



## Airworthiness Directive

**AD No.:** 2017-0254

**Issued:** 21 December 2017

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) 216/2008 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

This AD is issued in accordance with Regulation (EU) 748/2012, Part 21.A.3B. In accordance with Regulation (EU) 1321/2014 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [Regulation (EU) 1321/2014 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [Regulation (EC) 216/2008, Article 14(4) exemption].

### Design Approval Holder's Name:

DIAMOND AIRCRAFT INDUSTRIES GmbH

### Type/Model designation(s):

DA 42 and DA 42 M aeroplanes

**Effective Date:** 04 January 2018

**TCDS Number(s):** EASA.A.005 and EASA.A.513

**Foreign AD:** Not applicable

**Supersedure:** This AD supersedes EASA AD 2017-0120 dated 13 July 2017.

## ATA 78 – Engine Exhaust – Exhaust Pipes – Modification / Inspection

### Manufacturer(s):

Diamond Aircraft Industries GmbH (Austria), Diamond Aircraft Industries Inc. (Canada)

### Applicability:

DA 42 and DA 42 M (both Normal and Restricted category) aeroplanes, manufacturer serial numbers 42.004 to 42.427 inclusive, 42.AC001 to 42.AC151 inclusive, 42.M001 to 42.M027 inclusive, if equipped with TAE 125-02-99 engines (modification MÄM 42-198 or Optional Service Bulletin (OSB) 42-046) or TAE 125-02-114 engines (modification OÄM 42-252 or OSB 42-107).

### Reason:

Two cases were reported of uncommanded engine in-flight shutdown (IFSD) on DA 42 aeroplanes. Subsequent investigation identified that these occurrences were due to failure of the propeller regulating valve, caused by hot exhaust gases coming from fractured engine exhaust pipes. The initiating cracks on the exhaust pipes were not detected during previous inspections, since those exhaust pipes are equipped with non-removable heat shields that do not allow inspection for certain sections of the exhaust pipe.

This condition, if not corrected, could lead to further cases of IFSD or overheat damage, possibly resulting in a forced landing, with consequent damage to the aeroplane and injury to occupants.

To address this potential unsafe condition, Diamond Aircraft Industries (DAI) developed an exhaust pipe without a directly attached integral heat shield that allows visual inspection over the entire



exhaust pipe length. DAI issued Mandatory Service Bulletin (MSB) 42-120 and relevant Working Instruction (WI) WI-MSB 42-120, providing instructions to install the modified exhaust pipes. As an interim measure, an additional bracket was designed to hold the exhaust pipe in place in case of a pipe fracture. EASA issued AD 2016-0156 (later revised), requiring replacement of the exhaust pipes with pipes having the new design, or installation of the additional brackets.

After EASA AD 2016-0156R1 was issued, cracks were found during inspection on modified exhaust pipes. Further investigation determined that, with the modified exhaust pipe design, vibration leads to cracking. Consequently, DAI published MSB 42-129, providing instructions for inspection of modified exhaust pipes, and EASA issued AD 2017-0090, retaining the requirements of EASA AD 2016-0156R1, which was superseded, and additionally requiring repetitive inspections of modified exhaust pipes and, depending on findings, repair or replacement.

After EASA AD 2017-0090 was issued, cracks were found on additional brackets, as previously installed per DAI WI-MSB 42-120. Prompted by these findings, DAI revised MSB 42-120 and the relevant part of WI-MSB 42-120 (now at Revision 4), providing improved instructions for the installation of brackets, and additional instructions to inspect those brackets. Consequently, EASA issued AD 2017-0120, retaining the requirements of EASA AD 2017-0090, which was superseded, and additionally requiring those actions for the additional brackets. That AD also required reinstallation of the additional brackets in accordance with improved instructions.

Since EASA AD 2017-0120 was issued, it has been determined that installation of additional exhaust pipe brackets, combined with additional inspections, is the most adequate solution to address the original unsafe condition, while it was also established that the modified exhaust pipes without directly attached heat shield are not adequate as replacement parts. Durability analysis of the design is still under investigation and further improvements in the exhaust design are expected.

For the reasons described above, this AD partially retains the requirements of EASA AD 2017-0120, which is superseded, removing the option to install a modified exhaust pipe without direct heat shield, and adding inspection requirements for aeroplanes modified in accordance with Section III.2 of DAI WI-MSB 42-120 Revision 3 or later (installation of additional brackets), and for aeroplanes on which an exhaust pipe with directly attached heat shield was re-installed in accordance with DAI OSB 42-131.

This AD is still considered an interim action and further AD action may follow.

#### **Required Action(s) and Compliance Time(s):**

Required as indicated, unless accomplished previously:

Note 1: DAI Part Number (P/N) D60-9078-06-01, Technify P/N 52-7810-H0001 02, Technify P/N 52-7810-H0001 03, and Technify P/N 52-7810-H0001 04 exhaust pipes are hereafter collectively referred to as “affected exhaust pipe” (with directly attached heat shield) in this AD. This exhaust pipe does not have a time limit but is subject to inspections as part of this AD.

Note 2: DAI P/N D60-9078-06-01\_01 and Technify P/N 52-7810-H0014 01 exhaust pipes are hereafter collectively referred to as “modified exhaust pipe” (without directly attached heat shield) in this AD. This exhaust pipe is subject to inspections within short intervals as part of this AD and is not considered as a permanent exhaust pipe replacement.



**Modification(s):**

Note 3: The modification specified in paragraph (1) of this AD is required for aeroplanes having an affected exhaust pipe (see Note 1 of this AD) installed.

- (1) For all aeroplanes, except those already modified in accordance with the instructions of DAI WI-MSB 42-120 at original issue, or Revision 1, or Revision 2 (see Notes 5 and 7 of this AD): Within the compliance time as identified in Table 1 of this AD, modify the aeroplane by installing additional brackets on each affected exhaust pipe in accordance with the instructions of Section III.2 of DAI WI-MSB 42-120 Revision 3.

Table 1 – Brackets Installation (see Note 4 of this AD)

<b>FH Accumulated</b>	<b>Compliance Time</b>
1 300 FH or less	Before the exhaust pipe exceeds 1 500 FH
More than 1 300 FH	<b>A or B</b> , whichever occurs later
	<b>A</b> Within 200 FH or 12 months, whichever occurs first after 16 August 2016 [the effective date of EASA AD 2016-0156]
	<b>B</b> Within 10 FH after 27 July 2017 [the effective date of EASA AD 2017-0120]

Note 4: Unless specified otherwise, the FH in Table 1 of this AD are those accumulated on 16 August 2016 [the effective date of the original issue of EASA AD 2016-0156] by the affected exhaust pipe since first installation. If those FH are not known, the total time accumulated by the aeroplane since its first flight applies instead.

**Inspection(s):**

Note 5: The inspection and (re-)installation specified in paragraph (2) of this AD is required for aeroplanes which have been modified, before the effective date of this AD, in accordance with the instructions of Section III.2 of DAI WI-MSB 42-120 at original issue, or Revision 1, or Revision 2 (installation of additional brackets).

- (2) Within the compliance time as identified in Table 2 of this AD, remove and inspect the additional brackets on each affected exhaust pipe in accordance with the instructions of Section III.2 of DAI WI-MSB 42-120 Revision 3. If no crack is found on an additional bracket, reinstall that bracket in accordance with the instructions of Section III.2 of DAI WI-MSB 42-120 Revision 3.

Table 2 – Inspection of Additional Brackets (see Note 6 of this AD)

<b>FH Accumulated</b>	<b>Compliance Time</b>
40 FH or more	Within 10 FH after 27 July 2017 [the effective date of EASA AD 2017-0120]
Less than 40 FH	Before the additional brackets exceed 50 FH

Note 6: Unless specified otherwise, the FH in Table 2 of this AD are those accumulated since installation of the additional brackets on the aeroplane.



Note 7: The inspections specified in paragraph (3) of this AD are required for aeroplanes which have been modified in accordance with Section III.1 of DAI WI-MSB 42-120 at original issue, or Revision 1, or Revision 2 (installation of a modified exhaust pipe, see Note 2 of this AD).

- (3) Within the compliance time as identified in Table 3 of this AD and, thereafter, at intervals not to exceed 50 FH, inspect each modified exhaust pipe in accordance with the instructions of DAI MSB 42-129.

Table 3 – Initial Inspection of Modified Exhaust Pipes (see Note 8 of this AD)

<b>FH Accumulated</b>	<b>Compliance Time</b>
40 FH or more	Within 10 FH after 31 May 2017 [the effective date of EASA AD 2017-0090]
Less than 40 FH	Before the exhaust pipe exceeds 50 FH

Note 8: Unless specified otherwise, the FH in Table 3 of this AD are those accumulated since installation of modified exhaust pipes on an aeroplane as specified in paragraph (1.2) of EASA AD 2017-0120.

Note 9: The inspections specified in paragraph (4) of this AD are required for aeroplanes which have been modified in accordance with Section III.2 of DAI WI-MSB 42-120 Revision 3 or later (installation of additional brackets).

- (4) Within 50 FH after (re-)installation of additional brackets as required by paragraph (1) or (2) of this AD, as applicable, and, thereafter, at intervals not to exceed 50 FH, inspect the additional brackets in accordance with the instructions of DAI WI-MSB-42-120 Revision 3.

Note 10: The inspections specified in paragraphs (5) and (6) of this AD are required for aeroplanes which have an affected exhaust pipe originally installed or re-installed in accordance with the instructions of DAI OSB 42-131. Re-installation of affected exhaust pipes is approved for newly produced parts and re-qualified parts.

- (5) Within the compliance time as identified in Table 4 of this AD and, thereafter, at intervals not to exceed 500 FH, inspect each affected exhaust pipe in accordance with the instructions of DAI WI-MSB-42-120, Revision 4.

Table 4 – Initial Inspection of Affected Exhaust Pipes (see Note 11 of this AD)

<b>FH Accumulated</b>	<b>Compliance Time</b>
1 300 FH or more	Within 200 FH after the effective date of this AD
Less than 1 300 FH	Before the exhaust pipe exceeds 1 500 FH

Note 11: Unless specified otherwise, the FH in Table 4 of this AD are those accumulated on the effective date of this AD by the affected exhaust pipe since first installation. If those FH are not known, the total time accumulated by the aeroplane since its first flight applies instead. Re-qualified parts in accordance the instructions of Section III.2 of DAI WI-OSB-42-131, original issue, are considered to have accumulated 1 500 FH.



- (6) Within 50 FH after (re-)installation of additional brackets in accordance with the instructions of DAI OSB 42-131 at original issue, and, thereafter, at intervals not to exceed 50 FH, inspect the additional brackets in accordance with the instructions of DAI WI-MSB-42-120 Revision 3.

**Corrective Action(s):**

- (7) If, during any inspection as required by paragraph (3) of this AD, any crack is found on a modified exhaust pipe, before next flight, repair the exhaust pipe in accordance with the instructions of DAI MSB 42-129 or replace it with an affected exhaust pipe (see Note 1 of this AD) in accordance with the instructions of DAI WI-OSB-42-131.
- (8) If, during any inspection as required by paragraph (5) of this AD, the inspection criteria of Section III.4 of DAI WI-OSB-42-120, Revision 4, are not met, before next flight, repair or replace the exhaust pipe in accordance with the instructions of DAI OSB 42-131.
- (9) If, during any inspection as required by paragraph (2), (4) or (6) of this AD, any crack is found on an additional bracket, before next flight, replace that bracket with a new bracket in accordance with the instructions of DAI WI 42-120 Revision 3.

**Terminating Action:**

- (10) None.

**Ref. Publications:**

DAI MSB 42-120 original issue dated 24 June 2016, or Revision 1 dated 10 November 2016, or Revision 2 dated 07 June 2017, or Revision 3 dated 20 December 2017.

DAI WI-MSB 42-120 original issue dated 24 June 2016, or Revision 1 dated 10 November 2016, or Revision 2 dated 07 June 2017, or Revision 3 dated 06 July 2017, or Revision 4 dated 20 December 2017.

DAI MSB 42-129 original issue dated 17 May 2017.

DAI OSB 42-131 original issue dated 20 December 2017.

DAI WI-OSB 42-131 original issue, dated 20 December 2017.

The use of later approved revisions of these documents is acceptable for compliance with the requirements of this AD.

**Remarks:**

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. Based on the required actions and the compliance time, EASA have decided to issue a Final AD with Request for Comments, postponing the public consultation process until after publication.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).



4. For any question concerning the technical content of the requirements in this AD, please contact: Diamond Aircraft Industries GmbH, Austria, Telephone +43 2622 26700, Fax +43 2622 26780, E-mail: [airworthiness@diamond-air.at](mailto:airworthiness@diamond-air.at).

