

**Comment Response Document (CRD)
to Notice of Proposed Amendment (NPA) 04-2006**

**for amending the Executive Director Decision No. 2006/05/R
on certification specifications, including airworthiness codes and acceptable means of
compliance, for large aeroplanes (« CS-25 »)**

**Symbolic Exit Signs And
Revised Standards for Cargo Compartments (D To C)**

Explanatory Note

I. General

1. The purpose of Notice of Proposed Amendment (NPA) 04-2006, dated 25 April 2006 was to propose an amendment to the certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes (CS-25).

II. Consultation

By the closing date of 07 June 2006, the Agency had received 12 comments from 5 national authorities, professional organisations and private companies.

III. Publication of the CRD

2. All comments received have been acknowledged and incorporated into a Comment Response Document (CRD). This CRD contains a list of all persons and/or organisations that have provided comments and the answers of the Agency.
3. In responding to comments, a standard terminology has been applied to attest EASA's acceptance of the comment. This terminology is as follows:
 - **Accepted** – The comment is agreed by the Agency and any proposed amendment is wholly transferred to the revised text.
 - **Partially Accepted** – Either the comment is only agreed in part by the Agency, or the comment is agreed by the Agency but any proposed amendment is partially transferred to the revised text.
 - **Noted** – The comment is acknowledged by the Agency but no change to the existing text is considered necessary.
 - **Not Accepted** - The comment is not shared by the Agency
4. The Agency's Decision will be issued at least two months after the publication of this CRD to allow for any possible reactions of stakeholders regarding possible misunderstandings of the comments received and answers provided.
5. Such reactions should be received by EASA not later than 14-01-2007 and should be sent by the following link: CRD@easa.europa.eu;

#	Para	Comment provider	Comment / Justification	Response	Resulting text
1.	Explanatory Note	UK CAA	<p>We have a comment in relation to the standard EASA text used to introduce this and similar NPA material. Please see pages 5 (of 29) and 15 (of 29) of the above; in each case under “I. Explanatory Note”, paragraph 1, line 3. In both explanatory notes the same standard text is used, as follows:</p> <p>“... rulemaking activities under the JAA system where not stopped and ...” (text emboldened for emphasis).</p> <p>The word “where” (a conjunction) should be replaced by the similar sounding word “were” (the plural past of the word “to be”). Perhaps EASA would like to have a look at this?</p> <p>Justification: Correction.</p>	<p>Noted The text does not form part of the amendment.</p>	Unchanged
2.	<p>JAA NPA 25D-327</p> <p>New AMC 25.812(b)(1)</p>	Airbus	<p><u>The existing text as follows:</u> The maximum viewing distance "D" to be considered should be the maximum distance found between two adjacent exits on one side. If the minimum height calculated for the symbols is less than 38mm (1.5 inches), 38 mm (1.5 inches) should be taken.</p> <p><u>Is proposed to be changed into:</u> The viewing distance "D" to be considered is the distance to any sign visible to the passenger. In any case, the maximum viewing distance “D” to be considered is 60 feet as authorized between two adjacent exits on one side, to CS 25.807 (d)(7). If the minimum height calculated for the symbols is less than 38mm (1.5 inches), 38 mm (1.5 inches) should be taken</p> <p><u>Justification:</u> The definition given for “D” was not precise enough with a possible misinterpretation of the maximum allowable distance of 60 feet between two exits and the requirement for an emergency exit identification and location to be recognized from a distance equal to the width of the cabin.</p>	<p>Not Accepted The formula for calculating the maximum viewing distance “D” applies only to exit locator signs and exit signs on bulkheads or dividers. The aim of the formula is to calculate a maximum distance “D” from which the sign could be readily seen and identified by occupants approaching along a main passenger aisle (see CS 25.811(d)). The calculated maximum viewing distance “D” should not be less than the actual maximum distance between adjacent doors on one side.</p> <p>Note In reviewing the text of AMC 25.812(b)(1), the terminology used was found to be inconsistent and could cause confusion or misinterpretation regarding the height of the symbolic sign. Text is therefore amended to clarify this issue.</p>	<p>AMC 25.812(b)(1) Emergency Lighting ... The maximum viewing distance "D" to be considered should be the maximum distance found between two adjacent exits on one side. If the minimum overall height calculated for the symbolic sign symbols is less than 38mm (1.5 inches), 38 mm (1.5 inches) should be taken.</p>

#	Para	Comment provider	Comment / Justification	Response	Resulting text
3.	JAA NPA 25D-320 CS 25.858 - Cargo or Baggage compartment Smoke or Fire Detection Systems – (c)	Airbus	<p>Existing text: “There must be means to allow the crew to check in flight, the functioning of each smoke or fire detection circuit”.</p> <p>Is proposed to be changed into: “There must be means to allow the crew to check in flight, the functioning of each fire detection circuit”.</p> <p>Justification: The text, as proposed, is not harmonized with FAR 25 at amdt. 93 and original NPA 25-D230, as mentioned in the explanatory note and original JAA NPA proposal justifications. Furthermore, the reasons for adding the “smoke detection circuit” in CS-25.858(c) is not explained in the NPA. The “fire detection circuit” is a generic wording , which includes the “smoke detection system”, and it is useless to add “smoke detection circuit” in that paragraph.</p>	<p>Not Accepted The terms “fire detector” and “smoke detector” are used distinctively elsewhere in CS-25 Subpart D (e.g. CS 25.855, CS 25.857). Adding smoke detector in CS 25.858(c) is aimed at meeting the intended safety objective and clarifies the rule to avoid any possible misunderstanding.</p>	Unchanged
4.	CS 25.858 Cargo or Baggage Compartment Smoke or Fire Detection Systems	FAA	<p>FAA concurs with the new regulatory text as it agrees identically with current 14 CFR Part 25.858.</p> <p>Justification: N/A</p>	Noted	Unchanged
5.	CS 25.857 Cargo Compartment Clarification	FAA	<p>FAA concurs with the new regulatory text as it agrees identically with current 14 CFR Part 25.857 (d).</p> <p>Justification: N/A</p>	Noted	Unchanged
6.	JAA NPA 25D-327 Explanatory Note	FAA	<p>The FAA supports the concept of a common “exit” symbol, which has the potential to simplify design and improve safety. However, the FAA has not been able to conclude that such symbols have been shown to provide the equivalent level of recognition provided by the word “Exit”. The numerous studies on this subject have produced varying results, but for English</p>	<p>Noted As Europe is a more culturally diverse region with multiple spoken languages, the assumption that single language based signs will be understood by a very high proportion of passenger cannot be relied upon.</p>	Unchanged

#	Para	Comment provider	Comment / Justification	Response	Resulting text
			<p>speakers, the text based sign performs better than any of the symbolic signs. Much of the work that has been done is highly context driven, and the value of the symbol alone is not clearly established. That is, the context of the assessment may have provided a significant amount of the cues used to recognize the symbol. Under actual emergency conditions, with less external reference, the value of the symbol itself will be paramount.</p> <p>At this time, the FAA is not ready to accept symbolic signs in lieu of text-based signs. However, we will accept a combination symbolic/text sign. The comments that follow apply assuming that EASA nonetheless pursues the rulemaking proposed.</p> <p>Justification: The FAA’s standard for accepting an alternative to the specific requirement in the regulations must be that it shows an equivalent level of safety. Since the US population is English-speaking, the standard for equivalency is the recognition of the word “exit” by English speakers. None of the symbols studied to date have shown an equivalent recognition with that as a basis. Therefore, the FAA cannot accept a symbol in lieu of text, until that equivalency is shown. However, to help facilitate the movement toward a universal symbol, the FAA is conducting studies of symbol recognition, with the objective of identifying the steps necessary to achieve equivalency with a text-based sign.</p>	<p>In Europe and in other parts of the world, symbolic based signs are used widely in public buildings and other forms of transport. Best practice, supported by ISO 3864, promotes the use of universal symbols and while it is accepted that the amount of specific aeronautical research is limited, credit can be taken for studies undertaken in related fields. Furthermore, research undertaken in support of this proposal has determined that signs incorporating universal symbols are sufficiently understood by the travelling population to be applied to aircraft.</p> <p>The use of combination symbolic/text signs would not fulfil the basic intent of this proposal, which was to provide equivalent safety without the need for dual language signs to meet national linguistic requirements. The use of combination symbolic/text signs have not been addressed specifically in these proposals and were not assessed as part of the supporting research programme. AMC 25.812(b)(1) and AMC 25.812(e)(2) do not therefore promote combination signs as acceptable means of compliance. However, these proposals do not prevent combination symbolic/text signs from being proposed and, in line with normal certification procedures, it would be up to the applicant to demonstrate an equivalent level of safety to those designs which have been found acceptable to the Agency.</p>	

#	Para	Comment provider	Comment / Justification	Response	Resulting text
7.	JAA NPA 25D-327 25.811(g)	FAA	<p>The prohibition on mixing symbolic signs and language based signs on the same airplanes, presumably refers to having some exits with one type, and other exits with the other type. However, it might also be interpreted to prohibit a combined symbolic/language sign at a given exit. We recommend that that this be clarified in either in the text of the rule, or in the advisory material. For example, the last sentence of ¶ 25.811(g) could read: “All exits must use the same type (symbolic, language or a combination) of exit sign.”</p> <p>Justification: This will avoid confusion and preempt the need for further advisory material later on.</p>	<p>Partially Accepted Combination symbolic/language signs are not specifically addressed in the revised text and so a specific reference is considered inappropriate. However, the safety aim is to ensure that a single style of sign is used throughout the aircraft to avoid possible confusion, and it is agreed that the text could be made clearer in this regard.</p>	<p>CS 25.811 Emergency Exit Marking</p> <p>.... (g) Each sign required by subparagraph (d) of this paragraph may use the word ‘exit’ in its legend in place of the term ‘emergency exit’ or a universal symbolic exit sign (See AMC 25.812(b)(1), AMC 25.812(b)(2) and AMC 25.812(e)(2)). The design of exit signs must be chosen to provide a consistent set throughout the cabin. Mixing language signs and symbolic signs on the same aircraft is not allowed.</p>
8.	JAA NPA 25D-327 25.812(b)(1)(i) and (ii)	FAA	<p>We suggest that the standards for letter size and height/stroke-width ratio, as well as the background area be retained in the requirement. The regulations allow for alternative approvals, if equivalent safety is shown, but in the absence of regulatory standards, the potential for a lack of standardization and potentially inadequate exit marking exists.</p> <p>Justification: Experience has shown that certain requirements need to be prescriptive in order to satisfy the safety objective. In this case, because of the potential for adverse conditions to exist in a real emergency, demonstrations conducted under test conditions may not provide realistic results. Thus, signs that are smaller than would be needed in an emergency might appear to be acceptable under benign test conditions.</p>	<p>Not Accepted The proposal is in line with the general objective of providing objective based requirements. Also, moving detailed compliance requirements to AMC simplifies the rule and provides consistency with the rules governing symbolic signs.</p> <p>AMC defines an “Acceptable Means of Compliance”. Any alternate proposed by the applicant would require an equivalent level of safety to be established.</p>	Unchanged

#	Para	Comment provider	Comment / Justification	Response	Resulting text
9.	JAA NPA 25D-327 AMC 25.812(b)(1) and (2)	FAA	<p>If the proposed regulatory text remains as is regarding the dimensions of the text-based signs, the use of the terms “must” and “should” is not consistent between paragraphs AMC 25.812(b)(1) and (2). If the existing rule text is retained, this is not an issue. Note that this is discussed in paragraph 2 of the JAA comment-response document, but doesn’t appear to have been changed.</p> <p>Justification: The AMJ should use consistent terminology to describe the same criteria in the two different paragraphs.</p>	<p>Accepted AMC 25.812(6)(2) is amended</p>	<p>AMC 25.812(b)(2) Emergency Lighting</p> <p>.... A Locator sign, marking sign and bulkhead or divider sign must should either:</p>
10.	JAA NPA 25D-327 AMC 25.811(e)	FAA	<p>We have not seen any data supporting the use of the symbol shown for the floor proximity exit marking sign given as an acceptable example in this paragraph. Given the difficulties evident in the responses to signs with vertically oriented arrows in the Cranfield study, we recommend that text based signs be required in this application, or that the same symbol accepted as complying with 25.811(d)(1) be used here also.</p> <p>Justification: Data aren’t present to support the use of the symbol shown.</p>	<p>Accepted The justification given by the JAA CSSG for choosing the “arrow” symbol was primarily related to the small size of these signs and the need to provide the greatest amount of general illumination from the white portions of the sign.</p> <p>EASA specialists have reviewed the use of this symbol and concur with the commenter that its use could be problematic and that the need for general illumination could be achieved by other means.</p> <p>Furthermore, in reviewing the symbology used for other signs, it was clear that they did not reflect the latest international standards. Alternative symbols that are deemed to have equivalent safety and which would be acceptable to EASA are added to AMC 25.812(b)(1) and AMC 25.812(e)(2).</p>	<p>See Annex 1 below</p>
11.	JAA NPA 25D-327 General	TCCA	<p>TCCA supports the development of more universally-‘recognizable’ exit signs, particularly because of their potential to improve safety by making exit information more ‘accessible’ to a broader range of persons, but</p>	<p>Noted</p>	

#	Para	Comment provider	Comment / Justification	Response	Resulting text
	Comment(s)		<p>also because they will simplify design for smaller aeroplanes and for those cases that call for more than one language.</p> <p>TCCA has reviewed the data presented in support of the subject NPA, and finds it, though positive, not yet conclusive enough to proceed in the proposed direction. In particular, review of Cranfield Report No. 9706 has identified a number of issues/concerns; for instance,</p> <ul style="list-style-type: none"> – The interviews were conducted in the ‘sanitized’ environment of airport boarding lounges. It is not clear to what extent the results can be extended to actual aircraft emergency evacuation scenarios/conditions. – It is stated that subjects were selected at random; how this was achieved is not explained. In addition, it is specified that the sampling comprises almost 3 times as many males as females; it is not clear what effect this may have on the validity of the results. – It is not clear what specific instructions were provided to the subjects in those cases where the questionnaires were self-completed (and how many such cases there were). In addition, it is not clear how the subjects were ‘controlled’ in those cases, to ensure that the experimental protocol was properly followed. This notwithstanding, it is not clear what impact the difference between the self-completed and interviewer- 	<p>It is acknowledged that research of the type undertaken as part of this task must be carefully planned and executed. Reliance has to be placed on the professionalism of the organisation undertaking the study and the test protocol followed. In this case, Mobiel Centre, a dedicated and established market research organisation was used with the test methodology developed by Cranfield University’s Department of Applied Psychology, based on tests laid down in ISO 9186 “Procedures for the development and testing of public information symbols”.</p> <p>To ensure a widespread regional and cultural variation in the sample, participants were selected by targeting departing flights bound for different regions of the world. Individual selection was then done as randomly as was practicable. The proportion of male/female participants reflected the composition of the flights targeted.</p> <p>The wording of all instructions and questions were equivalent and regardless of methodology followed, a similar procedure was employed. The Cranfield report acknowledges that the different methodologies employed may have had a bearing on the results. Phase 2 of the study</p>	

#	Para	Comment provider	Comment / Justification	Response	Resulting text
			<p>administered methods has on the validity/reliability/consistency of the results.</p> <p>– It is not clear how the variables “nationality/region”, “previous exposure” and “frequency of air travel” were ‘isolated’ in the analysis (to ensure their independency) (ref. para. 2.7).</p> <p>– It is noted that the degree of comprehension of graphical exit signs by region shows that for (presumably) non-English speaking people (to whom such signs are mostly directed...) was, in some cases, lower than that for language signs; it is not clear what caused this phenomenon.</p> <p>Accordingly, TCCA cannot conclude (from the available data) that symbolic exit signs, as proposed, offer a level of safety equivalent to that of the required text signs in emergency evacuation conditions. TCCA is aware of work currently under way by the FAA to assess the comprehensibility (and “confusability”) performance of graphical exit signs, as well as to define activities needed to move towards their implementation. It is anticipated that this work will provide answers to many outstanding questions and concerns.</p> <p>In case, EASA decides to proceed with final rulemaking per this proposal, it is TCCA’s recommendation that EASA should consider retaining “EXIT” sign specifications in relevant rules (rather than being incorporated in a guidance document). Any time a minimum level of safety requirement is not specified in the rules If the requirements that define a minimum level of safety are not specified in the rules, it can potentially lead to its inadequate and inconsistent implementation.</p>	<p>investigated this further (see below).</p> <p>Further analysis of these factors was undertaken in Phase 2 of the study (Para 3). “Region of Origin” was determined as being mildly influential and was equally valid for both symbolic and language based signs. “Previous Exposure” and “Frequency of Air Travel” were not significant.</p> <p>The phenomenon is explained on the lack of contextual cues associated with the photographs. It is noted however, that, based on the 66% pass criteria, more regions pass the criteria with symbolic signs (5/8) as opposed to language based signs (4/8).</p> <p>EASA has determined that sufficient evidence exists that symbolic signs provide at least an equivalent level of safety compared with conventional signs and are readily recognised and understood by a multinational general and travelling population. (See also response to Comment 6).</p> <p>(See response to Comment #8)</p>	

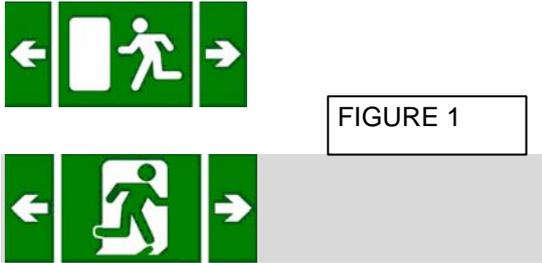
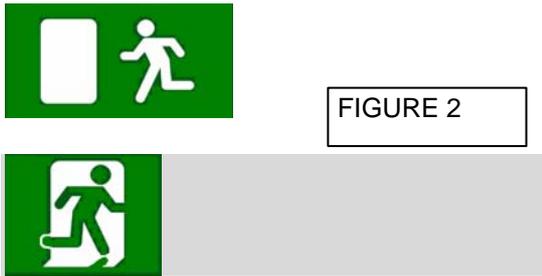
#	Para	Comment provider	Comment / Justification	Response	Resulting text
			<p>Notwithstanding the above, it should be considered that adoption of the subject NPA by EASA at this time, will result in “un-harmonization” if the FAA and/or TCCA do not adopt a similar rule change.</p> <p>Justification: Harmonization</p>		
12.		DGAC France	no comments	Noted	

ANNEX 1: CHANGE TO AMC MATERIAL TO ILLUSTRATE SYMBOLIC SIGN DESIGNS ACCEPTABLE TO EASA

AMC 25.812(b)(1)
Emergency Lighting

...

Examples of acceptable designs of symbolic exit signs

<p><u>CS 25.811(d)(1)</u> (exit locator sign)</p>	 <p>FIGURE 1</p>
<p><u>CS 25.811(d)(2)</u> (exit marking sign)</p>	 <p>FIGURE 2</p>
<p><u>CS 25.811(d)(3)</u> (exit sign on bulkhead or divider)</p>	 <p>FIGURE 3</p>

The design of symbolic exit signs should be chosen to provide a consistent set throughout the cabin.

AMC 25.812(e)(2)
Emergency Lighting

...

CS 25.812(e)
(exit identifier)

