



Federal Aviation Administration

Memorandum

Date: October 24, 2013

To: Manager, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Mike Dostert, ANM-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Engine Fire Detectors in Tailpipe on a Model EMB-550 airplane, FAA Project # TC0717IB-T

ELOS Memo #: TC0717IB-T-P-9

Regulatory Ref: §§ 21.21(b)(1), 25.1203(a)

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 Model EMB-550 airplane.

Background

Embraer requested an ELOS to the requirements in Title 14, Code of Federal Regulations (14 CFR) 25.1203(a), which requires fire detection within turbine engine tailpipe sections. The Embraer Model EMB-550 airplane includes the installation of thrust reversers, which are hydraulically operated and electrically controlled. The thrust reversers are built by the Aircelle reverser manufacturer. The Aircelle thrust reverser assembly also acts as a tailpipe for the Honeywell AS 907-3-1E engines. The proposed engine installation does not incorporate fire detection within the tailpipe section.

Applicable regulation(s)

§§ 21.21(b)(1), 25.1203(a)

Regulation(s) requiring an ELOS finding

§ 25.1203(a)

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 engine tailpipe configuration must either comply to § 25.1203(a) by incorporating fire detection within the tailpipe zone or compensating design features should be presented and analyzed to support a finding of equivalent safety under the provisions of § 21.21(b)(1). The design installation of the Embraer Model EMB-550 thrust reverser includes the following:

1. Embraer will demonstrate that the exhaust pipe surface (within this tailpipe zone) will not be an ignition source for hydraulic fluid.
2. Embraer will demonstrate that risk of fire from hydraulic fluid coming into contact with electrical wiring or components has been minimized. There is no electrical power in the thrust reverser during the stowed condition.
3. Embraer will demonstrate a minimum amount of hydraulic fluid can leak into the tailpipe zone.
4. Embraer will demonstrate compliance with the drainage and ventilation provisions of § 25.1187.
5. Embraer will demonstrate that firewalls are provided in the aft cowl and pylon sections which will isolate a fire within the tailpipe fire zone from the fuselage, pylon, and remainder of the engine nacelle and are in compliance with § 25.1193(e)(1).
6. Review of in-service data has confirmed that there have been no occurrences of tailpipe fires due to hydraulic fluid leakage / ignition on similar, previously certified engine / thrust reverser installations, nor are there any airworthiness directives (AD).

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

Compliance with the criteria stated above will minimize the potential for a fire in the tailpipe of the engine to such an extent that fire detection is unnecessary. The resulting configuration will be equivalently safe to the level of safety intended by the regulation.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project Issue Paper P-9, titled Engine Fire Detectors in Tailpipe. 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 has been made for the following regulation:

§ 25.1203(a) Fire Detector System

(documented in TAD ELOS Memo TC0717IB-T-P-9)

Original Signed By

Victor Wicklund

Transport Airplane Directorate,
Aircraft Certification Service

October 24, 2013

Date

ELOS Originated by: International Branch	Program Manager: Cindy Ashforth	Routing Symbol: ANM-116
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