



Airworthiness Directive

AD No.: 2016-0004R1

Issued: 22 April 2022

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 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 or Annex Vb Part ML.A.301, as applicable, 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 Annex Vb Part ML.A.303, as applicable] or agreed with the Authority of the State of Registry [Regulation (EU) 2018/1139, Article 71 exemption].

Design Approval Holder's Name:

SAFRAN HELICOPTER ENGINES

Type/Model designation(s):

ARRIEL 2 engines

Effective Date: Revision 1: 29 April 2022
Original Issue: 20 January 2016

TCDS Number(s): EASA.E.001

Foreign AD: Not applicable

Revision: This AD revises EASA AD 2016-0004 dated 06 January 2016, including its Correction dated 05 February 2016, which superseded EASA AD 2013-0079R1 dated 27 January 2014.

ATA 73 – Engine Fuel & Control – Hydro-Mechanical Metering Unit – Inspection

Manufacturer(s):

Safran Helicopter Engines, S.A. (SAFRAN), formerly Turboméca, S.A.

Applicability:

ARRIEL 2D engines, all serial numbers, except those that have a Hydro-Mechanical Metering Unit (HMU) post-modification (mod) TU 231 installed.

These engines are known to be installed on, but not limited to, Airbus Helicopters (formerly Eurocopter) AS 350 B3 and EC 130 T2 helicopters.

Definitions:

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

The pre-mod TU 177 MSB: SAFRAN Mandatory Service Bulletin (MSB) A292 73 2847 Version C.

The post-mod TU 177 MSB: SAFRAN MSB A292 73 2851 Version B.



Groups: Group 1 engines are those that do not have Turboméca mod TU 177 embodied. Group 2 engines are those that have Turboméca mod TU 177 embodied.

Reason:

During an ARRIEL 2D endurance test, the illumination of the Low Fuel Pressure warning light was observed. The investigation of the high pressure / low pressure (HP/LP) pump assembly within the HMU, removed following this occurrence, revealed a deterioration and a loss of the LP pump drive function.

This condition, if not detected and corrected, could lead to the illumination of the Low Fuel Pressure warning light in flight, possibly resulting in an uncommanded in-flight shut-down (if the booster pumps are not switched on or under high load factor manoeuvres). For a single-engine helicopter, it may result in an emergency autorotation landing.

To address this potential unsafe condition, Turboméca published the pre-mod TU 177 MSB Version A and EASA issued AD 2012-0141 to reduce the service life of the HMU, requiring replacement before exceeding a defined limit of operating hours.

After that AD was issued, further cases of deterioration of HMU rotating components have been reported, which occurred before the replacement interval required by that AD.

Prompted by these findings, Turboméca revised the pre-mod TU 177 MSB (Version B and C), providing additional instructions for an inspection of the HMU, to be accomplished prior to rotating part replacement. Consequently, EASA issued AD 2013-0079, retaining the requirements of EASA AD 2012-0141, which was superseded, requiring inspection of the HMU and, depending on findings, replacement with serviceable parts and replacement of the HMU rotating components before exceeding newly defined limits of operating hours.

After EASA AD 2013-0079 was issued, Turboméca developed a new HP/LP pump and metering valve assembly available through mod TU 177, which demonstrated an improved robustness of the HP/LP inter-pump drive link splines. Turboméca issued the post-mod TU 177 MSB Version A to provide instructions for part replacement for engines incorporating TU 177. Consequently, EASA AD 2013-0079 was revised accordingly, to exclude post-mod TU 177 engines from the required intermediate inspections of the HMU inter-pump sleeve and splines, while retaining the requirements for repetitive component replacement.

After EASA AD 2013-0079R1 was issued, it was determined that, for post-mod TU 177 engines, the repetitive replacement of the HMU is no longer necessary, but repetitive inspections of the HMU remain necessary, and Turboméca published the post-mod TU 177 MSB Version B accordingly. Consequently, EASA issued AD 2016-0004 (later corrected), partially retaining the requirements of EASA AD 2013-0079R1, which was superseded, and requiring, depending on engine configuration, repetitive inspections of the HMU and, depending on findings, replacement.

Since that AD was issued, SAFRAN developed mod TU 231, introducing a new HMU, and revised the pre-mod TU 177 MSB (Version E) and the post-mod TU 177 MSB (Version E) to exclude engines post-mod TU 231 from the Applicability.



For the reasons described above, this AD is revised accordingly. This AD also includes editorial changes, introducing the latest AD writing standards, without affecting the requirements.

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

Required as indicated, unless accomplished previously:

Inspections:

- (1) For Group 1 engines: Before exceeding 400 HMU operating hours since new, or since replacement of LP and HP fuel pumps rotating components in accordance with the instructions of the pre-mod TU 177 MSB (any revision), whichever occurs later, and, thereafter, at intervals not to exceed 400 HMU operating hours, accomplish the following actions in accordance with the instructions of paragraph 2.B.(1) of the pre-mod TU 177 MSB:
- Inspect and replace the HMU inter-pump complete sleeve (female splines); and
 - Inspect the HMU HP pump and LP pump male splines.

Note 1: A non-cumulative tolerance of 25 hours may be applied to the compliance times specified in paragraph (1) of this AD to allow synchronisation of the required inspections with other maintenance tasks.

Corrective Action(s):

- (2) If, during any inspection as required by paragraph (1) of this AD, a discrepancy is detected, as defined in the pre-mod TU 177 MSB, before next flight, replace the affected HMU with a serviceable HMU in accordance with paragraph 2.B.(1) of the pre-mod TU 177 MSB.

Note 2: For the purpose of this AD, a serviceable HMU is an HMU that has accumulated less than 800 operating hours since new, or since replacement of LP and HP fuel pump rotating components in accordance with the instructions of the pre-mod TU 177 MSB (any revision), and has accumulated less than 400 operating hours since new or since the last inspection of the rotating components in accordance with the instructions of the pre-mod TU 177 MSB (any revision); or an HMU which is post-mod TU 231.

- (3) For Group 1 engines: Before exceeding 800 HMU operating hours since new, or since replacement of LP and HP fuel pumps rotating components in accordance with the instructions of the pre-mod TU 177 MSB (any revision), as applicable, whichever occurs later, and, thereafter, at intervals not to exceed 800 HMU operating hours, replace the rotating components of the HP and LP pumps including the complete sleeve, or replace the HMU with a serviceable HMU, in accordance with the instructions of paragraph 2.B.(1) of the pre-mod TRU 177 MSB, as applicable.

Credit:

- (4) Inspections and replacement of parts, accomplished before 20 January 2016 [the effective date of the original issue of this AD] in accordance with the instructions of the pre-mod TU 177 MSB Version A or Version B is acceptable to comply with the initial requirements of paragraphs (1), (2) and (3) of this AD.



Inspections:

- (5) For Group 2 engines: Before exceeding 800 HMU operating hours, but not earlier than 600 HMU operating hours since new, or since replacement of LP and HP fuel pumps rotating components, or since last inspection of inter-pumps splines in accordance with the instructions of Version A of the post-mod TU 177 MSB, whichever occurs later, and, thereafter, at intervals not to exceed 800 HMU operating hours, but not earlier than 600 HMU operating hours, accomplish the following actions in accordance with the instructions of paragraph 2.1 of the post-mod TU 177 MSB:
- Inspect the HMU inter-pump complete sleeve (female splines); and
 - Inspect the HMU HP pump and LP pump male splines.

Note 3: A non-cumulative tolerance of 80 hours may be applied to the compliance time specified in paragraph (5) of this AD to allow synchronisation of the required inspections with other maintenance tasks.

Corrective Action(s):

- (6) If, during any inspection as required by paragraph (5) of this AD, a discrepancy is detected as defined in Table 1 of this AD, within the compliance time specified in Table 1 of this AD, replace affected HMU with a serviceable HMU in accordance with paragraph 2.1 of the post-mod TU 177 MSB.

Table 1

Detected Discrepancy	Compliance Time
Wear is visually detected without a magnifying glass (defined as naked eye in the post-mod TU 177 MSB)	Before next flight
Wear is visually detected with a magnifying glass	Within 25 HMU operating hours after the inspection during which the wear was detected, but without exceeding 880 HMU operating hours

Terminating Action(s):

- (7) For Group 1 and Group 2 engines: Accomplishment of corrective action(s) on an engine, as required by paragraph (2) or (6) of this AD, as applicable, does not constitute terminating action for the repetitive inspections as required by paragraph (1) or paragraph (5) of this AD, as applicable, for that engine.
- (8) For Group 1 and Group 2 engines: Installation on an engine of an HMU post-mod TU 231, in accordance with instructions approved by SAFRAN, constitutes termination action for the repetitive inspections as required by paragraph (1) or paragraph (5) of this AD, as applicable, for that engine.



Part(s) Installation:

(9) For Group 1 and Group 2 engines: From 20 January 2016 [the effective date of EASA AD 2016-0004], do not install an HMU on an engine, or an engine on a helicopter, unless in compliance with the requirements of this AD.

Ref. Publications:

Turboméca MSB A292 73 2847 Version A dated 29 May 2012, or Version B dated 06 March 2013, or Version C dated 03 December 2013, or Version D dated 24 June 2016, or Version E dated 14 April 2022.

Turboméca MSB A292 73 2851 Version A dated 03 December 2013, or Version B dated 22 October 2015, or Version C dated 23 May 2019, or Version D dated 20 May 2021, or Version E dated 14 April 2022.

The use of later approved revisions of the above-mentioned 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. The original issue of this AD was posted on 04 November 2015 as PAD 15-137 for consultation until 02 December 2015. The Comment Response Document can be found at <http://ad.easa.europa.eu>.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
4. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this AD, and which may occur, or have occurred on a product, part or appliance not affected by this AD, can be reported to the [EU aviation safety reporting system](#). This may include reporting on the same or similar components, other than those covered by the design to which this AD applies, if the same unsafe condition can exist or may develop on an aircraft with those components installed. Such components may be installed under an FAA Parts Manufacturer Approval (PMA), Supplemental Type Certificate (STC) or other modification.
5. For any question concerning the technical content of the requirements in this AD, please contact: SAFRAN Helicopter Engines, S.A. at www.tools.safran-helicopter-engines.com.

