



Federal Aviation Administration

Memorandum

Date: January 4, 2011

To: Manager, Seattle Aircraft Certification Office, ANM-100S

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Sue McCormick

Subject: INFORMATION: Equivalent Level of Safety Finding for the Boeing Model 737, 747, 757, 767, 777 and 787 Series Aircraft with Adhesives Used in Interior Panel Bent Joint Potting Applications (FAA Project No. PS08-0670)

ELOS Memo #: PS08-0670-C-1

Reg. Ref.: §§ 25.853 and 21.21(b)(1)

The purpose of this memorandum is to inform 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 Boeing Model 737, 747, 757, 767, 777 and 787 series aircraft.

Background

Title 14 Code of Federal Regulations (14 CFR) 25.853 is applicable to materials installed in compartments occupied by crew and passengers, and prescribes the flammability requirements necessary to install those materials. In 1972, the Federal Aviation Administration adopted flammability requirements applicable to interior ceiling panels, interior wall panels, partitions, galley structure, large cabinet walls, structural flooring, and materials used in the construction of stowage compartments ensuring that materials comply with the basic "Bunsen burner" requirements as defined in paragraph (a)(1)(i) of part I of Appendix F to part 25. These requirements prescribed that the materials used to fabricate these large panels must be self-extinguishing after having been subjected to the flame of a Bunsen burner for 60 seconds, in accordance with the procedures defined in paragraph (b)(4) of part I of appendix F. The average burn must not have exceeded 6 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

Boeing proposed an ELOS to § 25.853(a) be obtained by demonstrating that adhesives used in interior panel bent joint applications tested in accordance with specific methods, in conjunction with specific design requirements, are compensating features adequate to justify the requested ELOS finding.

Applicable regulation(s)

§§ 21.21(b)(1) and 25.853

Regulation(s) requiring an ELOS finding

§ 25.853(a), part I of appendix F to part 25

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

The FAA has determined that an ELOS finding per § 21.21(b)(1) may be granted for the requirements of § 25.853(a) provided the applicable certification testing and associated type design data are shown to meet either of the following criteria:

- 1) Section 25.853(d) when successfully tested in accordance with 14 CFR part 25, Appendix F, part IV; and are either
 - a. physically separated from ignition sources when installed in areas of the aircraft that are not accessible during flight, or
 - b. protected by a barrier material which, when tested alone, meets the requirements of §§ 25.853(a) and 25.855(d) when tested in accordance with 14 CFR part 25, Appendix F, part I, (b)(4) (60-second vertical test) and (b)(6) (30 second 45 degree test) , or
 - c. easily accessible with a hand fire extinguisher
- 2) Section 25.856(a) when successfully tested in accordance with 14 CFR part 25, Appendix F, part VI

Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation

Section 25.853(a) was released in 1972 to require materials for use in passenger and crew compartments to be more resistant to fire threats. In accordance with the recommendation made by the Aerospace Industry Association (AIA) and based on its findings under its development program, it was proposed to amend § 25.853 to require, among other things, that specified materials used in passenger and crew compartments be self-extinguishing when tested vertically, meet a more severe burn length requirement when subjected to a Bunsen burner flame for a minimum of 60-seconds.

The interior panels which use adhesives in bent joint potting applications are fabricated using traditional aerospace materials, such as fiberglass pre-impregnated facesheets applied to aramid honeycomb core, meeting the requirements of § 25.853(a) and (d). The quantity of adhesive used is relatively small when compared to the overall basic panel construction, but is still an element of the fabricated part. An ELOS to § 25.853(a) may be provided by: (1) testing the adhesive bent joint feature to the heat release test requirements of part IV of Appendix F to part 25 in conjunction with other compensating design features (i.e., isolated from ignition sources, protected by a flame resistant barrier, or accessible with a hand-held fire extinguisher) or, (2) testing the joint feature to the radiant panel requirements of part VI of Appendix F to part 25. Each of these test methods was developed subsequent to the § 25.853(a) requirement to improve the survivability of the cabin interior, and is generally considered more severe.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in project issue paper C-1. This memorandum provides standardized documentation of the ELOS 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. This ELOS memorandum number should be listed in the type certificate data sheet under the certification basis section. An example of an appropriate statement is provided below.

Equivalent Safety Findings have been made for the following regulation(s):
14 CFR 25.853(a) (documented in TAD ELOS Memo PS08-0670-C-1)]

Franklin Mangsby
for _____
Manager, Transport Airplane Directorate,
Aircraft Certification Service

4/14/11

Date

ELOS Originated by Seattle ACO:	Project Engineer Sue McCormick	Routing Symbol ANM-150S
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