



# FABRIC COVERING PROCEDURE MANUAL

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### **INTRODUCTION**

Air-Tech Coatings, Inc. was created to better serve the covering and coating needs of the aircraft owner. The advances in materials technology over the last forty years have yielded improved alternatives to the old "Grade A" and dope systems. These improvements have included the introduction of heat shrinkable polyester fabrics, new adhesives, and new coating systems. They are rapidly becoming the standard for covering, and the experience of thousands of aircraft owners who have used them are a great testimony to their ease of application, durability, and finish.

Re-covering of any fabric covered aircraft is to be accomplished under the authority of the Federal Aviation Administration (FAA). As with any major repair or alteration it must be inspected and approved by a Representative of the FAA or a delegated authority and the appropriate record entries made. Specific inquiry should be made if one is in doubt about how to accomplish such a repair. Consult approved Air-Tech Manual AT 101, Rev 9 or later approved revision, original aircraft manufacturer specifications and FAA AC 43.13–1B.

Air-Tech personnel are eager to assist anyone using the Air-Tech System. Basically, the covering and /or painting processes are simple; but the results achieved are dependent on following the recommendations and having good attention to detail and quality of work.

This manual is designed for those having some experience in the application of fabric covering and painting. For those who do not have such experience, Air-Tech can refer you to other more comprehensive publications.



### STATEMENT OF WARRANTY AND LIABILITY

Seller makes no express warranties of any kind with respect to acceptance and use of materials as referenced on invoice(s) and which are sold hereunder. The use of any sample or model during the negotiations leading to a sales agreement serves merely to indicate a type of goods to be tendered to the buyer. Such samples or models create no warranty that the goods will conform to the samples or models.

Seller warrants the products sold are in accordance with Seller's published specifications or those specifications agreed to by the seller in writing at the time of sale. Seller's obligations and liability under this warranty is expressly limited to repairing or replacing at the Seller's option within three months from the date of delivery any product not meeting the specifications.

These warranties are in lieu of all warranties, express, implied or statutory or arising by custom or trade usage, including any warranty of merchantability or fitness for any unique or special or express purpose, and of all other obligations or liabilities including without limitation, liability for damages (general or special, direct or indirect, consequential, incidental, exemplary) or for any claim for the loss of profits or business or damage to goodwill. Seller neither assumes nor authorizes any person to assume for the seller any other liability in connection with the sale or use of the goods sold, and there are no oral agreements or warranties collateral to or affecting this agreement.



### SAFETY INFORMATION

The products sold by Air-Tech Coatings, Inc. may be or contain potentially harmful solvents or substances. Proper application requires the materials to be used in a properly ventilated area with the use of OSHA approved breathing devices. All materials must be kept away from any source of combustion and all contaminated materials, i.e. rags etc. must be disposed of in an approved manner.

Please read and heed any and all safety warnings and precautions.

Material Safety Data Sheets (MSDS) are available upon request.



# **KIT MATERIAL QUANTITIES**

Dear Customer:

Every effort has been made to properly estimate the amount of material required for your aircraft project. The amounts arrived at are the result of the years of experience we have in doing the same type of work.

However, we realize that different users will apply and use the various materials at rates which may be higher or lower than our experience. This is impossible to avoid as the applications situations are of an almost infinite variety and the amount of material to be applied is often a "judgement call" based on the individual's "eye or taste".

As a supplier this presents somewhat of a dilemma for us as if we don't include a customer might feel he was shorted and if we include too much one might feel we "loaded" him up unnecessarily. Our goal, of course is for you to have just what you need. Accordingly, if you are supplied materials which are in excess of what you need to complete your project we will be pleased to take back for full credit any new unused materials which are not out of date and can be resold as new. Exceptions would be any custom color blended for your project. Alternatively, if your project requires a little more than originally supplied, we hope you will not think we shorted you intentionally.

Air-Tech's mission is to offer you the best value for your coating's dollar. We hope to do this by:

- Offering the best products at reasonable prices.
- Offering the easiest products to use.
- Offering the latest technology, longest lasting, most durable and chemical resistant materials.
- Ensuring that an **Air-Tech** finished aircraft has the look which will improve its worth.
- Offering the best technical service in our industry.

Thank You for choosing Air-Tech!!



# **PROCEDURE – METAL PREPARATION**

The adherence of any coating to a metal substrate is primarily a function of surface preparation. If the surface is properly prepared and free from contaminants one can apply a coating with the confidence that it will adhere and give many years of service life. Paying very close attention to preparation is an absolute must.

ALUMINUM SURFACES (Bare, either stripped or new)

- 1. The bare surface must be thoroughly cleaned, and any corrosion removed. First the surface can be cleaned with naphtha, acetone or MEK. If stripped metal, all stripper must be removed.
- 2. Wet abrade aluminum surface with a commercial phosphoric acid etch/brightener i.e. Air-Tech Aluminum prep keeping surface wet 3 5 minutes. Rinse with clean water; water must sheet over the entire surface; a water break free surface must be had. Abrasives containing iron i.e., steel wool are prohibited for cleaning operations as particles may become imbedded in aluminum and be the beginning of corrosion.
- 3. Apply a chromic acid conversation coating (Alodine) to the surface. Keep surface wet for 5 minutes. Reapply several times to obtain a pale gold or tan color. Rinse thoroughly and air dry. The next primer coat must be then applied within 24 hours!
- 4. For severe service such as water immersion or use in situations where high chemical resistance is required the use of a phosphoric acid wash primer is recommended. The next primer coat must be applied within 24 hours!
- 5. After the conversion coating and /or wash primer application the surface must be coated with Air-Tech's two component epoxy primer.

### STEEL:

- 1. Surfaces must be cleaned with naphtha, acetone, or MEK to remove oil or other contaminants.
- 2. Any rust or corrosion must be removed by sanding, steel wool or steel wire brush.
- 3. Surface must be cleaned by wet abrading it with a phosphoric acid etch solution. Surface must be kept wet for 5 minutes minimum.
- 4. Within 5 hours after surface has been cleaned it must be coated with an Air-Tech two component epoxy primer.

Note: Wash or self-etching primer is an optional treatment for steel surfaces after acid etch. It must be used on surfaces which will be placed in extreme service i.e. long-term water immersion etc. It is very good for zinc coated surfaces (galvanized).



# **PROCEDURE - PREPARATION OF AIRFRAME FOR RE-COVERING**

Prior to recovering obviously, the old covering must be removed. Paying close attention during this step can pay great dividends as the recovering progresses.

One must attempt to remove the old fabric intact or in as few pieces as possible as the old fabric can serve as a template for the new i.e., rib stitch spacing, cable exits, positioning of inspection rings and drain grommets. As the fabric is laid back attachments can be removed also. This may mean cutting rib lacing, removal of clips or screws or drilling out rivets. Fasteners must be removed without stressing the member to which they are attached; don't try to pull the fabric loose!!

On metal structures make certain there is no evidence of rust or corrosion. Check low points on each member as this is where moisture is likely to collect, and corrosion begin. Remember, this is one of the last opportunities to correct corrosion conditions. Inspect all control cables, electrical wiring, bolts, etc. and replace anything that is not likely to last another ten years. Inspect bell-cranks, repair and lubricate in accordance with manufacturer's recommendation.

Wooden surfaces must be sanded and coated with **Air-Tech** spar varnish. Do not use commercial polyurethane varnish typical of that found at hardware or paint stores!

Metal surfaces to which primer must be applied must be primed with **Air-Tech** two-part epoxy primer. Prior to epoxy primer application surfaces must be cleaned and/or treated according to methods acceptable to the FAA (Refer to FAA AC 43.13–1B Chapter 6).

Every sharp edge or protruding metal piece must preferably be eliminated or covered with chafing tape.

After preparation the airframe must be inspected and approved for cover by an FAA representative or his delegate. If this inspection can be conducted by the one who will perform the final inspection and authorize the return of the aircraft to service, it will accelerate the process.



# **PROCEDURE- PAINTING FUSELAGES OR TRUSS ASSY'S BEFORE COVER**

When painting a fuselage or truss assembly which is to be covered with fabric, allow the assembly to sit and cure for about a week before covering. This will develop enough chemical resistance to resist the solvents in the adhesive.

Also, when applying adhesive, do not apply thick coats of adhesive to the part, use thin coats only per the instructions.



# **PROCEDURE - INSTALLING POLYESTER FABRIC**

If fabric installation is being tried the first time, build a test panel. The process is not difficult but gaining familiarity with it via covering a test panel just makes good sense. The test panel must have the fabric installed, shrunk to fit and coated with the primer using the procedures herein.

The best order for covering the aircraft components is to start with a small part such as an elevator; proceed then to larger parts then to wings and fuselage last. All components must be completed though the primer/filler/UV barrier step and ready for the pigmented coats which can then be mixed only once to ensure color control.

The covering of the wing will be explained as most everything will be dealt with which will be encountered on other assemblies. After the wing the fuselage assembly will be discussed as there are some special considerations for that member.

Much time will be saved if one prepares a jig which will attach one end to the wing spar fittings and allow rotation of the wing as the work is being accomplished. The other end of the wing can be supported on a padded sawhorse.

Refer to the old fabric and original manufacturer specifications for guidance. A photo and simple sketch must be made of the structure and notes kept.

# I. Wing Installation

Mount the wing in the fixture and inspect the structure very carefully. The inter-rib bracing must all be in place and properly secured; wiring must be in good condition, properly routed and secured. Control cables must be routed properly and secured. Note the position of all as the rib stitch placement and spacing need to be coordinated with them. Bell-cranks must be inspected and lubricated as necessary. Remember compliance with original manufacturer specifications and/or FAA AC 43.13–1B is mandatory for any repair or modification.

Some recommend the use of pre-sewn envelopes which are tailor made for each aircraft. These envelopes are OK but with the wide polyester fabric and the reliable adhesives now employed the blanket method of covering is recommended. It is easier to work with the one ply of material on each side of a surface than to wrestle with an envelope attempting to keep seams straight and in the proper relationship.

### Option 1: Fabric is Wide Enough to Wrap Around Both Leading and Trailing Edges

Cut two fabric lengths wide enough to completely wrap around one side of the wing over both the leading and trailing edges. Cover any sharp metal protrusions with chafing tape. The leading edge and trailing edge of the wing must be coated with two thinned coats of adhesive (2 parts of RA 4000 Rev. 3 adhesive reducer to 1-part UA55 Rev. 1 adhesive) and each must be allowed to dry for 5 minutes. Coat the top of



the ribs which will come in contact with fabric with two coats of the thinned adhesive. Note the edges of most fabric are thermally cut which leaves a bead along each edge; this bead must be removed before application.

The first length of fabric must be oriented span-wise covering the surface (top or bottom). There must be a fabric overlap of 4 inches minimum at the leading edge and enough to wrap around the trailing edge. Leading edge seams must later be covered with a 2-inch surface tape minimum. Note the minimum fabric overlap for lapped joints other than leading edge is 2 inches.

The fabric is secured at the trailing edge using the thinned UA 55 Rev. 1 adhesive by wrapping it around and cementing it to the structure. As the fabric is attached brush a thinned coat of adhesive on the fabric and work it in with the brush or other aid to reactivate the previously applied adhesive and remove any entrapped air. The goal is to totally saturate the fabric.

The fabric must then be worked with adhesive toward the leading-edge paying attention to the aileron bay and tip bows to ensure the fabric is getting full adhesion. The fabric must be kept smooth and straight during this process but not pulled too tight. When this panel is completely attached apply two coats of thinned (2/1) UA 55 Rev. 1 adhesive to all attachment areas and allow it to dry. This will provide a foundation of adhesive for the next fabric layer.

Apply the next fabric panel in the same manner taking care to ensure the proper overlaps are maintained. Take great care with the adhesive to ensure there are no unsightly lumps and/or ridges.

In areas where the fabric is cut to allow for control cable exit, attachment points etc. make sure the fabric is securely attached with adhesive. After fabric tautening install fabric doublers for greater reinforcement. If any doubt exists as to the strength in these areas it is OK to even apply a triple fabric thickness. A point of notice is the aircraft manufacturer has precut acetate doublers for these areas to be installed after fabric tautening; consult manufacturer specifications and your parts manual.

### **Option 2: Use of Three Span-wise Lengths of Fabric**

If one width of the fabric will not cover the wing it is easy to use three pieces of fabricoriented span-wise to complete the cover job. The procedure is the same as option 1 except three spanwise lengths are used rather than two.

First, lay a length of fabric out span-wise onto the wing either top or bottom. Starting at the trailing edge wrap the fabric around the trailing edge and permanently attach it to the trailing edge with fabric adhesive in the same manner as Option 1. Then work the fabric toward and over the leading edge forward of the spar no less than four inches. Repeat this procedure for the other surface of the wing. After top and bottom fabrics are both in place a span-wise length of fabric must be cut which will wrap around the leading edge from the top of the spar to the bottom. Before attaching the leading-edge fabric, coat the entire leading edge including the 4-inch fabric laps with two coats of fabric adhesive thinned two to one and allow each to dry for 5 minutes. The leading-edge fabric installation can then be completed in the normal manner, paying attention to fully saturating the fabric and removing any entrapped air. The fabric must be allowed to dry overnight before the shrinking or tautening process is started. Good planning will ensure the overnight cure is no problem to the flow of work.



# II. Fuselage Installation

Prior to application of the fuselage fabric 2 coats of fabric adhesive (UA 55 Rev. 1 thinned 2 parts RA 4000 Rev. 3 adhesive reducer to 1-part UA 55 Rev. 1) must be applied to the longerons or other structural members to which the fabric is to be attached. Where possible the fabric must be wrapped around a tubing and attached with adhesive.

The fabric must be installed on the sides first, allowed to dry and slightly tautened at 250 degrees Fahrenheit to remove any wrinkles. The remaining fabric must then be installed with fabric adhesive overlapping the longerons or structural member to which it is attached and overlapping the slightly tautened fabric with a minimum 2-inch fabric to fabric overlap on an adhesive foundation of two thinned coats. After final fabric tautening surface tapes of at least 2 inches width will then be installed over the seams. Spring clips must be used to secure the fabric as is applied and until the adhesive is dried.

If interior fabric is required it must be applied first.

# Limitations:

Do not apply adhesives below 40°F. Allow adhesive joints 24 hours cure for full strength.



# **INTRODUCTION**

The procedures described herein apply only to the use of the materials referenced in the accompanying STC. In absence of specific instructions, the FAA approved methods and specifications of the original aircraft manufacturer and/or the techniques, procedures and directions of the FAA Advisory Circular 43.13–1B Chapter 2 govern.

### PREPARATION OF AIRFRAME FOR RECOVERING

Prior to recovery the airframe and components must be repaired and made ready for the covering process in accordance with FAA approved methods specified by the original aircraft manufacturer and/or FAA 43.13–1B.

# **INSTALLATION OF FABRIC**

- 1. Per FAA AC 43.13–1B Chapter 2 the method of fabric attachment should be identical, as far as strength and reliability are concerned, to the FAA approved method used by the original aircraft manufacturer.
- 2. Particular attention must be paid to the attachment method whether rib stitching, screws, rivets or clips. Installation/attachment should be according to FAA approved methods and specifications of the original manufacturer.
- 3. Cemented seams are to be located only over supporting perimeter airframe structures. Cemented seams which terminate in open bays are prohibited except for repairs to finished surfaces. Sewn seams must only be used when fabric width is not adequate to cover the surface; they must meet the original manufacturer's FAA approved specification or FAA AC 43.13–1B Chapter 2.
- 4. Air-Tech UA 55 Rev. 1 adhesive will be used in areas calling for cemented joints and for laying surface tapes according to procedures referenced herein (AT 101 FA, page 2; AT 101 ST, page 5).
- 5. Per FAA AC 43.13–1B Chapter 2 fabric may be applied so that either the warp or fill threads are parallel to the line of flight. Either the envelope or blanket method of covering is acceptable.
- 6. Only Polyester/Dacron fabrics may be used in this process which meet the requirements and are certified under Technical Standard Order TSO-C 15d, dated February 26, 1990 entitled "Aircraft Fabric".



# **PROCEDURE -APPLICATION OF FABRIC WITH AIR-TECH FABRIC ADHESIVE UA 55**

### **PROCEDURE AT 101 – FA**

The Air-Tech fabric adhesive is a concentrated thermoplastic adhesive. The following procedures must be followed:

- 1. Except for surface tape applications (see Step 6 below & page 5 herein) thin the UA 55 Rev. 1 adhesive concentrate with Air-Tech adhesive reducer (RA-4000 Rev. 3) in the ratio of 2 parts reducer to one part UA 55 Rev. 1 by volume. The viscosity of thin "pancake" syrup is about right.
- 2. Metal surfaces, bare or coated, are suitable substrates for gluing fabric. Metal surfaces requiring primer must have a two-part epoxy primer Air-Tech PE 1600M applied. Prior to primer application surfaces must be cleaned and treated according to FAA AC 43.13–1B Chapter 6.
- 3. Wood surfaces to which fabric is to be attached must be sanded and cleaned (FAA 43.13– 1B Chapters 1 & 2) and coated with Air-Tech polyurethane spar varnish (M 9200).
- 4. Any surface to which fabric will be attached must be brush coated with two thinned coats of adhesive. Minimum overlap for fabric lapped joints is 4 inches on the leading edge and 2 inches elsewhere.
- 5. When applying surface tapes with the adhesive a thinner mixture is required (3 parts reducer RA 4000 Rev. 3 to 1-part UA 55 Rev. 1) See Procedure AT 101 ST, page 5 herein.
- 6. After attaching fabric pieces, tapes or reinforcements always brush two thinned coats of adhesive (3 parts reducer RA 4000 Rev. 3 to 1-part UA 55 Rev. 1) on the glued attachment area.
- 7. On larger surfaces such as leading edges, "turtle decks", etc. brush two thinned coats (3/1) of adhesive on the area after fabric gluing and shrinking is complete.

### Limitations:

- 1. Do not apply adhesives below  $40^{\circ}$  F.
- 2. Allow 24 hours for cure to full strength.

Material Safety Data Sheets are available upon request.



# **PROCEDURE - TAUTENING POLYESTER FABRIC**

### **PROCEDURE AT 101 – T**

### **GENERAL SHRINKING – OPEN BAY SHRINKING**

For the tautening process an ordinary household clothing iron rated at 1100 watts or higher will produce satisfactory results. DO NOT USE A HEAT GUN FOR THIS PROCESS!

- 1. Calibrate the iron with an Air-Tech iron thermometer. The iron's thermostat control position must then be marked at the 250-degree, 300 degree and 350-degree Fahrenheit positions.
- 2. After allowing an overnight (12 hour) adhesive cure start the 250-degree setting and iron the entire fabric surface. Move the iron on all open bay flat surfaces 4-8 inches per second. Fabric on solid will require slower movement (2 5 inches/second). Be sure all areas are ironed, and the fabric is heated enough to shrink.
- 3. Increase the heat setting to 300 degrees and repeat the ironing process.
- 4. Increase the heat setting to 350 F and repeat the process again. This final ironing develops peak tension and stabilizes the weave to prevent any tension loss and will give the smooth, taut, wrinkle free surface desired.

### SHRINKING OF CORNERS, WRINKLES AND SMALLER AREAS

- 1. Puckers or wrinkles can be given special treatment with the same iron or a smaller fabric iron. Iron at a temperature of 350- F.
- 2. Wrinkles in the lapped areas where cement has been applied may be removed by the application of heat. Iron these areas at 250 275 F to achieve proper shrinking but not scorch the adhesive.



# **PROCEDURE - RIB ATTACHMENTS AND ACCESSORIES**

### PROCEDURE NO. AT 101 – R

After application and tautening of the fabric rib stitching and other approved attachment procedures are performed. Methods of attachments may be wing clips, pop rivets, P K screws, Martin Clips, or rib lacing (stitching) cord. Fabric must be attached according to FAA approved methods specified by the original aircraft manufacturer. If rib lacing cord is called for only Air-Tech RC 18 Rev. 1 Rib Stitch Cord may be used.

- 1. Per FAA AC 43.13–1B Chapter 2 prior to the reinforcement tape application brush one thinned coat (3/1) of UA 55 Rev. 1 to the tops of the ribs. Use the brush or other aid to work the adhesive into the fabric and to ensure air is not entrapped.
- 2. Allow the adhesive to dry 5 minutes and then apply the reinforcement tape.
- 3. Install the rib attachments per FAA approved methods specified by the original manufacturer.

### Notes:

- 1. If rib stitching lay out the stitch spacing with a lead pencil (NO INK PENS!!) making sure the stitches do not interfere with cables, pushrods, wiring, plumbing, etc.
- 2. Drain grommets and inspection rings are attached with Air-Tech UA 55 Rev. 1 adhesive.
- 3. Fabric doublers and optional inspection ring reinforcements may be cut from scrap fabric and are attached in the same manner as surface tapes (AT 101 ST, page 5 herein). When cutting these items use pinking shears as pinked edges minimize loose fibers and unraveling.

### Limitations:

Do not apply adhesive below 40 degrees Fahrenheit. Allow 24 hours for adhesive cure to full strength.



# **PROCEDURE - SURFACE TAPE INSTALLATION**

### **PROCEDURE AT 101 – ST**

Surface tapes are applied over all ribs, seam, and trailing edges. Widths of tape must equal manufacturer's FAA approved specification or the old fabric whichever is greater.

- 1. For application of surface tapes, a thinned mixture of adhesive is used (3 parts adhesive reducer RA 4000 Rev. 3 to 1-part UA 55 Rev. 1). To the area where tapes will be installed brush one thinned coat of adhesive; allow to dry 5 minutes; then apply a second thinned coat. Brush the adhesive only as wide as the tape.
- 2. Use thinned adhesive to wet out the area to which the tape will be installed. Lay a tape on the wet adhesive and use the brush to smooth it out applying more adhesive to fully wet it out. This will ensure removal of all entrapped air and complete the bonding of the tape to the fabric underneath.
- 3. Tapes to be wrapped around a trailing edge or curved tip can be applied by taking advantage of the "heat shrinking" feature of the material. Cement the center ¼ inch of the tape to the surface, allowing the tape to stand up at right angles to the surface until the adhesive has dried (10 minutes). Hold a small piece (4 in. x 12 in.) of cardboard under the tape as a backup and iron the tape. It will begin to shrink and curl around the surface lying flat as it does so. As it lays down, remove the cardboard and continue ironing directly on the surface until the tape lays flat without wrinkles. Then brush adhesive under the tape and cement it in place.
- 4. After tapes are installed brush two thinned coats of adhesive over all surface tapes (Refer Procedure AT 101 FA, Step 6, Page 2).
- 5. After the last coat of adhesive is dry (30 minutes minimum) iron all the edges of the tapes with a small iron set at 250 275 degrees Fahrenheit. The temperature is enough to soften the adhesive and allow it to be feathered out without scorching it and/or shrinking the tape. Iron temperature must be set using an Air-Tech iron thermometer.

Limitations:

Do not apply adhesives below 40 Fahrenheit. Allow adhesive 24 hours cure to full strength.



# TECHNICAL BULLETIN

# SURFACE TAPE SHRINKAGE (dark colored aircraft)

When applying surface tapes to your aircraft you should be aware that all tapes are supplied in a virgin or unshrunk condition. This normally presents no problems when covering as the temperatures encountered by a finished aircraft are less than that required to cause the fabric tapes to shrink. There is, however, an exception to this rule. Dark colored surfaces in direct sunlight can experience temperatures of 210°F or 115°C!! For this reason, we do not recommend dark colors i.e. black, dark blue, dark green as a base color coat on fabric covered aircraft.

Keep in mind when a dark color is chosen for the final aircraft finish the temperatures the surfaces can reach are above the minimum shrinking temperature of the fabric tapes. This will induce thermal stress in the taped areas as the tape is trying to shrink but the glue is keeping it from doing so. The situation is more often noticed when the light weight (1.7 oz) tapes are used. It becomes a struggle between the glue strength and the stresses in the tape. If the gluing is a good one no problem will result. On the other hand, if the glue job on the tapes is marginal the tapes in fact may shrink a little and expose a white line along one edge or the other. If this happens one can normally just iron the tapes and ensure the glue joint is good and then repaint the area. The worst case would be to replace the tapes and repaint.

To avoid this problem, it would be wise to preshrink the tapes by ironing them at a temperature above anything to be encountered in the environment, say 250°F. This will preshrink them and eliminate any possibility of later shrinking after the job is done. It is only necessary to do this to tapes which will be exposed to direct solar radiation i.e. tops of wings, etc. Other tapes, which are on the underside of the aircraft will see no excessive temperatures.

If you do use dark base color use only Regular weight (2.7 oz) tapes not the lightweight variety.

If you have any questions on this or another aspect of the fabric covering process, please call us at 501-985-1484.

# WE WANT TO HELP YOU!

Visit us at Our Web Site: airtechcoatings.com



### PFU 1030-F FABRIC PRIMER SYSTEM

### FLEXIBLE POLYURETHANE PRIMER FOR FABRIC FLAME/FLASH RESISTANT

# **EXCELLENT UV PROTECTION** APPLY IN HUMID WEATHER MSDS AVAILABLE ON REQUEST

#### COMPONENTS/MIXING RATIO:

PFU 1030-F PRIMER BASE 5 PARTS PCU 2030-F PRIMER CATALYST 1 PART RT 4070 Rev. 4 OR 4085 Rev. 4 Thinner UP TO 1 PART OR MORE TO FLOW OUT (VARY THINNER FOR CONDITIONS, EQPT. ETC.)

#### MIXING:

ADD <u>MEASURED AMOUNTS</u> OF CATALYST AND THINNER TO <u>MEASURED</u> AMOUNT OF PFU 1030-F; NEVER ADD BASE TO CATALYST. MIX THOROUGHLY. POT LIFE IS SHORT 1-1.5 HOURS @ 75F SO MIX ONLY THE AMOUNT NEEDED WITHIN THIS TIME PERIOD. ALSO REMEMBER TEMPERATURE DRAMATICALLY AFFECTS POT LIFE. HIGHER TEMPS MEAN SHORTER POT LIFE. CONVERSELY POT LIFE AND CURE SLOWS AS TEMPERATURE COOLS. USE ACC 1030 ACCELERATOR BELOW 70 F TO ENSURE PROPER CURE.

#### PROCEDURE:

- 1. To ensure primer attains the maximum wetting and adhesion the entire fabric covering must be cleaned with Air-Tech Fabric Wash (RF 4020 Rev. 3). Allow it to dry 30 minutes before application of the primer.
- 2. Although it is possible to spray all three to four coats in succession, color coats stand up better if you apply two coats of primer, wait overnight, then lightly sand and apply the remaining coats of primer. Spray good wet coats to ensure good soaking into the fabric weave, but don't attempt to load up the primer; this will retard cure. If additional coats are applied to fill weave or hide tapes wait until previous coats are fully cured! Notes:
  - a. Primer base should be mixed in paint shaker prior to use.
  - b. RT 4070 Rev. 4 thinner used at temp. below 85F: RT 4085 Rev. 4 above 85F.
  - c. Set air pressure at 35 psi at the gun.
- 3. If any areas require sanding let primer cure for 12 hours. Use 320 380 wet sandpaper and use Scotchbrite pad #7447 over rib stitches, rivets etc.
- 4. Recoating can be done any time after 12 hours up to one week without sanding.
- 5. Ventilate all cavities to remove solvent vapors. Remember that evaporation takes place inside the part as well as outside. These vapors must be removed.
- 6. Primed surfaces are ready for Air-Tech color coat. Don't topcoat unless these undercoats are cured; in other words, don't rush it.

SPECIFICATIONS: DRY FILM THK: 1.5-2 MILS % SOLIDS (SPRAYABLE): 46% WT/GAL: 11.3 LB.



# PFU 1030-F FABRIC PRIMER SYSTEM TIPS FOR USE

The PFU 1030-F Primer is a revolutionary new product for the aircraft covering enthusiast. It is unique in flame/flash resistance properties. With its inherent flexibility and chemical resistance PFU 1030-F is unique in the fabric covering industry. It provides a good base for Air-Tech color.

Please consider these points as you complete your project:

- 1. Spray gun choice Any good quality commercial spray equipment will work including HVLP. Choose the right tip, nozzle and air cap normally that recommended for medium weight material.
- 2. Follow safety precautions regarding breathing apparatus. Polyurethanes use isocyanates as catalyst. Any paint or dope contains solvents and harmful vapors so be smart.
- 3. Clean the fabric; primer will not stick to a soiled or greasy cloth.
- 4. The first coat can be sprayed or brushed. Brushing on the lightweight fabrics is recommended as weave pores are not uniform after shrinking. Brushing a coat can effectively seal the fabric and ensure good penetration or soakage. Thin this coat to avoid brush marks and a lot of sanding!
- 5. When spraying apply the coats "wet". Do not use a tack coat. Wet coats allow urethanes to flow and level properly. Spray surfaces horizontal if possible, for best leveling. Do not load up or spray excessive amounts.
- 6. The primer has a relatively short pot life so mix small quantities. Remember that as temperatures increase pot lives shorten. In cool temperatures (below 70F) use ACC 1030 accelerator for proper cure.
- 7. Up to about 85° F use RT 4070 Rev. 4 thinner; above 85 F use RT 4085 Rev. 4.
- 8. When adding thinner add only the amount necessary to give the proper viscosity for your paint conditions and equipment. The recommendations are based on normal situations but yours may be slightly different.
- 9. The primer can be applied all at once but does seem to work better if only two coats are applied, and the last coats are applied the next day after a light sanding. The color seems to stand up better.
- 10. If any pin holing is noticed, flood the pinholes out to eliminate them. After the primer dries pinholes can be filled with brushed on primer. Pin holing occurs if the fabric is not glued down on hard surfaces such as leading edges or if the fabric is shrunk in an uneven fashion making the pores all different sizes.
- 11. For best curing always ventilate the interior cavities of parts which are totally enclosed i.e. Wings, tail feathers. This will ensure curing from the back side also and will remove solvent vapors trapped in the part. These vapors would attack the primer if not ventilated inhibiting cure. Air through a drain hole or inspection port will help a great deal.
- 12. The primer may now be top coated with Air-Tech color. Apply the color within 5 days or an overall sanding of the primer surface is necessary for adhesion.

Lastly, there are no real surprises in the use of PFU 1030-F; just use good painting practices, the instructions, and these tips as a guide. However, if you have questions and are uncertain it is much better to call us and ask than to rework a mistake. We are ready to help anytime!



# **PROCEDURE - APPLICATION OF PRIMER/FILLER/UV BARRIER**

### PROCEDURE AT 101 PF – ALTERNATE 2

The Alternate 2 procedure for application of the primer/filler/UV barrier is essentially the same as the Alternate 1 or the original Air-Tech procedure. It differs only in the fact that the user no longer must add any Flex Resin to the mixture to obtain the desired flexibility for use on the fabric surface. Air-Tech accomplishes this in the manufacturing process.

After the fabric and tapes are installed move the assembly into the paint area for application of the flexible primer/filler/UV barrier.

- 1. To ensure the primer attains the maximum wetting and adhesion the entire fabric covering must be cleaned with Air-Tech Fabric Wash (RF 4020 Rev. 3). Allow to dry 30 minutes before application of the primer.
- 2. Spray one coat of the primer and allow to stand overnight; the next day spray two coats of primer "wet on wet" waiting only until the surface is dry to the touch normally 15-20 minutes. Do not spray if coat has been on an hour one must again wait overnight. Do not spray excessively thick coats as this will retard cure severely. Apply wet coats to ensure good soakage but do not load up the primer. On thin fabrics the first coat can be brushed; keep it thin to avoid brush marks. For clarification and better understanding the primer formulations used in this Alternate 2 Procedure are designated PFU 1020 for the standard and PFU 1030-F higher solids formulation. Follow mixing ratios for each formulation on the cans. Components used in each formulation are:

PFU 1020 – Primer mixture components 1020 Primer Filler Base PCU 2010 Primer Catalyst Reducer Thinner RT 4070 Rev. 4 or 4085 Rev. 4 4 PFU 1030-F Primer mixture components PFU PFU 1030-F Primer Filler Base PCU 2030-F Primer Catalyst Reducer Thinner RT 4070 Rev. 4 or 4085 Rev.

Notes:

- a. Primer bases should be mixed in paint shaker prior to use.
- b. ALWAYS add the catalyst to the primer never vice versa.
- c. Material should be allowed 5 minutes induction time after mixing.
- d. RT 4070 Rev. 4 thinner is used at temperatures below 75 F; RT 4085 Rev. 4 is used at temperatures above 75 F. The exact amount of thinner to add is a function of pressure, temperature, spray equipment, orifice sizes and painter technique.
- e. Air pressure must be set to obtain 35 psi at the gun.
- 3. If any areas require sanding let the primer cure for 12 hours after which it can be dry or wet sanded with 280-320 grit sandpaper. Do not sand over rib stitches, rivets, etc. but rather scuff these areas with a 3M Scotch brite Pad #7447. (3M Bldg. Svc. and Cleaning Products Div., St. Paul, MN 55144).
- 4. Recoating can be done any time after 12 hours up to one week without sanding or scuffing. After one week the surface must be sanded and/or scuffed for proper adhesion. Primed surfaces are now ready for top coating with selected color. Follow manufacturer's instructions during application.



# **MIXING RATIOS FOR PRIMER FILLER PFU 1030-F**

# TO MIX APPROX ONE QUART SPRAYABLE MATERIAL:

ITEM	RATIO	AMOUNT
PFU 1030-F PRIMER	5 PARTS	25 OZ.
PCU 2030-F CATALYST	1 PART	5 OZ.
RT 4070 Rev. 4 OR 4085 Rev. 4 THINNER	UP TO 1 PART	UP TO 5 OZ.

# TO MIX ONE GALLON SPRAYABLE MATERIAL:

ITEM	RATIO	AMOUNT
PFU 1030-F PRIMER	5 PARTS	100 OZ.
PCU 2030-F CATALYST	1 PART	20 OZ.
RT 4070 Rev. 4OR 4085 Rev. 4 THINNER	UP TO 1 PART	UP TO 20 OZ.

NOTE THE SHORT POT LIFE AND MIX NO MORE THAN CAN BE USED WITHIN THIS TIME PERIOD.

YOU MAY NEED TO THIN THE PRODUCT MORE IF ORANGE PEEL OCCURS.



# **PROCEDURE – HIGH SOLIDS FINISH COLOR COAT - CHSM**

THIS PROCEDURE APPLIES TO THE HIGH SOLIDS COLOR SYSTEM ONLY!!!

When you reach the color coat you are near the end of your project. Resist every temptation to hurry up and the job should turn out as you desire. There are a few precautions to remind you of at this point.

The primer coat is porous by design and it must be fully cured before application of the topcoat. If it is not the color will "bite in" too much and the high gloss can be lost. Let the primer cure 2-3 days at 70° F to ensure it is fully cured. Remember, if the shop cools down at night it may not have an adequate cure temperature. Curing really slows below 50° F. Also, it is very important to ventilate the interior cavities of solvent vapors as mentioned on previous pages. Unlike metal or a hard surface, the first coat of primer evaporates both inside the part and outside. These vapors must be removed for the primer to cure successfully. Sand the primer as necessary to provide a smooth surface for painting. Keep in mind that if more than 5 days elapse after priming the surface must be sanded for adhesion. PFU 1030 primer must be scuff sanded prior to painting. Final sand all primed surfaces with 240 or 320 grit sandpaper and clean with soap and water or an approved pre-cleaner for urethane paint. Let it dry thoroughly. (NEVER USE PAINT THINNER TO CLEAN)

Shake the color thoroughly to ensure uniform pigment dispersion. Manual mixing is not adequate.

The mix ratios for the color coat are as follows:

For color, CHSM-3, use proportions 6-1-1+Reducer:

- 6 parts Airtech CHSM-3 color part A
- 1-part CHSM 7071 Color Catalyst part B
- 1-part CHSM 7030 Crosslink Agent Part C (Part C has some reducer built into it)
- Additional thinning up to 10% with RT 4070 or 4085 or as needed to flow (be careful not to thin metallics to much as they will flow differently)

Paint between 70F and 95F.

Thinning will vary per color choice. Ideal is 20-25 seconds in #2EZ Zahn cup.

1.3-1.5 is ideal gun size with approximately 30 psi at gun while air is flowing. This will help break up the paint to even it out and help with flow.



### PROCEDURE – HIGH SOLIDS FINISH COLOR COAT – CHSM CONT'D

Example Mix Quantities in Ounces:						
<b>CHSM Color Part A:</b>	6	12	18	24		
7071 Catalyst Part B:	1	2	3	4		
7030 Crosslinking Agent Part C:	1	2	3	4		
4070 or 4085 Reducer:	Up to	10% by ready	to spray v	olume.		
Some colors such as whites and yellows						
will need to be reduced more than						
others. Some colors may not need any						
	reducer at all. (See Zahn cup rates.)					

# Don't mix too large a quantity as pot life is 1 hour at 70° F at 50% RH.

### Notes:

- 1. Color must be mixed thoroughly in a paint shaker prior to use.
- 2. Mixed formula may be sprayed immediately; no induction time is required.
- 3. Always add catalyst to color, not vice versa.
- 4. Theoretical coverage (color dependent) ready to spray 1mil dry, assuming 100% transfer is approximately 700-800 square foot.
- 5. When using HVLP turbines always use warm weather reducers.
- 6. For the best results always spray with surfaces horizontal. This allows you to get the proper amount of pigment on the surface.

Light wet coats are recommended. Do not apply coats too thick, as it can "sag" or cause solvent pop due to too thick of a film for solvents to disperse through before skinning over.

The number of coats to achieve color is usually 2 with approximately 10 minutes between coats at 70 degrees F or finger slick. Do not force dry with heat between coats. Total coat thickness 2mil with 4mil max. Can force after with 30 minutes at 140 degrees F. (Not mandatory)

If a good hiding color is chosen i.e. White one coat may be all that is necessary, use your own judgement on this. **If you have any doubt add another coat of color.** 

For trimming allow 2 days. For taping use only 3M fine line masking tape. Scuff area to be painted.

After trim is applied tapes must be removed as soon as possible; do not leave them in place as they will become most difficult to remove.

Coats can be recoated up to 24 hours without sanding – but it is always preferred to sand to ensure adhesion.

After 72 hours, if orange peel is present, can be color sanded wet or dry with 400 grit sand paper and top coated.

Clean spray equipment with lacquer thinner.

# WARNING: HEED ALL SAFETY PRECAUTIONS!!!



# **REPAIR PROCEDURE**

### **AIR-TECH FABRIC COVERING**

In the event of puncture or rip of fabric covering on which Air-Tech coatings have been applied repair is simple. Consult FAA AC 43.13–1B for instructions and details on patch size etc.

### PROCEDURE:

- 1. Around the rip or hole the area the size of the patch should be lightly sanded to roughen up the surface for adhesion. One should begin to see the primer showing through when sanded enough. Ensure the patch has an adhesive area with a distance of at least 2 inches from the edge of the hole or rip.
- 2. Thoroughly clean the area with RA 4000 Rev. 3 adhesive reducer to remove any foreign matter.
- 3. Thin the UA 55 Rev. 1 adhesive with reducer to a ratio of 3 parts reducer to 1-part adhesive.
- 4. Brush two thinned coats of adhesive on the area to receive a patch allowing each coat to dry for 5 minutes. Dryness is indicated by a dull or flat sheen.
- 5. Cut a fabric patch to the proper size. Pinked edges work much better.
- 6. Using the thinned adhesive (3/1) apply the patch in the same manner used for the surface tape. Thoroughly saturate the patch with adhesive and work any entrapped air out.
- 7. Apply two thinned coats of adhesive to the patch allowing each to dry 5 minutes. Take care to avoid any glue beads or ridges which would have to be sanded later.
- 8. Using a Teflon coated model maker's iron set at 250 F iron all the edges of the patch and feather out the adhesive. Note the adhesive thermally softens at this temperature and feathering is very easy. If ridges or beads persist soften them with MEK and wipe off with a clean untreated cotton cloth.
- 9. Prime and paint the patched area as necessary.



# **INSTRUCTIONS FOR CONTINUED AIRWORTHINESS**

Refer to Air-Tech Coatings Manual AT 102 for Instructions for Continued Airworthiness

Note: The statement above (about the ICA being located in Manual AT 102) should be included in the airframe log entry for the re-covering, as well as in Block 8 of the FAA form 337 for the re-covering.



# PROCEDURE – FAA APPROVAL / COMPLIANCE

This information is offered to assist the user of the Air-Tech Covering process in returning his aircraft to service.

Compliance or approval under the referenced STC requires strict adherence to the Air-Tech process as described in Procedure Manual AT 101; Revision 9 or later approved revision including the use of Air-Tech materials approved for such use under a Parts Manufacturer Approval (PMA). Deviation from approved procedures and/or substitution of other materials violates both Federal Regulations and this Supplementary Type Certificate (STC SA7965SW).

For an aircraft or component listed on the STC Master Eligibility List #191 (MEL), the repair and return to service is handled in the normal manner. A certified mechanic must fill out the FAA Form 337 and make the corresponding entries in the aircraft logbook. The entries must state that the repair or covering was performed in accordance with the Air-Tech Procedure Manual AT 101; Revision and Date noted and under the STC referenced herein. The aircraft must be inspected and returned to service by an FAA representative or delegated authority with an Inspection Authorization (IA).

For an aircraft or component not yet listed on the STC Master Eligibility List #191 (MEL), the installation must be approved by another means. Usually this can be accomplished by a "Field Approval" by an appropriately delegated FAA Aviation Safety Inspector using the FAA form 337 (approval in block 3 of the form).



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# APPENDIX



# TIP SHEETS

### AIR-TECH FABRIC COVERING PROCESS

The following attempts to answer some of the most asked questions concerning the Air-Tech process. Of course, the procedures in the manual control the process but these can be additional help. We hope they help you be even more successful with our products and your aircraft projects.

- 1. Surface Preparation
  - a. Aluminum Please follow recommended procedures using acid etch cleaner, Alodine and two-part Air-Tech epoxy primer. Zinc chromate primer will not work.
  - b. Steel Sandblast or clean thoroughly and coat with two-part Air-Tech epoxy primer.
  - c. Wood Use only catalyzed Air-Tech polyurethane varnish. Do not use hardware store "Polyurethane" or Spar varnish as glues etc. will lift them.
- 2. Fabric
  - a. Blanket versus Envelopes This is the customer's option. With the new fabrics 70 inches wide we use the blanket method almost exclusively.
  - b. Fuselage Envelope? For fuselages with permanent vertical fins we sometimes sew a blanket with the backbone or spine sewn in. However, on fuselages we always put on the belly piece last; this is the first to be damaged and it can be easily replaced by using this approach.
  - c. Weight of Fabric We recommend the following:
    - a. Spray planes or large planes (DC-3) use the 3.7 oz.
    - b. Std. Cat; exp.; aerobat.; etc. 2.7 oz. Or a combination i.e. 3.7 oz. On belly, elevator etc.
    - c. Ultralights 1.7 oz. Or a combination.

The weight of the Air-Tech coating system is less than any other so heavier fabrics can be used with no comparative weight penalty.

- 3. Application of the fabric
  - a. For new users always start with a small part i.e. elevator to learn the process.
  - b. One of the most common errors is the use of too much adhesive (UA 55 Rev. 1). Keep the glue thin by adding thinner (RA 4000 Rev. 3) to compensate for evaporation. Remember a thin bond is typically stronger than a thick one.
  - c. Always coat all surfaces which will come in contact with fabric with two coats of thinned adhesive. This especially includes leading edges, turtle decks, ribs etc.
  - d. Be neat and tidy with the glue; this will make for a better finish job.
- 4. Shrinking the Fabric
  - a. Follow procedures paying close attention to temperatures.
  - b. Use only a clothing iron (1100 watts) for shrinking in open bay areas. Heat guns are too difficult to control.
  - c. Use a small Teflon coated iron or heat gun to eliminate wrinkles or puckers around edges etc.
  - d. Shrink the fabric as tight as the structure will allow. A good fabric job is a tight one. Also remember Air-Tech coatings have no tautening properties.
- 5. Mechanical Attachment
  - a. Follow manufacturer's specification and AC 43.13 when applicable.
  - b. For rib stitching use Air-Tech's FAA/PMA approved flat woven rib lacing.



### 6. Surface Tapes

- a. Apply the surface tapes using Air-Tech FAA/PMA approved UA 55 Rev. 1 Adhesive per the recommended procedure.
- b. Pay close attention to detail and cleanliness when applying the tapes. The idea is to have them on perfectly prior to the application of any coatings. Iron the tape edges per Air-Tech procedures to ensure that all edges are flat. Do not use too high a temperature as it will shrink the tape.
- c. Glue ridges or drops should be removed by wetting them with MEK until soft and wiping them off with a clean cotton cloth. They will show through if not dealt with.
- 7. Primer/Filler Application
  - a. Spray Gun Choice Any good quality commercial grade spray equipment will work including HVLP such as the Croix.
  - b. With the Croix HVLP equipment most of the overspray problem is eliminated. Also, the turbine air can be used for breathing if positioned in a "clean air" area.
  - c. Select a medium size tip/ air cap for Air-Tech materials. It sprays like most polyurethanes or enamels.
  - d. The materials may be applied at temperatures of 50-100 F regardless of humidity if the spread between ambient temperature and the dew point is 5°F or greater. The materials are not prone to "blush".
  - e. Clean fabric per Air-Tech procedures with FAA/PMA approved RF 4020 Rev. 3 Fabric Wash.
  - f. Apply the coats of primer "wet" No tack coats! Wet coats allow the polyurethane to flow and level properly.
  - g. The first coat of primer can be brushed if one wishes. We spray all coats, but some prefer brushing that first coat.
  - h. The primer has a relatively short pot life so mix small quantities.
  - i. Up to about 85°F use the RT 4070 Rev. 4 thinner: above 85°F use RT 4085 Rev.
    4. Never store materials in a shed or area where temperatures will exceed 100 F.
  - j. Materials to be used should be at ambient temperature not hot or cold from storage.
  - k. If using a turbine system which heats the air note the flash time, if too short additional hose can be used or possibly a slower thinner or a blend of both.
  - 1. Apply the primer coats (cross coats) on after the other allowing enough time for "flash off" in between.
  - m. After the final primer coat allow the part to cure overnight. It can then be sanded as required to remove bugs or trash. No overall sanding is required.
- 8. Color Coats
  - a. After the final primer coat the color should be applied within 5 days for maximum adhesion. After 5 days the entire surface must be wet sanded for adhesion.
  - b. Use of other color coats. The Air-Tech process is an FAA approved system. Best results will be obtained using Air-Tech color maximum adhesion, maximum flexibility and the best finish.
  - c. Spray the color coats on "wet" Do not use tack coat.
  - d. Allow the first coat to dry to the touch before applying the second coat.
  - e. Apply only enough material to get color holdout. Excess materials serve no purpose.
  - f. Normally the process requires no sanding or buffing; however, if one is preparing



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a competition show plane fantastic results can be obtained as follows:

- 1. After the final primer coat can cure overnight sand as necessary to gain a smooth surface for top coating.
- 2. Apply one color coat and allow to cure 2-3 days.
- 3. Wet sand the surface using fine sandpaper 380 or finer.
- 4. Apply second color coat.
- 5. Normally buffing would not be required but if one wishes to buff, Air-Tech buffing procedures should be followed. Begin after 8-12 hrs. of cure.

Finally, please remember we are here for any question you have. Call us before any step if you are uncertain about how to proceed. We welcome these calls anytime 501-985-1484.



# **TECHNICAL DATA SHEET**

### FABRIC WASH RF 4020 REV. 3

As an aid to your fabric covering project Air-Tech includes RF 4020 Rev. 3 Fabric Wash with each kit. The Fabric Wash is a solvent alcohol blend which does three things:

- When applied before painting it helps ensure the removal of contaminants i.e. handprints which are not clearly visible.
- Using the Fabric Wash will greatly reduce static electricity when spraying primers. This will help reduce the "pickup" of dirt on the sprayed part.
- The Fabric Wash acts as a promoter of adhesion of the coatings to the fabric.

When applying use a lint free untreated cotton cloth wetted with the Fabric Wash. Wipe the part to be sprayed no more than 1 hour prior to spraying. Do not saturate the part with Fabric Wash; this is not necessary.

Prior to spraying allow the part to dry completely!! Do not spray any coating until the part is completely dry!!!

Fabric Wash should be used prior to spraying the primer/filler on the raw fabric. It can also be used prior to spraying the color coat if static electricity is a problem; however, make sure primer is cured before applying Fabric Wash.