



Pre-Purchase Inspection Guidelines

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February 21, 2014

1. Aircraft Logbooks

I recommend you start an aircraft inspection with a logbook review. The logs will tell you a lot about the airplane, it's history, as well as the organization of the owner. There should be at least three logbooks; one for the airframe, one for the engine, and one for the propeller. Check the serial numbers of the airframe, engine, propeller, etc. to make sure the logbooks match with the airplane. When looking through the logbooks, each maintenance entry should contain, at a minimum, the date of the entry, what work was accomplished, who signed off the work, and finally the A&P or Repairman certificate number. If the person performing the work isn't an A&P or doesn't have a Repairman certificate, they should write down a pilot certificate number or some other form of identification.

When reviewing the logbooks, remember to check over the airworthiness requirements necessary in FAR Part 91, as well as the Operating Limitations that were issued with the original Airworthiness Certificate.

For example, in order for the airplane to be considered airworthy, a Condition Inspection and ELT check is required to have been signed off within the previous 12 calendar months, a transponder check (if equipped) must be signed off with the previous 24 calendar months, etc.

A current copy of the aircraft's weight and balance information needs to be available in the airplane, and most records of these measurements are also found in the logbooks. It's a good idea to ensure the original airworthiness entry from the FAA or DAR is present, as well as the logbook sign off indicating the completion of the Phase 1 testing phase, assuming it has been signed off. This is also a good time to review the logbooks to check for any damage history and repairs, if applicable. Finally, make sure you review that all Sonex Service Bulletins (SB's) have been complied with and are recorded in the logbooks.

A complete listing of SB's can be found on the Sonex factory website or by contacting the factory directly.

2. Aircraft Structure

When it comes time to take a look at the actual airframe, the Sonex design is fairly straightforward and easy to inspect. The entire structure is fabricated out of 6061-T6 aluminum, and most exterior skins are 0.025" thick. When inspecting the exterior skins, check the entire airframe to make sure there are no creases, dents, dings or tears in the exterior skins that would require repair. When looking at the Stainless Steel Avex pulled rivets (also called pop or blind rivets), the heads of the domed rivets should sit flush on top of the skin and be tight and secure. The wing leading edge rivets are countersunk into the skin and ribs to ensure laminar airflow over the wing, and these rivets should be flush with the exterior skin and also secure.

As you're able, pull off fairings and inspection panels to check for interior corrosion issues (corrosion will normally look like a white, powdery film, normally where two pieces of metal are attached), wing and tail attach fittings for any deformation or cracks, as well as tightness and security in all control pushrods and cables. Speaking of controls, this would also be a good time to ensure all control surfaces move -



freely, have adequate and proper control deflections, and are properly secured at the hinge mounting points via a cotter pin or some other means. If any external antennas are present, check to make sure they are secure and not bent.

The Sonex kit comes with fiberglass wingtips, wheel pants, cowling, and tail end tips. All of these pieces should be secure and no cracks should be present.

Finally, be sure to check the bottom of the airplane for any dents or damage as well as excessive exhaust residue and/or oil leaks. If you find a lot of oil or black sooty exhaust on the bottom of the fuselage, this could indicate an engine oil leak, worn piston rings, or a host of other potential issues which may warrant additional investigation.

3. Landing Gear

The landing gear designed for the Sonex is very rugged and robust, utilizing solid titanium dowel rods for the main gear legs, as well as the tailwheel leg if equipped. This can be a challenging area to inspect due to the factory supplied wheel pants and landing gear leg fairings. At the very least, try to check the visible portion of the tires and brakes for security and wear. If a hydraulic brake setup has been installed, check for any leaks or any indications of brake fluid residue.

If putting the airplane on a set of jacks is possible, do so to ensure the wheels rotate freely but no excessive play is evident. Also, try to gently twist the wheels to ensure the axle and engine mount bolts have not been elongated in their sockets. If the wheels are loose, this could lead to wheel vibrations during takeoff and landing.

4. Engine and Cowling

When inspecting the airplane, insist that the cowling be removed to allow you a thorough visual inspection of the engine, cowling, and propeller area. This is a vital area to cover so take your time and check things over thoroughly. If the seller is able to perform a engine leak down/compression test, that can be a good indication on the condition of the internals of the engine. When looking at the engine itself, check for oil leaks as well as any possible indication of engine damage. This could involve such items as crankcase cracks, cracked cooling fins on the cylinders or heads, and leaking or damaged engine accessories.

On the Sonex aircraft, pay special attention to the cylinder head and spark plug area to ensure there is no indication of cracking or damage. All engine accessories, such as the starter, alternator (if equipped), magneto, etc. should be tight and secure with no movement possible. Don't forget about the exhaust system as well; the exhaust pipes should be securely mounted to the cylinder heads, and no cracks should be noted. If you look inside of the exhaust pipe, you should notice a dray, gray color inside of the tubes. If the inside of the exhaust tubes are black or oily, that may indicate an excessively rich mixture or possible valve/ring wear issues. While you're in the area of the exhaust pipes, take a look at the crankcase breather line to ensure there are no obstructions.

The carburetor on the Sonex engines is located beneath the engine and secured to the intake system. The carburetor should be checked for security, proper orientation, and all controls should be checked for freedom of movement and security. The fuel intake line will connect to the carburetor; this line should be secure with no indication of fuel leakage noted. Finally, check the air filter to ensure it's -



clean and unobstructed. Most Sonexes do not have a carburetor heat control installed, but if this airplane does, inspect proper orientation and operation.

Take a look at the rubber engine mount grommets on the engine mount to ensure the rubber mounts are properly safetied and have no excessive wear. While inspecting that area, perform a visual inspection of the engine mount to check for any sort of cracks, as well as to ensure all sensor wiring is properly safetied. In most cases, wires should not be simply tie wrapped to the engine mount as this could cause engine mount damage in the future. In many cases, engine control cables are routed next to, and secured to the engine mount; this is a good opportunity to ensure all engine control cables are properly secured, do not bind, and provide complete control movement to the engine accessories.

Moving slightly aft, perform a visual inspection of the firewall to ensure there is no damage, possibly the result of a hard landing. Many accessories on the Sonex airframe will be bolted to the firewall; ensure these items are all properly secured. The battery on the Sonex is normally mounted to the engine side of the firewall, so this is a good opportunity to inspect the battery, terminals, and battery box for signs of damage or battery corrosion.

Finally, perform a visual inspection on the propeller and engine cowling to ensure they are properly safetied, and there are no cracks or other damage present. Most Sonexes have wood propellers which require propeller nut re-torquing on regular intervals; make sure the torque is properly set per the propeller manufacturer's instructions.

5. Fuel System

The stock fuel tank in the Sonex is a rotationally molded, polyethylene fuel cell located under the glareshield in the forward fuselage. A simple on/off fuel valve is normally incorporated right underneath the fuel tank, followed by a solid aluminum fuel line to the firewall. Historically, many builders incorporate a firewall mounted gascolator for fuel filtration, but many builders are now substituting a simple inline fuel filter as a substitute in lieu of the gascolator. A flexible, stainless steel braided line is normally used from the firewall to the AeroCarb/AeroInjector. The system is designed to operate on a gravity feed setup, and as such a fuel pump is generally not installed or needed.

Fuel level monitoring can be accomplished by an electronic, capacitance style fuel probe threaded into the bottom of the fuel tank, or by incorporating a clear visual sight tube into an upper and lower port into the fuel tank.

When looking over the fuel system, check to make sure there are no fuel leaks anywhere in the system, as well as ensuring the entire system flows downhill with no interruptions. If the system includes a gascolator, take a fuel sample to check for any contamination in the system. Finally, the fuel cap should be tight and secure and the fuel vent should also be inspected for any blockage and security.

6. Cabin and Interior

As you begin looking at the cabin area, start by performing a visual inspection of the front windshield and canopy. The front windshield, as designed by Sonex, is a flat piece of polycarbonate ("Lexan" as it's generally known) wrapped over to form the curved front windshield. Polycarbonate provides excellent bird protection properties and is generally very easy to work with, but as a downside it's easy to scratch or haze over if certain chemicals are spilled. Aviation fuel must be wiped off immediately or there is a potential for windshield damage. The canopy is a single piece acrylic bubble, mounted to the canopy



frame via machine screws or aluminum rivets. Acrylic is more durable, but the older Sonex canopies are prone to cracking around the screw/rivet holes. The new canopies Sonex now ships include a rubber compound mixed into the acrylic that reduces the chances of cracking. Be sure to check for cracking as part of your inspection, as well as general fit of the canopy to ensure it closes and latches securely.

The Sonex kit includes a 4 point harness seatbelt as standard for each seat. This includes an aviation style lap belt with quick disconnect, as well as a shoulder harness attached to the upper longeron in the rear fuselage area. An inspection of the seatbelts is important to ensure there is no fraying or wear of the seatbelt itself, as well as proper operation of the latches.

If an interior has been installed in the airplane, an inspection for any wear or damage is important. Be sure to check cushions for any tears which could expose interior foam pieces, as well as overall interior condition. Most Sonex owners will secure interior panels and/or cushions with industrial grade Velcro, so an interior removal to complete a visual inspection should be a simple task. If the seat cushions are aftermarket, it may be a good idea to sit inside the airplane to ensure the cushions are at a proper thickness, as well as ensuring the cushions do not interfere with control stick deflection.

Finally, if the baggage area has been outfitted with a cargo sling or pan, inspect the area for proper security and to ensure any cargo will not interfere with the rudder cables or elevator pushrod. This may also be a good time to ensure the Airworthiness Certificate and Registration Certificate is present and in sight of aircraft occupants.

7. Avionics and Electronics

Each Sonex airplane is highly customized by the individual builder which can make a check of the electrical system a unique, airplane by airplane affair. In general however, safe wiring practices can be assured by checking under the instrument panel as you're able to ensure proper size wiring is used, and said wiring is properly secured. Watch for areas of possible electrical wire chafing and secure any wires where this is a concern.

In general, a thorough test of all electrical equipment is very important. Many Sonexes have digital EFIS or MFD screens installed, so take your time to go over each unit to make sure everything works properly.

If there are panel mounted electronic equipment such as a COM radio, transponder, intercom, etc., make sure everything powers up properly and all tuning knobs and switches move freely and work properly.

Many builders are now installing exterior lighting systems into the wings of their Sonexes for potential night usage, as well as a safety consideration. If the aircraft has such lights, take the time to ensure they are secure and working properly by turning on each lighting system individually and performing a visual check.

Finally, be sure to check over the condition and security of any pitot tube, static port and/or Angle of Attack (AOA) probe that is installed on the airplane. Most builders install the pitot tube in the right wing leading edge skin, but locations may vary. These probes should be secure and clear of obstructions when performing a visual inspection.



8. Test Running Engine

At some point, it's highly recommended that the engine be started and allowed to warm up to normal temperatures. However, prior to running the engine, it is recommended that both cowling halves be installed. Doing so will aid in engine cooling and will all sensitive engine components remain secure. While the engine is running, check operation of the alternator and ignition systems. The engine should run smoothly with no excessive temperature or pressure issues noted. If you are standing outside the airplane, watch the exhaust area to ensure there is no dark smoke coming out of the engine which could indicate a rich mixture. With the airplane tied down or otherwise secured, ensure the engine runs smoothly from idle all the way to wide open power. You don't want to run the engine at full power for long as this could overheat the engine, but if possible try and get a check of the RPMs at full throttle to ensure they are within the engine's guidelines.

Once the engine has been operated, perform another visual check of the engine compartment to ensure there are no new oil leaks and that all accessories are still secure.

Final Thoughts

Given the highly customized nature of each Sonex, a thorough pre buy inspection is very important. If you are unfamiliar with the Sonex series of airplanes, try and get a hold of a local builder or owner for a second opinion if you find any issues. The Sonex community is full of friendly, helpful people who would be more than happy to assist in your purchase. The Sonex factory is always available for questions as well.

Here are some online websites that may assist you as well:

www.sonexaircraft.com - Official Company Website

www.sonexbuilders.net - Online Web Forum

www.sonexfoundation.com - Home Of The Sonex Builders and Pilots Foundation

Best of luck on the purchase of your new airplane!