



# 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-2023-50R1

**Effective Date:**

13 December 2023

**ATA:**

32

**Type Certificate:**

A-224

**Subject:**

Landing Gear – Nose Landing Gear (NLG) Leg Pivot Axle Cracking

**Revision:**

Supersedes AD CF-2023-50, issued 10 July 2023.

**Applicability:**

Diamond Aircraft Industries Inc. (Diamond) DA 40, DA 40 D, DA 40 F aeroplane models, all serial numbers.

**Compliance:**

As indicated below, unless already accomplished.

**Background:**

On 22 January 2009, the European Union Aviation Safety Agency (EASA) issued AD 2009-0016 to address fatigue cracking of the NLG leg part number (P/N) D41-3223-10-00 at the pivot axle. EASA AD 2009-0016 required initial and repetitive inspection of the NLG leg P/N D41-3223-10-00 and replacement, as required, with a serviceable part. Installation of NLG leg P/N D41-3223-10-00\_1, or superseding P/N (\_2, \_3, etc.), was an optional terminating action to the repetitive inspection of the AD. After installation of NLG leg P/N D41-3223-10-00\_1, or superseding P/N, the AD prohibited the installation of NLG leg P/N D41-3223-10-00 on that aircraft.

Effective 15 November 2017, the design and oversight responsibilities for the models DA 40, DA 40 F, and DA 40 D were transferred from Diamond Aircraft Industries GmbH, of Austria, and EASA to Diamond Aircraft Industries Inc., of Canada, and Transport Canada.

Since then, Transport Canada has received several in-service reports of NLG leg P/N D41-3223-10-00\_1 cracking at the pivot axle and in some cases, fracture of the NLG leg. Investigation has revealed that the failures were the result of fatigue cracking.

This condition, if not detected, could lead to failure of the NLG, possibly causing damage to the aircraft and injuries to occupants.

Diamond has issued Mandatory Service Bulletins (MSB) 40-091, F4-038 and D4-108 applicable to DA 40, DA 40 F, and DA 40 D aeroplane models respectively. These MSBs require initial and repetitive inspection of the NLG leg pivot axle P/N D41-3223-10-00 and D41-3223-10-00\_1 using dye penetrant (Type II, Visible dye) to detect cracking. The DA40 Series Airplane Maintenance Manual (AMM), DA40-AMM, Revision 9, dated 18 October 2021, requires repetitive inspection of the NLG leg pivot axle using fluorescent dye penetrant (Type I) in accordance with American Society for Testing and Materials (ASTM) International Standards Document ASTM E1417 or equivalent method if a crack is suspected. Therefore, there is a possibility for operators to switch between Type I penetrant inspection technique and Type II.

Residue from colour contrast materials, introduced by Type II Visible dye penetrant inspections carried out previously, may create contamination of the fluorescent penetrant process, causing poor inspection results. ASTM E1417 states that Type II penetrant examination shall not be used prior to a Type I examination of the same surface. For this reason, the corrective actions mandated by AD CF-2023-50 differ from the Diamond MSBs.

To mitigate the risk of failure of the NLG at the pivot axle, AD CF-2023-50 was issued to require initial and repetitive detailed inspections of NLG leg P/N D41-3223-10-00 and P/N D41-3223-10-00\_1 to detect cracking and replacement, as required, with a serviceable part, and to prohibit the installation of P/N D41-3223-10-00 or D41-3223-10-00\_1 as a replacement part on affected aeroplane models. AD CF-2023-50 also required the replacement of all affected parts with serviceable parts within a specified compliance timeframe. Furthermore, AD CF-2023-50 modified the requirements of EASA AD 2009-0016, which was superseded, to reduce the repetitive inspection interval applicable to NLG leg P/N D41-3223-10-00, for aircraft that are predominantly operated from paved runways. AD CF-2023-50 differed from the corrective actions of Diamond MSBs by requiring detailed inspection of the pivot axle of the NLG leg P/N D41-3223-10-00 and D41-3223-10-00\_1 using a bright light and 10X magnifying glass instead of dye penetrant (Type II, Visible dye).

After AD CF-2023-50 was issued, it was determined that the repetitive inspection should include a tolerance to align with the scheduled 100 Hour Check of DA 40 Series Airplane Maintenance Manual Chapter 05. This AD Revision changes the repetitive inspection time from 100-hour intervals to 110-hour intervals.

### **Corrective Actions:**

For the purpose of this AD, the following definitions apply:

**The applicable MSB:** MSB 40-091, Revision 0, dated 18 January 2021, for DA 40 aeroplane model or MSB D4-108, Revision 0, dated 18 January 2021, for DA 40 D aeroplane model or MSB F4-038, Revision 0, dated 18 January 2021, for DA 40 F aeroplane model.

**Affected part:** NLG leg having P/N D41-3223-10-00 or P/N D41-3223-10-00\_1.

**Serviceable part:** NLG leg that is not an affected part. NLG leg having P/N D41-3223-10-00\_2 is considered a serviceable part.

### **Part I – Initial and Repetitive Inspections of NLG Leg P/N D41-3223-10-00 and P/N D41-3223-10-00\_1**

Within 25 hours air time or 30 days from 24 July 2023, the effective date of AD CF-2023-50, whichever occurs first, and thereafter at intervals not to exceed 110 hours air time, perform the following:

- A. Prepare the aeroplane for inspection of the pivot axle of the affected part in accordance with Section III Paragraphs 1 through 4 of the Work Instruction of the applicable MSB.
- B. Clean the pivot axle of the affected part using approved cleaning methods in accordance with Section 5-63, Penetrant Inspection – Cleaners and Applicators, Chapter 5, Nondestructive Inspection (NDI), Federal Aviation Administration (FAA) Advisory Circular (AC) 43.13-1B at Change 1, or equivalent methods, ensuring that any visible dye inspection residue is removed.
- C. Perform a detailed inspection of the pivot axle of the affected part using a bright light and 10X magnifying glass to detect cracking, paying special attention to the radius at the top of the pivot axle as shown in Figure 1 of the Work Instruction of the applicable MSB.
- D. If a crack is found, before further flight, replace the affected part with a serviceable part, and reinstall the nose wheel fork in accordance with Section III Paragraphs 8 through 12 of the Work Instruction of the applicable MSB.
- E. If no crack is found and the compliance time of Part III has not been exceeded, the affected part can remain installed. Reinstall the nose wheel fork in accordance with Section III Paragraphs 8 through 12 of the Work Instruction of the applicable MSB.

### **Part II – Parts Installation Prohibition**

As of 24 July 2023, the effective date of AD CF-2023-50, an affected part is not eligible for installation as a replacement part on affected aeroplane models.

### **Part III – Replacement of NLG Leg P/N D41-3223-10-00 and P/N D41-3223-10-00\_1**

Within 2500 hours air time or 24 months from 24 July 2023, the effective date of AD CF-2023-50, whichever occurs first, replace an affected part with a serviceable part.

Note: Any crack in the NLG leg P/N D41-3223-10-00\_2 or superseding P/N (\_3, \_4, etc.) is a reportable service difficulty as defined in CAR 101.01. Persons not required to report service difficulties by the CARs are requested to voluntarily report such findings via the Transport Canada Web Service Difficulty Reporting System (WSDRS) and/or directly to Diamond.

**Authorization:**

For the Minister of Transport,

*ORIGINAL SIGNED BY*

Jenny Young  
Chief, Continuing Airworthiness  
Issued on 29 November 2023

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