COMPOSITE MATERIALS

CM

INTRODUCTION

The use of composite materials in home built aircraft construction got its start back in 1970 when Ken Rand introduced his KR-1 and KR-2 kits. At the same time, a young designer named Burt Rutan was completing the design of his VariViggen which was awarded the Stan Dzik trophy for design contribution at Oshkosh in 1972. Although this aircraft featured some composite construction materials, it was fairly labor intensive to build and interest was modest. Taking the canard design concept a step further and simplifying construction through the use of the moldless composite technique, Burt educated thousands of builders and future designers through his plans, construction manuals, and many seminars and convinced aircraft enthusiasts worldwide that composites were indeed the future for aviation construction. Rutan Aircraft Factory followed the tremendous success of the VariEze kit program with plans for new designs such as the Long-EZ, Defiant, and Solitaire. At the same time, SCALED, Burt's new company specializing in design and prototype construction, was busy building proof-of concept aircraft such as the AD-1, Grizzly, and Beech Starship. Burt continues to operate SCALED today and remains active in designing and building the aircraft of tomorrow. We hope he will someday return to the homebuilt aircraft market, and arena that allowed him endless freedom to pursue aircraft design innovation.

During the 1980's many new designers entered the homebuilt aircraft market including Nat Puffer who introduced the popular Cozy, a side-by-side version of the Long-EZ. Aircraft Spruce & Specialty Co. became the distributor of Cozy kits as it had been for the Rutan designs since 1976. Hundreds of kits were shipped worldwide, and Aircraft Spruce grew as quickly as the composite movement. At the same time, Aircraft Spruce began supplying kits and materials to designers marketing their own new designs using the new "fast-build" pre-fabricated kit concept. This type of kit program was pioneered by Tom Jewett and Gene Sheehan of Quickie Aircraft and Tom Hamilton of Glasair fame. Many new designs followed, including Lance Niebauer's Lancair, Ken Wheeler's Express, the Cirrus and White Lightning. Aircraft Spruce has been a supplier of materials for all of these kit programs, and looks forward to working with the designers of new composite aircraft on their kit programs in the years to come. The design sophistication and ease of construction that are offered in composite aircraft kits today have provided a way for many aviation enthusiasts to build and fly higher performance aircraft at affordable prices. What an exciting time to be involved in sport aviation!

ADVANCED COMPOSITE FABRICS

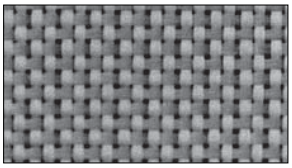
Advanced composite fabrics are those materials which have been used for a number of years in aerospace applications, replacing standard fiberglass fabrics. Today's materials - Kevlar, graphite, S glass and ceramics - are now making the transition from aerospace to homebuilt aircraft. Kevlar is an organic fiber which is yellow in color and soft to touch. It is extremely strong and tough and about the lightest structural fabric on the market today. Kevlar is highly resistant to impact but it is rather difficult to work with for hand layup applications and its compressive strength is considered poor. Graphite fibers are created by extreme stretching and heating of rayon fibers to change their molecular structure. Graphite has very low density (weight/unit volume), is very stiff (high modulus) and very strong (high tensile). S glass uses a different chemical formulation from standard E glass fabrics, and is stronger, tougher and stiffer than E glass. One ply of S glass can replace several plies of E glass, which can result in a stronger and considerably lighter aircraft component. Ceramic fabrics are the latest innovation in advanced composites. These fabrics produce laminates approaching the qualities of S glass plus they can withstand temperatures of almost 3000° F. Ceramic cloth can produce a very lightweight and effective firewall laminate, although at this time the cost is high. These advanced composite materials are currently being used in the production of such items as aerospace components, high-performance boats and race cars, and many revolutionary homebuilt aircraft such as the Long-EZ, Solitaire, Sea Hawk and Q200. The performance of future homebuilt aircraft will most certainly be incredible with the availability of these innovative new composite materials.

	Best ←				→ Worst
Cost	E Glass	S Glass	Kevlar	Graphite	Ceramic
Weight (Density)	Kevlar	Graphite	S Glass	E Glass	Ceramic
Stiffness	Graphite	Kevlar	S Glass	Ceramic	E Glass
Heat	Ceramic	S Glass	E Glass	Kevlar	Graphite
Toughness	Kevlar	S Glass	E Glass	Ceramic	Graphite
Impact Resistance	Kevlar	S Glass	E Glass	Ceramic	Graphite

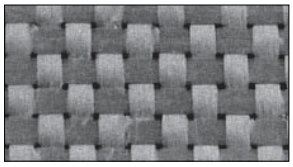
WHICH ONE DO YOU CHOOSE?

Often the choice of the materials to use for a laminate is difficult because of the required properties. One must consider the advantages of one material over another and its anticipated performance. S glass is about 30% stronger and 15% stiffer than E glass. It has 20-25% of the stiffness of graphite and is as strong, but it is also 30% heavier. S glass though, has only half the strength and stiffness of Kevlar and twice the weight. Kevlar on the other hand, is 40% stronger and 25% lighter than graphite but has only half the stiffness of graphite. Sometimes, blending different advanced composite fabrics in a laminate can achieve the proper balance of stiffness, strength and weight. Use the following six parameters listed here, from a best to a worst case, to help you decide which advanced composite fabric(s) is best for your application.

KEVLAR FABRIC STYLES



120-PLAIN-34x34



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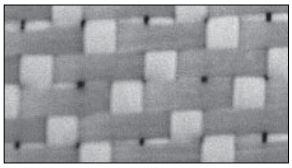
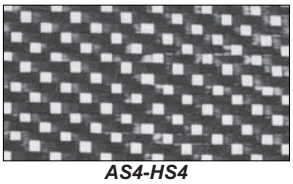
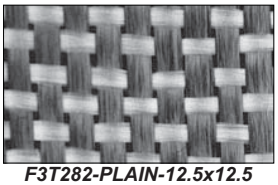


285-CROW FOOT-17x17

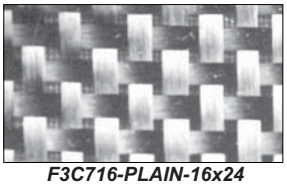
GRAPHITE FABRIC STYLES



AS4-HS4

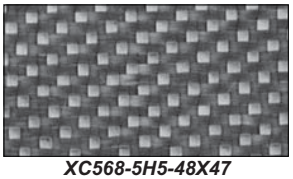


F3T282-PLAIN-12.5x12.5



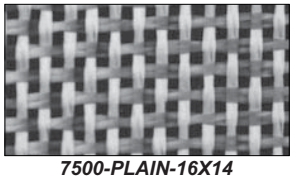
F3C716-PLAIN-16x24

CERAMIC FABRIC



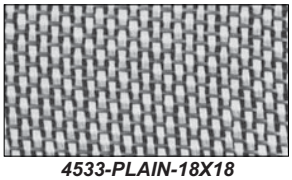
XC568-5H5-48X47

E-GLASS



7500-PLAIN-16X14

S-GLASS



4533-PLAIN-18X18

COMPOSITE MATERIALS

HELPFUL HINTS AND PRECAUTIONS

It is important to have the entire work area including tables, foam, tools and working materials thoroughly warm before commencing. This may take 3-4 hours. An electric hair dryer may be used to warm local areas, being careful not to overheat the part or epoxy. When, due to cool temperatures, a part is slow to wet out, a few quick passes with a hair dryer will greatly speed the layup time. Do not use a hair dryer to heat a cup of epoxy. This can give local hot spots and ruin pot life.

The epoxy system components should be stored at room temperature. Never keep resin or hardeners in a cold place, even for long-term storage. If the resin appears to crystallize and settle out it should be returned to its normal state as soon as possible, even if prompt usage is not anticipated. Placing the container of resin in hot (160-190°F.) water for several hours will usually decrystallize it and return it to a clear state. Mild agitation will accelerate the process. Leaving the resin hot for 3-5 hours after it clears will reduce its susceptibility to recrystallize. Securely close containers after use.

Never attempt any layup below 70°F. since the higher viscosity of the resin will make it more difficult to wet out the cloth. Ideal working temperature is 85°F. Keep epoxy at 75° to 85°F. Never work outside in sunlight. It's acceptable to work in a shop with radiant heaters, as long as:

1.) The heat is diffused and the heat source does not become much hottr than the ambient.
2.) The heat is not provided by a source that generates particulates or aerosol hydrocarbons.

Never make a glass layup over a core that is not straight and smooth. The glass panel cannot take the loads if it has bumps or depressions in excess of the allowable values. A wrinkle, depression or bump in a layup which is greater than 1/16" high or low and which is more than 20% of the chord length or 20% of the spar chord is not acceptable and requires repair. A depression can usually be repaired by filling with flox to level and laying over the entire depression the amount of glass that is underneath, lapping outside the depression a distance equal to one inch per ply. Care should be taken not to lay up a depression or bump in the thick main spar caps. The transition of the spar caps into the wing fittings must be smooth and without joggles. These precautions apply only to the flying surfaces. The fuselage and fuel tanks can have relatively large depressions or bumps without affecting structural safety. Care should be taken in the finishing process not to sand through more than one ply on the structure.

Joining foam blocks - (1) Paint a coat of epoxy (no micro) on the joining surfaces. (2) Trowel a wedge of dry micro on the center of one surface. (3) Squeeze the joining surfaces together, wiggling them back and forth to obtain a thin micro joint less than 1/16" thick. It is desirable to have the micro about 3/8" low in the joint (not squeezed out). The low joint is filled with micro before glass is laid over the joint allowing a wet bond between the micro and the glass. If some does squeeze out, wipe the joint low with a mixing stick. Do not try to fill large voids with micro, as there is a possibility of exotherm damage. For a void larger than about 0.1", fill with a sliver of foam with micro on each side.

- A paper cutter is excellent for measuring and cutting the many little squares of glass cloth.
- Epoxy should be removed from metal tools or parts with acetone, MEK or soap and water before it cures.
- Micro slurry should not be applied to glass surfaces being bonded. This weakens the joint.
- Do not use Bondo on styrofoam, It has a polyester base which will dissolve the foam. Bondo will not attack urethane or PVC.

Precaution - Be sure layups are not dry, with air present (small flecks of white). Inspect thoroughly before leaving a wet layup. A cured layup that is too dry must be rejected.

Make sure that ample micro slurry is applied over the foam, particularly the urethane. Inadequate slurry allows air to remain under the first ply, decreasing laminate peel strength and surface durability.

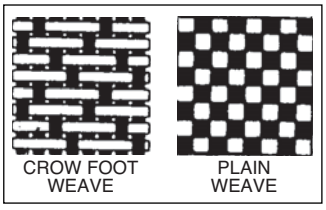
Hot wire cutting - A good method to use for judging wire temperatures is the appearance of the cut foam surface. A cratered or rutted surface indicates the wire is too hot. A very light "hair" of plastic strands on the surface is just right. Always adjust the temperature so that the wire will cut one inch in 4 to 6 seconds with light pressure.

Exotherm foam damage - Care must be taken to avoid heavy buildups of epoxy/micro down inside a joint that is insulated by foam, such as the assembly of the wing cores. The gap to be filled by micro when assembling any foam cores should not be thicker than 1/16". In filling a gap greater than 0.1", excessive weight is added and, more importantly, the large mass of epoxy/micro insulated by the foam can exotherm. Heat resulting from the exotherm can be as high as 450°F., which will melt away the foam locally and destroy the joint. White is the recommended color for composite aircraft since it absorbs very little of the sun's heat (10%) while a black surface will heat up tremendously (95% absorption). Trim colors in noncritical areas are acceptable. Any good quality automotive enamel, lacquer, acrylic or polyurethane is acceptable. A primer-surfacer with an ultra-violet radiation barrier is recommended as an undercoating.

Caution: Do not ever wipe paint thinners on any part of the structure. Minute pin holes in the epoxy/glass skin can allow the thinners to penetrate down to the styrofoam,which dissolves in thinners.

QUALITY CONTROL

One of the unique features of the glass-foam-glass composite construction technique is the ability to visually inspect the structure from the outside. The transparency of the glass/epoxy material makes it possible to see all the way through the skins and even through the spar caps. Defects in the layup take four basic forms: (1) resin lean areas, (2) delaminations, (3) wrinkles or bumps in the fibers and (4) damage due to sanding structure away in finishing. Resin lean areas are white in appearance due to incomplete wetting of the glass cloth with epoxy during layup. The presence of minor white (lean) areas up to about 2 inches in diameter is not cause for rejection of the piece. Delaminations in a new layup may be due to small air bubbles trapped between plies during the layup. Small delaminations or bubbles up to 2" diameter may be filled by drilling a small hole into the bubble and filling the void with epoxy. Major wrinkles or bumps along more than 2" of chord are cause for rejection in the wings, canard and winglet on the VE, particularity on the top. In most cases the rejected part can be repaired by following the basic rule: Remove the damaged area and fair back the area at a slope of at least one inch per ply with a sanding block in all directions. Count the number of plies removed while sanding and replace with same, plus one more ply of BID over the entire patch.



WEAVE PATTERNS

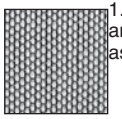
The weave pattern describes the manner in which the warp yarns and the filling yarns are interlaced in the fabric. Plain Weave consists of one warp end woven over and under one filling pick. Plain weave is generally characterized by fabric stability with minimum pliability except at low fabric counts.

Crowfoot Weaves are constructed with one warp end weaving over three and under one filling pick. It is characterized as being more pliable than either plain or basket weaves, having conformability to complex or compound curved surfaces and making possible the weaving of higher counts than plain or basket weaves.

COMPOSITE MATERIALS

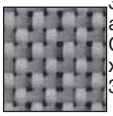
STANDARD E-GLASS FIBERGLASS CLOTH

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.



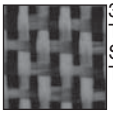
1.45 oz./sq. yd. Lightweight Industrial Cloth used in Osprey and other designs. Widely used by model builders, known as "Deck Cloth" , Thread Count 60 x 47.

#1080 (P/N 1080-50) 50" Width..... **. yd**



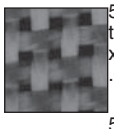
3.16 oz./sq. yd. Lightweight Industrial Cloth with aerospace applications. Excellent for model building. Only .004" thick. Crowfoot weave, which contours nicely. Thread Count 60 x 58. Breaking Strength 125 x 120 lb./in. Finished Weight 3.08 oz./sq. yd.

#120 (P/N 120-38) 38" Width..... **. yd**



3.74 oz./sq. yd. Light weight Boat or Tooling Cloth. Tight plain weave. Thread Count 24 x 22. Breaking Strength. 160 x 135 lb./in. Finished Weight 3.60 oz./sq. yd. Thickness .0055"

#1522 (P/N 1522-50) 50" Width..... **. yd**



5.79 oz./sq. yd. Lightweight Boat Cloth. Flat weave, not twisted. Thread Count 18 x 18. Breaking Strength 250 x 225 lb./in. Finished Weight 5.85 oz./sq. yd. Thickness .010".

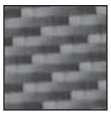
#3733 (P/N 3733-60) 60" Width..... **. yd**

5.85 oz./sq. yd. Lightweight Boat or Tooling Cloth. Plain Weave. Thread Count 18 x 18. Breaking Strength 250 x 250 lb./in. Finished Weight 5.64 oz./sq. yd. Thickness .009" as used on KR Aircraft.

#7533 (P/N 7533-60) 60" /Width..... **. yd**

8.5 oz./sq. yd. Lightweight boat or tooling cloth. Threads per inch: 18L x 18W. Used in Osprey aircraft and other homebuilts.

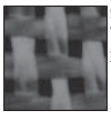
#7520 (P/N 7520-50) 50" width ..... **. yd**



8.95 oz/yd² Medium Weight Standard Industrial Cloth. 8 Harness Satin. Thread Count 57 x 54. Breaking Strength 350 x 330 lb./in. Finished Weight 8.95 oz./yd² Thickness 9.0 mils. Sold by the yard.

#7781 50"" Width (P/N 7781-50) ..... **. yd**

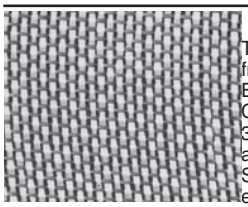
#7781 60" Width (P/N 7781-60)..... **. yd**



9.66 oz./sq. yd. Heavy Weight Boat or Tooling Cloth. Plain Weave. Thread Count 16 x 14. Breaking Strength 450 x 410 lb./in. Finished Weight 9.40 oz./sq. yd. Thickness .014".

#7500 (P/N 7500-60) 60" Width..... **. yd**

S-GLASS



The chemical formulation of S-glass differs from that of standard E-glass. Examples of E-glass are found in the Standard Fiberglass Cloth section of this catalog. S-glass is 30% stronger and 15% stiffer than E-glass and retains these properties up to 1500° F. S-glass is also considerably tougher than an equivalent E-glass. Other styles are available on request. Specify S-glass style when ordering. Sold by the yard.

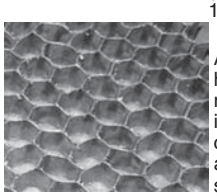
Style	Part No.	Weight oz./ Sq.Yd.	Width	Thick-ness	W x F	Weave	Price Per Lineal Yd.
4533	4533-60	5.8	60"	.009"	18 x 18	Plain	.

S-2 UNIDIRECTIONAL FIBERGLASS TAPES

A unidirectional fabric constructed with Owens-Corning Fiberglass S-2 Glass offering outstanding strength-to-weight ratio, superb glass-resin ratio control to minimize probability of resin-rich and/or resin-dry areas, handleability without distortion and exceptionally high impact resistance. The integrity of the S-500 is maintained through very fine, adhesive coated fill yarns that are bonded to but not interwoven with the unidirectional fibers of the S-2 Glass. The fill yarns are spaced approximately 1.5 inches apart. The use of short-nap paint rollers is suggested, rolling under pressure, always parallel to the fibers. Use with epoxies, vinyl esters and polyesters. Weight of fabric - 0.56 Lbs. per Sq. Yd. Tensile Strength (hand layup in polyester, air cured) - 128,000 PSI. Thickness .016". Sold by the foot.

11" Wide..... P/N 01-00336..... **. Ft**

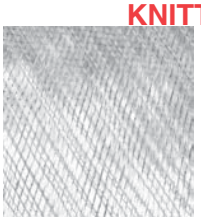
NOMEX HONEYCOMB



AHN 7800 is an Commercial Grade Nomex honeycomb particularly suited for use where resistance to corrosive attack and moisture are important. This material exhibits good strength characteristics and is fire resistant. It is available in a variety of cell sizes and densities to suit most purposes. Typical applications include lightweight non-structural bulkheads for ships, joiner panels, shelters, antennas, and auto body panels. This material is not intended for aircraft or aerospace applications. This material also exhibits good thermal insulation properties and also has good dielectric properties. This honeycomb is easily machined, formed, and shaped and well suited to adhesive bonding.

Description	Part No.	Price
HONEYCOMB 1/8" THICK, 1/8" CELL 4X8	01-00487	.
HONEYCOMB 1/8" THICK, 1/8" CELL 4X4	01-00489	.
HONEYCOMB 1/4" THICK, 1/8" CELL	01-01052	.

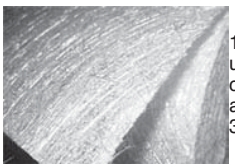
KNITTED E-GLASS FABRIC



Knitted fabrics are a relatively new format in composites. The performance of the glass is greatly enhanced by removing the interstices of the woven fabric and the crimped condition. E-glass in woven goods normally has 22,000 psi tensile strength. Layered non-woven goods give 27,000 psi which is about a 20% improvement. Knitted glass offers greater ease of fabric orientation and saves time over multi-layered wet lay-ups.

Part No.	Weight/sq yd	Width	Ply Thickness	Price/yd
Biaxial - Double Bias +/-45°				
01-00640	17.6 oz	50"	17.0 mil	.
Uni-Directional				
01-00650	1.5 oz	50"		.

GLASS MAT



100% Fiberglass in a non-woven state. It is used for bulk "build-up" in molding and fabricating components. Also useful for filling holes and badly damaged parts. 1.5 Oz. Weight. 38" Width.

P/N 01-06500...../Yd

GRADE B COTTON FABRIC

Grade "B" cotton is manufactured to the specification of Grade "A" cotton - with the same thread count, burst strength and shrink characteristics - but has either not been tested for compliance with MIL-C-5646 or has failed the test in the some aspect. Consequently we do not recommend that it be used for covering anything but a static display.

P/N 09-01730.....

COMPOSITE MATERIALS

RUTAN FIBERGLASS CLOTHS

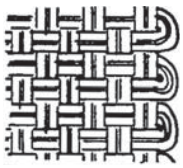
The most basic structural material in building a composite aircraft is glass cloth. The use of glass in aircraft structures, particularly structural sandwich composites, is a recent development. Glass cloth is available commercially in hundreds of different weights, weaves, strengths and working properties. 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 .Lineal Yd.

Small Cross Fibers

Selvage Edge

Major Fiber Bundles

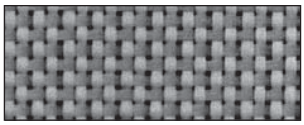


Selvage Edge

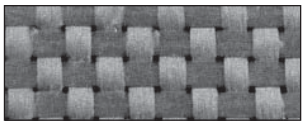
BIDIRECTIONAL P/N RA7725
8.8 Oz. 38" Width Threads/inch:
54L x 48W . Lineal Yd.

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

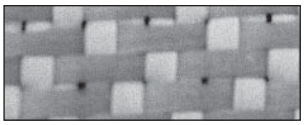
BIDIRECTIONAL WOVEN KEVLAR



STYLE 120



STYLE 281



STYLE 285

"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.

Style	Part No.	Oz./ Sq.Yd	Weight Width	Thickness	W x F	Weave	Breaking Strength Lbs/Inch		Price Per Lineal Yd
							Warp	Fill	
120	01-38100	1.8	38"	.0035"	34 x 34	Plain	260	250	.
281	281-38	5.0	38"	.010"	17 x 17	Plain	625	650	.
285	285-38	5.0	38"	.010"	17 x 17	Crow	630	650	.

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

UNIDIRECTIONAL KEVLAR

KS-400 is a unique unidirectional reinforcing material combining the benefits of Kevlar 49 with Owens-Corning Fiberglass S-2 Glass. Designed for use in laminates which must have high modulus or stiffness and tensile strength combined with low weight or density. Specifically constructed to enhance properties of wet-out behavior, bondability and impact strength in a hand laid-up composite. As compared with woven fabrics of pure Kevlar, KS-400 should produce laminates with better fiber-resin ratios and superior stiffness. The integrity of KS-400 is maintained through very fine, adhesive coated Dacron fill yarns that are bonded to, but not interwoven with, the unidirectional fibers. Only vinyl esters or epoxies should be used as impregnating resins. The presence of the S-2 Glass enables the fabricator to determine visually when the material is properly wet out. Resin bond is far superior to the glass than to the Kevlar. This means increased resistance to delamination. Also the presence of the S-2 Glass even in such a relatively small amount increases the impact strength of the laminate significantly. In application, it is important that the fabricator does not confuse the appearance of the cross-direction adhesive binder with air bubbles. The impregnating resin will soften this adhesive and it will flow slightly. The adhesive shows up as milky areas on both sides of the fabric within the finished laminate. A gel coat or paint covers these areas effectively. 12" Wide ..... P/N 01-00340 ..... **. Ft**

10% Discount on 50 ft. (4 lbs) • 20% Discount on full roll, 300 ft. (24 lbs)

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 ..... .

Quantity Discount: 10% on 6, 15% on 10

INDUSTRIAL FABRIC SHEARS

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

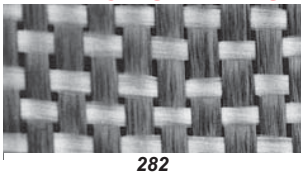
Right Hand Shears..... P/N 01-00397 ..... .
Left Hand Shears..... P/N 01-00398 ..... .

ECONOMY KEVLAR SCISSORS - GINGHER® Scissors cut Kevlar exceptionally well. Lightweight, extremely sharp and comfortable, these 2 1/2 oz. scissors are perfect for use during the lay-up. Soak in acetone for easy clean-up. We recommend saving one pair for only cutting Kelvar®, and keep ing a second pair for general use.

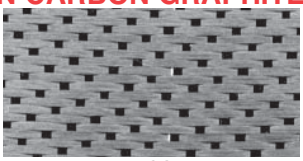
P/N 01-00342 ..... .

CARBON GRAPHITE

BIDIRECTIONAL WOVEN CARBON GRAPHITE



282



584

Woven graphite is a fabric introduced in recent years which has become an excellent alternative to fiberglass and Kevlar - only mils thick with great strength. In addition to its great strength, graphite fabric also has very low density and is very stiff. Although it is quite costly, the material saving is appreciable since only one course of graphite is required for 3 or 4 of fiberglass. It cuts considerably easier than Kevlar. Graphite "Prepregs", which are standard graphite weaves impregnated with either polyester or epoxy resins, have been used by major manufacturers to cut production time on composite parts. The required equipment and precise production controls for proper cure of prepregs make them difficult to adapt to homebuilt applications. The excellent qualities of the graphite fabric itself give it an immediate waiting market in the aircraft building field.

Graphite fabric is stocked in the three different styles shown below. Other weights and weaves of graphite are available on a special order basis. Be sure to specify the graphite style when ordering. These carbon graphite cloths are not pre-preg fabrics. **** Warning folding for shipment can damage the filaments in the fabric. Folding will be done at customers risk and request only.***

CARBON FIBER

Style	Part No.	Weight Oz./Sq Yd.	Width	Thick-ness	W x F	Weave	Breaking Strength		Price /yd.
282	01-00970	5.8	39"	.007"	12.5x12.5	Plain	300	300	.
282	01-00971	5.8	50"	.007"	12.5x12.5	Plain	300	300	.
282	01-28260	5.8	60"	.007"	12.5x12.5	Plain	300	300	.

TWILL 2 X 2 WEAVE

Style	Part No.	Weight Oz./Sq Yd.	Width	Thick-ness	W x F	Weave	Breaking Strength		Price /yd.
284	01-00972	5.8	50"	.007"	12 x 12	2x2 Twill	n/a	n/a	.
284	01-00602	5.7	50"	.007	12X12	2/2 Twill	n/a	n/a	.

8HS WEAVE

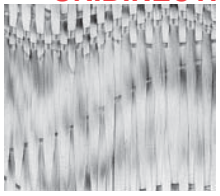
Style	Part No.	Weight Oz./Sq Yd.	Width	Thick-ness	W x F	Weave	Break-ing Strength		Price /yd.
584	01-00626	11	42"	.013"	24x24	8HS	650	650	.

STANDARD E-GLASS & FIBERGLASS TAPES

Tapes are woven from 8.7 oz./sq. yd. fiberglass cloth, .012" thick, into narrow widths with non-raveling selvage. Perfect for glassing seams, corners, edges fan for repair jobs. Sold in 50 yd. rolls.

1" Width 26 Warp, 17 Fill ..... P/N 01-06610.....Roll .
1-1/2" Width 32 Warp, 17 Fill ..... P/N 01-06615.....Roll .
2" Width 40 Warp, 17 Fill ..... P/N 01-06600.....Roll .
3" Width 58 Warp, 17 Fill ..... P/N 01-06700.....Roll .
4" Width 76 Warp, 17 Fill ..... P/N 01-06705.....Roll .
6" Width 106 Warp, 17 Fill ..... P/N 01-06710.....Roll .
12" Width 218 Warp, 17 Fill ..... P/N 01-06720.....Roll .

UNIDIRECTIONAL FIBERGLASS TAPE



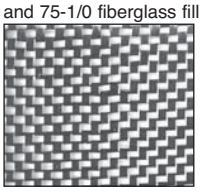
This is a fibrous glass reinforcement designed to furnish exceptionally high directional strength. Manufactured from parallel strands of glass roving which are held together by a fine woven cross thread. The placement of the cross thread is such that the parallel rovings do not wander or have a tendency to cross over each other. This 100% unidirectional tape can be used instead of unidirectional fabric for spar caps, wings and elevators. Contours well and cuts building time considerably. Wt. 22 oz./sq. yd., 0.025" thick. May be used with either polyester or epoxy systems. Used on Polliwagen. Long-EZ, Cozy. Adventure and applicable to all composites.

3" Wide ..... P/N 01-06800..... **Yd.**

UNIDIRECTIONAL CARBON GRAPHITE

Construction is such that the fibers are oriented in a straight or linear manner with no twist and are able to be maintained in that condition while being impregnated by hand. The fabric is formed from rovings or "tows" of fibers similar to that used in making woven fabric. These fibers are locked into position by very fine fill (or cross machine direction) fibers which are encapsulated with an adhesive which is compatible with common impregnating resins. These fill fibers and the encapsulating adhesive will be visible in any clear resin. The resulting "pattern" is normal and should not be interpreted as poor wet-out of the reinforcing fibers. For hand lay-ups, resin may be applied by spray, brush or by pouring action. A short napped paint roller is recommended for spreading the resin. Excess resin should always be rolled out in a direction parallel to the graphite fibers. The final or external layer should be applied with the fill yarns facing down (unexposed). Satisfactory for use with epoxies, polyesters, vinyl esters and other resins. The fabric is rolled with a polyethylene interliner to maintain cleanliness. Care and cleanliness should be practiced when working with Graphite materials. Unattached graphite fibers are easily airborne. A filter mask should be worn when cutting and fabricating. Itching & irritation caused by broken filaments becoming imbedded in the skin can result from filament breakage during handling.

This graphite fabric is similar to the bidirectional woven graphite described above but is a unidirectional weave using standard 3000 tow graphite warp and 75-1/0 fiberglass fill .



UNIDIRECTIONAL GRAPHITE FULL WIDTH ROLLS

Sold by the yard.

Style	Part No.	Weight Oz. Sq.Yd.	Width	Thick-ness	W x F	Weave	Tensile Strength Lbs./Inch Warp	Tensile Strength Lbs./Inch Fill	Price per Lin. Yd.
716	716-38	4.7	38"	.006"	16 x 24	Plain	550	125	.

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

GRAPHITE FIBER TAPES

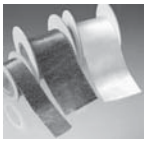
- ***Tensile Strength –*** 54,000 PSI/in. width
- ***Weight –*** 0.033 Lb./Sq.Ft.
- ***Thickness –*** 0.012" Laminated

5" Wide ..... P/N 01-06200..... **. /Foot**

25% Discount on full roll of 250 ft.

12" Wide ..... P/N 01-06300..... **. /Foot**

15% Discount on 12"W x 50' Roll & 25% Discount on 12"W x 300' Roll



UNIDIRECTIONAL CARBON TAPES

These carbon fiber tapes are used to add stiffness and tensile strength in one direction without adding significant thickness or weight. These West System tapes have 12 carbon fiber bundles per inch of tape width. The bundles are held together with a polyester fill thread making the tape easy to handle. These tapes are compatible with epoxies but not with vinlyester or polyester resins. #702 tape is 1.5" wide and #703 tape is 3" wide.

Style No.	Width (in.)	Length	Part No.	Price/.roll
702	1.5"	12 ft.roll	01-00238	.
702	1.5"	50 ft.roll	01-00239	.
703	3"	12 ft.roll	01-00240	.
703	3"	50 ft.roll	01-00241	.

CARBON FIBER TUBING

Aircraft Spruce offers structural tubing and structural torsion tubing, engineered and built to meet your exact specifications and tolerances. Structural Tortion Tubing, in continuous lengths up to 40', is manufactured with the computer-controlled, fully-automated Helical Winding Process. We offer a broad array of Fiber Options and tubing wall thickness and diameter is determined on a case-by-case basis to suit your application. ***Special Order Sold in 10 ft. lengths only (can cut for UPS shipment).***

D of Tube	Wall Thickness	Length	Part No.	Price
0.5"	.100	10'	03-00171	.
0.75"	.100	10'	03-00172	.
1.00"	.120"	10'	03-00173	.
1.25"	.120"	10'	03-00174	.
1.5"	.120"	10'	03-00175	.
1.75"	.120"	10'	03-00176	.
2"	.120"	10'	03-00177	.
2.5"	.120"	10'	03-00178	.
3"	.120"	10'	03-00179	.

GRAPHITE – LAMINATING EPOXIES

CARBON GRAPHITE YARN TOW

High strength (470,000 PSI) carbon fibers are used as reinforcement in high performance structural composites for aircraft applications, recreational and industrial products. Carbon fiber filaments are finer than a human hair. These filaments are bundled together to make a fiber of 3,000, 6,000 or 12,000 filaments which is called a "tow". The tow is sized with an epoxy compatible material to improve the handling characteristics. It is then wound on a cardboard core holding from 4 to 6 pounds of fiber. 1 Lb. spool.

Actual Size	Part No.	Approx. Yield	Roll Size	Price/Spool
3K Tow	01-00343	2470 Yd./Lb.	4 Lb.	.
6K Tow	01-00307	1229 Yd./Lb.	1 Lb.	.
6K Tow	01-00955	1229 Yd./Lb.	1.5 Lb.	.
12K Tow	01-00345	621 Yd./Lb.	4 Lb.	.

It appears that the 6K tow will prove most practical for homebuilding applications. This size will be available in the small units shown. The 3K and 12K sizes are offered in full spools only. The 3K tow is used primarily by weavers. The 12K is difficult to wet out but can be done by diligent brushing.

S-GLASS ROVING FILAMENTS

This is the S-Glass Strand (roving) used by Rutan Aircraft Factory on the Defiant homebuilt kits. Also applicable to other homebuilt aircraft applications. Defiant requires four 15lb. rolls of S-Glass Strand.

One 15 Lb. Roll P/N 01-06400 .....

KEVLAR 49 ROVING

Unidirectional Aramid fiber roving. Type 968, 7100 denier, comprised of five strands of 1420 denier. Used in the popular geodesic dacron kayaks and boats by Platt Monfort, this roving has a wide variety of applications.

300 Ft . Roll ..... P/N 968.....

FOUR-MINUTE EPOXY

Epolite 9935 is a clear, 2 component room temperature curing easy-to-mix liquid epoxy system with a four minute gel time. It is an excellent adhesive for composite and wood applications, has very low shrinkage, and provides excellent machinability. Shelf life: 1 year.

P/N 01-07700 .....

SYSTEM THREE QUIKFAIR EPOXY FAIRING PUTTY

Lightweight, micro ballooned filled, fast curing 2-part epoxy fairing putty with excellent moisture resistance. Use on both fiberglass and wood epoxy structures above or below the waterline. At 70° F it is sufficiently cured to be hand sanded in 3 hours or machine sanded in 4 hours. This allows you to apply 3 coats in a standard 8 hour shift or 6 in a round the clock basis. Complete a fairing or filleting job in a day rather than 3 or 4 days. NOTE: QuikFairs warm butter-like consistency makes it easy to measure by weight. Use care when measuring by volume as QuikFair does not self-level and may trap air pockets. As QuikFair is fast curing the working time is short. Mix no more than can be applied within 10 minutes.

24 oz. Kit .....P/N 01-00404 .....

1-1/2 qt. Kit .....P/N 01-00405 .....

EPOXY PREMIUM PIGMENTS

These Premium Pigments are a paste to tint polyester, vinyl ester, epoxy resin, and polyurethane. Add about 6% to 8% of pigment by weight or 1/2 pint of pigment per gal. of resin.

White - 1 oz. .....P/N 01-45308 .....

White - 8 oz. .....P/N 01-45501 .....

Black - 1 oz. .....P/N 01-45319 .....

Black - 8 oz. .....P/N 01-45512 .....

JEFFCO EPOXY LAMINATING SYSTEM

1307 Low Viscosity Resin / 3102 Fast Hardener - 100% solids 2-component epoxy laminating system with excellent wet out, low viscosity and high strength. Very low odor and toxicity. Easy to use, 4:1 weight or volumetric mixing, safe, fast curing products for a variety of use applications. Used for fast curing, penetrating wood coatings, adhesives and sealers, fiberglass laminating and microsphere filled fairing compounds. Excellent cold temperature cures down to 40°F. No solvents or VOC's. Non-hazardous, non-corrosive hardener.

3176 30-minute Medium R/T Epoxy Hardener - Fast setting, even in thin films. Good low temperature cure. Fast wetting of fiberglass reinforcements. Easy to use 4:1 mix ratio. High HDT at room temp, increasing with post cure. Low toxicity, very low odor. Non-hazmat.

Low Viscosity Laminating Resin

1307 LV, Pail (40 lbs)..... P/N 01-07917.....

1307 LV, Gallon (8 lbs) ..... P/N 01-07914.....

Fast Hardener

3102, Pail (40 lbs) ..... P/N 01-07920 .....

3102, Gallon (8 lbs)..... P/N 01-07918 .....

3102, Quart (2 lbs) ..... P/N 01-07915 .....

Medium Hardener

3176, Pail (40 lbs) ..... P/N 01-07921 .....

3176, Gallon (8 lbs)..... P/N 01-07922 .....

3176, Quart (2 lbs) ..... P/N 01-07923 .....

KITS - Jeffco Epoxy, 1 gal. kit, fast..... P/N 01-07916 .....

Jeffco Epoxy, 5 gal. kit, fast..... P/N 01-07919 .....

Jeffco Epoxy, 1 gal. kit, medium.... P/N 01-07924 .....

Jeffco Epoxy, 5 gal. kit, medium.... P/N 01-07925 .....

AEROPOXY LIGHT PATCHING/FILLER COMPOUND

Aeropoxy Light, a modification of the ES6279 adhesive system, is a 2-component paste epoxy patching and filler compound for foam, wood, fiberglass and other surfaces. The mixed consistency of this system is very smooth and creamy, so it spreads easily, and can be spliced 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! The resin and hardener of this system are color coded for easy mixing. The resin is white and the hardener is brown, giving a good visual indication of complete mixing with a uniform tan color free of streaks. AEROPOXY LIGHT has special low density fillers incorporated into it that provide very distinct benefits. It is a very light material (4 pounds per gallon), and therefore contributes minimal added weight to the filled or repaired structure. Also, the cured material is very easy to sand, making the finished patch undetectable when covered or painted. There are no volatile ingredients in AEROPOXY LIGHT, so the cured material will not outgas, which could cause a loss of adhesion of paint or coverings. Sold in kits of part A & B.

1-1/2 lb. Kit.....P/N 02-30006 .....

6 lb. Kit.....P/N 02-30007 .....

IMPACT RESISTANT LAMINATING EPOXY

DLRH-3212 is an unfilled, clean epoxy resin system with a long pot life. DLRH-3212 is a tough, strong, impact resistant resin with chemical resistance. It has excellent wetting quality on kevlar, carbon graphite and fiberglass cloth. Used extensively in construction of aircraft, race cars, motorcycles, helmets and sports equipment. Mixing Ratio by Wt: 100:30; Pot Life (200 Gm MASS) 60 Min; Tensile Strength @ 25 C 12,500; Flexural Modulus @ 25 C 40,900; Heat Deflection 325 F; Thermal Shock 72°F–125°F; Shore "D": 80, Density: Resin: 9.7, Hardener: 7.9, Mixed: 9.1; Shelf Life: Resin/ Hardener 1 Year.

Qt Kit ..... P/N 01-00430.....

Gal Kit ..... P/N 01-00431.....

5 Gal Kit ..... P/N 01-00432.....

EPOXY LAMINATING SYSTEMS

CM

POLY EPOXY
STRUCTURAL EPOXY SYSTEM

Poly Epoxy is a true high-performance epoxy resin with unmatched tensile, compressive, and flex strengths. It also has unbeatable peel, shear, and fatigue resistance, as well as impact strength and fracture behavior. It's great for wings, canards, fuselages, tail feathers, and landing gear. Use it in molds or moldless construction. It parts easily and works beautifully in vacuum bagging. (Avoid silicone-treated peel ply.) It has TWO cure phases, while all other resins—epoxy, polyester, or vinylester—have just one. The two phases occur all by themselves during the curing process. The resulting bond is tougher and stronger than any other.

Poly Epoxy Kit, quart ..... P/N 01-07905 .....
Poly Epoxy Kit, gallon..... P/N 01-07906 .....

POLY EPOXY TECHNICAL DATA

Mechanical Properties:	w/Post Cure	w/o Post Cure
Tensile Strength, psi	9600	8800
Elongation at Break, %	7.5	3.6
Tensile Modulus, psi	470,000	460,000
Flexural Strength, psi	19,000	14,500
Flexural Modulus, psi	515,000	500,000
Compressive Strength, psi	32,000	33,000
Shore D Hardness	82	70
Glass Transition Temp., °C	72	62
Heat Distortion Temp., °C	64	50
Water Immersion Weight Gain, % (140 °F, 30 days)	2.8	2.9

Rheology: Mixing Ratio:3 parts Resin to 1 part Converter by Weight 10 parts Resin to 4 parts Converter by Volume

Kinetics:

Pot Life, 100 grams ..... 105 mins 1 quart.....75 mins
Mold Open Time.....3-4 hrs Tack Free Time..... 5-6 hrs

AVAILABLE EXCLUSIVELY FROM AIRCRAFT SPRUCE

ALPHA POXY
NON-STRUCTURAL EPOXY SYSTEM

AlphaPoxy is a low-cost flexible epoxy system that is ideal for laying up non-structural parts like wheel pants, or fairings. Because it is flexible, we don't recommend it for structural applications, such as fabricating load-bearing structural aircraft parts. Use PolyEpoxy for these applications. This is a low-viscosity system specifically formulated for filling with microballoons, cotton flox, or milled glass fibers to make slurries. It was designed for maximum sandibility; when cured, it is soft enough to be easily cut with sandpaper smoothing a breeze. AlphaPoxy is also excellent when used as a final filler resin over structural parts when an epoxy gel coat is called for. You can use it in place of polyester resins for a much more durable part at a very attractive price. AlphaPoxy uses a non-MDA hardener that allows us to ship it as non-hazardous material.

AlphaPoxy Kit, 1-1/4 gallon ..... P/N 01-07911 ..... .
AlphaPoxy Hardener, gallon..... P/N 01-07909 ..... .
AlphaPoxy Resin, 7/8 gallon ..... P/N 01-07912 ..... .
AlphaPoxy Hardener, 5 gal. pail..... P/N 01-07910 ..... .

AlphaPoxy Hardener, 3/8 gallon ..... P/N 01-07908 ..... .
AlphaPoxy Resin, 5 gal. pail ..... P/N 01-07913 ..... .
Rheology: Mixing Ratio:
2 parts Resin to 1 part Hardener by Weight

AVAILABLE EXCLUSIVELY FROM AIRCRAFT SPRUCE

E-Z POXY
EPOXY LAMINATING SYSTEMS

In early 1996, Composite Design Co. developed E-Z Poxy to provide a replacement epoxy system for Epolite (Safe-T-Poxy) which is no longer produced by Hexcel. The E-Z Poxy series of laminating systems utilizes one resin and your choice of three hardeners for varying pot life and viscosity requirements. The E-Z Poxy systems offer the same handling and physical properties as the discontinued Epolite systems including ease of use, long pot life, rapid cure for demold or process continuation, and superior room temperature curing properties. Excellent for use in sport aviation, marine, and industrial applications.

E-Z 83 hardener is equivalent to Safe-T-Poxy standard hardener, E-Z 84 is equivalent to Safe-T-Poxy II hardener, and E-Z 87 is equivalent to Safe-T-Poxy slow hardener. E-Z Poxy products should not be mixed with materials produced by other epoxy manufacturers.

E-Z POXY PRICE LIST

Description	Part No.	Price
E-Z Poxy 1-1/2 gal. kit*	01-07850	.
E-Z Poxy 5 gal. kit**	01-07950	.
E-Z Poxy 1-1/2 qt. kit	01-08050	.
E-Z Poxy II 1-1/2 gal. kit*	01-08850	.
E-Z Poxy II 5 gal. kit**	01-08950	.
E-Z Poxy 1 gal. resin	01-00245	.
E-Z Poxy 5 gal. resin	01-00246	.
E-Z Poxy 1/2 gal. hardener	01-00247	.
E-Z Poxy II 1/2 gal. hardener	01-00248	.
E-Z Poxy 2-1/2 gal. hardener	01-00249	.
E-Z Poxy II 2-1/2 gal. hardener	01-00250	.
E-Z Poxy 5 gal. hardener	01-00251	.
E-Z Poxy II 5 gal. hardener	01-00252	.
E-Z Poxy slow 1/2 gal. hardener	01-00253	.

**** 8 lbs. resin, 3.5 lbs hardener ** 40 lbs. resin, 18 lbs. hardener***

E-Z POXY TECHNICAL DATA
E-Z POXY RESIN SYSTEMS FROM COMPOSITE POLYMER DESIGN

E-Z 10 Epoxy Resin
E-Z 84 Aromatic Amine Hardener
E-Z 83 Aromatic Amine Hardener
E-Z Aromatic Amine Hardener

E-Z 10 Resin (Viscosity* 1500 cps @ 77F with:

Hardener	EZ 83	EZ 84	EZ 87
Mixed Properties:			
Mixed Viscosity cps @ 77F*	1300	800	1500
Viscosity Hardener cps @ 77F*	410	140	830
Pot Life @ 77F	2 hrs.	2 hrs.	5 hrs.
Tack Free @ 77F	4 hrs.	8 hrs.	8 hrs.
Cure Time @ 77F	24 hrs.	3 days	3 days
Mix Ratio by Volume	100/47	100/47	100/47
Mix Ratio by Weight	100/44	100/44	100/44
Physical Properties Tg (F):			
R/T	151	151	142
P/C*	196	196	196
Elongation %	3.5	3.5	3.9
Specific Gravity	1.14	1.13	1.14
Linear Shrinkage @ 23C (4 days %)	.10	.10	.10
Tensile Strength PSI			
R/T	8,200	8,100	8,400
P/C	10,000	10,000	10,000
Tensile Modulus (PSI x 10 -5)	4.8	4.2	4.0
* Viscosity may vary +/- 10%			
*Post Cure for 2 hrs. @ 150F			

E-Z Poxy systems provide excellent room temperature curing systems for hand layup of composite parts and tooling. The systems are designed to provide ample working time with the varied pot life options while providing a rapid finish cure. Post curing these systems will increase their physical properties as designated in the above data, however, post cure is not required.

POLYESTER GEL COATS

These polyester gel coats can be used as the surface of new fiberglass parts layed up in molds or used in the repair of gel coat surfaces on fiberglass parts. On surface repairs, the gel coat must be sealed to fully cure. PVA can be used to seal the gel coat.

Color	Size	P/N	Price
Black	Pint	09-01668	.
	Quart	09-01666	.
	Gallon	09-01667	.
White	Pint	09-01669	.
	Quart	09-01664	.
	Gallon	09-01665	.

Color	Size	P/N	Price
Dark Blue	Pint	09-01670	.
	Quart	09-01671	.
	Gallon	09-01672	.
Red	Pint	09-01673	.
	Quart	09-01674	.
	Gallon	09-01675	.

Color	Size	P/N	Price
Clear	Pint	09-02159	.
	Quart	09-02160	.
	Gallon	09-02161	.

EPOXY LAMINATING SYSTEMS

POLYESTER RESINS

Polyester resins are hygroscopic (they draw moisture from the air). There are two types of resin, and one or both types may be required, depending on the application. Type "A" resin has a small amount of wax in it, which comes to the surface and forms a barrier against the moisture. This permits the resin to cure completely and the surface is hard and easily sanded. Bond Coat "B" resin does not have any wax content. As a result the surface stays a little tacky, as the surface cure is being inhibited by moisture. This tacky surface provides excellent adhesion between coats. Bond Coat resin is therefore recommended for the first coat of resin to fill the weave of the glass cloth, for bonding fiberglass cloth to plywood or other surfaces and for multi-layers of glass cloth.

TYPE "A" RESIN

#1520-5 is a general purpose ortho surfacing resin intended for the finishing coat applied over the Bond Coat #1063-5, or for single coat application. A second coat may be applied after full cure and thorough sanding but is not recommended.

Polyester Resin #692 Quart ..... P/N 01-00346
1 Gal. #1520-5 with 1 Oz. Catalyst ..... P/N 01-00347
5 Gal. #1520-5 with 4 Oz. Catalyst ..... P/N 01-00348
Additional catalyst may be required. 1 Oz. .... P/N 01-06900
4 Oz. ..... P/N 01-07325

TYPE "B" RESIN

#L253T-20 is a general purpose bond coat ortho resin for use in making multi laminates. It will not cure to a high gloss finish. Use 1520-5 for finish coat to obtain smooth, hard gloss finish. Replaces #1063-5.

1 Gal. #L253T-20 with 1 Oz. Catalyst ..... P/N 01-00349
5 Gal. #L253T-20 with 4 Oz. Catalyst ..... P/N 01-00350
Additional catalyst may be required.
Same catalyst used for #1520-5 and #L253T-20.
Note: Use #1520-5 finish coating over #L253T-20 but never use #L253T-20 over #1520-5.

Above resins are not for use in making fuel tanks. For fuel tanks (except those for gasohol) use #6060-5 Isophthalic Resin.*

1 Gal. #6060-5 with 1 Oz. Catalyst ..... P/N 01-00351
5 Gal. #6060-5 with 4 Oz. Catalyst ..... P/N 01-00352
Additional catalyst may be required.
Catalyst same as for resins listed above.
* Iso Resin is highly flexible. Has excellent adhesion to metal, wood, concrete, fiberglass and other "hard-to-adhere" surfaces. Compatible with most fuels. Iso is a wax-free resin and must be over-coated with Type "A" Surfacing Resin to obtain a surface cure.

SURFACE CURING AGENT is used in polyester resin to improve sanding properties. Added to #1063-5 Bond Coat or #6060-5 Isophthalic, it will provide same sanding properties as in Type "A" Surfacing Resin. Use in proportions of 2 oz. per gallon of resin. Surface Curing Agent is used in addition to catalyst.

4 Oz. in Polyethylene Dispenser Bottle ..... P/N 01-07100
Pint (16 Oz.) in Polyethylene Dispenser Bottle P/N 01-07200
Gallon (128 Oz.) ..... P/N 01-07300

MGS EPOXY RESINS

MGS epoxy resins are approved for the production of certificated aircraft parts. The 335 and 285 systems are especially suited for homebuilders because of their long shelf lives, excellent workability, physiological friendliness, adjustable cure rates and excellent static and dynamic strength characteristics. The 285 system is available with fast and slow hardeners which can be blended with each other in any proportion to provide the desired working life and cure cycle. Pot lives and working times can be adjusted from fifteen minutes, using the fast hardeners, to six hours, when the slow hardeners are employed. Once the hardeners have been blended, the specified resin to hardener mixing ratio must be maintained. The 335 System is available only with fast hardener. Components of the 335 system should not be mixed with those of the 285 system. With both systems, if only the slowest hardener is used, the cure times should be extended to a few days, otherwise some brittleness may be noted. While room temperature curing results in good properties when the faster hardener combinations are used, some curing at elevated temperatures or post curing will result in the highest achievable strength and Tg, with the slower blends. Even unfavorable low temperature and high humidity conditions in the work environment will not effect the quality of the product and high gloss, uncontaminated, tack free surfaces are achievable every time. The resins do not contain any unreactive dilutants which with many systems result in de-gassing and bubbling of the painted finish. The MGS resins do NOT contain aromatic amines. While proper processing practices should be maintained, the physiological friendliness of these systems have been demonstrated by many years of production experience. The 285 system has slightly higher physicals than the 335 and will also achieve a higher maximum Tg after post curing. While the 335 is more viscous than the 285, after mixing with the appropriate hardeners, their viscosities are comparable. MGS systems are used in the construction of the Cozy, Diamond, Cirrus and other aircraft.

System 285 (Max. Tg 105 C - 110 C; 195 F - 230 F)		
Mixing ratio Resin:Hdnr	**Pot life**	**Mixed Viscosity@20C**
100:50 by volume	H285-F 40 min	300-500 cp
100:40 by weight	H287-S 4 hours	
	H285 : H287	
	40 : 60 2 hours	

System 285 Prices

L285 Resin (1 Gal.) ..... P/N 01-41000
H285F Hardener (.25 gal/1 qt.) ..... P/N 01-41005
H287S Hardener (.25 gal/1 qt.) ..... P/N 01-41006

System 335 (Max. Tg 75 C - 80 C; 160 F - 180 F)		
Mixing ratio Resin:Hdnr	**Pot life**	**Mixed Viscosity@20C**
100:45 by volume	H335-F 15 min	800 cp
100:38 by weight	H340-S 6 hours	400 cp
	H335 : H340	
	50 : 50 1.5 hours	
	20 : 80 4 hours	

System 335 Prices

L335 Resin (Gal.) ..... P/N 01-41100
H335F Hardener (.225 gal/0.9 qt.) ..... P/N 01-41105
H340S Hardener (Slow) ..... P/N 01-41106

Two units of hardener are required for each gallon of resin

VINYL ESTER RESIN

Dow Chemical's Derakane 411-350 PA Vinyl Ester Resin is an epoxy-based Vinyl ester designed to provide superior toughness and high corrosion resistance. Many leading kit aircraft manufacturers use vinyl ester resins extensively due to its quality and ease of fabrication. We furnish medium "promoted" vinyl ester 411-350 PA resin which includes CONAP, DMA the resin is cured by adding the MEKP which is furnished with the kit. Gel times vary according to the amount of MEKP added and the ambient temperature. Shelf life of promoted vinyl ester resin is short at only a few months.

MEDIUM PROMOTED: Includes CONAP, DMA and other additives. Add MEKP for complete cure:
Quart ..... P/N 01-01076
Gallon ..... P/N 01-07350

MEKP NORAC Catalyst Only (4 oz.) ..... P/N 01-07325
Vinyl Ester Resin411-350PA - 1oz. ..... P/N 01-01109
Vinyl Ester 1-Gal. Kit (Resin & Catalyst) ..... P/N 01-07355
Vinyl Ester Resin 411 55 Gallon ..... P/N 01-01057

RESIN: Color may vary by manufacturer.

Typical room-temperature properties of clear castings made with DERAKANE 411 resins

Property	DERAKANE 411-350PA
Tensile Strength, psi	11-12,000
Tensile Modulus, units 105 psi	4.9
Elongation, %	5-6
(DERAKANE 411-350)	(7-8)
Flexural Strength, psi	16-18,000
Flexural Modulus, units 105 psi	4.5
Compressive Strength, psi	16-17,000
Compressive Modulus, units 105 psi	3.5
Compressive Deformation at Yield, %	6.5-7.8
Specific Gravity	1.12
Heat Distortion Temp.,°F	210-220
Barcol Hardness	35

CATALYST LARGE QUANTITY CHART

Catalyst Concentration	Resin Quantity		
	Quart	Gallon	5 Gallon
1/2%	1/16 oz.	2/3 oz.	1-1/3 oz.
3/4%	1/4 oz.	1 oz.	5 oz.
1%	1/3 oz.	1-1/3 oz.	6-2/3 oz.
1-1/2%	1/2 oz.	2 oz.	10 oz.

WARNING: Mekp Catalyst is very dangerous to the eyes. Always wear full goggle protection and have running water at hand when working with Mekp.

CATALYST SMALL QUANTITY CHART

(20 -30 minute pot life at 2% mix ratio)

Catalyst Concentration	Resin Quantity - 30 drops = 1 cc				
	2 oz.	4 oz.	8 oz.	12 oz.	16 oz.
1/2%	9 drops	18 drops	36 drops	1.8 cc	2.5 cc
3/4%	14 drops	27 drops	2 cc	3 cc	4 cc
1%	18 drops	36 drops	2.5 cc	3.75 cc	5 cc
1-1/2%	27 drops	2 cc	4 cc	6 cc	8 cc
2%	36 drops	2.5 cc	5 cc	7.5 cc	10 cc

EPOXY LAMINATING SYSTEMS

CM

AEROPOXY FROM PTM&W INDUSTRIES

CORROSIVE

PR2032 is a medium viscosity, unfilled, light amber laminating resin that is designed for structural production applications. 3 hardeners are available for use with PR2032. PH3660, has a 1-hour pot life. When used with either of these hardeners, 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. The AEROPOXY systems will cure completely at room temperature, or can be given an elevated temperature cure. AEROPOXY contains no MDA (a known liver toxin and carcinogen) and meets or exceeds current OSHA requirements for safe use. Hardener PH3665 has a longer pot life than PH3660, 2 hours, that is useful for vacuum bagging larger parts before the resin has gelled. Hardener PH3630 is intended for smaller laminates, fast repairs or additions to a primary structure. PH3630 pot life is 30 min.

Part No.	Description	Wt. (lbs.)	Price
01-42125	1 quart PR2032 Resin	2.25	.
01-42130	1 pint PH3660 Hardener	.66	.
01-42135	Aeropoxy QUART KIT	2.91	.
01-42140	3/4 gallon PR2032 Resin	7.5	.
01-42145	1 quart PH3660 Hardener	2.0	.
01-42150	Aeropoxy GALLON KIT	9.5	.
01-42155	5 gallon PR2032 Resin	48	.
01-42160	2 gallon PH3660 Hardener	13	.
01-42165	Aeropoxy PAIL KIT	61	.
01-00160	1 pint PH3630 Hardener (fast)	--	.
01-00161	1 quart PH3630 Hardener (fast)	--	.
01-00162	1 pint PH3665 Hardener (slow)	--	.
01-00163	1 quart PH3665 Hardener (slow)	--	.

Aeropoxy mixing ratio — 100:27 by weight, 3:1 by volume.

WEST SYSTEM EPOXY

WEST SYSTEM brand resins and hardeners, form a two-part epoxy system developed by Gougeon Brothers specifically for wood and composite boat construction. Rutan Aircraft Factory now recommends WEST SYSTEM epoxy for certain homebuilt aircraft applications, particularly where a moisture resistant epoxy is desired. 105 Resin is the base material on which all of the WEST SYSTEM epoxy systems are built. The resin is a clear, light amber, low-viscosity liquid. It is designed specifically to wet out wood fiber. With roller applications, it possesses excellent thin film characteristics in flowing out and is self-leveling without fish-eyeing. Its relatively high flash point makes it safer to work with than polyesters. It can be cured in a wide temperature range, then sanded and shaped. It cures quite clear so that the natural finish shines through. 205 Fast Hardener, when mixed with the 105 Resin in a ratio of 5 parts Resin to 1 part Hardener, yields a high-strength, rigid solid with excellent cohesive properties and provides an excellent moisture vapor barrier. The 105 Resin/205 Fast Hardener has a pot life of 10-15 minutes at 70°F. It is also recommended in coating applications where natural finishing is desired. Partial cure time at 70°F is 5-7 hours. 206 Slow Hardener is a low-viscosity mixture of polyamines. The 105 Resin/206 Slow Hardener has a pot life of 30-40 minutes at 70°F. It is normally used when extended time is needed for large coating and bonding applications. It is especially well suited to working in warmer climates. Partial cure time is 9 hours at 70°F.

WEST EPOXY KITS

WEST COMPONENTS

Kit No.	Kit Size	Part No.	#105 Resin	Hardener		Kit Price	Resin		Fast Hardener		Slow Hardener	
				#205 Fast	#206 Slow		Part No.	Price	Part No.	Price	Part No.	Price
A-1	1.2 Qt	01-08100	32 Oz	7 Oz	------	.	01-00353	.	01-00356	.	01-00359	.
A-2	1.2 Qt	01-08200	32 Oz	------	7 Oz	.	32 Oz	-----	7 Oz	------	7 Oz	-----
B-1	1.2 Gal	01-08300	126 Oz	27 Oz	------	.	01-00354	.	01-00357	.	01-00360	.
B-2	1.2 Gal	01-08400	126 Oz	------	27 Oz	.	126 Oz	-----	27 Oz	------	27 Oz	------
C-1	5.25 Gal	01-08500	4.35 Gal	121 Oz	------	.	01-00355	.	01-00358	.	01-00361	.
C-2	5.25 Gal	01-08600	4.35 Gal	------	121 Oz	.	4.35 Gal	-----	121 Oz	------	121Oz	------

ORDER 301/303 PUMP PACKS SEPERATELY.

207 SPECIAL COATING HARDENER

This hardener is used where a very clear, moisture resistant natural wood finish is needed. Can be used to laminate veneers where joints will be subjected to sunlight. Improves sun resistance. Pot life: 20 min., cure solid in 9-12 hours, and maximum strength within 7 days.

.66 pint.....P/N 207-SA ..... .
.33 gal.....P/N 207-SB ..... .
1.45 gal..... P/N 207-SC ..... .

209 TROPICAL HARDENER

This hardener is used for bonding applications in warm or humid weather or when extended working time is needed. Provides twice the working time as 206 hardener. Forms a clear, amber solid when cured. Pot life is 40 minutes, solid state in 24 hours, and maximum strength in 5-9 days.

.66 pint.....P/N 01-00362..... .
.33 gallon.....P/N 01-00364..... .
1.45 gal.....P/N 01-00363..... .

PRO-SET 125 RESIN & 229 HARDENER

Mixing: 125 Resin: 229 Hardener - By weight, 100:30 & By volume, 100:35. Pot life: 65°–83 min, 72°–77 min, 85°–27 min.

For PROFESSIONAL use only.

Physical Property	Test Method	Room Temp (2 wks.)
Compression Yield (psi)	ASTM-D-695	14,500
Tensile Strength (psi)	ASTM-D-638	7,550
Annular Shear Fatigue(lb)@100,000 cycles	GBI Method	11,641

GAL.#125 Resin ..... P/N 125-0..... .
GAL.#229 Hardener ..... P/N 229-0..... .

WEST SYSTEM ACCESSORY PRODUCTS

• West System User Manual..... P/N 01-08750 .....**FREE**

• West System 101 Handy Repair Pack - Contains 105 resin & 205 hardener plus accessories needed for small repairs
P/N 01-08760 ..... .

• West System #101-6 Maxi Repair Kit - incl. materials to make 6 individual repairs using 105 resin and 205 hardener.
P/N 01-08770 ..... .

• West System 501 White Pigment - use this epoxy based pigment to provide a neutral white base for the final coloring system. Mix at ratio of 1 teaspoon to 8 oz. of epoxy. 8 oz. can..... P/N 01-08775 ..... .

• West System 410 Microlight an excellent filler which provides easy workability for a variety of applications. Easy to sand and cures to a neutral tan color.
1.7 oz., 01-08780 ..... . 4.3 oz., 01-08785..... .

423 GRAPHITE POWDER

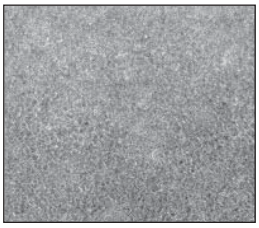
423 Graphite Powder can be mixed with WEST SYSTEM epoxy to produce a low friction coating with increased scuff resistance and durability. 423 is often used as a bearing surface, and as a coating on the bottoms of racing craft that are dry sailed. P/N 09-00315.....

301/303 PUMP PACK

Using Mini Pumps helps ensure accurate metering of resin/hardener mixture. Pumps mount directly on resin and hardener containers. One stroke from each pump delivers proper ratio of resin to hardener. Kit consists of 3 pumps for A, B, and C epoxy kits. P/N 01-00318.....

FOAM

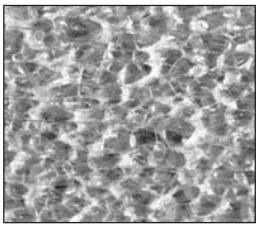
STYROFOAM – SMALL CELL



STYROFOAM FB – Low density (2 lb./ft3). Tight closed cell structure leaves no voids between the cells. The result is high compressive strength and unequaled resistance to water penetration. Has excellent resistance to bases, salts, alcohols and most acids but not to petroleum based solvents. Cuts smoothly with a hot wire for airfoil shapes.

Foam Type	Density	Thickness	Sheet Size	Part No.	Price/Sheet
Styrofoam (Blue) Small Cell	2 Lb/Ft^3	5/8”	24” x 48”	01-09400	.
		5/8”	24” x 96”	01-09500	.
		3/4”	24” x 96”	01-09600	.
		1”	24” x 48”	01-09700	.
		1”	24” x 96”	01-09800	.
		1-1/2”	24” x 96”	01-09900	.
		2”	24” x 48”	01-10000	.
		2”	24” x 96”	01-10100	.
		4”	24” x 48”	01-10200	.

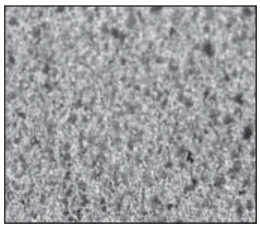
POLYSTYRENE – LARGE CELL



POLYSTYRENE – LARGE CELL This blue large cell expanded foam is 2 lb. density and cuts easily using a hot wire to airfoil shapes. Compatible with most adhesives, but should be used only with epoxies, not polyester resins. Will dissolve in fuels and solvents.

Foam Type	Density	Thickness	Sheet Size	Part No.	Price/Sheet
Styrofoam FB (Blue) Large Cell		8”	16” x 4”	01-37600	.
		8”	16” x 42”	01-10600	.
		8”	16” x 67”	01-10800	.
		8”	16” x 109”	01-10900	.
Polystyrene (Round Corners)	2 Lb/Ft^3	10”	20” x 96”	01-11100	.
		10”	24” x 96”	01-11200	.

POLYURETHANE FOAM



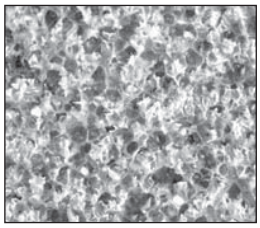
CAUTION

DO NOT USE HOT WIRE!

URETHANE – This foam is easily contoured using a large knife, and then sands well to final form. Excellent for producing the fuselage, wing tips, and other curved parts. It is fuel resistant and can be used for fuel cells. Compatible with most adhesives. Do not hot wire polyurethane foam. Color: tan or green.

Foam Type	Density	Thickness	Sheet Size	Part No.	Price/Sheet
Urethane (Tan or Green)	2 Lb/Ft^3	1/2”	24” x 48”	01-11300	.
		1/2”	48” x 48”	01-11400	.
		3/4”	24” x 48”	01-12150	.
		3/4”	24” x 96”	01-12160	.
		1”	24” x 48”	01-11500	.
		1”	24” x 96”	01-11600	.
		1”	48” x 96”	01-11700	.
		2”	24” x 48”	01-11900	.
		2”	24” x 96”	01-12000	.
		2”	48” x 96”	01-12100	.

DIVINYCELL FOAM



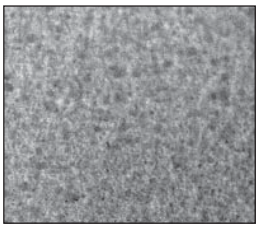
CAUTION

DO NOT USE HOT WIRE!

DIVINYCELL – A closed cell medium to high density foam which has high compression strength, durability, and excellent fire resistance. Can be vacuum formed to compound shapes and can be bent using heat. Compatible with polyester, vinylester, and epoxy resins.

Foam Type	Density	Thickness	Sheet Size	Part No.	Price/Sheet
Divinycell PVC (Blue) Type H45	3 Lb/Ft^3	1/4”	32” x 48”	01-12300	.
		3/8”	32” x 48”	01-12400	.
		5/8”	24” x 47”	01-12500	.
		3/4”	15” x 26”	01-12600	.
		3/4”	32” x 48”	01-12700	.
		1”	32” x 48”	01-12800	.
		1-3/4”	32” x 48”	01-12900	.
Eracer		2”	48” x 96”	01-12920	.
	Eracer	2”	24” x 48”	01-12910	.
	Eracer	3”	48” x 96”	01-12940	.
	Eracer	3”	24” x 48”	01-12930	.
Divinycell PVC (Tan) Type H100	6 Lb/Ft^3	1/4”	37” x 37.5”	01-13000	.
		1”	6” x 10”	01-13100	.
		1”	10” x 12”	01-13200	.
Divinycell PVC	15.6 Lb./Ft^3	1/4”	24.8” x 27.75”	01-13300	.

LAST-A-FOAM



CAUTION

DO NOT USE HOT WIRE!

LAST-A-FOAM – Rigid, Polyether Polyurethane foam with fine closed-cell structure, light cream-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.

Foam Type	Density	Thickness	Sheet Size	Part No.	Price/Sheet
Last-A-Foam Urethane/Polyester (Yellow) 275° F	4.5 Lb/Cu. Ft.	10mm	24” x 96”	01-13400	.
		1/4”	24” x 48”	01-13550	.
		1/4”	24” x 96”	01-13500	.
		3/8”	24” x 96”	01-13600	.
		1/2”	24” x 96”	01-13700	.
		3/4”	24” x 96”	01-14000	.
Last-A-Foam Urethane/Polyester (Yellow) 275° F	6Lb/Cu. Ft.	1/4”	24” x 48”	01-14100	.
		3/8”	24” x 48”	01-14200	.
		3/4”	24” x 48”	01-14250	.
Last-A-Foam Urethane/Polyester (Yellow) 275°F	8 Lb/Cu. Ft.	1”	16” x 24”	01-01048	.
Last-A-Foam Urethane/Polyester (Yellow) 275° F	18 Lb/Cu. Ft.	0.200”	12” x 48”	01-14400	.
		1/4”	12” x 48”	01-14500	.

FOAM — REPAIR KITS — SEAT FOAM

LIQUID "X-30" FOAM
(TWO-COMPONENT POLYURETHANE FOAM)

This system consists of two components - "X-30" Resin and "X-30" Catalyst. When the resin and catalyst are mixed in equal volumes they expand into a rigid closed-cell foam of 2 pound density. Thorough mixing of the two components is essential. "X-30" Foam expands approximately 40 times its liquid volume. Small-batch mixes are recommended. Cured foams can be easily trimmed, cut and shaped with common woodworking tools. Use toluene or MEK for cleanup. "X-30" Foam contains a highly reactive agent and is classified as a toxic material. It is combustible, a strong skin sensitizer and eye irritant. Avoid contact with the skin. Use rubber gloves when handling. Used for: Flotation, thermal and acoustical insulation reinforcement and miscellaneous void filling. Most small pleasure boats can be made "sink-proof" with approximately two gallons of "X-30". Data sheet available. "X-30" Foam contains a volatile fluorocarbon and should be stored at 70°F. or lower. "X-30" is used on the Osprey II bottom hull, canopy, nose cone, etc., requiring about four gallons of material (2 gallons of each). Shelf life at least 6 months. Users have reported "more than 2 years shelf life".

Kit Size	Part No.	Approx. Foamed Vol. (Cu.Ft.)	Weight Lbs.	Price/Kit
1 Quart Kit (1 Pt. ea component)	01-08800	1-1/4	3	.
2 Quart Kit (1 Qt. ea component)	01-08900	2-1/2	6	.
2 Gallon Kit (1 Gal. ea component)	01-09000	10	22	.
10 Gallon Kit (5 Gal ea component)	01-09100	50	110	.

X-30 is the original polyurethane foam. Do not accept substitutes!

POLYFIX COMPOSITE REPAIR KITS

Polyfix is a 3-part system that uses chemical reaction to heat the repair to 140°F, fusing it to the parent part. This system repairs ABS, PVC, CVPC, SMC, acrylic, vinyl, graphite, Kevlar, plexiglass, nylon, fiberglass, and many other materials, The system combines cyanoacrylate glue, a catalytic filler, and an accelerator. May be used on speed fairings, wing tips, cowlings, glareshields, and more. Kits include polyfix chemicals, Polydust, gloves, mixing tools, and an easy to follow instruction manual.

Description	Size	Part No.	Price
Polyfix Plastic Repair Kit	-	01-01045	.
Polyfix Plastic Repair Kit	Small	01-00235	.
Polyfix Plastic Repair Kit	Medium	01-00236	.
Polyfix Plastic Repair Kit	Large	01-00237	.
Non-Clog Cyanoacrylate Applicator reg. Tip	6" Long	01-01006	.
Non-Clog Cyanoacrylate Applicator Fine Tip	6" Long	01-01007	.
Polyfix Thin Cyanoacrylate	1/2 OZ	01-01008	.
Polyfix Thin Cyanoacrylate	1 OZ	01-01009	.
Polyfix Thin Cyanoacrylate	2 OZ	01-01010	.
Polyfix Thin Cyanoacrylate	8 OZ	01-01011	.
Polyfix 9000 Extra Thick	1/2 OZ	01-01012	.
Polyfix 9000 Extra Thick	1 OZ	01-01013	.
Polyfix 9000 Extra Thick	2 OZ	01-01014	.
Polyfix 9000 Extra Thick	8 OZ	01-01015	.
Polyfix 11000 Gap Fill	1/2 OZ	01-01016	.
Polyfix 11000 Gap Fill	1 OZ	01-01017	.
Polyfix 11000 Gap Fill	2 OZ	01-01018	.
Polyfix 11000 Gap Fill	8 OZ	01-01019	.
Polyfix Industrial 4000 Flexible Thin	1 OZ	01-01020	.
Polyfix 3000 Rubber Fill	1 0Z	01-01021	.
Polyfix 3000 Rubber Fill	2 OZ	01-01022	.
Polyfix 17000 Industrial Odorless Gap Fill	1/2 OZ	01-01023	.
Polyfix 17000 Industrial Odorless Gap Fill	1 OZ	01-01024	.
Polyfix 17000 Industrial Odorless Gap Fill	2 OZ	01-01025	.
Polyfix 17500 Industrial Odorless Gap Fill	1/2OZ	01-01026	.
Polyfix 17500 Industrial Odorless Gap Fill	1 OZ	01-01027	.
Polyfix 17500 Industrial Odorless Gap Fill	2 OZ.	01-01028	.
Polyfix 64000 Carbon Gap	1/2OZ	01-01029	.
Polyfix 64000 Carbon Gap	1 OZ	01-01030	.
Polyfix 64000 Carbon Gap	16 OZ	01-01031	.
Polyfix PLYDT Catalytic	10M/MG	01-01032	.
Polyfix PLYDT Catalytic	1/2 PT	01-01033	.
Polyfix PLYDT Catalytic	1 PT	01-01034	.
Polyfix 10000 Accelerator	2 OZ	01-01035	.
Polyfix 10000 Accel	8OZ	01-01036	.
Polyfix 6000 Debonder	1 OZ	01-01037	.

COMPOSITE MATERIALS PRACTICE KIT

All designers highly recommend that builders who are considering a composite project purchase this practice kit. It contains the excellent 26 page 11" x 17" manual by Burt Rutan entitled MOLDLESS COMPOSITE SANDWICH HOMEBUILT/ AIRCRAFT CONSTRUCTION ($14.50) plus the assorted foams, epoxy, fiberglass, filler materials and supplies with which to work. Everything needed to practice the technique of composite building before venturing into a complete aircraft project.

Practice Kit with Manual ..... P/N 01-15000 .....
Practice Kit without Manual ..... P/N 01-15100 .....
International Practice Kit with Manual ..... P/N 01-15050 .....

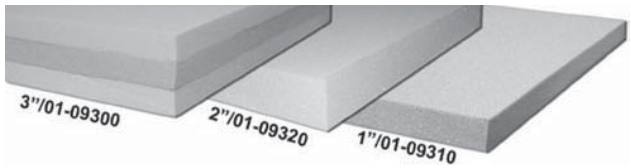
Same as Practice kit with the manual, but excludes the epoxy for International shipping.

BACKSAVER FOAM

Backsaver foam is temperature sensitive, softening when it comes in contact with a warm surface; Thus, in a seat cushion, the foam softens and conforms to the person's body. This provides even pressure distribution and unconstricted blood circulation, significantly reducing discomfort, even over long periods. In addition, Backsaver foam has excellent energy absorption properties, which have made it excellent for use in the U. S. space shuttle program and in military aircraft and helicopters. Pilots find that Backsaver cushions reduce their discomfort and fatigue, even on missions of 8 hours or more. Aircraft Spruce now makes Backsaver foam available to the homebuilt and general aviation market.

17" x 18" sheet ..... P/N 01-09325 ..... **. ea.**
48" x 72" sheet ..... P/N 01-09330 ..... **. ea.**

CONFOR FOAM SEAT CUSHION



Confor Form (formerly called Temperfoam) is the conforming foam cushion that was developed for the "Astronaut's Couch" back in the Apollo space program. Confor Foam has the capability of absorbing a tremendous amount of impact shock compared to common polyfoam and it is flame resistant. It is an excellent product that will give your seats enduring comfort that you never thought possible. Adapts to you for pressure point-free comfort that is really incredible. The best universal cushion for aircraft use is a 3" CF42/CF45/CF47 laminate. Confor Foam meets FAR 25.853, FAR 25.855, and CAL 117 burn specifications making it excellent for certified aircraft or homebuilts. Some special sizes in 1", 2", or 3" thicknesses are available on special request.

1" x 16" x 18" ..... P/N 01-09310 ..... **. ea.**
2" x 16" x 18" ..... P/N 01-09320 ..... **. ea.**
3" x 16" x 18" ..... P/N 01-09300 ..... **. ea.**

INFLATABLE LUMBAR SUPPORT

This inflatable air pillow can be installed just under the seat material and will give you the customized support just where you need it. A convenient palm-size pump and a release valve control the firmness of the lumbar support. The In-Flight Back Support is made of a heavy duty self-extinguishing neoprene rubber, specially designed to pass FAR 23.853 flame-test requirements.

One inflatable lumbar support ..... P/N 13-01501 .....
Two Inflatable lumbar supports ..... P/N 13-01821 .....

POLY-CEL 100 POLYURETHANE FOAM

New one-component polyurethane foam that requires no mixing. Dispenses like shaving cream from an aerosol can, then sets up to a rigid closed-cell foam. Adheres permanently to almost any surface - does not shrink, dry out or become brittle with age. 12 oz. aerosol can.

P/N 01-09200 .....

VACUUM BAGGING SUPPLIES

VACUUM BAGGING TECHNIQUES BOOK - P/N 01-14803 ..... **./ea.**

VACUUM BAGGING FILM - #7400 film is a high grade nylon 6 film. It is transparent green in color and heat stabilized for long term, 350°F cures. Film is soft & pliable and ideal for high temperature composites, metal-bond, and any function requiring heat & pressure. Width: 54".
P/N 01-14805 ..... **./Yd.**

4.5 OZ. BREATHER/BLEEDER PLY - #3450 is a 4.5 oz./sq. yd. non-woven polyester breather system used for even volatile evacuation from vacuum bags. It can be used at pressures up to 85 psi (5.8 bars). Multi-directional conformability make it a very efficient breather. This breather does not contain any binders which could seal the air flow. Width: 60".
P/N 01-14810 ..... **./Lin.Yd.**

STRETCHLON VACUUM BAG FILM 60" - Modified urethan film with increditby high elongation, which allows anyone to vacuum bag easily. This film has memory and can be reused. .0015 x 60" x 200 ft (38m x 1.52m x 62m) approx shipping weight 18lbs per roll (8.1 kg) Not affected by low humidity, always stays soft with no cracking. Elongation up to 600%, one with elastic memory. Use temperatures up to 400°F (204°C). Can be heat seamed to custom shapes reducing labor costs. Fewer pleats necessary, conforming to autoclave pressures
P/N 01-01080 ..... **./Lin.Yd.**

10 OZ. BREATHER/BLEEDER PLY - #3100 is a 10 oz./sq. yd. nonwo-ven polyester breather system used for even volatile evacuation from vacuum bags. It can be used at pressures up to 200 PSI (13.8 bars). Multi-directional conformability makes it a very efficient breather. This breather does not contain any binders which could cause seal-off of air flow. Width: 60". P/N 01-14815 ..... **./Lin.Yd.**

2 OZ. NYLON RELEASE PLY - #5201 SRB is a smooth nylon fabric which has been scoured and heat set so that it is contaminate free and will not shrink during the laminate cure cycle. It is then coated with a special release blend. The peel ply may be used for composite manufacturing and metal bonding, but is not recommended for use with resin systems containing phenolic. Thickness: .005". Color: Blue. Width 60".
P/N 01-14820 ..... **./Lin.Yd.**

3 OZ. POLYESTER RELEASE PLY - #5252SRB is a medium coarse weave polyester peel ply that leaves a surface with a rougher texture. It has been scoured and heat set to eliminate shrinkage during use and then coated with a special release blend. It can be used on all composite and metal bonding systems and is not affected by resin systems contain-ing phenolic. #5252 provides protection of the laminate surface between primary & secondary processing. Thickness: .006". Color: Blue. Width: 60". P/N 01-14825 ..... **./Lin.Yd.**

RELEASE FILM - #2410 material is the most economical release film available that can be used at temperatures over 350° F. The film has handling qualities similar to the lowest priced halohydrocarbon film. Thickness: .002". Color: Clear. Width: 54".
P/N 01-14830 ..... **./Lin.Yd.**

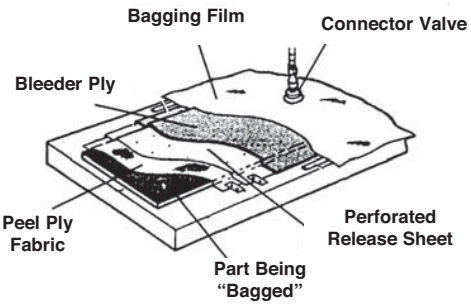
POROUS TEFLON COATED RELEASE FILM - #7025 is used where a medium weight porous release fabric is required on the surface of a part. During the cure of the assembly it will allow excess resin and all of the air and volatiles to pass into the bleed/breather ply (CFM Airflow 70). At completion of the cure the fabric will release cleanly from the assembly. Color: Brown. Width: 37.5". 10 yard min. order.
P/N 01-14835 ..... **./Lin.Yd.**

NON-POROUS TEFLON COATED RELEASE FABRIC - #7039 is a light weight extra smooth TFE coated glass fabric. It will leave little or no fabric imprint on most composite lay-ups. It is used as a release fabric where there is no requirement for bleeding or breathing resin or volatiles from the composite lay-up. It is mainly used for protecting caul sheets from resin contamination and as a release media on tool surfaces. Thickness: .003". Color: Brown. Width: 37.5".
P/N 01-14840 ..... **./Lin.Yd.**

FLASH TAPE - #6045-02 is a polyester backing film with a fully cured silicone adhesive. This tape is very tough and ideal for resin or adhesive flash removal. Color.: Blue. Thickness: .002". Roll size: 1" wide x 72 yds. P/N 01-14845 ..... **./roll**

400° F RESISTANT SEALANT TAPE - #4401 is a grey vacuum bag seal-ant tape that removes cleanly from the tool surface at the completion of the cure cycle. It can be used at any temperature up to 400° F. It can be used on any tool surface now in use and has been a standard of the industry for many years. It has high initial tack and is very easy to apply to prevent leaks between the bag and tool. It works well for composites, metalbond, or any function that requires temperature and/or pressure up to 400° F. Color: Grey. Size: 1/8" x 1/2" x 25 ft.
P/N 01-14850 ..... **./roll**

SEALANT TAPE ROLLER - #9050 is a plastic roller designed to assist in applying sealant tape between the bag and the tool. It assists the opera-tor in applying maximum pressure to make a leak-proof, smooth seal. The unit is lightweight and easy to use, and the plastic roller helps pre-vent damage to the film. Roller width: 1-3/16". Roller Diameter: 1-3/8".
P/N 01-14875 ..... **./ea.**



VACUUM VALVE - TWO PIECE - #8112 is a two-piece vacuum valve which requires one quarter turn to lock in place. Service temperature to 500° F. This valve is an industry standard The base is anodized and is red in color. Inside Diameter: 1/4" standard. Threads: 1/4" NPT.
P/N 01-14855 ..... **./ea.**

OVEN VACUUM HOSE - #8020 is a thick walled, flexible silicone hose. It is normally used for debulking and oven cures using vacuum only. Furnished in standard 10 foot lengths. Other lengths available on special order. Hose size: 1/4" ID. P/N 01-14860 ..... **./ea.**

HIGH TEMPERATURE QUICK DISCONNECT SET - #8432 is a two-piece quick disconnect both male and female for use to 500° F at pressures up to 200 psi (13.8 bars). Sold as a set of male & female components.
P/N 01-14865 ..... **./set**

SHRINK TAPE - #9010 is an oriented polyester film designed to shrink as the laminate approaches cure temperature. The applied pressure is maintained during cure. It is used extensively where the shape of the assembly makes conventional bagging too labor-intensive. If excess resin needs to be released during cure, perforating the shrink tape after the assembly has been wrapped with a porcupine roller will reduce the resin content as well as permitting air and volatiles to escape. Thickness: .002". Width: 1-1/4", Roll length: 100 yds.
P/N 01-14870 ..... **./roll**

GREENFLOW 75 - Greenflow 75 is designed to efficiently distribute resin with little waste due to the low profile, tight construction. Greenflow 75 can be used with polyester vinlyester and epoxy resins. Color: Green. Thickness: .035± .003 (.89mm±75μm). Melt Point (Method:DSC): 230°F (161°C). Configuration of Net: Rhombic
P/N 01-01081 ..... **./Lin. Yd.**

PORCUPINE ROLLER - #9060 is a steel roller with a wood handle designed to perforate films to allow air, volatiles, and some resin to flow through the film. The amount of resin flow can be controlled by the depth of the pin penetration. Also useful on foam to give the bonding adhesive a better grip on the foam surface. P/N 01-14880 ..... **./ea.**

VACUUM GAUGE - a dial faced vacuum gauge capable of displaying vacuum from 0" to 30" Hg. It is 2" in diameter and can be used on the vacuum pump line, holding tank, or with a vacuum valve to determine vacuum in specific areas of a bagged assembly. Fitting size: 1/4" NPT.
P/N 01-14885 ..... **./ea.**

VACUUM PUMP - Standard vacuum pump ideal for small shop vacuum bagging operations. P/N 01-14891 ..... **./ea.**

VACUUM PUMP KIT - Includes vacuum pump, gauge, valve, fittings, and hose. P/N 01-00164 ..... .

VACUUM RELIEF VALVE - P/N 52763 ..... .

BAGGING SUPPLIES STARTER KIT - Includes 10 yards of Vacuum Bagging Film #7400, 10 yards of 4.5oz. Breather Bleeder #3, 1 roll 400° resistant Sealant Tape (25 yards/roll), 10 yards Dacron Fabric 1.8oz.x 60", & 10 yards 60" x .001 Perforated Release Sheet.
P/N 01-14894 ..... .

PERFORATED RELEASE SHEETS - 60" width, .001 thickness. Sold by the yard. P/N 01-14895 ..... **./yd.**

ECONOMY VACUUM GENERATOR - a low cost and reliable method of generating a vacuum for those who already own an air compressor. The generator will create 27" of Hg vacuum/pressure when coupled in-line to an air compressor capable of producing 2.2 cfm. Larger air compressors are advisable for continuous use applications. Suitable for parts up to 80 ft2. P/N 12-11148 ..... .

VACUUM FORMING MACHINE CONSTRUCTION PLANS - Finally, an affordable solution for builders that need vacuum forming capability. This 106 page illustrated assembly manual includes wiring diagrams, parts lines, parts sources, full size cut-away drawings of an assembled machine, 27 dimensioned assembly and parts drawings, and much more. All details of construction of the machine are covered and photos and diagrams will guide you through it.
P/N 01-14896 ..... .

AIRCRAFT PLASTIC REPAIR

CM

A complete line of plastic repair an drefinishing products, as well as instructional materials, which make plastic repair easy and effective. Why spend alot of money on aftermarket aircraft parts, when quality repairs can easily be made on the originals? The materials listed below are specifically engineered to be used on plastics and can be used to repair and refinish the following: Cracked or broken instrument panels, wingtips, fairings, yokes, wheel pants, all types of plastic fairings, strut and landing gear fillets, headset housings, antenna housings, stripped threads and cracked mounting holes in plastic components and more! These materials can also be used to fabricate missing sections of your existing component or to create small parts.

1000-A SUPER CLEAN PLASTIC CLEANER (19 FL.OZ.)

Before doing any sort of plastic repair, use Super Clean plastic cleaner to maximize the durability of your repair. Super Clean removes mold release agents, wax, grease, silicone, tar, bugs, sealers and other contaminants from painted or unpainted plastic or metal surfaces. It's simple to use, just spray it on and wipe it off with a clean, lint-free cloth.

P/N 01-00533

2020-T SMC HARD-SET FILLER (2-5OZ. TUBES)

SMC Hard-set Filler is a 2-part epoxy system that is very rigid when fully cured. It works on ABS, SMC, fiberglass, polycarbonate and on any other repair application that requires a rigid, high impact resistant repair material. It has a working time of 3 to 4 minutes and is ready to sand in 15 minutes.

P/N 01-00534

2045W STAINLESS STEEL REINFORCING MESH (50 SQ.IN.-5"X10")

Reinforcing Wire Mesh is designed to be used to reinforce any repair made with an airless plastic welder. We recommend that the mesh be used to when a tear goes to the edge of the plastic. Since it is stainless steel, it is 5 times stronger than aluminum wire screen and is virtually impervious to oxidation under normal conditions. You can also use the mesh to fabricate tabs, fill holes and provide reinforcement in any meltable plastic.

P/N 01-00536

2100-1 SMALL INSTA-WELD KIT

Each Insta-Weld Kit comes with Insta-Weld 1, Insta-Weld 2, Activator, and Weld Compound. A complete set of instructions is included with each kit. This kit is designed to repair SMC, fiberglass, hard plastics, metals, rubber and other materials too numerous to mention. It does not work on polypropylene, polyethylene or TPO substrates. The small Insta-Weld Kit comes with a 1 oz. bottle of both the Insta-Weld 1, Insta-Weld 2 & 2 oz. bottle of Activator & weld compound.

P/N 01-00538

2200-1 INSTA-WELD 1 (THIN)

Insta-Weld 1 is our "thin" adhesive and is to be used when you have a clean break with no gap to fill. It has the consistency of water. To use, spray the borken area with 2303 Activator, clamp the parts together then appy a small amount of Insta-Weld 1. The adhesive will wick into the crack and create an instant repair. It does not work on polypropylene, polyethylene or TPO substrates.

P/N 01-00539

2250-1 INSTA-WELD 2 (THICK)

Insta-Weld 2 is our "thick" adhesive and is to be used when it is necessary to fill a gap. Insta-Weld 2 is about the consistency of 30 weight oil. To use, spray one side of the break with 2303 Activator, apply Insta-Weld 2 to the other side, then clamp together. It does not work on polypropylene, polyethylene, or TPO substrates.

P/N 01-00540

2303-3 INSTA-WELD ACTIVATOR (2FL. OZ. W/SPRAYER)

Our quick spray Activator causes instant curing of all Insta-Weld adhesives. Actovator may be used before or after adhesive is applied. Come in plastic bottles and include sprayer.

P/N 01-00541

PLASTIFIX REPAIR KITS

Plastifix repairs virtually any rigid plastic and works exceptionally well on ABS. Repair cracks, fill gaps, reinforce repairs, rebuild broken tabs, fix stripped threads, and more. PlastiFix's most unique feature is the FlexMold molding bar which allows you to create a mold and cast missing pieces. No other plastic repair is more versatile. the 30 gram kits are enough to complete approximately 24"+ of cracked plastic repair. The large kits will do about 24 feet. **Kit Includes:** 253X Plastifix Powder 30G, 2520 Plastifix Liquid 50ML, 2542 Dropper Bottle Assembly, 2543 Power Application Cup, 2548 Transfer Pipette, 2550 Applicator Needle Qty: 2, 2560 Flexmold Molding Bar 10CC.

2501-PlastiFix Repair Kit (30g, white) ..... P/N 01-00542
2503-PlastiFix Repair Kit (30g, black) ..... P/N 01-00543
2504-PlastiFix Repair Kit (30g, clear) ..... P/N 01-00544
2502-**Large Kit includes:** 2531-L Plastifix Power 150G (WHITE), 2532-L Plastifix Power 150G (BLACK), 2520 Plastifix Liquid 250ML, 2542 Dropper Bottle Assembly QTY 2, 2543 Power Application Cup QTY 2 2548 Large Transfer Pipette, 2550 Applicator Needle QTY 4

P/N 01-00545

3800-4 FLEX-TEX FLEXIBLE TEXTURE MATERIAL (QUART)

Flex-Tex is a unique blend of materials designed to be used for re-texturing repaired areas on instrument panels, consoles, etc. A wide variety of pebble-grained textures can be achieved with this product by varying the air pressure, distance from work, and speed of pass. Apply with a regular spray gun or a PreVal sprayer. Dries flat black. Must be top-coated with color for durability and appearance.

P/N 01-00546

MICRO-WELD 100

Micro Weld 100 is a versatile and economical tool for repairing many type of plastics. Airless welding provides the do-it-yourself-er and professional alike a way to economically repair many of the items that would normally be thrown away. Excellent for repair of plastic aircraft parts. **FEATURES:** • 100 Watt heating element with built in temperature control unit • 2045W Stainless Steel Reinforcing Mesh • 5027HT Welding Tip • Welder Stand • Carry Case • Instruction Booklet • 15ft of 6 different welding rods

P/N 01-00766

BUMPER & CLADDING COAT (PINT)

Permanently recolor faded, scuffed, marred, or discolored plastics. Sticks to plastic without adhesion promter or primer. Just clean the plastic with Super Clean Plastic Cleaner & spray the paint. No mixing required! Gives satiny, OEM look when dry.

Black (pint) ..... P/N 01-00548
3502-4 White (quart) ..... P/N 01-00551
3601-4 Light Gray (quart) ..... P/N 01-00552
3602-4 Dark Gray (quart) ..... P/N 01-00553

6481-2 2" ALUMINUM BODY TAPE

Can be used to hold broken parts together, create dams and simple molds when repairing plastic parts with PlastiFix or when welding.

P/N 01-00549

CS100 CLEAN SHEETS

Clean Sheets are great to have around the shop. They allow you to keep your epoxy mixes clean and smooth while saving time by always having a clean surface to mix on. No more cutting cardboard to mix epoxy. 100 sheets per board.

P/N 01-00550

2043-U UNI-CLOTH FIBERGLASS CLOTH (9 SQ.FT.)

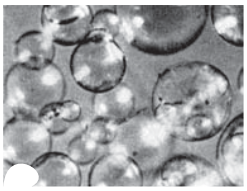
Uni-Cloth is a quality fiberglass cloth that is well suited for reinforcing plastic repairs as well as any other application requiring fiberglass reinforcement.

P/N 01-00535

Plastics Repair Instructional Book - P/N 01-00554
Plastics Repair Instructional DVD - P/N 01-00555

FILLERS

GLASS BUBBLES



These bubbles are actually hollow glass spheres. Because the high-quality glass is very crush resistant, the foam is much stronger, stiffer and water-resistant than any foam made by chemical foaming. These foams displace 4-6 times their weight in most resins and improve the handling characteristics of the base resin. They have a low bulk density and are nontoxic. Mix resin and hardener as directed, then fold in the glass bubbles. Upon cure, a strong, low-density product results which is easy to sand and file. May be shaped to form compound angles and curves. The term "micro" was applied to the mixture of microspheres and epoxy early in the development of composite structures. Although microspheres have been replaced by glass bubbles the word "micro" is still commonly used to reference the mixture. "Micro' is used to fill voids and low areas, to glue foam blocks together and as a bond between foams and glass cloth. Micro is used in three consistencies - (1) a "slurry" which is a one-to-one by volume mix of epoxy and glass bubbles, (2) "wet micro" which is about two to four parts glass bubbles by volume to one part epoxy, and (3) "dry micro" which is a mix of epoxy with enough glass bubbles to obtain a paste which will not sag or run (about five parts to one by volume). In all instances glass bubbles are added to completely mixed epoxy resin and hardener. Wet micro is used to join foam blocks and is much thicker than slurry (it has the consistency of honey) but can be brushed. Dry micro is used to fill low spots and voids and is mixed so that it is a dry paste and will not sag. Apply with a putty knife. Never use micro between glass layers.

CAUTION - When mixing epoxy and glass bubbles, wear a dust mask and keep your face away from the balloons that may float up into the air. Although glass balloons are inert, they can lodge in your eyes or in your lungs and cause problems. Handle with care.

One Pound Bag (Approx. 1 Gal.)..... P/N 01-14600..... .

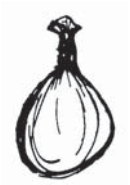
Five Pound Bag (Approx. 5 Gal.)..... P/N 01-14700 ..... .

DISPOSABLE ICING BAGS

These 12" disposable icing bags are ideal for applying beads of any size of micro epoxy or flox epoxy to all surfaces. Great for close-outs and are real time savers. Simply fill, cut end to desired bead size and squeeze. Never breaks down from epoxy. Sold in packs of 100 icing bags.

Pack of 100 bags..... P/N 01-14710..... .

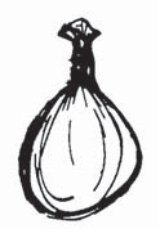
CAB-O-SIL



Cab-O-Sil is a fumed lightweight silica thickener used to reduce the flow of epoxies on vertical surfaces, as well as filling pinholes with its smooth texture.

1 gallon bag ..... P/N 01-04711..... .

FLOCKED COTTON FIBER



A structural resin filler. The mixture of cotton fiber and epoxy is referred to as "flox". The mixture is used in structural joints and in areas where a very hard, durable buildup 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 sag or run. Flox is often used to reinforce a sharp corner. Paint a light coat of pure epoxy inside the corner, trowel flox in to make a triangular support. The flox corner is done just before one glass surface is applied for a wet bond to one surface.

1 Lb. Bag ..... P/N 01-14800..... .

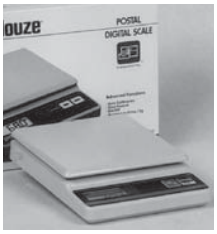
5 Lb. Bag ..... P/N 01-14900..... .

MILLED GLASS FIBERS

As the name implies, this material is made by milling fiberglass into a very thin consistency. This material is used in preparing a structural filler. This material is used in fillets that require structural integrity. Milled fiber fillers have higher strength than cotton flock but have fine particles of fiberglass that can penetrate the skin.

1 Lb..... P/N 01-14780..... .

PELOUZE PE 5 ELECTRONIC SCALE



Weighs up to 5 lbs. in grams or ounces. Ounces weighed in 1/10 oz. increments. Greatly increases accuracy of mixing resins. Allows the user to use different resin systems with varying mix ratios, yielding better physical properties of the cured resin.

P/N 12-01580..... .

BONDO

Automotive body filler, used extensively in composite construction to hold jig blocks in place, and for other temporary fastening jobs. Hardens quickly and can be chipped off without damaging the fiberglass. The color of the mixture is used to judge how fast it will set. As more hardener is added, the brighter in color the mixture becomes and the faster it hardens.

#261 Pint (1-1/2 Lb.) ..... P/N 01-00365..... .

#262 Quart (3 Lb.)..... P/N 01-00366..... .

#265 Gallon (12 Lb.) ..... P/N 01-00367..... .

BONDO MIXING BOARD

A handy, rigid polypropylene sheet, 6"W x 8-1/2"L. Ideal surface for mixing Bondo. Will not stick. When job is finished, let residue dry, flex board and excess Bondo will pop off, leaving board clean.

#359 ..... P/N 359..... .

DYNALITE

A formulation of polyester resin, talcs and Microspheres used as a lightweight filler on metal and fiberglass. Works easily, sands faster. Only 7.5 lbs. per gallon as compared to 12 lbs. per gallon for conventional fillers.

494 Gallon..... P/N 01-00368..... .

492 Quart ..... P/N 01-01072..... .

FIX-IT

A universal repair compound. It is excellent for rebuilding or fabricating parts and as an all purpose adhesive for wood, metals, ceramic, glass, and many plastics. Fix-it can be tapped or drilled, sanded, filed or painted. Patch holes and cracks and seals leaks. Sets rock hard overnight. Fix-It Metal is the same as standard Fix-It except it is loaded with aluminum metal to match the strength, weight, and use for each project. Fix-It is non-toxic, non-hazardous, and impervious to fuels and liquids.

Fit-It 1/4 Lb kit..... P/N 01-14770..... .

Fit-It 1 Lb kit..... P/N 01-14775..... .

Fit-It Metal 1/4 Lb kit..... P/N 01-14790..... .

Fit-It Metal 1 Lb kit..... P/N 01-14795..... .

3M™ #77 SPRAY ADHESIVE

This aerosol spray adhesive works well to laminate styrofoam sheets together. Laminations cut well with a hot wire. Net wt. 16.75 oz.

24 fl. oz. Aerosol Spray Can ..... P/N 09-28330..... .

FOR OTHER 3M™ PRODUCTS SEE PAGES 345-352

PUTTY FLEX FILLER

Urethane Supply Company's 1047 Putty Flex is a premium polyester finishing glaze that provides superior adhesion with excellent flexibility on plastics. Putty Flex produces excellent feather edge results on plastic, metal, SMC, fiberglass, cured primer and paint. Use to fill pinholes, dings, scrapes, sanding scratches and more! Putty Flex sands easily and resists clogging sandpaper. P/N 01-00961 ..... .

FILLERS – PRIMERS

CM

SUPERFIL BY POLY-FIBER

An ultra-light, corrosion-inhibiting filler for aircraft, marine and automotive use. Adheres to composites, bare aluminum, steel and bare or varnished wood. Easy to mix & apply: mix 2 parts A:1 part B by weight: apply with squeegee; let dry overnight. Excellent sanding qualities. More consistent than hand-mixed micros. Wt: less than 5 lbs/gal. Ships Non-Hazmat.

1 Quart Kit (20oz. Resin/12oz Hdnr) .....P/N 09-28250 .....
3 Gal Kit (2 gal.Resin/1 gal. Hdnr).....P/N 09-28260 .....

UV SMOOTH PRIME FILLER/PRIMER

By Poly-Fi ber - A waterborne linear polyurethane formulated to fill pinholes, protect against ultraviolet rays, and prime composite surfaces prior to applying epoxy primer and Poly-Fiber Aero-Thane or any polyurethane top coat paint. Apply approximately 6 coats without sanding between coats. Recommend rolling on first 3 coats and either rolling or spraying final 3 coats. Dry sand when dry.

1 qt. w/16 ccCrosslinker .....P/N 09-28280 .....
1 gal. w/64 ccCrosslinker ....P/N 09-28290 .....

FEATHER FILL

A sprayable polyester filler/primer used for filling of minor surface irregularities such as scratches, blemishes and exposed fiberglass threads before final sanding and painting. It adheres to bare metal, plastic filler and fiberglass with minimal surface preparation. Cures ready to sand and paint in 45 - 60 minutes. Any type of finish - lacquer, enamel, acrylics - can be applied over Feather Fill with excellent adhesion. Quart kit includes catalyst and instructions. Approximately six quarts are required for finishing a Vari-Eze. ***DO NOT WET SAND.***

#401 (1 Qt.).....P/N 01-00369 .....
#391 (1 Gal.).....P/N 01-00370 .....

RUST DEFENDER SANDABLE FILLER

Rust Defender is a one step finishing material from bare metal, body filler plastic, wood, aluminum, or fiberglass to a surface ready to accept any type of paint without concern about penetration of solvents or moisture. Provides fast build-up and fill, is non-shrinking, easy sanding, wet sandable and waterproof, and self-etching. Rust Defender can be sprayed or brushed on and can be built up like Bondo or Featherfill. can be be wet sanded and then is ready to sand in one hour, and it does not clog up your sandpaper. Pot life and cure time aare about one hour at 70 degrees Farenheit. Rust Defender is a versatile polyester filler which can save the homebuilder a lot of elbow work!

Quart.....P/N 01-00558 .....
Gallon.....P/N 01-00559 .....

HI BUILD POLYESTER SANDING PRIMERS

* Quick Build Primer
* Quickly fills uneven surfaces, and major imperfections
* Easy sanding prep for surface primer, top coats
* Low VOC product
* Perfect Primer for prestec topcoats or any other surface coatings desired
* Fairly Hi-Build to 120mils

Color	Size	Part No.	Price	Color	Size	Part No.	Price
Gray	Quart	09-02162	.	Gray	Gallon	09-02163	.
Black	Quart	09-02164	.	Black	Gallon	09-02165	.
White	Quart	09-02166	.	White	Gallon	09-02167	.

AEROPOXY LIGHT FILLER

AEROPOXY Light is a two-component, lightweight epoxy patching and filler paste for foam, wood, and composite surfaces. It mixes easily, applies smoothly, bonds strongly and sands quickly to make the hard job of surface filling much easier.

Color	AEROPOXY Light Reddish Tan	Test Method Visual
Mix Ratio	2 to 1 by weight or Volume 2-3 hrs. To Shape	Calculated
Gel Time, 100 gms	5-6 hrs. To Sand	ASTM D2471
@ 77°F	24 hrs. Full Cure	
Specific Gravity	.49	ASTM D792
Cured Hardness	53 Shore D	ASTM D2240
Compressive Strength	2156 psi	ASTM D695

AEROPOXY LIGHT 1/2 LB KIT - P/N 02-30006 .....
AEROPOXY LIGHT 6 LB KIT - P/N 02-30007 .....

HYSOL EPOXY PATCH KITS

EPL0151 is a clear two part resin / hardener which is ideal for bonding fiberglass, PVC, and graphite. Cure time is 6-8 hours. EPK1C is a white 2-part resin / hardener epoxy system which is used to bond aluminum and ceramics.

EPK0151 Kit, 3.35 oz. (fiberglass)
P/N 01-15875.....
EPK1C Kit 4.0 oz kit (aluminum)
P/N 01-15880.....

LITE WEIGHT FILLER

Lite Weight autobody filler is a very versatile filler which is excellent for holding jig blocks in place during composite construction. Applies evenly and allows sanding within minutes. Cures well even in humid climates. Creme hardener is included.

Quart..... P/N 01-00243.....
Gallon..... P/N 01-00244.....

WEST SYSTEM 410 MICROLIGHT

An excellent filler which provides easy workability for a variety of applications. Easy to sand and cures to a neutral tan color.

1.7 Oz ..... P/N 01-08780.....
4.3 Oz. ..... P/N 01-08785.....

EPOXY SURFACE COAT

#1099 is a white, thickened epoxy material used to created the durable surface coat on room temperature epoxy molds. This surface coat can be brushed on as thick as 1/8" at a time without developing runs or sags. It is specially formulated to provide strong interlaminar bonds with the reinforcing materials, even if it is left unsupported overnight. #1099 readily accepts all our pigments, resists chipping and cracking, and retains its high gloss. Mix Ratio by Weight – 100:11.

3.33 lb. Quart kit ..... P/N 09-01099.....
Case..... P/N 09-01099-1 .....

PRIME COAT PRIMER / FILLER

Prime Coat ia s sandable, quick-drying aerosol primer which fills pin holes and scratches caused ny sanding on fiberglass, wood, metals and many plastics. Prime Coat will prepare the surface of materials for the finish coat and provides an effective corrosion barrier as well. Prime Coat is zinc chromate yellow and can be used under lacquer, enamel, acrylic or epoxy finish coats. 11 oz. can.

P/N 01-00305 .....

PEEL PLY – PRIMERS – PAINTS

PEEL PLY

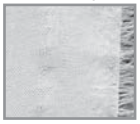
A layer of 2.7 oz. Dacron fabric strips or tape laminated into a layup as if it were an extra ply of glass. The peel coat wets out with epoxy like glass cloth and cures along with the rest of the layup. However, the Dacron does not adhere structurally to the glass and when peeled away it leaves a surface ready for glass-to-glass bonding without sanding.

PEEL PLY TAPES

Requirements for Small Aircraft:

3 Rolls of 1" x 50 Yds. Tape.....P/N 09-15000 ..... **./roll**
2 Rolls of 2" x 50 Yds. Tape.....P/N 09-15100 ..... **./roll**
1 Roll of 3" x 50 Yds. Tape .....P/N 09-15200 ..... **./roll**
1 Roll of 4" x 50 Yds. Tape .....P/N 09-15300 ..... **./roll**

Quantity Discount: 10% on12 Rolls; 15% on 25 Rolls(assorted).



DACRON FABRIC FOR HOMEBUILT AIRCRAFT

Easily controlled shrinkage by the application of heat by either a conventional steam iron or other heat source assures a professional covering job even on the first attempt. May be coated with aircraft dope, epoxies or other finishes as acceptable to the FAA. Dacron is available in many weights and weaves but three types have been selected as being most suitable as an aircraft covering material. The tensile strength of Grade A and Irish Linen aircraft fabrics is 80 lbs, which may be used as a comparable standard in selecting the proper Dacron fabric weight for a specific application. 1.8 oz. lightweight material which is generally used on gliders and over plywood. 2.7 oz. fabric is comparable in strength to Grade A. The finer weave assures an ultra-smooth texture-free finish. The 3.7 oz. material is a heavy duty fabric for extraordinary service. Sold by the yard. NOT for use on certified aircraft.

1.8 OZ X 60", 611.....P/N 09-00100 ..... .
2.7OZ, 62 W #604.....P/N 09-00300 ..... .
605 2.97 OZ X 66.....P/N 09-00500 ..... .

MOLD RELEASE AGENTS

POL-EASE ® 2300 MOLD RELEASE

Provides superior release with minimum buildup on mold surfaces for casting urethane elastomers, epoxy, polyester, and rubber compounds. Molded parts are easily cleaned for finishing operations. It is effective on aluminum, steel, epoxy, polyester, and elastomeric molds; it does not distort intricate patterns. P/N 01-31749 ..... .

MAXIMUM MOLD RELEASE WAX

Meguiar's® Mold Release Wax is a blend of imported waxes specially formulated to provide a maximum number of releases per application.
P/N 01-09415 ..... .

MOLD RELEASE WAX

High-temperature paste wax. 14 oz.
P/N 01-00177 .....

FIBERGLASS MOLD RELEASE

Plastilease 512B, a film-forming, water soluble parting agent, assures clean release of fiberglass parts from molds. For application by brush or spray.
P/N 01-30600..... **./Qt.**

LPS MRX SILICONE MOLD RELEASE

Excellent for releasing molded parts in high temperature and extreme pressure environments. MRX Silicone Spray Mold Release provides maximum releases and superior value for the end-user. This non-staining, non-corrosive mold release is heat stable up to 500°F. It is a nonflammable product and contains no class I or II ozone depleting chemicals. Like all LPS MR-series mold releases, MRX Silicone Spray Mold Release doesn't use Methylene Chloride.
16 oz. aerosol can .....P/N 09-00271 ..... **./qt**

PVA RELEASE FILM

PVA (Polyvinyl Alcohol) should be used with #1016 Wax to aid in the release of parts form a mold. It should be applied in 3 thin mist coats over nonpourous, waxed mold surfaces.After the final wax coat has dried, begin by spraying a light tack coat of PVA. Typically, within 5 mins. the final heavier coats can be added. The PVA dries to form a smooth, glassy film. After part release, the residual film can be removed with water. We recommend using an inexpensive automotive siphon spray gun and 70-90 psi for application, although airbrushes will work on hobby size projects. PVA can also be sprayed over any polyester repair to provide an airless tack-free cure. For use with epoxies.
P/N 01-14813A ..... **./qt**

ZOLATONE COCKPIT PAINT

Used to paint cockpit interiors, excellent on fiberglass. Gives a coarse, durable, professional finish. 1 gallon required for Long-EZ cockpit. Primer not required when used on fiberglass. Color chart available on request.

Color	Use Primer	Part No.	Price
White/White	White	20-02	**$99.75**
Black/Black	Black	20-06	**$99.75**
Apollo Gray	-	20-11	**$99.75**
Hamlet Black	-	20-42	**$99.75**
Camille White	White	20-54	**$99.75**
Lilith Charcoal	Black	20-59	**$99.75**
Marble Stone	-	20-63	**$99.75**
Gray Stone	Gray	20-64	**$99.75**
Onyx Black	-	20-71	**$99.75**
Silver Gray	Gray	20-72	**$99.75**
Bright Blue	-	20-77	**$113.95**
Dark Red	-	20-78	**$113.95**
Desert Camo	Black	20-80	**$99.75**
Emerald Green	-	20-85	**$113.95**

ZOLATONE PRIMER

Order 1 Qt. Colored Primer and 1 Qt. Catalyst		
Color	**Part No.**	**Price**
Zolatone Epoxy Primer White Quart	01-00994	**$31.95**
Zolatone Epoxy Primer Gray Quart	01-00995	**$31.95**
Zolatone Epoxy Primer Black Quart	01-00996	**$31.95**
Zolatone Epoxy Primer Catalyst Quart	01-00997	**$27.85**

ZOLATONE POWER SPRAY KIT

Perfect for applying Zolatone on small objects or touching-up any Zolatone coating application, the Power Spray Kit is convenient and easy to use. Simply pour zolatone into the plastic Power Spray Jar using a funnel or small dip cup. Attach jar to Power Sprayer assembly with propellant can and you're ready to go. The spray nozzle has been designed specifically for Zolatone coatings. The Power Spray Kit includes enough propellant to cover approximately 14sq.ft. (depending on distance from object, number of coats, and precise pattern desired.) Replacement cans of propellant are available so you can use the Power Spray Kit over & over.

Power Spray Kit .....P/N 09-00266 ..... .
Replacement Prop Can.....P/N 09-00267 ..... .

DUPONT FILL 'N SAND

Du Pont 210-S is a dark gray waterbased primer surfacer which provides an effective ultraviolet radiation barrier as well as an excellent finish-sanding surface in preparation for the finish paint. Any DuPont top coats - acrylic lacquer, acrylic enamel or polyurethane (Imron) - will go well with 210-S. RAF recommends urethane paint over lacquer or enamel as it is tougher, more flexible and adheres best. It is also strongly recommended that one recognized paint manufacturers' products be used throughout, from the primer through the top coat. Du Pont 210-S replaces 131S and 3011-S primers formerly recommended by RAF.

DuPont Fill 'N Sand (Quart).....P/N 01-00378 ..... Qt. .
DuPont Fill 'N Sand (Gallon) .....P/N 01-00379 .....Gal. .

Quantity Discount: 15% on 12 each, (assorted)

HI GLOSS CLEAR POLYESTER TOP COAT

Features: * Super Clear - Glass like appearance * Scratch Resistant * Buffs to a Super Hi-Gloss Finish * Refinishes to Original Hi-Gloss * Practically a Walk-A-Way Gloss Finish **Product Applications:** * Exotic wood coating * Gel coat additive for air cure application * Musical instrument wood coating * Top coat over clear primers * Top coat over pigmented colors for clear depth * Automotive interior composite parts clear coating * Archetectural wood crafts

Quart .....P/N 09-02168 ..... .
Gallon.....P/N 09-02169 ..... .

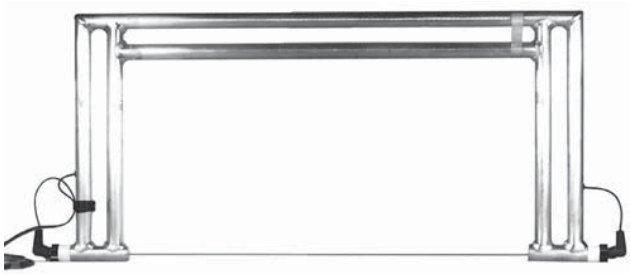
COMPOSITE TOOLS

CM

AIRCRAFT DESIGNER APPROVED TOOLS

The tools offered in this section have been selected by professional aircraft designers and builders as being either necessary or highly desirable for working with composite structures.

KUT-MASTER FOAM CUTTING FRAME



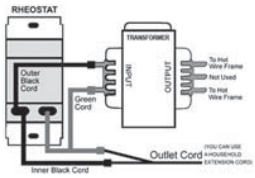
These custom-built foam cutting frames can help produce professional results in foam cutting for the amateur builder. Constructed of 1-1/8" O.D. aluminum tubing, the heli-arc welded frame is lightweight yet extremely durable. The frames come completely pre-wired and ready to attach to the voltage controls shown below, and a tensioning system maintains uniform wire tension throughout the cutting process. The frames are stocked in 3 standard lengths, and custom frames are available on request (send sketch). Cutting depth is 11". Weight- 5 lbs.

2 Ft. Frame .....P/N 01-15200 .....

3 Ft Frame .....P/N 01-15300 .....

4 Ft Frame .....P/N 01-15400 .....

HOMEBUILDERS SPECIAL HOTWIRE KIT



An excellent new hot wire system consisting of a controller and transformer. Recommended by Rutan Aircraft Factory as a good system at a very economical price .

P/N 01-15600 .....

SAFETY WIRE

Type 302 stainless steel safety wire, for hot wire cutter. This is superior to nichrome wire, which is brittle and breaks easily. Specify .032" or .041" diameter wire.

.032" Dia. Wire, 25 Ft. Coil..... P/N 01-15725.....

.041" Dia. Wire, 25 Ft. Coil..... P/N 01-15825.....

1 Lb. Spool ..... P/N 05-02687.....

INCONEL 600 HOT WIRE

Does not stretch. Excellent for hotwiring polystyrene foam.

.032" Dia. Wire ..... P/N 01-15805..... **ft.**

.041" Dia. Wire ..... P/N 01-15810..... **ft.**

MUSIC WIRE

Music wire is high carbon steel and although very high in tensile strength, must be capable of wrapping around itself without showing signs of cracking. 156 ft. of .049" dia. wire per lb., 46 ft. of .090" dia. wire, per lb. 22 Gal.

.049" Dia. (1 lbs.)..... P/N 03-49500 .....

.090" Dia.(32Ga.,1lbs.) .... P/N 03-49600 .....

TYPE 302 STAINLESS SPRING WIRE

062" Dia.....P/N 03-49610..... **ft**

MICHAEL ENGINEERING EPOXY RATIO PUMPS

This highly recommended pump, aptly called "Sticky-Stuff Dispenser", will save about $50 in epoxy in building a VE type aircraft, plus time, mess, dermatitis, temper and risk of bad batches. Used by individual craftsmen and professionals alike, it is a practical engineering tool especially designed to eliminate the sticky, messy, costly hand proportioning of epoxy resins. It is well built and should last through the construction of dozens of aircraft. The Sticky-Stuff Dispenser assures accurate measurement of low-viscosity (under 3,500 centipoises) unfilled epoxy resin. The standard Model A dispenser pump delivers a ratio of 100 parts of resin to 44 parts of hardener.

Adjustable Ratio Pump .....P/N 01-16010.....

Rebuild Kit for 45:100 pump .....P/N 01-00504 .....

Small replacement container (qt).....P/N 01-15920 .....

Large replacement container (gal).....P/N 01-15910 .....

Stainless Steel Check Valve (Use with Jeffco epoxies)
P/N 01-00258 .....

CALRAD VARIABLE VOLTAGE CONTROL

A fine quality control to supply the electrical current for hot-wire cutting of styrofoam & PVC foam. One unit can serve to build many aircraft. Input 115VAC Output variable from 0-130VAC at 5amps Caution - fuse should be inserted in the secondary to protect the control in the event of a short circuit.

Size: 6"h, 5"w, 6"d

Input Cable: 6ft. heavy duty 3-prong

Output Jack: 3 -prong AC jack

Fuse Protected: 5A, 3AG: On/Off Rocker Type Power Switch

AC Voltmeter: 0-150 VAC.

P/N 01-15500.....

COMPOSITE TOOL KIT

This kit includes an assortment of many of the commonly required tools used in composite construction.

QTY.	PART NO.	DESCRIPTION
1	20W	Glass Shears
1 box	01-25800	500 Mixing Sticks
2 boxes	01-25700	12 oz. Mixing Cups
2 boxes	01-25710	16 oz. Mixing Cups
10	01-24899	3" Plastic Squegee
10	09-21200	1" Disposable Brushes
10	09-21300	2" Disposable Brushes
1	12-01580	Electronic Scale
2 boxes	01-36550	Latex Gloves
1	GLR123D	1/2" x 3" Laminating Roller
1	GLR12C	1/2" Corner Roller
1	GLR26	2" x 6" Plastic Grooved Roller

Kit - P/N 01-00166.....

COMPOSITE TOOLS

DISPOSABLE RESPIRATOR REPLACEMENT PARTS

Dusts, Mists, & Fumes Pre-Filter ..... P/N 01-00382.....
Fit/Check Filter Cover..... P/N 7500-27.....

GROOVED LAMINATING ROLLERS

These are the standard laminated rollers for wetting out woven roving and mat with polyester resin. Use with epoxy resin for applying tape into corners and for spreading thickened epoxy over large areas for gluing and fairing.

1"x 3" ..... P/N 01-01054.....
1"x 6" ..... P/N 01-00396.....
1"x 9" ..... P/N 01-00383.....
2"x 3" ..... P/N 01-00384.....
2"x 6" ..... P/N 01-00385.....
2"x 9" ..... P/N 01-00386.....
1/4" Corner Roller..... P/N 01-00387.....
1/2" Corner Roller..... P/N 01-00388.....
1/2"x 3" Detail Roller..... P/N 01-00389.....
3/4"x 3" Detail Roller..... P/N 01-00390.....
3/4"x 6" Detail Roller..... P/N 01-00391 .....

EPOXY LAYUP ROLLERS

3" wide roller with stipple adhesive cover. Has excellent stippling action for working out air bubbles in layups and has no tendency to lift the cloth. Use on all major layups. Order frame and cover separately.

Roller Frame Only..... P/N 01-24902.....
Cover Only ..... P/N 01-24903.....

PRECISE ACCU-KNIFE SET

Heavy duty cutting edges, Complete knife set. Over 40 blades to choose from. Specifications: • Blades are made of the highest-grade steel and are ground to razor sharpness for precision cutting. • Features include positive-holding blade lock • Nonslip handles. Complete with 8 different handles • 44 sharp blades • An aluminum-oxide, wet/dry sharpening stone • Packed in a handy plastic carrying-storage case with magnets to keep the blades in place

Fine precision cutting tools for the lab-highest quality knife set. Ultra-micro to heavy-duty cutting edges are perfect for corks, paraffin, plant samples, and rubber tubing. Exceptionally sharp knives are ideal for delicate, close-tolerance, accurate cutting needs.

High-grade steel construction - Blades are made of the highest-grade steel and are ground to razor sharpness for precision cutting. Features include positive-holding blade lock, nonslip handles, and a perfect weight for balance.

Over 40 blades - Comes complete with 8 different handles, 44 sharp blades, and an aluminum-oxide, wet/dry sharpening stone. Set is packed in a handy plastic carrying-storage case with magnets to keep the blades in place. P/N 12-00381 .....

DISPENSER FOR MEKP CATALYST

Perfect to measure and pour catalyst. The bottle will hold 16 oz. of catalyst and dispenses liquid safely and accurately from 2.5 to 35 cc. Measurements are instantly repeatable.

P/N 01-08503 .....

RESIN PUMP SYSTEM

Put an end to mess and worry. make mixing small resin batches a snap. Increse accuracy of resin proportions and performance of resins. Each pump measures a liquid output of 30cc.

Pint pump..... P/N 01-00957.....
Quart pump..... P/N 01-00965.....
Gallon pump ..... P/N 01-00973.....

STAINLESS STEEL INSTAREAD THERMOMETER

Stainless Steel Instant Read 1: • Dial Thermometer • 0 Degree to 220 Degree F • Shatter-Proof Plastic Lends • Durable Stainless Steel • Plastic Case/ Calibrating Tool P/N 01-00394 .....

POST CURE KIT

This kit consists of one post cure thermometer (P/N 01-00394) and 1 regulating thermostat (P/N 2E51) that allows control of electrical devices for heating. P/N 01-00393.....

JIFFY MIXER

This is a very effective 2-1/2" diameter stainless steel mixer on a 15" shaft. Attach to an air drill for fast, efficient mixing of larger batches. It will not dig into or gouge the sides or bottom of your mixing container.

P/N 01-00395 .....

X-ACTO TOOLS

NO. 5282 KNIFE SET -
Nos . 1, 2 and 5 knives plus 10 assorted extra blades Handy, fitted chest.
P/N 01-17300.....

NO. 5083 KNIFE SET -
Nos . 1, 2 and 6 knives plus 14 assorted extra blades in beautiful wooden chest.
P/N 01-17400 .....

X-ACTO BLADE NO. 11 - Classic fine point blade. A general purpose blade. Package of 5. P/N 01-16500 .....

X-ACTO BLADE NO. 18 - X-Acto Blade #18. For deep wood chiseling. 1/2" surface. Package of 5
P/N 01-16600 .....

Other X-Acto items also available. Call for pricing.

COMPOSITE TOOLS

STANLEY TOOLS

STANLEY TAPE MEASURE

This 12 foot steel tape measure, with 1/2" blade, is graduated in tenths and hundredths of inches and also in fractions of inches (32nds). Very handy for all aircraft construction. A "must" for composite construction.
No. 33-272..... P/N 33-272 .....

STANLEY UTILITY KNIFE

Aluminum, die-cast in two sections - provides blade storage. Has handy hang hole. Furnished with No. 11-921 blade and blade guard.
No. 10-099..... P/N 10-099 .....

KNIFE BLADE

Heavy-duty pointed razor-type utility knife blade for No. 10-099 knife and most other makes of utility knives.
No. 11-921 (Pkg. of 5 Blades)
P/N 11-921 ..... .

HOOK BLADE

For use with No. 10-099 knife and most other makes of utility knives to cut linoleum, roofing material, cartons, etc., without damage. The razor-sharp hooked ends cut to full thickness in one stroke.

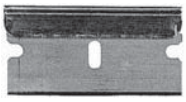
No. 11-961Pkg. of 5 Blades .....P/N 11-961 ..... .

Quantity Discount: 15% on any 10 Stanley items (assorted)

SPRING CLAMPS

Heavy-gauge steel clamps with vinyl grips and tips to prevent marring work. Jaws specially formed to hold flat or round objects. Two sizes available:

No. 3201-HT – Jaw Opening 1", Length 4"..... P/N 83-261 .....
No. 3202-HT – Jaw Opening 2", Length 6"..... P/N 83-262 .....



SINGLE-EDGE RAZOR BLADES

Used for trimming rough edges of laminates.
P/N 01-24904 ..... **./ea.**

Box of 100 30% Discount.

DOVETAIL SAW

Cuts a true, smooth and narrow kerf. Comfortable hardwood handle provides positive grip. Professional quality.
No. 15-022 ..... P/N 15-140 .....

STRAIGHT EDGE

A 6-ft. long kiln-dried spruce board, 7/8" to 1" thick and 3" to 4" wide, used for checking the straightness of flying surfaces during composite construction.
P/N 01-25900.....

6" STEEL RULER

Flexible stainless steel rule graduated in l0ths and l00ths on one side and in quick-reading 32nds and 64ths on the other side.
6 inch ..... P/N 616.....
12 inch ..... P/N 12-02062.....

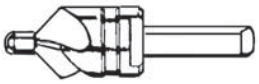
FELT TIP MARKERS

Used for marking locations on fiberglass throughout construction.
P/N 01-26000.....

12" LONG DRILL BITS

For use with standard electric drill for hard-to-reach jobs.
#10 (.1935" Dia.) ..... P/N 12-05500.....
1/4" Dia..... P/N 12-05600.....

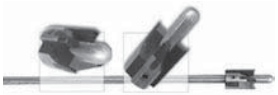
COUNTERSINK



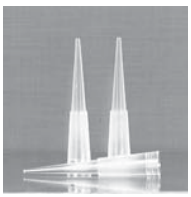
This assembly consists of a 1/2" dia. AT418E-4 100° cutter, a 1/4" dia. AT416- pilot and an AT409-1 adapter with 1/4" dia. shank for use with a hand drill. The adapter has a collet-like shaft to securely hold the replaceable pilot. Add pilot dash number to AT409. To complete part number see tool section for complete selection of pilots.
Complete Assemblies.....***See Page 597***

COUNTERBORE

A 5/8" diameter boring tool, with 1/4" diameter pilot. 10" threaded extension is used for boring holes in hard to reach places. Used in the installation of the landing gear on the LongEZ and Cozy aircraft. 3/4" bore does not have 1/4" pilot and must use the pilot received with the 5/8" boring tool.



5/8" diameter w/pilot..... P/N 12-00219 .....
3/4" diameter without pilot ..... P/N 12-00220 .....



MINI GLUE TIP

Fits most Yorker top dispenser bottles. Just slip a Mini Glue Tip on spout and seal with a pin. Always ready for use-no fuss to fill, no mess to clean. Made of polypropylene - glues don't stick. For shallow tip bends, heat in water, shape with fingers until cool.
P/N 01-27000.....Pkg. of 4 Tips.....

RUBBER SEALANT

No. 732 RTV general-purpose, clear, one-part silicone rubber. Cures to a firm silicone rubber in 24 hours at room temperature.

4.7 Oz. Tube ..... P/N 09-27800.....

COMPOSITE TOOLS

MISCELLANEOUS TOOLS AND SUPPLIES

ROTARY ("PIZZA") CUTTER

Makes clean cuts on fiberglass fabrics and other materials. The disc blade is made of high quality tungsten steel which is very sharp. Used by high-volume composite shops. Use with wooden backing board and handle knife with caution.

RTY-2 Cutter..... P/N 01-00299.....
Replacemnt Blade ..... P/N 01-00300.....
Blades (5 Pack) ..... P/N 01-00301.....

ALUMINUM ROTARY CUTTER FOR COMPOSITE WORK

This all aluminum cutter however, will not "melt" when exposed to acetone, methylene chloride and other chemicals used to clean the cutters after use on wet layups. After use the aluminum rotary cutter is cleaned by simply leaving it in a can filled with acetone.

Aluminum Rotary Cutter..... P/N 09-24906.....

90 DEGREE ALUMINUM ROTARY CUTTER FOR COMPOSITE WORK

This cutter handle is all aluminum with special stainless hardware for easy assembly when changing out rotary cutter blade. Will not melt when exposed to acetone, methylene chloride, and other chemicals. Good for wet layups. To clean, just drop in small container of acetone..... P/N 01-01047.....

PAINT BRUSHES

Natural, undyed bristle brushes with smooth, unpainted wooden handles. Unaffected by paints, dopes, resins, thinners or solvents.

1" Wide Brush..... P/N 09-21200 .....
2" Wide Brush..... P/N 09-21300 .....

RUBBER SQUEEGEE

Developed especially for working with epoxies, this 6", or 36" wide hard rubber squeegee is superior to the plastic types. Can be easily cleaned & reused many times.

6" Squeegee.....P/N 01-24901 ..... **ea**
36" Squeegee.....P/N 01-00012 ..... **.ea**

NOTCHED SPREADER

This plastic spreader is excellent for spreading epoxy at a steady rate to provide an even surface. Measures 4" x 4" and is notched on three sides in increments of 1/8", 3/16", 1/4".

P/N 01-24909..... **. ea**

GRADUATED TAPER-TIP APPLICATOR

This graduated 2 oz. syringe is ideal for measuring and dispensing precise amounts of resins and other liquids.

P/N 01-25635 .....

DISPENSER BOTTLE

Polyethylene bottle with Yorker (applicator) cap.

4 Oz. Bottle..... P/N 01-24905.....
16 Oz. (1 Pint) Bottle..... P/N 01-24906.....

Less 15% for 12 or more

INDUSTRIAL SYRINGE

Made of hi-impact polyethylene with seamless body and special safety-grip plunger. Capacity 10 cc. Tapered dispensing nozzle can be clipped with scissors at proper diameter to govern output. Excellent epoxy dispenser. P/N 01-25000.....

MIL GAUGES

These color-coded mil gauges are solid anodized aluminum for long life and come in four sizes for a variety of FRP applications. Machined to close tolerances (0.0001") for accuracy and available in mils (inches) and microns (metric).

3-18 mils ..... P/N 01-00411 .....
10-35 mils ..... P/N 01-00412.....
40-65 mils ..... P/N 01-00413.....
400-650 microns ..... P/N 01-00410.....

MULTI-MEASURE PLASTIC CONTAINERS

Use again and again for liquid ingredient accuracy. A must-have item when mixing resins. Seal the liquid in the container with the matching sized plastic lid.

1 Qt. mix cup ..... P/N 01-00915.....
1 Qt. lid ..... P/N 01-00926.....
2.5 Qt. mixing cup ..... P/N 01-00330.....
2.5 Qt. lid ..... P/N 01-00331.....

EPOXY MIXING CUPS

Unwaxed, flat bottom paper cups in three convenient sizes for small mixes.

3 Oz..... (100 Cups)..... P/N 01-25600.....
8 Oz..... (50 Cups)..... P/N 01-00416.....
12 Oz... (60 Cups)..... P/N 01-25700.....
16 Oz... (24 Cups)..... P/N 01-00324.....

MIXING STICKS

These mixing sticks are medical tongue depressors which work well for mixing small batches of epoxy. Size: 3/4" x 6".

Box of 500..... P/N 01-25800.....

TAPERED OFFSET SPATULA

This tapered spatula is stainless steel with wood handle. Ideal for making 3/8" radii on bulkheads, ribs, or anywhere a uniform radius is required.

P/N 01-24915 ..... **ea.**

COMPOSITE TOOLS

DREMEL TOOLS

DREMEL MOTO-TOOL -
A versatile, precision power tool with many uses in the construction of composite aircraft. Ideal for wood, plastics and metals. Sturdy, shatter-proof nylon housing.

MODEL 100 MOTOTOOL - Constant Speed: 35,000 RPM. Lubricated bronze sleeve bearings. Amps: 0.8
P/N 01-18600 .....

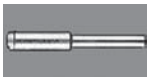
MODEL 395 MOTOTOOL - Variable Speed: 5,000-28,000 RPM with 100% ball bearing construction for long life, smooth operation. External caps allow for easy replacement of motor brushes. Amps: 0.75 (low speed), 0.9 (high speed) ..... P/N 01-18700 .....

DREMEL KIT 2850D - SINGLE SPEED MULTIPRO KIT
Helps any do-it-yourselfer completes all kinds of projects. Contains Single Speed MultiPro Tool, Quick Change Collet Nut, Accessory Holder, Wrench, 15 assorted Accessories and 175+ uses book.
P/N 01-18800 .....

DREMEL KIT 2850 - TWO SPEED MULTIPRO KIT
Ideal for multiple applications on a variety of materials. Contains Two Speed MultiPro Tool, Quick Change Collet Nut, Customized Storage Case, Wrench, 30 assorted Accessories and 175+ uses book.
P/N 01-38000 .....

DREMEL KIT 3956 - VARIABLE SPEED MULTIPRO SUPER KIT
Includes flex-shaft for precision hands free operation. Cut, grind, carve, rout, sharpen, drill, polish, sand and more. Contains Variable Speed MultiPro Tool, Flex-shaft Attachment, "New" Customized Storage Case, Wrench, 72 assorted Accessories and 175+ uses book.
P/N 01-00130 .....

MULTIPRO CHUCK
The Dremel MultiPro chuck allows you to quickly and easily change accessories on your Dremel MultiPro rotary tools without changing collets. Will accept accessoroies with 1/32" - 1/8" shanks. Use only with corded MultiPro tool models 275, 285, 395, 595.
P/N 01-00131 .....



NO. 402 MANDREL – For use with all cutting wheels, sanding discs and polishing wheels. 1/8" shank.
P/N 01-22000 .....

NO. 428 WIRE BRUSH – VE builder reports it works beautifully for cleaning the residual foam and micro off of the canard, wing and winglet trailing edge overlaps in preparation for the top skin layups. Do not run in excess of 15,000 RPM
P/N 01-22100 .....

REPLACEMENT MOTOR BRUSHES - (Specify Moto-Tool Model No.) P/N 01-18701 ..... **per pair .**

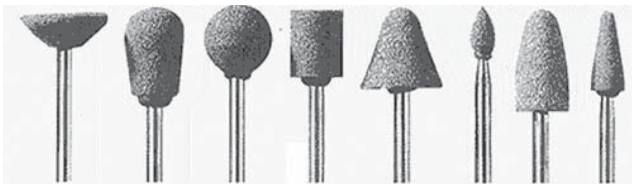
COMPOSITE TOOLS

DREMEL TOOLS

CM

ALUMINUM OXIDE GRINDING STONES

Use on metals, castings, welded joints, rivets and rust. Ideal for sharpening, deburring and general purpose grinding of most materials.

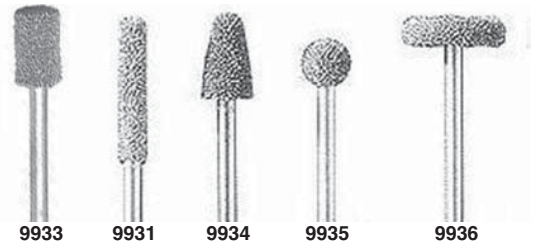


903 911 921 932 941 945 952 953

Cutter	Part No.	Price	Cutter	Part No.	Price
#903	01-00134	.	#941	01-00132	.
#911	01-00135	.	#945	01-00138	.
#921	01-00136	.	#952	01-00139	.
#932	01-00137	.	#953	01-00140	.

STRUCTURED TOOTH TUNGSTEN CARBIDE CUTTERS

Fast cutting sharp teeth for greater material removal. Use on fiberglass, wood, plastic, epoxy, rubber, laminates, particle board, soft metals, ceramic tile.



9933 9931 9934 9935 9936

Cutter	Part No.	Price	Cutter	Part No.	Price
#9931	01-00148	.	#9934	01-00152	.
#9933	01-00151	.	#9935	01-00153	.
			#9936	01-00154	.

954 971 997 8153 8175 8193 8215

Cutter	Part No.	Price	Cutter	Part No.	Price
#954	01-00141	.	#8175	01-00145	.
#971	01-00142	.	#8193	01-00146	.
#997	01-00143	.	#8215	01-00147	.
#8153	01-00144	.			

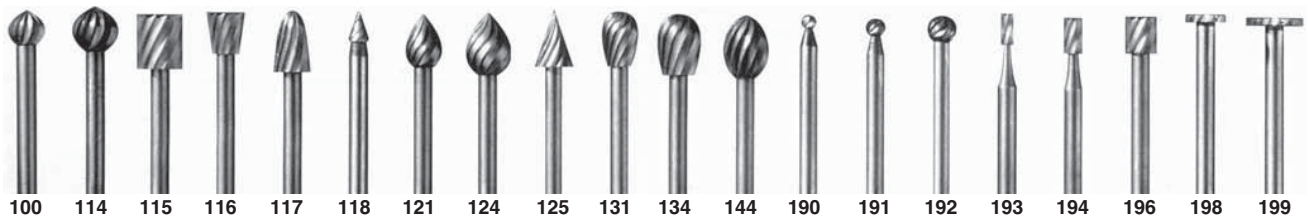
NO. 407 1/2" DRUM SANDER - Ideal for rough shaping of wood and smoothing of fiberglass. Sander bands are replaceable. Furnished w/ one band. 1/8" shank P/N 01-19000 .....

NO. 408 DRUM SANDER BANDS - 1/2" Diameter, Coarse grit. Two packages of 6 are required for the VE. P/N 01-19100 .....

DREMEL 543 CUTTING / SHAPING WHEEL - For cutting and shaping on soft and hard woods, fiberglass, plastics and laminates (not metal.) This versatile wheel is coated with tungsten carbide grit for long life. It is coated on both sides, so it cuts and finishes in one operation. P/N 01-01056 .....

HIGH SPEED CUTTERS

High Speed Cutters can be used for shaping, hollowing, groving, slotting, making tapered holes in soft metals, plastics and woods. Number 198 and 199 cutters can be used to make small slits.



100 114 115 116 117 118 121 124 125 131 134 144 190 191 192 193 194 196 198 199

Cutter	Part No.	Price	Cutter	Part No.	Price	Cutter	Part No.	Price	Cutter	Part No.	Price	Cutter	Part No.	Price
#100	01-19200	.	#117	01-21000	.	#125	01-21300	.	#190	01-20200	.	#192	01-20400	.
#114	01-19300	.	#118	01-21200	.	#131	01-19700	.	#191	01-20300	.	#196	01-20700	.
#115	01-20800	.	#121	01-19400	.	#134	01-19800	.	#193	01-20500	.	#198	01-21600	.
#116	01-20900	.	#124	01-19600	.	#144	01-20000	.	#194	01-20600	.	#199	01-21700	.

SANDING TOOLS

CM

SANDING STICK

Our Sanding Stick is ideal for aircraft builders, hobbyists, machinists, or anyone who needs to finish those hard to reach surfaces. It is made of high impact chemical resistant material and its unique design allows the user to rotate the abrasive belt 360° for its complete use. Sanding Stick is excellent for polishing, deburring, or sanding wood, metal, ceramics, and electronics, and can be used dry or with water, acetone, kerosene, or oil. Order different colored holders for easy grit identification. Order holders and belts separately.

Sanders: Complete the Holder part number by adding correct numbers for the holder color desired. Complete with 10 (gray), 20 (red), 30 (blue) 40 (green), 50 (yellow), or 60 (black). Example: 01- 41140 is a green holder in 1/2" x 8" size.

1/4" x 6" ..... P/N 01-410 .....
1/2" x 8" ..... P/N 01-411 .....
3/4" x 10" ..... P/N 01-412 .....

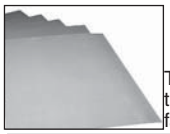
Belts: Complete the Belt parts number by adding the correct numbers for the belt grit desired. Complete with 080 (80 grit), 120 (120 grit), 240 (240 grit), 320 (320 grit), 400 (400 grit), or 600 (600 grit). Example: 01-43400 is a 1/2" x 8" belt in 400 grit.

1/4" x 6" ..... P/N 01-42 .....
1/2" x 8" ..... P/N 01-43 .....
3/4" x 10" ..... P/N 01-44 .....

SANDING BLOCK

A hard rubber tool which comfortably fits the hand for scratch- to finish-sanding. Used by professionals for years in all sanding operations. Simply cut a piece of sandpaper 2-3/4" x 9" and insert each end into the sanding block. Paper is held securely by nail retainers. Makes the sanding operation much easier.

Model No. 100 ..... P/N 01-26400 .....



SANDPAPER

The weights and grits listed have been found to be the most effective for sanding fiberglass/epoxy surfaces. Sheet Size: 9" x 11".

Sandpaper Type		Part No.	Price /Sheet Less than 50 Sheets
Aluminum Oxide 36 Grit	Open Coat "D" Weight	01-26200	.
Silicon Carbide			
100 Grit	"C" Weight	01-37700	.
220 Grit	"A" Weight	09-20600	.
320 Grit	"A" Weight	09-20800	.

SANDPAPER 3M™

Wet or dry Tri-M-Ite (3M) is a silicon carbide abrasive paper made especially for producing satin-smooth finishes on metal and other doped, lacquered or enameled surfaces. Wet or dry performs best when used with water or oil, but can also be used dry. Sheet size 9" x 11". Available in 220-A, 280-A, 320-A or 400-A grit.

(Type A paper has an especially light, flexible backing).

Sandpaper Grit Size	Part No.	Price/ Sheet
120-A	09-20550	.
220-A	09-20600	.
280-A	09-20700	.
320-A	09-20800	.
400-A	09-20900	.

FOR OTHER 3M™ PRODUCTS SEE PAGES 345-352

CURVED TOOTH FILE

Milled files designed for smooth, fast work on annealed steels, hard plastics and composite materials. 14" length, 1-11/32x5/16 sections, 8 teeth per inch. P/N 01-00392 .....

PREPPIN' WEAPON SANDING BLOCK

Preppin' Weapon is a handy sanding block made of Styrofoam core and high impact ABS that won't break when dropped. Easy to grip for wet or dry sanding. Contoured to fit the shape of a hand and is sized to fit a 1⁄4" sheet of plain backed 8 x 11 sandpaper or a 2 3⁄4" wide file paper. It's coil spring design holds single or multiple sheets equally tight and saves reloading time by stacking up to 4 sheets and tearing them away as the abrasive wears out. Save reloading time by using colors to indicate grits. Excellent for builders of aircraft, boats, cars, etc.

Yellow ..... P/N 12-00505 .....
Red ..... P/N 12-00506 .....
Green ..... P/N 12-00507 .....

MINI-SANDER

A unique sanding tool which uses a 1-1/2" wide strip of sandpaper formed to make a belt. Locked taut by a patented mechanism that snaps into place with a finger pull. Its knife edge sides and padded body sand close to right angle fittings & fit into small concave recesses. Sander body is 7/8"h x 4"l and made of high impact plastic. Buy ready-made belts or make your own (6 belts from standard sheet).

Mini-Sander ..... P/N 01-26800 .....
Wet or dry Mini-Strips, 3 - #500, 3 - #320, 3 - #220
Pkg. of 9 Strips ..... P/N 01-26900 .....
New Continuous Belts (load free) Aluminum Oxide #120
Package of 3 ..... P/N 01-26910 .....
New Continuous Belts (load free) Aluminum Oxide #220
Package of 3 ..... P/N 01-26915 .....

PERMA-GRIT CONTOUR SANDING BLOCKS

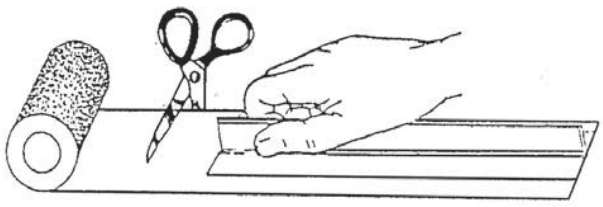
These user friendly sanding blocks are made from extruded, anodized aluminum. The 32mm (1.25") Radius Curve is covered on the external and internal radius with Tungsten Carbide abrasive sheets. The Contour Blocks come in either the Coarse (60US grit approx.) or Fine (120US grit approx.) Small block is 5.5" long and large block is 11" long.

Benefits:

- Shape and sand curves, grooves, etc. quickly and easily
- Great for fillets, leading edges, under cambers, etc.
- Extremely tough, will not wear out like normal sandpaper
- Will last for years without having to change the sheets
- Does not clog easily (brush or knock out)
- Easy to remove glues, resins, paint, epoxy etc. w/ paint remover

140MM Contour Block (COURSE) ..... P/N 01-00591 .....
140MM Contour Block (FINE) ..... P/N 01-00592 .....
280MM Contour Block (COURSE) ..... P/N 01-00593 .....
280MM Contour Block (FINE) ..... P/N 01-00594 .....

TEE BAR ALUMINUM SANDING BLOCKS



These Tee Bar sanding blocks provide a large, straight, and flat sanding surface which won't wear out. Easy to hold, can be used over and over and are permanently anodized. These blocks can help provide straighter and truer surfaces. The self-adhesive sanding strips can be cut to any length, are clean and neat, do not need glue and do not peel. Furnished in handy 3" wide x 5 yard rolls and available in various grits.

11" Aluminum Tee Bar ..... P/N 01-25008 .....
22" Aluminum Tee Bar ..... P/N 01-25007 .....
Silicone Carbide Superfine Sanding Strip ..... P/N 01-25001 .....
Silicone Carbide Fine Sanding Strip ..... P/N 01-25002 .....

PERMA-GRIT HAND TOOLS

HAND TOOLS

Perma-Grit Tools are made of Tungsten Carbide Grit, one of the hardest elements available, second only to diamonds. They are specifically designed and developed for aircraft builders, woodworkers, and modelers. These tools will cut, sand and shape tough composite materials, saving homebuilders hours of building time. Ideal for fuselage shaping and wing building, these tools are highly recommended by several kitplane manufacturers. Available in coarse (180) & fine (320) grit.

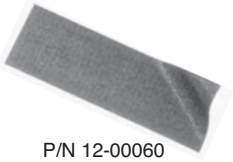
Model No.	Part No.	Description	Price
F-101	12-00040	230mm x 38mm Flat Fine File	.
F-102	12-00041	230mm x 38mm Flat Coarse	.
R-200F	12-00042	230mm x 26mm / 36mm diameter Fine	.
R-200C	12-00043	230mm x 26mm / 36mm diameter Coarse	.
R-201C	12-00044	230mm x 38mm Tangent Coarse	.
R-201F	12-00045	230mm x 38mm Tangent Fine	.
R-202C	12-00046	18mm diameter tube Coarse	.
R-202F	12-00047	18mm diameter tube Fine	.
R-203C	12-00048	12mm diameter tube Coarse	.
R-203F	12-00049	12mm diameter tube Fine	.
R-204C	12-00050	6 mm round Coarse grit	.
R-204F	12-00051	6 mm round Fine grit	.
S-204C	12-00052	6 mm square Coarse grit	.
S-204F	12-00053	6 mm square Fine grit	.
R-101	12-00054	230mm x 38mm diameter Internal Fine grit	.
R-102	12-00055	230mm x 38mm diameter Internal Coarse grit	.
Set 8C	12-00056	contains: 8 popular shapes in Tool Roll F-101, F102, R-200C, R-201C, R-202C, R-203C, R-204C, S-204C	.
Set 8F	12-00057	contains: 8 popular shapes in Tool Roll F-101, F102, R-200F, R-201F, R-202F, R-203F, R-204F, S-204F	.
TR1	12-00058	Tool Roll - Holds 8 tools, red plastic w/velcro fastener	.

ROTARY FILES

Supplied with a 3mm integral arbor so they may be used in reversible drive drills and hobby drills. These files are well balanced and run smoothly, and cur a wide range of materials with little need for secondary finishing. Available in coarse and fine grit.

Model No.	Part No.	Description	Price
RF1C	12-00070	Narrow Cone coarse	.
RF1F	12-00071	Narrow Cone fine	.
RF2C	12-00072	Wide Cone Coarse	.
RF2F	12-00073	Wide Cone Fine	.
RF3C	12-00074	Drum Coarse	.
RF3F	12-00075	Drum Fine	.
RF4C	12-00076	Pancake Coarse	.
RF4F	12-00077	Pancake Fine	.
RF5C	12-00078	Domehead Coarse	.
RF5F	12-00079	Domehead Fine	.
RF6C	12-00080	1/8 diameter Rod Coarse	.
RF6F	12-02247	1/8 diameter Rod Fine	.

SANDING BLOCKS & FLEXI-STRIPS



P/N 12-00060

These verstile sanding blocks are ideal for sanding large areas, creating straight edges, producing dihedral angles, profiling leading edges, feathering trailing edges, and more. The sanding blocks are coarse grit on one side and fine grit on the opposing side. The flexible grit strips can be cut and shaped to any form, external or internal.

Model #	Part No.	Description	Price
SB140	12-00064	140mm x 51mm Coarse one side, fine opp.	.
SB280	12-00065	280mm x 51mm Coarse one side, fine opp.	.
SB560	12-00066	560mm x 51mm Coarse one side, fine opp.	.
FXT-103	12-00060	51mm x 280mm Fine Grit Strip	.
FXT-104	12-00061	51mm x 280mm Coarse Grit Strip	.
FXT-106	12-00062	51mm x 140mm Fine Grit Strip	.
FXT-107	12-00063	51mm x 140mm Coarse Grit Strip	.

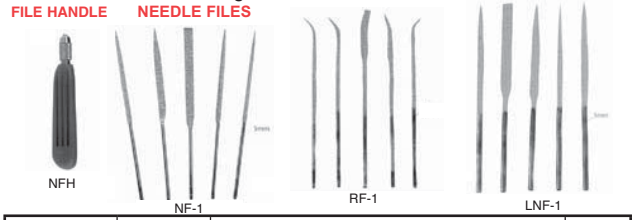
ROTARY CUTTING DISCS

These durable cutting discs are abailable in two sizes (19mm and 32mm) and come complete with a 3mm steel arbor to fit hobby drills. Will cut all woods, piano wire, composites, ceramics, stone, etc.

Model No.	Part No.	Description	Price
RD1	12-00067	19mm diameter disc with arbor	.
RD2	12-00068	32mm disc with arbor	.
RD3	12-00069	19 & 32mm disc with arbor	.

NEEDLE FILES

These extremely versatile tools are excellent for shaping and finishing. They will cut in any direction and do not clog easily. Our needle files cut quickly and leave an excellent finish. Very popular for detail work. Furnished in Medium 280 grit.



Model No.	Part No.	Description	Price
NF1H	12-00081	Set of 5 needle files w/ Handle	.
NF1	12-00082	Set of 5 needle files w/o Handle	.
NF-F	12-00083	Flat needle file	.
NF-K	12-00084	Knife needle file only	.
NF-R	12-00085	Round needle file only	.
NF-S	12-00086	Square needle file only	.
NF-T	12-00087	Triangle needle file only	.
RIF-1	12-00088	HSet of 5 Riffler files w/ Handle	.
RIF1	12-00089	Set of 5 Riffler files w/o Handle	.
RIF-F	12-00090	Flat Riffler file only	.
RIF-H	12-00091	Half-round Riffler file only	.
RIF-R	12-00092	Round Riffler file only	.
RIF-S	12-00093	Square Riffler file only	.
RIF-T	12-00094	Triangle Riffler file only	.
LNF-1	12-00095	Set of 5 Large needle files / no handle	.
LNF-F	12-00096	Flat Large needle file only	.
LNF-H	12-00097	Half-Round Large needle file only	.
LNF-R	12-00098	Round Large needle file only	.
LNF-S	12-00099	Square Large needle file only	.
LNF-T	12-00100	Triangle Large needle file only	.
NFH	12-00101	Needle File handle only	.

3/8" INCH NEEDLE FILE KIT WITH HANDLE

Set of 5 files: Hand, Round, Halfround, Square and 3-Square Extremely versatile tools, popular for detailed work.These file cuts in any direction and does not clog easily. Cuts quickly leaving an excellent finish.

P/N 12-01752.....

LARGE NEEDLE FILE HANDLE

Comfortable plastic handle with brass collet to accept all large (18cms) needle files.Overall length 115mm. Collect 5mm

PN 12-01927.....

COMPOSITE SAFETY EQUIPMENT

Adequate safety protection cannot be stressed too highly. Eyes, lungs, and skin are exposed to harmful chemicals and abrasive objects which can be discomforting or permanently disabling. Always wear glasses when working with the Dremel grinder to protect the eyes from flying particles. Sanding or grinding fiberglass and foams creates dust that can be harmful to the lungs. Use a dust respirator mask or a disposable type. Many individuals will develop an allergy when working with epoxy with bare hands. Skin protection measures should always be taken.

INVISIBLE GLOVES #1211

Invisible Gloves #1211 are a soft paste-like substance that when applied to hands provide protection against caustic and carcinogenic chemical products including hydraulic fluid, paints, ink, MEK, zink chromate, jet fuel, graphite, engine exhaust by-products, adhesives and much more. Invisible Gloves meets military and industrial safety standards and can protect any area of the body (hands, arms, face, legs, etc...) exposed to hazardous products. Especially useful in working with materials used in composite aircraft construction. One pint yields 100 pair of gloves. Invisible Gloves #1211 are easily removed with water. Allows complete freedom of hand and finger movement. Hands will not heat up and tools will not slip.

P/N 12-15800 ..... **/pint**

GLOVES IN A BOTTLE

Protect your hands with a protective skin lotion called Gloves in a Bottle. Perfect for homebuilders, particularly those who work with composite aircraft, it binds with skin, forming an invisible pair of gloves to help protect against machinery and chemicals. It also protects against cracking and drying due to cold weather. Conventional lotions try to replace natural moisture with artificial moisture, but they come off when you wash or touch something. Gloves in a bottle keeps moisture-robbing irritants out while helping to retain your skin's natural moisture, resulting in better-hydrated skin. When applied, the invisible gloves are undetectable once they dry and last four hours or more. they come off naturally with exfoliated skin cells. FEATURES: • Fragrance and colorant free, hypoallergenic, non-greasy, non-sticky • Turns the outer layer of skin into what works like an invisible pair of gloves • Will not wash off. Literally becomes part of the outer layer of skin itself and comes off naturally with the outer layer of skin • Used and recommended by many hundreds of dermatologists and many thousands of other health care professionals • Keeps out irritants that rob the skin of natural oils and moisture and helps retain skin's own natural oil and moisture • Conventional lotions only attempt to replace natural moisture with artificial moisture but they don't really work because every time you wash or touch something they come off.

2 oz. ..... P/N 01-00655 .....
8 oz. ..... P/N 01-00656 .....

SERIES 8 WASH-OFF HAND PROTECTION

SERIES 8 - A less expensive "clone" of the famous PR88 hand creme developed in Europe, Series 8 is highly recommended by Rutan Aircraft Factory for working with epoxies. It protects hands from most epoxies, grease, oil paint, paste, gasoline, tar, lacquer, acetone, styrene, fiberglass and many more substances. It helps prevent chapping, cracking and drying of hands, and is an excellent aid to persons with sensitive skin. No soap is needed for cleanup - hands wash clean with water alone.

4 Oz. Plastic Cup .....P/N 13-38302 .....
32 Oz. (Qt.) Plastic Jar.....P/N 13-38306 .....

PLY NO. 9 PROTECTIVE HAND GEL

Provides a thin, invisible, flexible film which is an excellent barrier to epoxy resins, rubber adhesives, vinyl plasticizers, polyester resins and glass fibers. Epoxy and gel wash off easily in soap and water.

One-Lb. Jar ..... P/N 01-36100.....

DENATURED ALCOHOL

Can be mixed with soap and water. Is harmless to rubber. Use as a solvent for thinning, removing and cleaning epoxy, brushes, and equipment.

Gallon.....P/N 01-00399 .....

REPLACETONE

Cleans polyester and epoxy resins from tools and hands without the hazards associated with chemical cleaning solvents. It is a non-volatile, non-flammable, and a biodegradable replacement for acetone and MEK solvents. Replacetone separates resins to the bottom of the cleaning container, but it does not dissolve them. Pour off non-emulsified Replacetone and use again.

Quart ..... P/N 01-08823 .....
Gallon ..... P/N 01-08834 .....

LATEX GLOVES

Disposable but reusable gloves which resist tearing. Large size. Fits right or left hand. Box of 100.

P/N 01-36550 .....

COTTON GLOVES

Lightweight liners - wear under latex gloves. More comfort, improved sensitivity.

P/N 01-36600 ..... **/Pair**

BUTYL GLOVES

These gloves are resistant to the permeation of epoxy resins and curing agents and have been found to offer by far the best protection of any glove available.

P/N 01-36700 .....

TYVEK SUITS

These are the tough, full-body suits with hoods that professional painters use. Available in extra large or extra extra large.

X-Large.....P/N 01-36800 .....
XX-Large.....P/N 01-36805 .....

MAXSHIELD DISPOSABLE PROTECTIVE CLOTHINGS

FULL BODY COVERAGE: RECYCLED TYVEK® - Jumpsuit with Hood Covers. It's the ultimate protection in a Tyvek® jumpsuit, covering you from head to toe with an integrated hood and elastic-topped shoe covers. If you work in an environment where it's important to keep a barrier between you and microscopic particles, this is the Tyvek® jumpsuit for you.

Size	PN	Price
Small	12-01827-S	.
Medium	12-01827-M	.
Large	12-01827-L	.
XL	12-01827-XL	.
XXL	12-01827-2XL	.

THE TYVEK® SUIT - The Lowest-Priced Recycled Coverall. You work with messy stuff... dirt, paint, solvents, chemicals, oil, grease. Protect your skin and clothing with an affordable barrier garment – the Tyvek® suit. These multipurpose suits are so durable you can wear them over and over. But they're priced so low, you can afford to throw them away when it's time.

Size	PN	Price
Small	12-01826-S	.
Medium	12-01826-M	.
Large	12-01826-L	.
XL	12-01826-XL	.
XXL	12-01826-2XL	.

RECYCLED TYVEK® APRONS - The Better-Than-Plastic Apron. A regular throw-away plastic apron might be good enough for small jobs. But for complete protection from food splashes, hot oil, dangerous chemicals, and other big messes, the serious professional chooses a Tyvek® apron. Features: • Bib style for full protection. • 28" x 36" in size. • Serged seams for strength. • Long ties to customize the fit,

PN 12-01824.....

TYVEK® DISPOSABLE SHOE COVERS - Boot Covers High top boot covers w/elastic top.

PN 12-01825 .....

TYVEK® DISPOSABLE - Shoe Covers, Boot Covers With a Tyvek® disposable shoe covers you don't have to compromise. That's because Tyvek® disposable shoe covers deliver the best balance of protection, durability and comfort.

PN 12-01995 .....