

Comment				Comment summary	Suggested resolution	From the commenter point of view a modification of the published text is*: -Not requested; -Recommended; -Requested	EASA comment disposition	EASA response
NR	Name of the organisation commenting	Section, table, figure	Page					
1	The Boeing Company	Special Condition	3	The text states: “In order to protect cabin occupants during evacuation, from the risk of fuselage tank explosion triggered by an external fuel fed ground fire ³ , the aeroplane design must prevent fuel tank vapours ignition conditions...”. Review of the MOC indicates that the subject of this Special Condition is hot surface ignition. Since “fuel tank vapours ignition conditions” could be interpreted more broadly, Boeing recommends more specific language adopted.	Suggested re-wording as follows: “In order to protect cabin occupants during evacuation, from the risk of fuselage tank explosion triggered by an external fuel fed ground fire ³ , the aeroplane design must prevent hot surface ignition fuel tank vapours ignition conditions from occurring inside the conformal fuselage structural fuel tank...”	Recommended	Partially Accepted	Thank you for your comment which is partially accepted as more accurate. The intent of the Special Condition is indeed to address hot surface ignition of fuel vapours as opposed to other possible sources of ignition. EASA has revised the text of the Final Special Condition accordingly.

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2	The Boeing Company	Special Condition	3	<p>The text states: “The corresponding demonstration must consider sufficient time to allow a safe evacuation of all occupants after an event leading to an external fuel fed ground fire.” However, ‘sufficient time’ should be defined in the Special Condition.</p> <p>Consistent with CS 25.975(a)(7), Boeing recommends that the Special Condition specify a minimum of 2 minutes and 30 seconds. This existing standard applies to fuel tank vents to address similar evacuation safety concerns. In addition to being consistent with the CS, this standard is also consistent with 14 CFR 25.975(a)(7). Boeing recommends that the time requirement for this Special Condition be consistent with these existing standards.</p>	<p>Suggested re-wording as follows:</p> <p>“In order to protect cabin occupants during evacuation, from the risk of fuselage tank explosion triggered by an external fuel fed ground fire³, the aeroplane design must prevent fuel tank vapours ignition conditions from occurring inside the conformal fuselage structural fuel tank for a minimum of 2 minutes and 30 seconds when exposed to an external fuel fed ground fire.</p> <p>The corresponding demonstration must consider sufficient time to allow a safe evacuation of all occupants after an event leading to an external fuel fed ground fire.</p>	Recommended	Not Accepted	<p>Thank you for your comment. EASA does not agree to the comment.</p> <p>The comment is actually raising 2 points:</p> <ol style="list-style-type: none"> 1- Actual time definition within the text of the Special Condition 2- Actual value of that time (in the text of the Means of Compliance) in accordance with §25.975(a)(7). <p>1-The Special Condition should be performance-based with the objective to become applicable to different design solutions.</p> <p>As a consequence, the duration for safe evacuation of the cabin shall be tailored to relevant design of the cabin. This duration is detailed in the Means of compliance: “<i>In order to comply with the Special Condition requirement, the applicant should demonstrate that the conditions for fuselage tank fuel vapours’ ignition should not occur within 5 minutes of exposure to the external ground fire.</i>”</p> <p>2-The 5 minutes time duration is defined to remain consistent with maximum occupant protection time in case of external fire conditions (refer to CS 25.856(b)).</p> <p>The proposed 2 minutes and 30 seconds is linked to a different objective, i.e. ‘[...] the prevention of fuel tank explosions caused by the ignition of vapours outside fuel tank vents’, per § AMC25.975(a)(7) intent and caused by ‘[...] the propagation of flames from outside the tank through the fuel tank vents into the fuel tank vapour spaces when any fuel tank vent is continuously exposed to flames’ per CS25.975(a)(7) extract.</p> <p>As a reminder the 2min30s for vent flame arrestor have been applied to tanks where design practices are generally locating the flame arrestors in wings. Should the requirement be applied to fuselage tank and/or fuselage tank vent designs, then this duration may have to be re-evaluated.</p> <p>Finally, there is some history in the introduction of the 2min 30s for fuel tank flame arrestors. The initial FAA NPRM (60 FR 6632) dated February 2, 1995 proposed to require a 5min performance. Additional cost information were provided from component suppliers and industry commented that flame arrestors in production at that time could not meet the proposed 5min standard. FAA determined that there was still some benefits with a 2min30s standard. This value was introduced at rule level by Docket No. FAA-2014-0500 Amdt. No. 25-143, 81 FR 41207, June 24, 2016). EASA harmonized the CS 25.975 with Amdt. 21 that introduced subparagraph (a)(7) on the same principle that despite the target was 5min , there is a benefit in introducing flame arrestor with a reduced performance. This performance is specific to flame arrestor and placed at flame arrestor rule level.</p>

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3	ANAC	Special condition	3/5	<p>I disagree that the RCT (design and location) tank is considered as an unusual or novel design feature for this category of aircraft.</p> <p>There are other aircraft that have a fuel tank installed in the fuselage with the same characteristics to those described in this document.</p> <p>My understanding is that the concern of external fuel fed ground fire which would cause the tank to explode, is a concern for any fuel tank. In the event of ground fire, both a low-wing tank and a fuselage tank will suffer the same explosion risk.</p> <p>For this reason, material designed to build fuel tanks must be at least fire resistant as per requirement 25.965(e)(2).</p>	<p>If EASA considers this risk to be significant, the risk of fuel tank explosion from an external fire should be extended to any type of fuel tank configuration. Or that SC states the risk (large tank near the ground, high quantity of fuel, etc) of this specific tank in the fuselage.</p>	Requested	Not Accepted	<p>Thank you for your comment.</p> <p>While the comment is pointing that the external fire on fuel tank should be addressed equally for any fuel tank, EASA considers that risks and consequences on aeroplane safety may justify different certification approaches. The discussion below is addressing briefly those differences.</p> <p>EASA is aware that similar conformal fuel tanks do exist but considers indeed the current project RCT <u>different in term of risks and consequences</u> on the safety of cabin occupants compared to other fuels tanks. A previous known large aeroplane (outside of business jets) Conformal Fuel Tank (CFT) was already installed, but CS 25.856(b) was not applicable at that time to that aircraft.</p> <p>In the context of CS 25.856(b), Auxiliary/Additional Center Tanks (ACTs) are different from current project RCT as ACTs are not CFT, i.e. ACTs don't have their skin directly exposed to external fire. Several barriers (e.g. fuselage skin, fuselage insulation, ACTs double skins) prevent direct fire heat propagation to the inner ACTs.</p> <p>EASA considers that typical Wing Tank are not considered unusual design features and they are not subject to the same requirement related to passengers protection/evacuation.</p> <p>This consideration justifies the unusual design features identification on Large Aeroplane.</p>
4	FAA	2)	2	<p>Suggest clarifying that the external fuel leak in the accident referenced with respect to CS 25.963(e)(2) was the result of the failure of a fuel tank access panel following impact leading to the perforation of the wing fuel tank.</p>	<p>This rule was created following an accident where a fuel tank access panel failed from impact damage causing a fuel leak from a perforated wing tank and generated an external fuel fed ground fire.</p>	Recommended	Accepted	<p>Thank you for your comment. The proposal is accepted as providing clarification and being more accurate.</p> <p>EASA has revised the text of the Final Special Condition as proposed.</p>

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5	FAA	MOC 4	5	The External fuel fed Ground Fire Flame definition stipulates that the burner called out in part VII of Appendix F should be used to assess the ignitibility of the vapors inside the fuel tank. However, the specified burner is representative of a post crash fire in the context of the test sample it is used on, in Appendix F. That test sample is much smaller than the fuel tank.	Suggest modifying the last sentence as follows: if this burner is used in demonstrating compliance with these special conditions, the applicant must consider the relative scale of the burner flame as compare with an actual fire, in determining the effects on fuel inside the tank.	Recommended	Partially Accepted	<p>Thank you for your comment which is partially accepted. EASA acknowledges the point but considers that the reference to “Appendix F part VII burner” is to actually address the characteristics of the external fuel fed fire <u>flame</u> (the title of the section indicates “C3 External fuel fed Ground Fire Flame definition”). The MoC does not prescribe the number of burners to be used to become representative of actual external fire conditions. The Appendix F section VII burner flame is representative of real size external fire flame measurement with some margins (refer to FAA DOT/FAA/CT-90/10).</p> <p>Please note that for any acceptable MoC, alternate MoC could be proposed by the applicant, such as simulation. It would then be essential that the characteristics of the external fire flame in contact with RCT skin is in accordance with the Appendix F section VII burner flame.</p> <p>In particular, scale consideration is an item of compliance demonstration that cannot be ignored.</p> <p>EASA has revised the text accordingly: “Consequently, for a conformal fuselage tank compliance demonstration to the present Special Condition, burner(s) with the same flame characteristics may be used.”</p>

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