



Standard Practice for Production Acceptance in the Manufacture of a Fixed Wing Light Sport Aircraft¹

This standard is issued under the fixed designation F3035; 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 The following requirements apply for the manufacture of fixed wing aircraft, including gliders. This practice includes the production acceptance test requirements.

1.2 This practice applies to aircraft seeking civil aviation authority approval, in the form of flight certificates, flight permits, or other like documentation.

1.3 *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:

F2245 Specification for Design and Performance of a Light Sport Airplane

F2564 Specification for Design and Performance of a Light Sport Glider

F2972 Specification for Light Sport Aircraft Manufacturer's Quality Assurance System

3. Terminology

3.1 Definitions:

3.1.1 *design and performance specification, n*—used herein to refer to Specifications **F2245** and **F2564**.

3.1.2 *LSA airplane (light sport aircraft airplane), n*—powered aircraft designed in accordance with Specification **F2245** that is manufactured and delivered ready to fly.

3.1.3 *LSA glider (light sport aircraft glider), n*—aircraft designed in accordance with Specification **F2564** that is manufactured and delivered ready to fly.

3.1.4 *LSA kit (light sport aircraft kit), n*—aircraft designed in accordance with Specifications **F2245** or **F2564** that is manufactured and delivered as a kit.

3.2 Acronyms:

3.2.1 *POH*—Pilot's Operating Handbook

3.2.2 *LSA*—light sport aircraft

4. Significance and Use

4.1 The purpose of this practice is to provide the minimum requirements necessary for the establishment of a production acceptance program for a manufacturer of light sport aircraft.

4.2 The purpose of this specification is to provide the minimum requirements for the establishment of a ground and flight test program for verifying the initial production aircraft meets certain operational performance requirements that have been set forth by the manufacturer in its Pilot's Operating Handbook (POH).

4.3 In addition, this specification provides minimum requirements to verify that each subsequent production airplane has no obvious defects that would prevent the safe operation of the airplane.

4.4 All requirements given in this specification are to be performed in accordance with the manufacturer's Specification **F2972**-compliant quality assurance system requirements.

4.5 The following criteria should not be construed as requirements for specific features to be included on a LSA. When a requirement specifies a feature that does not exist on a LSA, the requirement does not apply.

5. Final Inspections

5.1 Manufacturer shall verify that all applicable production processes and documentation given in Section 6 of Specification **F2972** exist or have been completed for the aircraft prior to conducting the following Production Acceptance procedures.

5.2 *LSA Kit*—Manufacturer shall verify and document the proper completion of the production process prior to the further distribution of any LSA kit or subsystem kit. Manufacturer shall provide the builder of a LSA kit with appropriate Production Acceptance Ground Check and Flight Test Procedures, as described below.

6. Ground Testing

6.1 *LSA Airplane and LSA Glider*—Manufacturer shall verify the proper completion of the production process prior to

¹ This practice is under the jurisdiction of ASTM Committee F37 on Light Sport Aircraft and is the direct responsibility of Subcommittee F37.20 on Airplane.

Current edition approved Sept. 15, 2013. Published October 2013. DOI: 10.1520/F3035-13.

the further distribution of any LSA. The following ground check procedures shall be conducted and documented for each LSA.

6.2 *Ground Check*—Prior to flight testing, the manufacturer shall conduct a thorough ground inspection of each LSA produced to verify at least the following:

6.2.1 *Weight and Balance*—Empty weight and proper center of gravity location have been calculated and verified to be within limits, and that a weight and balance report has been completed for the airplane in accordance with a documented and approved procedure.

6.2.2 *Systems Check*—The proper function of all switches and circuits, instrumentation, brakes, and any other appropriate systems shall be verified.

6.2.3 *Flight Controls Check*—All flight controls shall be checked for smooth and proper function and proper maximum deflections as specified by the manufacturer. Control system connections and safeties shall be checked and verified intact.

6.2.4 *Seats and Safety Belts*—Seats and occupant restraint systems shall be checked for conformity and visual defects.

6.2.5 *Powerplant Check*—Engine or Electric Propulsion Unit (EPU) checks and procedures shall be performed to verify:

6.2.5.1 Proper installation,

6.2.5.2 Proper servicing of all engine fluids,

6.2.5.3 No apparent fuel, oil, or coolant leaks, as appropriate,

6.2.5.4 Propeller installation and pitch adjustment, as applicable,

6.2.5.5 Performance of an engine “run-in” with adjustments, as required,

6.2.5.6 Tachometer indicates engine idle RPM and maximum static RPM is within manufacturer’s published limits,

6.2.5.7 Proper function of engine or EPU instrumentation,

6.2.5.8 Proper function of ignition system(s),

6.2.5.9 Proper function of induction heating system, and

6.2.5.10 For powered LSA gliders, proper retraction and extension of the engine.

6.2.6 *Placards Check*—The aircraft shall be checked to verify:

6.2.6.1 That all required ASTM and CAA compliant placards, switch, and instrument markings are in place, and

6.2.6.2 That all placards also match the POH.

6.2.7 *Preflight Inspection*—The following shall be verified:

6.2.7.1 All required documentation is on board,

6.2.7.2 All visible surfaces are free of deformation, distortion, or other evidence of failure or damage,

6.2.7.3 Inspection of all visible fittings and connections for defective or insecure attachment, and

6.2.7.4 Complete walk-around inspection in accordance with the POH.

6.3 *Taxi Test*—After completion of the Ground Check, a Taxi Test shall be conducted to verify:

6.3.1 Brake function,

6.3.2 Landing gear tracking and steering.

6.3.3 If a compass is installed, it must be calibrated with consideration of magnetic interference of aircraft systems.

7. Flight Testing

7.1 *LSA Airplane and LSA Glider*—Manufacturer shall verify the proper completion of the production process prior to the further distribution of any LSA. The following flight test procedures shall be conducted and documented for each LSA.

7.2 *Flight Test for LSA Airplanes*—After completion of the Taxi Test, a flight test shall be conducted.

7.2.1 Safe flight operation of each completed LSA airplane shall be verified to include acceptable handling and control characteristics, stall characteristics, engine operation, airspeed indications, and overall suitability for normal flight in accordance with the POH. The flight test procedure, at a minimum, shall include recorded verification of the following:

7.2.1.1 Takeoff runway wind, outside air temperature, and pressure altitude,

7.2.1.2 Verification that takeoff distance meets manufacturer’s POH,

7.2.1.3 Verification that the climb rate meets or exceeds the manufacturer’s published specification,

7.2.1.4 Appropriate response to flight controls in all configurations,

7.2.1.5 Wings-level idle-power stall speed in all configurations, including verification of appropriate stall warning and stall recovery characteristics,

7.2.1.6 Verification of no unusual performance or handling characteristics, and

7.2.1.7 Proper engine operation.

7.3 *Flight Test for LSA Gliders*—After completion of the taxi test, a flight test shall be conducted. Safe flight operation of each completed LSA glider shall be verified to include acceptable handling and control characteristics, stall characteristics, airspeed indications, and overall suitability for normal flight in accordance with the POH.

7.3.1 The flight test procedure, at a minimum, shall include recorded verification of the following:

7.3.1.1 Wings-level stall speed in all configurations, including verification of appropriate stall warning and stall recovery characteristics,

7.3.1.2 Appropriate response to flight controls in all configurations, including, if allowed, winch launching and aerotowing, and

7.3.1.3 Verification of no unusual performance or handling characteristics.

7.3.2 In addition, for powered LSA gliders, the flight test procedure shall also include the recorded verification of the following:

7.3.2.1 Takeoff runway wind, outside air temperature, and pressure altitude,

7.3.2.2 Verification that takeoff distance meets manufacturer’s published specification,

7.3.2.3 Verification that the climb rate meets or exceeds the manufacturer’s published specification,

7.3.2.4 Wings-level idle-power stall speed in all configurations, including verification of appropriate stall warning and stall recovery characteristics,

7.3.2.5 Proper retraction and extension of engine, when equipped,

7.3.2.6 Appropriate characteristic evaluation of auto-feathering propeller systems, when equipped, and

7.3.2.7 Proper engine operation and operating temperatures.

7.4 *Design Confirmation Flight Test*—For each completed LSA, or by random sampling at a frequency determined appropriate by the manufacturer, and for the first production unit off the production line, an in-depth test flight shall be conducted to verify production uniformity to the flight criteria of the design and performance specification.

8. Instrument Calibration

8.1 Any aircraft instrument requiring periodic calibrations shall have a current calibration.

9. Resolving Discrepancies

9.1 Manufacturer shall develop and implement a system to correct any anomalies found during ground checks or flight testing.

9.2 *Non-Compliance*—Any aircraft which fails any production acceptance test required by this standard shall be physi-

cally tagged as non-compliant. Anomalies shall be reworked per manufactures instructions, and each reworked anomaly must be re-evaluated.

9.2.1 *Non-Compliance Tag*—While the non-compliance is being resolved, a non-compliance notice must be attached to the aircraft in such a manner that it is in clear view of a potential operator of the LSA.

10. Documentation

10.1 A written checklist may be used as an acceptable method of documenting Production Acceptance inspections, checks, and tests.

10.2 The following shall be recorded:

10.2.1 A record of the identity and title of the person(s) executing the inspections, tests, and checks.

10.2.2 The location of the production flight test and type of authorization issued to conduct the flight testing.

11. Keywords

11.1 LSA; manufacture; production acceptance

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).