



AIRWORTHINESS DIRECTIVE

This Airworthiness Directive (AD) is issued pursuant to Canadian Aviation Regulation (CAR) 521.427. No person shall conduct a take-off or permit a take-off to be conducted in an aircraft that is in their legal custody and control, unless the requirements of CAR 605.84 pertaining to ADs are met. Standard 625 - Aircraft Equipment and Maintenance Standards Appendix H provides information concerning alternative means of compliance (AMOC) with ADs.

Number:

CF-2007-10R2

Effective Date:

26 May 2022

ATA:

27

Type Certificate:

A-276

Subject:

Flight Controls – Flaps Failure

Revision:

Supersedes AD CF-2007-10R1, issued 18 August 2008.

Applicability:

MHI RJ Aviation ULC. (formerly Bombardier Inc.) model CL-600-2B19, serial number 7003 through 7990 and 8000 and subsequent.

Compliance:

As indicated below, unless already accomplished.

Background:

On 22 November 2006, due to weather conditions a CRJ 100 executed a missed approach. At the same time, a flaps malfunction resulted in the flaps becoming unresponsive while in the fully deployed position (45 degree). The pilot declared an emergency and diverted to the alternate airport. Due to high fuel consumption when flying in this configuration, the aircraft landed at a diversion airport with 512 pounds of fuel remaining.

The Bombardier CL-600-2B19 aeroplanes have had a history of flap failures at various positions for several years. Flap failure may result in a significant increase in required landing distances and higher fuel consumption than planned during a diversion. The nature of the malfunction is related to the design and reliability of some of the components of the flap system.

To lower the risk of exposure until a permanent solution becomes available, Transport Canada is implementing the following four mandatory actions:

- Part I:** Airplane Flight Manual (AFM) Change. This action is mandated to provide the crew with additional guidance information for the FLAPS FAIL abnormal procedure, to address the possibility of fuel exhaustion resulting from a flaps failure at other than 0 degrees, in combination with a diversion to an alternate airport.
- Part II:** Operational Procedures: The operational procedures mandated herein are aimed at reducing or eliminating the risk caused by flaps failures. These operational procedures cover the three most critical flaps failure modes.
- Part III:** Training Procedures: This action is mandated to provide personnel with training on the operational procedures of Part II of this AD and instruction on zero flap landing.
- Part IV:** Maintenance Actions: The maintenance actions are mandated to improve overall flaps system reliability and bring the failure rate to an acceptable level, until permanent solutions are implemented.

AD CF-2007-10R1 was issued to enhance the flaps system performance through the introduction of

modified flaps actuators (internal seal), change to temperature limitations, and change to flaps operating speeds.

In addition, AD CF-2007-10R1 also added an additional maintenance requirement following a flap fail event and introduction of a cockpit placard associated with new operating limitations.

This AD revision, CF-2007-10R2, removes the reporting requirements mandated by Part V., Paragraph 3 of this AD as the mitigating actions have been implemented. Future events will be captured via Service Difficulty Reports (SDR).

Corrective Actions:

Part I. AFM Change:

- A. Within 30 days after 31 July 2007 (the effective date of AD CF-2007-10)
 1. Amend the AFM by inserting Temporary Revision (TR) RJ/165, dated 18 April 2007 or later approved revisions.
 2. Advise all flight crew members and operational control/dispatch of the changes introduced through the AFM TR RJ/165.
 3. Advise all flight crew members and operational control/dispatch of the operational procedures mandated in Part II below.
- B. Within 30 days after 25 August 2008 (the effective date of AD CF-2007-10R1):
 1. Amend the AFM by inserting TR RJ/165-1, dated 7 August 2008 or later approved revisions.
 2. Advise all flight crew members and operational control/dispatch of the changes introduced through the AFM TR RJ/165-1.
 3. Advise all flight crew members and operational control/dispatch of the operational procedures changes incorporated by the above-mentioned TR.

Part II. Operational Procedures:

Except as specified (in Part II, Paragraphs 3. b. and 3. c.), within 30 days after 31 July 2007 (the effective date of AD CF-2007-10) operators shall comply with the more restrictive of the procedures in this AD, applicable regulations and/or established Standard Operating Procedures (SOPs). The following operational procedures are imposed:

1. Flap Extended Diversion

Upon arrival at the destination airport, an approach shall not be commenced, nor shall the flaps be extended beyond the 0 degree position, unless one of the following conditions exists:

- a. When conducting a precision approach, the reported visibility (or RVR) is confirmed to be at or above the visibility associated with the landing minima for the approach in use, and can be reasonably expected to remain at or above this visibility until after landing; or
- b. When conducting a non-precision approach, the reported ceiling and visibility (or RVR) are confirmed to be at or above the ceiling and visibility associated with the landing minima for the approach in use, and can be reasonably expected to remain at or above this ceiling and visibility until after landing; or
- c. An emergency or abnormal situation occurs that requires landing at the nearest suitable airport; or
- d. The fuel remaining is sufficient to conduct the approach, execute a missed approach, divert to a suitable airport with the flaps extended to the landing position, conduct an approach at the airport and land with 1000 lb (454 kg) of fuel remaining.

Note 1: The fuel burn factor (as per AFM TR/165) shall be applied to the normal fuel consumption for calculation of the flaps extended missed approach, climb, diversion and approach fuel consumption.

Note 2: Terrain and weather must allow a minimum flight altitude not exceeding 15,000 feet along the diversion route.

Note 3: For the purpose of this AD, a "suitable airport" is an airport that has at least one usable runway, served by an instrument approach if operating under Instrument Flight Rules (IFR), and the airport is equipped as per the applicable regulations and standards for marking and lighting. The existing and forecast weather for this airport shall be at or above landing minima for the approach in use.

2. Flap Failure After Takeoff

When a takeoff alternate is filed, terrain and weather must allow a minimum flight altitude not exceeding 15,000 feet along the diversion route to that alternate, or other suitable airport. The fuel at departure shall be sufficient to divert to the takeoff alternate or other suitable airport with the flaps extended to the takeoff position, conduct an approach and land with 1000 lb (454 kg) of fuel remaining.

Note: The fuel burn factor (as per AFM TR/165) shall be applied to the normal fuel consumption for calculation of the flaps extended, climb, diversion and approach fuel consumption.

3. Flap Zero Landing

Operations where all useable runways at the destination and alternate airports are forecast to be wet or contaminated (as defined in the AFM) are prohibited during the cold weather season (December to March inclusive in the northern hemisphere) unless one of the five following conditions (a. through e.) exists:

- a. Each installed flap actuator shall meet one of the following three conditions:
 - (i) The actuator has less than 5000 Flight Cycles (FC) and/or the actuator has been verified serviceable in accordance with Part C (Low Temperature Torque Test of the Flap Actuators) of Bombardier Service Bulletin (SB) 601R-27-150, issued 12 July 2007 or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, or
 - (ii) The actuator has part number (P/N) 601R93101-19 / -21, P/N 601R93103-19 / -20, or P/N 601R93104-19 / -20 and has less than 5000 FC since repair (where it can be shown that the actuator inboard pinion seals, Eaton P/N 853SC177-1 and Eaton P/N 853SC177-2, were replaced), or
 - (iii) The actuator has P/N 601R93101-23 / -25, P/N 601R93103-23 / -24, or P/N 601R93104-23 / -24.
- b. For the period within 30 days after 25 August 2008 (the effective date of AD CF-2007-10R1), the flight is conducted at a cruise altitude where the Static Air Temperature (SAT) is -60 deg C or warmer. If the SAT in flight is colder than -60 deg C, descent to warmer air shall be initiated within 10 minutes.
- c. After 30 days from 25 August 2008 (the effective date of CF-2007-10R1), pre-dispatch forecast ground temperature at the time of arrival at destination airport is above -25 deg C.
- d. The Landing Distance Available on a useable runway at the destination airport is at least equal to the actual landing distance required for flaps zero. This distance shall be based on Bombardier performance data, and shall take into account forecast weather and anticipated runway conditions.
- e. The Landing Distance Available on a useable runway at the filed alternate airport, or other suitable airport is at least equal to the actual landing distance for flaps zero. This distance shall be based on Bombardier performance data and shall take into account forecast weather and anticipated runway conditions.

Note 1: If the forecast destination weather is less than 200 feet above Decision Height (DH) or Minimum Descent Altitude (MDA), or less than 1 mile (1500 meters) above the authorized landing visibility (or equivalent RVR), as applied to the usable runway at the destination airport, then condition 3. a., 3. b., 3. c. or 3. e. above must be satisfied.

Note 2: When conducting No Alternate IFR (NAIFR) operations, condition 3. a., 3. b., 3. c. or 3. d. above must be satisfied.

Part III. Training:

Provide flight crew members and operational control/dispatch personnel training as follows:

1. Training for Flap Failure Procedures

Within 30 days after 25 August 2008 (the effective date of CF-2007-10R1), provide ground briefing for flight crew members and affected ground personnel on the operational procedures mandated in Part II of this AD.

2. Annual Simulator Training on Zero Flap Landing

Within one year after 31 July 2007 (the effective date of AD CF-2007-10), provide flight crew members instruction on zero flap landing within the normal simulator training cycle (at least annually).

Zero flap landing instruction for any CRJ series aircraft is considered to meet this requirement.

Part IV. Maintenance Actions:

Accomplish Bombardier SB 601R-27-150, dated 12 July 2007, or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, in accordance with the following schedule:

Maintenance Task	Compliance Schedule/Actions
<ul style="list-style-type: none"> - Cleaning and Lubrication of the Flexible Shafts, and - Installation of Metallic Seals in the Flexible Drive Shafts 	<p>Part A of the above-mentioned SB must be accomplished before 30 November 2007.</p> <p>If any damage or delamination of sealant extends more than 0.25 in. (6.3 mm) from a lockwire hole, prior to further flight perform a low temperature torque check on the actuator in accordance with the above-mentioned SB. If the actuator is serviceable, repair the damaged sealant per the actuator Component Maintenance Manual before return to service.</p>
<ul style="list-style-type: none"> - Pressure Test of the Flexible Drive Shaft 	<p>Part B of the above-mentioned SB must be accomplished within 24 months or 4000 hours air time, whichever occurs first, after 31 July 2007 (the effective date of AD CF-2007-10).</p> <p>Any flexible drive shaft that exhibits leakage (any sign of bubbles within one minute during the pressure test in water) shall be replaced with a serviceable unit prior to the next flight.</p>
<ul style="list-style-type: none"> - Low Temperature Torque Test of the Flap Actuators P/N 601R93101-19/-21, P/N 601R93103-19/-20 and, P/N 601R93104-19/-20. 	<p>Part C of the above-mentioned SB must be accomplished within 24 months after 31 July 2007 (the effective date of AD CF-2007-10). For actuators with 5000 FC or more, Part C shall be repeated every 12 months thereafter.</p> <p>Actuators P/N 601R93101-19 / -21, P/N 601R93103-19 / -20 and P/N 601R93104-19 / -20, where it can be shown that the actuator inboard pinion seals have been replaced with Eaton P/N 853SC177-1 and Eaton P/N 853SC177-2, need not comply with Part C of the above-mentioned SB until they reach 5000 FC after seal replacement. Part C shall be repeated every 12 months thereafter.</p> <p>Any actuator that fails the low temperature torque check [greater than 15 lb-in (1.69 N-m) breakout and/or 13 lb-in (1.47 N-m) running torque at -59 to -61 deg C] shall be replaced with a serviceable unit prior to next flight.</p>

Installation of actuators P/N 601R93101-23 / -25, P/N 601R93103-23 / -24 and P/N 601R93104-23 / -24 in accordance with Bombardier SB 601R-27-151 or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada, constitutes terminating action to Part II, Paragraph 3 of this AD.

Part V. Dispatch Following a Flap Fail Event:

Dispatch after a flap fail message is subject to the following requirements:

1. Appropriate maintenance actions to assess and rectify the system defect must be performed in accordance with Fault Isolation Manual (FIM) section 27-50-00 prior to further revenue operations.
2. If maintenance resources are not available following a flap fail event and normal flap system operation can be restored after an on-ground system reset, continued revenue operation is permitted without further maintenance action for the next 10 flights, subject to the following limitations:

- a. The circuit breaker reset operation can be performed by the flight crew when authorized by the Operator's Maintenance Control organization;
- b. Operational limitations of Part II, Paragraph 3. d. or 3. e. of this AD apply to revenue operations until maintenance action on flaps is performed.

Note 1: If the forecast destination weather is less than 200 feet above DH or MDA, or less than 1 mile (1500 meters) above the authorized landing visibility (or equivalent RVR), as applied to the usable runway at the destination airport, then condition of Part II, Paragraph 3. e. must be satisfied.

Note 2: When conducting NAIFR operations, condition of Part II, Paragraph 3. d. must be satisfied.

- c. If another flap fail event occurs any time after the initial circuit breaker reset operation, no further revenue operation is permitted. Subsequent non-revenue operation is permitted only for the purpose of moving the aircraft to a maintenance base where repairs can be made.
- d. Prior to dispatch following a circuit breaker reset as described above, the flaps must be operated for five full extension/retraction cycles by the flight crew with no subsequent failures.
- e. Thrust reversers, ground spoilers and brake system are verified operational prior to each flight.
- f. At the end of the 10 flights following the circuit breaker reset operation, requirements of Part V, Paragraph 1 shall be met.

Part VI. Cockpit Placard:

Before 1 December 2008 incorporate Bombardier SB 601R-11-090, Revision NC or later revisions approved by the Chief, Continuing Airworthiness, Transport Canada.

Authorization:

For the Minister of Transport,

ORIGINAL SIGNED BY

Rémy Knoerr
Chief, Continuing Airworthiness
Issued on 12 May 2022

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