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Standard Practice for Maintenance and the Development of Maintenance Manuals for Light Sport Aircraft[1]

This standard is issued under the fixed designation F2483; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice provides guidelines for the qualifications to accomplish the various levels of maintenance on U.S.-certificated experimental and special light sport aircraft. In addition, it provides the content and structure of maintenance manuals for aircraft and their components that are operated as light sport aircraft.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]
F2241 Specification for Continued Airworthiness System for Powered Parachute Aircraft
F2244 Specification for Design and Performance Requirements for Powered Parachute Aircraft
F2245 Specification for Design and Performance of a Light Sport Airplane
F2295 Practice for Continued Operational Safety Monitoring of a Light Sport Aircraft
F2352 Specification for Design and Performance of Light Sport Gyroplane Aircraft
F2415 Practice for Continued Airworthiness System for Light Sport Gyroplane Aircraft

2.2 *Federal Standards:*[3]
14 CFR Part 21.190 Issue of a Special Airworthiness Certificate for a Light-Sport Category Aircraft
14 CFR Part 43 Maintenance, Preventive Maintenance, Rebuilding, and Alteration
14 CFR Part 65 Certification: Airmen Other Than Flight Crewmembers

3. Terminology

3.1 *Definitions:*

3.1.1 *annual condition inspection*—detailed inspection accomplished once a year on a LSA in accordance with instructions provided in the maintenance manual supplied with the aircraft. The purpose of the inspection is to look for any wear, corrosion, or damage that would cause an aircraft to not be in a condition for safe operation.

3.1.2 *A&P*—airframe and powerplant mechanic as defined by 14 CFR Part 65 in the U.S. or equivalent certification in other countries.

3.1.3 *FAA*—United States Federal Aviation Administration.

3.1.4 *heavy maintenance*—any maintenance, inspection, repair, or alteration a manufacturer has designated that requires specialized training, equipment, or facilities.

3.1.5 *line maintenance*—any repair, maintenance, scheduled checks, servicing, inspections, or alterations not considered heavy maintenance that is approved by the manufacturer and is specified in the manufacturer's maintenance manual.

3.1.6 *LSA (light sport aircraft)*—aircraft designed in accordance with ASTM standards under the jurisdiction of Committee F37 Light Sport Aircraft, for example, Specification F2244 for powered parachutes, Specification F2245 for airplanes, and Specification F2352 for gyroplanes.

[1] This practice is under the jurisdiction of ASTM Committee F37 on Light Sport Aircraft and is the direct responsibility of Subcommittee F37.70 on Cross Cutting.
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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.
[3] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

3.1.7 *LSA repairman inspection*—U.S. FAA-certificated repairman (light sport aircraft) with an inspection rating as defined by 14 CFR Part 65, authorized to perform the annual condition inspection on experimental light sport aircraft, or an equivalent rating issued by other civil aviation authorities.

3.1.7.1 *Discussion*—

Experimental LSA do not require the individual performing maintenance to hold any FAA airman certificate in the U.S.

3.1.8 *LSA repairman maintenance*—U.S. FAA-certificated repairman (light sport aircraft) with a maintenance rating as defined by 14 CFR Part 65, authorized to perform line maintenance on aircraft certificated as special LSA aircraft. Authorized to perform the annual condition/100-h inspection on an LSA, or an equivalent rating issued by other civil aviation authorities.

3.1.9 *maintenance manual(s)*—manual provided by an LSA manufacturer or supplier that specifies all maintenance, repairs, and alterations authorized by the manufacturer.

3.1.10 *major repair, alteration, or maintenance*— any repair, alteration, or maintenance for which instructions to complete the task excluded from the maintenance manual(s) supplied to the consumer are considered major.

3.1.11 *manufacturer*—any entity engaged in the production of an LSA or component used on an LSA.

3.1.12 *minor repair, alteration, or maintenance*— any repair, alteration, or maintenance for which instructions provided for in the maintenance manual(s) supplied to the consumer of the product are considered minor.

3.1.13 *overhaul*—maintenance, inspection, repair, or alterations that are only to be accomplished by the original manufacturer or a facility approved by the original manufacturer of the product.

3.1.14 *overhaul facility*—facility specifically authorized by the aircraft or component manufacturer to overhaul the product originally produced by that manufacturer.

3.1.15 *repair facility*—facility specifically authorized by the aircraft or component manufacturer to repair the product originally produced by that manufacturer.

3.1.16 *14 CFR*—Code of Federal Regulations Title 14 Aeronautics and Space also know as the "FARs" or Federal Aviation Regulations.

3.1.17 *100-h inspection*—same as an *annual condition inspection*, except the interval of inspection is 100 h of operation instead of 12 calendar months. This inspection is utilized when the LSA is being used for commercial operations such as flight instruction or rental, or both.

4. Significance and Use

4.1 The purpose of this practice is to provide guidance to owners, mechanics, airports, regulatory officials, and aircraft and component manufacturers who may accomplish maintenance, repairs, and alterations on a light sport aircraft. In addition, this practice covers the format and content of maintenance manuals and instructions for the maintenance, repair, and alteration of an LSA.

5. Aircraft Maintenance Manual

NOTE 1—This practice provides the information needed to comply with the requirement of what the maintenance manual will contain. Manufacturers of SLSA and ELSA Kits for sale in the U.S. are required to provide a maintenance manual for each aircraft in accordance with 14 CFR Part 21.190. These manuals do not require any type of approval from the FAA or other government entity; however, the regulations do require the manual to be developed in accordance with industry consensus standards.

5.1 *Format*—The maintenance manual shall have the following sections:

5.1.1 *General*—Listings of general specifications, capacities, and instructions on ground handling, servicing, and lubrication such as:

5.1.1.1 Equipment list,

5.1.1.2 Sources to purchase parts,

5.1.1.3 List of disposable replacement parts, for example, air filters, fuel filters, oil filters, and tires,

5.1.1.4 Engine specifications,

5.1.1.5 Weight and balance information,

5.1.1.6 Tire inflation pressures,

5.1.1.7 Approved oils and capacities,

5.1.1.8 Recommended fastener torque values,

5.1.1.9 General safety information, and

5.1.1.10 Instructions for reporting possible safety of flight concerns found during inspection/maintenance.

5.1.2 *Inspections*—Instructions on and checklists for the completion of periodic and annual condition/100-h inspections, as appropriate.

5.1.3 *Structures*—A description of and instructions for the maintenance, repair, and alteration of the aircraft primary structures such as:

5.1.3.1 Wing (fixed, rotary, or inflatable),

5.1.3.2 Empennage (or cart),

5.1.3.3 Landing gear, and

5.1.3.4 Structural control surfaces, for example, elevator (if applicable).

5.1.4 *Engine*—A description of and instruction for the maintenance, repair, and overhaul of the aircraft's engine if the aircraft is powered.

NOTE 2—An LSA manufacturer may defer to the engine manufacturer for the required maintenance, repair, and overhaul instructions.

5.1.5 *Fuel System*—A description of the system, schematic diagram, and instructions for the maintenance and repair of the aircraft fuel system, if a powered aircraft.

5.1.6 *Propeller*—A description of and instructions for the maintenance and repair of the propeller, if a powered aircraft.

NOTE 3—An LSA manufacturer may defer to the propeller manufacturer for the required maintenance, repair, and overhaul instructions.

5.1.7 *Utility Systems*—A description of the systems and instructions for the maintenance and repair of utility systems such as heating, vent, and air-conditioning, if installed.

5.1.8 *Instruments and Avionics*—A description of and instructions for the maintenance, repair, replacement, and installation of existing and additional instruments and avionics, as applicable.

5.1.9 *Electrical System*—A description of the system, schematic diagram, and instructions for the maintenance, repair, and alteration, as appropriate.

5.1.10 *Structural Repair*—A description of the structural repairs that are authorized without further consultation with the manufacturer.

5.1.11 *Painting and Coatings*—A description for the repair, replacement, or alteration, or a combination thereof, of paint or coatings used on the aircraft.

5.1.12 *Revisions*—A section, such as a change history table, for the listing of any revisions to the maintenance manual by the manufacturer.

5.1.13 *Feedback Form*—A form for the aircraft owner or maintainer to provide notification to the manufacturer about issues and anomalies identified during the operation or maintenance of the aircraft or in the content of the manual.

5.2 *Inspection, Repair, and Alterations*—Each of the inspections, repairs, and alterations outlined in the maintenance manual shall specifically list:

(1) Recommended special tools to accomplish the task,

(2) The parts needed to perform the task,

(3) Type of maintenance, for example, line, heavy, or overhaul,

(4) The level of certification needed to accomplish the task, for example, owner, A&P, repairman (light sport aircraft) inspection, and repair station,

(5) Detailed instructions and diagrams as needed to perform the task, and

(6) Method to test/inspect to verify the task was accomplished properly.

5.2.1 *Repairs and Alterations*—Manufacturers may refer to other repair and alteration manuals such as the FAA's AC for the detailed instructions to accomplish tasks outlined in the maintenance manual.

5.3 *Level of Certification*—When listing the level of certification needed to perform a task, the manufacturer shall use one of the following descriptors.

5.3.1 *Owner*—Items that can be expected to be completed by a responsible owner who holds a pilot certificate but who has not received any specific authorized training.

NOTE 4—FAA regulations authorize SLSA aircraft owners who hold at least a sport pilot certificate to perform maintenance as outlined in 14 CFR Part 43.

5.3.2 *LSA Repairman Inspection*—Items that can be expected to be completed on an ELSA by a responsible owner, which holds an FAA repairman certificate (light sport aircraft), with an inspection rating or equivalent.

5.3.3 *LSA Repairman Maintenance*—Items that can be expected to be completed on a SLSA by a responsible individual, which holds a FAA repairman certificate (light sport aircraft), with a maintenance rating or equivalent.

5.3.4 *A&P*—Items that can be expected to be completed by a responsible individual who holds a mechanic certificate with airframe or powerplant ratings, or both, or equivalent.

5.3.5 *Task Specific*—Items that can be expected to be completed by a responsible individual who holds either a mechanic certificate or a repairman certificate and has received task specific training to perform the task.

5.3.5.1 When specifying the "task specific" level of certification, the manufacturer must also specify the specific training required.

5.3.6 Multiple descriptors and modifiers may be used. For example, a manufacturer may list under level of certification required for the replacement of a piston engine valve, "A&P or LSA Repairman Maintenance Task-Specific."

6. Line Maintenance, Repairs, and Alterations

6.1 *Authorization to Perform*—The holder of an LSA repairman certificate with either an inspection or maintenance rating is generally considered the minimum level of certification to perform line maintenance of LSA.

NOTE 5—Many of the tasks listed are also authorized by the FAA to be performed by the owner of the SLSA who holds a sport pilot certificate. The examples listed below should not be considered as restrictions against the performance of the tasks by an owner that is authorized to perform said task by the FAA.

6.2 *Typical Tasks Considered as Line Maintenance for LSA's Include:*

6.2.1 100-h inspection,

6.2.2 Annual condition inspection,

6.2.3 Servicing of fluids,

6.2.4 Removal and replacement of components for which instructions are provided in the maintenance manual such as:

6.2.4.1 Fuel pumps,

6.2.4.2 Batteries,

6.2.4.3 Instruments, switches, lights, and circuit breakers,

6.2.4.4 Starters/generators/alternators,

6.2.4.5 Exhaust manifolds/mufflers,

6.2.4.6 Wheel and brake assemblies,

6.2.4.7 Propellers,

6.2.4.8 Sparkplugs, ignition wires, and electronic ignition models/components limited to the use of mechanical connections,

6.2.4.9 Hoses and lines,

6.2.4.10 Sailcloth covering,

6.2.4.11 Ballistic recovery system,

6.2.4.12 Floats, and

6.2.4.13 Skis.

6.2.5 Repair of components and structure for which instructions are provided in the maintenance manual and which do not require additional specialized training, such as:

6.2.5.1 Patching of a hole in a fabric, metal, or composite non-structural component, and

6.2.5.2 Stop-drilling of cracks.

6.2.6 Alterations for which specific instruction are provided in the maintenance manual, such as:

6.2.6.1 Installation of a communications radio, transponder, GPS, and antenna,

6.2.6.2 Installation of a strobe light system, and

6.2.6.3 Compliance with a manufacturer service directive when the repairman is listed as an authorized person to accomplish the alteration.

7. Heavy Maintenance, Repairs, and Alterations

7.1 *Authorization to Perform*—The holder of a mechanic certificate with airframe or powerplant rating(s), or both, or an LSA Repairman maintenance that has received additional task specific training for the function to be performed is generally considered the minimum level of certification to perform heavy maintenance of LSA.

7.2 *Typical Tasks Considered as Heavy Maintenance for SLSA's Include:*

7.2.1 Removal and replacement of components for which instructions are provided in the maintenance manual or service directive instructions, such as:

7.2.1.1 Complete engine removal and reinstallation in support of an engine overhaul or to install a new engine,

7.2.1.2 Remove and replacement of engine cylinders, pistons, or valve assemblies, or a combination thereof,

7.2.1.3 Primary flight control cables/components, and

7.2.1.4 Landing gear assemblies.

7.2.2 Repair of components or aircraft structure, or both, for which instructions are provided in the maintenance manual or service directive instructions, such as:

7.2.2.1 Repainting of control surfaces,

7.2.2.2 Structural repairs, and

7.2.2.3 Recovering of a dope and fabric covered aircraft.

7.2.3 Alterations of components or aircraft structure, or both, for which instructions are provided in the maintenance manual or service directive instruction, such as:

7.2.3.1 Initial installation of skis, and

7.2.3.2 Installation of new additional pitot static instruments.

8. Overhaul

8.1 *Authorization to Perform*—Only the manufacturer of an LSA or the component to be overhauled on an LSA may perform or authorize to be performed the overhaul of an LSA component.

NOTE 6—In the U.S., no FAA certification is given to be an LSA approved overhaul facility.

8.2 *Overhaul Manual*—A separate overhaul manual in addition to the manufacturer's maintenance manual is required to perform the overhaul of an LSA or LSA component.

NOTE 7—The form and content of such a manual is not governed by this practice or by any FAA regulation.

NOTE 8—Specific form and content guidelines have not been promulgated here as type-specific training and authorization is required from the manufacturer in order to overhaul an SLSA or component.

8.3 Typical components that are overhauled include:

8.3.1 Engines,

8.3.2 Carburetors/fuel injection systems,

8.3.3 Starters/alternators/generators, and

8.3.4 Instruments.

9. Major Repairs and Alterations

9.1 All major repairs or alterations made to aircraft subsequent to its initial design and production acceptance testing to applicable ASTM standards and sale to a consumer must be evaluated relative to the requirements of the applicable ASTM design and production acceptance specification(s).

9.2 The manufacturer or other entity that performs the evaluation of an alteration or repair shall provide a written affidavit that the aircraft being altered will still meet the requirements of the applicable ASTM design and performance specification subsequent to the alteration.

9.3 The manufacturer or other entity that performs the evaluation shall provide written instructions and diagrams on how, who, and the level of certification needed to perform the alteration or repair.

9.3.1 The instructions must include ground and flight testing that complies with the original ASTM production acceptance testing standard, as appropriate, to verify the alteration was performed correctly and the aircraft is in a condition for safe operation.

9.3.2 The instructions and diagrams provided to the S-LSA owner or mechanic shall be documented on an LSA Major Repair and Alterations (MRA) form as defined in Annex A1.

9.4 The manufacturer or other entity that performs the evaluation shall provide information to the owner of the aircraft for the documentation of the alteration in the aircraft's records.

10. Task-Specific Training

10.1 A manufacturer of a product may require type-specific training in order to accomplish a task in either the maintenance manual or in an authorization for a major repair, maintenance, or alteration. The FAA does not give approval to these task-specific training programs for SLSA. A manufacturer may specify any task-specific training it determines is appropriate to accomplish a task.

10.2 Examples of task-specific training include:

10.2.1 Engine manufacturer heavy maintenance or overhaul school, or both,

10.2.2 EAA Sport Air Fabric Covering School,

10.2.3 Parachute manufacturer repair course, and

10.2.4 Aircraft manufacturer course.

11. Safety Directives

11.1 An SLSA may have a safety directive issued against an aircraft or component part. The original aircraft manufacturer issues the directive as outlined in the applicable ASTM continued airworthiness specification.

NOTE 9—SLSA and components installed on SLSA's do not have airworthiness directives issued against them. If an AD is issued against a type-certificated product that may be incorporated into special light sport aircraft, the manufacturer of the aircraft is required in accordance with Practices F2295 and F2415, and Specification F2241 to issue a safety directive providing instruction on how to address the safety defect outlined in the AD on the specific SLSA.

11.2 The original LSA manufacturer is responsible for providing the applicable instructions to comply with any safety directive, which will include:

11.2.1 A list of the tools needed to accomplish the task,

11.2.2 A list of the parts needed to perform the task,

11.2.3 Type of maintenance, for example, line, heavy, overhaul,

11.2.4 The level of certification needed to accomplish the task, for example, A&P, repairman inspection,

11.2.5 Detailed instructions and diagrams as needed to perform the task, and

11.2.6 Method to test/inspect to verify the task was accomplished properly.

11.3 Service directives are considered as mandatory tasks in order to maintain a condition of safe operation and compliance with the applicable original ASTM design specification.

NOTE 10—Service directives are not considered mandatory for experimental LSA's in the U.S.

12. Keywords

12.1 airplane; condition inspection; gyroplane; heavy maintenance; inspection; light sport aircraft; line maintenance; maintenance manual; major alteration; major repair; overhaul; powered parachute; repairman; safety directive; special light sport aircraft; weight shift

ANNEX

(Mandatory Information)

A1. LSA MAJOR REPAIR AND ALTERATION (MRA) REQUIREMENTS

NOTE A1.1—Type Certificated (TC) components are not covered by this annex.

A1.1 *Introduction*—Any repair or alteration not contained in the related Aircraft Maintenance Manual (AMM) must be authorized by the Aircraft Original Equipment Manufacturer (OEM). The Aircraft OEM must provide complete information on how to perform the repair or alteration which can include, but is not limited to, the following:

A1.1.1 Aircraft Models and Serial Number(s) that can use the MRA.

A1.1.2 *Replacement Parts*—Assemblies, subassemblies, detail parts, or attaching parts required.

A1.1.3 Consumable or Bulk Materials required.

A1.1.4 Special tools, fixtures, or test equipment required.

A1.1.5 Preparation Instructions.

A1.1.6 Installation Instructions.

A1.1.7 Assembly Instructions.

A1.1.8 Testing Instructions.

A1.1.9 Inspection Instructions.

A1.1.10 Authorization.

A1.1.11 Documentation and Records Requirements.

A1.2 The Aircraft OEM shall also do the following:

A1.2.1 Create, store, and maintain the data in whatever format (electronic, paper, and other) they determine is best for their company.

A1.2.2 Decide whether additional information is required for in-house use and records.

A1.2.3 Decide how the in-house information will be stored (for example, in a database, spreadsheet, or some other form of electronic or paper storage).

A1.2.4 Decide how the information will be incorporated into the maintenance manual and in some cases the Pilot's Operating Handbook (POH).