EASA Proposed CM-PIFS-001 Issue 01 – Large Transport Aeroplanes with Composite Wing – Fuel Tank Fire Withstanding Capability - Comment Response Document

Comment				Comment summary	Suggested resolution	Comment is an observation or is a suggestion	Comment is substantive or is an objection	EASA comment disposition	EASA response
NR	Author	Section, table, figure	Page						
1	*Rolls-Royce Deutschland Ltd Co KG*	All	All	Some general remarks: What kind of fire should be considered? Inside a designated fire zone a fire with the intensity of a standard burner is considered, only at one location at a time. A post crash fire means in most cases that a fuel tank is already damaged. A large fuel pool causes a large tank area subjected to the flame. Wetted tank areas are assumed not so much of a concern because of inside cooling. However, outside skin layers may be affected because of lower heat conductivity relative to aluminium, which may affect structural strength. Structural strength of the non-wetted composite tank areas is more of concern relative to aluminium, which may cause the wing to crack. Burn through resistance of composite, > 4 layers CFC, is even better than of aluminium. Probability of auto ignition via composite is lower than for aluminium because of lower heat conductivity.	N/A	Observation		Noted	In CS-25 fire resistance demonstration by test is normally associated with ISO 2685; the FAA AC 20-135 is also an acceptable alternative. EASA highlights that fire in a Designated Fire Zone is not reduced to a single burner test which is a local representation of a fuel fed engine fire used in consideration of testing practicalities. EASA will not comment into details the technical argument presented in the Certification Memorandum. However, it shall be noted that the lower thermal conductivity of composite material is not only a concern for structural strength, as it will allow heat to concentrate in the area of flame application. This would possibly cause the temperature to exceed the fuel auto-ignition temperature, whereas the better conductivity of aluminium would allow spreading the temperature on much wider area resulting in lower temperatures within the tank. An additional concern specific to composite material, in opposition to aluminium, is the porosity upon resin migration under fire conditions where fibre may absorb flammable liquids despite those fibres may ensure a no-burnthrough in a dry environment.
2	*Boeing Commercial Airplanes*	3rd "box" from top of page	1	The Notification states that the Certification Memorandum (CM) is intended to "provide guidance… as non-binding material… provided for information purposes only… not intended to introduce new certification requirements or to modify existing certification requirements and do not constitute any legal obligation." It is not clear why this information should not more properly be proposed (and vetted) as formally adopted guidance material such as an Acceptable Means of Compliance (AMC), or how it differs from other types of Guidance Material.	Add more explanation of how CMs differ from AMCs and EASA "Policy Statements," and how EASA plans to implement CM guidance.	Yes		Noted	This is a generic comment related to EASA Certification Memoranda (and possibly FAA policy memo). There is no technical comment, and the response should be provided by the Certification Memorandum procedure itself.
3	*Boeing Commercial Airplanes*	3rd "box" from top of page	1	Further to the comment above, given that FAA AC 20-107B, "Composite Aircraft Structure," was recently released and contains material that addresses the concerns identified in the proposed CM it would be preferable, if EASA believes guidance material is required, to provide it in a harmonized form.	Provide any guidance material that EASA believes appropriate in a form that is harmonized with FAA's parallel material.	Yes		Noted	This specific Certification Memorandum is based upon the Airbus A350 and B787 FAA and EASA certifications. It can therefore be considered as harmonised with the FAA policies, as understood by EASA through both certification exercices.
4	*Boeing Commercial Airplanes*	2.2 & 3.1	5, 6	The proposed CM is advisory in nature and discusses two approaches that an applicant may use to demonstrate that a composite wing is equivalent to an aluminium wing for fire resistance. The second option is derived from an FAA report and indicates that wing/fuel tank design should endure an external fuel fed fire for at least five minutes. This explicit statement is not included in the parallel FAA AC 20-107B, "Composite Aircraft Structure,"' section 11.b.	Since the underlying intent of the proposed CM and AC are complementary, we recommend that the proposed CM section 2.2 be revised to read: *"… it has been considered that the intent of CS 25 will be met if the applicant demonstrates that the composite structure is able to sustain a fire for five minutes or as otherwise specified in FAA AC 20-107B."* The proposed CM section 3.1 should be changed similarly.		Yes	Not accepted	EASA has not yet adopted FAA AC 20-107B; the adoption of such material into CS-25 is beyond the scope of this Certification Memorandum.
5	*Boeing Commercial Airplanes*	2.2	5	Current wording in the third paragraph states: *"… the intent of CS 25 will be met if the applicant demonstrates that the composite structure is able to sustain a fire for five minutes."* We consider the actual intent would be to *withstand* a post-crash fire, not *sustain* it.	Change the word "sustain" to "withstand" in the noted sentence, for better clarity.		Yes	Accepted	Comment agreed.

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6	*Embraer*			EASA should clarify which type of test would be applicable to verify flame resistance for 5 minutes to the composite structure, like the "Discussion of Comments" of FAA Special Condition SC-25-348 "Boeing Model 787-8 Airplane; Composite Wing and Fuel Tank Structure - Fire Protection Requirements", described below, which mentions that AC 20-135 would be applicable: *Comment 4 - Airbus. Airbus also requested clarification of the following statement on page 17443 of the Federal Register, under the heading "Discussion of Proposed Special Conditions: * * * AC 20-135 indicates that, when aluminium is used for fuel tanks, the tank should withstand the effects of fire for 5 minutes without failure." Airbus said this statement needed clarification, because the actual language in the AC discusses fire resistance of a number of elements, but does not consider the fuel tank as a whole.* *FAA Response - The commenter is correct that A C 20- 1 35 does not specifically refer to demonstrating that the fuel tank as a whole is fire resistant. In the past fuel tanks have typically been constructed of aluminium, which is considered to be fire resistant. AC 20-135 provides general guidance on how materials can be shown to be fire resistant if they can withstand the effects of fire for 5 minutes. These special conditions require that the fuel tank be shown to meet fire resistance standards and one means of showing a material meets these standards is described in the AC. Since the fuel tank is constructed of composite materials, we consider the guidance in the AC to be applicable to the fuel tank as a whole. We've made no change to these special conditions as a result of this comment.*				Noted	The Certification Memorandum does not provide details on how to perform the fire demonstration. The current CS Definitions and CS-25 (sections 1 and 2) provide the relevant definitions and references to the relevant advisory material, including ISO 2685; FAA AC 20-135 is also an acceptable alternative. To record the various discussions held on recent projects, please note that EASA is considering drafting another Certification Memorandum pertaining to fire testing.
7	*Airbus*		1	The preamble reads: "EASA Certification Memoranda clarify the Agency's general course of action on specific certification items. They are intended to provide guidance on a particular subject and, as non-binding material, may provide complementary information or guidance for compliance demonstration with current standards. Certification Memoranda are provided for information purposes only and must not be misconstrued as formally adopted Acceptable Means of Compliance (AMC) or as Guidance Material (GM). Certification Memoranda are not intended to introduce new certification requirements or to modify existing certification requirements and do not constitute any legal obligation. EASA Certification Memoranda are living documents into which either additional criteria or additional issues can be incorporated as soon as a need is identified by EASA" The current CM is not inline with this intent.	The intent of a CM is described by this text. However the current text of this CM is not in line with the intent of a CM, where not only non-binding guidance, but new requirements are introduced. The CM is in fact a copy of EASA/FAA Special Condition text raised for CFRP wing fuel tanks, and is a new requirement. From a general point of view, the Agency should ensure that CM will not substitute to the usual rulemaking process for new requirements. Airbus request to remove the complete text related to the Special Condition from the CM chapter 2.1, 2.2 and 3. See point 4 for recommendation what to include in a CM on this subject.			Not accepted	After a thorough review of the Special Conditions raised on the subject on recent projects, including the Airbus A350 and the Boeing 787, it appeared they did not introduce new requirements and that those Special Conditions were providing only interpretative material. The classification as Special Condition really result in the certification teams focussing on CS-25 requirements, while ignoring the definitions of fire resistance provided in CS Definition. This is clearly explained in the Certification Memorandum.

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8	*Airbus*		4	No requirement is referenced in § 1.2 REGULATORY REFERENCES & REQUIREMENTS	As mentioned in point 1, this chapter 1.2 provides no reference to existing requirements as the CM itself is a new requirement. See point 4 for resolution.			Not accepted	The Certification Memorandum conclusion provides exactly the point proposed as item 9 by the commenter. It seems the commenter would have organised and written the Certification Memorandum in a different manner, but does not really challenge the main outcome i.e. the choice proposed for compliance finding. Based upon this situation the EASA does not consider it necessary to revise the Certification Memorandum.
9	*Airbus*		6	The title "Certification Policy" of paragraph 3 implies a different context than non-binding guidance.	Remove the term "Policy".			Noted	This Certification Memorandum is not binding and only presets the current EASA policy.
10	*Airbus*		General	It is considered that if a Certification Memorandum is required on this topic it should not be incorporating the Special Condition text but address the issue of Post Crash and Post Incident large pool fires by providing guidance in how to demonstrate compliance with the Special Conditions issued on several programs. In this case, Airbus proposes that the Certification Memo is re-distributed for comments to all interested parties after it has been rewritten.	Instead of the Special Condition text, the CM could address the following guidance: 1. Likely scenarios, after incidents with consequential fire, within the airport boundaries. 2. Fire resistance of which structural components to be addressed. 3. Definition of large pool fires – extent and intensity. 4. Specific issues relating to fuel tanks. 5. Definition of fire resistance – penetration, explosion risk, structural integrity. 6. Level of compliance required for large transport aircraft designs. 7. Clarification on Loads to be used during structural assessment 8. Clarification on testing versus analysis. 9. Give choice to applicant between equivalence with similar wing manufactured of light alloy and a 5 minutes fuel fed fire endurance demonstration. 10. What is “similar wing manufactured of light alloy”, is it same thickness or metallic wing sized to same loads?			Not accepted	The Certification Memorandum conclusion provides exactly the point proposed as item 9 by the commenter. It seems the commenter would have organised and written the Certification Memorandum in a different manner, but does not really challenge the main outcome i.e. the choice proposed for compliance finding. Based upon this situation the EASA does not consider it necessary to revise the Certification Memorandum.
11	*UK CAA*			Please note that the UK CAA does not have any comments.				Noted	Thank you.
12	*EASA*	Title	1	I was just looking at the website and noticed that there is a new certification memo entitled ‘Large Transport Aeroplanes with Composite Wing Fuel Tank Fire Withstanding Capability’ I know this subject is not my field at all, but could I suggest a simpler and clearer title might be something like:	Withstanding Fires on Large Transport Aircraft with Composite Wings and Fuel Tanks, Or Withstanding Fires on Large Transport Aircraft with Composite Wing Fuel Tanks. It’s just a suggestion, as the current title is a bit ponderous.	Suggestion		Partially accepted	It is proposed to amend the title to "Large transport aircraft: Fire withstanding capabilities of composite wing containing fuel tank".