



Federal Aviation Administration

Memorandum

Date: October 24, 2015

To: Manager, Transport Standards Staff, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Douglas Bryant, ANM-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for PW1100G-JM 2.5 Bleed & Track lock Areas (§ 25.1181) and PW1100G-JM and LEAP-1A Areas Adjacent to Designated Fire Zones (§ 25.1182) on the Airbus Single Aisle New Engine Option Model Airplanes, FAA Project Number AT00949IB-T

ELOS Memo#: AT00949IB-T-P-21

Reg. Ref.: §§ 25.863, 25.865, 25.867, 25.869, 25.1181, 25.1182 & 25.1185 through 25.1203

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Airbus Single Aisle (SA) New Engine Option (NEO) Model A319-151n/171n, A320-251n/271n, & A321-251n/271n airplanes.

Background

Title 14, Code of Federal Regulations (14 CFR) 25.1181(a)(6) identifies the compressor and accessory sections of turbine engines as a designated fire zone. Section 25.1181(b) requires that each designated fire zone must meet the requirements of §§ 25.863, 25.865, 25.867, 25.869, and 25.1185 through 25.1203. Airbus has proposed not to identify the 2.5 bleed area and the track lock box area, which are located in a compressor area, as a designated fire zone on the Airbus SA model airplanes equipped with Pratt & Whitney Model PW1100G-JM engines. This proposal does not directly comply with the designated fire zone requirements of § 25.1181(a)(6) & (b).

Section 25.1182 requires each nacelle area immediately behind the firewall, and each portion of any engine pod attaching structure containing flammable fluid lines, must meet each requirements of §§ 25.1103(b), 25.1165 (d) and (e), 25.1183, 25.1185(c), 25.1187, 25.1189, and 25.1195 through 25.1203, including those concerning designated fire zones. However, engine pod attaching structures need not contain fire detection or extinguishing means. Airbus has

proposed areas on both the Pratt & Whitney Model PW1100G-JM and CFM Model LEAP-1A engine installations that are adjacent to the designated fire zones that do not have fire detection and extinguishing systems. Except for the adjacent pylon areas that are considered engine pod attaching structures, this proposal does not directly comply with the requirements of § 25.1182, specifically the referenced requirements of §§ 25.1195 through 25.1203.

Applicable regulation(s)

§§ 25.863, 25.865, 25.867, 25.869, 25.1103, 25.1165, 25.1181, 25.1182, 25.1183, 25.1185 through 25.1203

Regulation(s) requiring an ELOS finding

§§ 25.1181(a)(6) & (b), 25.1182 and 25.1195 through 25.1203

Description of compensating design features or alternative standards which allow the granting of the ELOS finding (including design changes, limitations or equipment need for equivalency)

The compensating design factors for not meeting requirements for a designated fire zone are as follows:

- Limited or no flammable fluid present in areas,
- Fireproof bulkheads and seals separating areas from fire zones,
- Adequate drainage and ventilation of the areas,
- Fireproof oil lines,
- Fire resistant hydraulic components and lines, and
- There are no ignition sources present within the areas during normal and foreseeable failure conditions other than low energy electrical wiring.

The compensating design factors for not meeting requirements for areas adjacent to a designated fire zone are as follows:

- The accessory gearbox is not located in the fan compartment,
- Limited or no flammable fluid present in areas,
- Fireproof bulkheads and seals separating areas from fire zones,
- Adequate drainage and ventilation of the areas,
- Fireproof design oil tank and oil lines,
- Fire resistant hydraulic components and lines, and
- There are no ignition sources present within areas during normal and foreseeable failure conditions other than low energy electrical wiring.

Explanation of how design features or alternative standards provide an ELOS to that required by the regulation

Although noncompliant with the regulations, the lack of ignition sources and incorporation of design features that minimize flammable fluid that would otherwise feed a fire in the 2.5 bleed and track lock areas is considered to provide an ELOS to demonstrating that the SA NEO model

airplanes equipped with PW1100G-JM engines complies with §§ 25.1181(a)(6) & (b), which includes the fire detection and extinguishing requirements in §§ 25.1195 through 25.1203. Airbus will show the fan compartment complies with the other regulations listed in § 25.1181(b), which are §§ 25.863, 25.865, 25.867, 25.869 and 25.1185 through 25.1193, as applicable.

Although noncompliant with the regulations, the lack of ignition sources and incorporation of design features that minimize flammable fluid that would otherwise feed a fire in the areas identified in Table 1 that are adjacent to designated fire zones is considered to provide an ELOS to demonstrating that the SA NEO model airplanes complies with § 25.1182(a), which includes the fire detection and extinguishing requirements in §§ 25.1195 through 25.1203.

Table 1. Applicable areas adjacent to designated fire zones

Engine Installation	PW1100G-JM	LEAP-1A
Areas	<ul style="list-style-type: none"> • Fan zone • 2.5 bleed • Track lock box • Lower aft beam compartment • Adjacent pylon areas 	<ul style="list-style-type: none"> • Engine air inlet • Thrust reverser • Tertiary lock system • Cold area above core compartment • Adjacent pylon areas

Airbus will show the areas listed in Table 1 comply with the other regulations listed in § 25.1182(a), which are §§ 25.1103(b), 25.1165(d) and (e), 25.1183, 25.1185(c), 25.1187 and 25.1189, as applicable.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in the project issue paper P-21, titled “PW1100G-JM 2.5 Bleed & Track lock Areas (§ 25.1181) and PW1100G-JM and LEAP-1A Areas Adjacent to Designated Fire Zones (§ 25.1182).” This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS finding. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section in accordance with the statement below:

- Equivalent Level of Safety Findings have been made for the following regulation(s):
- 14 CFR 25.1181(a)(6) & (b), Designated fire zones: regions included.
 - 14 CFR 25.1182, Nacelle areas behind firewalls, and engine pod attaching structures containing flammable fluid lines.
 - 14 CFR 25.1195, Fire extinguishing systems.
 - 14 CFR 25.1197, Fire extinguishing agents.
 - 14 CFR 25.1199, Extinguishing agent containers.
 - 14 CFR 25.1201, Fire extinguishing system materials.
 - 14 CFR 25.1203, Fire-detector system.
- (documented in TAD ELOS Memo AT00949IB-T-P-21)

Original Signed by Christopher Parker

October 24, 2015

Transport Airplane Directorate,
Aircraft Certification Service

Date

ELOS Originated by: Propulsion and Mechanical Systems Branch	Project Engineer: Douglas Bryant	Routing Symbol: ANM-112
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