



U.S. Department  
of Transportation

Federal Aviation  
Administration

# Advisory Circular

**Subject:** AIRWORTHINESS COMPLIANCE  
CHECKLISTS USED TO  
SUBSTANTIATE MAJOR  
ALTERATIONS FOR SMALL  
AIRPLANES

**Date:** 03/16/05  
**Initiated by:** ACE-100

**AC No:** 23-21  
**Change:** 1

1. PURPOSE. This change revises existing material in four paragraphs. First, it adds a reference to FAA Order 8300.10. Second, it indicates that no further FAA approval is required when 100 percent of the data is DER approved. Third, it includes a reference to the FSDO/ASI for signature on FAA Form 337. Fourth, it includes a requirement to submit ICA's to the FSDO/ASI for acceptance. The change number and the date of the changed material are shown at the top of each changed page. Vertical bars in the margin indicate the changed material. Pages having no changes retain the same heading information.

2. PRINCIPAL CHANGES.

Paragraphs 7a, 7d, 8a(2)(b), and 8e(4) are revised.

#### PAGE CONTROL CHART

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s/

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## 6. DOCUMENTS REQUIRED FOR OBTAINING FIELD APPROVAL.

The applicant should submit the following to their local Flight Standards District Office (FSDO):

- Completed FAA Form 337 with sufficient descriptive and detailed substantiating data to describe the alteration or repair
- Completed airworthiness compliance checklist containing applicable data
- Any other documentation required to describe limitations, emergency/abnormal procedures, normal operating procedures, performance, weight and balance, etc. such as would be contained within an Airplane Flight Manual Supplement (AFMS)
- Applicable ICAs. (New ICAs or revisions to ICAs, which contain Airworthiness Limitations Section (ALS) of the ICA, require FAA approval by and must be coordinated with the Aircraft Certification Office (ACO). See paragraph 7f for restrictions on establishing, altering, or canceling airworthiness limitations. Your submitted ICAs without ALS are only accepted by the FAA).

Individual airworthiness compliance checklists will have different data elements that are necessary to show compliance with the regulations. Also, some may require FAA ACO coordination for approval such as for approval of an AFMS, if otherwise not approvable by an ASI. This requirement depends on the alteration and will be conveyed on the checklist. Simple major alterations may not benefit from the use of a checklist when the applicant can show that the installation of equipment and system can be accomplished as a major alteration using approved data e.g. approved service bulletin, Airworthiness Directive (AD), STC, etc. This AC is not meant to imply that the use of these checklists are mandatory or impose the use of checklists in all cases, but it is meant to encourage their use.

## 7. GENERAL OVERVIEW.

**a.** The use of these compliance checklists should be limited to alterations that have been determined to be “major” alterations, as defined in 14 CFR, part 1, but are not so complex that they require an amended Type Certificate (TC) or STC per FAA Order 8300.10. Alterations that are classified as “minor” under 14 CFR, part 1, do not require the alteration be declared on an FAA Form 337, however the use of a compliance checklist would assist in making the determination that, in fact, the installation of all equipment, systems, and their components can be installed as a minor alteration. The first step in considering using these compliance checklists is making the determination that the major alteration is one that does not require an STC [(reference FAA Order 8300.10). –Change 1]

**b.** The next step is to determine the aircraft’s certification basis, which will provide the amendment level of 14 CFR, part 23 (or predecessor Civil Aviation Regulation (CAR) 3, Bulletin 7, etc.). The alteration must show compliance to all applicable regulations at that

amendment level. The certification basis of the airplane is found on the airplane's Type Certificate Data Sheet (TCDS). The TCDS is the controlling document for an airplane, its model number and serial number. The TCDS can be found online at <http://www.airweb.faa.gov/rgl>. You need to know the certification basis in order to complete the checklist form in the correct manner. The major alteration may be completed to a certification basis by applying later amendments of the regulations than the existing ones specified in the TCDS for the aircraft at the time of its initial certification.

**c.** The next step is to determine what data is required by the FAA to approve the major alteration as declared in Item (Block) 8 of the submitted FAA Form 337. Both descriptive and substantiating data must be provided in sufficient detail to describe the installation. A DER, FSDO ASI, or an ACO engineer can approve data. The "approval" methods of this data determine how the checklist is to be completed. The analysis and the flexibility of data approval methods depicted on the checklist illustrate the value in using these checklists during the job planning stages. For example, you may determine several compliance requirements for the installation of electrical equipment components, structural, wiring, antenna, or the associated electrical load analysis which is performed. You may possess approved data for the installation of the electrical equipment components and the antenna from the manufacturer, for example, you may use AC 43.13-1B as acceptable data for the wire type and gauge qualification, and you may use a DER to complete the approved data for electrical loads analysis. The checklist defines the contents of the data package and illustrates all items to be included within it.

**d.** One of the methods of obtaining approved data for a particular alteration is to utilize a DER to provide necessary approved data. This methodology is described in FAA Order 8110.45, "Use of Data Approved by Designated Engineering Representatives to Support Major Alteration," dated 8/30/02, and Order 8110.37C, "Designated Engineering Representative (DER) Guidance Handbook," dated 9/30/98. Both Orders can be found at the FAA website <http://www.faa.gov>. When you identify a requirement for data during an alteration, you may contact a DER with the authority, as listed in Order 8110.37C, to generate the report and submit approved data. The use of a DER to develop FAA approved data can save time because it is an efficient means to ensure completeness of the required data. [If 100 percent of the necessary data is DER approved data, no further FAA approval is required.—Change 1] When contacting a DER, only DERs specifically authorized by their managing ACO are permitted to approve data for major repairs and alterations.

**e.** If you use a DER(s) to develop and approve data, you may receive feedback from the DER(s) regarding additional data requirements. For example, if you have contracted for an electrical DER to accomplish an electrical loads analysis, and he or she notices the need for, and recommends a structural review of the equipment installation, you should take that recommendation into consideration and include it as an additional checklist requirement.

**f.** Neither the DER nor an ASI has the authority to establish, alter, or cancel the FAA approved airworthiness limitations contained in the ALS of an approved ICA. Only the product manufacturer has the authority to establish or alter the ALS and only the ACO can approve the ALS.

## 8. HOW TO CREATE AND USE AIRWORTHINESS COMPLIANCE CHECKLISTS.

This section describes how to use, and provides instructions for completing each section of the airworthiness compliance checklist. Each checklist lists the pertinent regulation at the existing certification basis of the airplane at the time the alteration is performed. It also shows the manner or method by which the data can be approved.

Each checklist is formatted with the same paragraphs with information specific to the particular alteration and with data specifically pertinent to that individual checklist. A discussion regarding each paragraph of a typical checklist found in the appendices is as follows:

**a. Paragraph ‘a’ of Checklist.** The first page of each checklist is the table, which provides a means to show compliance to the applicable regulations associated with the major alteration to be accomplished. The compliance table contains the following:

**(1) Title Block.** The title has a brief description of the major alteration to be accomplished. The title block contains information about the aircraft: Make, Model, and Serial Number blocks will be found on the aircraft manufacturer’s identification plate. The Registration Number is the same as shown on FAA Form 8050-3, Certificate of Aircraft Registration (N - number). The title block also contains the Statement of Applicability to be signed by the IA or a representative of the CRS, and states “I have determined the planned alteration to be in compliance with paragraph ‘c’, “checklist applicability”.” The intent is to have the IA or the CRS evaluate the aircraft and proposed alteration to determine if the use of the checklist is appropriate. The IA or CRS accomplishes this by evaluating the applicability requirements defined in paragraph c of the checklist.

**(2) The Body of the Compliance Table.** The table outlines the applicable regulations, which need to be complied with, and the methods for showing compliance. The table contains eleven columns. The first four columns are used to show methods of compliance and completeness of compliance for the required line item as follows:

**(a)** Column 1 is titled “Item Completed Initials”. This column is used primarily by the applicant for initialing the completeness of that particular line item. When column 1 is completed and all the line items are initialed, the checklist is complete.

**(b)** Columns 2, 3, and 4, “Planned FAA Approval Method” are used to indicate the data approval method. These columns are used during the planning stages of the alteration. The applicant will make selections for a planned data approval method for each line item in the table by checking the box in column 2, or 3, or by writing descriptions of data in column 4. Column 2 is labeled “DER, 8110-3.” The box in this column will be selected, if for that line item compliance will be documented on an FAA Form 8110-3 from a DER. Column 3 is labeled “FSDO/ASI, 337 Block 3.” The box in column 3 will be selected if it is intended that the ASI will approve the data in this line item. This is commonly accomplished by coordination between the modifier and the ASI during planning stages. If the column 3 box is selected, Block 3 of FAA Form 337 must be completed and signed by the [FSDO/ASI—Change 1] Column 4 is titled “Other”. This column will be used when data approval is to be accomplished by means other than the use of an FAA Form 8110-3 with DERs signatures or by having the [FSDO/ASI—

Change 1] approve the data by signing Block 3 of the FAA Form 337. When using this column, enter the intended approval method. Some typical examples would include using a specified chapter and paragraph of AC 43.13-1B, STCs, or approved structural repair manuals.

(c) Column 5 is titled “Subject Evaluated.” This column contains a brief description of the engineering subject matter, which requires approved data to show compliance to the regulatory requirement of that particular line item.

(d) Columns 6 and 7 are titled “14 CFR or CAR 3”. Each of these columns lists the applicable 14 CFR or CAR 3 requirement that is associated with the certification basis of the airplane to find compliance for that particular line item. The determination of which column to select between “14 CFR” and “CAR 3” relates to the date of the initial or original the certification for the airplane. If your aircraft has a certification basis other than 14 CFR, part 23 or CAR 3, such as CAR 4 or Bulletin 7, indicate as such in column 7 per tables 1-1, 2-1, 3-1, 4-1, and 5-1, note 5 in the tables. For example, if the aircraft had a certification date prior to 1966 (the initial date for part 23), you would select the CAR 3 column. The amendment level of part 23 at which each sub part was amended is listed next to the part. The requirement is to show compliance to the appropriate amendment for the existing certification basis of your airplane. For example, if your airplane’s certification basis is 14 CFR, part 23, amendment 37, and the checklists identify a line item “14 CFR, part 23, § 23.301, N, 28, 42, 48” you are required to show compliance to 14 CFR part 23, § 23.301, as written in amendment 23-28. Amendments 42 and 48, which may be more stringent are not applicable to your aircraft when using this checklist. In this example, you would circle the “28” and show compliance by using column 2-4, as required. Note: There may be times when compliance with the most recent amendment would be desirable to satisfy certain operational conditions, or in order to comply with special conditions or other requirement to mitigate safety risk.

(e) Column 8 is titled “Items to Consider or Intent of the Regulation”. This column contains examples of the items under which regulatory compliance of the particular line item is identified.

(f) Column 9 is titled “DER Authority”. This column identifies the specific DER authority delegated to him or her to execute the FAA Form 8110-3 “Statement of Compliance with the Federal Aviation Regulations” for the respective approval basis. These authorities are identified within Order 8110.37, as amended. A DER may also be required to have the authority delegated to him or her by the cognizant Aircraft Certification Office in order to perform different functions than those identified in Order 8110.37, as amended. If eligible, the respective DER must indicate additional authorized functions in paragraph ‘h’ of Table 1-1 of the checklist.

(g) Column 10 is titled, “Other Guidance”. Listed here are other sources of information, ACs or Orders that may help in preparation.

**b. Checklist Table.** The Checklist Table is a description of checklist intent.

**c. Approval, Paragraph ‘c’ of Checklist.** Alterations meeting the scope described in paragraph c may be approved by using this checklist and completing the FAA Form 337. The IA

can approve this alteration and the airplane incorporating it for return to service using DER data by completing Block 7, "Approval for Return to Service," of FAA Form 337. The FAA usage of Block 3, "For FAA Use Only," will not be required to accomplish this checklist for alterations that fall within the scope of paragraph 'c', providing that no data approval is required by AFS/ASI.

**d. Airworthiness Compliance Checklist Applicability, Paragraph 'd' of Checklist.**

(1) This paragraph stipulates all the limitations and restrictions of the usage of the checklist. The following limitations, restrictions, and requirements are common to all checklists:

(a) Checklists do not add to or detract from any existing FAA regulations. Some installations may have additional regulatory requirements beyond those listed below. An alteration cannot override an AD. If an alteration affects an AD, contact the FSDO or ACO for assistance.

(b) A foreign country may require more documentation of airworthiness than a copy of the FAA Form 337 before it will license an airplane that has been altered with DER data or via the field approval method. The nature and amount of additional documentation required depends upon the terms of the bilateral agreement between the United States and the importing country. Consult the applicable bilateral agreement and comply with its terms before exporting an altered airplane. Refer any questions regarding compliance with a bilateral agreement to your local Manufacturing Inspection District Office (MIDO).

(c) Alterations must be compatible with previous alterations and the current configuration.

(d) Checklists for alterations requiring revision of the FAA approved limitations section of the Aircraft Flight Manual (AFM) or Flight Manual Supplement (FMS) require ACO coordination (reference 14 CFR, part 23, §§ 23.1581 through 23.1589).

(e) Checklists that require changes to the ALS of the Instructions for Continued Airworthiness, as described by 14 CFR, require ACO coordination for approval.

(2) Other restrictions or limitations applicable to the individual alteration are stipulated. One example would be the following:

This checklist is to be used only on the following:

- (a) Airplanes of 6,000 pounds or less maximum gross weight,
- (b) Airplanes having a single, naturally aspirated reciprocating piston engine,
- (c) Unpressurized airplanes.

**e. Checklist Use, Paragraph ‘e’ of Checklist.** In this paragraph specific installation instructions, installation requirements, continued airworthiness requirements, and inspections are outlined. Discussion is provided regarding specific engineering examination requirements, installation limitations, and any ICAs required. Specific engineering support data required for the alteration is outlined in detail. Specific installation requirements, specific things to watch out for, are outlined, and any specific instructions for continued airworthiness are stipulated. For example:

- (1) If adding or relocating equipment, specific installation requirements should be stipulated in this section.
- (2) Appropriate operations advisory information should be included in the AFM/FMS.
- (3) Installation must comply with installation instructions and limitations from the component manufacturer.
- (4) Any additional ICAs are properly documented per 14 CFR, part 23, § 23.1529, requirements [and submitted to FSDO/ASI for acceptance.—Change 1]

**f. Necessary Approvals, Paragraph ‘f’ of Checklist.** This paragraph specifies the necessary approvals to complete the checklist and where on the checklist to indicate the approvals. Specific sections of the tables will be filled out by DERs, CRSs, A&Ps, and/or IAs.

**g. Applicable Guidance Material, Paragraph ‘g’ of Checklist.** This paragraph allows for additional applicable guidance material to be added to the checklist.

**h. Evidence of DER Authority to Approve, Paragraph ‘h’ of Checklist.** This paragraph provides an opportunity for a DER to present his authority to sign and approve a particular engineering discipline that has been presented to him in a manner other than in accordance with FAA Order 8110.37.

**i. Complete Checklist Process.** Send a copy of the completed checklist and supporting data to the local FSDO office which will, in turn, forward it to the FAA Aircraft Registration Branch, Oklahoma City, Oklahoma, for inclusion in the aircraft record. Submit originals to the aircraft owner or operator to be kept with the aircraft records.

**9. BENEFITS.** The benefits of using the airworthiness compliance checklist during return to service of specific alterations on small airplanes are numerous:

- a. The data package requirements for submittal to the FAA are known.
- b. A specific list of all necessary data requirements and means of obtaining FAA approval is stipulated.