


EASA	AIRWORTHINESS DIRECTIVE	
	AD No.: 2013-0171	
	Date: 30 July 2013	
<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 EU 748/2012, Part 21.A.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>		
Design Approval Holder's Name:	Type/Model designation(s):	
TURBOMECA	ARRIEL 2 engines	
TCDS Number:	EASA E.001	
Foreign AD:	Not applicable	
Supersedure:	This AD supersedes EASA AD 2009-0091 dated 04 May 2009.	
ATA 73	Engine Fuel & Control – Hydro-Mechanical Metering Unit (HMU) Constant Delta Pressure Valve Diaphragm – Replacement	
Manufacturer(s):	Turbomeca S.A.	
Applicability:	ARRIEL 2B1 and 2B1A engines, all serial numbers. These engines are known to be installed on, but not limited to, Eurocopter AS 350 B3 and EC 130 B4 helicopters.	
Reason:	<p>Several cases of rupture of the constant delta pressure (delta-P) valve diaphragm were reported on ARRIEL 2B1 engines, due to wear of the delta-P diaphragm fabric.</p> <p>This condition, if not corrected, can result in the loss of the automatic control mode of the helicopter, accompanied by a deterioration of the behaviour of the auxiliary back-up mode (emergency mode). On a single-engine helicopter, this could possibly prompt an emergency landing.</p> <p>In order to reduce the probability of a diaphragm rupture due to fabric wear, EASA issued AD 2007-0006, requiring periodical replacement of all diaphragms having logged more than 2 000 operating hours.</p> <p>Since that AD was issued, no further case of rupture of the constant delta-P valve diaphragm was reported on ARRIEL 2B1 engines. However, several additional diaphragms returning from service were inspected by Turbomeca, and some signs of wear were detected on diaphragms having logged less than 2 000 hours. Based on the inspection results, it was decided to decrease the limit from 2 000 hours to 1 500 hours, in order to further reduce the probability of delta-P diaphragm rupture. Prompted by these findings, EASA issued AD 2007-0126, which superseded EASA AD 2007-0006, to require implementation</p>	

	<p>of the reduced limit.</p> <p>After EASA AD 2007-0126 was issued, Turbomeca developed modification TU157, which consists in modifying the pressure relief valve of the HMU by introducing a damping device into the valve. Introduction of this device has demonstrated to decrease the pressure fluctuations in the system, thereby significantly reducing the risk of wear of the delta-P diaphragm fabric. This removes the need for life limit of the delta-P diaphragm, which was before overhaul of the HMU. Modification TU157 was therefore considered as the terminating action for the requirements of EASA AD 2007-0126.</p> <p>Consequently, EASA issued AD 2009-0091, retaining the requirements of EASA AD 2007-0126, which was superseded, except that:</p> <ul style="list-style-type: none"> • In addition to ARRIEL 2B1 engines, the Applicability was expanded to include ARRIEL 2B1A engines, which share the same HMU design • Applicability was reduced to exclude ARRIEL 2B1 and 2B1A engines which incorporate modification TU157. <p>Since issuance of EASA AD 2009-0091, an occurrence was reported on an ARRIEL 2B1 engine fitted with an HMU having a diaphragm that had been operated for less than 1 500 hours since installation. This engine had performed a large number of engine starts and shut-downs, and had an average of Power Turbine (C2) cycle consumption rate per hour higher than the usual rate known in service.</p> <p>Turbomeca analysis shows that:</p> <ul style="list-style-type: none"> • the pressure pulsations in the fuel system, which are a significant contributor to the delta P diaphragm wear, mainly occur when the engine is stopped. • the C2 cycle number is the most likely indicator of the number of engine starts and stops. <p>For the reasons described above, this AD, which supersedes EASA AD 2009-0091, reintroduces periodical replacement of the HMU, with the possibility to account for HMU C2 cycle consumption.</p>
Effective Date:	13 August 2013
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless accomplished previously:</p> <ol style="list-style-type: none"> (1) For engines which do not incorporate modification TU157, within the compliance time specified in Appendix - Table 1 of this AD, as applicable, and, thereafter, at intervals not to exceed the values specified in Appendix - Table 1 of this AD, as applicable, replace the HMU with a serviceable HMU in accordance with the instructions of Turbomeca Mandatory Service Bulletin (SB) 292 73 2818 version D. (2) Modification of an engine in accordance with the instructions of Turbomeca SB 292 73 2157 (modification TU157) constitutes terminating action for the requirements of paragraph (1) of this AD. (3) Compliance with the requirements of paragraph (1) of this AD can be demonstrated by: <ol style="list-style-type: none"> (3.1) Revising as follows the approved Aircraft Maintenance Programme (AMP) and standard practices on the basis of which the operator or the owner ensures the continuing airworthiness of each operated helicopter: <p style="margin-left: 40px;">Incorporate the HMU operating limits described in the Appendix - Table 1 of this AD</p> <p style="margin-left: 40px;">and</p> (3.2) Complying with the approved AMP described in paragraph (3.1) of this AD.

	(4) From the effective date of this AD, installation of a pre-mod TU157 HMU on an engine, or an engine with a pre-mod TU157 HMU on a helicopter is allowed, provided that the HMU is in compliance with the requirements of paragraph (1) of this AD.
Ref. Publications:	Turbomeca MSB 292 73 2818 version D dated 24 June 2013. The use of later approved revisions of this document is acceptable for compliance with the requirements of this AD.
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 04 July as PAD 13-095 for consultation until 25 July 2013. 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 Section, Executive Directorate, EASA. E-mail: ADs@easa.europa.eu. 4. For any question concerning the technical content of the requirements in this AD, please contact: Turbomeca S.A., ARRIEL 2 Customer Support 40220 Tarnos, France Fax: +33 5 59 74 45 15, or your usual or nearest TURBOMECA technical representative (refer to http://www.turbomeca-support.com).

Appendix - Table 1 - **Compliance Times**

HMU Condition	Accumulated HMU operating hours (1) or C2 cycles, on the effective date of this AD	Initial Replacement	Interval for repetitive replacement
HMU operating hours associated with an equivalent number of C2 cycles	Less than 900 HMU C2 cycles	Before accumulating 1 000 HMU C2 cycles or 1 500 HMU operating hours, whichever occurs first	1 000 HMU C2 cycles or 1 500 HMU operating hours, whichever occurs first
	900 HMU C2 cycles or more	Within 100 HMU C2 cycles after the effective date of this AD	
HMU operating hours not associated with an equivalent number of C2 cycles	Less than 1 100 HMU operating hours	Before accumulating 1 200 HMU operating hours	1 200 HMU operating hours
	1 100 HMU operating hours or more	Within 100 HMU operating hours after the effective date of this AD	

Note (1): HMU operating hours are to be counted since new, overhaul, application of Turbomeca SB 292 73 2105 any version or application of Turbomeca SB 292 73 2818 any version, whichever occurs later.