

RESPONSES TO FLIGHT TEST GUIDE COMMENTS FROM NPA 23-3

Proposed ACJ: Paragraph & Section:- General.
Comment: In several places, for example 23.677(b) and 23.677(d) (2), item 139, design issues are addressed. This is not considered appropriate for a Flight Test Guide.
Response: Partially accepted. However, if a comment addressing Flight Crew is necessary, then the Flight Test Guide is believed to be the appropriate location. Nevertheless, the last sentence of Section 139d(2) will be moved to an ACJ 23.1555(e)(2).

Proposed ACJ: Paragraph & Section:- General
Comment: There are various references to US documents, e.g. from NASA and the US Air Force. The latter, in particular, are unlikely to be readily available in Europe.
Response: Noted. This is an harmonisation item. No changes are proposed at this stage. The Flight sub-group is willing to review proposals to replace unacceptable references.

Proposed ACJ: Paragraph & Section:- General
Comment: 'Multi-engine' is replaced by 'twin-engine' in several places but this is not consistently done throughout.
Response: Accepted. The necessary corrections will be addressed.

Proposed ACJ: Paragraph & Section:- General
Comment: There is also a need for a thorough review to ensure that the document, if it is to be recognised as the JAA Flight Test Guide, is consistent with JAA terminology and units.
Response: Noted. It is intended to address the consistency of terminology and units within JAA codes and advisory material as a separate action in the future.

Proposed ACJ: Paragraph & Section:- General
Comment: Despite the statement in the FTG Foreword, all references to the FAA System have not been deleted. As an example, 287. Section 23.1301b(1) and b(3)(i) require US publications not commonly available in Europe. As background material, the reference is useful, but details of proposed tests should be in the ACJ.
Response: Not accepted. The statement in the Foreword is considered valid because the remaining references are regarded as being useful. However, it is intended, at the next amendment, to specify the full title of these documents together with details of where they can be obtained.

Proposed ACJ: Paragraph & Section:- 2, 6 Section 23.21.
Comment: a(5), a(4) seeks to prevent improper advantage being taken of the airspeed tolerances. As accurate measurement of airspeed by both determination of position error and indicator calibration is required, the possibility that an applicant might behave in this way would be eliminated [if] these tolerances were restricted to performance tests. For handling tests a statement should be added that airspeed error that provided alleviation was unacceptable. To take two examples:
- on a low performance aeroplane when showing compliance JAR 23.173(b)(1), to invoke the tolerance to extend the "friction band" to more than 10% could be a useful alleviation.
- the high speed end, to allow tests nominally to V_{ne} or V_D to be to any lesser speed should be unacceptable.
Response: Noted. However, the existing text is believed to cover adequately these concerns.

Proposed ACJ: Paragraph & Section:- 4, 6b(3)(ii)
Comment: Ballast. This assumes that ballast is only ever required for aft cg tests. We are not aware that jettisonable ballast has ever been used.
Response: Partially accepted. The present text was felt to be clear and helpful, except that the "forward" will be deleted in the 3rd sentence:-

Solid and Liquid Ballast. In critical tests, the ballast should be loaded in a manner so that disposal in flight can be accomplished and be located at a point which will produce a significant c.g. shift ~~forward~~ when jettison takes place

Proposed ACJ: Paragraph & Section:- 4, 7a(1)
Comment: CG Envelope. Line 3 "about" is ambiguous. It should read "on either side of..."
Response: Accepted. The text will read:-

(1) C.G. Envelope. ... This relief is only acceptable when the test data general scatter is ~~about~~ either side of the limiting c.g. or when e.g. correction from test c.g. to limit c.g. is acceptable.

Proposed ACJ: Paragraph & Section:- 6, 9a
Comment: Ballast. There should be some treatment of moveable ballast (it was required operationally on the Optica).

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Response: Not accepted. The introduction of in-flight moveable ballast would require a rule change by a separate NPA action. Furthermore, the example given as justification was regarded as a special design feature, for which special conditions would seem to be more appropriate.

Proposed ACJ: Paragraph & Section:- 8, 11b(3)(ii)(B)

Comment: Turbo Prop Governors. It is not clear which 'governor' should be inoperative and which 'maximum' is intended. This paragraph should have specific turboprop material added, which is more explicit.

Response: Noted. The JAR 23 Study Group would welcome proposals for future consideration.

Proposed ACJ: Paragraph & Section:- 16, 8 Section 23.51.

Comment: c(3). A reminder should be added that ability to take off satisfactorily in a crosswind of not less than 0.2 V_{so} must be demonstrated. An AFM statement is required (23.1585(a)(2)).

Response: Not accepted. The crosswind case is comprehensively covered separately in Flight Test Guide section 207 for both take-off and landing.

Proposed ACJ: Paragraph & Section:- 20

Comment: Typos (several). Replace VL0F by VLOF.

Response: Accepted. These will be corrected.

Proposed ACJ: Paragraph & Section:- 21, 19c

Comment: Extrapolation of data. Paragraph 19c addresses altitude extrapolation for take-off performance on commuters - this coverage appears ad-hoc and incomplete. (BCAR K2-2, Appendix, includes standards for the extrapolation of data in terms of altitude, temperature and weight.) [Note: For JAR 25 extrapolation guidance regarding weight and altitude is agreed, but not temperature].

Response: Noted. The JAR 23 Study Group would welcome proposals and justification for future consideration

Proposed ACJ: Paragraph & Section:- 24, 20b(11)(ii)

Comment: Reverse Thrust. The 10 kt crosswind is not in AC23-8A, Change 1, yet is not marked by marginal line.

Response: Not accepted. The origin of the 10kts is FAR 23 Flight Test Guide item 21.b.(11)(ii) (Change 1) on page 28.

Proposed ACJ: Paragraph & Section:- 25, 20b(12)
Comment: Time Delays. The figure is inaccurate; AC23-8A is better.
Response: Accepted. JAR Fig 21-1 will be corrected.

Proposed ACJ: Paragraph & Section:- 25, 20c(1)
Comment: ARP-926A. The reference to SAE document ARP-926A is not appropriate for JAA. (Also see page ACJ-42).
Response: Not accepted. References to SAE documentation is considered acceptable.

Proposed ACJ: Paragraph & Section:- 27, 22b(2)(iv)
Comment: Power Lapse. This paragraph is a statement. It should be rephrased to indicate what an applicant is expected to do about engine power lapse at varying altitudes.
Response: Noted. A text proposal, with justification, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- 30, 22j
Comment: Reduced Power Take-offs. Additionally, reduced power take-offs should be prohibited for non-standard operations, or when workload is increased due to unserviceability or other factor.
Response: Accepted. The text will be amended as follows:-

(iv) The AFM states, as a limitation, that reduced takeoff power settings may not be used:

(A) When the antiskid system (if installed) is inoperative.

(B) On runways contaminated with snow, slush, or ice.

(C) On wet runways and runways contaminated with snow, slush, or ice, unless suitable performance accountability is made for the increased acceleration and stopping distances on these the wet surface.

(D) When items affecting performance cause a significant increase in crew workload. Examples are in operative equipment (e.g. inoperative engine gauges, reversers or engine systems resulting in the need for additional performance corrections) or non-standard operations (i.e. any situation requiring a non-standard take-off technique)

Proposed ACJ: Paragraph & Section:- 33, 24b(1)
Comment: Net Takeoff Flight Path. JAR 23 does not address three and four-engined aeroplanes.
Response: Accepted. The text will be amended as follows:-

b. Net Takeoff Flight Path - Section 23.61(b) and (c).

(1) The net takeoff flight path is the actual path diminished by a gradient of 0.8 percent for two-engine aeroplanes, ~~0.9 percent for three engine aeroplanes, and 1.0 percent for four engine aeroplanes.~~ See figure 24-2.

Proposed ACJ: Paragraph & Section:- 34, 25 Section 23.65
Comment: b(2) A warning should also be given about misleading results caused by vertical air movements due to standing waves both upwind and downwind of high ground. Their presence can be difficult to detect because the air can be smooth with no lenticular clouds. Downwind their effects can extend 30 or more miles and persist after the wind has died.
Response: Noted. This subject is covered by Section 16a(1) (Atmospheric Standards).

Proposed ACJ: Paragraph & Section:- 34, 25 Section 23.65
Comment: b(8). The implication is that the authorities will accept AFM climb performance which takes advantage of continuously tapering climb speed with altitude. CAA has in the past refused to accept data based on this technique; at best CAA has allowed speed reduction to be scheduled in easily remembered and applied steps. Unless CAA has changed this policy, the point should be included in the ACJ.
Response: Not accepted. This comment would first require a change of the requirement text. (Paragraph 23.65(a)(4) requires a climb speed not less than the greater of 1.1 V_{MC} and 1.2 V_{S1} for twin-engined aeroplanes, and not less than 1.2 V_{S1} for single-engined aeroplanes.)

Proposed ACJ: Paragraph & Section:- 35, 25b(6)
Comment: Sawtooth climb. The drawback to the sawtooth climb method is that heavy reliance is placed on the data close to the critical AFM conditions, and an optimistic data fairing can mislead. Consequently a set of further check climbs should be flown at the critical AFM conditions.

Response: Not accepted. The specified level of accuracy is considered appropriate for this class of aeroplane.

Proposed ACJ: Paragraph & Section:- 27 Section 23.67.

Comment: a(2). The last sentence is not understood. 23.1587(c) does not require best rate of climb data regardless of ability to meet cooling requirements; engine cooling may require climb performance to be scheduled at speeds above those for best rate of climb, the applicant having to accept the consequent performance penalty.

Response: Accepted. The text will be amended as follows:-

Secondary objectives are to establish the climb speed to be used in the cooling tests required by 23.1041 through 23.1047, including the appropriate speed variation with altitude, and to establish ~~the speed for best rate of climb (or for minimum descent, as appropriate)~~ a climb speed (or descent speed, as appropriate) which, irrespective of the speed used in demonstrating compliance with climb and cooling requirements, is required for presentation in the AFM in accordance with JAR 23.1587(c)(5).

Proposed ACJ: Paragraph & Section:- 27 Section 23.67 b(1).

Comment: The last sentence is not understood. Engines may differ in power delivered due, for instance, to different accessory loads; thrust on propeller-driven aircraft may differ with installed position, e.g. wing-mounted tractor engines having the same direction of rotation will not deliver the same thrust port and starboard. The critical engine must be determined by flight test and AFM performance be based on the results from that engine.

Response: Accepted. The background to the intent of the last sentence is not known. It is proposed that it can be deleted as it does not add significantly to the clarification provided by the remainder of the text.

~~The relative power or thrust capabilities of each engine should be established so that comparative climb performance data can be corrected to equal engine powers.~~

Proposed ACJ: Paragraph & Section:- 39, 27 Table

Comment: Typo, line 3, "£" should be "€". Also see line 4 and 5.

Response: Accepted. These will be corrected as proposed.

Proposed ACJ: Paragraph & Section:- 39, 27 Table
Comment: Typo, line 9, 11. The "3" in front of speed factors and gradients should be "3".
Response: Accepted. These will be corrected as proposed.

Proposed ACJ: Paragraph & Section:- 41, 28b(2)
Comment: Sawtooth Glides. Glide performance need not be established to the same level of accuracy as climb performance, and consequently establishing a complete drag polar is unnecessary. A small number of glides at close to the expected best glide speed would suffice.
Response: Accepted. The opening text of paragraph 28(b)(2) will be modified as follows:-

(2) **Sawtooth Glides.** If sawtooth glides are used to determine the glide performance, these glides.....

Proposed ACJ: Paragraph & Section:- 41, 28b(3)
Comment: AFM Glide data. A statement of NM per 1000 ft loss of altitude would be sufficient.
Response: Accepted. Sub-paragraph b(3) will be amended accordingly as follows:-

(3) ~~A chart or table should be constructed for the AFM that presents the literal (over the ground) gliding distances for the altitude range expected in service, at the best glide speed as determined in (3) of this section.~~
As a minimum, a statement of nautical miles per 1000 feet loss of altitude at the demonstrated configuration and speed at MTOW, standard day, no wind, has to be given.

Proposed ACJ: Paragraph & Section:- 42, 29a(3)
Comment: Approach. This should be retitled "Approach and Landing".
Response: Accepted. The title will be amended.

Proposed ACJ: Paragraph & Section:- 43, 29a(5)(V)
Comment: Reverse Thrust, Twins. Where there is a flap change, all engines and one engine inoperative, what should an applicant do? A factor of 15%, for this instance, would be acceptable.
Response: Not accepted. If there is a flap change for one-engine-inoperative landings, the landing distance should be determined in that configuration.

Proposed ACJ: Paragraph & Section:- 45, 29b(7)
Comment: Steep Approaches. FAR/JAR 23.75 call for approaches at 3°, so all tests should be appropriate, with no provision for correction. This paragraph should be deleted.
Response: Not accepted. Paragraph 23.75(a)(2) permits approach angles greater than 3°

Proposed ACJ: Paragraph & Section:- 52, 48a
Comment: Minimum Control Speed. The strikethrough on the second line is not required. The added text is correct.
Response: Accepted. The struck-through text will be deleted.

Proposed ACJ: Paragraph & Section:- 52, 48a(3)
Comment: V_{MC} Control Rigging. The advice regarding setting control deflections and cable tensions to minimum tolerances is unchanged, but we are not aware this has been done in practice.
Response: Not accepted. The proposed text is considered to be correct and helpful.

Proposed ACJ: Paragraph & Section:- 52, 48a(4)
Comment: Weight and CG for V_{MC}. Light weight is more than desirable for V_{MC} testing, it is essential if V_{MC} has to be established, i.e. if stall warning is not limiting at light weight.
Response: Accepted. The text will be amended to read:-

*(4) **Weight and C.G.** For rudder limited aeroplanes ... operating engine is minimised. Light weight ~~is also desirable~~ may be necessary for V_{MC} testing, because the stall speed is reduced.*

Proposed ACJ: Paragraph & Section:- 53, 48b(3)
Comment: V_{MC} Bank Angle. The words "either with wings level or, at the option of the applicant," should be deleted. They are not necessary and do not add anything to the requirement.
It is unusual for an applicant to determine V_{MC} with less than 5° bank, so the new wording is redundant. A concern with sideslip angle at V₂ may be relevant (minimum drag) but drag is not a concern at V_{MC}.
Response: Not accepted. The present wording is consistent with the text of paragraph 23.149(a), which states that V_{MC} can be determined with upto 5° of bank.

Proposed ACJ: Paragraph & Section:- 53, 48b(5)
Comment: Deicer Boots. This paragraph deals with modifications other than deicer boots, and is in any case much more general than effects on just V_{MC} .
Response: Accepted. The title will be changed to read:-

(5) Deicer Boots, Anti-Ice and other External Equipment.

Proposed ACJ: Paragraph & Section:- 53, 48b(6)
Comment: Variable V_{MC} . This is applicable to any type with a WAT chart. Cross-reference is to 23.51
Response: Accepted. The text will be amended as follows:-

*(6) **Variable V_{MC} .** For reciprocating engine-powered aeroplanes of more than 2730kg (6000lbs) maximum weight and for turbine engine powered aeroplanes and for commuter category aeroplanes, a V_{MC} which varies with altitude and temperature is a permissible condition for use in determining paragraph ~~23.53~~—23.51, Takeoff Speeds, provided that the AFM does not show a V_R below the red radial line speed required by § 23.1545(b)(5).*

Proposed ACJ: Paragraph & Section:- 54, 48c(6)
Comment: V_{MC} Test Weight. Not, "if possible.....should be light enough" - 'must' if V_{MC} can be determined.
Response: Accepted. The text will be amended to read:-

*(6) **Static Minimum Control Speed.** The test pilot ... ambient condition. ~~If possible, t~~ est weights should be light enough to identify the limits of directional control without stalling or being in pre-stall buffet.*

Proposed ACJ: Paragraph & Section:- 54, 48c(6)(i)
Comment: Flap and Gear for V_{MC} . Simply repeats basic requirement and so is redundant.
Response: Accepted. The first two sentences will be deleted:-

(i) ~~Flaps and Gear. Set the flaps to the takeoff setting being investigated. The landing gear should be in the retracted position. For the take-off conditions ... landing conditions.~~

Proposed ACJ: Paragraph & Section:- 54, 48c(6)(iii)
Comment: V_{MC} Power. The two actions in the first sentence should be reversed; there is no need to make every set up akin to a dynamic V_{MC} test.
Response: Accepted. The first sentence will be amended as follows:-

(iii) Power. Render one engine inoperative and set takeoff power on one engine and render the other engine inoperative. The ... other devices.

Proposed ACJ: Paragraph & Section:- 54, 48c(6)(iv)
Comment: V_{MC} Controls. Delete reference to the 5 degree bank option (see above). "Near maximum use of lateral controls" needs qualifying - is full lateral control acceptable or not?
 The paragraph heading is largely irrelevant to the content. Again the concern with sideslip at V_{MC} is of academic interest. We have never seen an AFM which states a V_{MC} slip ball deflection. In any case it is of little benefit because V_{MC} will almost certainly be determined with 5° bank, not at zero or minimum sideslip. Flight is not envisaged at V_{MC} for piston engined aircraft below 6000 lb. ($V_R \geq 1.05 V_{MCA}$ and not V_{MCL}).

Response: Accepted. In the first sentence for lateral controls, the word "near" will be deleted, since full useage is not forbidden. Note that the same change will be made in item 48(b)(1). The last sentence will be deleted, as zero sideslip is not a criteria for V_{MC} , other than for single-engine climb, where it is part of the present text for item 27(b)(2). The title will be changed to Test Technique, to be consistent with item 27(b)(2).

*(iv) **Controls** Test Technique. Gradually reduce airspeed until it is no longer possible to prevent heading changes with maximum use of the directional and/or ~~near maximum use of the lateral controls,~~ or the limit control forces have been reached. No changes in lateral or directional trim should be accomplished during the speed reduction. Usually the 5° bank option will be used (see paragraph 48b(3) to maintain straight flight. A yaw string may be used to assist the test pilot in attaining zero sideslip (or minimum sideslip).—~~The approximate ball deflection should be noted for inclusion in the AFM~~*

Proposed ACJ: Paragraph & Section:- 55, 48c(10)
Comment: AFM V_{MC} . Why should AFM quote windmilling V_{MC} when autofeather is fitted and required? Is this a concern

for landing, where autofeather may not arm? If so, take-off and landing cases need separate treatment.

Response: Accepted. The wording of the last two sentences will be modified accordingly:-

*(10) **AFM Minimum Control Speed Value.** V_{MC} ... indicator. If this V_{MC} determined with an autofeather system, the AFM required equipment list as well as the Kind of Operational Equipment List (KOEL) should list autofeather as a required item and the AFM would normally state the V_{MC} with the autofeather system inoperative (propeller windmilling) in the abnormal/emergency procedures section. The normal procedures section should also require the autofeather to be armed (if applicable) during takeoff and landing.*

Proposed ACJ: Paragraph & Section:- 55, 48c(6)(v)

Comment: V_{MC} Critical Engine. Why should V_{MC} be repeated with prop. windmilling if credit is given for autofeather? What criteria would be applied to the windmilling case?

Response: Accepted. Since credit is given for automatic feathering or other devices (see item 48(c)(6)(iii)), the last sentence will be deleted:-

*(v) **Critical Engine.** Repeat steps (i) through (iv) to identify which inoperative engine results in the highest minimum control speed. ~~If an autofeather system is installed and static V_{MC} was determined with the propeller feathered, repeat steps (i) through (iv) with the critical engine inoperative and with the propeller windmilling.~~*

Proposed ACJ: Paragraph & Section:- 55, 48c(8)

Comment: Dynamic V_{MC} . This technique leads to extreme pitch attitude on high thrust/weight ratio aeroplanes, making the test extremely demanding, giving variable and inconclusive results. CAA practice is to decelerate to below V_{MC} , all engines, accelerate with 2 x MTOP at a representative climb pitch attitude, cut engine at static V_{MC} . (This can only be done if V_{MC} is acceptably above stall).

Response: Accepted. The proposed procedure is supported, and will be included as an option in an additional section of item (8) as follows:-

*(8) **Dynamic Minimum Control Speed.** After determining ... critical conditions. In test conditions with a high thrust/weight ratio, a modified procedure may be applied to avoid extreme pitch attitudes: Decelerate to below V_{MC} (all engines), then accelerate with 2xMTOP to a representative climb pitch attitude, and cut the critical engine at static V_{MC} (verify before hand*

that V_{MC} is acceptably above the actual stall speed).

Proposed ACJ: Paragraph & Section:- 55, 48c(9)
Comment: Repeatability. Repeatability will be improved with the technique outlined above. This need only be done if dynamic V_{MC} was critical (rare?). The statement "the dynamic V_{MC} speed is the minimum control speed" contradicts the final sentence of the previous paragraph which states, correctly, that the higher of the static and dynamic speeds applies.
Response: Accepted. The first sentence will be amended accordingly and the subsequent two will be deleted:-

*(8) **Repeatability.** Once determined, and if the dynamic V_{MC} seems to be the critical one, the dynamic V_{MC} should be verified by running a series of tests to determine the speed is repeatable. ~~The dynamic V_{MC} speed is the minimum control speed for the aeroplane. This speed may not exceed $1.2 V_{Si}$ at maximum gross weight and the most unfavourable c.g. for stall speeds.~~*

Proposed ACJ: Paragraph & Section:- 57, 51b
Comment: Stick Force per 'g'. The Note is contradictory and conflicts with the requirement.
Response: Accepted. The Note will be amended as follows:-

***NOTE:** ~~75% maximum continuous power or maximum power selected by the applicant as an operating limitation during cruise (reciprocating engine) or maximum continuous cruise power (turbine).~~*

Proposed ACJ: Paragraph & Section:- 59, 63a
Comment: Trim Actuator Settings. Not sure this is done in practice.
Response: Not accepted. This should be common practice, especially if trim is limiting.

Proposed ACJ: Paragraph & Section:- 62, 71a(2)
Comment: Control Frictions. Not sure this is done in practice.
Response: Not accepted. No change is considered necessary.

Proposed ACJ: Paragraph & Section:- 63, 72b(1)(i)
Comment: Static Longitudinal Stability. 2nd paragraph: "After observing trim speed, apply a light pull force....." should not specify the size of the force, it may not be light on some aircraft. The next paragraph, for push forces, does not pre-judge the issue.
Response: Accepted. The first sentence of the second paragraph will be amended by deleting the word "light" as follows:-

*(i) **Stabilised Method.** The aeroplane ... are critical.*

After observing trim speed, apply a ~~light~~ pull force and stabilise at a slower speed. Continue ... trim speed.

Proposed ACJ: Paragraph & Section:- 63, 72b(1)(ii)
Comment: Acceleration Deceleration Method. This technique is not well known. It seems crucially dependent on ease of setting power quickly and accurately within fine limits. This is not easy on some types. Setting the power to the original at a higher or lower speed with a fixed pitch propeller will require quite a few adjustments as the Np changes with forward speed at a fixed throttle setting.
Response: Not accepted. As indicated, this procedure may be preferable for aeroplanes with high cruise speeds, on which fixed pitch propellers are unusual.

Proposed ACJ: Paragraph & Section:- 65, 73a(4)
Comment: L & D Control Forces. There is an illogicality here. You cannot have lightening before a maximum force is reached, or it wouldn't be a maximum.
Response: Not accepted. The existing text is consistent with the requirement.

Proposed ACJ: Paragraph & Section:- 67, 75b(2)(iii)
Comment: Short Period Data. The final sentence is not a procedure, it is an open ended comment.
Response: Accepted. The final sentence will be moved from item (b)2)(iii) to item (a)(1) first section.

*(a)(1) **Short and Long Period Modes.** Most normally-configured ... period mode. The influence of control system springs/bob-weights can be significant.*

*(b)(iii) **Short Period Data.** Obtaining quantitative ... be qualitatively described as*

essentially deadbeat. ~~The influence of control system springs/bob weights can be significant.~~

Proposed ACJ: Paragraph & Section:- 67, 75b(2)(v)
Comment: Sequence of Control Inputs. Another open ended comment. Should one infer that ND/NU is better?
Response: Not accepted. This sequence is an option only.

Proposed ACJ: Paragraph & Section:- 70, 86a(5)(ii)
Comment: Elevator Rigging for Stalls. Not sure this is done in practice.
Response: Not accepted. This is important, especially when test results are close to the limit.

Proposed ACJ: Paragraph & Section:- 70, 86a(5)(iv)
Comment: Altitude for Stalls. Implies all stalls should be done at or near maximum approved altitude. Surely the intent is that only a sample needs to be done at high altitude.
Response: Noted. A text proposal, with justification, would be appreciated for future consideration. In the meantime, sound judgement should be exercised.

Proposed ACJ: Paragraph & Section:- 71, 86b(3)(iii)
Comment: Pilot Determinations. Spurious "(iii)"
Response: Accepted. "(iii)" will be deleted.

Proposed ACJ: Paragraph & Section:- 71, 86b(3)(iii) and (iv)
Comment: Pilot Determinations - Stall. What is the objective behind these determinations? What criteria should be applied? Guidance is needed.
Response: The background to this item is CAM 3.120(e) which required that "any loss of altitude in excess of 100ft or any pitch in excess of 30 degrees below level should be entered in the AFM.". This was included in FAR 23 as paragraph 23.1587(a)(1), but was deleted by Amendment 23-45. As this requirement has not been introduced into JAR 23, item b(3)(iii) can and will be deleted. Item b(3)(iv) is required by JAR 23 and will remain:-

~~(iii) The pitch attitude below level.~~

(iv) The amount of roll or yaw encountered during the recovery.

Proposed ACJ: Paragraph & Section:- 71, 86d
Comment: Stick Pusher. We have very serious reservations about this topic, amongst which are:
- not be treated differently according to whether the aerodynamic end point is recoverable or not recoverable (86d(2)), the airspeed tolerances of 86d(3) are too large, and
- the differing airspeed margins of 86d(4) are irrational, potentially dangerous and commercially onerous if there is a reliable pusher. This is also clearly a requirement. We strongly recommend pushers need this section be reserved pending the outcome of future work.
Response: Accepted. The existing text will be deleted and the item will be declared RESERVED:-

d. Stick Pusher RESERVED

Proposed ACJ: Paragraph & Section:- 73, 87b(2)(ii)
Comment: Altitude Loss. What is 'excessive'? This needs guidance material.
Response: Noted. A text proposal, with justification, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- 73, 87b(2)(iii)
Comment: Pitch Up. This is incompatible with 86(b)(3)(i) [no reversal in stick force].
Response: Comment is not understood.

Proposed ACJ: Paragraph & Section:- 74, 100 Section 23.221 Spinning
Comment: b(1). The cross-reference to paragraph 7a is not understood.
Response: Not accepted. The cross-reference to paragraph 7a is the correct reference.

Proposed ACJ: Paragraph & Section:- 74, 100 Section 23.221 Spinning
Comment: b(3) the intent of this paragraph is to ensure that the slowest recovery spins still meet the requirements with:
- maximum permitted control deflections, resulting in max. angle of attack and max. yaw rate at entry
- minimum permitted control deflection. to provide minimum counter-yaw and minimum nose-down pitch authority for recovery.
It is difficult retrospectively for certification authorities to establish exactly what control travels were set for particular parts of a spin programme. It is

suggested that the intent of the ACJ could be achieved and consistency of certification standards between countries improved if the following procedure was adopted:

The complete spin programme to be flown with all control travels set to the nominal figures.

At the conclusion the applicant to agree with the authority the slowest recovery spins. These then to be repeated with the elevator and rudder travels set to the most adverse permissible limits for entry and recovery. If satisfactory, these spins should be repeated with any spin recovery system removed. If unsatisfactory, any further configuration changes would concentrate on these critical cases.

Response: Accepted. The commenter's procedure will be introduced with minor alterations as follows:-

(3) Control Deflections. Control surface deflections should be set to the critical side of the allowable tolerances for the selected critical configurations. For example, possible spin flight test programme could be to be perform the spin matrix with the controls set at the nominal deflection values. Analysis of the data will show the critical conditions for entry and recovery. Once these critical test are defined and agreed by the Certification Authority, these critical tests are repeated with the control deflections set to the most critical tolerances. If satisfactory, these tests must be repeated with the anti-spin system removed.

Proposed ACJ: Paragraph & Section:- 74, 100 Section 23.221 Spinning
Comment: b(8) Most aerobatic category aeroplanes are used for flying training. The ACJ should make clear that they must all be shown to meet the requirements using the conventional recovery technique.
 If the manufacturer of, say, a competition standard acrobatic aeroplane wishes to develop additional recovery techniques, that is acceptable, but the AFM and the cockpit placard should still spell out the conventional recovery.

Response: The first part of the comment is accepted. To clarify that even for acrobatic category spins without the given limits must be possible with conventional recovery procedures, the wording will be changed as follows:-

Recovery. Recoveries should consist of throttle reduced to idle, ailerons neutralised, full opposite rudder, followed by forward elevator control as required to get the wing out of stall and recover to level flight., ~~except that~~ For acrobatic category spins the manufacturer may establish additional recovery procedures, provided

such procedures comply with this section.
~~determines the need for another procedure.~~

The second part of the comment is not accepted. Recognising that all specified recovery procedures must comply with this Section, it is believed that the manufacturer should be allowed to decide which procedure is specified on the placard required by JAR 23.1567(d) (1).

Proposed ACJ: Paragraph & Section:- 74, 100 Section 23.221 Spinning
Comment: C(2) In the third sentence, the example states "Start the count for 1 turn after the application of right rudder" (the example is for a left hand spin) so is in conflict with JAR 23.221(a) which requires recovery in not more than one additional turn "after initiation of the first control action for recovery". The interpretation is perhaps more sensible than the requirement.
The third ACJ sentence would also avoid confusion if the words "for one turn" were deleted and a further sentence added: "If the aircraft has not recovered after one further turn, it does not comply with the requirement". At present the wording implies that the aircraft is expected to stay in the spin for a further turn.
The last sentence should be made more specific to keep the magnitude of the programme within bounds. Spins from normal entries using full up elevator and full rudder and accelerated entries from a 0°, banked turn should be covered. Inadvertent entries, slower entries and lesser bank angles can reasonably be taken as no more critical.
Response: Accepted. The wording of the last three sentences will be amended as follows:-

(2) Recovery from Spins with Normal Control Usage During Entry and Recovery. Start the count (heading, ground reference, etc.) for recovery with the application of the first action, which may be the reduction of power. ~~for one turn after the application of right rudder.~~ See subparagraph c(5) for use of flaps. Spins from normal entries using full up elevator and full rudder, and accelerated entries from a 60° banked turn should also be covered. Intentional, inadvertent, normal, up to 60° bank, and accelerated stalls should be considered.

Proposed ACJ: Paragraph & Section:- 74, 100 Section 23.221 Spinning
Comment: c(3). The objective of the tests on a Normal Category aeroplane is stated in c(1) as "Essentially the test is a check of the controllability in a delayed recovery from a stall". With this in mind, as in c(2), the cases to be

covered must be carefully considered. Specifically thought should be given to these points:

- The effect of power should be confined to entries power off and on. Only if no spin results need other powers be tried.

- the effect of entry attitude is adequately covered by normal entries from level flight and accelerated entries from 60' banked turns

- the effect of ailerons applied at entry is more potent than application after spin entry

- in 1 turn spins it is not practicable to investigate control adjustments

- no attempt should be made to investigate the effect of partial control inputs on recovery. Partial inputs will result in failures to recover within the prescribed 1 additional turn, but that does not mean the aeroplane cannot be certificated. There would however be some prolonged recoveries, or even failures to recover, because the empennage and rear fuselage configuration of Normal Category aircraft does not have to be designed with spin recovery as a prime criterion.

Per the stated objective to be met, it is strongly recommended that the 1 turn spin programmes should be made using the conventional recovery and there should be no messing about.

Response:

Noted, but it is considered that this paragraph is of a general nature and has to be interpreted for the specific aeroplane under consideration. This point will be clarified in a new sentence, inserted as follows:-

(3) ***Recovery from Spins Following Abnormal Control Usage.*** *Abnormal control usage should be evaluated during the spin to ensure that uncontrollable spins do not occur. The parameters which need to be investigated depend on the design of the aeroplane well as on the results of the Normal Spin Tests. The intent of these tests.....*

Proposed ACJ:

Paragraph & Section:- 74, 100 Section 23.221 Spinning

Comment:

c(4) The matrix in Fig. 100-1 does not include all the abuse cases of c(2) and(3).

Response:

Not accepted. The matrix given in Fig. 100-1 is intended to be an example matrix only. The applicant should adapt this matrix to the specific aeroplane. To clarify this point, the title of the figure will be amended buy the addition of the word "Sample", i.e.

Figure 100-1 Sample Spin Evaluation Configuration Matrix.

Proposed ACJ:

Paragraph & Section:- 74, 100 Section 23.221 Spinning

Comment:

d(3) In d(2) it is recognised that, to be spinning intentionally in an Acrobatic Category aeroplane, the

pilot can be expected to have had proper instruction and to be following the published recovery procedure. So, again as in c(2) and (3), the need for each abuse case should be manifest. Specifically,

- the effect of entry attitude could adequately be covered by normal entries from level flight and accelerated entries from 60° banked turns

- the effect of ailerons applied at entry is more potent than during the spin.

- Certification tests establish that an Acrobatic Category aeroplane will not develop an uncontrollable spin, no matter what the abuse. That does not say that prompt recovery can be guaranteed without the proper control inputs. There are abuses, such as incomplete or wrongly sequenced inputs, which may not produce recovery at all, certainly not in the required number of turns.

The ACJ recognise that if, in service, recovery is delayed to 2 whole turns, something is amiss. It seems constructive therefore to allow a check procedure, so that the pilot can at least be certain that he has not caused the delayed recovery. Deliberate spinning will usually be done at a safe altitude which allows time for a second recovery procedure.

If the manufacturer, having demonstrated to the satisfaction of the authorities the efficacy of a secondary procedure, such as recycling the control to pro-spin before carrying out the normal recovery sequence, instructions on this procedure should be required in the AFM.

Response: Noted. As this subject will be covered in the forthcoming discussions on acrobatic aeroplanes, the current text will be retained.

Proposed ACJ: Paragraph & Section:- 75, 100b(2)

Comment: Typo. "Applicants", fifth line.

Response: Accepted. This will be corrected (from Applicant's to Applicants).

Proposed ACJ: Paragraph & Section:- 76, 100b(5)(iii)

Comment: Spin Chutes. It is difficult to determine that the spin chute has no effect without flying the test.

Response: Not accepted. There may be occasions where the text is applicable.

Proposed ACJ: Paragraph & Section:- 76, 100b(6)

Comment: Build Up. Incorrect reference on 5th line. It should still be c(7).

Response: Accepted.

(5) **Build-Up.** When any doubt exists ... characteristics. Any control force lightening or reversal is an indication of possible deep stall entry. See subparagraph c(8Z) for definition of excessive back pressure. A yaw ... uncontrollable spins.

Proposed ACJ: Paragraph & Section:- 76, 100b(6)
Comment: Build Up. References to "uncontrollable spins" should read "irrecoverable spins".
Response: Accepted. The wording "uncontrollable spins" will be changed to "unrecoverable spins" (additionally in paragraphs 100(c)(3) and 100(d)(3)) to be consistent with the terminology of the requirements of 23.221(a)(3) and (c)(3):-

100(b)(5) **Build-Up.** When any ... back pressure. A yaw rate instrument is valuable in detecting progress toward a fully-developed spin condition or an uncontrollable manoeuvre. Unusual application of power or controls has sometimes been found to induce ~~uncontrollable~~ unrecoverable spins. Leading with elevator in recovery and cutting power as the aeroplane rolls into a spin have been known to induce ~~uncontrollable~~ unrecoverable spins.

100(c)(3) **Recovery from Spins Following Abnormal Control Usage During Entry and Recovery.** Abnormal control usage should be evaluated during the spin to ensure that ~~uncontrollable~~ unrecoverable spins do not occur. The intent ... acceptable.

100(d)(3) **Abnormal Control Usage.** The discussion ... category spins. Abnormal control usage should be evaluated at several points throughout the spin to ensure that ~~uncontrollable~~ unrecoverable spins do not occur. These checks ... back stick.

Proposed ACJ: Paragraph & Section:- 77, 100c(4)
Comment: Recovery With Abnormal Control Usage during Recovery. CAA will be making proposals for this section.
Response: Noted. A text proposal, with justification, will be expected.

Proposed ACJ: Paragraph & Section:- 78, Figure 100-1
Comment: Proposed Comment
 Not only CG envelope but also the moment of inertia should be considered when investigating the spin characteristics.

Reasons for proposed comment

When ballasting the aeroplanes to get the proper CG (Especially the aft CG case) it is easy to get a moment of inertia which will not correspond to the normal loading of the aeroplane. If ballasting too conservatively in respect of the moment of inertia, the flight tests could be catastrophic, if ballasting in the opposite way the certified aeroplane could be dangerous.

Response: Noted. This input had been given in connection with 100(b)(2) which is titled "Modification". However, the title of this sub-paragraph will be changed to "Moment of Inertia"

Proposed ACJ: Paragraph & Section:- 78, 100d(3)

Comment: Abnormal Control Usage. The last but two sentence beginning "Following abused control usage..." is confusing and should be clarified.

Response: Noted. A text proposal, with justification, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- 80, 100e

Comment: Data Acquisition. Precise control of weight and balance (except prior to takeoff) is difficult in most light aircraft. Should "control deflections" be read as the maximum surface travel.

Response: Accepted. The word "precise" will be deleted as it is considered superfluous:-

*e. **Data Acquisition.** The test aeroplane should be equipped with a calibrated airspeed indicator, accelerometer, and altimeter. ~~Precise~~ Control of weight and balance and control deflections is essential.*

Proposed ACJ: Paragraph & Section:- 80, 107a(1)

Comment: Crosswind. Should be in Limitations section if applicant considers limiting case has been investigated.

Response: Accepted. The text will be amended accordingly as follows:-

*(1) **Crosswind.** This regulation establishes the minimum value of crosswind that must be demonstrated. Since the minimum required value may be far less than the actual capability of the aeroplane, higher values may be tested at the option of the applicant. The highest 90° crosswind component tested satisfactorily should be put in the AFM as performance information. If the demonstrated crosswind is considered limiting, it should be specified in Section 2 of the AFM.*

Proposed ACJ: Paragraph & Section:- 82, 109. Section 23.239 Spray characteristic.

Comment: Ideally JAR 23.239 should have a corresponding requirement for landplanes on flooded or slushy runways, or JAR 23.901(d) should include reciprocating engines. In the absence of a requirement, it would still be useful if the ACJ included a reminder that it is highly undesirable for spray to impact on piston engine air intakes. Even if an engine does not malfunction, there is a power loss associated with operation via alternate intakes with their deliberate temperature rise.

Response: Accepted. The JAR 23 Study Group will investigate the need for an amendment to Sub-part E, or to the ACJ material, in a future NPA action.

Proposed ACJ: Paragraph & Section:- 85, 121b(3)(ii)(C) and 121b(3)(iii)

Comment: Longitudinal Upset and Two-axis Upset. The ill-defined 6°-12° pitch upset and 15°-25° roll input ("appropriate to the type") are imported from Part 25. The numbers are the same, logically they should be changed to relate better to Part 23 aircraft, or, better still, explicitly defined. Fortunately, these manoeuvres tend not to be critical.

Response: Noted. A text proposal, including substantiation, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- 87, 139c(4)

Comment: Trim Failure Recognition. It is incompatible with the treatment of hardovers to assume zero recognition time for trim failures. No credit can be given for a 'heads-in' visual warning of trim motion or failure, or for an audio if this routinely sounds with normal trim motion.

Response: Accepted. The second and third sentences of this section will be deleted:-

(4) Failure Warning. The first indication a pilot has of a trim runaway is a deviation from the intended flight path, abnormal control movements, or a warning from a reliable failure warning system. ~~An aural or flashing visual warning signal (in clear view of the pilot), actuated by a trim-in-motion system, is considered to give the pilot clear warning. Consequently, pilot recognition time is considered negligible with a trim-in-motion system.~~ The following time delays after pilot recognition are considered appropriate:

Proposed ACJ: Paragraph & Section:- 88, 139c(5)
Comment: Second Set of Controls. This is a requirement, and should be progressed as such.
Response: Not accepted. This item is intended to give an interpretation of a quick-disconnect/interrupt switch with an optional "Second Set of Controls" concept.

Proposed ACJ: Paragraph & Section:- 90, 166., Section 23.831 ventilation.
Comment: Many of the tests listed are those that a manufacturer would make in tracking down a CO problem, but even in that case, some are not intelligently directed. The main points: of ingress are:
Singles. Fuselage floor, including rear fuselage back to the sternpost.
Twins. Wing roots forward and behind the main torsion box.
All types. Cabin heater outlets to cockpit and cabin.
It is suggested that the table should be amended for certification:
- to delete the glide tests as unproductive
- to include a test with flaps and gear down with power for level flight, Although such configurations are not maintained for long periods in normal operation, they can involve bad CO ingress into the cabin inside the wing leading edge or along the flap shrouds. on twins, if CO levels are acceptable in the takeoff and landing approach cases, there is not likely to be a problem in the cruise. CO concentration measurements for certification purposes need only be taken at crew face level and in front, middle and rear cabin at face level.
Response: Accepted. To make it clear that the matrix is only an example, the text will be amended by adding:-

"A sample matrix for CO concentration is given in Fig. 166-1"

The proposed changes to the matrix will also be adopted. The climb for twins will be required to be carried out with one-engine-inoperative.

Proposed ACJ: Paragraph & Section:- 92, 190
Comment: Flight Test Guide has 3 pages on 23.903 and is written in places like requirement material.
Response: Noted. This is not an harmonisation item. The present text will be retained.

Proposed ACJ: Paragraph & Section:- 92, 190. Section 23. 903 Engines.
Comment: a(4) As JAR 23 does not encompass aircraft with more than 2 engines, this item is addressing total power loss. Brief total power loss, e.g. when both engines are feeding from a single tank which run dry, should be covered by ability to unfeather quickly once another tank has been selected, but the value of confronting the pilot with the drag of a windmilling propeller in this situation is not obvious. If there is concern about loss of vital ancillary services, that should be made clear and the procedure explained in the AFM.
Response: The intent of the comment, indicating that the benefit of the material for a twin-engine aeroplane is not obvious, is understood. For the time being, the text will be deleted, and the item declared as "RESERVED".

Proposed ACJ: Paragraph & Section:- 95, 193 a
Comment: On page ACJ-95, paragraph 193.a. would be improved texturally if the words "not acceptable" in both sentences were to be replaced by the more usual word "unacceptable".
Response: Accepted. The proposed text will be amended to read as follows:-

a. Explanation. This regulation ... without an appreciable and ~~not acceptable~~ unacceptable loss of power ~~A not acceptable~~ An unacceptable loss of power may depend...

Proposed ACJ: Paragraph & Section:- 95, 194(b)
Comment: Sub-paragraph 194.b.(12) is associated with 23.933(a)(1)(ii) which addresses turbojet / turbofan thrust reversers but the whole of 194.b. commences with the words "Reverse thrust propeller installations may be approved provided ... etc. ...". It appears that much of the other sub-paragraphs. of 194.b. might be equally relevant for turbojet / turbofan thrust reversers and it is suggested therefore that the text at 194.b. should be changed to :-
"Procedures. Installations of reversing systems may be approved provided the following is acceptable:"
Response: Accepted. The text will be amended to read:-

*b. Procedures. ~~Reverse thrust~~ Reversing systems may be ...
(9)(ii) The propeller/engine does not overspeed during and after the propeller reversing operation*

Proposed ACJ: Paragraph & Section:- 99, 247/248. Sections 23.10451 & 1047 Cooling test procedures

Comment: The ACJ should not perpetuate the lax cooling requirements of FAR 23. These allow cooling climbs to be started airborne, flaps and gear retracted, in a 75% power cruise.

The procedures Proposed for turbine engined singles in Section 23.1045a(8) and for twins in the event of engine failure in a(9), which involve climb from takeoff represent the real worst case. It is not rational to propose two standards.

Response: Not accepted. Although a climb from take-off is not necessarily always the worst case for reciprocating engine powered aeroplanes, it will remain as being an acceptable means of compliance

Proposed ACJ: Paragraph & Section:- 104, 256. Section 23.1093 Induction System icing protection

Comment: a. Reciprocating engines. All cases (1-5) in JAR 23.1093(a) specify the engine power to be set for the test. It has been accepted in the past, in line with the requirement, that these tests are done at 75% power. This also accords with reality which is that the cruise at partial power is when ice most readily builds up on the butterfly valve.

The extra tests involving powers above and below that specified in the requirement in JAR 23.1093(a) are not consistent with the requirement. Nor has service experience shown the need to modify the requirement. It is believed that the required temperature rises, measured at 75% power in level flight have been found satisfactorily to protect against carburettor icing in all cruise conditions.

Response: Rejected. The comment is not understood, since neither the proposed advisory material nor the existing requirement texts require power settings higher than 75%.

Proposed ACJ: Paragraph & Section:- 118, 289b

Comment: Speed Warning Device. The proposed FTG words are not helpful in interpreting "minimise". They also confuse nuisance inherent in the design and its tolerances (which is what the requirement is about) and nuisance due to failure, i.e. reliability, (which is a completely separate issue).

Response: The comment is noted. A text proposal, including substantiation, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- 122, 320
Comment: 23.1353 The wording used reflects the standard of BCAR 23. It is recommended that it is replaced by the new proposed wording for the ACJ which is discussed in the comment on ACJ 23.1353. This will then reflect current practice.
Response: Accepted. The proposed modified wording is supported as being more precise and will be proposed as follows:-

"When ascertaining that the installed aeroplane battery capacity is adequate for compliance with 23.1351(h) account should be taken of any services or equipment essential for the continued safe flight and landing of the particular aeroplane in accordance with the approved emergency procedures and in any approved condition of operation. Account should also be taken of those services which cannot readily be shed. In order to ensure that services will function adequately for the prescribed period, the duration of battery supply should normally be based on a battery capacity of 72% of the nameplate rated capacity at the one hour rate. This figure takes into consideration the battery state of charge, the minimum capacity permitted during service life and the battery efficiency and is based on a battery capacity of 80% of the nameplate rated capacity, at the one hour rate, and a 90% state of charge." Recognition time may depend on the kind of warning system.

Proposed ACJ: Paragraph & Section:- 129, 410
Comment: GAMA Handbook. There are problems with the GAMA handbook, in respect of the specific statements regarding approval status of parts of the document. These have to be corrected.
Response: Not accepted. The material of GAMA Handbook Spec. is intended to be reviewed and adapted for JAR 23 by the JAR 23 Flight sub-group.

Proposed ACJ: Paragraph & Section:- 129, 410, 411, 412, 413 & 414, 23.1581, 23.1583, 23.1585, 23.1587 & 23.1589
Comment: These Sections should be removed because the ACJ has not yet been drafted and this is pre-empting anything that may be decided later. There are fundamental issues involved in these Sections which need thorough consideration before they are written into an ACJ. One such issue is whether, in Section 23.1581(b)(2), it is acceptable to have a mixture of approved and unapproved material without segregation or identification. This is not something we would favour.

Another concern is whether there should be any controls on the use of Electronic Checklists (Section 23.1585).

Response: Partially accepted. This Section is unchanged from FAR 23 Flight Test Guide and has been current practice since 1975. The present exercise was to adopt as much of the FAR 23 Flight Test Guide for JAR 23 as feasible. Necessary improvements will be undertaken by future NPA actions.

1 Proposed ACJ: ACJ 23.1581(a)(3) Explanatory Note

2 Proposed ACJ: ACJ 23.1585(a) Explanatory Note

Comment 1: It is not appropriate to rely on the GAMA Spec. 1, which refers specifically to the FAA and FARs, without serious consideration. The task of drafting this ACJ should be referred to the Flight Manuals Working Group which has experience of Flight Manuals and has already produced an AMJ on the subject for JAR-25.

Comment 2: If one was looking for an interpretation of the Flight Manual term "abnormal", one would not immediately think to look in a Flight Test Guide which then refers you on the GAMA Spec.1.

Response (1+2): Not accepted. The proposal to bring this task to the JAR 25 AFM Working Group is not supported. For general aviation aeroplane, a comprehensive Operating Instruction (e.g. POH) is necessary for safety reasons. For Part 25 aeroplanes, the AFM is primarily a basis for a company-specific operating instructions to be prepared by the operator and approved by the Authority. Furthermore, for Part 25 aeroplanes, type ratings are required, for which Training Manuals are also produced. Specialist consideration within the JAR 23 Study Group of existing AFM-ACJ material will be undertaken as a priority action item.

Proposed ACJ: Paragraph & Section:- App. 17, Appendix 1

Comment: Power Reduction. The omission of a normally aspirated, fixed pitch power reduction method is a significant shortcoming.

Response: Noted. A text proposal, with justification, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- App. 7, Appendix 7.

Comment: USEFUL INFORMATION
"International" standard atmosphere data should be included in place of the US standard data.

Response: Accepted. A harmonised version will be introduced.

Proposed ACJ: Paragraph & Section:- App. 72, Appendix 7
Comment: US Standard Atmosphere. The ICAO international standard should be used?
Response: Noted. Both were found to be identical. The title will be changed from "US Standard Atmosphere" to "Standard Atmosphere".

Proposed ACJ: Paragraph & Section:- App. 8, Appendix 8
Comment: CONVERSION FACTORS TABLE
(a) On page App 8-2, the two uses of the term "Fluid Ounces" (one in the left-hand column and one in the right-hand column) both need changing to "Fluid Ounces, US".
Response: Accepted. A harmonised version will be introduced.

Proposed ACJ: Paragraph & Section:- App. 81, Appendix 8
Comment: Change "(advp)" to "(avdp)".
Response: Partially accepted. The terms avdp and Pounds (Troy) will be deleted, since they are no longer used.

Proposed ACJ: Paragraph & Section:- App. 9, Appendix 9
Comment: Position Error determination. The lower end of the speed range useable depends not only on absolute airspeed (speed course 1.3 V_s , Trailing Cone 1.2 V_s , Flyby 1.3 V_s). Trailing cone can be done down to stall, the others down to 1.1 V_s .
Response: Noted. A text proposal, including substantiation, would be welcomed for future consideration.

Proposed ACJ: Paragraph & Section:- App. 93, Appendix 9 Figure.
Comment: Typo - 'helicopter'.
Response: Accepted. It will be corrected.

Proposed ACJ: Paragraph & Section:- App. 99, Appendix 9.
Comment: Tower Fly-by. The proposed method is over complex and should be replaced by the following. An aneroid is used to datum the tower altitude before and after flight; it is fitted to the aircraft which is flown past the tower. A photograph of the aircraft against a level datum allows one to establish an accurate height which is correlated with the aircraft aneroid reading, giving a simple accurate PE value.
Response: Noted. A text proposal, including substantiation, would be welcomed for future consideration.