


<b>EASA</b>	<b>AIRWORTHINESS DIRECTIVE</b>
	<p><b>AD No.: 2010-0101R3</b></p> <p><b>Date: 05 September 2012</b></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><b>Type Approval Holder's Name :</b></p> <p>Turboméca</p>	<p><b>Type/Model designation(s) :</b></p> <p>ARRIEL 1 engines</p>
TCDS Number :	EASA.E.073
Foreign AD :	Not applicable
Revision:	This AD revises EASA AD 2010-0101R2 dated 24 March 2011.
<b>ATA 72</b>	<b>Engine – Module M03 (Gas Generator) – Post-TU347 Second Stage Turbine Disc – Reduced Life Limit</b>
Manufacturer(s):	Turboméca S.A.
Applicability:	<p>Arriel 1A, 1A1, 1B, 1C, 1C1, 1C2, 1D, 1D1 and 1S1 turbo-shaft engines, all serial numbers, if modified by Turboméca TU347, except those with Gas Generator 2<sup>nd</sup> stage Turbine Discs modified by Turboméca Modification TU365 in production, or modified by Turboméca Service Bulletin (SB) 292 72 0365 in-service.</p> <p>These engines are known to be installed on, but not limited to, Eurocopter AS350 series, AS365 and SA365 series helicopters, and Sikorsky S-76A and S-76C series helicopters.</p>
Reason:	<p>Metallurgical non-conformities have been found when performing quality inspections during production of Arriel 1 Gas Generator (GG) second Stage Turbine Discs introduced by Turboméca Modification TU347 (P/N 0 292 25 040 0). Analysis concluded that the approved life limit of the post-TU347 GG second Stage Turbine Disc needs to be reduced to 2 500 GG cycles.</p> <p>Exceeding the revised approved life limit could result in a GG second Stage Turbine Disc burst with uncontained high energy debris.</p> <p>To address this unsafe condition, EASA AD 2010-0101-E required compliance with the revised life limit of the GG second Stage Turbine Disc by removing the module M03 (Gas Generator) or the GG second Stage Turbine fitted with a GG second stage Turbine Disc which has reached or exceeded the new life limit.</p> <p>After issuance of AD 2010-0101-E, Turboméca introduced a reinforced</p>

	<p>Eddy-current inspection which provides a lower (improved) detection threshold of the metallurgical non-conformities. This reinforced Eddy-current inspection, named “CFR”, combined with a revised analysis, allowed to increase the life limit of the post-TU347 GG second Stage Turbine Discs identified as “CFR” over the 2 500 GG life cycles of the “non-CFR” Discs, as specified in AD 2010-0101R1.</p> <p>Revision 2 of this AD was issued to increase further the life limit of the post-TU347 GG 2<sup>nd</sup> stage turbine discs identified as “CFR” and the life limit of the post-TU347 GG 2<sup>nd</sup> stage turbine discs identified as “non-CFR”. This was possible as, since issuance of AD 2010-0101R1, Turboméca had carried out further analysis and testing on those discs.</p> <p>Since issuance of EASA AD 2010-0101R2, Turboméca developed an improved forging process for 2<sup>nd</sup> stage Turbine Discs that prevents generation of metallurgical non-conformities, introduced by Turboméca Modification TU365 and SB 292 72 0365.</p> <p>Note: The 2<sup>nd</sup> stage Turbine Discs modified by Turboméca Modification TU365 or by SB 292 72 0365 have a life limit of 6 500 Gas Generator (GG) cycles.</p> <p>Revision 3 of this AD is issued in order to exclude from the AD applicability engines on which 2<sup>nd</sup> stage Turbine Discs modified by Turboméca Modification TU365 or by SB 292 72 0365 are installed. To reflect this situation, Turboméca amended Mandatory Service Bulletin (MSB) A292 72 0831 at revision D, to limit the applicability of this MSB to 2<sup>nd</sup> stage Turbine Discs not modified by Turboméca Modification TU365. In addition, some editorial changes have been made to improve the readability of the AD.</p>						
Effective Date:	<p>Revision 3: 19 September 2012</p> <p>Revision 2: 07 April 2011</p> <p>Revision 1: 18 August 2010</p> <p>Original Issue: 06 June 2010</p>						
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless accomplished previously:</p> <p>(1) For “non-CFR” (see Note [a]) second Stage Turbine Discs, within the compliance time as indicated in Table 1, as applicable, replace the module M03 (Gas Generator) or the GG second Stage Turbine, in accordance with Turboméca MSB A292 72 0831 version D.</p> <p style="text-align: center;">Table 1:</p> <table border="1" data-bbox="587 1451 1401 1733"> <tr> <td data-bbox="587 1451 1007 1585">“non-CFR” Second Stage Turbine Disc Accumulated GG cycles at the effective date of this AD (see Note [a]):</td> <td data-bbox="1007 1451 1401 1585">Compliance time:</td> </tr> <tr> <td data-bbox="587 1585 1007 1659">4 000 or more</td> <td data-bbox="1007 1585 1401 1659">20 GG cycles after the effective date of this AD</td> </tr> <tr> <td data-bbox="587 1659 1007 1733">Less than 4 000</td> <td data-bbox="1007 1659 1401 1733">Upon accumulating 4 000 GG cycles</td> </tr> </table> <p>Note [a]: “non-CFR” second Stage Turbine Discs were not subject to the reinforced Eddy-current inspection. These parts are <b>not marked</b> with “CFR”. P/N may only be 0 292 25 040 0.</p> <p>(2) For “CFR” (see Note [b]) GG second Stage Turbine Discs, the approved life is defined in the latest update of the Airworthiness Limitation Section of the Engine Maintenance Manual Chapter 05 – INSPECTIONS – FREQUENCIES, Chapter 05-10-03, Task 05-10-03-900-801-A01, Par. Service Life Limits – Life Limit Values. The references of the Engine Maintenance Manuals are in Appendix of this AD (French / English</p>	“non-CFR” Second Stage Turbine Disc Accumulated GG cycles at the effective date of this AD (see Note [a]):	Compliance time:	4 000 or more	20 GG cycles after the effective date of this AD	Less than 4 000	Upon accumulating 4 000 GG cycles
“non-CFR” Second Stage Turbine Disc Accumulated GG cycles at the effective date of this AD (see Note [a]):	Compliance time:						
4 000 or more	20 GG cycles after the effective date of this AD						
Less than 4 000	Upon accumulating 4 000 GG cycles						

	<p>versions). At the issue date of this AD, the approved life of the “CFR” GG second Stage Turbine Disc is 6 500 GG cycles.</p> <p>Note [b]: “CFR” second Stage Turbine Discs were subject to the reinforced Eddy-current inspection. These parts are permanently <b>marked</b> with “CFR” next to the Part Number (P/N). P/N may be 0 292 25 040 0, or 7 292 25 040 1.</p> <p>(3) In a Repair Center, a “non-CFR” second Stage Turbine Disc removed from service may be sent to an approved facility to be subject to a reinforced Eddy-current inspection in accordance with Paragraph 2.B.(2) of Turboméca MSB A292 72 0831 version D. The discs that will pass the inspection will be marked “CFR” and the remaining life will be the approved life defined in Paragraph (2) of this AD minus the number of consumed cycles of the part, in accordance with Paragraph 2.D.(3) of Turboméca MSB A292 72 0831 version D.</p> <p>(4) Compliance with the requirements of paragraph (1), (2) and (3) of this AD can be demonstrated by:</p> <p>(4.1) Revising as follows, unless accomplished previously, the approved Aircraft Maintenance Programme (AMP) on the basis of which the Operator or the Owner ensures the continuing airworthiness of each operated helicopter, as well as the Engine log book and Module M03 log card:</p> <p style="padding-left: 40px;">Incorporate the new life limits of the GG second Stage Turbine Disc specified in Turboméca MSB A292 72 0831 version D.</p> <p style="padding-left: 40px;">and</p> <p>(4.2) Complying with the approved AMP as described in paragraph (4.1) of this AD.</p> <p>(5) After the effective date of this AD, do not install a post-TU347 GG second Stage Turbine Disc unless in compliance with the requirements of this AD.</p>
Ref. Publications:	<p>Turboméca MSB A292 72 0831 version D dated 11 June 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"> <li>1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.</li> <li>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.</li> <li>3. Enquiries regarding this AD should be referred to the Safety Information Section, Executive Directorate, EASA. E-mail: <a href="mailto:ADs@easa.europa.eu">ADs@easa.europa.eu</a>.</li> <li>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 nearest technical representative at <a href="http://www.turbomeca-support.com">www.turbomeca-support.com</a>.</li> </ol>

## APPENDIX

Maintenance Manuals according to Engine Variant:

Engine Variant	Maintenance Manual	
	French Version	English Version
ARRIEL 1A	292 01 931	n/a
ARRIEL 1A1	X 292 B3 452 1	X 292 B3 452 2
ARRIEL 1B	X 292 65 452 1	X 292 65 452 2
ARRIEL 1C	X 292 B0 452 1	X 292 B0 452 2
ARRIEL 1C1	X 292 C3 452 1	X 292 C3 452 2
ARRIEL 1C2	X 292 G1 452 1	X 292 G1 452 2
ARRIEL 1D	X 292 E5 452 1	X 292 E5 452 2
ARRIEL 1D1	X 292 G2 452 1	X 292 G2 452 2
ARRIEL 1S1	X 292 H4 452 1	X 292 H4 452 2