMBER	PRICE
6 OZ (170g)	WEST SYSTEM EPOXY	**423-6**	**7.50**

105 EPOXY RESIN

Is the base material of the West System family of products, on which all possible West System compounds are built. The resin is a clear, light amber, low-viscosity liquid epoxy resin. It is a formulated resin designed specifically to wet out and bond with wood fiber, fiberglass and a variety of metals. With roller applications, it possesses excellent thin-film characteristics in flowing out and self-leveling without fish eyes.. It can be cured in a wide temperature range and can be sanded and shaped afterwards. The resin cures quite clear so that you can achieve a natural finish by coating with varnish. It has a relatively high flash point, which makes it safer to work with than polyesters. Makes an excellent adhesive when mixed with fillers to reduce sag and bridge voids. Viscosity is approximately 600 CPS at 70 degrees F (21 degrees C). Use optional mini pumps for accurate, easy dispensing. West System epoxy is not compatible with fuels containing alcohol. Coverage (porous) 350-405 sqft., non porous 462-520 sqft. No MDA. ORM-D - Ship Ground Only.

KIND	QUANTITY	USE WITH	PART NUMBER	PRICE
RESIN	QUART	-A HARDENERS	**105-A**	**32.65**
RESIN	.98 GALLON	-B HARDENERS	**105-B**	**86.00**
RESIN	4.35 GALLON	-C HARDENERS	**105-C**	**299.20**

205 FAST HARDENER

Is used in a majority of situations to produce a rapid cure which develops its physical properties quickly. 205 is an epoxy curing agent consisting of a formulated mixture of polyamines of medium viscosity. When mixed with the 105 resin in a five-part resin to one-part hardener ratio, the cured resin/hardener mixture yields a rigid, high-strength solid which has excellent cohesive properties and provides an outstanding moisture vapor barrier. The 105 resin & 205 Fast hardener mixture has a pot life of 10 to 15 minutes at 70 degree F (21 degrees C) and cures to a solid state in 6-8 hours. Will achieve maximum strength in several days. Use with 301 mini pumps. No MDA. ORM-D - Ship Ground Only.

DESCRIPTION	QUANTITY	USE WITH	PART #	PRICE
FAST HARDENER	.44 PINT	-A RESIN	**205-A**	**14.90**
FAST HARDENER	.86 QUART	-B RESIN	**205-B**	**32.90**
FAST HARDENER	.94 GALLON	-C RESIN	**205-C**	**119.94**

206 SLOW HARDENER

Is an epoxy curing agent consisting of a low-viscosity mixture of polyamines. When combined with 105 resin in a five-part resin to one-part hardener ratio, the cured resin/hardener mixture yields a high-strength, rigid moisture-resistant solid, excellent for coating and bonding, and as a wet-out resin for glass cloth. Ideal for use when extended assembly time is desirable in bonding applications. Pot life at 70 degrees F (21 degrees C) is 25 to 30 minutes. Cures to a solid state at 70 degrees F in approximately nine hours. Will achieve maximum strength in several days. Use with 301 mini pumps. ORM-D on A and B. HAZARD on C. Ship Ground Only.

DESCRIPTION	QUANTITY	USE WITH	PART #	PRICE
SLOW HARDENER	.44 PINT	-A RESIN	**206-A**	**15.90**
SLOW HARDENER	.86 QUART	-B RESIN	**206-B**	**34.48**
SLOW HARDENER	.94 GALLON	-C RESIN	**206-C**	**126.54**

COMPOSITE MATERIALS

207 SPECIAL COATING HARDENER

These hardeners cannot be used with 300 mini pump system. 207 special coating is used where an exceptionally clear, moisture-resistant natural wood finish is desired. Ultraviolet inhibiting additive improves sun resistance; however, additional protection of a quality UV varnish is required. Can be used for laminating veneers where bleed through at joints may be exposed to sunlight. Pot life 20-25 minutes, cure solid state 9-12 hrs, maximum 4-7 days. 209 hardener is used for bonding applications in extremely warm and/or humid conditions or when extended working time is desired at room temperature providing twice the working time of 206 Slow. Forms a clear, amber-colored solid. Pot life 40-50 minutes, solid state 20-24 hrs, maximum 4-9 days. Hazard - Ship Ground Only!

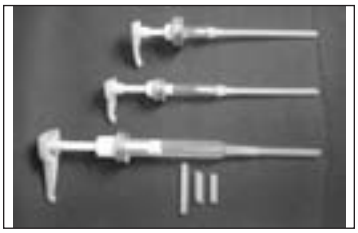
DESCRIPTION	QUANTITY	USE WITH	PART #	PRICE
HARDENER	.66 PINT	-A RESIN	**207-SA**	**29.25**
HARDENER	.33 GAL	-B RESIN	**207-SB**	**63.75**
HARDENER	1.45 GALLON	-C RESIN	**207-SC**	**210.00**

209 TROPICAL HARDENER

These hardeners cannot be used with 300 mini pump system. 207 special coating is used where an exceptionally clear, moisture-resistant natural wood finish is desired. Ultraviolet inhibiting additive improves sun resistance; however, additional protection of a quality UV varnish is required. Can be used for laminating veneers where bleed through at joints may be exposed to sunlight. Pot life 20-25 minutes, cure solid state 9-12 hrs, maximum 4-7 days. 209 hardener is used for bonding applications in extremely warm and/or humid conditions or when extended working time is desired at room temperature providing twice the working time of 206 Slow. Forms a clear, amber-colored solid. Pot life 40-50 minutes, solid state 20-24 hrs, maximum 4-9 days. Hazard - Ship Ground Only!

DESCRIPTION	QUANTITY	USE WITH	PART #	PRICE
HARDENER	.66 PINT	-A RESIN	**209-SA**	**26.95**
HARDENER	.33 GALLON	-B RESIN	**209-SB**	**58.15**
HARDENER	1.45 GALLON	-C RESIN	**209-SC**	**210.00**

300 MINI PUMPS



West System mini pumps to be used with 105 resin and 205 or 206 hardeners. Adapter tubes included to be used with the quart, .98 gallon or 4.35 gallon kits.

DESCRIPTION	PART NUMBER	PRICE
ABC COMBINATION SET	**300**	**10.35**

MINI PUMP FOR 125-0/229-0

West System mini pump for use with the #125 resin and 229 hardener

DESCRIPTION	PART NUMBER	PRICE
MINI PUMP	**300-P**	**13.50**

AEROPOXY SYSTEM

PR3660/2032 PR2032 Resin & Hardener is a medium viscosity, unfilled, light amber laminating resin that is designed for structural production applications. When used with PH3660 hardener, the system gives excellent wet-out of fiberglass, carbon and aramid fibers. Special additives have been incorporated into this system to promote chemical adhesion to fabrics made with these fibers. Typical applications include aircraft and sailplane skins, auto bodies, radomes and prototype parts. Cure time: at least 24 hours, at a minimum temperature of 72° F, before moving the structure. Pot life (4 oz): 3630: 30 mininutes 3660: 60-65 minutes, 3665: 120-140 minutes. Mix ratio: 100 parts PR2032 to 27 parts 3660, by weight or 3 parts PR2032 to 1 part PH3660 by volume. ORM-D label - Ship Ground.

KIND	QUANTITY	USE WITH	PART #	PRICE
RESIN	QT (2.25 LB)	PT HARDENER	**2032-QT**	**26.82**
FAST HARDENER	PT (0.66 LB)	QT RESIN	**3660-PT**	**9.50**
RESIN	3/4 GAL (7.5 LB)	QT HARDENER	**2032-3/4G**	**63.00**
FAST HARDENER	QT (2 LB)	3/4 GAL RESIN	**3660-QT**	**27.70**
SLOW HARDENER	QT (2 LB)	3/4 GAL RESIN	**3665-QT**	**29.00**
SUPER FAST HARDENER	QT (2 LB)	3/4 GAL RESIN	**3630-QT**	**25.50**
RESIN	5 GAL (48 LB)	2-1/2 GAL HARDENER	**2032-5G**	**315.50**
FAST HARDENER	2-1/2 GAL (13 LB)	5 GAL RESIN	**3660-2-1/2G**	**135.00**
SLOW HARDENER	2-1/2 GAL (13 LB)	5 GAL RESIN	**3665-2-1/2G**	**135.00**

125 & 229 PROSET RESIN & HARDENER

Mixing: 125 Resin: 229 Hardener: By weight - 100:30, by volume - 100:35. Pot life: 65 degree - 83 min, 72 degree - 77 min., 85 degree - 27 min. ORM-D - Ship Ground Only!

KIND	USE WITH	PART NUMBER	PRICE
RESIN	229-0 HARDENER	**125-0**	**101.14**
HARDENER	125-0 RESIN	**229-0**	**59.99**

501 WHITE PIGMENT

Is an epoxy-based paste which can be used to tint the epoxy mixture to provide a base color for the final finish system. A colored surface also tends to highlight flaws and imperfections which otherwise might be overlooked. Pigment should be added at a rate of approximately one teaspoon (10g) of pigment to eight ounces (236ML) of epoxy. More pigment will increase opaqueness; however, adding pigment leads to a proportional increase in mixture viscosity. Pigment should only be added to epoxy used for second or third coats because it may interfere with the wetting qualitites of epoxy. Cured, pigmented epoxy surfaces do not provide a final finish surface, but require enamel or polyurethane paint systems to provide ultraviolet protection. Sold in 4 ounce bottles.

SIZE	PART NUMBER	PRICE
4 OZ CAN	**501**	**12.45**

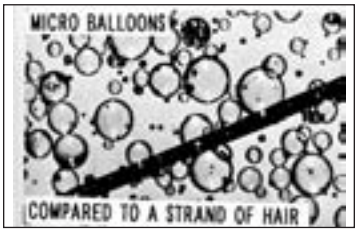
COMPOSITE MATERIALS

406 COLLOIDAL SILICA ADHESIVE FILLER

406 Colloidal Silica is a thickening additive used to control the viscosity of the epoxy and prevent epoxy runoff in vertical and overhead joints. 406 is a very strong filler that creates a smooth mixture, ideal for general bonding and filleting. It is West Systems' most versatile filler. Often used in combination with other fillers. It can be used to improve the strength, abrasion resistance, and consistency of fairing compounds, resulting in a tougher, smoother surface. Color: off-white.

SIZE	PART NUMBER	PRICE
5.5 OZ	406-7	18.85

MICRO BALLOONS



Glass and quartz bubbles also called micro balloons used to add to mixed epoxy and hardener. Totally non-structural and very light, with a texture and color approaching talcum powder they are used to thicken epoxy. Slurry consistency is still quite runny, similar to honey. Ratio of filler to epoxy is not critical, simply add filler to well mixed epoxy until the desired consistency is achieved. If it gets too thick, add more epoxy. Slurry is used to coat and seal the raw sanded foam before laying on the glass cloth. Also aids in easing the removal of trapped air bubbles by sealing off the foam. Dry micro is achieved by adding additional filler to the slurry. Similar to dry bread dough, has excellent and easy sanding characteristics, but very light in weight. Use by painting on a thin coat of epoxy, then add dry micro mix. Press in place. Dry micro is good for filling low spots, totally non-structural.

SIZE	PART NUMBER	PRICE
1 GALLON BAG	B23/500-G	8.75

101-6 MAXI REPAIR PACK

Here is everything you need to complete small repairs around the boat, shop or home. The repair pack includes two 16-gram packets of West system 105 resin, two 3.2-gram packets of 205 hardener, and 3.5 grams of high-density filler. Also included are an application brush, mixing stick, pipe cleaner, two cleaning pads and step-by-step instructions. The components are mixed in the disposable container/package.

DESCRIPTION	PART NUMBER	PRICE
MAXI PACK	101-6	24.95

T-88 ADHESIVE

Adhesive is non-brittle, 2 part adhesive gives superior results under adverse conditions. Will bond aluminum, steel and wood. Amber color becomes virtually invisible when varnished. When fully cured unaffected by water, oil, gasoline and virtually all chemicals. Not affected by freezing temperatures, resin can be heated if it becomes crystallized. Pot life 45 min. at 70 degrees. Work time 2 hours. Mix ratio: 100 to 83 by weight. 1 to 1 by volume. Minimum shelf life, 1 year.

SIZE	CONTAINS	PART NUMBER	PRICE
1/2 PINT KIT	2 EA 4 OZ BOTTLES	T-88-1/2PT	18.40
PINT KIT	2 EA 8 OZ BOTTLES	T-88-PT	23.82
QUART KIT	2 EA 16 OZ BOTTLES	T-88-QT	35.52
1/2 GALLON KIT	2 EA 32 OZ BOTTLES	T-88-1/2G	62.57
GALLON KIT	2 EA QUART BOTTLES	T-88-GAL	120.16

CABOSIL

Is a fumed silicone dioxide and is used to modify the flow properties of epoxy to keep it from sagging when used on vertical surfaces. Does not change the properties of the epoxy. (Approximately 5 oz. by weight

SIZE	PART NUMBER	PRICE
1 GALLON BAG	M5	6.75

COTTON FLOCK

Structural resin filler used in structural joints and in areas where a very hard durable build up is required. Flox is mixed in much the same way as dry micro but only about two parts flock to one part epoxy is required. Mix in just enough flock to make the mixture stand up. If "wet flox" is called out, mix it so it will not sag or run. "Flox" is often used to reinforce sharp corners to give more structural integrity. The flox corner is done just before one glass surface is applied for a wet bond to one surface.

SIZE	PART NUMBER	PRICE
1 GALLON BAG	902	3.39

MILLED GLASS

Use as a strengthened filler with epoxies. Quite heavy, 1-lb. is equal to approximately 1 cup measurement. Powder consistency.

SIZE	PART NUMBER	PRICE
1 GALLON BAG	MLD-GLS	4.09

101 HANDY REPAIR PACK

Here is everything you need to complete small repairs around the boat, shop or home. The repair pack includes two 16-gram packets of West system 105 resin, two 3.2-gram packets of 205 hardener, and 3.5 grams of high-density filler. Also included are an application brush, mixing stick, pipe cleaner, two cleaning pads and step-by-step instructions. The components are mixed in the disposable container/package.

DESCRIPTION	PART NUMBER	PRICE
MINI PACK	101	11.75

EPOXY COMPOUND

A versatile 2-part epoxy compound that may be used as an adhesive, a filler or sealant for fast 30 min. repairs. As an adhesive, Epoxo 88 sets up in 6 min. and cures rapidly in any thickness, developing 1500 lbs tensile strength in 15 min. It bonds aluminum, fiberglass, foam, honeycomb, wood, plastics etc., yielding 2275 psi tensile shear strength when bonding aluminum to aluminum. As a filler, it exhibits excellent sanding properties with negligible shrinkage; it may be sanded & feather-edged after 15 min. 5 yr shelf life.

DESCRIPTION	PART NUMBER	PRICE
18 OZ TUBES	88T25R	20.99

COMPOSITE MATERIALS

QUICK CURE 5 MINUTE EPOXY

By SYSTEM THREE - For fast repairs and bonding to wood, most metals, fiberglass, ceramics concrete, glass leather and many plastics. Will not bond to polyethylene, teflon or similar rubber and plastic materials. By mixing equal parts of A & B, this product will harden in about 5 minutes at room temperature. Not recommended for service above 200 degrees F or for long immersion in water. Pint kit equals 2 - 1/2 pint containers, Quart kit equals 2 pint containers.

SIZE	CONTAINS	PART NUMBER	PRICE
PINT KIT	2 EA 1/2 PT BOTTLES	**T-5-PT**	**29.99**
QUART KIT	2 EA PINT BOTTLES	**T-5-QT**	**45.00**

AEROPOXY LIGHT

A/B Two-component light tan paste epoxy patching and filler compound for foam, wood, fiberglass and other surfaces. The mixed consistency is very smooth, so it spreads easily and can be splined to a feather edge without separation. It is a thixotropic, non-sag material that will remain in place in thick sections, even when applied upside down! Aeropoxy light is a very light material, and therefore contributes minimal added weight to the filled or repaired structure. The cured material is very easy to sand, making the finished patch undetectable when covered or painted. Pot life - 4 fluid ounces - 25-30 minutes. Mix ratio: Weight - 100:50, Volume - 2 to 1. Cure time at 77 degree - to shape: 2-3 hours, to sand: 5-6 hours, full cure: 24 hours. Compressive strength 2156 psi., density - .0178 lb/cubic inch, 4 lbs/gallon.

DESCRIPTION	PART NUMBER	PRICE
1-1/2 LB KIT	**LIGHT-QT**	**25.04**
6 LB KIT	**LIGHT-GAL**	**85.00**

SMOOTH PRIME UV PRIMER

Pinhole killer. Waterborne polyurethane primer applied with a foam roller or spray gun Fills pinholes in layups or molded parts. White color. Crosslinked for maximum performance. Kit comes with a crosslinker and syringe. Dry sand for a smooth, pinhole-free surface. Dries in 20 minutes, sand in two hours. Clean up with water. Three gallons required for most composite aircraft. Kits include 1/2 oz.crosslinker & syringe. NON-HAZMAT

SIZE	PART NUMBER	PRICE
QUART	**SP-QT**	**55.50**
GALLON	**SP-GAL**	**158.00**

STERLING PRIMER FILLER

Is a high solids primer with excellent sanding and film thickness. Mixing equal parts by volume, primer may be applied either by conventional or airless sprayer, brush or roller. Pot life is approximately 2.5 hours. Ready to sand within 30-45 minutes depending upon thickness, temperature and relative humidity. 2-Gallon kit consists of 1 gallon primer, and 1 gallon catalyst. ORM-D - Ground shipping only. Weight per gallon 10.5 lb. THINNER-use to thin Sterling primer when using conventional spray equipment.

SIZE	TYPE	PART NUMBER	PRICE
GALLON	THINNER	**U1014**	**35.99**
2 GALLON KIT	PRIMER	**U1761/U1762**	**355.00**

SUPERFIL EPOXY FILLER

Epoxy resin with non-MDA hardener - ships non hazardous. Use as you would an epoxy micro slurry. Mix by weight for best results. Scuff-sand smooth surfaces before application. Trowel or squeegee to desired thickness. EP420 primer may be applied directly over dried superfil. Mix by weight 2 parts A to 1 part B. Cure to sand - 12 hours at 77 degree, pot life 1 hour at 77 degree. Can be used on many substrates such as wood, fiberglass and metals.

SIZE	CONTAINS	PART NUMBER	PRICE
QUART KIT	1 A & B BOTTLE	**SEFK-1**	**22.22**
3 GALLON KIT	2 A & 1 B BOTTLES	**SEFK-3G**	**165.90**

LITE WEIGHT FILLER

Is a super lightweight autobody filler that applies without sagging. Lets you file or sand in minutes to even days later. Requires less sanding to reduce dust and clogging. Feather edges superbly. Cures under humid conditions. Red cream hardener included. Also used extensively in composite construction to hold jig blocks in place and other temporary fastening jobs. Gallons require hazardous material fees. Product ships Ground Only - no air - RED, BLUE ETC. Large quantities may be less expensive to ship truck freight. ORM-D.

SIZE	PART NUMBER	PRICE
1 QUART	**LW-157**	**12.50**
1 GALLON	**LW-156**	**19.78**

KAMPEL AEROFIL

Aerofil is an easy-to-use fabric filler that repairs defects on nitrate, butyrate and fiberglass surfaces. Small cracks, chips and other defects can be repaired quickly and easily. Pin holes can be filled and tape edges smoothed. Several coats may be applied for deeper repairs due to Aerofils quick drying time. Sands and works easily. Fiberglass repairs may also be made after sealing with lacquer primer. 2 colors: white for general repairs; silver for dark base or UV protection. 1/4# can. Aircraft Fabric Filler.

DESCRIPTION	PART NUMBER	PRICE
SILVER-1/4 LB	**KA-S**	**17.25**
WHITE-1/4 LB	**KA-W**	**15.75**

FIBERGLASS PINHOLE FILLER

A single component, high-solids paste used for filling pinholes in glass laminates and open grained woods prior to finishing with epoxy or polyurethane coatings. After sanding and cleaning, filler is rubbed into the surface and, after a short time, wiped clean and allowed to dry (2 hrs w/fiberglass) before application of primer, etc. Coverage: 600 sq ft/gal. Shelf life: 1 yr unopened.

SIZE	PART NUMBER	PRICE
GALLON	**28C1-G**	**105.31**

COMPOSITE MATERIALS

MICROLIGHT 410 FILLER

Is the ideal low-density filler for creating a light, easily-worked fairing compound especially suited for fairing large areas. Microlight handles well and mixes with greater ease than microballoons, and is approximately 30% easier to sand. It is also more economical for large fairing jobs. Cures to a tan color. Not recommended for high-heat exposure.

SIZE	PART NUMBER	PRICE
1.7 OZ	**410-2**	**11.11**
4.3 OZ	**410-7**	**24.66**

EVERGLASS

Fiberglass filled putty for repair for fiberglass or metal bodies. Easy mixing, waterproof filler applies smoothly and ready for filling or sanding in 5 minutes. ORM-D - Ground shipping only.

SIZE	PART NUMBER	PRICE
1 QUART	**632-QT**	**16.13**
1 GALLON	**622**	**49.22**

SLICK SAND

Used for filing scratches, blemishes and exposed fiberglass threads before final sanding and painting. Sprayable polyester filler cures in 45-60 minutes. Catalyst included in kit. 1 catalyst per quart, 4 per gallon. ORM-D - Ground shipping only.

SIZE	PART NUMBER	PRICE
1 QUART	**2243-QT**	**23.66**
1 GALLON	**2244-G**	**75.55**

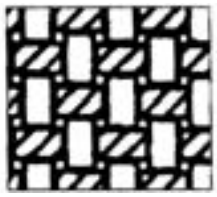
COMPOSITE PRACTICE KIT & BOOK

Now available an introductory kit to answer your questions concerning composite aircraft. The kit consists of a book and sample materials, or purchase the book separately. The book "Moldless Composite Sandwich Homebuilt Aircraft Construction" consists of 26, 11 x 17 pages (equal to 52 pages) describing how the material is applied, education on the materials, tools required, inspection and repair methods. Sample materials include: foam (2 types), epoxy, glass bubbles, flock, peel ply, wire for hotwire saw, etc. Written by Rutan Aircraft Factory. UPS GROUND shipping only - no red, blue, orange or parcel post. Can not be shipped outside of U.S.A.

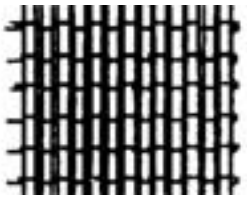
DESCRIPTION	PART NUMBER	PRICE
PRACTICE KIT	**CK**	**95.00**

FIBERGLASS INFORMATION

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. Fiberglass cloths are available in different formulations. "E" glass (electrical is the most common all purpose glass), while "S" (high strength) glass is made for special applications. 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 bidirectional cloth and a unidirectional cloth 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. Uni 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. Uni 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". Glass cloth should be stored, marked and cut in a clean area with clean hands and clean tools. Glass contaminated with dirt, grease or epoxy should not be used. The area used for storing and cutting glass cloth should be separated from the aircraft assembly area because it will be exposed to foam dust, epoxy and other elements which can contaminated the cloth. A pair of good quality sharp scissors, felt-tipped marker, a straight board and a tape measure are needed for marking and cutting. The small amount of ink from marking and numbering plies has no detrimental effect on the glass cloth. Standard fiberglass cloth is exactly what the name says - glass. Fine fibers are spun from molten glass marbles, gathered into yarn and woven into a strong, supple glass fabric. It can be folded, rolled or draped, like any other loosely woven fabric - but it can be chemically transformed into solid sheets of tremendous strength. All the fiberglass fabrics listed below are volan treated for maximum strength and resistance to moisture and abrasion. They feature a weave that is tight enough for high strength, yet open enough for thorough wetting by resins. Fiberglass tapes have non-raveling selvage for glassing seams, corners, edges and repair jobs. Roving glass is a substitute for uni cloth for contours over spar caps, wings and elevators. It is made of roving glass held together with cross threads to avoid roving cross over.

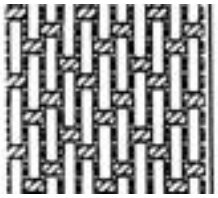


PLAIN WEAVE



UNI

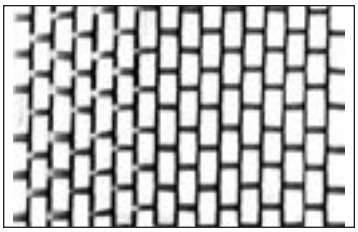
BID



CROWFOOT

COMPOSITE MATERIALS

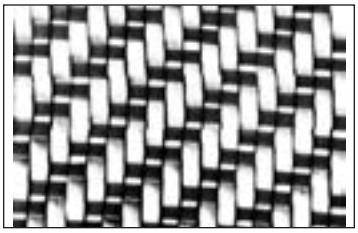
UNI FIBERGLASS



Has 95% of the glass volume woven parallel to the selvage giving exceptional strength in that direction and very little at right angles to it. Uni is used in areas where the primary loads are in one direction and very little at right angles to it. Uni is used in areas where the primary loads are in one direction and maximum efficiency is required, such as wing skins and spar caps.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
UNI - E GLASS	7.02 OZ P/SQ/YD	38 INCHES	80 LENGTH X 18 WIDTH	**RA5177**	**6.87**

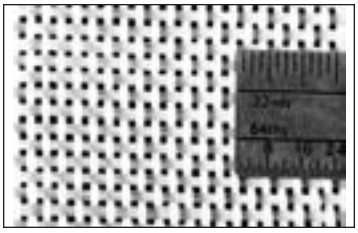
BID FIBERGLASS



Has half of the fibers woven parallel to the selvage edge of the cloth, and the other half at right angles to the selvage which gives the cloth the same strength in both directions. Bid is used for pieces which are cut at a 45° angle to the selvage and laid into contours with very little effort. Bid is often applied at 45° orientation to obtain a desired torsional or shear stiffness.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
BID - E GLASS	8.8 OZ P/SQ/YD	38 INCHES	54 LENGTH X 48 WIDTH	**RA5277**	**7.40**

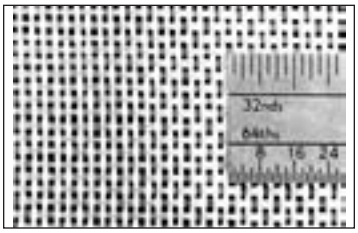
A CLOTH 7520



Boat and tooling glass fabric 8.5 oz. per sq. yd. in 50" width. As used on Osprey aircraft. Threads per inch: 18 length x 18 width.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
A-BOAT & TOOLING	8.5 OZ P/SQ/YD	50 INCHES	18 LENGTH X 18 WIDTH	**7520**	**8.25**

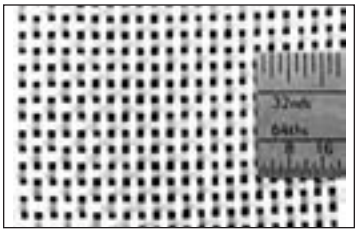
B CLOTH 1522



Boat and tooling glass fabric of tight weave. 3.74 oz. per sq. yd in 50" width. As used on Dragonfly aircraft. Threads per inch: 24 length x 22 width.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
B-BOAT & TOOLING	3.74 OZ P/SQ/YD	50 INCHES	24 LENGTH X 22 WIDTH	**1522**	**5.98**

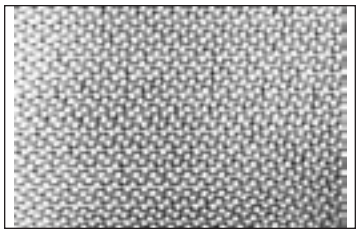
BOAT & TOOLING



Boat and tooling glass fabric 5.79 oz. per sq. yd in 60" width. As used in Dragonfly aircraft. Threads per inch: 18 length x 18 width.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
BOAT & TOOLING	5.79 OZ P/SQ/YD	60 INCHES	18 LENGTH X 18 WIDTH	**3733**	**6.99**

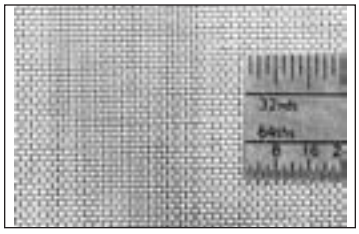
CROWFOOT



Industrial fabric with crowfoot weave. 3.16 per square yard. 38" width, 60 x 58 threads per inch. .004" thick.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
INDUSTRIAL CROWFOOT	3.16 OZ P/SQ/YD	50 INCHES	60 LENGTH X 58 WIDTH	**120FC**	**6.95**

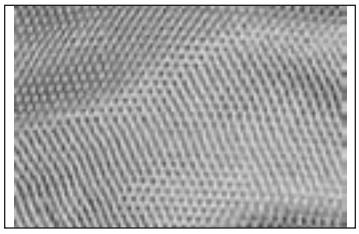
DECK CLOTH



50" width, 1.45 oz. per sq. yd. threads per inch: 60 length x 47 width. Commonly used over wood or plywood or last layer of fiberglass lay up giving the surface a fine weave for finishing.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
DECK CLOTH	1.45 OZ P/SQ/YD	50 INCHES	60 LENGTH X 47 WIDTH	**1080**	**5.86**

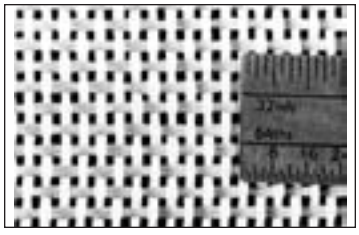
E GLASS



"E"cross fill fiberglass cloth, 8 harness satin weave (8HS). 50" wide, 8.9 oz per sq/yd. threads per inch 57 length x 54 width. Meets mil spec MIL-S-9084C

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
MEDIUM INDUSTRIAL	8.9 OZ P/SQ/YD	50 INCHES	57 LENGTH X 54 WIDTH	**7781**	**7.99**

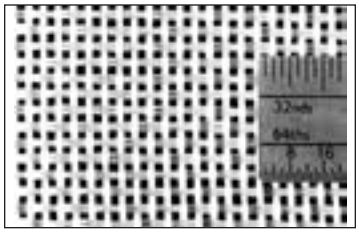
HEAVY WEIGHT



Heavy weight boat and tooling glass fabric in plain weave. 9.66 oz. per sq. yd. 60" width. As used in Dragonfly aircraft. Threads per inch: 16 length x 14 width.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
HEAVY-BOAT & TOOLING	9.66 OZ P/SQ/YD	60 INCHES	16 LENGTH X 14 WIDTH	**7500**	**8.30**

KR 7533 CLOTH

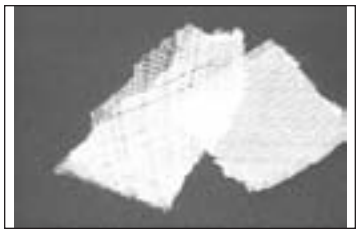


Lightweight boat or tooling cloth in plain weave. 50" width, 5.85 oz. per sq. yd. As used on the KR aircraft. Threads per inch: 18 length x 18 width.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
LIGHT-BOAT & TOOLING	5.85 OZ P/SQ/YD	50 INCHES	18 LENGTH X 18 WIDTH	**KR7533**	**7.49**

COMPOSITE MATERIALS

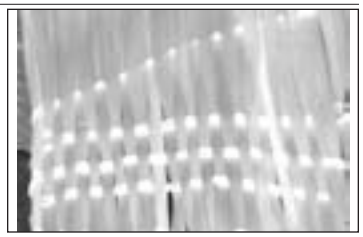
BIAXIAL & TRIAXIAL



Also known as knitted E glass, the performance of the glass is greatly enhanced by removing the interstices of the woven fabric and the crimped condition. Layered nonwoven biaxial and triaxial gives 27,000 psi which is about 20% improvement of normal E glass. Biaxial and triaxial glass offers greater ease of fabric orientation and saves time over multilayered wet layups. FAA certified with tracer thread: special order add 10% to list price. Special order iin 100 yard roll only.

TYPE	WEIGHT	WIDTH	THICKNESS	TENSILE	WEAVE	PART#	YARD
BIAXIAL	12 OZ	50"	14 MILS	27000 PSI	BIAS +/- 45°	**BI-X12**	**10.25**
BIAXIAL	18 OZ	50"	18 MILS	27000 PSI	BIAS +/- 45°	**BI-X18**	**10.55**
TRIAXIAL	22 OZ	50"	22 MILS	27000 PSI	BIAS +/- 0°	**TRI-X22**	**16.50**

ROVING "E" GLASS



Substitute for uni cloth for contours over spar caps, wings,and elevators. Made of parallel strands of roving glass held together with cross threads to avoid roving cross over. 3" wide .025 thick,22oz. per sq. yd. Can be used instead of uni-cloth for spare caps. Lengthwise tensile PSI - 87,000 Lengthwise flexural PSI - 160,000.

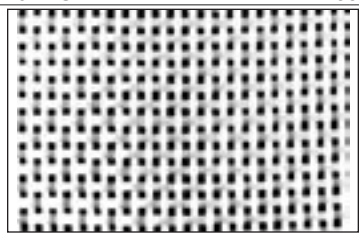
TYPE	WEIGHT	WIDTH	THICKNESS	PART #	YARD
ROVING/PARALLEL	22 OZ	3”	.025	**1600-3**	**2.00**

MAT CLOTH

Heavy weight 100% fiberglass in nonwoven state. Excellent to use for filling in holes for damages and repairs. Used as build up in fabricating components. 13.5 oz. per sq. yd 50" width. Mat cloth is bonded with highly soluble powdered polyester binder. Can be used with vinylester resins.

DESCRIPTION	PART NUMBER	YARD
HEAVY MAT	**102MC**	**4.99**

S2 GLASS WOVEN 4533



Fills the gap in the material spectrum between conventional E glass and Kevlar. Designed for most wet layup applications, S glass has a better corrosion resistance to strong base materials. As used on Defiant. 30% stronger and 15% stiffer than E-glass. 4533 plain weave woven glass is sold by the yard, 30" width, .0075 thickness, 5.4 oz weight with a tensil strength of 300 x275. 4533 is commonly used on surfboards.

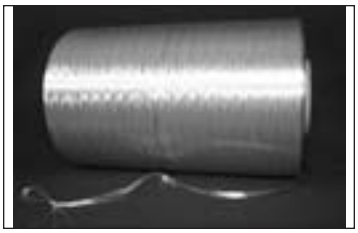
TYPE	WEIGHT	WIDTH	PART #	YARD
S2 GLASS-WOVEN	5.4 OZ P/SQ/YD	30 INCHES	**4533**	**7.99**

FIBERGLASS ARROW SHAFT

G-10 x 30-1/2" arrow stock as used in LongEze. 5/16" x .030

OD	WALL	LENGTH	PART NUMBER	PRICE
5/16"	.030	28 INCH	**G-10**	**1.75**

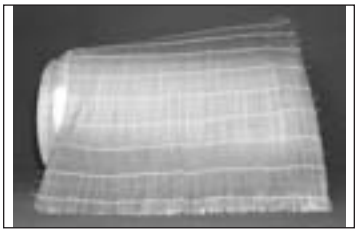
S GLASS ROVING FILAMENT SPOOL



Same characteristics as the 4533 woven, Roving 449AA-750 is sold only the 15# spool.Strands of glass used for Defiant spar caps. Lengthwise tensile - 87, 000 Psi, Lengthwise flexural - 160,000 psi. Roll is approximately 12" high, 8-1/2" wide.Sold only by the 15# spool.

SPOOL SIZE	PART NUMBER	PRICE
15 LB 750,000 YDS	**449AA-750**	**199.95**

UNIFIBER REINFORCEMENT TAPE



Nonwoven unidirectional reinforcement tape consisting of a crimp free layer of parallel reinforcement filaments of S2 glass. The reinforcing filaments are totally open to the impregnating resin, resulting in rapid wet-out free of voids. The absence of interwoven binder threads make Unifibre easy to handle and non-fraying whatever angle is cut. Layers of Unifibre will cohere firmly together at 50 degree C under moderate pressure. Flexural strength MPa: 1420; Flexural Modulus GPa: 95.2, Interlaminar shear strength MPa: 86.2. Weight - 8.1 oz sq/yd., 12" wide - 300 ft per roll.

WIDTH	WEIGHT	PART NUMBER	RUNNING FOOT
12 INCHES	8.1 OZ./SQ.YD.	**275S-2**	**3.70**

FIBERGLASS BIDIRECTIONAL TAPE

Woven from 8.7 oz bidirectional cloth, these rolls available in 3 width with non-raveling selvage. Excellent for glassing seams, corners, edges and repair jobs. Weave runs 90 degree to selvage edge.

DESCRIPTION	PART NUMBER	PRICE
1" X 50 YD	**1X50-FGT**	**12.00**
2" X 50 YD	**2X50-FGT**	**15.99**
3" X 50 YD	**3X50-FGT**	**22.99**
4" X 50 YD	**4X50-FGT**	**28.90**

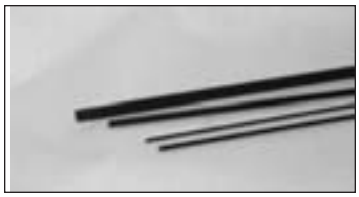
CARBON FIBER UNIDIRECTIONAL TAPE

Carbon fiber unidirectional reinforcing tapes are used to improve tensile strength and stiffness in one direction while adding minimum thickness and weight. The 702 is 1-1/2" wide, the #703 is 3" wide. Both have 12 carbon fiber bundles per inch of width, each containing 12,000 fibers resulting in 144,000 carbon fibers per inch of tape width to provide excellent strength and stiffness without adding much weight. A polyester fill thread ties the bundles together making it easy to handle. Sizing on the tapes makes it compatible for epoxy , not recommended for polyester or vinylester resins.

DESCRIPTION	PART NUMBER	PRICE
1-1/2" X 12 FT	**702-12**	**42.00**
1-1/2" X 50 FT	**702-50**	**104.71**
3" X 12 FT	**703-12**	**49.24**
3" X 50 FT	**703-50**	**148.23**

COMPOSITE MATERIALS

CARBON FIBER ROD



CARBON FIBER ROD is 8 times stronger than aluminum, yet half the weight, this carbon fiber rod has a compression strength of 275,000 psi and a tensile strength of 320,000 psi. Modulus is 21 msi Cleaning or sanding of the rod prior to laminating is not required. Its characteristics make it an ideal material for fabricating spars, etc. Sold per foot in either solid round or solid rectangular shapes. May be rolled for shipping.

SIZE	WGT/1000'	PART NUMBER	PRICE
.060	1.9 LBS	**RD060-CF**	**1.05**
.080	3.4 LBS	**RD080-CF**	**1.20**
.125	8.8 LBS	**RD125-CF**	**1.65**

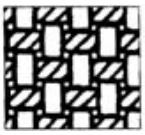
CARBON FIBER BAR

CARBON FIBER BAR is 8 times stronger than aluminum, yet half the weight, this carbon fiber rod has a compression strength of 275,000 psi and a tensile strength of 320,000 psi. Modulus is 21 msi Cleaning or sanding of the rod prior to laminating is not required. Its characteristics make it an ideal material for fabricating spars, etc. Sold per foot in either solid round or solid rectangular shapes. May be rolled for shipping.

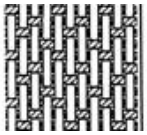
SIZE	WGT/1000'	PART NUMBER	PRICE
.092 X .220	14.4 LBS	**BR092X220-CF**	**2.75**

KEVLAR MATERIALS

Aramid fiber, one of the newest and most far-reaching developments of textile research, has the highest strength-to-weight ratio of any commercially available fiber. Kevlar gives airplane builders a significant design edge by allowing designers and builders to save weight and increase strength in their aircraft. Kevlar aramid has an outstanding combination of lightweight, high strength, outstanding toughness with abuse resistance, and stiffness that can be put to good use in the production of light aircraft. Kevlar fibers have a density 43 percent lower than fiberglass and 23 to 30 percent lower than the various graphite and carbon fibers. Kevlar 49 is 2.5 times as strong as the commonly used E-glass and greater than ten times as strong as aluminum on a specific tensile strength basis. The tensile modulus or stiffness of Kevlar is greater than twice that of fiberglass on a specific weight basis. Kevlar has good chemical resistance and meets FAA flammability requirements as it does not melt or support combustion. It provides a less rigid structure, with even better damage resistance. Composites of Kevlar are more durable than those of fiberglass and carbon because the aramid fiber provides superior resistance to damage, vibration and crack propagations as well as excellent fatigue resistance. 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.

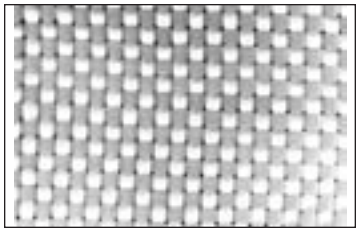


PLAIN



CROWFOOT

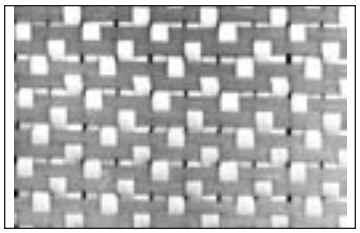
281 KEVLAR BI-DIRECTIONAL



Plain weave has a weight of 5.0 ounce p/sq. yd., 010 thickness, tensil strength is 620x 655. The cloth is 38" wide - sold by the running yard only. Can be used with epoxy, polyester and vinylester resins.

TYPE	WEIGHT	PART NUMBER	PRICE
PLAIN WEAVE	5.0 OZ / SQ.YD.	**281**	**18.18**

285 KEVLAR CROWFOOT



Crowfoot weave is 5.0 oz/sq. yd., .010 thickness and a tensile strength of 630 x645. The cloth is 38" wide - sold by the running yard.Can be used with epoxy, polyester and vinylester resins.

TYPE	WEIGHT	WIDTH	TPI	PART #	YARD
CROWFOOT	5.0 OZ/SQ.YD.	38”	630 L X 645 W	**285KV**	**18.27**

PARTALL PARTING AGENT

Wax based compound useful as a general purpose parting agent on metal molds as well as a prime coat for partall mold release. A thin coat evenly applied to a mold is usually good for 3-5 cycles. Simply apply the paste to the mold surface, allow to dry, then buff.

DESCRIPTION	PART NUMBER	PRICE
PARTING AGENT	**#2**	**11.34**

PARTALL MOLD RELEASE

For brushing or spraying on molds to prevent resin from sticking to the mold. A green viscous water/alcohol film-forming solution, water soluble, particularly recommended as a parting layer or separator between polyester or epoxy resin and mold surfaces of most kinds. Not recommended for use with resins containing water or giving off water during the cure-phenolics for instance. #10 partall is generally applied at room temperature to form a smooth, very glossy film. Will not shrink and pull away from corners or curved surfaces. After resin is cured the film will part easily from the mold and is readily dissolved from the molded parts with water. Use after tool has been paste waxed with partall paste. QT - ORM-D. 5-GAL - HAZARD - Ship Ground Only!

DESCRIPTION	PART NUMBER	PRICE
1 QUART	**#10**	**7.75**
5 GALLON	**#10-5GAL**	**72.75**

INSTAFOAM

Instafoam is back! Consists of equal parts of resin and catalyst. When the two components are mixed in equal volume, they expand into a rigid closed cell foam of 2.1 lb nominal density; expanding approximately 30 to 1 depending on temperature. Thorough mixing of the two components is essential. Small-batch mixes are recommended. Cured foams can be easily trimmed, cut and shaped with common woodworking tools. Use toluene or MEK for cleanup. The 1/2 gallon kit contains 1 quart each of A & B, the 1 gallon kit contains 1/2 gallon each of A & B and the 3 gallon kit contains 3 - 1/2 gallon each of A & B. Meets MIL-P-21929B Cls I. ORM-D Ship Ground Only!

DESCRIPTION	PART NUMBER	PRICE
1/2 GALLON KIT-4#	**INSTFM-1/2G**	**19.55**
GALLON KIT-8#	**INSTFM-1**	**36.17**
3 GALLON KIT-24#	**INSTFM-3**	**97.90**

COMPOSITE MATERIALS

VACUUM BAGGING

Vacuum bagging is a clamping method that uses atmospheric pressure to hold the adhesive-coated components of a lamination in place until the adhesive cures. The laminates (wood veneers, synthetic fibers or core materials) are sealed within an airtight envelope: mold on one side, airtight bag on the other. When the bag is sealed to the mold, pressure on the outside and inside of this envelope is equal to atmospheric pressure. As the vacuum pump evacuates air from inside the envelope, atmospheric pressure forces the sides of the envelope and everything within the envelope together putting equal and even pressure over the surface of the envelope. Vacuum bagging offers advantages over conventional clamping or stapling techniques. Mechanical clamping applies pressure only to concentrated areas, which can damage core materials in one area and not provide enough pressure in others for good bond. Stapling cannot be used on core material due to core's lack of holding power. Vacuum bagging offers evenly distributed pressure over the entire surface regardless of the type of material being laminated. Vacuum bagging also controls excess adhesive in the laminate resulting in higher fiber-to-resin rations, which translates into higher strength-to-weight ratio. Vacuum bagging requires the following equipment: Vacuum pump, control valve, throttle valve, trap, port, gauge, flexible hose, bagging materials: vacuum bag, breather material, release fabric and sealant.

BAGGING FILM D250

Room temperature to 200 degree F, this film is very dependable and releases easily from the sealant, so expect to use the same piece of film for all the compaction cycles. Color: blue, tensile strength: 4000 psi, tear resistance: 400 ply, ultimate elongation: 430%, width: 55 inches. Price/Yard.

DESCRIPTION	PART NUMBER	PRICE
BAGGING FILM	D250	4.46

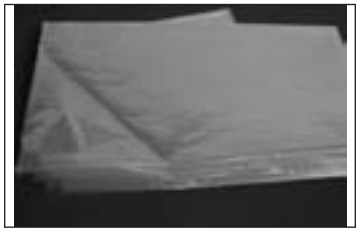
BAGGING FILM D330

Newly developed bagging film that is highly recommended to be used for any advance composite fabrication application. It is also recommended for other applications where softness, workability and defect free films are essential. Color:blue temperature up to 300 degree F. Elongation 550%, width 48" v-fold. Price Per Yard.

DESCRIPTION	PART NUMBER	PRICE
BAGGING FILM	D330	3.30

BAGGING FILM WL7400

Nylon vacuum film is .002" thick, 48" wide: v-fold. Elongation at break 350+, tensile strength - 8000 psi, maximum temperature use - 390°F, Melt point minimum 414 degree F, Yield: 24,500inchx2/#/mil. Color- green/blue, shelf life - 18 months. Price Per Yard.



DESCRIPTION	PART NUMBER	PRICE
BAGGING FILM	WL7400	1.75

BREATHER-BLEEDER

4 oz. 60" wide, 1/8" thick polyester breather material that stretches to all contours. One layer will conduct air at 50 psi. N4 is not a release material and should be used with release film - #4600. Maximum use temperature - 400 degree F. Price is per yard.

DESCRIPTION	PART NUMBER	PRICE
BREATHER-BLEEDER	N4	2.75

RELEASE FABRIC BLB1

Ply B peel ply coated with a release agent that releases all aircraft resins up to 400 degrees F. Use with R300 sensitive tape as all coated peel plies have the potential to transfer. 60" wide, 2 oz. nylon peel ply is .004 - .005 thickness. Grab tensile: warp - 110 LBS. filling - 140 LBS. minimum. Price is per yard.

DESCRIPTION	PART NUMBER	PRICE
RELEASE FABRIC BLB1	BLB-1	7.73

RELEASE PLY-BONDING & PAINTNG

Release Ply B is a heat set and scoured smooth weave nylon fabric used as a release fabric directly against bond lines or laminated where a finish for subsequent bonding or painting is needed. Excellent for controlling adhesive squeeze out, release B, may stick on 350 degree F cures, and works well on all fiberglass/epoxy laminates. 60" width, white nylon weight: 2 oz., Grab tensile: warp - 110 lbs. filling - 140 lbs (min). Price is per yard.

DESCRIPTION	PART NUMBER	PRICE
RELEASE PLY B	RPB-1	4.25

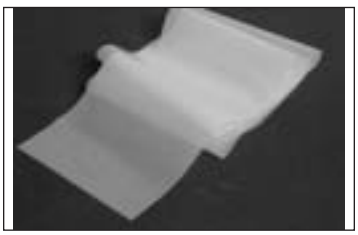
RELEASE FILM D7000

Exhibits superior release qualities over the entire temperature range. The elongation allows for superior conformability for irregular shapes. Elongations: 550%, maximum temperatures 600 degrees F, thickness: .001, width: 48", color: red. Price is per yard.

DESCRIPTION	PART NUMBER	PRICE
RELEASE FILM	D7000	11.78

RELEASE FILM W4600B

Blue, 54# wide, .002 thick release material. Elongation - 300%, maximum temperature use: 400 degree F. Shrinkage 2.5% at 400 degree F. Releases without contamination from phenolics, epoxies and polyesters. 18 mo shelf life. Price is per yard.



DESCRIPTION	PART NUMBER	PRICE
RELEASE FILM	W4600B	3.77

NYLON FABRIC 100-B

100-B is a close-weave nylon fabric that has been scoured and heat set. Scouring eliminates contamination from sizing and lubricants used during manufacture of the fabric and heat setting reduces the shrinkage and fraying of the fabric during runs. It is ideal for use on composite assemblies whose secondary processing is required after the peel ply fabric has been removed. Not recommended for assemblies containing phenol resins. Weight 1.98 oz/sq.yd. thickness: .005in. color: white width: 60in. Price is per yard.

DESCRIPTION	PART NUMBER	PRICE
NYLON FABRIC	100-B	6.00

COMPOSITE MATERIALS

FABRIC PEEL PLY

1.8 oz woven polyester cloth 63" wide. Sold by the running yard only. Ideal for usage as peel ply

DESCRIPTION	PART NUMBER	PRICE P/YARD
1.8 oz cloth	PP-63	4.99

SEALANT TAPE

Multipurpose sealant tape that can be used for cures to 375° F. Seals easily to metal or composite tooling. Tape is yellow, 1/8" thick by 1/2" wide, 25 ft roll.

DESCRIPTION	PART NUMBER	PRICE
SEALANT TAPE	AT200Y	3.95

QUICK DISCONNECT TOOL

AQD500TF high temperature disconnects are two way shut off fittings. When disconnected, air flow is shut off in both the plug and socket allowing your vac valve to remain under vacuum pressure after being disconnected. Parts can be moved without losing vacuum. The socket or coupler is equipped with a threaded female fitting that creates an air tight seal when inserted into airflow. The plug portion has a female 1/4" standard pipe thread. The sleeve portion of the coupler portion retracts upward, away from opening the receives the plug half. This sleeve is spring loaded so when released it returns to original position. Sleeve must be retracted before coupling is achieved and must return to original position to create an airtight seal between the two halves. Temps up to 500 degrees. Cad-plated steel.

DESCRIPTION	PART NUMBER	PRICE
QUICK DISCONNECT	AQD500TF	18.50

REPLACEMENT MUFFLER

Replacement bronze muffler for vacuum bagging pump. Thread size us 1/4 NPT.To be placed in airline and taped. Note: Use shop vac to suck out most of air first.

DESCRIPTION	PART NUMBER	PRICE
MUFFLER	885-7	17.78

VACUUM GAUGE VG-30

Durable vacuum gauge determines how much vacuum pressure is under your vacuum bag. Gauge is calibrated in both inches of mercury ad metric units and has a rubber jacket to protect it from damage. The stem is 1/4" pipe thread that can be used with the AQD500 quick disconnect. To get a reading place the gauge in the diagonal corner from your vacuum port. After pulling full vacuum, disconnect vacuum source. Allow a little air to reenter through port and within seconds the gauge should register a drop in pressure. Reads 0 to 30 lbs per sq. inch. 0 to 100 KPA

DESCRIPTION	PART NUMBER	PRICE
VACUUM GAUGE	VG-30	42.03

VACUUM GAUGE 885-5

Necessary in monitoring the vacuum level/clamping force during the cure time of the laminate. 2 inch diameter gauge has 1/4" NPT fitting and reads 0 to 30 pounds per square inch. 0 to 100 KPA VAC/KPA.

DESCRIPTION	PART NUMBER	PRICE
VACUUM GAUGE	885-5	26.99

VACUUM VALVE

2 piece cast aluminum valve makes vacuum bag connections positive and fast. Simply insert through bag by cutting an X in the film, the round bottom base plate is designed to keep breather from compressing under the plate and sealing off. Successfully tested to hold 29 inches of mercury and 200 psi at temperatures up to 500 degrees F.

DESCRIPTION	PART NUMBER	PRICE
VACUUM VALVE	401C	18.00

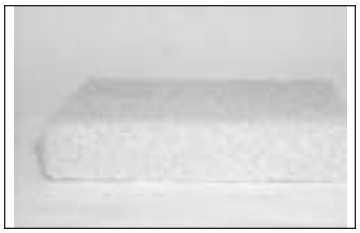
VACUUM VENTURI GENERATOR

Works with any air compressor delivering at least 65 psi @ 3.5 SCFM. (Operating range 40-100 psi) Develops over 20 inches Hg of vacuum (10 psi) & will evacuate 2.2 SCFM @ 0 inches Hg.

DESCRIPTION	PART NUMBER	PRICE
VENTURI GENERATOR	885-6	92.48

COMPOSITE MATERIALS

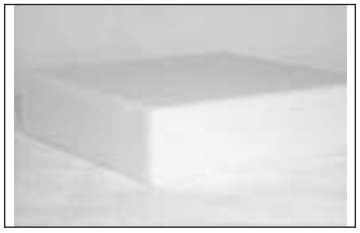
POLYURETHANE FOAM



Small cell Tan or green, depending on stock. Not to be Hot Wired as it emits hazardous gas. Always use a mask to avoid breathing dust and do not burn the leftover scraps. Contours easily when cut with a large knife, then sanded with other bits of foam to the final design. Useful in making the fuselage, wing tips or wheel fairings, and small streamlined parts with lots of curves. Inside curves can be made with a wire brush, then final finished with curved scrap blocks. Polyurethane foam is fuel resistant; therefore, it can be used for fuel cells. Can be glued with any type of adhesive. Density is 2 pounds per cubic foot.

THICKNESS	DEMINSIONS	PART NUMBER	PRICE
1/2"	24" X 48"	**F100-005**	**3.75**
1/2"	24" X 96"	**F100-010**	**6.75**
3/4"	24" X 48"	**F100-015**	**6.35**
3/4"	24" X 96"	**F100-020**	**12.25**
1"	12" X 24"	**F100-024**	**3.75**
1"	24" X 48"	**F100-025**	**12.15**
1"	24" X 96"	**F100-030**	**16.25**
2"	12" X 12"	**F100-033**	**4.25**
2"	24" X 48"	**F100-035**	**26.18**
2"	24" X 96"	**F100-040**	**41.86**
2"	48" X 120"	**F100-055**	**68.70**

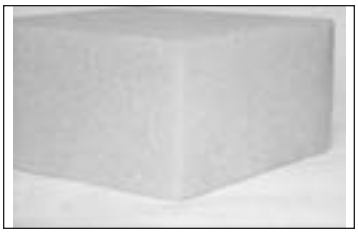
LAST-A-FOAM



Rigid, Polyether Polyurethane foam with fine closed-cell structure, light creamy-yellow color. Last-a-foam is wonderfully versatile for sandwich-core applications. It cuts and shapes easily with common woodworking tools, and bonds to itself and other materials with most epoxy, polyester, or urethane-type adhesives. Last-a-foam is unaffected by water, fuels and most solvents, and paint finishes are easily applied. It is frequently used in regular molds after the gel-coat and first two layers of glass are installed; the Last-a-foam is added and another layer of glass applied for a strong light-weight sandwich.

THICKNESS	DEMINSIONS	DENSITY	PART NUMBER	PRICE
1/4"	24" X 48"	4.5 LB	**F400-005**	**13.50**
1/4"	24" X 96"	4.5 LB	**F400-010**	**27.20**
1/2"	24" X 48"	4.5 LB	**F400-025**	**22.04**
1/2"	24" X 96"	4.5 LB	**F400-030**	**42.70**
3/8"	24" X 48"	4.5 LB	**F400-035**	**17.96**
3/8"	24" X 96"	4.5 LB	**F400-040**	**34.90**
3/4"	24" X 48"	4.5 LB	**F400-045**	**29.18**
3/4"	24" X 96"	4.5 LB	**F400-050**	**55.95**
1/4"	24" X 48"	6 LB	**F400-055**	**15.95**
1/4"	24" X 96"	6 LB	**F400-058**	**30.22**
3/8"	24" X 8"	6 LB	**F400-060**	**19.50**
3/8"	24" X 96"	6 LB	**F400-065**	**35.25**
1"	6" X 6"	8 LB	**F400-075**	**3.65**
1"	16" X 18"	8 LB	**F400-080**	**13.18**
0.2"	12" X 48"	18 LB	**F400-085**	**19.75**
1"	6" X 10"	6 LB	**F400-090**	**3.95**
1"	16" X 96"	8 LB	**F400-091**	**59.88**
1"	24" X 48"	6 LB	**F400-094**	**45.49**
1"	24" X 96"	6 LB	**F400-095**	**83.40**

POLYSTYRENE FOAM



POLYSTYRENE Blue Large Cell expanded 1.6 lb. density, with flame retardant additive. Cuts easily with hot wire for airfoil shapes. Can be dissolved with fuels, solvents, and thinners. Originally used on VE & LE designs. Do not use with polyester resin - use only epoxy. Can be glued with any type of adhesive.

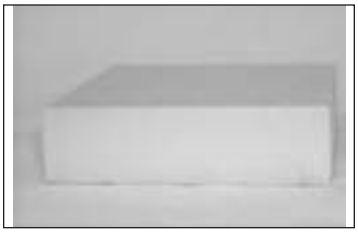
THICKNESS	DEMINSIONS	PART NUMBER	PRICE
7"	14" X 4"	**F200-005**	**3.20**
7"	14" X 20"	**F200-007**	**14.91**
7"	14" X 41"	**F200-010**	**25.98**
7"	14" X 44"	**F200-013**	**27.72**
7"	14" X 64"	**F200-015**	**42.68**
7"	14 X "67"	**F200-016**	**46.00**
7"	14" X 109"	**F200-020**	**79.00**

DIVINYCELL FOAM

Tan, light blue, closed cell, medium and high density foam with higher compression strength. Standard "aircraft quality" foam that meets FAA regulations for fire resistance, as well as the industry's engineering needs. Can be sawed, cut or filed shaped in one-direction, and bends with a heat gun. At 200 degree F, the material can be vacuum formed in a mold to compound shapes. Rigid polyvinyl, it can be used with polyester resins. These sizes ship UPS oversize rate.

THICKNESS	DEMINSIONS	DENSITY	PART NUMBER	PRICE
28-1/4"	28-1/4"X28-3/4"	15.6 LB	**F500-085**	**105.41**
2"	24"X48"	3 LB	**F500-120**	**94.83**
1/4"	29-1/2"X43-1/4"	6 LB	**F500-055**	**40.48**
2"	48"X96"	3 LB	**F500-115**	**337.84**
1/4"	32"X48"	3 LB	**F500-020**	**20.76**
3"	24"X48"	3 LB	**F500-130**	**146.99**
3/8"	32"X48"	3 LB	**F500-030**	**29.68**
3"	48"X96"	3 LB	**F500-125**	**522.54**
3/4"	24"X48"	3 LB	**F500-035**	**31.92**
5/8"	24"X48"	3 LB	**F500-010**	**42.65**
1"	32"X48"	3 LB	**F500-005**	**61.75**
1-3/4"	24"X48"	3 LB	**F500-040**	**63.18**

STYROFOAM



Blue (as used in Mohawk, Goldwing, Sky Pup & Solitaire) Extruded blue styrofoam as used in the building industry for insulation boards. Can be hot wired . Will dissolve with fuel, solvents or thinners. Use only epoxy for gluing. Density is 2 pounds per cubic foot.

THICKNESS	DEMINSIONS	PART NUMBER	PRICE
3/4"	24" X 96"	**F600-010**	**12.85**
3/4"	48" X 96"	**F600-011**	**24.59**
1"	24" X 96"	**F600-015**	**21.99**
1-1/2"	48" X 96"	**F600-020**	**46.79**
2"	24" X 96"	**F600-025**	**32.80**
4"	24" X 48"	**F600-030**	**32.07**
4"	24" X 96"	**F600-035**	**62.84**