


<b>EASA</b>	<b>AIRWORTHINESS DIRECTIVE</b>	
	<p><b>AD No.: 2012-0143</b></p> <p><b>Date: 01 August 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>Design Approval Holder's Name :</b></p> <p>Turboméca</p>	<p><b>Type/Model designation(s) :</b></p> <p>ARRIEL 1 engines</p>	
<p>TCDS Number: EASA.E.073</p>		
<p>Foreign AD: Not applicable</p>		
<p>Supersedure: This AD supersedes EASA AD 2009-0236R1 dated 22 June 2012.</p>		
<b>ATA 72</b>	<b>Engine – Gas Generator Second Stage Turbine – Inspection / Replacement</b>	
<p>Manufacturer(s):</p>	<p>Turboméca</p>	
<p>Applicability:</p>	<p>All ARRIEL 1B post-mod TU 148, ARRIEL 1D, ARRIEL 1D1 and ARRIEL 1S1 turboshaft engines, all serial numbers, except those with Gas Generator 2<sup>nd</sup> stage turbine wheels installed that have incorporated Turbomeca modification TU347 in production, or have been modified by Turbomeca Service Bulletin (SB) 292 72 0347 in-service.</p> <p>These engines are known to be installed on, but not limited to, Eurocopter AS 350 B/BA/BB/B1/B2 and Sikorsky S-76A+/A++/C helicopters.</p>	
<p>Reason:</p>	<p>Several cases of release of gas generator 2nd stage turbine blade occurred in service, with full containment of debris. These events resulted in an uncommanded In-Flight Shut Down (IFSD) of the engine. While awaiting terminating actions, it was decided to implement mandatory check and replacement of the turbine in order to reduce the probability of uncommanded engine IFSD.</p> <p>EASA AD 2007-0018 retained the requirements of previous DGAC France AD F-2004-047 and included changes with regard to ARRIEL 1B engines only. Reduction of the turbine blade life limit from 6 000 hours to 3 000 hours was taken as a precautionary measure following additional events.</p> <p>EASA AD 2007-0018R1 reduced the original AD applicability following introduction of a new Turbine P/N 0 292 25 039 0 available for all ARRIEL 1 engine models through Turboméca Modification TU347 or SB 292 72 0347. This new Turbine incorporates improvements that are the terminating action for</p>	

	<p>this AD. Therefore inspections and replacement requirements were deleted for engines equipped with the new Turbine P/N 0 292 25 039 0.</p> <p>Since issuance of EASA AD 2007-0018R1 new cases of release of gas generator 2nd stage turbine blade pre-TU347 have occurred at lower blade service lives compared to previous events.</p> <p>Prompted by these findings, EASA issued AD 2009-0236, which superseded AD 2007-0018R1, by lowering some inspection thresholds and repetitive intervals, lowering the life limits of the 2<sup>nd</sup> stage turbine blades, and lowering replacement thresholds of the 2<sup>nd</sup> stage turbine disks and blades installed on the pre-TU347 2<sup>nd</sup> stage turbine wheels, for single-engine applications.</p> <p>Since issuance of EASA AD 2009-0236, further modifications of post-TU347 2<sup>nd</sup> stage turbine wheels have been approved, and those modified 2<sup>nd</sup> stage turbine wheels are also not affected by the requirements of this AD. It was therefore possible to establish the list of pre-TU347 2<sup>nd</sup> stage turbine wheels to which the AD requirements are still applicable. AD 2009-0236R1 was therefore issued to limit the list of affected pre-TU347 2<sup>nd</sup> stage turbine wheels, to which the AD requirements are still applicable. In addition to that, further changes have been made to align the writing of this AD to the current writing standards.</p> <p>Since issuance of EASA AD 2009-0236R1, it has been identified that some pre-TU347 2<sup>nd</sup> stage turbine wheels P/Ns had been omitted in the list of Appendix 2 of EASA AD 2009-0236R1.</p> <p>For the reason described above, in order to avoid further possible mistakes or omissions, this AD supersedes EASA AD 2009-023R1, retaining its requirements, and requires, for engines without Turboméca modification TU347, accomplishment of repetitive inspections of the 2<sup>nd</sup> stage turbine wheels, and depending on findings, accomplishment of applicable corrective actions. It also requires the implementation of life limits for the affected 2nd Stage Turbine Blades.</p>
Effective Date:	15 August 2012
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless accomplished previously:</p> <p>(1) Inspections:</p> <p>After 12 November 2009 [the effective date of EASA AD 2009-0236 at original issue], once the 2<sup>nd</sup> stage turbine has accumulated 1 200 Engine Flight Hours (EFH) or 3 500 cycles since new or since inspection in a repair centre:</p> <ul style="list-style-type: none"> <li>- Do checks in accordance with the following tables and associated Turboméca Mandatory Service Bulletins (MSBs):</li> </ul> <p>Table 1.a: 2<sup>nd</sup> Stage Turbine Inspection Requirements</p> <p>and</p> <p>Table 1.b: Acceptability of checks performed in accordance with previous and latest MSBs</p> <p>Attention should be paid to engine configurations, conditions, actions, compliance time and repetitive intervals.</p> <p>Note 1: The referenced tables can be found in Appendix 1 of this AD.</p> <p>(2) Life Limits of the 2<sup>nd</sup> Stage Turbine Blades:</p> <p>After 12 November 2009 [the effective date of EASA AD 2009-0236 at original issue], the life limits of the 2<sup>nd</sup> stage turbine blades must be set to the values provided in:</p> <p>Table 2: Life Limits of the 2<sup>nd</sup> Stage Turbine Blades</p>

	<p>(3) Replacement of the 2<sup>nd</sup> Stage Turbine Disk and Blades:</p> <p>The replacement requirements for the 2nd Stage Turbine Disk and Blades are provided in:</p> <p>Table 3.1: 2nd Stage Turbine Replacement Requirements – ARRIEL 1B</p> <p>Table 3.2: 2nd Stage Turbine Replacement Requirements – ARRIEL 1D, 1D1</p> <p>(4) From the effective date of this AD, do not install a Gas Generator 2<sup>nd</sup> stage turbine wheel, or a Gas Generator module (M03) on an engine, unless in compliance with the requirements of this AD.</p> <p>Note 2: Inspection intervals for ARRIEL 1S1 engines are unchanged compared to the requirements of AD 2007-0018R1.</p> <p>Note 3: Inspection requirements, 2<sup>nd</sup> stage turbine Blade life limits and turbine replacement requirements do not apply to post TU-347 turbine, which is the terminating action of this AD.</p> <p>(5) Modification of an engine by installation of a post-TU347 turbine constitutes terminating action for the repetitive inspections and life limits required by this AD.</p>
Ref. Publications:	<p>Turboméca MSB A292 72 0807 Version E, dated 29 October 2009.</p> <p>Turboméca MSB A292 72 0810 Version C, dated 24 July 2009.</p> <p>Turboméca SB 292 72 0347 (any revision).</p> <p>The use of later approved revisions of these documents 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:  <b>Turboméca</b>, 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 1

<b>Table 1.a: 2<sup>nd</sup> Stage Turbine Inspection Requirements</b>				
Once the 2 <sup>nd</sup> stage turbine has accumulated 1 200 EFH or 3 500 cycles since new or since inspection in a repair centre:				
<b>Configuration</b>	<b>Condition</b>	<b>Action</b>	<b>Compliance Time</b>	<b>Repetitive Interval (Not to Exceed)</b>
<b>ARRIEL 1B, ARRIEL 1D, ARRIEL 1D1</b>	If no check has been previously done or if the blades have been in operation for more than 100 EFH since a check according to relevant MSB <sup>(1)</sup>	Do a check of the relative position of the 2 <sup>nd</sup> stage turbine blades, in accordance with MSB A292 72 0807 Version E, Par. 2B(1)(a)&(b) or 2B(2)(a)	Within 50 EFH	150 EFH, until installation of an inspected pre-TU347 turbine fitted with new blades
	If the blades have been in operation for less than 100 EFH since a check done according to relevant MSB <sup>(1)</sup>		Within 150 EFH since the last check	
<b>ARRIEL 1S1</b>	If no check has been previously done or if the blades have been in operation for more than 100 EFH since a check according to relevant MSB <sup>(2)</sup>	Do a check of the relative position of the 2 <sup>nd</sup> stage turbine blades, in accordance with MSB A292 72 0810 Version C, Par. 2B(1)(a)&(b) or 2B(2)(a),(b)&(c)	Within 50 EFH	150 EFH, until installation of an inspected pre-TU347 turbine fitted with new blades
	If the blades have been in operation for less than 100 EFH since a check done according to relevant MSB <sup>(2)</sup>		Within 150 EFH since the last check	

Notes:

<sup>(1)</sup>&<sup>(2)</sup>: Refer to Table 1.b

<b>Table 1.b: Acceptability of checks performed in accordance with previous and latest MSBs</b>			
<b>Note</b>	<b>Variant</b>	<b>Previous MSBs</b>	<b>Latest MSBs</b>
<sup>(1)</sup>	<b>ARRIEL 1B</b>	MSB A292 72 0263 (Initial Issue to Update 5), or MSB A292 72 0807 (Version A to Version D)	MSB A292 72 0807 Version E
<sup>(1)</sup>	<b>ARRIEL 1D, ARRIEL 1D1</b>	MSB A292 72 0263 (Initial Issue to Update 5), or MSB A292 72 0808 (Initial Issue to Update 1), or MSB A292 72 0809 (Version A to Version D)	
<sup>(2)</sup>	<b>ARRIEL 1S1</b>	MSB A292 72 0263 (Initial Issue to Update 5), or MSB A292 72 0810 (Version A to Version B)	MSB A292 72 0810 Version C

## Appendix 1 (continued)

Table 2: Life Limit of the 2nd Stage Turbine Blades	
Configuration	2 <sup>nd</sup> Stage Turbine Blade Life Limit
ARRIEL 1B, ARRIEL 1D, ARRIEL 1D1	1 200 hours ( <i>except allowances as defined in Table 3</i> )

Table 3.1: 2nd Stage Turbine Replacement Requirements – ARRIEL 1B				
Configuration	Condition on 12 November 2009 [the effective date of EASA AD 2009-0236 at Original Issue]	Action	Compliance Time	Repetitive Interval (Not to Exceed)
ARRIEL 1B	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated more than 3 000 EFH since new, <u>or</u> 2 <sup>nd</sup> stage turbine disk having accumulated more than 2 200 EFH since new or inspection <i>whichever occurred first</i>	Replace the 2 <sup>nd</sup> stage turbine disk and blades with an inspected pre-TU347 turbine fitted with new blades or a post-TU347 turbine in accordance with MSB A292 72 0807 Version E, Par. 2B(1)(c)or(d) or 2B(2)(b)or(c)	Before next flight <i>Note: Already required by AD 2007-0018R1</i>	Repeat replacement before 2 <sup>nd</sup> stage turbine blades have accumulated 1 200 EFH since new
	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated more than 1 800 EFH and less than 3 000 EFH since new		Within the next 400 EFH, <u>or</u> Before 2 <sup>nd</sup> stage turbine blades have accumulated 3 000 EFH since new, <u>or</u> Before 2 <sup>nd</sup> stage turbine disk has accumulated 2 200 EFH since new or inspection, <u>or</u> No later than 30 June 2011 <i>whichever comes first</i>	
	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated more than 900 EFH and less than 1800 EFH		Within the next 800 EFH, <u>or</u> Before 2 <sup>nd</sup> stage turbine disk has accumulated 2 200 EFH since new or inspection, <u>or</u> No later than 30 June 2011 <i>whichever comes first</i>	
	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated less than 900 EFH since new		Before 2 <sup>nd</sup> stage turbine blades have accumulated 1 200 EFH since new	

## Appendix 1 (continued)

Table 3.2: 2nd Stage Turbine Replacement Requirements – ARRIEL 1D, 1D1				
Configuration	Condition on 12 November 2009 [the effective date of EASA AD 2009-0236 at Original Issue]	Action	Compliance Time	Repetitive Interval (Not to Exceed)
ARRIEL 1D, 1D1	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated more than 1 500 EFH since new, <u>or</u> 2 <sup>nd</sup> stage turbine disk having accumulated more than 1 500 EFH since new or inspection <i>whichever occurred first</i>	Replace the 2 <sup>nd</sup> stage turbine disk and blades with an inspected pre-TU347 turbine fitted with new blades or a post-TU347 turbine in accordance with MSB A292 72 0807 Version E, Par. 2B(1)(c)or(d) or 2B(2)(b)or(c)	Before next flight <i>Note: Already required by AD 2007-0018R1</i>	Repeat replacement before 2 <sup>nd</sup> stage turbine blades have accumulated 1 200 EFH since new
	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated more than 900 EFH and less than 1 500 EFH since new		Before 2 <sup>nd</sup> stage turbine blades have accumulated 1 500 EFH since new, <u>or</u> Before 2 <sup>nd</sup> stage turbine disk has accumulated 1 500 EFH since new or inspection, <u>or</u> No later than 30 June 2011 <i>whichever comes first</i>	
	Engines with 2 <sup>nd</sup> stage turbine blades having accumulated less than 900 EFH since new		Before 2 <sup>nd</sup> stage turbine blades have accumulated 1 200 EFH since new	