EASA	AIRWORTHINESS DIRECTIVE
	AD No.: 2012-0124R1 **Date: 22 January 2013** 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.

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].

Design Approval Holder's Name:	**Type/Model designation(s):**
TURBOMÉCA	ARRIEL 2 turboshaft engines

TCDS Number:	EASA.E.001
Foreign AD:	Not applicable
Revision:	This AD revises EASA AD 2012-0124 dated 09 July 2012, which superseded EASA AD 2012-0054 dated 02 April 2012.
ATA 72	**Engine – Module M03 (Gas Generator) – Turbine Blades – Modification**
Manufacturer(s):	Turboméca S.A.
Applicability:	ARRIEL 2B, 2B1, 2B1A, 2C2 and 2S2 turboshaft engines, all serial numbers, except those incorporating Turboméca modification TU166. These engines are known to be installed on, but not limited to: Eurocopter AS 350 B3, EC 130 B4 and EC 155 B1 helicopters, Changhe Z11 helicopters, and Sikorsky S-76C++ helicopters.
Reason:	Several cases of Gas Generator (GG) Turbine blade rupture occurred in service on ARRIEL 2 twin engine and one on single engine helicopters. For the case occurring in flight on a single engine helicopter (ARRIEL 2B1 engine), the pilot performed an emergency autorotation, landing the helicopter without further incident. The design of ARRIEL 2 engines (containment shield around the GG Turbine) allows debris from a blade to be contained in the event of rupture. However, the rupture of a GG Turbine blade may lead to an uncommanded In Flight Shut-Down (IFSD) which, on a single-engine helicopter, could ultimately lead to an emergency autorotation landing. The most probable root cause of the ruptures is an excitation of one of the vibration modes of the GG Turbine blade in conjunction with several secondary contributing factors which are deemed sufficient to reduce the vibratory stress margin of the blade to a level consistent with the rate of occurrences of ruptures encountered. Turboméca has released TU166 modification which consists in inserting

	blade dampers between the GG Turbine disc and the GG Turbine blade platform. Introduction of these dampers minimizes the effects of the GG Turbine blade vibratory excitation and increases the blade tolerance for this type of stress. EASA issued AD 2010-0198 to require the accomplishment of TU166 modification on ARRIEL 2 single engine applications. Since issuance of AD 2010-0198, an accident occurred with a Sikorsky S-76C++ twin-engine helicopter following an uncommanded IFSD of one of its ARRIEL 2S2 engines, resulting from a GG Turbine blade rupture. The affected ARRIEL 2S2 engine did not have TU166 modification incorporated. Therefore EASA AD 2012-0054 was issued to extend the applicability of the AD to the ARRIEL 2S2 engines. Since issuance of EASA AD 2012-0054, the statistical analysis was updated for all ARRIEL 2 engine models to account for recent cases of GG Turbine blade rupture. In all cases, the engine did not have TU166 modification incorporated, and the event resulted in an uncommanded IFSD. The associated risk analysis performed has shown that action is necessary on Arriel 2C2 engines. For the reasons described above, this AD retains the requirements of EASA AD 2012-0054, which is superseded, and expands the applicability to ARRIEL 2C2 engines. This AD is revised to give credit for previous incorporation of modification TU166 on ARRIEL 2B, 2B1 and 2B1A engines.
Effective Date:	Revision 1: 29 January 2013 Original issue: 23 July 2012
Required Action(s) and Compliance Time(s):	Required as indicated, unless accomplished previously: (1) Accomplish TU166 modification in accordance with the instructions of Turboméca Mandatory Service Bulletin (MSB) A292 72 3166 version B for the ARRIEL 2B, 2B1 and 2B1A, Turboméca MSB A292 72 4166 version A for the ARRIEL 2S2 and Turboméca MSB A292 72 5166 version A for the Arriel 2C2: when the GG Turbine is replaced (at approved Operator or Service Center), or when the engine or Module M03 is going through overhaul or repair (at approved Maintenance or Repair Center), whichever occurs first, but no later than: • 25 months after 15 October 2010 [the effective date of EASA AD 2010-0198] for ARRIEL 2B, 2B1 and 2B1A engines. • 7 months after 16 April 2012 [the effective date of EASA AD 2012-0054] for ARRIEL 2S2 engines. • Before exceeding 650 Engine Hours accumulated by the Module 03 after 23 July 2012 [the effective date of this AD at original issue] for ARRIEL 2C2 engines. (2) Modification of an engine, before 23 July 2012 [the effective date of this AD at original issue], by incorporating modification TU166, in accordance with the instructions of Turboméca MSB A292 72 3166 version A for the ARRIEL 2B, 2B1 and 2B1A, or in accordance with the instructions of Turboméca SB 292 72 2166 versions A through G for the ARRIEL 2B, 2B1, 2B1A, 2C2 and 2S2, as applicable, is acceptable to comply with the requirements of paragraph (1) of this AD for that engine. (3) From 23 July 2012 [the effective date of this AD at original issue], do not install an ARRIEL 2B, 2B1, 2B1A, 2C2 or 2S2 engine on a helicopter, unless in compliance with the requirements of this AD.

Ref. Publications:	Turboméca MSB A292 72 3166 version B dated 20 September 2010. Turboméca MSB A292 72 4166 version A dated 23 March 2012. Turboméca MSB A292 72 5166 version A dated 18 June 2012. 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 required actions and the risk allowance have granted the issuance of a Final AD with Request for Comments, postponing the public consultation process after publication. 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: Turboméca, S.A., ARRIEL 2 Customer Support 40220 Tarnos, France Fax: +33 5 59 74 45 15 or your usual or nearest Turboméca technical representative at www.turbomeca-support.com.