

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
RENTON, WASHINGTON 98057-3356

In the matter of the petition of

**The Boeing Company**

for an exemption from §§ 25.841(a)(2) and  
25.841(a)(3) of Title 14, Code of Federal  
Regulations

**Regulatory Docket No. FAA-2008-0826**

**AMENDED PARTIAL GRANT OF EXEMPTION**

By letter no. RA-11-02860 dated June 7, 2011, C. M. Thompson, Lead Project Administrator, Development Projects, The Boeing Company, P.O. Box 3707, Seattle, WA 98124-2207, provided the Federal Aviation Administration (FAA) with the results of flight testing intended to show compliance to the conditions of partial grant of exemption no. 9943. Boeing conducted certification flight tests to demonstrate the 747-8F (freighter) airplane emergency descent capability. As required per exemption no. 9943, the goal of the test was to show that following a rapid decompression due to an uncontained engine-rotor burst event at an airplane operating pressure altitude of 43,000 ft, the cabin-pressure altitude would not exceed 40,000 ft for more than 1 minute and 25,000 ft for more than 3 minutes. However, the flight-test descent profiles showed that the airplane failed to meet the 25,000-foot target within 3 minutes.

Boeing requests that the maximum operating altitude be set to 42,100 ft for the Model 747-8F airplane to meet the conditions of exemption no. 9943. Furthermore, Boeing recommends that the maximum operating altitude reduction is an administrative change that falls within the bounds of the exemption and therefore, there is no need to revise the exemption or send it out for public comment.

**The Initial Petition and Partial Grant of Exemption**

By letter no. BDCO-08-02707 dated July 25, 2008, C. M. Thompson, Lead Project Administrator, Development Projects, The Boeing Company, P.O. Box 3707, Seattle, WA 98124-2207, petitioned to exempt the Model 747-8/-8F airplanes from the requirements of Title 14, Code of Federal Regulations (14 CFR) 25.841(a)(2) and (a)(3), as amended by Amendment 25-87. The FAA requested and Boeing sent additional material, with the final

submission on July 2, 2009. The petition for exemption sought to relieve these airplanes from the requirement that—during a decompression caused by failures of the engines—airplane cabin pressure altitude not exceed 25,000 ft for more than 2 minutes or exceed 40,000 ft for any duration.

Based on its evaluation of the petition and the comments received, the FAA determined that there was sufficient justification for a partial grant of exemption from § 25.841(a)(2)(i) and (ii). On October 19, 2009, we issued exemption no. 9943. In issuing the partial grant of exemption, the FAA imposed conditions pertaining to the following:

1. The maximum indicated operating pressure altitude,
2. Flightdeck crew procedures for a rapid decompression event, and
3. Flight test data corroborating descent profiles used in Boeing's analysis.

In terms of § 25.841(a)(3), the FAA determined that Boeing was in compliance, and thus relief from that regulation was not necessary.<sup>1</sup>

### **Notice and Public Procedure**

The FAA has waived the requirement to publish a summary of the discussion concerning this amendment to exemption no. 9943 because first, a summary notice of petition received was published in the Federal Register on October 19, 2009, and second, we believe that the changes in this amended partial grant of exemption do not impact the intended level of safety as granted in exemption no. 9943. As the FAA is not altering the exposure altitude limits or the duration of exposure at the altitude limits, the level of safety as contained in exemption no. 9943 does not change.

Note that two comments to the original petition were considered in the FAA's analysis of that petition, but none of the associated comments pertain to the changes in this amended partial grant of exemption.

### **The FAA's Analysis of the Request for Amendment**

In its analysis of Boeing's petition for exemption dated July 25, 2008, and the comments received, the FAA considered the following factors:

1. Need for the exemption;
2. Conformance of a grant of exemption with applicable FAA policy, specifically the Mechanical Systems Harmonization Working Group (MSHWG) Final Report on § 25.841(a)(2) and (a)(3) and our Interim Policy on Amendment 25-87 requirements;
3. Review of historical data and research;
4. Fuselage holes caused by debris from uncontained engine rotor failure; and

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<sup>1</sup> Copies of Boeing's petition, the comments received, and the FAA's Partial Grant of Exemption are available at *regulations.gov* in docket number FAA-2008-0826.

## 5. Use of supplemental oxygen.

The FAA concluded Boeing presented sufficient justification for a partial grant of exemption from § 25.841(a)(2)(i) and (a)(2)(ii), provided that the three conditions discussed above were met (i.e., include in the Airplane Flight Manual (AFM) the maximum indicated operating pressure altitude; include in the AFM approved flightdeck-crew procedures for a rapid decompression event; and Boeing provides certification flight-test data corroborating descent profiles used in Boeing's decompression analysis).

Regarding the provisions of § 25.841(a)(3), the petitioner continues to be able to comply with the regulation, since its analysis did consider fuselage structure, engine failures, and system failures. Therefore, relief from this requirement remains unnecessary.

FAA certification flight tests on the 747-8F airplane failed to demonstrate compliance to one of the conditions of the original exemption, i.e., the cabin-pressure altitude would not exceed 25,000 ft for more than 3 minutes. The FAA conducted meetings with Boeing to determine the extent of the failure and to discuss the impact on exemption no. 9943. The FAA reviewed the flight-test data, considered the information from Boeing in analyzing their request for amendment of exemption no. 9943, and has reached the following conclusions:

1. The FAA considered Boeing's request to limit the maximum operating altitude via an administrative change, and we do not concur. We provide this amendment to exemption no. 9943 to ensure adequate clarification and documentation of the change.
2. The FAA concurs with Boeing's request that the maximum operating altitude be set to 42,100 ft for the 747-8F airplane to meet the intent of exemption no. 9943. Our review of the certification flight tests confirms that an altitude of 42,100 ft will meet the intent of the requirements of previously approved exemption no. 9943, i.e., to ensure that the duration of the exposure to an altitude above 25,000 ft is limited to no more than 3 minutes.
3. As this amendment does not affect the intended level of safety per exemption no. 9943, the FAA has decided to issue this amendment to exemption no. 9943 without a public-comment period.

### **The FAA's Decision**

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, the Boeing Company's petition to amend exemption no. 9943 for relief from the requirements of §§ 25.841(a)(2)(i) and 25.841(a)(2)(ii), as amended by Amendment 25-87, is granted for the Boeing 747-8/-8F airplanes.

This amended partial grant of exemption is subject to the following conditions:

1. Boeing must show that, after decompression at a specified airplane indicated operating pressure altitude, for which Boeing substantiates and gains approval from the FAA, the cabin pressure altitude will not exceed 25,000 feet for more than 3 minutes or 40,000 feet for more than 1 minute.

2. Boeing must submit to the FAA certification flight-test data that corroborate the descent profiles used in meeting condition 1.
3. The Boeing 747-8 and -8F AFMs must identify the maximum allowed indicated operating pressure altitude that may not exceed the specified airplane indicated operating pressure altitude Boeing substantiated and the FAA approved in accordance with condition 1.
4. The Boeing 747-8 and -8F AFMs must contain applicable flightdeck crew procedures for a rapid decompression event. The section of the AFM that addresses the actions the flightdeck crew should follow, in the event of a decompression, must state that the flightdeck crew should initiate a descent at the maximum rate of descent and safe descent speed, which is typically the maximum operating speed ( $V_{MO}/M_{MO}$ ), assuming structural integrity of the airplane.

Issued in Renton, Washington, on **JUL 12 2011**



Ali Bahrami  
Manager, Transport Airplane Directorate  
Aircraft Certification Service