



適航指令發布單

Airworthiness Directive Issuance Form

民航局 AD 編號 AD number	CAA-2020-06-005	發布日期 Date issued	2020/6/5
適用之航空產品 Applied to (models, serial numbers or part numbers, as applicable)	The Boeing Company Model 777-200, -200LR, -300, -300ER, and 777F series airplanes, certificated in any category, equipped with a Center Wing Tank (CWT) having a capacity of 26,100 U.S. gallons or greater.		
主旨摘要	This AD requires a repetitive check of the fuel quantity indicating system fuel quantity calculation for the center wing tank fuel quantity, developing a process to provide documentation to the flight crew that this check was done, and revising the existing airplane flight manual to incorporate verification procedures and flight crew awareness.		
民航局 CAA <input type="checkbox"/> 本國產品 Native products <input type="checkbox"/> 其他個案 Other	<div style="text-align: center;">設計國民航主管機構 Original Authorities</div> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input checked="" type="checkbox"/> FAA <input type="checkbox"/> EASA <input type="checkbox"/> Brazil <input type="checkbox"/> Transport Canada Civil Aviation <input type="checkbox"/> DGAC </div> <div style="width: 50%;"> <input type="checkbox"/> Germany LBA <input type="checkbox"/> CAA-NL <input type="checkbox"/> UK CAA <input type="checkbox"/> Japan CAB <input type="checkbox"/> CAA of Israel <input type="checkbox"/> Other _____ </div> </div>		
	設計國 AD 編號 Original AD number	2020-11-11	
	1. 直接採用原 AD 之內容?(Is the original AD directly adopted?) <input checked="" type="checkbox"/> 是(Yes) <input type="checkbox"/> 否(No) _ a. 生效日期另訂為(Re-specify the effective date as) : _____ b. 執行時限另訂為(Re-specify the compliance time or period as) : _____ 2. 使用人是否需要將 AD 執行結果向民航局提出報告?(Do Users need to report the status of compliance to the CAA?) <input type="checkbox"/> 是(Yes) <input checked="" type="checkbox"/> 否(No)		
備註 Note	None		
註： 1. AD 內容後附。 2. 航空器產品使用人得向民航局提出豁免、替代符合方法、執行時限之展延之申請。 3. 如有任何問題，請聯絡交通部民用航空局初始適航科。Tel：(02)2349-6331~3, Fax：(02)2545-8464, e-mail： adcaa@mail.caa.gov.tw Note： 1. The AD text is enclosed. 2. Exemption, an alternative method of compliance or adjustment of the compliance time may be proposed to the CAA for approval. 3. For further information, please contact Civil Aeronautics Administration on Tel：(02)2349-6331~3, Fax：(02)2545-8464, e-mail： adcaa@mail.caa.gov.tw			

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2020-0461; Product Identifier 2020-NM-065-AD; Amendment 39-19915; AD 2020-11-11]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for certain The Boeing Company Model 777 airplanes. This AD requires a repetitive check of the fuel quantity indicating system (FQIS) fuel quantity calculation for the center wing tank (CWT) fuel quantity, developing a process to provide documentation to the flight crew that this check was done, and revising the existing airplane flight manual (AFM) to incorporate verification procedures and flight crew awareness. This AD was prompted by reports of discrepancies between the FQIS fuel quantity and the refueling truck uploaded fuel amount, followed by certain engine-indicating and crew-alerting system (EICAS) messages. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective June 18, 2020.

The FAA must receive comments on this AD by July 20, 2020.

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Examining the AD Docket

You may examine the AD docket on the internet at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0461; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, the regulatory evaluation, any comments received, and other information. The street address for Docket Operations is listed above. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Kevin Nguyen, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3555; email: kevin.nguyen@faa.gov.

SUPPLEMENTARY INFORMATION: **Discussion**

The FAA has received reports involving discrepancies between the airplane FQIS, specifically the CWT fuel quantity, and the refueling truck uploaded fuel amount, followed by a FUEL DISAGREE EICAS message at an early stage of flight (e.g., within 3 hours after take off), and/or with an INSUFFICIENT FUEL EICAS message. There have been at least 25 in-service events reported by operators. In at least 16 of these events, the airplanes continued with the mission; of those, 6 landed at the destination airport, and 10 had to land at a diversion airport. Insufficient fuel in the CWT as a result of this discrepancy is due to a design flaw in the FQIS in which the FQIS calibrates incorrect velocity of sound in the jet fuel during center tank fueling, which leads to an improper fuel density calculation, and results in the FQIS showing a different fuel amount from the actual fuel quantity in the CWT. In almost all of the events, the FQIS showed more fuel than the actual fuel quantity in the CWT, resulting in less fuel on the airplane than the required fuel load for the mission. Alternatively, the FQIS could show less fuel than the actual fuel quantity in the CWT, resulting in more fuel on the airplane than the required fuel load for the mission. This issue affects only the CWT and not the main tanks.

There are practical difficulties in comparing the fuel quantity uploaded by the refueling truck or hydrant. The fueling system relies on the airplane FQIS to report the mass (kilograms or pounds) of fuel onboard and stops the fueling process when the requested fuel for the next flight is onboard. The refueling trucks then report the volume (liters or gallons) of fuel that was uploaded because fuel is paid for by a volume measurement. Comparing the fuel volume upload with the final fuel load mass, which also accounts for the remaining fuel in the tanks from previous flight, is not an easy calculation and is prone to significant inaccuracies. The existing airplane maintenance manual and operator fueling procedures require verification that the correct fuel amount required for the current mission has been loaded onto the airplane. The FAA has received reports that verification tasks are either not accomplished or done incorrectly. As a result, the flight crew may be unaware of insufficient fuel loaded in the CWT and the airplane is dispatched for the mission. The airplane onboard fuel management system typically reports fuel quantity anomalies within the first three hours of flight resulting in a FUEL DISAGREE EICAS message and/or an INSUFFICIENT FUEL EICAS message that necessitates fuel check (e.g., leak check) and fuel quantity monitoring. These messages may require the flight crew to take action, such as performing an air turn back or a diversion.

Discrepancies in the CWT FQIS fuel quantity and the refueling truck uploaded fuel amount could result in an airplane dispatched with insufficient fuel loaded in the CWT and with the flight crew unaware of the insufficient fuel prior to departure. This condition, coupled with continued flight to the destination airport after receiving the EICAS messages while en route to the destination, could result in fuel exhaustion and subsequent power loss of all engines. Thereby, resulting in the inability to land at the destination airport or at a diversion airport, possibly leading to uncontrolled flight into terrain.

FAA's Determination

The FAA is issuing this AD because the agency evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

AD Requirements

This AD requires a repetitive check of the FQIS fuel quantity calculation and display of the CWT fuel quantity through a new procedure, Refueling Station Door Cycling Procedure, developing a process to provide documentation to the flight crew that this check was done, and revising the existing AFM to incorporate verification procedures for flight crew awareness.

Interim Action

The FAA considers this AD interim action. The FAA has been coordinating with Boeing in the development of a modification that will address the unsafe condition identified in this AD. However, due to the urgency of the unsafe condition and due to additional time needed for Boeing to develop the modification, the FAA has determined that interim action is necessary. Once the modification is developed, approved, and available, the FAA might consider additional rulemaking.

FAA's Justification and Determination of the Effective Date

An unsafe condition exists that requires the immediate adoption of this AD without providing an opportunity for public comments prior to adoption. The FAA has found that the risk to the flying public justifies waiving notice and comment prior to adoption of this rule because discrepancies in the CWT FQIS fuel quantity and the refueling truck uploaded fuel amount could result in an airplane dispatched with insufficient fuel loaded in the CWT and with the flight crew unaware of the insufficient fuel prior to departure. This condition, coupled with continued flight to the destination airport after receiving the EICAS messages while en route to the destination, could result in fuel exhaustion and subsequent power loss of all engines. Thereby, resulting in the inability to land at the destination airport or at a diversion airport, possibly leading to uncontrolled flight into terrain. Additionally, the compliance time for the required action is shorter than the time necessary for the public to comment and for publication of the final rule. Therefore, the FAA finds good cause that notice and opportunity for prior public comment are impracticable. In addition, for the reasons stated above, the FAA finds that good cause exists for making this amendment effective in less than 30 days.

Comments Invited

This AD is a final rule that involves requirements affecting flight safety and was not preceded by notice and an opportunity for public comment. However, the FAA invites you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2020-0461 and Product Identifier 2020-NM-065-AD at the beginning of your comments. The FAA specifically invites comments on the overall regulatory, economic, environmental, and energy aspects of this final rule. The FAA will consider all comments received by the closing date and may amend this final rule because of those comments.

The FAA will post all comments received, without change, to <https://www.regulations.gov>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact received about this final rule.

Regulatory Flexibility Act (RFA)

The requirements of the RFA do not apply when an agency finds good cause pursuant to 5 U.S.C. 553 to adopt a rule without prior notice and comment. Because the FAA has determined that it has good cause to adopt this rule without notice and comment, RFA analysis is not required.

Costs of Compliance

The FAA estimates that this AD affects 255 airplanes of U.S. registry. The FAA estimates the following costs to comply with this AD:

Estimated Costs				
Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Refueling Station Door Cycling Procedure	1 work-hour × \$85 per hour = \$85 per check	\$0	\$85 per check	\$21,675 per check.
AFM revision	1 work-hour × \$85 per hour = \$85	0	\$85	\$21,675.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. “Subtitle VII: Aviation Programs” describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: “General requirements.” Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866, and
- (2) Will not affect intrastate aviation in Alaska.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39–AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):



**FAA
Aviation Safety**

AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/
www.gpoaccess.gov/fr/advanced.html

2020-11-11 The Boeing Company: Amendment 39-19915; Docket No. FAA-2020-0461; Product Identifier 2020-NM-065-AD.

(a) Effective Date

This AD is effective June 18, 2020.

(b) Affected ADs

None.

(c) Applicability

This AD applies to The Boeing Company Model 777-200, -200LR, -300, -300ER, and 777F series airplanes, certificated in any category, equipped with a Center Wing Tank (CWT) having a capacity of 26,100 U.S. gallons or greater.

(d) Subject

Air Transport Association (ATA) of America Code 28, Fuel.

(e) Unsafe Condition

The FAA is issuing this AD to address discrepancies in the CWT fuel quantity indicating system (FQIS) fuel quantity and the refueling truck uploaded fuel amount, which could result in an airplane dispatched with insufficient fuel loaded in the CWT and with the flight crew unaware of the insufficient fuel prior to departure. This condition, coupled with continued flight to the destination airport after receiving engine-indicating and crew-alerting system (EICAS) messages while en route to the destination, could result in fuel exhaustion and subsequent power loss of all engines. Thereby, resulting in the inability to land at the destination airport or at a diversion airport, possibly leading to uncontrolled flight into terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) CWT Fuel Quantity Check—"Refueling Station Door Cycling Procedure"

Within 30 days after the effective date of this AD: Check the fuel quantity of the CWT by doing the "Refueling Station Door Cycling Procedure" as specified in paragraphs (g)(1) through (6) of this AD. Thereafter, check the fuel quantity of the CWT as specified in paragraphs (g)(1) through (6) of this AD before further flight after any center tank fueling (adding or removing fuel).

(1) Get access to the refueling station door and integrated refuel panel on the left wing.

(2) Close and latch the refueling station door on the left wing for a minimum of five (5) seconds. If installed, make sure the right wing refueling station door is closed.

(3) Re-open the refueling station door and wait for the fuel quantity display to reset.

(4) Make sure that the center or total fuel tank quantities still remain within fuel load sheet requirements. If the fuel quantity is incorrect then accomplish actions specified in paragraphs (g)(4)(i) and (ii) of this AD.

(i) Adjust fuel loading as applicable for fuel upload parameters. Refer to operator's refuel procedures for adjusting the fuel load.

(ii) Repeat the "Refueling Station Door Cycling Procedure," starting at paragraph (g)(2) of this AD.

(5) Close the refueling station door.

(6) Notify the operator after the "Refueling Station Door Cycling Procedure" has been done, and correct fuel load verified.

(h) Process To Provide Documentation to the Flight Crew

Within 30 days after the effective date of this AD, submit a process to the FAA (Flight Standards) for approval that describes at the end of the fueling process and before each flight how documentation is provided to the flight crew that the CWT fuel quantity check using the "Refueling Station Door Cycling Procedure" specified in paragraph (g) of this AD was done.

(i) Airplane Flight Manual (AFM) Revision Requiring Flight Crew Verification

(1) Within 30 days after the effective date of this AD: Revise the "Certificate Limitations: Fuel Quantity Indication System (FQIS)" section of the operator's existing AFM by incorporating the information specified in figure 1 to paragraph (i)(1) of this AD.

Figure 1 to paragraph (i)(1) - *Certificate Limitations: Center Wing Tank Fuel Quantity Check*

**Certificate Limitations: Fuel Quantity Indication System (FQIS)
(Required by AD 2020-11-11)**

Operating limitation requiring flight crew verification that the aircraft refueling station door was cycled.

When fuel is added to or removed from the center fuel tank, the Flight Crew must acknowledge they have received notification that the aircraft refueling station door has been cycled in accordance with the Normal Procedures Section procedure titled: Fuel Quantity Indication System (FQIS) *Refueling Station Door Cycling Procedure*

(2) Within 30 days after the effective date of this AD: Revise the "Normal Procedures: Fuel Quantity Indication System (FQIS)–Refueling Station Door Cycling Procedure" section of the operator's existing AFM by incorporating the information specified in figure 2 to paragraph (i)(2) of this AD.

Figure 2 to paragraph (i)(2) - Normal Procedures: Center Wing Tank Fuel Quantity Check

Normal Procedures: Fuel Quantity Indication System (FQIS) Refueling Station Door Cycling Procedure (Required by AD 2020-11-11)

Note: The flight crew is not expected to complete this procedure but is required to acknowledge that the procedure has been completed.

A fault has been discovered in the fuel quantity indication system (FQIS) where the calculated and displayed fuel quantity can be significantly different from the actual fuel load onboard.

To correct the inaccurate fuel load indication, perform the following after every CWT fueling (adding or removing fuel) and before further flight:

- a) Get access to the refueling station door and integrated refuel panel on the left wing.
- b) Close and latch the refueling station door on the left wing for a minimum of five (5) seconds. If installed, make sure the right wing refueling station door is closed.
- c) Re-open the refueling station door and wait for the fuel quantity display to reset.
- d) Make sure that the center or total fuel tank quantities still remain within fuel load sheet requirements. If the fuel quantity is incorrect then accomplish the following actions:
 - 1) Adjust fuel loading as applicable for fuel upload requirements per the operator's refuel procedures.
 - 2) Repeat the "Refueling Station Door Cycling Procedure," starting at step b).
- e) Close the refueling station door.
- f) Notify the operator after the "Refueling Station Door Cycling Procedure" has been done, and correct fuel load verified.

(j) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (k) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by The Boeing Company Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO Branch, FAA, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(k) Related Information

For more information about this AD, contact Kevin Nguyen, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3555; email: kevin.nguyen@faa.gov.

(l) Material Incorporated by Reference

None.

Issued on May 28, 2020.

Lance T. Gant,
Director, Compliance & Airworthiness Division, Aircraft Certification Service.
[FR Doc. 2020-11993 Filed 5-29-20; 4:15 pm]