

## LSA Synopsis

In 2006 CASA introduced a category of aircraft called Light Sport Aircraft (LSA). The amendments to the regulations were developed by a project team consisting of CASA specialist, representatives from each of the sporting organisations, Australian manufacturers and CASA authorised persons.

LSA is the result of other National Airworthiness Authorities (NAA) adopting similar rules to address advances in sport and recreational aviation technology. LSA aims to allow the manufacture of safe and economical light sport aircraft, to be operated for the purpose of sport and recreation, to carry a passenger, to be used for hire, and to conduct flight training and glider towing.

### What is a Light Sport Aircraft?

LSA is a category of aircraft that does not replace any existing category. It is not intended for existing aircraft already operating under a different airworthiness category. It is a small, simple to operate aircraft. It can be a ready-to-fly production aircraft or it can be a kit built aircraft of the same make and model as the production aircraft.

With regard to the requirements of the regulations, a light sport aircraft is an aircraft, other than a helicopter, that has:

- A maximum takeoff weight of 600 kg or 650 kg for an aircraft intended and configured for operation on water or 560 kg for a lighter-than-air aircraft.
- A maximum stall speed in the landing configuration ( $V_{so}$ ) of 45 knots CAS.
- Maximum two person, including the pilot.
- A fixed landing gear. A glider may have retractable landing gear. (For an aircraft intended for operation on water, a fixed or repositionable landing gear)
- A single, non-turbine engine fitted with a propeller.
- A non-pressurised cabin.
- A variable pitch – constant speed, fixed pitch or ground adjustable propeller (ASTM F2506-13) come into effect 2013. The ASTM doesn't cover Props that are able to revers pitch i.e. on amphibian aircraft
- If the aircraft is a glider a maximum never exceed speed ( $V_{ne}$ ) of 135 knots CAS

The types of aircraft that may satisfy these criteria are 3-axis aeroplanes, powered parachutes, weight-shift control aeroplanes (trikes), gliders, balloons, airships and gyroplanes.

**Administration** " an LSA may operate under either a sport and recreational aviation organisation such as RA-Aus, or under CASA.

### What is not an LSA

The types of aircraft that do not fit in this category are:

- Hang gliders
- Paragliders
- Multi-engine aircraft
- Helicopters
- Complex aeroplanes with retractable undercarriages or turbine engines

### The FAA LSA rule

The United States FAA introduced an LSA rule on 1 September 2004. CASA intended to harmonise with this rule as much as possible. However, because of the extensive experience with operating similar types of aircraft in Australia, it was decided that minor differences in defining LSA were warranted.

These differences are:

- CASA allows a stall speed of 45 knots in the landing configuration ( $V_{so}$ ) whereas the FAA allows a stall speed 45 knots in clean configuration ( $V_{s1}$ )
- CASA has no requirements for a propeller whereas the FAA requires the propeller to be fixed pitch or ground adjustable.
- CASA allows a never exceed speed ( $V_{NE}$ ) for glider of 135 knots whereas the FAA allows 120 knots.
- CASA allows a gross maximum weight of 560 kg for a lighter-than-air whereas the FAA allows only 300 kg.
- CASA has no maximum airspeed requirement for a powered aircraft whereas the FAA stipulates maximum airspeed in level flight with maximum continuous power ( $V_H$ ) of not more than 120 knots CAS [in standard sea level atmospheric conditions].

## **Manufacturer responsibilities**

The manufacturer is responsible to certify the aircraft and the continuing airworthiness. This means that the manufacturer certifies that each aircraft complies with the LSA standards by signing a statement of compliance. The statement of compliance must indicate that the aircraft was manufactured by a qualified manufacturer, complies with the design and performance, quality assurance, production testing (not required for a kit aircraft) and continued operational safety monitoring standards.

If the aircraft is manufactured overseas, the manufacturer will also need to provide evidence that the aircraft is manufactured in a Contracting State, and the aircraft is eligible for a certificate of airworthiness, or another document of similar effect, in the country of manufacture.

The manufacturer will be required to continually monitor the airworthiness of these aircraft in accordance with the LSA Continued Operational Safety Monitoring standard. This will require the manufacturer to manage a database of all owners of aircraft in Australia and overseas, investigate service defects and address safety critical defects with corrective action in the form of safety directives issued to all affected owners. The manufacturer is also responsible for approving all modifications to production aircraft (not kit built aircraft) even if the modification has been approved by a CAR 35 engineer. The reason for this is that the manufacturer is now responsible for the continuing airworthiness of these aircraft which includes modifications.

The manufacturer will also need to provide product information in accordance with the LSA standards. This will include data plate, conformity details of the aircraft, warning decals, operating instructions, aircraft flight training supplement and the maintenance and inspection procedures.

## **What happens if the manufacturer no longer exists?**

In the event that a manufacturer no longer exists or can no longer provide continuing airworthiness support to owners of their aircraft, CASA can appoint a competent person to carry out the manufacturers continuing airworthiness requirements. If no-one satisfies CASA approval criteria or no person applies to CASA for appointment, the existing production LSA can no longer operate under a Special Certificate of Airworthiness. In such situations, these aircraft can be operated under an experimental certificate for LSA.

## **CASA responsibilities**

The LSA regulations do not require CASA to issue Type Certificates or Production Certificates nor issue safety of flight Airworthiness Directives, except in cases of significant public interest. However, if the manufacturer decides to include a type certificated product such as an engine or propeller in its aircraft, then these components can be subject to applicable ADs.

CASA will participate with industry in periodically reviewing the LSA standards and approving these standards. CASA will also be responsible for overseeing the authorised persons performing initial airworthiness entry control. It is expected that this should significantly reduce CASAs role with recreational and sport aircraft.

## **CASA authorised persons**

CASA authorised persons may issue a special certificate of airworthiness for LSA (production ready-to-fly aircraft) or an experimental certificate for LSA (kit built aircraft or production aircraft that no longer satisfy the LSA standards).

Before the certificate of airworthiness or experimental certificate is issued, the authorised person must verify the manufacturers statement of compliance satisfies the LSA requirements, and the owner has available the operating instructions, flight training supplement, and maintenance and inspection manuals. The authorised person must inspect the aircraft is in a condition for safe operation. If the aircraft was manufactured overseas, the authorised person must also ensure that the aircraft was manufactured and eligible for a Certificate of Airworthiness in an ICAO Contracting State.

## LSA standards

The LSA standards are a series of standards with which the LSA manufacturer must comply. The US standards were issued after the FAA requested the American Society for Testing and Materials (ASTM) to develop consensus standards for each LSA category such as fixed wing, weight shift lighter-than-air, powered parachutes, gliders and gyroplanes.

A committee of manufacturers, aviation sports bodies and regulators was formed to develop Design and Performance, Quality Assurance, Production Testing and Continued Operational Safety Monitoring standards for each aircraft category. Other design standards for propellers, reciprocating and diesel engines and ballistic emergency parachutes were also included by the ASTM as cross cutting standards.

Unlike the FAA, CASA has also included other existing design standards as acceptable for this type of aircraft. However, cherry picking of selected paragraphs out of these standards will not be acceptable. If the manufacturer selects a design standard for an aircraft then compliance with the entire standard must be shown. A list of the CASA approved LSA standards are defined by the [Advisory Circular 21-42 V2.0, Light Sport Aircraft Manufacturers Requirements](#). This list will be updated as more ASTM standards are developed and become available.

Current CASA alternative standards for design and performance (ASTM Standard F2245) are:

- **BCAR Section S (Britain)**
- **CS VLA (EASA)**
- **CS LSA (EASA)**
- **CAO 101.55 (Australia)**
- **LTF-UL (Germany)**
- **UL/2 PT2 (Czech Republic)**
- **DS 10141E (Canada).**
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## Historical LSA standards

- BFU-95 (Germany)
- PICA26 (Australia)
- JAR VLA (Joint Aviation Authorities)

## Certificate of Airworthiness for LSA

There are two types of Certificates of Airworthiness for LSA. These are Special Certificate of Airworthiness and Experimental Certificates.

The Special Certificate of Airworthiness for LSA is for production ready-to-fly aircraft. These aircraft may be used for hire, flying training and towing gliders. The Special Certificate of Airworthiness remains valid provided the aircraft is maintained in accordance with the requirements of the manufacturer and the aircraft has not been modified unless approved by the manufacturer.

However, if the aircraft is not maintained in accordance with the manufacturer, or the manufacturer can no longer provide the continuing airworthiness, or the aircraft is modified without the manufacturer's approval, the Special Certificate of Airworthiness will no longer be in force and the owner will need to apply for an Experimental Certificate to operate the aircraft.

An Experimental Certificate for LSA is available for kit built LSA and for aircraft that no longer satisfy the requirements of the Special Certificate of Airworthiness. Before an Experimental Certificate can be issued to a kit built aircraft, the manufacturer should have produced a production aircraft of the same model issued with

a Special Certificate of Airworthiness. Unlike the amateur built aircraft, there is no requirement that the owner must build 51% of the aircraft.

The Experimental Certificate also provides an avenue for operating aircraft that no longer comply with the requirements of the Special Certificate of Airworthiness for LSA. There are a number of circumstances where this could arise such as the aircraft has been modified without the manufacturer's approval or has not been maintained in accordance with the manufacturer's requirements. Another circumstance may be that the manufacturer has gone out of business and no suitable persons or organisations have taken over the continuing airworthiness functions for the aircraft.

For more information see [Advisory Circular 21-41V2.0](#), *Light Sport Aircraft Certificate of Airworthiness*.

## **Operating limitations and requirements for LSA with a Special Certificate of Airworthiness**

Production LSA issued with a Special Certificate of Airworthiness can be used for private operations, flight training, and glider towing.

The maintenance and inspection of these aircraft are required to be carried out in accordance with the manufacturer's maintenance and inspection procedures. If the aircraft is used for flying training, glider towing or hire, the aircraft must be inspected every 100 hours Time in Service (TIS) or every year, whichever occurs first. If the aircraft is used for private purposes only, the aircraft is required to be inspected every 12 months. If an aircraft has been idle for an extended period of two years or more, the inspection and maintenance is required only once during the period but within 12 months of the next flight.

Because the manufacturer is responsible for the continuing airworthiness of their aircraft in accordance with the Continued Operational Safety Monitoring standard, the manufacturer must evaluate all significant defects and correct any unsafe condition that may exist in the remaining fleet. Therefore the aircraft owner should notify the manufacturer of any safety of flight issues or significant defects. After assessing such defects, the manufacturer can then issue to all affected owners a Safety Direction (SD) to correct an unsafe condition. It is therefore very important and is a requirement with the LSA standard that all registered operators provide the manufacturer with current contact information.

It is mandatory that the owner comply with the requirements of the SD. The owner can apply to the manufacturer for a variation or exemption against the SD provided suitable safety justification is included in the application. The manufacturer will assess the application and if the safety justification satisfactorily addresses the safety issue, the manufacturer can approve an alternative means of compliance or grant an exemption against the SD. However, if the manufacturer does not approve an application, the owner must comply with the requirements of the SD.

In the interests of safety, CASA may include additional operating limitations to an aircraft. This would only occur if CASA considered that other requirements by the manufacturer were inappropriate or did not address a safety critical issue.

The manufacturer must approve all modifications to LSA issued with a Special Certificate of Airworthiness. This is different to other aircraft where CASA or a person authorised under CAR 35 can approve modifications without notifying the manufacturer. The owner should be aware that unapproved modification of the aircraft will result in the Special Certificate of Airworthiness no longer being in force and the owner will be required to apply for an experimental certificate for LSA resulting with reduced operational privileges.

Prior to flying the aircraft, the pilot must inform the passenger that the aircraft does not meet the same airworthiness requirements as an aircraft with a Standard Certificate of Airworthiness. Also an information placard must also be displayed in the cabin or cockpit at a location in full view of the passenger and the pilot, with the wording:

THIS AIRCRAFT HAS BEEN DESIGNED AND MANUFACTURED IN ACCORDANCE WITH THE LIGHT SPORT AIRCRAFT AIRWORTHINESS STANDARDS AND DOES NOT CONFORM TO STANDARD AIRWORTHINESS REQUIREMENTS.

## **Operating Limitations for Experimental LSA**

The operating limitations for experimental LSA are the same as other experimental aircraft such as amateur built aircraft. Experimental LSA cannot be used for flying training (unless training the owner). These aircraft are limited to day flying under the visual flight rules and cannot be operated over built-up areas unless authorised by CASA or an authorised person.

For further information see [AC 21-42\(0\) LSA Manufacturers Requirements](#) [pdf document 92 KB] and [AC 21-41\(0\) LSA Certificate of Airworthiness](#) [pdf document 65 KB].

## Notes from RA-Aus Technical Manager

### A few pointers about LSA

#### Factory built:

- The factory needs to be an approved manufacturer (via a production certificate of approval or by approved statement of competency).
- The factory needs a QA system in place.
- The factory needs to have their aircraft certified as an LSA and meet the appropriate design rules.
- The factory needs to sign a statement of compliance indicating that the aircraft meets the appropriate design rules; only ASTM standard for the US but Australia has numerous acceptable standards including CAO 101.55, PICA26, JAR VLA, UL2/1 etc. The list is found in [Advisory Circular 21-42V2.0](#).
- The factory needs to supply all the manuals with the aircraft.
- The factory needs to keep a list of registered owners of their aircraft.
- The factory is responsible for all airworthiness issues of their aircraft and their information to their owners(ANs, ADs etc).

When you have purchased an LSA, you will need:

- All documentation and manuals.
- A statement of LSA compliance from the manufacturer on CASA form 681
- A Special Certificate of Airworthiness completed by a CASA approved Authorised Person
- Noise Exemption certificate from Air services

Actions to take:

- Request a registration number allocation from the RA-Aus office. This can be done before the aircraft arrives.
- Once the aircraft has arrived, send a copy of the factory flight test report, weight and balance and statement of compliance to the office to receive provisional registration. This does not allow you to fly, but it will indicate that the aircraft has been registered. This is important (and differs from the amateur built procedures at the moment).
- Only after your aircraft is registered, should you submit an application to CASA to have your aircraft inspected by an 'Authorised Person'. Be sure to fill out the application form precisely and completely and register the activities you wish to accomplish with your aircraft (flight training, glider towing). You MUST have the appropriate manuals before you for each activity you are requesting.
- If the aircraft does not conform to the design standard under which it is being accepted (as decided by the inspector in the end), or the paperwork is not complete, or the aircraft has no conformity statement or is not registered, your application for a Special Certificate of Airworthiness will be rejected. The inspector must give you the reasons why and the application will be closed. Once you have all the faults sorted, you can re-apply.
- Once you have a Special C of A, send a copy to the RA-Aus office and the registration will be upgraded to 'full'.

## Warning.

- If you make any unapproved modifications to your factory built aircraft, you will be required to contact a CASA Authorised Person and have an Experimental Certificate of Airworthiness issued. If you reverse the modification, the aircraft will need to be re-inspected by an Authorised Person. A sub Part 21M engineers have no place in approving modifications for LSA aircraft, unless their modifications are accepted by the factory and the factory approves it.
- If you maintain your aircraft and use a different oil filter, get it approved by the manufacturer, to cover yourself.
- Be aware that every piece of your aircraft has to conform to the design standards it was built to and which is acceptable for the LSA category, even the seat covers!
- It is easy to fall out of the SLSA (special LSA) and into the ELSA (Experimental) but very hard and time consuming to get back to SLSA.
- For factory build's, the owners should be in constant contact with the manufacturer or importer.

## Experimental LSA

The manufacturer conforms to the same guidelines as 'factory built', although their responsibility stops when you take delivery of the kit. It is up to the homebuilder to make sure they follow the building guidelines and conform to the design standards of LSA. If you decide to modify the aircraft during building, you need to make certain that your aircraft still complies to the LSA standard. If you spend 500 hours designing retracts for your aircraft, the inspector will knock it back and there is no category for you left, so you can stick it on a pole. Same goes if you put a turbine in etc.

## Actions

- As above, the aircraft must be registered before it will be inspected.
- If the CASA Authorised Person is happy with you, you will receive an Experimental Certificate of Airworthiness, a copy of which is sent to the RA-Aus office to get full registration.
- RA-Aus will not be issuing C of As. The 'Authorised Persons' are CASA instrument holders.

## Existing factory built aircraft

Can you bring your existing aircraft into the LSA category? Yes, with a few restrictions, providing you get a statement of conformity from the manufacturer, then follow the steps outlined above.

Contact the RA-Aus Technical Manager to discuss this further.

## Updated information for CASA authorised Persons and Importers. Received 26-11-14

Dear LSA manufacturers and Instrument of Appointment Holders

Please be advised that a new revised form 681 (LSA Statement of Compliance) together with separate completion guidelines (CASA form 681i) has been published on the CASA website as per the links below and are also attached for your reference.

Form 681: <http://www.casa.gov.au/manuals/regulate/csofa/form681.pdf>

Form 681i, Completion guidelines: <http://www.casa.gov.au/manuals/regulate/csofa/form681i.pdf>

Please utilise the new form 681 and associated completion guidelines when issuing or assessing a LSA statement of compliance and do not hesitate to contact SASAO for any queries you may have in this regard.

Regards

Klaus Schwerdtfeger