



Emergency Airworthiness Directive

AD No.: 2017-0050-E

Issued: 17 March 2017

Note: This Emergency 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: 20 March 2017

TCDS Number(s): EASA.R.002

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA AD 2016-0199 dated 07 October 2016.

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

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

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 to require, as a precautionary measure, the accomplishment of certain one-time inspections. Review of the data collected through the reporting required by that AD resulted in findings relating to the installation of the MGB upper deck fittings of the three MGB suspension bars. Prompted by these findings, EASA issued Emergency AD 2016-0103-E, which superseded AD 2016-0089-E, to require further inspection to ensure correct installation of the MGB suspension bars and attachment fittings.



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, 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 imposed by EASA Emergency AD 2016-0104-E, which was superseded, and required accomplishment of the actions specified in the related AH service publications. This 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.

Since EASA AD 2016-0199 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 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.

For the reasons described above, this AD retains the requirements of EASA AD 2016-0199, which is superseded, modifies the MGB oil filter inspections regime, additionally requires repetitive inspections of the MGB oil cooler and, depending on findings, accomplishment of applicable corrective action(s).



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 reduced life limit as specified in Table 1 of AH AS332 ASB 63.00.83 or EC225 ASB 63A030, as applicable.

Parts Service Life Reduction:

- (2) From 13 October 2016 [the effective date of EASA AD 2016-0199], before exceeding the applicable reduced life limit, as specified in Table 1 of AH AS332 ASB 63.00.83 and EC225 ASB 63A030, 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, as applicable.

Serviceability Determination of Epicyclic Modules:

- (3) Before next flight after 13 October 2016 [the effective date of EASA AD 2016-0199], determine whether the epicyclic module is a serviceable epicyclic module (see Note 2 of this AD) in accordance with the instructions of Section 1.E.2 of AH AS332 ASB 05.01.07 Revision 4 or EC225 ASB 05A049 Revision 4, as applicable, and, depending on that determination, remove each unserviceable module from the helicopter.

Note 2: 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 AH AS332 ASB 05.01.07 Revision 4 or EC225 ASB 05A049 Revision 4, as applicable.

Note 3: AH AS332 ASB 05.01.07 and EC225 ASB 05A049 (single document at Revision 4) is hereafter referred to as 'the applicable ASB' in this AD.

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

- (4) Within the compliance time and in accordance with the accomplishment instructions, defined in Table 1 of this AD, as applicable to helicopter model, amend the applicable RFM by inserting a copy of Appendix 4.B (AS 332 L2) or Appendix 4.C (EC 225 LP) of AH AS332 ASB 05.01.07 or EC225 ASB 05A049, as applicable, 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 (4) of this AD.

Table 1 – RFM amendment

Helicopter model	Compliance time	Accomplishment instruction
AS 332 L2	Before next flight after 13 October 2016 [the effective date of EASA AD 2016-0199]	AH AS332 ASB 05.01.07 Revision 2
EC 225 LP	Before next flight after the effective date of this AD	AH EC225 ASB 05A049 Revision 4

Repetitive Inspections of MGB Particle Detectors:

- (5) 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 flight hours (FH), whichever occurs first, inspect the MGB particle detectors (epicyclic module, MGB sump, flared casing and MGB oil cooler) in accordance with the instructions of Section 3.B.1 of the applicable ASB.

Repetitive Inspections of MGB Oil Filter and Oil Cooler:

- (6) Within the threshold(s) specified in Table 2 of this AD, and thereafter at intervals not to exceed the compliance time specified in Table 2 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 2 – 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 the effective date of this AD	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 2 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 2 of this AD.

Corrective Action(s):

- (7) If, during any inspection as required by paragraph (5) or (6) 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: None

- (8) Accomplishment of corrective action(s) on a helicopter, as required by paragraph (7) of this AD, does not constitute terminating action for the repetitive inspections as required by paragraphs (5) or (6) of this AD for that helicopter.

Credit:

- (9) 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 or EC225 ASB 05A049 at Revision 2 or Revision 3, as applicable, are acceptable to comply with the initial requirements of paragraphs (3), (5) and (6) of this AD, as applicable, for that helicopter.

Parts Installation:

- (10) 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 2 of this AD).

Ref. Publications:

Airbus Helicopters AS332 ASB 63.00.83 and EC225 ASB 63A030 (single document) Revision 1, dated 07 October 2016.

Airbus Helicopters AS332 ASB 05.01.07 and EC225 ASB 05A049 (single document) Revision 2 dated 07 October 2016, or Revision 3 dated 25 February 2017, or Revision 4 dated 17 March 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. The results of the safety assessment have indicated the need for immediate publication and notification, without the full consultation process.
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.

