


EASA	AIRWORTHINESS DIRECTIVE	
	<p>AD No.: 2012-0071</p> <p>Date: 26 April 2012</p> <p>Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) No 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.</p>	
<p>This AD is issued in accordance with EC 1702/2003, Part 21A.3B. In accordance with EC 2042/2003 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 [EC 2042/2003 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [EC 216/2008, Article 14(4) exemption].</p>		
<p>Type Approval Holder's Name : TURBOMÉCA</p>	<p>Type/Model designation(s) : ARRIEL 1 engines</p>	
TCDS Number:	EASA.E.073	
Foreign AD:	Not applicable	
Supersedure:	This AD supersedes DGAC France AD 1990-064(A) R1 dated 21 March 2001.	
ATA 72	Engine – Axial Compressor, Gas Generator Hollow Shaft and Rear Bearing – Identification / Inspection / Cleaning / Replacement	
Manufacturer(s):	Turboméca S.A.	
Applicability:	<p>ARRIEL 1A, 1A1, 1A2, 1B, 1C, 1C1, 1C2, 1D, 1D1, 1E2, 1K, 1K1, 1S and 1S1 turbo-shaft engines, all serial numbers, except those incorporating Turboméca TU360 modification.</p> <p>These engines are known to be installed on, but not limited to, Eurocopter (formerly Eurocopter France, Aerospatiale) AS 350 B, BA, BB, B1 and B2, and AS 365 N, Eurocopter Deutschland (formerly Messerschmidt-Bölkow-Blohm) MBB-BK117-C1 and -C2, AgustaWestland (formerly Agusta) A 109 K2, and Sikorsky S-76A helicopters.</p>	
Reason:	<p>Several cases have been reported of uncommanded in-flight shut-down (IFSD) on ARRIEL 1 engines. Results of subsequent investigations showed that engine operation in a dust laden atmosphere may lead to dust ingestion inside the engine, the possible consequences of which are erosion of the air path components (mainly the axial compressor wheel), and/or laterite deposit inside the gas generator hollow shaft which, in case of uneven distribution or detachment, can lead to an unbalanced condition of the gas generator rotating assembly and, ultimately, gas generator rear bearing failure.</p> <p>This condition, if not detected and corrected, could lead to an uncommanded engine in-flight shut down and may lead to an emergency landing.</p> <p>To address this potential unsafe condition, DGAC France issued AD 1990-064(A), later revised to R1, to require periodic vibration monitoring (Engine Maintenance Manual Chapter 05-10-03) and repetitive gas generator hollow shaft cleaning based on axial compressor erosion checks.</p> <p>Since that AD was issued, in-service experience has shown that laterite</p>	

	<p>deposits inside the gas generator hollow shaft may be found when the axial compressor wheel has less erosion than initially assessed. In addition, Turboméca have developed an improvement of the hollow shaft (modification TU360), which makes the engine less susceptible to laterite deposits.</p> <p>For the reasons described above, this AD requires the determination of the engine history and operating conditions, and a one-time inspection of the axial compressor for erosion, in order to define the first cleaning of the Gas Generator hollow shaft. It also requires a repetitive cleaning of the shaft. Modification of an engine through Turboméca modification TU360 (which can be done during overhaul) constitutes terminating action for the requirements of this AD.</p>
Effective Date:	10 May 2012
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless accomplished previously:</p> <ol style="list-style-type: none"> (1) Within 50 engine hours (EH) after the effective date of this AD, determine the engine history and operating conditions. If the engine operates, or has been operated, in dust laden atmosphere, or the operating history of the engine or Module 03 cannot be established, or doubt exists about the current operating conditions of the engine, within 50 EH after the effective date of this AD, inspect the axial compressor for erosion in accordance with the instructions of paragraph 1.A.(1) and Figure 2 of Turboméca Mandatory Service Bulletin (MSB) A292 72 0230 Version C. <p>Actions accomplished before the effective date of this AD in accordance with the instructions of Turboméca MSB A292 72 0230 Issue 1 are acceptable to comply with the requirements of this paragraph.</p> <ol style="list-style-type: none"> (2) Depending on the results of the inspection as required by paragraph (1) of this AD, determine the compliance times and accomplish initial and repetitive cleanings of the gas generator hollow shaft as specified in Appendix 1 of this AD. (3) If, during any of the cleanings as required by paragraph (2) of this AD, the dust weight collected inside the gas generator hollow shaft is more than 8 grams, before next flight, replace the gas generator rear bearing. Replacement of the gas generator rear bearing as required by this AD does not constitute terminating action for the repetitive cleaning. (4) After the effective date of this AD, if the helicopter configuration is modified, or the type of mission or geographical operating area changes, within 50 EH after such a change, accomplish the actions as specified in paragraph (1) of this AD. Depending on the results, accomplish all the actions as specified in paragraphs (2) and (3) of this AD. (5) From the effective date of this AD, do not install a Module 03 (gas generator) on an engine unless it is in compliance with the requirements of this AD. (6) Modification of an engine through Turboméca modification TU360 constitutes terminating action for the requirements of this AD.
Ref. Publications:	<p>Turboméca MSB A292 72 0230 Version C dated 29 February 2012.</p> <p>The use of later approved revisions of this document is acceptable for compliance with the requirements of this AD.</p>
Remarks :	<ol style="list-style-type: none"> 1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD. 2. This AD was posted on 23 March 2012 as PAD 12-021 for consultation until 20 April 2012. The Comment Response Document can be found at http://ad.easa.europa.eu. 3. Enquiries regarding this AD should be referred to the Safety Information

	<p>Section, Executive Directorate, EASA. E-mail: ADs@easa.europa.eu.</p> <p>4. For any question concerning the technical content of the requirements in this AD, please contact: Turboméca, S.A., ARRIEL 1 Customer Support, 40220 Tarnos, France, Fax: +33 5 59 74 45 15, or contact your usual or nearest Turboméca technical representative at www.turbomeca-support.com.</p>
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Appendix 1 - Compliance Times
for Initial and Repetitive Cleanings of the Gas Generator Hollow Shaft

Erosion of the Axial Compressor (See Note 1)	Gas Generator (Module M03) and Axial Compressor (Module M02) are installed on the same Engine	Compliance Time for the Initial Cleaning of the Gas Generator Hollow Shaft (see Note 2)	Intervals for the Repetitive Cleanings of the Gas Generator Hollow Shaft (see Note 2)
Erosion rate is higher than 1 mm per 1 000 EH or Total erosion is more than 3 mm	Since equal or more than 200 EH	Within 50 EH after the inspection of the erosion of the axial compressor	Refer to Figure 6 of Turboméca MSB A292 72 0230 Version C
Erosion rate is lower than 1 mm per 1 000 EH and Total erosion is less than 3 mm	Since less than 200 EH, or unknown	To be determined in accordance with Figure 3 of Turboméca MSB A292 72 0230 Version C (see Note 3)	
	Not relevant		

Note 1: For inspection of the erosion of the Axial Compressor, refer to tasks 72-32-00-280-801 and 72-32-00-280-802 of applicable Arriel 1 Maintenance Manuals (these tasks define acceptance criteria and maintenance actions following findings of erosion check).

Note 2: Refer to paragraph 2.B 'Operating Instructions' and 2.D 'Identification' (for recording of the required periodicity) of Turboméca MSB A292 72 0230 Version C.

Note 3: Two different methods may be used for determination of the compliance time:

- (1) "Lump" method:
 - If take-off and/or landing is carried out in « brown-out » (= no visibility) condition :
 - Within 50 EH after the inspection of the erosion of the axial compressor
 - If no take-off or landing is carried out in « brown-out » condition :
 - For single engine application: Within 150 EH after the inspection of the erosion of the axial compressor
 - For twin engine application: Within 300 EH after the inspection of the erosion of the axial compressor
- (2) "Counting" method: Time calculated in function of flight condition parameters.