



# Standard Practice for Kit Assembly Instructions of Aircraft Intended Primarily for Recreation<sup>1</sup>

This standard is issued under the fixed designation F2563; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the instructions a kit producer must provide to a consumer in order to assemble and safely flight-test a recreational aircraft to ensure compliance with applicable ASTM standards.

1.2 The instructions prescribe the necessary mechanical skills or training, or both, required for successful completion of the kit, as well as necessary tooling, fixtures, inspections, measurements, and other pertinent items required for successful completion of the kit. Proof of compliance with these instructions may be vital for obtaining flight authorizations from the applicable CAA.

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:*<sup>2</sup>

[F2242 Specification for Production Acceptance Testing System for Powered Parachute Aircraft](#)

[F2356 Specification for Production Acceptance Testing System for Lighter-Than-Air Light Sport Aircraft](#)

[F2447 Practice for Production Acceptance Test Procedures for Weight-Shift-Control Aircraft](#)

[F3035 Practice for Production Acceptance in the Manufacture of a Fixed Wing Light Sport Aircraft](#)

## 3. Terminology

3.1 *Definitions:*

3.1.1 *consumer*—any person who follows the instructions covered by this practice to assemble the kit.

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.2 *operation*—process or action that is part of a series in the assembly of a kit. It is identified by the kit producer as a means to partition the aircraft assembly task into subgroups of tasks or processes that allow the consumer to track progress or completion of portions of the kit in an orderly manner.

3.1.3 *producer*—any person or company who fabricates the kit and authors the instructions covered by this practice.

3.2 *Acronyms:*

3.2.1 CAA—Civil Aviation Authority

3.2.2 CAGE—commercial and government entity

3.2.3 KAI—kit assembly instructions

## 4. Required Sections

4.1 The KAI shall include at least the following information (preferably in the same sequence as numbered in 4.1.1):

4.1.1 (1) Revisions, or instructions for accessing them, for example on a website; (2) Introduction and instructions for using the KAI; (3) Table of Contents; (4) Safety Summary; (5) Applicable standards and specifications; (6) Terminology; (7) Required consumer abilities and responsibilities; (8) Required equipment and environmental conditions; (9) Parts list; (10) Assembly operations; (11) Final assembly Inspections; (12) Flight-test procedures; and (13) Additional requirements.

4.1.2 The required information may be provided in separate books or volumes.

4.1.3 The production acceptance inspection and testing procedures as specified in Practices [F2242](#), [F2356](#), [F2447](#), or [F3035](#) may be provided to satisfy the requirements of Sections 12 and 13 below.

4.2 If the KAI references material or instructions generated by a third party (for example, a component manufacturer), that material must also meet the requirements of this practice. If it does not, the kit manufacturer must create its own material on the topic that complies with this practice.

## 5. Revisions

5.1 The kit provider shall update the KAI when changes of form, fit, or function are identified as needed in the aircraft or its sub-components via a revision to the KAI.

5.2 KAI revisions shall be uniquely identified by date, purpose, and applicable KAI section.

5.3 The KAI shall include a form to be used to provide feedback on the document to the kit producer on errors, anomalies, suggestions, or queries. The form shall identify the source document, user, date, subject, discussion, and returnable acknowledgement sections for each communication as a minimum.

## 6. Safety Summary

6.1 The KAI shall provide a list of potential hazards associated with kit assembly. It is important to note that no list of potential hazards could ever include every possible hazard. This section is intended to serve as an advisory to all parties to enhance safety.

6.1.1 *Chemicals*—If hazardous chemicals are used in the assembly of the kit, it is advised that information such as Material Safety Data Sheets (MSDS) or equivalent be provided in the KAI.

## 7. Applicable Standards

7.1 The KAI shall list the title, source, and significance of the aircraft standards applicable to the aircraft.

## 8. Required Consumer Abilities and Responsibilities

### 8.1 *Consumer Skills and Training:*

8.1.1 The KAI shall prescribe any specific skills or training necessary to complete each operation.

8.1.2 The KAI shall prescribe any specific responsibilities the producer expects the consumer to assume for completion of the kit.

8.1.3 The KAI shall prescribe the responsibilities of the customer for obtaining a flight authorization from the applicable CAA. Deviation from the instructions or unauthorized modifications may prohibit the assembled aircraft from obtaining a flight authorization. Such information shall be provided in the KAI.

## 9. Required Equipment and Environmental Conditions

### 9.1 *Required Equipment and Parts:*

9.1.1 The KAI shall prescribe any specific equipment necessary for completion of each operation such as, but not limited to, tooling, jigs, parts, and fixtures. This list should include specific manufacturers (CAGE codes if applicable), part numbers, quantity, and description if possible.

9.1.2 The KAI may prescribe any specific equipment recommended for completion of each operation.

9.2 *Required Environmental Conditions*—The KAI shall prescribe any specific environmental conditions necessary for completion of each operation such as, but not limited to, temperature range, humidity, wind, dust, and lighting.

## 10. Parts List

10.1 The KAI shall contain a parts list of all the kit parts (or subassemblies) listing a part number or identifier, description, and quantity.

10.2 A unique part number or identifier shall be assigned to each unique assembly, subassembly, detail part, or consumable material provided in the kit.

10.2.1 A description that includes the material of each component shall be provided with each identifier for each unique part.

NOTE 1—The material may be omitted from the parts list descriptions if it is clearly discernible from the instructions themselves.

## 11. Assembly Operations

11.1 This section shall specify the order in which assembly operations should be completed. If operations can be done in random order, this shall also be specified.

11.1.1 Each KAI assembly operation section shall include a space for the builder to log completion date and participation. It is recommended that there be a place for the builder to document time spent performing each operation as well.

11.2 *Pre-Assembly Operations and Checklists*—The KAI shall prescribe any specific pre-assembly operations and checklists necessary for the completion of each operation. At a minimum, it is recommended that the instructions for each operation provide a checklist for the skills, tools, parts, and conditions required to complete that operation.

11.3 *Assembly Operations*—Each assembly operation section shall include information such as text, photos, templates, electrical schematic drawings, or technical drawings sufficient to explain how to perform that operation and ensure compliance with the design criteria.

11.4 *Post-Assembly Inspections and Measurements*—Each assembly operation section shall prescribe any specific inspections, measurements, or criteria necessary for verifying successful completion of that operation.

## 12. Final Assembly Inspections

12.1 *Systems Inspections*—The KAI shall prescribe specific system inspections necessary for verifying successful operation of each system.

12.2 *Engine Start-Up and Break-In*—The KAI shall prescribe any specific procedures necessary for initial engine start-up and break-in.

12.3 *Pre-Flight Tests and Verifications*—The KAI shall prescribe any specific tests and verifications required prior to initial test flights.

12.3.1 The KAI shall include the Production Acceptance and Quality Assurance procedures that relate to the final assembly checks required to show compliance with the applicable ASTM standards.

12.4 *Additional Information*—Additional information on inspections can be found in Practices **F2242**, **F2356**, **F2447**, or **F3035**.

12.5 *CAA Documentation and Authorizations*—The KAI shall provide the manufacturers documentation necessary for obtaining all required registration, inspections, and authorizations from the applicable CAA. Check **Appendix X2** for information regarding various countries' requirements.

## 13. Flight-Test Procedures

13.1 *Flight-Test Objectives*—The KAI shall prescribe any specific flight-test objectives necessary for verification of successful operation.

13.2 *Flight-Test Environmental Conditions*—The KAI shall prescribe the environmental conditions for conducting initial flight-tests.

13.3 *Flight-Test Procedures and Maneuvers*—The KAI shall prescribe any specific flight-test procedures and maneuvers necessary for verification that the controls and systems operate within the limits established in the manufacturers published aircraft operating instructions.

13.3.1 The KAI shall include the Production Acceptance procedures that relate to the flight test procedures required to show compliance with applicable ASTM standards.

13.4 *Post Flight-Test Documentation and Notifications*—The KAI shall prescribe any specific flight-test documentation or notifications required for verification of successful operation.

13.5 *Additional Information*—Additional information on flight testing can be found in Practices **F2242**, **F2356**, **F2447**, or **F3035**.

## 14. Keywords

14.1 assembly; authorization; flight test; instructions; modifications; operation; parts list; registration; verification

## APPENDIXES

### (Nonmandatory Information)

## X1. METHODS OF COMMUNICATION

### X1.1 *Formats*:

X1.1.1 Electronic documents are acceptable so long as they are viewable on freely distributed software, such as a PDF viewer, or other no-cost format, such as HTML, or be viewed without purchasing additional software. If electronic data is provided in a proprietary format, the kit producer shall provide the appropriate viewing software.

### X1.2 *Illustrations*:

X1.2.1 Illustrations provided in the KAI should be sufficiently large and clear enough so that they accurately depict the operation to a person with reasonable vision. Black and white photocopies of photographs seldom contain sufficient clarity and definition to be useful. If such reproduction methods are to be used, it is highly suggested that technical line drawings be

used. Such drawings should be large enough in size so that they are useful and clear. Photographs are useful if the printing quality is high enough to preserve the clarity of the image.

X1.3 It is recommended that kit providers and builders share information between and among themselves using E-mail and Web sites. The intent is to enhance the building experience and improve dissemination of best practices and safety information within the community.

X1.4 It is recommended that documentation provided to the consumer in English be written as ASD SIMPLIFIED TECHNICAL ENGLISH. Doing so will enhance the clarity of the documents. It will also create documents that may be easily translated into other languages.

## X2. REQUIREMENTS FOR OBTAINING A FLIGHT AUTHORIZATION IN VARIOUS COUNTRIES

### X2.1 *Australia*:

#### X2.1.1 *Manufacturers Required Documents*:

X2.1.1.1 A statement of compliance by the manufacturer that indicates:

- (1) The aircraft's make, model, serial number, and date of manufacture;
- (2) The design of the aircraft complies with the LSA standards;
- (3) The manufacturer's quality assurance system complies with the LSA standards and based on that system, the aircraft conforms to the manufacturer's design data;
- (4) The manufacturer will make available to any interested person the aircraft's operating instructions, the aircraft's maintenance and inspection procedures, and the aircraft's flight training supplement that complies with the LSA standards; and
- (5) The manufacturer will monitor the continuing airworthiness of the aircraft and will issue directions or requirements that comply with the LSA standards to correct any unsafe condition.

X2.1.1.2 A copy of the manufacturer's assembly instructions.

X2.1.1.3 Copies of the aircraft operating instructions, the aircraft maintenance and inspection procedures, and the aircraft flight-training supplement.

#### X2.1.2 *Consumer Information for Application of an Experimental Certificate for a Kit Built Light Sports Aircraft*:

X2.1.2.1 When applying for an experimental certificate for a kit built LSA, the applicant should provide the following:

- (1) Manufacturer's statement of compliance (see above);
- (2) Written information that a production aircraft of the same make and model has been issued a special certificate of airworthiness for LSA or a similar document from a contracting state;
- (3) The aircraft operating instructions, the aircraft maintenance and inspection procedures, and the aircraft flight-training supplement;
- (4) Evidence that repairs and modifications are either manufacturer approved or fit the LSA definition;

(5) For imported aircraft, evidence that the aircraft was manufactured in a contracting state and the aircraft is eligible for a certificate of airworthiness or similar document in the country of manufacture;

(6) Evidence that any certificated engine/equipment complies with all associated Australian ADs; and

(7) A placard installed in the aircraft as per CAR 262 AP.

X2.1.2.2 CASA or the authorized person shall inspect the aircraft to determine if it is in a safe condition. The assembly of the aircraft in accordance with the manufacturer's kit

assembly instructions, completion of the inspection and maintenance records, and a manufacturer's compliance statement is a sound basis for establishing whether the aircraft is in condition for safe operation.

X2.1.2.3 CASA or the authorized person may take a copy of the manufacturer's statement of compliance and other relevant documentations for its records. However, the aircraft operating instructions, the aircraft maintenance and inspection procedures, and the aircraft flight-training supplement are required to be returned to the applicant.

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