DESCRIPTION	RECENT	(OLD)
ELEVATOR CUFF INSTALLATION	329	
ELEVATOR FOAM CORES	307	(620)
ELEVATOR GLASSING	307	(620)
ELEVATOR HINGE INSTALLATION	314	(631)
ELEVATOR TO CANARD FINAL FIT	316	(630)
ELEVATOR TO CANARD FIT	312	(630)
ELEVATOR TORQUE TUBE/COUNTERWEIGHT	318	(632)
ELEVATOR TRIM INSTALLATION	603	
ELEVATOR TRIM (SPARROW STRAINER)	604	
ENGINE COOLING DUCTS	503	
ENGINE INSTALLATION	701	
ENGINE "P" LEAD INSTALLATION	711	
FAIRINGS (COWL TO WING)	500	(1011)
FAIRINGS (EXHAUST)	505	
FAIRINGS (WHEEL)	507	(812)
FIREWALL REINFORCEMENT (CABIN SIDE)	481	(593)
FIREWALL TRIAX (ENGINE SIDE)	409A	
FUEL BAFFLES INSTALLATION	468	
FUEL BAFFLES POSITIONING	466	
FUEL BULKHEAD FITTINGS	469	(916)
FUEL CAP INSTALLATION	471	(920)
FUEL PLUMBING	719	
FUEL SIGHT GAUGES	721	
FUEL SYSTEM DIAGRAM	718	
FUEL SYSTEM PRESSURE CHECK	720	
FUEL VENT INSTALLATION	470	(917)
FRESH AIR/HEATED AIR ROUTING	731	
FUSELAGE DOOR LIP	443	
FUSELAGE DOOR HOLE TREATMENT	443	
FUSELAGE REINFORCE/UPPER CANARD COVER	451	(584)
FUSELAGE UPPER HALF INSTALLATION	472	(590)
GEAR BULKHEAD REINFORCEMENT	410	
GLARE SHIELD	805	
INSTRUMENT PANEL/CONSOLE PLACEMENT	415	
INSTRUMENT PANEL LAY OUT	706	
INTERIOR FINISHING	800	
LOWER STRAKE INSTALLATION	459	
MAIN GEAR BUSHINGS	434	(552)
MAIN GEAR INSTALLATION	436	(553)
MAIN GEAR PILOT HOLES	434	(552)
MAIN GEAR POSITIONING	432	(551)
MAIN GEAR PREPARATION	430	(550)
MAIN SPAR INSTALLATION	425	(541)
MAIN SPAR POSITIONING	425	(540)
MASTER BRAKE CYLINDER BOX	454	(820)
NOSE ACCESS DOOR	452	(590)
NOSE GEAR INSTALLATION	437	(560)
NOSE STRUT COVER INSTALLATION	512	
NOSE WHEEL INSTALLATION	487	
OIL ACCESS DOOR	506	
OIL COOLER INSTALLATION	726	
PITOT TUBE	717	
RUDDER BELLCRANK	219	(780)
RUDDER CABLE INSTALLATION	605	

DESCRIPTION	RECENT	(OLD)
RUDDER CABLE NYLAFLOW INSTALLATION	457	(534)
RUDDER CONDUIT	205	
RUDDER CUT-OUTS	217	(780)
RUDDER HINGE INSTALLATION	217	(780)
RUDDER PEDDLE INSTAL.(FINAL ASSEMBLY 21)	455	(820)
RUDDER RETURN SPRINGS	220	
RUDDER & RUDDER WELLS	217	
SEAT BELT HARD POINTS	419	(531)
SEAT BELT INSTALLATION	803	
SEAT BULKHEAD INSTALLATION	482	
SEATS INSTALLATION	482	
SPARROW STRAINER INSTALLATION	604	
SPEED BRAKE ACUATOR INSTALLATION	417	(514)
SPEED BRAKE INSTALLATION	401	(513)
SPEED BRAKE WARNING CIRCUIT	709	(514)
SPINNER/BACK PLATE INSTALLATION	732	
STATIC PORT	716	
STRAKE BAFFLE POSITIONING	466	(915)
STRAKE BAFFLE CUT-OUT (LOWER)	464	(913)
STRAKE GLASSING (LOWER)	465	(913)
STRAKE INSTALLATION (UPPER)	472	(913, 920)
STRAKE INSTALLATION (LOWER)	459	(910)
STRAKE POSITION (CRITICAL)	460	(911)
STRAKE REINFORCEMENT (OUTBOARD END)	475	(921)
SUMP TANK BAFFLES	476	(930)
SUMP TANK COVER	477	(931)
SUMP TANK FUEL/VENT TUBING	476	(930)
SUMP TANK INSTALLATION	477	(931)
SUMP TANK MOUNTING TABS	476	(930)
THROTTLE/MIXTURE CONTROLS	723	
THRU SPAR POSITIONING	425	
VACUUM SYSTEM	716	
WHEELS/AXLE INSTALLATION	487	(811)
WINDOW CUT-OUTS	449	(583)
WINDOW FITTING	449	(584)
WINDOW INSTALLATION	449B	(584)
WING ATTACH BOLT ACCESS HOLES	208	(751)
WING CORES	200	(710)
WING PREPARATION FOR WINGLETS	211	(760)
WING RIBS	207	(750)
WING GLASSING	203	(720, 730)
WINGLET ATTACH	214	(761)
WINGLET GLASSING (INBOARD)	209	(740)
WINGLET GLASSING (OUTBOARD)	209	(741)
WINGLET PREPARATION	209	(740)
WINGLET PREPARATION FOR WING	212	(761)
WINGLET SET-UP & ALIGNMENT	213	(761)
WINGLET TO WING LAY-UP SCHEDULE	214	(762)

It has come to my attention that there is some confusion regarding the definitions and uses of the various epoxies and fillers. This is probably due to my state of confusion while ad libbing the video tapes, so here is the scoop...

EPOXIES

SAFETYPOXY: Used for all construction processes and general lay-ups. DO NOT USE ANYTHING OTHER THAN SAFETYPOXY FOR A GLASS LAY-UP.

GENEMID or WEST SYSTEM:There are several other Epoxy systems that are supplied or available from vendors. I do not recommend them for construction, but they are superior for bonding metal to glass, and in the making of microballoon for use in assembling and finishing.

GLASS BUBBLES:Used only with Safetypoxy to make MICROSLURRY, which is applied to foam surfaces just prior to glassing. Always put microslurry on bare foam before glassing. Mix the bubbles and the safetypoxy to a mayonnaise-like consistency. If the mixture is too dry, it will ball and roll up. If the mix is too wet, it will soak into the foam and cause a heavy lay-up.

MICROBALLOON:There happen to be several manufacturers, and each has a different trade name for essentially the same product. I think that this has caused some confusion. We use B-CELLS mixed with Genemid epoxy to form an excellent light-weight filler with good adhesion and sanding properties. Microballoon is used to bond foam to foam or foam to glass (cores to spars), and also to fill damaged bare foam. It is important that you let it cure and sand smooth prior to glassing. Microballoon is also used to fill and contour glassed areas (wings, etc.) before priming.

When mixing to bond foam to foam or glass, blend to a consistency slightly drier or thicker than mayonnaise. Smear the mixture on both mating surfaces, squeeze out the excess, and wipe it off. When mixing fillers for finishing purposes, make the mixture as dry as possible. Sometimes a few drops of water added to the mix will make it more workable. Apply to the surface with a putty knife or squeegee. You will find that the filler sands easily and washes up well with water.

MICROGLASS:

Mix with SAFETYPOXY to form fillets in corners prior to glassing and between glass to glass lay-ups (such as the fuel strake skins to spar and bulkheads.)

Mix with GENEMID to bond hardpoints to cured glass (i.e. canard lift-tabs and bushings. Thoroughly wipe off the excess as this stuff is a bitch to sand.

SOMETHING NEW:

CABOCIL: This is a resin extender or thickening agent. We found that by adding Cabocil to Genemid or Safetypoxy, we formed a strong, solid, heavy, but non-porous filler. When mixed with Genemid to a paste consistency, it is good for fixing chipped or damaged edges of cowlings, doors, etc. We also found it to be very helpful in filling the porous surfaces left after the microballoon process has been sanded. Apply with a putty knife or squeegee to porous surfaces. Be careful to remove all excess Cabocil, because once it is cured, it is very difficult to sand. Following cure, sand with 120-180 grit paper, then prime with epoxy primer. You will find that all those annoying pin holes have disappeared. I believe that one pound of Cabocil will be adequate to finish out a VELOCITY. Cabocil can be purchased at Alpha Plastics.

Sincerely,

DAN

Please add this text to your manual right at the start of Section 1.

REVISION DATE: 12/20/90

Lots of our builders have experienced confusion with Section 1, which introduces the new Velocity owner to the Epoxy/Filler/Glass systems that are used during the construction. The purpose of this text is to update the owner on the items that he will receive from Alexander Aerocraft. For example, we are now supplying Epolite 2410 Resin/Epolite 2184 Hardener in place of Safetypoxy. See following:

SAFETYPOXY RESIN (OLD PLANS) = HEXCEL EPOLITE 2410 RESIN (NOW SUPPLIED)
SAFETYPOXY HARDENER (OLD) = HEXCEL EPOLITE 2184 HARDENER (NEW)
Use in Michael's Epoxy Pump

USAGE:
* ALL GLASS LAY-UPS
* WITH MILLED FIBER (MICROGLASS) FOR STRUCTURAL FILLETS, AND STRUCTURAL BONDING (Hinge pockets, speed brake, etc)
* WITH GLASS BUBBLES (MICROBALLOONS) - SLURRY TO COVER FOAM CORE SURFACES JUST PRIOR TO GLASS LAYUPS.

GENEMID = ALPHAPOXY (or Generic Brand X Epoxy)
See mixing directions on containers

We are now shipping dispenser nozzles that fit onto the ALPHPOXY containers.

USAGE:
* NEVER USED FOR GLASS LAYUPS
* WITH MILLED FIBER (MICROGLASS) - ALUMINUM HARDPOINT INSTALLATION, WINDOW INSTALLATION.
* WITH GLASS BUBBLES (MICROBALLOON) - SURFACE CONTOUR FILLER (Wings, Canard, winglets over glassed surfaces)

MILLED FIBER (MICROGLASS) - Light green in color, and much denser than the glass bubbles. Used for hard point installation, structural fillets and fairings, etc.

GLASS BUBBLES (Microballoon) - White, very lightweight filler. Used for fairing, filling, slurry, etc.

Q-CELLS HAVE BEEN DISCONTINUED, REPLACED BY SAME AMOUNT OF GLASS BUBBLES. This was upon recommendation by Alexander Aerocraft, who informed us of possible moisture retention problems with the Q-Cells. Use glass bubbles wherever the plans call for Q-Cells (i.e. - bonding foam cores to spars.)

Many people have been confused by the statement in the plans to use SAFETYPOXY/GLASS BUBBLE SLURRY to cover the blue foam

surfaces just prior to glassing, since we also stat in the plans that SAFETYPOXY (EPOLITE) will dissolve the blu foam. THE SLURRY MIX WILL NOT HARM THE BLUE FOAM, AS THE E XY HAS BEEN SUFFICIENTLY DILUTED BY THE FILLER MATERIAL, so p e do not be apprehensive about using the EPOLITE SLURRY on core surfaces.

ENCLOSED WITH THIS TEXT, YOU WILL FIND 4 CLOTH SAMPLES, MAKE IDENTIFICATION OF YOUR FIBERGLASS EASIER. EACH ROLL IS PED WITH A 4-DIGIT CODE # AS WELL:

TRIAX - CDB200 (Usually labeled as Triax, and the h est of the cloth rolls)
UNIDIRECTIONAL - 7715
COARSE BID - 7725
FINE BID - 7781

AS USUAL, PLEASE CONTACT US IF YOU HAVE QUESTIONS.

DESCRIPTION

The Velocity Aircraft is a four place family style homebuilt that has high performance yet is safe, practical, stable uncomplicated, comfortable to fly, and whats more it isn't even ugly!.

VIDEO TAPES

A series of video tapes are provided with each kit. They were made while building the Velocity from a kit just like yours.

The sketches and narratives were made at the same time so that you can view the tapes a step at a time before going into your shop and then use your manual with familiarity.

CONTENTS OF MANUAL

The Velocity Homebuilding Construction Manual includes sketches, photos, and detailed narratives of how to build a complete Velocity aircraft.

GETTING HELP WHILE BUILDING

1. View the video tapes.

2. Study the Velocity Homebuilding Construction Manual.

3. Repeat 1 & 2 above.

4. Join EAA. Talk with fellow EAAers, particularly those with composite building experience.

5. Get started! with the project. Answers to questions become obvious common sense with 'hands on' experience.

6. Ask another person for their understanding of what's written or drawn.

7. Rerun your video for the part in question.

8. Review the newsletters for clarifications.

9. Write to Velocity Aircraft, 200 West Airport Drive, Sebastian, FL 32958. Leave space on your inquiry for an answer and enclose a stamped, self addressed envelope.

10. Call Velocity Aircraft, (407) 589-1860, between 9 & 12 AM and 1 & 4 PM.

11. Send us photos and updates of your progress so we can share your experience and ideas with others.

EPOXIES

SAFETYPOXY. Safetypoxy is used in all major lay-ups on foam and all lay-ups of glass to glass.

For lay-ups on foam, a slurry of safetypoxy and microballoon is mixed. Throughout the construction manual this mixture is referred to as "microslurry".

DOW/GENIMID. This system is used primarily in the finishing and filling and joining of metal parts to glass.

For finish work, genemid has the superior ability to be mixed with microballoons as well as the ease of smooth application and sanding. For joining metal or aluminum parts to glass, genimid is mixed with milled glass fiber. Throughout the construction manual safetypoxy mixed with milled fiber is referred to as "microglass".

GLASS CLOTH

"E" GLASS. E glass (Electrical) is the standard of the industry, both for marine and general aviation use. It is used throughout the construction.

Knytex 22 ounce triaxial, called "TRIAX" in the construction manual, is used throughout. The factory uses it in the outer skin of the strakes and in the instrument panel. The builder will use it for bulkhead reinforcement, the skin of the wings and canard, and fabrication of various hard points and energy absorbing pads.

Hexel 7 ounce unidirectional, called "UNI" in the manual, is used at the factory in the molding of the outer.fuselage skin. It is used by the builder in the winglets, winglet attachment, elevators and canard skin.

8 ounce bidirectional, referred to as "BID" in the manual, is a coarse woven cloth used by the builder throughout to attach mating parts as well as constructing wing, rudder, and aileron end ribs.

8 ounce bidirectional, referred to as "fine BID" in the manual, is a fine woven cloth used by the builder in fabricating fuel strake baffles and their attachment, all outside glass taping, and anywhere a 'finer' finish is needed.

"S" GLASS. S glass is a Structural fiber, strong in tension, used in the spar caps and landing gear legs at the

factory and to reinforce the door by the builder.

Hexcel 17 ounce biaxial cloth is used by Velocity in pre-molded parts only such as the fuselage outer skin and landing gear reinforcement for torsional loading.

Hexcel 12 ounce biaxial cloth is used by Velocity in pre-molded parts only such as the inner fuselage and strake skins and other small parts like the spinner, wheelpants, sump tank, etc.

Knytex 17 ounce biaxial cloth is used by Velocity for primary shear web construction in all spars to handle compression loading.

Knytex 12 ounce biaxial cloth is used by Velocity in secondary shear web construction.

Certanteed 22 ounce woven roving is used only by Velocity in the cowling reinforcement.

There are no Kevlar, Corbin or hybrid fabrics used in the Velocity aircraft.

FILLERS

GLASS BUBBLES. These are amorphous fumed silica bubbles. They are microscopic bubbles that the builder adds to resin to form a slurry for filling voids, forming fillets under glass layups, and joining foam to foam and glass to foam.

Mixed with safetypoxy, the bubbles lighten the lay-up and provide resistance to delamination. It is used with all foam lay-ups. The safetypoxy slurry is called "microslurry." in the manual.

Q-CELLS. These are microscopic cells. Added to genimid, this mixture produces a smooth material for fillets and fairings, and troweled onto rough glass it is easily sanded and shaped for finishing.

The resin and Q-cell mixture is called "microballoon" in the manual.

MILLED FIBER. Milled fiber is finely chopped glass fiber that the builder adds to resin to form a slurry to fill voids at hard points, attach glass to metal, and other structural glass to glass construction. It has superior secondary adhesive qualities.

Mix with safetypoxy for filling voids around structual glass to glass lay-ups for compatibility with the safetypoxy lay-ups. Use with genimid to attach metal pieces ONLY!

The resin and milled fiber slurry is called "microglass" in the manual.

GLUES

BONDO. Bondo is a fast hardening putty that can be bought at any auto supply or hardware store. It is used to hold parts in place while applying permanent glass lay-ups. Do not use on blue foam because it will dissolve the foam.

5 MINUTE EPOXY. This supplied in the kit and is used for quick bonding to hold parts in position for permanent lay-ups. It will not dissolve the blue foam.

FOAM

BLUE POLYSTYRENE: The blue foam is a premium grade of extruded, not expanded, foam. All the foam parts have been pre-cut by Velocity with a hot wire to form the airfoils in the wings, winglets, and elevators.

WHITE CLARK FOAM: The Clark foam is used extensively in the factory in the molding process of the Velocity aircraft. The builder uses it in the fabrication of the bulkheads, baffles, seatback, and seat supports.

PLYWOOD

SWEDISH PLYWOOD: The wood supplied with the Velocity kit is a superior grade 6 mil, 5 ply plywood produced in Sweden. It is especially designed and manufactured for epoxy lamination in the marine industry. It is superior to aircraft birch when used with epoxy for lamination of wood to glass as used in the Velocity construction process.

HARDWARE

Wherever possible, aircraft grade hardware is supplied with the Velocity kit. A few special purpose fasterners are provided.

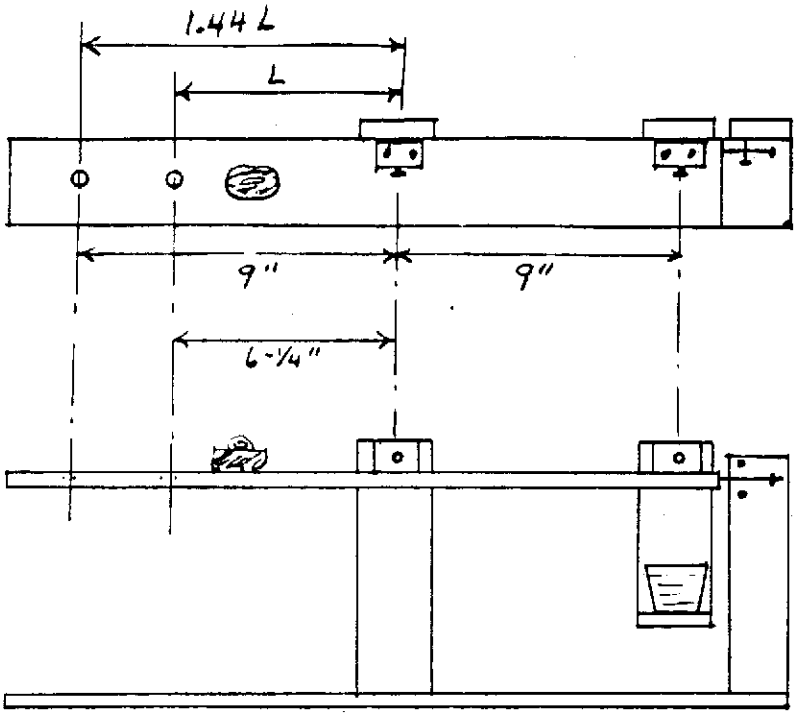
OEM EQUIPMENT

Many components are obtained by Velocity from the Original Equipment Manufacturer to keep the overall kit price to a minimum. These include wheels, brakes, tires, tubes, actuators, cables, etc. and materials.

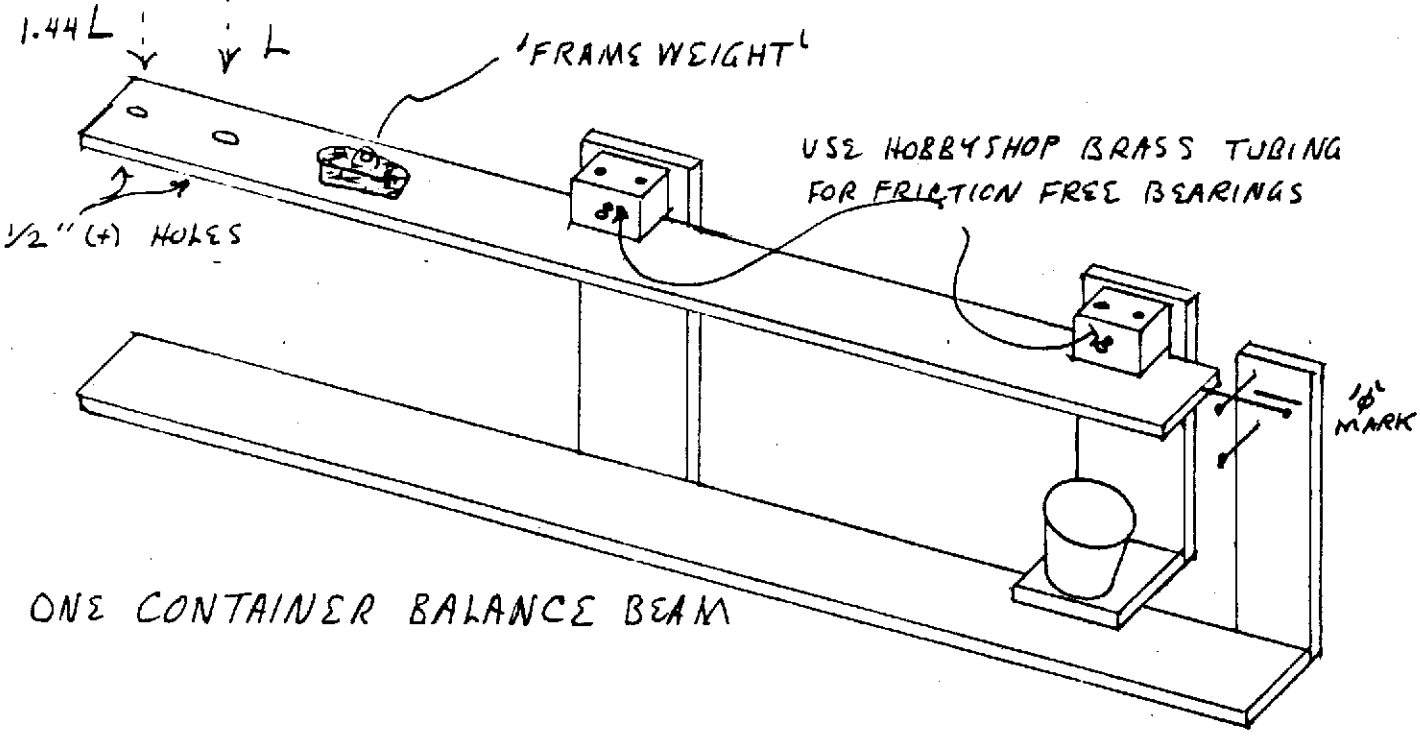
MACHINED PARTS

Velocity has a complete machine shop including welding facilities that provide specialty items such as machined gear

castings, control system parts and assemblies as well as weldments for engine mounting and exhaust.



COUNTERWEIGHTS e.g. AN8-50 (~ 140 grams)
AN8-22A (~ 70 grams)
USE 1/2" WASHERS OR OTHER 1/2" BOLTS TO VARY MIX AMOUNTS.



ONE CONTAINER BALANCE BEAM

MIXING EPOXY

Epoxy resin is mixed in a ratio that is supposed to provide the right number of molecules to 'join hands' or combine at a controlled rate to form strong solid substance we call "glass". Therefore, it is very important that the correct proportions of resin and hardener, otherwise the result will be a substance that never hardens or one that hardens too quickly. Either condition produces a bad product.

It is the recommendation of Velocity Aircraft that the builder invest in an epoxy pump. It will save time, money, and inadvertent error. A proper ratio pump can be purchased from:

ALEXANDER AEROPLANE COMPANY, INC.
900 SOUTH PINE HILL ROAD
GRIFFIN, GA 30223
800-831-2949 (OUTSIDE GEORGIA) (404)228-3815

REP: JON GOLDENBAUM

If preferred, a balance beam scale may be constructed per the sketch on the opposite page.

This scale is designed to mix the epoxy and hardener in one container as opposed to the 'wet cup' balance beams in use with other kits. The 'wet cup' method works but is a nuisance to most builders.

Make a varied selection of counterweights to facilitate convenient quantities of mix. It is important to mix the epoxy using the following steps. Post them on the wall behind the balance beam.

For calibrating it has been suggested to use pennies in the desired Ratio Example 43-100 to check the accuracy of your scale.

1. PLACE THE EMPTY MIXING CUP ON THE BALANCE BEAM.
2. BALANCE THE SCALE WITH THE 'FRAMEWEIGHT'.
   (Be sure the counterweight is removed)
3. PUT THE APPROPRIATE COUNTERWEIGHT ON HOLDER 'L'.
4. POUR EPOXY INTO THE MIXING CUP TO BALANCE THE SCALE.
5. MOVE THE COUNTERWEIGHT TO HOLDER '1.44L'.
6. ADD HARDENER TO MIXING CUP TO BALANCE THE SCALE.

A couple of cautions: Putting too little hardener in the mix will prevent a complete cure, the lay-up will stay soft or sticky. Putting too much will make the mix cure prematurely, maybe right in the middle of your lay-up! So, take a little care when adding the hardener. Be sure to stir the mixture well, and do not add fresh epoxy to an old batch of mixed epoxy.

CUTTING CLOTH

Keep a neat clean flat area for cutting your cloth. Scissor cut large and irregular shaped pieces.

Cut narrow tapes with a razor. All BID tapes are cut on a 45 degree bias, i.e. 45 degrees with the edge of the cloth. It's a good idea to cut about twenty 2" and 3" tapes and keep them handy in a box.

When marking to cut on the 45 degree bias the widths specified in the manual are perpendicular to the cut lines, and are not measured along the edges of the cloth roll, e.g. a 2" wide tape is almost a 2-7/8" distance along the cloth roll edge.

The easiest way to cut a 45 degree biased piece is to:

1. Start with a square end;
2. Measure and mark a point along the cloth roll edge a distance equal to the cloth roll width;
3. Draw a line from the corner on the opposite edge;
4. Measure the required cut widths perpendicular to the drawn line.

Of course, succeeding pieces are then cut parallel to the 45 degree cut line. Occasionally check the angle by folding over the 'point' and measuring to see that the 'point' is as long as the cloth roll is wide.

The measurements noted in the manual for cloth or tapes are the approximate total lengths required to do the lay-up(s). Stagger the overlaps on multiple lay-ups to avoid big bumps in one spot.

If more than one piece has to be used for one layer of UNI, e.g. on the elevators, butt the ends, do not overlap. Stagger the butting positions on subsequent layers.

SANDING

Always sand existing cured glass before another lay-up.

GLASSING FOAM

Mix glass bubbles with safetypoxy, making "microslurry", for glass cloth lay-ups on foam. Mix to a mayonaise texture.

Mix Q-cells with genimid, making "microballoon", for foam to

foam gluing. Mix to a paste or whipped cream consistency for foam to existing glass.

Always spread a coating of microslurry onto the foam before gluing or glassing. A lighter lay-up and complete bond will result.

Put no microspheres or microballoon between multiple cloth lay-ups and existing glass. The bond in this case would not be as good.

USING BONDO OR 5-MINUTE

Bondo is handy for holding parts in place while applying glass lay-ups. Use in small 'dobs'. Be aware that bondo dissolves blue foam! Use small dobs of 5-minute epoxy to hold blue foam in place.

GLASSING CLOTH

Wet out cloth with a brush and a squeegee. The brush works better if about half the bristles are cut off. Dab or "stipple" the epoxy into the cloth where it appears dry or has air underneath.

A shallow angle between the surface and the squeegee will force the epoxy into the fabric. A straight or more vertical angle will remove epoxy. You want just enough to wet the fabric completely, no dry spots, but no more because it adds weight and subtracts strength.

On a flat surface a large flat trowel or flexible putty knife works well. On confined or curved areas, use a flexible plastic squeegee.

Small, multiple layers of glass cloth are pre-wet, one on top of another, on a flat, plastic covered, or glass surface for a more thorough but not too wet lay-up and ease of application.

Scissor trim cloth within 1/4" of edges to prevent lifting due to the weight of the wetted cloth drooping over the edge.

Knife trimming an edge in four to six hours is easier than sawing, grinding, or sanding.

FILLING

Filling is done with microballoon, microspheres, and microglass. Small dings or voids are filled with a dry (thick) mix of microspheres.

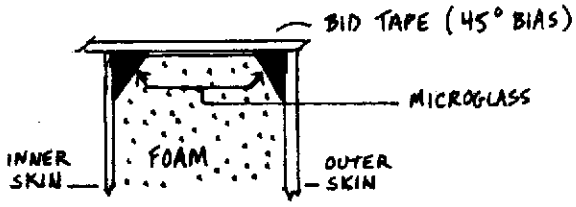
Microsphere slurry fills voids, pores, and roughness between a cloth lay-up and foam and provides for better adhesion to the

foam. Do not apply between a cloth lay-up and smooth bare glass like spar caps. The bond between glass to glass is not as good.

Microballoon is used to fill in (sanded) glass areas. Q-cells are mixed with genimid resin to a thick paste. This is then spread and smoothed with a trowel. As with squeegeeing epoxy, the trowel angle determines the thickness or quantity of filler. Genimid filler is easily sanded, shaped and will finish smooth enough for paint priming. This can be used to repair dings or irregularities in the foam before glassing. Let cure and sand prior to glass lay-up.

Microglass fill is used in structual areas, especially at attachment of aluminum hard points. Mix milled fiber with safetypoxy for structual lay-ups and with genimid for hard points.

All composite edges are "relieved" by sanding away about an 1/8" wedge of foam from the internal skin surfaces and filled with microglass just before applying fine BID tapes to cover these edges.



ATTACHING/JOINING

!!!ALWAYS!!!

Pre-cut cloth to size in advance;

SAND glass join lines to a sufficient margin for lapping glass lay-ups, delamination WILL occur if you don't;

SAND metal parts prior to glassing, delamination WILL occur if you don't;

Lightly pre-wet glass areas to be glassed;

Use BID or fine BID cut on a 45 degree bias;

Use genimid microballoon for foam to foam;

Pre-coat foam with safetypoxy microslurry (glass bubbles) for glass to foam;

Pre-wet multiple glass cloth pieces for small layups or hard points on a flat surface covered with visqueen. Next, pre-wet area slated for application, and transfer glass to lay-up point.

Follow the lay-up schedule in the construction manual.

HARDWARE

Hardware is packaged and labeled with standard identification numbers and all hardware parts are referred to by these numbers throughout the construction manual.

WORK HABITS

To avoid building an allergic reaction to working with the chemicals involved with building a composite airplane, wear plastic gloves while working with the resin and a face mask while sanding, grinding, or cutting with a power tool.

NEVER wash epoxy off with acetone!!! It removes the protective oils from your skin and washes the poison right through your pores into your system.

Allergic reactions may not occur immediately. There is an accumulative buildup that shows up after varying exposure to the resins and inhalation of dust. Don't wait for it to happen. Once it does, it usually is a permanent allergy and you won't finish your airplane. While it goes away with abstainance, it comes back quickly and almost immediately with subsequent contact or exposure to the resin or dust.

The safetypoxy is supposed to be non-toxic. Some people are not affected by any of the resins. Almost everyone has no problem with any of the composite materials if reasonable precautions are taken. There are people who have worked full time for years that have no problems because they have good self protective work habits.

Work at learning to mix, apply, cut, sand, et al, keeping the materials on the tools and the airplane and away from your body, inside and out. Keep lay-up and wetting areas clean as you work, no drips, no runs, no errors. It also saves a lot of work later.

We want you to have an enjoyable experience. We want you to finish your airplane. We want you to spread the good word and get others to enjoy it as well. Take proper precautions!

PATCHING

To patch a void, break, or ding that is too large to fill with dry microspheres, cut out a cavity in the foam with straight and smooth sides. Then cut a block to fit snugly leaving it large enough to protrude from the cavity for trimming and contouring to the original surface.

USE OF A LEVEL

Level with a carpenter's level on top of a straightedge. Do all levelling with a level that has been marked "top" and "right" so that, in use, you always orient the level the same

way. This avoids errors due to slight differences when the level is turned over or around.

MICRO

Clean off any excess microglass, microballoon or microspheres from joints or surfaces while it is still wet. It's hard to do later and you may sand, grind, or chip away more than you want to.

WATER LEVEL

A water level is assembled by attaching an 8' tape measure to any vertical surface with 0" being on the floor. Take approximately 30' of 1/2" clear plastic tubing, attach one end permanently at the 8' mark. Partially fill water colored with antifreeze or dye and use spring clamp on the free end up so water does not run out while moving about.

BENCHES

Build a sturdy fuselage support bench approximately 7' X 3' X 18" high. This establishes a convenient working height.

Construct four sawhorses that stand at a comfortable working height. Purchase a pair of 3 foot-wide interior doors and check them for flatness. These are used for tabletops on the sawhorses.

TOOLS

There are few special tool required to build a Velocity. There are a number of them that can make the job a lot easier and save time.

NECESSARY TOOLS:

Drill bits; 12" long 1/4", #19 (#8 clearance), #21 (#10 tap), #30 (1/8" rivet), #40 (3/32" rivet), #11 (3/16"/#10 clearance), 1/4", 3/8".

Taps: 10-32, 1/4-28.

Holes saws; 1", 1-1/8", 1-1/2", 2-1/4", 2-1/2", 3-1/8".

Fly cutter for 3-3/4" hole for fuel cap.

Pop rivet tool.

Hand tools, including drill and saber saw (hack saw blade will WORK).

Cleco pliers and clecos.

NICE TO HAVE TOOLS:

A cordless drill.

An air compressor, spray gun, air driven die grinder and a small right angle grinder with accessories, and an air saw.

SUGGESTION ON CONSTRUCTION PROCEDURE

There are two basic kinds of work that you will be doing during the actual construction of your VELOCITY kit. One is building assemblies such as the wings, canard, bulkheads, and winglets. These constructions consist of glass over foam or wood. If you take your time and follow the plans, this process is very simple, as long as you remember to always check everything prior to adding the epoxy.

The other type of work performed during the construction is the joining of subassemblies with epoxy and glass tapes. This requires little skill, but it is important to follow directions. The order in which you build your VELOCITY will vary between one builder to the next. We suggest that you start with a bulkhead like the firewall in order to get the feel for handling large amounts of glass and epoxy. Next, go on to your wings, winglets, canard, and elevators. If you have the room to attach your winglets, do so and try to finish these components out to primer stage with microballoon, and then put them aside. Any shrinkage will occur while the fuselage is being built. Another advantage to constructing in this order is that you will have lots of glass scraps left over that you can use for hardpoints and small bulkheads. This allows you to better conserve materials.

Once the aforementioned components are built, go on to the fuselage, build the rest of the bulkheads and install them. Next install the main and nose gear , thus eliminating the need for a supporting structure. If you are tall, put the axles and wheels on, but it is easier to shim and support the fuselage without the wheels. It seems to stay level and doesn't need to be chocked to stay put. Next install the spar and remove the lower cowl. Work on the doors and windows can also be done at this time. It is helpful to finish out around the windows prior to installing the upper half of the fuselage. One of our builders completed all his wiring, instrumentation, and avionics before he put the top on.

Install control systems in the fuselage and put the top on. Put the wings on and attach the fuel strakes. Anytime you have a break, you can build your ailerons and rudders. Remember, if you do your finishing to primer stage before you build your ailerons and rudders, it is that much easier. Finish out your canard and elevators before installing the hardware.

You are now about 50% finished with the plane. Fairings and finishing touches seem to take forever, but at least your project will resemble an airplane rather than a bathtub or boat. Aesthetics definitely help the incentive!

Engine installation comes next, and then the interior work. This will take time and will vary depending on how complete you want to make it. We strongly suggest that you do your flight testing in primer so that if any adjustments or modifications are to be made, you won't have to touch up that beautiful paint job. Good luck, and we wish you many happy hours of building and flying your VELOCITY!