Airworthiness Directive

AD No.: 2017-0134

Issued: 27 July 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:
AIRBUS HELICOPTERS

Type/Model designation(s):
AS 332 L2 and EC 225 LP helicopters

Effective Date: 01 August 2017

TCDS Number(s): EASA.R.002

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA AD 2017-0111 dated 23 June 2017.

ATA 05 – Time Limits / Maintenance Checks – Main Gearbox Particle Detector / Oil Filter / Oil Cooler – Inspection

ATA 63 – Main Rotor Drive – Epicyclic Module – Replacement / Modification / Reduced Service Life Limit

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Manufacturer(s):

Airbus Helicopters (formerly Eurocopter, Eurocopter France, Aerospatiale)

Applicability:

AS 332 L2 and EC 225 LP helicopters, all manufacturer serial numbers.

Reason:

Following a fatal accident that occurred in Norway to an EC 225 LP helicopter, involving in-flight detachment of the main rotor hub from the Main Gearbox (MGB), EASA issued Emergency AD 2016-0089-E and Emergency AD 2016-0103-E to require some immediate inspections as an initial precautionary measure.

After EASA AD 2016-0103-E was issued, a second preliminary report from the investigation board indicated metallurgical findings of fatigue and surface degradation in the outer race of a second stage planet gear of the MGB epicyclic module. At that time, it could not be determined whether that was a contributing factor to the accident, or a subsequent failure of another origin.

Prompted by these findings, pending further investigation to determine the root cause(s) of the reported damage, EASA decided, as an additional precautionary measure, to temporarily ground the fleet by issuing Emergency AD 2016-0104-E, prohibiting flight of all AS 332 L2 and EC 225 LP helicopters.

After that AD was issued, the investigation determined that rupture of the second stage planet gear, which was found with fatigue and surface degradation, likely caused the accident. Although the root cause of this failure is still not fully understood, it involved cracking of the planet gear bearing outer race, some spalling and propagation of a crack into the rim of the gear, finally resulting in its rupture. There were two approved configurations of the affected planet gear within the current type design. In depth review of the two designs and their service data showed that one planet gear configuration had higher operating stress levels that resulted in more frequent events of spalling, associated with rolling contact fatigue, while the other planet gear configuration exhibited better reliability behaviour. It was also determined that, by limiting the type design to the planet gear configuration which has demonstrated lower stress levels and better reliability and introducing a reduced life limit combined with more effective oil debris monitoring procedures, as well as other operational controls, an acceptable level of safety can be restored.

Prompted by these determinations, Airbus Helicopters (AH) issued AS332 Emergency Alert Service Bulletin (ASB) 63.00.83 and EC225 ASB 63A030 (single document at Revision 1), and AS332 Emergency ASB 05.01.07 and EC225 ASB 05A049 (single document at Revision 2), to introduce the necessary instructions allowing helicopters to return to service.

Consequently, EASA issued AD 2016-0199 to end the flight prohibition previously imposed by EASA Emergency AD 2016-0104-E, which was superseded, and required accomplishment of the actions specified in the related AH service publications. That AD for return to service of the fleet was primarily based on the better performance of the low stress planet gear configuration and improved close monitoring procedures as derived from testing performed in the scope of the investigation.

After that AD was issued, further testing investigation provided additional results regarding the close monitoring provisions. Following those results, EASA issued AD 2017-0042 (later revised) to require a one-time inspection of the oil cooler and the reporting of findings to acquire more information on the condition of the MGB oil system. Additional analysis and flight testing determined the need to amend the inspections required by EASA AD 2016-0199 to improve the detection capability of MGB second stage planet gear degradation. Consequently, AH issued AS332 Emergency ASB 05.01.07 and EC225 ASB 05A049 (single document at Revision 4) to provide the necessary instructions and EASA issued AD 2017-0050-E, retaining the requirements of AD 2016-0199, which was superseded, to modify the MGB oil filter inspections regime and to additionally require repetitive inspections of the MGB oil cooler.

Since EASA AD 2017-0050-E was issued, AH designed for the EC 225 LP helicopters a Full Flow Magnetic Plug (FFMP) device enabling collection of MGB particles upstream of the oil cooler (MOD 07 53047, available for in-service installation through AH SB EC225-63-032), and in addition, a revised repetitive inspection regime. AH also streamlined the concept of maintenance of the MGB, which resulted in the need to further revise life limits for the second stage planet gear of the MGB. AH issued AS332 Emergency ASB 05.01.07 and EC225 ASB 05A049 as separate documents at Revision 5. Consequently, EASA issued AD 2017-0111, retaining the requirements of EASA

AD 2017-0050-E, which was superseded, and required, for EC 225 helicopters, installation of an FFMP device with adaptation of the MGB oil filter and oil cooler inspections, and, for AS 332 L2 and EC 225 LP helicopters, implementation of new service life limits for the MGB second stage planet gears.

Since EASA AD 2017-0111 was issued, AH designed an improvement for FFMP of the EC225 LP helicopters (MOD 07 53052, available for in-service installation through Revision 1 of AH SB EC225-63-032) and a similar FFMP device for AS 332 L2 helicopters (MOD 07 53049, available for in-service installation through AH SB AS332-63.00.84). Consequently AH issued Revision 6 of AS332 ASB 05.01.07 and Revision 6 of EC225 ASB 05A049 to provide updated inspection regimes.

For the reason described above, this AD retains the requirements of EASA AD 2017-0111, which is superseded and requires additional work for the EC225 LP helicopters and installation of an FFMP device for AS 332 L2 helicopters with adaptation of the MGB oil filter and oil cooler inspections.

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

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

Required as indicated, unless accomplished previously.

Parts Removal from Service:

(1) Before next flight after 13 October 2016 [the effective date of EASA AD 2016-0199], identify the Part Number (P/N) of each second stage planet gear assembly and replace each assembly, having P/N 332A32-3335-00, P/N 332A32-3335-02, P/N 332A32-3335-03, P/N 332A32-3335-05 or P/N 332A32-3335-07, with a serviceable part (see Note 1 of this AD) in accordance with the instructions of AH AS332 ASB 63.00.83 or EC225 ASB 63A030, as applicable.

Note 1: For the purpose of this AD, a serviceable second stage planet gear assembly has P/N 332A32-3335-04, or P/N 332A32-3335-06, and has not exceeded the applicable 'new service life limit' as specified in Table 1 of AH AS332 ASB 63.00.83 or EC225 ASB 63A030, both at Revision 2, as applicable.

Parts Service Life Reduction:

(2) From 30 June 2017 [the effective date of EASA AD 2017-0111], before exceeding the applicable 'new service life limit', or within the 'compliance time' value, both as specified in Table 1 of AH AS332 ASB 63.00.83 and EC225 ASB 63A030, both at Revision 2, whichever occurs later, replace each second stage planet gear assembly P/N 332A32-3335-04 and P/N 332A32-3335-06 with a serviceable part (see Note 1 of this AD) in accordance with the instructions of AH AS332 ASB 63.00.83 or EC225 ASB 63A030, both at Revision 2, as applicable.

Note 2: AH AS332 ASB 05.01.07 Revision 6 and EC225 ASB 05A049 Revision 6 are hereafter collectively referred to as 'the applicable ASB' in this AD.

Serviceability Determination of Epicyclic Modules:

(3) Before next flight after 30 June 2017 [the effective date of EASA AD 2017-0111], determine whether the epicyclic module is a serviceable epicyclic module (see Note 3 of this AD) in accordance with the instructions of Section 1.E.2 of the applicable ASB (see Note 2 of this AD) and, depending on that determination, remove each unserviceable module from service in accordance with the instructions of the applicable ASB.

Note 3: For the purpose of this AD, a serviceable epicyclic module is a module equipped with serviceable second stage planet gear assemblies (see Note 1 of this AD) and that has never been subject to repair and/or parts replacement ("RE" as per AH terminology) following an event as specified in Table 1 of the applicable ASB.

Modification:

(4) Within the compliance time specified in Table 1 of this AD, as applicable, install an FFMP device (MOD 07 53047 for EC 225 LP and MOD 07 53049 for AS 332 L2) in accordance with the instructions of AH SB EC225-63-032, or AH SB AS332-63.00.84, as applicable.

Table 1 – FFMP Installation

Helicopter Model	Compliance time
EC 225 LP	Within 100 flight hours (FH) or 4 months, whichever occurs first after 30 June 2017 [the effective date of EASA AD 2017-0111]
AS 332 L2	Within 100 FH or 3 months, whichever occurs first after the effective date of this AD

Additional Work for EC 225 LP helicopters:

(5) After modification of a helicopter as required by paragraph (4) of this AD, within 3 months after the effective date of this AD, accomplish the FFMP additional work (MOD 07 53052) on that helicopter in accordance with the instructions of AH SB EC225-63-032 Revision 1.

Rotorcraft Flight Manual (RFM) Amendment – MGB Particle Burning In-Flight Prohibited:

(6) Within the compliance time defined in Table 2 of this AD, as applicable to helicopter model and configuration, amend the applicable RFM by inserting a copy of Appendix 4.B of the applicable ASB, inform all flight crews and, thereafter, operate the helicopter accordingly.

Introducing a later revision of the RFM that includes these instructions is an acceptable method to comply with the requirements of paragraph (6) of this AD.

Table 2 – RFM amendment

Helicopter model	Compliance time
AS 332 L2	Before next flight after 13 October 2016 [the effective date of EASA AD 2016-0199]
EC 225 LP in post MOD OP 26408 configuration	Before next flight after 20 March 2017 [the effective date of EASA AD 2017-0050-E]
EC 225 LP in pre MOD OP 26408 configuration	Before next flight after 30 June 2017 [the effective date of EASA AD 2017-0111]

Repetitive Inspections of MGB Particle Detectors:

(7) **Pre-MOD 07 53047 (EC 225 LP) or Pre-MOD 07 53049 (AS 332 L2) helicopters:**
Before next flight after 13 October 2016 [the effective date of EASA AD 2016-0199], and, thereafter, during each "after last flight" of the day (ALF) inspection, or at intervals not to exceed 10 (FH), whichever occurs first, inspect the particle detectors of the MGB epicyclic module, MGB sump, MGB flared casing and MGB oil cooler in accordance with the instructions of Section 3.B.1 a) of the applicable ASB.

(8) **Post-MOD 07 53047 (EC 225 LP) or Post-MOD 07 53049 (AS 332 L2) helicopters:**
After modification of a helicopter as required by paragraph (4) of this AD, during each ALF inspection, or at intervals not to exceed 10 (FH), whichever occurs first, inspect the particle detectors of the MGB epicyclic module, MGB sump, MGB flared casing and FFMP in accordance with the instructions of Section 3.B.1 b) of the applicable ASB.

Inspection(s) of MGB Oil Filter and Oil Cooler:

(9) **Pre-MOD 07 53047 (EC 225 LP) or Pre-MOD 07 53049 (AS 332 L2) helicopters:**
Within the threshold(s) specified in Table 3 of this AD, and thereafter at intervals not to exceed the compliance time specified in Table 3 of this AD, as applicable, inspect the MGB oil filter and oil cooler in accordance with the instructions of Section 3.B.2 and 3.B.4 of the applicable ASB.

Table 3 – MGB Oil Filter and Oil Cooler Inspections (see Note 4)

FH Accumulated	Compliance Times	
	Threshold (first time inspection)	**Interval**
Less than 40 FH	Before exceeding 50 FH	
40 FH or more, but less than 300 FH	Within 10 FH after 17 March 2017 the effective date of EASA AD 2017-0050-E	25 FH
300 FH or more	Within 10 FH after the inspection as required by EASA AD 2017-0042R1	10 FH

Note 4: Unless specified otherwise, the FH in Table 3 of this AD are those accumulated by any of second stages planet gears, since first installation on a helicopter. As the FH accumulated by the part increase, the inspection interval is to be reduced, as indicated in Table 3 of this AD.

(10) **Post-MOD 07 53047 (EC 225 LP) or Post-MOD 07 53049 (AS 332 L2) helicopters:** Before next flight after modification of a helicopter, as required by paragraph (4) of this AD, inspect the MGB oil cooler in accordance with the instructions of Section 3.B.4 of the applicable ASB.

Corrective Action(s):

(11) If, during any inspection as required by paragraph (7), (8), (9) or (10) of this AD, as applicable, particles are detected, exceeding the criteria as defined in Appendix 4.A of the applicable ASB, before next flight, accomplish the applicable corrective action(s) in accordance with the instructions of Appendix 4.A of the applicable ASB.

Terminating Action:

(12) None.

Credit:

(13) Serviceability determination and, depending on findings, replacement of unserviceable epicyclic module, RFM amendment; and inspections and, depending on findings, corrective action(s) accomplished on a helicopter before the effective date of this AD, in accordance with the instructions of AH AS332 ASB 05.01.07 at Revision 2 or Revision 3 or Revision 4 or Revision 5, or EC225 ASB 05A049 Revision 2 or Revision 3 or Revision 4 or Revision 5, as applicable, are acceptable to comply with the requirements of paragraphs (3) and (6) of this AD; and the requirements of paragraphs (8) and (10) of this AD, as applicable, for that helicopter.

Parts Installation:

(14) From 13 October 2016 [the effective date of AD 2016-0199], do not install on any helicopter an epicyclic module second stage planet gear assembly, having P/N 332A32-3335-00, P/N 332A32-3335-02, P/N 332A32-3335-03, P/N 332A32-3335-05 or P/N 332A32-3335-07. It is allowed to install on any helicopter a replacement MGB epicyclic module, provided that, prior to installation, it is determined that it is a serviceable module (see Note 3 of this AD).

Ref. Publications:

AH AS332 ASB 63.00.83 and EC225 ASB 63A030 (single document) Revision 1, dated 07 October 2016 and Revision 2 dated 23 June 2017.

AH AS332 ASB 05.01.07 Revision 2 dated 07 October 2016, Revision 3 dated 25 February 2017, and Revision 4 dated 17 March 2017, Revision 5 dated 23 June 2017 and Revision 6 dated 27 July 2017.

AH EC225 ASB 05A049 Revision 2 dated 07 October 2016, Revision 3 dated 25 February 2017, Revision 4 dated 17 March 2017, Revision 5 dated 23 June 2017 and Revision 6 dated 25 July 2017.

AH SB EC225-63-032 original issue dated 23 June 2017 and Revision 1 dated 25 July 2017.

AH SB AS332-63.00.84 original issue dated 27 July 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.

4. For any question concerning the technical content of the requirements in this AD, please contact: Airbus Helicopters (Technical Support), Aéroport de Marseille Provence 13725 Marignane Cedex, France, Telephone +33 (0)4 42 85 97 97, Fax +33 (0)4 42 85 99 66, Web portal: https://keycopter.airbushelicopters.com > Technical Requests Management.