



Work Books

A flight instructor's guide to S-LSA maintenance regulations

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On September 1, 2004, the FAA published the final rule on the new sport pilot certificate and light-sport aircraft (LSA) category. We're now more than five years into the rule, and we have approximately 6,500 LSA registered. Most are homebuilt experimental light-sport aircraft (E-LSA), but new FAA registrations for factory-built special light-sport aircraft (S-LSA)

were expected to top out at about 1,100 for 2009.

By all indications, the LSA industry is the leader in new aircraft production and sales, and this foreshadows exciting times for our industry and the freedom of flight. Yet, many flight instructors have been slow to adopt sport pilot training, and new LSA owners are frustrated with the low numbers of instructors who are able to help them with their transition to sport flying.

Often, this reluctance comes from a perception that the airplanes are "different" than Part 23 aircraft, and indeed they are—not only in how they fly, but also how they're tended and maintained. Even instructors who have jumped into LSA with both feet will find that the process for keeping the aircraft airworthy may throw them for a loop if they're unsuspecting. While learning to teach in a LSA is another topic al-

together, it's just as important to know the idiosyncrasies for keeping this particular category of aircraft legal to fly.

ASTM: The "New" Standard

LSA are new machines, from conception through certification. Instead of needing to meet regulatory requirements set by national aviation agencies, each aircraft is required to meet standards agreed to by ASTM International, a non-profit organization that has 110 years of experience developing industry standards. These standards, covering a range of products, are used by tens of thousands of individuals, companies, and agencies globally. In fact, ASTM has approximately 12,000 standards worldwide. These standards reflect the most current technology, because they're living documents that are continually revised by committees composed of more than 31,000 members from 135 countries.

ASTM Committee F37, the LSA committee, is the facilitator of new worldwide LSA consensus standards. "Consensus Standards means, for the purpose of certifying light-sport aircraft, an industry-developed consensus standard that applies to aircraft design, production, and airworthiness," says Dan Schultz, director of ASTM Committees. "It includes, but is not limited to, standards for aircraft design and performance, required equipment, manufacturer quality-assurance (QA) systems, production acceptance test procedures, operating instructions, maintenance and inspection procedures, identification and recording of major repairs and major alterations, and continued airworthiness."

The LSA committee sets a clear strategy for identifying and expeditiously developing high-quality, global sport-aviation standards, and it's charged with developing stan-

dards for safety, performance, and flight-proficiency requirements. These standards include implementing standard controls for quality assurance, which ensure that aircraft will conform to design criteria as well as support QA with acceptance tests and procedures that show completed aircraft meet reported performance. They also provide a roadmap for the future of LSA by developing additional standards that will build a safe LSA environment beyond those initially envisioned.

The FAA's use of private-sector standards to support the regulatory framework for aircraft certification has been an innovative concept. Manufacturers no longer need production or type certification, which drastically cuts the development costs for new aircraft. The LSA regulations and consensus standards have literally prompted a rebirth of aviation.

International standardization has also reduced by at least half the cost and liability for producing small aircraft for personal purposes, compared to complying with Part 23 regulations. Those are significant savings, which can be passed on to customers, especially since one standard can be applied worldwide.

Because there is no type certificate or production certificate for S-LSA, each aircraft is inspected by the FAA, usually through a designated airworthiness representative (DAR), before it can receive its airworthiness certificate. Since LSA have a different certification process, they also have a different maintenance plan. That's not what many flight inspectors may expect.

LSA Maintenance

The FAA and manufacturers set requirements over who can perform maintenance and required inspections for S-LSA. FAR Part 43.7 is quite particular about who

can perform these duties. One is a certificated airframe and powerplant (A&P) mechanic, with or without inspection authorization. (Obviously, A&Ps can maintain other categories of aircraft as well.) Another is a light-sport repairman with a maintenance rating (LSRMA). The LSRMA rating limits the holder to S-LSA and E-LSA maintenance and inspections only; he can't work on other category aircraft.

That said, as with Part 23 aircraft, certificated-pilot owners can do limited routine maintenance on their aircraft, too, including routine, simple maintenance items, such as oil changes, spark plugs, and tires.

The guidebook on who can do what is the maintenance manual (MM) specific to that aircraft. This manual includes information on the condition inspections, repair of the airplane, and authorization for repairs and maintenance. Each task outlined in the MM defines who is authorized to perform that duty—whether it's the sport pilot certificate (or higher) holder, an A&P, or an LSRMA. It's similar to a cookbook recipe, where all the ingredients are listed. Each task also states how it is performed and what tools are required.

If a particular maintenance or repair task is not addressed in the manual, this is considered "major," and the manufacturer must be contacted for the proper procedure. Engine manufacturers may also put limitations on certain maintenance; Rotax allows only approved Rotax Service Centers to do heavy maintenance, engine overhaul, and major repairs on its engine. More specific information on this is found in the engine manual.

Owners and pilots of S-LSA are also part of the "Continued Airworthiness" program for their aircraft. Continued Airworthiness means

the airplanes must continually remain in compliance with all applicable standards during their useful life to remain airworthy. This means that, even if the owner has an A&P certificate, he just can't go out to his hangar and upgrade equipment or make improvements to the airplane or engine.

The manufacturer must approve all changes; an owner must contact it to explain exactly what he would like to do. Its authorized representative will send him a letter of authorization stating who can do the work and how it must be done. This document becomes a permanent attachment to his Airplane Operation Instructions (AOI) manual and MM.

There's no way around this. An owner who makes changes to his airplane, including any of its components, without approval renders his airplane out of compliance, which makes it no longer airworthy. Most likely, it'll also void his insurance, too. Even worse, FAA personnel can ramp check the airplane at any time, and they'll look to see if any equipment upgrades or changes have an authorization letter attached to the aircraft's AOI and MM. If it doesn't, the FAA will ground the airplane, and it could levy significant penalties.

For that reason, I like to go over the aircraft's manuals and documents with each of my students during their training. We look at the AOI and turn to the equipment list to compare this to what's in the airplane. Everything on the list needs to be installed and, of course, in work-



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ing condition. If there is something installed that's not on the list—such as a different radio, instrument, or autopilot—then we look at the airplane's maintenance logbook and make sure there is the authorization form from the manufacturer attached. The work needs to be performed as required by the authorization, and the person who did the work signs the logbook.

Aircraft Compliance

As with Part 23 airplanes, S-LSA must comply with Part 91 regulations. Airplanes used for rental and training require 100-hour and annual inspections, and FAR Part 91 flight rules apply to all aircraft operating in our national airspace; that includes compliance with any safety information issued by the manufacturer or the FAA.

Part of the continued airworthiness program is an open relationship between manufacturers and owners. Manufacturers must provide owners, in a reasonably timely manner, information on any safety issues that may develop, and they have the responsibility to monitor and correct safety issues with their aircraft. To do so, they will issue safety directives, which are the equivalent of airworthiness directives (ADs) for type-certificated aircraft. Usually, the manufacturer posts this information on its website for public view, and it will send individual owners notifications, as well.

The manufacturer can issue one of three types of safety directives: a safety alert for conditions that require immediate action; a service bulletin for conditions that don't require immediate action but have a recommended future action; and a notification, which doesn't necessarily recommend future action but is primarily for promulgation of continued airworthiness information.

When the manufacturer issues one of these directives, it will include information on exactly what needs to be done, by whom, how, and what parts and tools are needed. Aircraft logbooks are updated to show completion of any safety directive. Proper compliance with directives is mandatory.

FAA-issued ADs may apply, too, if the S-LSA has a certificated engine or component, such as a Lycoming or Continental. Only these components will have Form 337s or Service Difficulty Reports. LSA in general won't have them,

since, again, they're not type-certificated. Instead, owners have a responsibility to report any safety concerns or equipment and part failure directly to the manufacturer.

In each MM, or in a separate document also provided by the manufacturer, are the specific procedures for reporting items. It is a good idea to check the manufacturer's website on a regular basis for any LSA you train in for updated information; compare the aircraft's log-books to manufacturer's website to determine that safety directives have been complied with before flying a new aircraft.

As an instructor in a S-LSA, you should become familiar with the AOI, the MM, and any other manuals supplied with the airplane. LSA aren't Part 23 aircraft, and these documents will help you understand how the proper maintenance of this category of aircraft differs. They'll also help you determine if the aircraft you intend to fly remains in compliance with the applicable standards. Aircraft dealers usually make sure the buyer is familiar with these requirements when he receives his new aircraft, but it's vital that you do, too. That way you can help your customer put some fun, safe, legal hours on his airplane for years to come.

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