Designation: F 2279 – 03

Standard Practice for Quality Assurance in the Manufacture of Light Sport Airplanes[1]

This standard is issued under the fixed designation F 2279; 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 establishes the minimum requirements for the development of a Quality Assurance and Production Acceptance Program, to be used for the manufacture of LSA airplanes or airplane kits.

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:*

F 2245 Specification for Design and Performance of a Light Sport Airplane[2]

F 2295 Practice for the Continued Operational Safety Monitoring of a Light Sport Airplane[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *LSA (Light Sport Aircraft)*—used herein to refer to both LSA airplanes and LSA airplane kits.

3.1.2 *LSA Airplane (Light Sport Aircraft Airplane)*—a powered fixed wing aircraft designed per Specification F 2245 that is manufactured and delivered ready to fly.

3.1.3 *LSA Airplane Kit (Light Sport Aircraft Airplane Kit)*—A powered fix wing aircraft designed per Specification F 2245 that is manufactured and delivered as a kit.

3.1.4 *manufacturer*—any entity engaged in the production of a LSA.

3.1.5 *permanent record*—where specified herein, applicable quality assurance records shall be kept for each LSA produced for as long as the relative airworthiness certificate remains in effect.

3.1.6 *reserved holding area—for rejected parts, materials, and assemblies*, shall mean an area for the containment of rejected non-airworthy items awaiting proper disposition, where such rejected items shall not be distributed for use on a LSA.

3.1.7 *satellite manufacturing, assembly, and distribution facilities*—refers to facilities being operated by commercial or private entities that, though authorized by the original manufacturer, are not directly associated with or controlled by the original manufacturer.

3.1.8 *secure storage area—for accepted parts, materials, and assemblies*, shall mean an area of storage where the preservation of the contents to required design specifications is reasonably assured until distributed for use on a LSA.

3.2 *Acronyms:*

3.2.1 *POH*—pilot operating handbook.

3.2.2 *QAM*—quality assurance manual; the documentation of the Quality Assurance Program.

3.2.3 *QAP*—quality assurance program; the method of inspections used by the manufacturer of a LSA to verify and ensure the proper production thereof.

3.2.4 *QAR*—quality assurance record; the record of Quality Assurance associated with each LSA produced.

4. Significance and Use

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

5. Quality Assurance Program (QAP)

5.1 Manufacturers of LSA shall develop a Quality Assurance Program (QAP) in accordance with the criteria established within this practice.

5.2 *Quality Assurance Manual (QAM)*—Each manufacturer shall document their QAP in the form of a Quality Assurance Manual (QAM).

5.3 *Quality Assurance Administration*—The manufacturer's administration that is charged with the implementation of the QAP may consist of one or more: company employees,

[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.

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[2] *Annual Book of ASTM Standards*, Vol 15.07.

company officials, or manufacturer's agents or assigns. The individual(s) that make up the quality assurance administration shall be identified within the QAM.

5.4 *Quality Assurance Record (QAR)*—A record shall be maintained of the date of acceptance, the origin, and the certifications of materials used in the production of airframe components considered by the manufacturer to be critical to the structural integrity of a LSA (see Note 1).

NOTE 1—The intent of this record is to provide a means for the manufacturer to identify and reduce the number of LSA within a fleet that may be affected by a materials anomaly that would require corrective action, thereby reducing the economic impact of such corrective action. This paragraph should not be construed as a requirement for specific parts traceability.

5.4.1 Manufacturer shall maintain a Quality Assurance Record (QAR) for each LSA produced. Each QAR shall consist of the following:

5.4.1.1 Applicable final inspection records, check, and test documentation from the production acceptance procedures (see Section 8),

5.4.1.2 A copy of the Manufacturers Statement of Compliance, and

5.4.1.3 The configuration of each aircraft at its point of delivery (for continued operational safety monitoring purposes), including associated parts lists and installed equipment lists.

NOTE 2—Each item listed in 5.4.1 shall include the LSA serial number and date of manufacture.

5.5 *Quality Assurance Revisions*—A system shall be implemented to ensure that only the latest revisions to the QAM are in use.

5.6 *Quality Assurance Audits*—Manufacturer shall conduct an annual audit of their QAP. Manufacturer shall maintain a record of all such audits. Any determination of non-compliance shall be resolved and a revision to the QAM shall be made if necessary to address any anomalies found.

6. Engineering and Manufacture

6.1 *Record of Compliance*—The manufacturer shall keep a permanent record of the design documentation used to show compliance of a particular configuration to the version of Specification F 2245 in effect at the time of manufacture.

6.2 *Configuration Control*—All LSA configurations in production shall have Records of Compliance to the latest released revision of Specification F 2245.

6.3 *Production Documentation*—The manufacturer shall maintain a record of all production documentation, including revisions. Production documentation may include, but is not limited to, the following:

6.3.1 Parts lists,

6.3.2 Process routings,

6.3.3 Component and assembly drawings,

6.3.4 Manufacturing instructions and specifications, and

6.3.5 Tooling and gauge drawings.

6.4 *Special Processes*—A system shall be implemented to control all special processes and services related to the production of airframe components considered by the manufacturer to be critical to the structural integrity of the LSA, such as welding, brazing, heat treatment, plating, structural composites, adhesive bonding, and so forth, that ensures that each process and service is performed in accordance with approved specifications containing definitive standards of quality, and that periodic inspection of gauges, solutions, or any critical equipment is controlled and documented.

7. Quality Assurance Inspections

7.1 Manufacturers shall implement and document a system of inspections to verify conformity of product to all applicable engineering requirements and production specifications.

7.1.1 Conforming, non-conforming, and items awaiting inspection must be separated or clearly distinguishable. Items found to be nonconforming shall either be evaluated by a Materials Review Board (MRB) per 7.4 or rejected per 7.5.

7.2 *Receiving Inspection*—Manufacturer shall implement a purchasing procedure that shall ensure all items ordered are clearly specified. Incoming items provided by outside vendors shall be inspected for conformity to applicable specifications.

7.3 *Acceptance of Conforming Items*—Conforming items shall be distributed as required or placed in a secure storage area for future use.

7.4 *Evaluation of Non-Conforming Items by a Materials Review Board*—A Materials Review Board (MRB) may be established to determine the disposition of non-conforming items, and shall consist of one or more manufacturer designated technical representatives. MRB representatives shall be identified within the QAM. If analysis, additional inspection, functional checks, repair, rework, and so forth assures that an item meets all of the relevant design requirements, the MRB may authorize its use in the production of a LSA. Otherwise, the item must be rejected per 7.5. The manufacturer shall keep a permanent record showing the disposition of non-conforming items that have been evaluated and accepted by the MRB.

7.5 *Rejection of Non-Conforming Items*—A process for disposing of items found to be unusable due to damage, shelf life limits, or other variations must be defined and implemented. A rejected item must be mutilated, disposed of, or sufficiently marked as rejected to ensure that it is not used in the production of a LSA. A rejected component may be placed in a reserved holding area for future disposition or disposal.

8. Production Acceptance

NOTE 3—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.

8.1 *Final Inspections*—Manufacturer shall verify and record that a shop order for each LSA produced has been completed prior to conducting the following Production Acceptance procedures.

8.1.1 *LSA Airplane 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.

8.1.2 *LSA Airplane*—Manufacturer shall verify the proper completion of the production process prior to the further