

SO YOU WANT TO BUY A FIBERGLASS SAILPLANE?

by Aland Adams

You may not find it hard to choose a sailplane to buy based on your flying skill, pocketbook and advice from instructors and friends. But, evaluating and purchasing a used fiberglass sailplane can be more difficult. Since they differ from traditional sailplanes, they are harder to evaluate and it can be difficult to find help. To give you a start, following are some items I pay attention to when checking out a fiberglass sailplane prior to purchase. I've also included some general advice on purchasing sailplanes.

FINISH: Check the finish carefully for fine cracks. These should be most noticeable along the wing leading edge, and the top and bottom of the fuselage. This is where the fiberglass shells are joined. Extra filler is used to maintain the contour in these areas. Numerous fine cracks indicate a re-finish job is in the offering. Larger cracks (severe) can indicate something worse; especially, if found in non-joint areas. Severe cracks that start in the finish may have propagated into the glass cloth. If so, these will require the glass cloth to be replaced, in addition to removing the gel coat. Severe cracks may also indicate de-lamination of the fiberglass skin. You can check for this by carefully pressing with a dime adjacent to the crack. If the dime side of the crack deflects more than the other, there may be a problem. Also, any cracks that form a regular pattern could indicate some kind of structural damage and should be checked out by a professional.

The gel coat most susceptible to cracking, Vorgelat, is used on many German sailplanes. Grob's and DG's have Schwabalac, which is less susceptible to cracking. Some sailplanes in the United States have been re-finished with Prestec, which stands up well. PIK's are unusual as they do not have gel coat. They were built with high temperature curing resins. After curing they were assembled, shaped, sanded and painted! This provided PIK's with a long lasting finish and other advantages noted below. So, if you see cracks on a PIK, wonder about how it has been treated. Just for reference, a total re-finish can cost from \$6,500 to \$10,000.

Sometimes while examining the finish, you may notice broad lumps or bumps. You may see these, or they can be found by lightly rubbing your fingertips

along the skin surface. (Cordwise on wings.) These bumps may be most noticeable along the spars, especially on older sailplanes. They are usually a result of the sailplane manufacturer using room temperature curing epoxy. While manufacturers may speed up the cure process by elevating the temperature, these epoxies continue to cure with time and can (and typically do) change shape. Again, PIK's are an exception since they were nearly fully cured when removed from the ovens. The resulting deformations shouldn't pose a structural problem, but can degrade performance, especially if they are along the leading edges or spar. Performance can be improved with careful re-profiling, but again, this is a labor intensive process (read expensive).

Try to determine how the finish has been cared for. For good longevity fiberglass sailplanes should be waxed at least once a year. While there is a lot of controversy on the type of wax to use, it is probably best to use one without silicone (supposedly it makes repairs easier). Finally, find out how the sailplane has been stored when not flown. Hopefully, exposure to moisture has been minimized, and it has been kept in a trailer or hangar. While moisture is the major factor in gel coat damage, UV light and extreme cold temperatures are harmful as well.

CANOPY: A canopy is expensive to replace (\$1,500 to \$2,500) and will make you mad, surprised and maybe even windblown if a crack propagates across it. Check carefully around the access hole (window) and all of the screw holes near it for small cracks (small cracks do grow with stress and become big ones). Stop drilling sometimes helps but does not always last. Also, cracks may be glued. If done properly this can be successful. Make sure the frame fits the fuselage well. Finally, check that the hinges have not been bent and that there aren't any stress cracks in the finish around them. Sometimes the canopy flips open in a gust and damages the glass around where the hinges attach.

WING ROOT FITTINGS: Check for fore-and-aft motion of the wings when the sailplane is assembled. There should be NO noticeable play. To check this, have someone apply about 20 pounds of pressure, fore and aft, on the wing tip while you watch for motion at the root. Or, if alone, find a slightly tapered shim and wedge it into gap at root, from the bottom, at the trailing edge. Then, apply pressure at the wing tip and see if it falls out. Repeat for the

leading edge and the other wing.

Looseness indicates that the wing root rib pins and sockets are not where they were when the sailplane was built. This can be caused by people moving the sailplane by pulling on the wing tips (something you promise NEVER to do when you buy a glass bird). Sometimes shimming can cure this, but many times the wing pins and sockets must be removed, the glass around them rebuilt and the pins and sockets put back in; another expensive (\$3,000-\$7,000) operation.

MAIN FITTINGS: Check the main pin(s), their sockets and other wing fittings. The bearing surfaces are usually unplated and need to be kept greased to keep them from rusting. Rust, or any kind of marring, is a problem. Sometimes, these problems can be polished out (with emery cloth). If it's bad, like deep rust or a deep scratch, the offending part will have to be replaced. Most inspectors check this VERY carefully. You may have difficulty getting an annual until problems in this area are resolved. If the main pin sockets in the spars are loose or damaged, repairing them will be expensive as noted above.

Also, check the attachment fittings for the horizontal stabilizer. These are usually smaller versions of the pin and socket assemblies found on the wings, and should be examined in the same way. Make sure that, when assembled, there isn't any play when fore-and-aft or up-and-down pressure is applied at the tip.

CONTROLS: Check all of the exposed control mechanisms (look at those under the seat pan as well if you can). Make sure they are not loose, are in good repair and that the connection points are not worn. Hopefully they have been kept lightly lubed with some kind of greaseless product (I like LPS). This helps to keep them from attracting dust and dirt. Check for play in the control system by holding the control surfaces in their neutral position and gently moving the control stick. If the stick moves more than 1/16th of an inch, there could be problems (the owner's manual should have exact specifications). If this stuff is loose, I would wonder if someone has had flutter in the controls (and maybe elsewhere).

Check all of the control surfaces carefully. Look for cracking around the hinges and at the actuation points. Gently tap the surface (especially along the trailing edge), and listen for buzzing sounds which would indicate de-lamination of the fiberglass. This

can be another sign of flutter damage. On most fiberglass sailplanes the weight and balance of these surfaces is controlled carefully to prevent flutter. If you see signs of repair, try to determine if they were balanced and are within the allowed weight. Because of the criticality of control surface weight and balance, control surfaces often cannot be repaired when damaged.

Finally, check for cracks around the spoiler boxes. These are usually found emanating from the corners of the boxes. This is an area of higher than normal stress, so many sailplanes develop these cracks over time. Since they may be unavoidable, make sure they do not look severe as this indicates the structure under the gel coat should be repaired. This is usually a several hundred dollar repair.

LANDING GEAR: Off field landings can be hard on landing gears. Take a look inside the gear well at the gear mechanism. (Don't forget your flashlight!) Make sure that the tubes look "normal" (straight, undented). Carefully check the paint for cracks since they can indicate areas of over-stress or bending. Ensure that the gear doors fit snugly when the gear is retracted. Ill-fitting doors (slightly open due to interference with the tire) usually indicate something isn't the same as when the sailplane was built.

RADIOS/INSTRUMENTS: Make sure the airspeed, altimeter and compass are in good condition. These three instruments are required by the FAR's. If they are not functioning properly (like a dry compass), the sailplane is not airworthy. Many manufacturers specify markings for airspeeds (see the owner's manual). If these markings aren't present, the sailplane is not airworthy.

Unless the radio is a 720 channel model, you are probably facing replacing it. The FCC is slowly regulating the older ones out of existence. Variometers and flight computers are purchaser dependent. If you like what's there, its valuable. Otherwise, you'll probably get around to replacing them eventually. The needle on older mechanical variometers can "float" up. The aging (out-gassing) of the paint on the needle makes it lighter. If it's a Winter, it can be sent back and overhauled (if it's a PZL or LUN, you are out of luck). I tend to have mechanical variometers cleaned and overhauled if they are 5-10 years old or demonstrate sluggishness. This costs about half as much as a new one, and you'll be surprised how much better they work.

Whatever you purchase, plan to replace all of the

instrument plumbing and electrical wiring. Most plastic instrument tubing takes a set and loosens slightly with age. Some sailplanes have rubber tubing which deteriorates rapidly. Both of these problems cause leaking and your instruments (especially variometers) can start telling you lies. I replace all tubing and connectors in my panel every 2-3 years. Most sailplane wiring has been hastily patched together, as well, and it's real inconvenient to have your favorite vario and radio quit half way to nowhere. When you replace the wiring, make sure the solder joints are secure and covered (preferably with shrink tubing).

Finally, try to determine how the batteries have been cared for. This will help you determine how much life is left in them. Some folks don't properly care for their batteries. So, while they may reach full charge, they die off real fast. Batteries should be stored at room temperature. Gel type batteries should be charged once a month, when stored. NiCads should be discharged to the point where the electronics don't work properly, then re-charged, periodically.

RELEASE: Almost all fiberglass sailplanes have Tost releases. These have a Tost specified service life after which they can be overhauled and recertified. The service life of older ones is three years and newer ones four. A recently rebuilt, and certified by Tost, release has a four year service life. The service life is specified in the Tost manual which should be with the sailplane's manual. The springs in Tost releases do become weaker with time as well as with use, and the Tost folks are very serious about having the releases rebuilt. The sailplane's logbook should have entries for each time a release was rebuilt or replaced. Having a release rebuilt costs about \$125 and really worn or corroded ones end up being replaced. Many aircraft inspectors haven't known to check release service life. Most are learning about this, and could require compliance for the next inspection. Out-of-service equipment in an aircraft makes the aircraft un-airworthy.

OXYGEN SYSTEMS: Watch for out-of-service systems. Components of oxygen systems have to be tested and certified periodically. Cylinders have service dates stamped into them. Most cylinders have a five year service life, if not being used commercially. Other components (even cylinders) have yellow tags, when purchased, indicating when the items must be serviced. Most owners keep these tags with their owner's manual. Again, installed,

out-of-service equipment makes aircraft un-airworthy. You shouldn't be able to get an annual unless they are current or removed. Special note: If the sailplane has an A8A regulator you are facing replacing it. There is a part in the regulator which is not made anymore. If it fails a re-certification test you are going to have to replace it.

TRAILERS: This is usually one of the most neglected glider accessories. In addition to checking the overall state of the trailer take a look at the tires. Usually tires rot from the sun before they wear out. I've had tires with real good tread disintegrate on the road. For this reason I replace them based on age and I like to have a spare. Another good reason to have a spare is that correct size rims can be hard (sometimes impossible) to find. Find out how the running gear has been cared for. I have the bearings greased and the tires balanced yearly. Out of balance tires can do more damage to your instruments than anything else. If you buy a sailplane, make sure this is done before you trailer it home.

For the best UV protection of your sailplane, the trailer should have a metal top or have some kind of metalized paint applied to the upper surface. There should be good vents and a solar powered fan, especially in humid climates. This helps keep moisture from condensing on the sailplane while it is in the trailer.

HANDLING GEAR: Well-designed trailer fittings and assembly gear make a big difference in the enjoyment of your sailplane. Good, and well maintained, systems keep trailer rash to a minimum and will keep crew happy. Make sure to ask the current owner if there are any special tricks to assembling the sailplane. I have found that finding the right position for the fuselage and the first assembled wing can make a big difference when it comes to inserting the second wing and putting in the main pin(s).

PARTS: One important factor to consider is the availability of parts. Some manufacturers are no longer in business. This can make getting parts hard. Landing gears, gear doors, tail skids/wheels, etc. can be damaged on a off-field landing. So if you are planning to fly cross-country you might want to choose a sailplane whose manufacturer is still supplying parts.

DOCUMENTATION: Make sure there is an airworthiness certificate and note who the registered owner is on the registration. If you know an AI, see

if he will let you look up the AD's posted against the sailplane. If not, for a fee, the AOPA will provide a list of AD's when provided make, model, and serial number. Look in the log book to ensure any AD's have been done. Also, try to determine if any other service bulletins have been issued by the manufacturer. Sometimes, owners have copies of these bulletins, but I'd contact the manufacturer, dealer, sailplane repair folks and other owners, if need be. If you purchase a sailplane whose manufacturer is still in business, notify them you own the sailplane. This allows them to send you new service bulletins or other notices, as required.

Review the log book, looking for any repairs that may have been done. If the sailplane is type certified (not experimental), also check for reports of major repair or alteration (FAA form 337). When I have found these, I usually check up on them by calling the noted repair person, and/or others, to learn about the extent and impact of the work. Finally, check the log book to see if the sailplane has a current annual. If the sailplane is not "in annual," or if you are uncomfortable about some aspect of its condition, include getting a new annual as a condition of sale. Make sure it is done by someone you have confidence in and who understands fiberglass sailplanes.

Check the weight and balance. See how recent it is and see if the equipment list really matches what is in the sailplane. In any case you should plan to weigh and re-do the weight and balance before you fly the sailplane (do you really know if someone didn't put lots of lead in the tail and not properly document it?).

Another thing you MUST do is to double-check the sailplane's ownership so that you can get a good bill of sale. For a fee, the AOPA will research this for you and provide you the noted owner on the last recorded bill of sale. Also they will give you a list of any lien holders who have registered with the FAA. Also make sure you can get a bill of sale, title or other proof of ownership for the trailer. Many states require you to prove ownership before you can register a trailer and get a license plate. (It's a good idea to check with the folks who issue licenses before you consummate your deal.)

INSURANCE: If you elect to insure the sailplane, you should have your policy set up and in force when the transaction occurs. Sailplane insurance is different from car insurance in that you declare the value of the sailplane. The premium is usually

proportional to this value. Under-insuring is common but can be risky. If the cost to repair a damaged sailplane exceeds the insured value minus the salvage value, the sailplane will be totaled. In this case you get the insured value of the sailplane less your deductible. It is important to know that insurance companies expect you to included all instruments, radios, oxygen systems, etc., in your declared value. In case of an accident, these items will be included in the salvage.

If you want to insure the trailer, it is most common, and usually the most economical, to do this with the sailplane policy. But note, these endorsements do not usually cover liability (e.g. protect you if the trailer comes loose during travel and hits something or someone). Check your auto insurance as they usually provide liability coverage for towed vehicles.

OTHER THOUGHTS: Here are some more things to consider before you take possession of a sailplane. Think about how you are going to transact the cash. One idea is to take a cashier's check made out to the seller when you go get the sailplane. Then give the owner the check once you have inspected the sailplane and ensured the paperwork is OK. If a bank is involved, they will probably have their own ideas on how to do this.

When sailplanes are transported at purchase, it is customary for the buyer and seller to drive halfway. Other arrangements are usually included in the negotiation of the selling price. If you are driving to get a sailplane, find out the size of the ball used with its trailer. If you are told it is a 50 mm hitch, you can usually use a 1 7/8" ball successfully. Also try to find out how the trailer lights are wired. Then try to set up similar wiring for your car. But, don't count on this working. I always take tools to rewire things since this always seems to be a problem.

Good luck!