

AMC 25.1543 Instrument Markings - General

ED Decision 2003/2/RM

The markings should be such that the instrument remains easily readable with the minimum of confusion.

CS 25.1545 Airspeed limitation information

ED Decision 2016/010/R

(See [AMC 25.1545](#))

The airspeed limitations required by [CS 25.1583\(a\)](#) must be easily read and understood by the flight crew.

[Amdt 25/18]

AMC 25.1545 Airspeed limitation information

ED Decision 2003/2/RM

A placard could be used when the speed limitation can be a simple presentation (e.g. an IAS speed up to a given altitude and an indicated Mach number thereafter). A complex speed limitation should be presented automatically on the instrument, (e.g. by means of an additional moving pointer).

CS 25.1547 Magnetic direction indicator

ED Decision 2003/2/RM

- (a) A placard meeting the requirements of this paragraph must be installed on, or near, the magnetic direction indicator.
- (b) The placard must show the calibration of the instrument in level flight with the engines operating.
- (c) The placard must state whether the calibration was made with radio receivers on or off.
- (d) Each calibration reading must be in terms of magnetic heading in not more than 45° increments.

CS 25.1549 Powerplant instruments

ED Decision 2003/2/RM

(See [AMC 25.1549](#))

For each required powerplant instrument, as appropriate to the type of instrument:

- (a) Each maximum and, if applicable, minimum safe operating limit must be marked with a red radial or a red line;
- (b) Each normal operating range must be marked with a green arc or green line, not extending beyond the maximum and minimum safe limits;
- (c) Each take-off and precautionary range must be marked with a yellow arc or a yellow line; and
- (d) Each engine or propeller speed range that is restricted because of excessive vibration stresses must be marked with red arcs or red lines.

AMC 25.1549 Powerplant instruments

ED Decision 2003/2/RM

- 1 Powerplant instrument range markings are intended to indicate to flight crew members, at a glance, that the powerplant operation is being accomplished in a safe or desirable, undesirable but allowable, or unsafe region. The colour red indicates an unsafe condition which requires immediate and precise action by the flight crew. The use of multiple red lines should be avoided to minimise confusion.
- 2 A precautionary range is a range where limited operation is permissible, as indicated in the aeroplane Flight Manual. Experience has shown that to satisfy the requirement for clearly visible markings, the following minimum dimensions should be observed.
 - a. *Red, yellow and green lines.* 1.3 mm (0.05 inch) wide and 7.6 mm (0.3 inch) long.
 - b. *Red, yellow and green arcs and areas.* 2.5 mm (0.1 inch) wide, length as required.

CS 25.1551 Oil quantity indicator

ED Decision 2003/2/RM

Each oil quantity indicating means must be marked to indicate the quantity of oil readily and accurately.

CS 25.1553 Fuel quantity indicator

ED Decision 2003/2/RM

If the unusable fuel supply for any tank exceeds 3.8 l (one gallon), or 5% of the tank capacity, whichever is greater, a red arc must be marked on its indicator extending from the calibrated zero reading to the lowest reading obtainable in level flight.

CS 25.1555 Control markings

ED Decision 2003/2/RM

- (a) Each cockpit control, other than primary flight controls and controls whose function is obvious, must be plainly marked as to its function and method of operation.
- (b) Each aerodynamic control must be marked under the requirements of [CS 25.677](#) and [25.699](#).
- (c) For powerplant fuel controls –
 - (1) Each fuel tank selector control must be marked to indicate the position corresponding to each tank and to each existing cross feed position;
 - (2) If safe operation requires the use of any tanks in a specific sequence, that sequence must be marked on, or adjacent to, the selector for those tanks; and
 - (3) Each valve control for each engine must be marked to indicate the position corresponding to each engine controlled.
- (d) For accessory, auxiliary, and emergency controls –
 - (1) Each emergency control (including each fuel jettisoning and fluid shutoff control) must be coloured red; and
 - (2) Each visual indicator required by [CS 25.729\(e\)](#) must be marked so that the pilot can determine at any time when the wheels are locked in either extreme position, if retractable landing gear is used.

CS 25.1557 Miscellaneous markings and placards

ED Decision 2016/010/R

(See AMC 25.1557)

- (a) *Baggage and cargo compartments and ballast location.* Each baggage and cargo compartment, and each ballast location must have a placard stating any limitations on contents, including weight, that are necessary under the loading requirements. However, underseat compartments designed for the storage of carry-on articles weighing not more than 9 kg (20 lb) need not have a loading limitation placard. (See [AMC 25.1557\(a\)](#).)
- (b) *Powerplant fluid filler openings.* The following apply:
 - (1) Fuel filler openings must be marked at or near the filler cover with –
 - (i) The word ‘fuel’;
 - (ii) Reserved.
 - (iii) The permissible fuel designations; and
 - (iv) For pressure fuelling systems, the maximum permissible fuelling supply pressure and the maximum permissible defuelling pressure.
 - (2) Oil filler openings must be marked at or near the filler cover with the word ‘oil’.
 - (3) Augmentation fluid filler openings must be marked at or near the filler cover to identify the required fluid.
- (c) *Emergency exit placards.* Each emergency exit placard must meet the requirements of [CS 25.811](#).
- (d) *Doors.* Each door that must be used in order to reach any required emergency exit must have a suitable placard stating that the door is to be latched in the open position during take-off and landing.

[Amdt 25/18]

AMC 25.1557(a) Baggage and Cargo Compartment and Ballast Location

ED Decision 2003/2/RM

If baggage, cargo compartment and ballast location limitations are complex and involve, for example, additional limitations on loading intensity and distribution, it is acceptable to provide a placard making reference to the appropriate document.

CS 25.1561 Safety equipment

ED Decision 2003/2/RM

- (a) Each safety equipment control to be operated by the crew in emergency, such as controls for automatic liferaft releases, must be plainly marked as to its method of operation.
- (b) Each location, such as a locker or compartment, that carries any fire extinguishing, signalling, or other lifesaving equipment must be marked accordingly.
- (c) Stowage provisions for required emergency equipment must be conspicuously marked to identify the contents and facilitate the easy removal of the equipment.
- (d) Each liferaft must have obviously marked operating instructions.
- (e) Approved survival equipment must be marked for identification and method of operation.

CS 25.1563 Airspeed placard

ED Decision 2003/2/RM

A placard showing the maximum airspeeds for wingflap extension for the take-off, approach, and landing positions must be installed in clear view of each pilot.

AEROPLANE FLIGHT MANUAL

CS 25.1581 General

ED Decision 2003/2/RM

(See [AMC 25.1581](#))

- (a) *Furnishing information.* An aeroplane Flight Manual must be furnished with each aeroplane, and it must contain the following:
 - (1) Information required by [CS 25.1583 to 25.1587](#).
 - (2) Other information that is necessary for safe operation because of design, operating, or handling characteristics.
 - (3) Any limitation, procedure, or other information established as a condition of compliance with the applicable noise standards.
- (b) *Approved information.* Each part of the manual listed in CS 25.1583 to 25.1587 that is appropriate to the aeroplane, must be furnished, verified, and approved, and must be segregated, identified, and clearly distinguished from each unapproved part of that manual.
- (c) Reserved.
- (d) Each aeroplane Flight Manual must include a table of contents if the complexity of the manual indicates a need for it.

AMC 25.1581 Aeroplane flight manual

ED Decision 2021/015/R

1 PURPOSE

The primary purpose of the European Aviation Safety Agency (EASA) approved Aeroplane Flight Manual (AFM) is to provide an authoritative source of information considered to be necessary for safely operating the aeroplane. This Acceptable Means of Compliance (AMC) identifies the information that must be provided in the AFM under the airworthiness regulations and provides guidance as to the form and content of the approved portion of an AFM. Although mandatory terms such as ‘shall’ or ‘must’ are used in this AMC, because the AMC method of compliance is not mandatory, these terms apply only to applicants who seek to demonstrate compliance by following the specific procedures described in this AMC.

2 RELATED CERTIFICATION SPECIFICATIONS (CS)

Paragraphs 25.1581, 25.1583, 25.1585, 25.1587 and 25.1591 of the CS and noise regulations identify the information that must be provided in the AFM. Paragraph 25.1581 also requires ‘other information that is necessary for safe operation because of the design, operating, or handling characteristics’. Additional related requirements are the applicable operational rules.

3 DEFINITIONS

- a. *Aeroplane Flight Manual (AFM).* A EASA approved document that contains information (limitations, operating procedures, performance information, etc.) necessary to operate the aeroplane at the level of safety established by the aeroplane’s certification basis.
- b. *Flight Crew Operating Manual (FCOM).* A document developed by a manufacturer that describes, in detail, the characteristics and operation of the aeroplane or its systems.

- c. *Safe Operation.* For the purposes of this AMC, safe operation means operation of the aeroplane in a manner that is mandatory, or is recommended, for compliance with the airworthiness requirements.
- d. *Limitation.* For the purposes of this AMC, an AFM limitation establishes the approved bounds of operation of the aeroplane or its systems.
- e. *Aeroplane Flight Manual Warnings, Cautions and Notes.* The AFM contains operating procedures, techniques, etc. that may be categorised as warnings, cautions and notes as defined in the following paragraphs. The following definitions should not be confused with the colour requirements prescribed in [CS 25.1322](#) for warning, caution and advisory lights installed in the cockpit.
 - (1) **Warning.** An operating procedure, technique, etc. that may result in personal injury or loss of life if not followed.
 - (2) **Caution.** An operating procedure, technique, etc. that may result in damage to equipment if not followed.
 - (3) **Note.** An operating procedure, technique, etc. considered essential to emphasise. Information contained in notes may also be safety related.
- f. *Procedure.* A procedure is a step-by-step method used to accomplish a specific task.
 - (1) **Emergency.** A procedure requiring immediate flight crew action to protect the aeroplane and occupants from serious harm.
 - (2) **Abnormal or Non-normal.** A procedure requiring flight crew action, due to failure of a system or component, to maintain an acceptable level of airworthiness for continued safe flight and landing.
 - (3) **Normal.** A procedure associated with systems that are functioning in their usual manner.
- g. *Revision.* A change to the content of the AFM through the addition, deletion, or modification of material.
- h. *Appendices and Supplements.* Additions to the AFM that may or may not supersede existing AFM material.
 - (1) **Appendix.** An addition to the AFM to cover the installation of optional equipment or specific operations (engine inoperative ferry, reduced thrust or power takeoff, configuration deviation list (CDL), etc.).
 - (2) **Supplement.** Information that supersedes or is in addition to the basic AFM resulting from the issuance of a supplemental type certificate (STC), or from approved changes to AFM limitations, procedures, or performance information without an STC.

4 DISCUSSION

The AFM provides information to safely operate the aeroplane under normal, abnormal and emergency conditions. The AFM contains the operating limitations, operating procedures, and performance information for the aeroplane.

- a. *Historically,* the AFM was often the only source of information available to the flight crew for safely operating a transport category aeroplane. Consequently, the form and content of these earlier AFMs were designed to meet the needs of the flight crew. For example,

very detailed operating procedures were presented in a form easily used in the cockpit (e.g., checklist format).

- b. *As more complex equipment was incorporated into transport category aeroplanes, many aeroplane and equipment manufacturers developed separate operating manuals intended for on-board use by the flight crew. These operating manuals are generically referred to within this AMC as Flight Crew Operating Manuals (FCOM). By locating information such as cockpit checklists, systems descriptions and detailed procedures in the FCOM, the bulk and complexity of the AFM can be kept manageable. As a result, the AFM for many transport aeroplanes has evolved into more of a reference document than a document used frequently by the flight crew. In recognition of the usefulness and convenience provided by these FCOMs, the normal operating procedures information in the AFMs for these transport category aeroplanes should be limited to those procedures considered ‘peculiar’ to the operation of that aeroplane type.*
- c. *The AFM should be limited to the smallest practicable amount of material that is appropriate for the intended operation of the aeroplane. In general, the systems descriptions and procedures provided in the AFM for most large transport aeroplanes should be limited to that which is uniquely related to aeroplane safety or airworthiness. Since the AFM still serves as the sole operating manual for many small transport category aeroplanes, these AFMs should continue to contain detailed operating information.*
- d. *Widespread use of computers has led to the capability of replacing or supplementing parts of the conventional paper AFM with a computerized version. Guidance for EASA approval of computerized AFM information is presented in [Appendix 1](#) of this AMC.*

5 GENERAL GUIDELINES

Previously approved AFMs are unaffected by this AMC. When such manuals are amended, the concepts of this AMC should be applied, if practicable.

- a. *Segregation of Approved and Unapproved Material.* Paragraph 25.1581 of the CS requires that EASA approved information be segregated, identified, and clearly distinguished from each unapproved part of the AFM. Unapproved material should be labelled that it is for guidance information only, and must be located in a different section than the approved material.
- b. *Provisions for approval* of and revisions to the AFM are as follows:
 - (1) Each page of the approved portion should bear the notation, ‘EASA Approved’, a unique date of approval or revision number for that page, the aeroplane type or model designation, and an appropriate document identification number. For AFM pages produced by an STC applicant, both the STC applicant’s name and the aeroplane type or model designation should appear.
 - (2) All AFMs, revisions, appendices, and supplements requiring EASA approval must be submitted to the EASA. A log of currently approved pages in the AFM should be furnished in each copy of the manual. A location should be provided on the log for the approval signature and the approval date. Alternatively, a specific approval page can be furnished for the approval signature and the current revision status.
 - (3) When revisions are incorporated, a means of indicating those parts of the information that have been changed should be provided. For example, vertical bars placed in the margin of the revised page may be used for this purpose. Each revised

page should be identified in the same manner as the original, with the exception of the new date and revision notation, as applicable.

- (4) Appendices and supplements should be incorporated in the AFM in a separate section appropriately identified at the end of the basic manual. Supplements should normally follow appendices. Format, page identification, organisation, and other details should be the same as that of the basic manual.
 - (5) Appendices and supplements may be developed by the TC holder, STC applicant, or the operator, and should be submitted for evaluation and approval according to EASA certification procedures. Usually, the TC holder writes appendices to the AFM, and an STC applicant or operator supplements the AFM. However, an STC applicant may elect to produce a completely new AFM.
 - (6) It may be necessary to provide a greater amount of descriptive and procedural information in appendices and supplements than that appearing in the basic AFM, if the appendix or supplement is the only source for this information.
- c. *The AFM may address either a single aeroplane model* (i.e., hardware build) or several models of the same aeroplane type. If information is provided for more than one model, the AFM should clearly identify which operating limitations, operating procedures, and performance information apply to each model (e.g., by model designation, serial number, etc.). If the AFM format is such that different pages apply to different aeroplanes, the log of pages should clearly identify the specific pages of the AFM that apply to each aeroplane.
 - d. *Any required weight and balance information* that is not a physical part of the AFM, must be incorporated by reference in the Limitations Section of the AFM per [CS 25.1583\(c\)](#).
 - e. *Aeroplane Flight Manual Units.* The AFM units should be consistent with the flight deck instrumentation, placards, and other measuring devices for a particular aeroplane. The AFM should be given in SI units (International System of Units). This does not apply to the units of measurement related to:
 - airspeed: knots.
 - altitude: feet.
 - vertical speed: feet per minute.
 - navigational distance: nautical miles.Systems of units must be properly identified and presented. Multiple scales may be used on AFM charts to show different units, e.g., pounds and kilograms. However, the charts should be constructed to minimise any misunderstanding or interpolation problems by, for example, using a transfer scale so that principal values of each of the units are on major grid lines or index marks.

6 AEROPLANE FLIGHT MANUAL CONTENTS

The AFM should be divided into the following sections, as appropriate for the specific aeroplane type or model. For purposes of standardisation, it is recommended that the sequence of sections and of items within sections follow this outline.

- a. *Introductory Section.* The intent of the introductory material is to identify the revision status and control the applicability and content of the AFM. The normal content of this section is as follows:
 - (1) Title page. The title page should include the manufacturer's name, the aeroplane model designation, the commercial designation or name, if any, assigned to the aeroplane, and an appropriate document identification number. Provision should be made for the inclusion of the approval date of the basic document and the signature, name, and title of the EASA approving official.
 - (2) Log of revisions.
 - (3) Revision highlights, if appropriate.
 - (4) Log of pages (including all information necessary to determine which pages apply to a given aeroplane model (i.e., hardware build)).
 - (5) Compatibility listing of appendices and supplements produced by the aeroplane manufacturer.
 - (6) Table of contents. (Alternatively, a table of contents for each section may be placed at the beginning of that section.)
 - (7) List of abbreviations.
- b. *Limitations Section.* The purpose of the Limitations Section is to present those operating limitations appropriate to the aeroplane model as established in the course of the type certification process in determining compliance with the applicable certification requirements (e.g., CS-25 and noise regulations). The operating limitations must be expressed in mandatory, not permissive, language. The terminology used in the AFM must be consistent with the relevant regulatory language. Limitations prescribed by operating rules may be incorporated as appropriate.
 - (1) Weight Limitations. A statement of the maximum certificated take-off and landing weights must be provided. The maximum taxi/ramp weight, maximum zero-fuel weight, and any other fixed limit on weight, should also be included. Any limitations on aeroplane loading associated with the stated weight limitations must be included in the AFM or addressed in a separate weight and balance document. Separate take-off and landing weight limits may be listed corresponding to each applicable constraint (e.g., structural or noise requirements, customer option, etc.), if the instructions in the Limitations Section clearly state that the most restrictive of these take-off and landing weight limitations represent the maximum certified weights.
 - (i) For those performance weight limits that vary with runway length, altitude, temperature and other variables, the variation in weight limitations may be presented as graphs in the Performance Section of the AFM and included as limitations by specific reference in the Limitations Section.
 - (ii) Only one set of noise limited take-off and landing weights may be established for a specific aeroplane model (i.e., hardware build).
 - (2) Noise limitations. An aeroplane model (i.e., hardware build) may not be identified as complying with the requirements of more than one noise stage level at a time. The operating limitations contained in the Limitations Section of the AFM should comply with the noise certification criteria for that stage. If the noise certification status of an aeroplane model is upgraded to a more stringent stage level the AFM

must either be revised or supplemented, whichever is appropriate, to include only information appropriate to the new stage level.

- (i) Landing Flap Restriction. An operating limitation preventing the use of an approved landing flap setting to comply with noise requirements can only be established under the airworthiness requirements or as a voluntary design change. A statement must be added to the Limitations Section to preclude using that landing flap setting for normal operations. Emergency procedures may, however, continue to use the restricted flap setting. A placard must be placed in the aeroplane and appropriate other means must be installed (e.g., crushable guard on the restricted portion of the flap selection quadrant), to prevent using the restricted flap setting for normal operations.
 - (ii) Reduced and Derated Take-off Thrust or Power. Noise certification levels are determined at the maximum all-engines operating take-off thrust or power. Reduced and derated thrust or power are not changes that would invalidate the noise certification status of the aeroplane, provided the full rated take-off thrust or power remains approved for that aeroplane.
- (3) Operating Limitations. The extremes of the operational variables, including any appropriate descriptions for which compliance with the certification requirements has been shown and for which the AFM data have been approved, should be listed with respect to the following:
- (i) Operations.
 - (A) Maximum take-off, landing and zero-fuel weight limits.
 - (B) Minimum in-flight weight.
 - (C) Minimum and maximum pressure altitude for which operation is limited for each flight phase (take-off, en route and landing). Further altitude limitations caused by changes to structure, powerplant, equipment characteristics or flight characteristics (e.g. due to failures) should be provided.
 - (D) Ambient atmospheric temperature (maximum and minimum).
 - (E) Minimum control speed. (This information may be located in the Performance Section of the AFM, with cross-reference in the Limitations Section.)
 - (F) Maximum tailwind. The maximum allowable tailwind component for take-off and landing should normally be limited to 10 knots. If airworthiness approval has been granted for take-off and landing in tailwinds greater than 10 knots, the AFM should provide the limiting tailwind value, accompanied by a statement such as the following:
The capability of this aeroplane has been satisfactorily demonstrated for take-off and manual landing with tailwinds up to knots. This finding does not constitute operational approval to conduct take-offs or landings with tailwind components greater than 10 knots.