**Some Notes on Adhesives:**

Several types of adhesives may be used during the construction of most Aerospace Speciality Products model kits - in most steps of the instructions the choice of adhesive is left to the modeler, a few steps may make specific suggestions as to the type and application of adhesive. Please read these suggestions and choose the adhesives you wish to use accordingly.

**Types of Adhesives and Suggested Applications:**

Wood Glue (use an Aliphatic Resin, such as Elmer's Carpenters Glue or Titebond, not white glue) - very good for bonding paper to paper (centering rings to tubes, for example), wood to paper (fins to body tubes), or wood to wood. May take several hours to fully dry (see instructions with the specific brand being used for more details). Can generally be handled safely without fear of skin reaction or problems due to inhalation.

Application Examples:

For attaching centering rings, apply a thin, even layer of glue to the tube where the ring will sit and slide the ring into place. Remove any excess glue with your finger, piece of scrap wood, etc.

For gluing engine mounts, etc. inside tubes, apply a generous amount of glue inside the tube where needed and smooth with a piece of scrap wood, etc. Slide the engine mount in in one smooth motion until it is in the desired location.

For attaching fins, use the "Double - Glue Joint" method - Apply a thin layer of glue to the root edge of each

fin and to the body tube where the fin will be attached and allow to

dry until no longer tacky. Apply another thin layer of glue to the root edge and wait a few moments until the glue becomes slightly tacky then firmly press the fin in place on the body tube. You may need to hold in proper position for several minutes.

Wood glue can also be used for fillets. Fillets are layers of glue added to joints (such as the joint between a fin and body tube or between a centering ring and engine tube on an engine mount) or other areas to strengthen the joint and/or for aesthetic reasons (such as hiding a seam). To make a fillet with wood glue, squeeze a small amount of glue into the joint (such as between the root edge of the fin and the body tube) and smooth the glue with your finger to form the fillet and remove any excess glue. Allow the model to rest horizontally while the glue dries to prevent the glue from dripping or sagging as it dries. This type of glue may shrink as it cures and you may need to repeat this procedure until the fillet is as desired.

Cyanoacrylate (CA) - very good for bonding both like (i.e. wood to wood or wood to paper) and unlike materials (such as plastic to paper or wood) and can create a fairly strong bond quickly. Several brands and cure rates are available - in general you may use any brand you may find in your hobby shop (CA glues are also known as "Super Glue", the household brands found in the grocery store, etc. are not recommended for hobby construction). Most brands come in quick, medium and slow cures. Spray accelerators are also available to hasten the cure times even further. For most purposes, a medium cure will be the best choice, while the quick (or "thin") type is best for "wicking" the adhesive into small joints. Slow ("thick") CA is best for fillets. The fumes are irritating to many people - be sure to use in a well ventilated area ("Odorless" types are also available). Great care should be used as it is very easy to bond skin with this type of adhesive!

Application Examples:

For most cases, parts to be bonded are held tightly in place and the glue is applied to the joint and allowed to seep into the joint. For fins (or other wood with exposed grain holes on the surface to be bonded) you may need to apply some medium cure to seal the cut edge of the fin slightly before bonding to the tube. If large areas are to be bonded, apply medium or slow CA to the area to be bonded then press then parts together rather than trying to wick the glue in.

To make a fillet with CA, apply a few drops of slow CA to the joint (such as between the root edge of the fin and the body tube) and draw the tip of a straight pin (or the sharp point of a pencil) through the glue to form the fillet. Allow the model to rest horizontally while the glue dries to prevent the glue from dripping or sagging as it dries. Repeat the procedure as needed to create the fillet.

Epoxy - very good for bonding both like (i.e. wood to wood or wood to paper) and unlike materials (such as plastic to paper or wood) and can create a very strong bond. Many types and cure rates are available - in general you may use any brand of general epoxy you may find in your hobby shop or hardware store (do not use "Finishing" epoxy for general construction). Most come in fast curing (4-6 minute working time), medium curing (12-20 minutes) or long curing times (30-60 minutes). In general the longer the curing/working time, the stronger the bond. However, for models of this type and size, the longer cure time is of no great advantage - if you wish to use epoxy, select a medium or fast type. Epoxies have to be mixed to adhere - for ease of use it is best to select one that mixes in even amounts (1:1). Note that not all are mixed in equal parts; be sure to read the directions of the brand of epoxy you are using. For accurate mixing, use a disposable graduated mixing cup and sturdy mixing sticks - do not mix more than you will use in just a few minutes (experience is the best teacher here) -

it is better to have to mix more epoxy than to have to throw away hardened glue that you did not get to use. Some people are sensitive, or can develop sensitivity, to epoxies. It is best to use in a well-ventilated area and avoid as much skin contact as possible. The use of rubber gloves or (at least) rubbing alcohol is suggested if you think you may be sensitive.
We also carry and recommend a special two-part paste-type epoxy adhesive called EPOXO 88 that works well for many applications. It cures very quickly, and unlike most other rapid cure brands it dries very strong and hard. It comes in two tubes and has a consistency somewhat like toothpaste when mixed. You can mix it in a 1:1 ratio on a piece of cardboard or other disposable surface.

Application Examples:

For attaching centering rings, apply a thin, even layer of glue to the tube where the ring will sit and slide the ring into place. Remove excess glue if needed.

For gluing engine mounts, etc. inside tubes, apply a layer of glue inside the tube with a piece of scrap wood, etc. and slide the engine mount in place in one smooth motion.

For attaching fins, apply a thin layer of glue to the root edge of each fin and then firmly press the fin in place on the body tube. You may need to hold in proper position for several minutes until the epoxy begins to set.

Epoxy can be used for fillets as well. To make a fillet, apply a small amount of glue into the joint (such as between the root edge of the fin and the body tube) and smooth the glue with the rounded end of a mixing stick ("tongue depressor") or your finger to form the fillet and remove any excess glue (if using your finger, be sure to protect your skin). Allow the model to rest horizontally while

the glue dries to prevent the glue from dripping or sagging as it dries. To make more sandable, a filler (such as "Micro-Balloons") may be added to the epoxy.
EPOXO 88 may be sanded, drilled, etc after curing without the addition of a filler.