INTRODUCTION: During my four years in the USAF I was an Airframe Repairman working on several types of military and civilian aircraft including C47's, F4 Phantoms, F104's, B-52's, KC-135's and SR-71's. As an aircraft model builder I’ve seen some glaring oversights in the way modern kits are “riveted” so I’m providing a basic overview of typical ways aircraft are assembled. This is not meant to be a doctoral thesis on aircraft assembly, but just a general guide for correcting model aircraft riveting.

**BUTT JOINT**

Most panels on aircraft are sheets of aluminum butted together. In this configuration there is a row of rivets on both sides of the seam fastening the panels to the structural member. Note that the rivets are close to the edge.

**LAP JOINT**

In some rare instances aircraft skin panels overlap with the trailing edge of forward panel overlapping the leading edge of the trailing panel. In this case a single row of rivets fastens both skin panels to the structural member. Note again that the rivets are close to the edge.

**PANELS and DZUS FASTENERS**

Panels that are frequently removed to allow access to engines, etc. are held in place by quick release fasteners. Depending on the type of aircraft, different types of quick release fasteners are used. In most WWII aircraft Dzus fasteners are common.

**Note:** The top illustration shows the position of the slot parallel to the panel edge indicating the fastener is latched. The bottom illustration shows the position perpendicular to the panel edge indicating the fastener is not latched.

**ACCESS PANEL BASICS**

If an access panel is within a skin panel the corners are radiused to prevent stress points and cracking. Panels that are bounded on all sides by skin panels are squared off.
There are two options for working with Archer rivets.

**Option #1 - lacquer based.** This is the preferred method and what we recommend. Although this may seem like a daunting task it goes quickly, involves little or no sanding and is easily removed from recessed panel lines and delicate kit details.

**Option #2 - acrylic based.** Being acrylic based it is essentially the same as Option #1 but it cleans up with water and is ideal for modelers allergic to lacquer thinner. This method requires some light sanding to remove the excess filler, takes longer to dry and is a bit more difficult to remove from fine kit details although it is easily removed from panel lines.

**OPTION #1: FILLING IN KIT RIVETS WITH A LACQUER BASED FILLER**

**STEP 1**
Put a small amount of Tamiya filler in an artist paint pallet or something similar.

**STEP 2**
With a dropper, add lacquer thinner and mix to a consistency similar to milk or thinner, it’s not that critical, just so it’s thin.

**STEP 3**
Add the artist pigment and mix until it becomes lumpy. Again, it’s not critical, just keep adding and mixing. Dryer is better than wetter.

**STEP 4**
Using a dropper, add lacquer thinner and mix back to a watery consistency.

**STEP 5**
Load your MicroBrush applicator until there is a ball of filler on the tip. Don’t be too concerned that it will drip, it won’t and more is better than less.

**STEP 6**
Apply the filler so that it appears opaque. The best results are obtained if the only thing touching the model is the drop of filler. When you feel the applicator touch the model, reload your brush. Dragging the applicator over the model will not deposit enough filler and if you have to add more it will pull up what you’ve already applied.

Wait a few minutes (This stuff dries very quickly) and look at the surface of the filler. If the surface of the filler is glossy, there is too much putty. Add more pigment and lacquer thinner. The surface of the filler should appear matt/flat.

**STEP 8**
Lacquer thinner dries quickly and the applicator will load up with dry filler and will have to be cleaned frequently. Twisting the applicator in a paper towel will clean the dry filler chunks off the applicator.

The filler will also thicken in the palette and will need more lacquer thinner frequently.

You can let the filler dry out in the palette or on your tools completely. Simply add lacquer thinner and mix until it becomes liquid again. Clean your tools with lacquer thinner.

**Basic tools you’ll need:**
1. Tamiya White Putty (or a similar lacquer based filler)
2. Lacquer thinner
3. Zinc White or Titanium White artist pigment
4. An old brush is for mixing
5. MicroBrush brand applicator.
6. A short bristle brush and cocktail stick sharpened to a chisel point

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WORKING WITH ARCHER RIVETS

STEP 7
After waiting only a few minutes wipe away the excess with a paper towel. If you have to rub hard your filler needs more pigment and lacquer thinner. If rubbing hard doesn’t work, scrape the excess off with your fingernail or something similar that will not mar the surface of the model. If this happens add more pigment and lacquer thinner.

STEP 8
This is what to expect after wiping away the excess filler. Because lacquer thinner etches into styrene you will see some “ghosting” around the edge of where the filler was. This is easily removed with a FINE sanding stick or 3200 micro mesh.

STEP 9
Any excess in the panel lines or other details can be easily brushed away with your small, stiff brush or the cocktail stick.
Proceed to Step 10, apply the rivet decals and assemble the model as mentioned on the last page.

STEP 10
Highlight the panel lines with a pencil to help guide the rivet application and then clear coat and apply the rivet decals.
We highly recommend using Alclad Aqua Gloss but Future or a gloss clear acrylic will work just as well.

OPTION #2: FILLING KIT RIVETS WITH AN ACRYLIC BASED FILLER

To make the filler you’ll need:
1: Future or gloss clear acrylic (not shown).
2: Any white artist pigment.
3: Isopropyl alcohol (IPA)
4: Water
5: An old brush for mixing and applying.
6: A cocktail stick sharpened to a chisel point

STEP 1
Mix 1 part Future (or acrylic) with two parts IPA and two parts water together and then add pigment until you have a mixture consistency similar to cream. Whether you use Future or acrylic makes little difference. There is no “formula” for the ratio, just be sure to check how easily the excess is removed after it dries and adjust your mix accordingly.

STEP 2
Using the same brush you for mixing, spread the mixture over the kit rivets with a scrubbing motion. If the mix beads up, add IPA.
Do your best to avoid delicate details like piano hinges, etc. because this mixture is not as easy to remove as the lacquer based mix.

STEP 3
Begin cleaning the DRY filler off by rubbing with a paper towel. Removes what remains with MicroMesh 2400. Using your sharpened cocktail stick remove any filler from panel lines etc. Proceed to Step 10 on the previous page.

PROS and CONS OF OPTION 1 and OPTION 2

OPTION #1 (LACQUER BASED FILLER)
PROS:
Easy to remove any excess around delicate kit details.
Easily cleaned from tools.
Dry filler can be stored for use later by adding lacquer thinner.

CONS:
Some modelers may be allergic to lacquer thinner.
Lacquer thinner evaporates quickly and will have to be added frequently to the filler mix. It will also load up in your applicator and mixing brush requiring frequent cleaning.

OPTION #2 (ACRYLIC BASED FILLER)
PROS:
Uses no harsh solvents
Same results as lacquer based filler
Water clean up

CONS:
Difficult to remove from fine kit details
Dries slowly
Unused filler cannot be re-used after it dries.

OUR RECOMMENDATION: Use Option 1 around delicate kit details and Option 2 elsewhere.

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TIPS FOR APPLYING ARCHER RIVETS

TOOLS YOU’LL NEED
Top to bottom:
Self clamping tweezers
A scale/ruler. The one shown here is included with any Archer purchase.
Sharp hobby knife
Ball of “blue tac” or equivalent to keep parts from moving around during application.
Flat synthetic as shown and a #3 round sable brush (not shown). The flat synthetic is ideal for positioning and the sable brush for moisture control.

STEP 1: Cut a full strip of rivets from the sheet. Measure the length you will need and using a sharp hobby knife slice through the clear film at that point. **DO NOT cut all the way through.**

STEP 2: Count two rivets beyond the slice and cut there. The piece between the slice and the cut will act as a “handle”.

STEP 3: Using clamping tweezers, hold the strip by the “handle” and dip it in water for about 10 seconds. After about 20 more seconds remove moisture until you see the texture of the carrier paper. Excess moisture impedes application.

STEP 4: Prepare the surface with Mr. Mark Setter then roughly position the rivets, hold with a damp sable brush, slide the rivet decal off the end and hold while pulling the carrier paper away lengthwise.

STEP 5: Use a flat synthetic brush to fine tune into position. Always pull on the rivet decal lengthwise rather than trying to push it to avoid kinking it. A cocktail stick is a good tool for this. Carefully follow the kit rivet lines to avoid making them look crooked. Being off even half a rivet diameter is too much. Be patient.

STEP 6: Apply liberal amounts of setting solution. This is an absolute must and more is better than less. In our testing we’ve found that Micro Sol, Mr. Mark Softer and Solvaset work well.

APPLY THE RIVETS BEFORE ASSEMBLY
It’s a lot easier to work with the rivet decals if you apply them to the kit parts before assembly. We have learned that a gloss coat and setting solutions will bond the rivets strongly enough to tape over them without pulling them off the model.

STARTING THE APPLICATION
Apply the longest runs of rivets first then fill in the short runs between them. Do not overlap. If this is your first time doing this, start on the areas least likely to be seen until you get the hang of applying them.
Trim very close to the rivets that go next to a panel line, otherwise the clear film will catch on the edge of the panel line making close adjustments difficult.
When adjusting long runs, sight down the row from the end to assure the run is straight. Use a flat synthetic shader brush to gently correct any deviation.
When you start to apply the rivet decals and there is too much water on the underside of the paper there will be a tendency for the rivet decal to fold over onto the bottom of the paper. If this happens pull the rivet decal back over until the folded over portion is back on top. It’s nearly impossible to fix a folded strip of rivet decals after they are on the kit.

SETTING SOLUTIONS and GLOSS COAT
A gloss coat, along with a prep and setting solution is ideal for maximum adhesion. We recommend Mr. Mark Setter under the rivets due to it’s adhesive properties. Note that this can be somewhat problematic because it softens the clear film and can make adjusting the rivets tricky if you don’t work quickly.
Always follow with an liberal amount of a setting solution after the decals have dried. Ignore any wrinkling when doing this - once it dries the decal film will settle down.

MICROBRUSH® APPLICATOR
Use a MicroBrush® brand applicator. Generic brand brushes detach from the handle when using the lacquer based filler.

WHY USE A #3 ROUND SABLE BRUSH?
Sable brushes are very soft and absorbent much better than synthetic brushes. This is very important because decals are attracted to water making precise positioning difficult. With a little experience you’ll know how much moisture is ideal and a sable brush makes it much easier to precisely control moisture either when adding or removing it.