Airworthiness Directive

AD No.: 2016-0055R1

Issued: 11 October 2016

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:	Type/Model designation(s):
SAFRAN HELICOPTER ENGINES	ARRIEL 2 engines

Effective Date:	Revision 1: 11 October 2016 Original issue: 31 March 2016
TCDS Number(s):	EASA.E.001
Foreign AD:	Not applicable
Revision:	This AD revises EASA AD 2016-0055 dated 17 March 2016, which superseded EASA AD 2015-0162 dated 06 August 2015.

ATA 72 – Engine – Accessory Gear Box Module M01 – Inspection / Replacement

Manufacturer(s):
Turboméca S.A.

Applicability:
ARRIEL 2B, 2B1, 2B1A, 2C, 2C1, 2C2, 2D, 2E, 2N, 2S1 and 2S2 engines, all serial numbers.

These engines are known to be installed on, but not limited to, Airbus Helicopters AS350B3, EC130B4, EC130T2, AS365N3, EC155B and EC155B1 helicopters, Airbus Helicopters Deutschland MBB-BK 117 D-2 (EC145T2 or H145) helicopters, Avic international AC311 helicopters, and Sikorsky S-76C helicopters.

Reason:
An uncommanded in-flight shut-down (IFSD) of an ARRIEL 2 engine was reported, caused by rupture of the 41-tooth gear, which forms part of the bevel gear of the accessory gearbox (module M01). The subsequent investigation revealed that wear on the housing of the front bearing of this gear was a major contributor to this rupture. In addition, the investigation showed that this wear mechanism had resulted in positive Spectrometric Oil Analysis (SOA) indications before the event.

This condition, if not detected and corrected, could potentially lead to further cases of IFSD, possibly resulting in an emergency landing.

To address this potentially unsafe condition, Turboméca issued Mandatory Service Bulletin (MSB) 292 72 2861 to provide SOA check instructions. Consequently, EASA issued AD 2015-0162 to require repetitive SOA checks and, depending on the results, replacement of the module M01.

After that AD was issued, it was determined that wear inspections were necessary, in addition to the repetitive SOA checks. Turboméca updated MSB 292 72 2861 accordingly and EASA issued AD 2016-0055, partially retaining the requirements of EASA AD 2015-0162, which was superseded, to introduce wear inspections, and, depending on findings, replacement of the module M01.

Since EASA AD 2016-0055 was issued, it was determined that wear inspections are sufficient to detect not-permissible wear degradation. Prompted by this finding, SAFRAN Helicopter Engines issued MSB 292 72 2861 version D to delete SOA check instructions and providing clarified procedures for wear inspection. It was also determined that ARRIEL 2B1B engines are not affected by the unsafe condition addressed by this AD.

For the reasons described above, this AD is revised to remove the SOA checks, reduce the Applicability and it corrects a reference in paragraph (6), where the paragraph defining a serviceable M01 module was incorrectly referred to as paragraph (8), instead of paragraph (7). This AD also introduces some editorial changes, without changing the requirements.

Required Action(s) and Compliance Time(s):
Required as indicated, unless accomplished previously:

(1) [Deleted]

SOA Checks:
(2) [Deleted]

Table 1 – [Deleted]

Note 1: A non-cumulative tolerance of 10% EH may be applied to the compliance times specified in this AD for repetitive inspections, to allow synchronization of the required inspections with other maintenance tasks for which a non-cumulative tolerance is already granted in the applicable EMM. The 10% EH tolerance does not apply to the initial SOA check and wear inspection.

Note 2: [Deleted]

Wear Inspections:
(3) For engines equipped with a pre-mod TU 194 M01module fitted with a machined front casing P/N 0292120650 (as identified in SAFRAN Helicopter Engines MSB 292 72 2861 (formerly Turboméca) MSB 292 72 2861), within the threshold specified in Table 2 of this AD, and, thereafter, at intervals not to exceed the values specified in Table 3 of this AD (see Note 1 of this AD), accomplish a wear inspection in accordance with the instructions of Turboméca MSB 292 72 2861 version B or SAFRAN Helicopter Engines MSB 292 72 2861 version D.

Table 2 – Initial Wear Inspection

EH accumulated by the Module M01 (since first installation on an engine or since last overhaul) on 31 March 2016 [the effective date of this AD at original issue]	**Compliance Time**
Less than 800 EH	Before exceeding 850 EH since first installation of the Module M01 on an engine, or since last Module M01 overhaul, as applicable
800 EH or more, or EH not known	Within 50 EH or 30 days, whichever occurs first after 31 March 2016 [the effective date of this AD at original issue]

Table 3 – Wear Inspection Interval

Engine Models	**Interval** (see Note 1 of this AD)
ARRIEL 2B, 2B1, 2B1A, 2C, 2C1, 2C2, 2D, 2S1 and 2S2	600 EH
ARRIEL 2E and 2N	800 EH

Corrective Action(s):

(4) [Deleted]

(5) [Deleted]

(6) If, during any wear inspection as required by paragraph (3) of this AD, wear is found that exceeds 0.15 millimetres (mm), within the compliance time specified in Table 4 of this AD, as applicable, depending on the wear results and the inspected area, replace the module M01 with a serviceable module M01 (refer to paragraph (7) of this AD), in accordance with the instructions of Turboméca MSB 292 72 2861 version B or SAFRAN Helicopter Engines MSB 292 72 2861 version D.

Table 4 – Module 01 Replacement (after finding wear)

Wear (W) Found [in mm]	**Wear Inspection accomplished while engine installed on aircraft**	**Wear Inspection accomplished in- shop**
$0.15 < W \leq 0.30$	Within 200 EH	Before release to service of the engine
$0.30 < W \leq 0.40$	Within 25 EH	
$W > 0.40$	Before next flight	

(7) For the purpose of this AD, a serviceable module M01 is either a pre-mod TU 194 M01 module fitted with a machined front casing P/N 0292120650, that is subjected to wear checks in

accordance with paragraph (3) of this AD, or a pre-mod TU 194 M01 module fitted with a cast front casing P/N 0292127020, or a post-mod TU 194 M01 module.

Parts Installation:

(8) From 31 March 2016 [the effective date of this AD at original issue], it is allowed to install on an engine a module M01 fitted with a machined front casing P/N 0292120650, provided that, following installation, the engine is subjected to wear inspections as required by paragraphs (3) of this AD.

Ref. Publications:

Turboméca MSB 292 72 2861 version A dated 24 April 2015, version B dated 02 February 2016, version C dated 11 March 2016, or SAFRAN Helicopter Engines MSB 292 72 2861 version D dated 23 September 2016.

The use of later approved revisions of this document 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.

4. For any question concerning the technical content of the requirements in this AD, please contact: SAFRAN HELICOPTER ENGINES, ARRIEL 2 Customer Support, 40220 Tarnos, France, Fax: +33 5 59 74 45 15, or your usual or nearest SAFRAN HELICOPTER ENGINES technical representative
(refer to http://www.safran-helicopter-engines.com/).