

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

Bombardier Aerospace, Inc.

for an exemption from § 25.1435(b)(1) of
Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2000-8218

GRANT OF EXEMPTION

By letter of September 21, 2000, Mr. K.A. Barnett, Airworthiness Manager, Bombardier Aerospace, P.O. Box 6087, Station Centre-ville, Montreal, Quebec, Canada H3C 3G9, petitioned for exemption from the static pressure test requirements of § 25.1435(b)(1) of Title 14, Code of Federal Aviation Regulations (14 CFR). The proposed exemption, if granted, would permit compliance for the Bombardier Model CL-600-2D24 hydraulic system by similarity to the previously tested hydraulic system on the Bombardier Model CL-600-2C10 Regional Jet airplane.

The petitioner requests relief from the following regulations:

Section 25.1435(b)(1) states that a complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate, and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure.

ANM-01-031-E

Related Section of the Federal Aviation Regulations (FAR):

Section 25.1435(a)(2) states that each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied by a factor of 1.5, in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure.

The petitioner's supportive information is as follows:

"In accordance with FAR Chapter 11.25, Bombardier Aerospace requests an exemption against FAR 25.1435(b)(1). Bombardier's basis for this request is outlined below.

"Considering the derivative nature of the CRJ-900, the Hydraulic System remains virtually identical (apart from the increase in tubing length) to that of the CL-600-2C10 (CRJ-700). For this reason, it is Bombardier's position that the testing conducted on CL-600-2C10 remains valid for the CL-600-2D24 and need not be repeated. Hence, it is proposed that CL-600-2D24 compliance will be shown by similarity."

"Applicable Aircraft: Bombardier Regional Jet Series 900
CL-600-2D24
Serial numbers: 15001 and subsequent

"Reference: Docket 28617 published in Federal Register /
Volume 61, No 129 / Pages 35055-35062 / July 3,
1996 / Proposed Rule and Notice 96-6."

"Technical Information in Support of the Exemption

"Bombardier Aerospace requests an exemption for FAR 25.1435(b)(1), based on the referenced NPRM and the precedent set by the granting of an Exemption under similar circumstances for the Bombardier Global Express BD700-1A10, Exemption 6726 (Docket 29077). In addition, a similar request for exemption was granted for the Bombardier Regional Jet model CL-600-2C10, Exemption 6893 (Docket 29466)

"Bombardier states that their position is derived from the discussion of the reference Proposed Rule and Notice, for FAR 25.1435(c)(3) - Hydraulics Systems Tests - which states that:

"The complete hydraulic systems must be functionally tested on the airplane in normal operation over the range of motion of all associated user systems. The test must be conducted at the system relief pressure or 1.25 times the design operating pressure if a system pressure relief device is not part of the system design. Clearance between hydraulic system elements and other systems or

structural elements must remain adequate and there must be no detrimental effects.'

"In the reference Proposed Rule and Notice, the FAA proposes to replace the current FAR 25.1435(b)(1) with the proposed FAR 25.1435(c)(3) requirement. The proposed rule would revise the current airplane static proof pressure test requirements to require a complete functional (dynamic) airplane test at a lower pressure. Specifically the proposed rule requires that the complete hydraulic system must be functionally tested on the airplane over the range of motion of all associated user systems at the system relief pressure or 1.25 times the design operating pressure if a system pressure relief device is not part of the system design.

"As part of Bombardier testing for the CL-600-2C10 (RJ-700) to demonstrate compliance with FAR 25.1309(b), Bombardier conducted a dynamic test equivalent to the proposed FAR 25.1435(c)(3) to demonstrate systems operations following hydraulic pump compensator failure. The CL-600-2C10 (CRJ-700) along with the CL-600-2D24 (CRJ-900) hydraulic system design operating and the relief valve cracking pressures are 3000 and 3750 psi, respectively. A dynamic test was conducted on CL-600-2C10 at 3750 psi, which is equal to both the system relief pressure and 1.25 times the design operating pressure. All LRU's related to the hydraulic system are identical on both aircraft (CL-600-2C10 and CL-600-2D24) and as such the CL-600-2D24 will be addressed on the basis of similarity. For the CL-600-2C10, Bombardier employed the new proposed Advisory Circular (AC) 25.1435-1 to ensure consistent interpretation and application of the proposed revised standard.

"Bombardier Aerospace shares the FAA's opinion, expressed in the referenced NPRM, that the proposed functional test more closely approximates actual operating conditions in which higher system pressures would be seen than in the existing static test. This is because for the static test, several parts of the system and associated relief valves, including return lines, may need to be disabled to allow the system pressurization at 1.5 times the design operating pressure because the relief valves are designed to open at a pressure lower than 1.5 times the design operating pressure.

"CL-600-2C10 hydraulic system components, lines and installations were individually tested to 1.5 times the design operating pressure as part of qualification tests and aircraft functional test procedures to satisfy the current FAR 25.1435(a)(2) requirement. However, a single test of the complete hydraulic system was not conducted, as it required extensive test preparation and created an unnecessary financial burden without adding to the level of safety.

"Summary

"Based on the substantiation provided in the petition, Bombardier formally requests an Exemption from the requirements of FAR 25.1435(b)(1) for the CL-600-2D24 model aircraft. As outlined above, Bombardier conducted individual component testing in conjunction with the dynamic test on the CL-600-2C10 model aircraft. It is

Bombardier's position that the testing conducted on CL-600-2C10 remains valid for the CL-600-2D24 and need not be repeated. Hence, it is proposed that CL-600-2D24 compliance will be shown by similarity.

"Bombardier believes that the testing currently stipulated by FAR 25.1435(b)(1) is of no additional value and that the proposed method of demonstrating compliance will provide a safe and reliable product."

In view of the substantiating factors/discussion detailed above, Bombardier asserts that the granting of this exemption with respect to testing a complete hydraulic system at 1.5 times operating pressure is in the public interest because the proposed method of demonstrating compliance will provide a safe and reliable product and that the complete hydraulic system proof pressure test required by § 25.1435(b)(1) is of no additional value, and creates an unnecessary financial burden without adding to the level of safety, and hereby petitions the FAA to grant the subject exemption.

A summary of the petition was published in the Federal Register on December 5, 2000 (65 FR 76001). No comments were received.

The Federal Aviation Administration's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner, and has determined that there is sufficient merit to warrant a grant of exemption provided the following conditions are met by the petitioner:

1. Similarity to the previously tested hydraulic system on the CL-600-2C10 (CRJ-700) may be used for compliance for the unchanged parts of the installations; and
2. Proof pressure testing be conducted at the pressure relief valve setting (3750 psig) in lieu of the 1.5 times design operating pressure (4500 psig) for the changed parts of the installation. These include: (1) Rerouting of tubes and hoses due to fuselage extension, (2) Hydraulic line size changes, and (3) Any components relocated. During the test, where appropriate, equipment will be moved through their full range of motion to demonstrate adequate clearance exists between hydraulic components and surrounding systems.

In consideration of the foregoing, I find that a 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 Bombardier Aerospace Inc., is hereby granted an exemption from 14 CFR § 25.1435(b)(1) to the extent necessary to permit type certification of the Model CL-600-2D24 by showing of compliance of the hydraulic system by (1) similarity to the previously tested

hydraulic system on the Bombardier Model CL-600-2C10 and (2) conducting applicable testing specified under 2. above. All test results pertinent to this exemption must be documented in a report and a copy provided to this office.

Issued in Renton, Washington, on February 15, 2001

/s/

Charles D. Huber
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service, ANM-100