


| EASA | AIRWORTHINESS DIRECTIVE | |
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|  | <p>AD No.: 2009-0236R1</p> <p>Date: 22 June 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>Design Approval Holder's Name :</p> <p>Turboméca</p> | <p>Type/Model designation(s) :</p> <p>ARRIEL 1 engines</p> | |
| <p>TCDS Number : EASA.E.073</p> | | |
| <p>Foreign AD : Not applicable</p> | | |
| <p>Revision: This AD revises EASA AD 2009-0236 dated 29 October 2009, which superseded EASA AD 2007-0018R1, dated 14 August 2007.</p> | | |
| <p>ATA 72</p> | <p>Engine – Gas Generator 2nd Stage Turbine – Inspection / Replacement</p> | |
| <p>Manufacturer(s): Turboméca</p> | | |
| <p>Applicability:</p> | <p>All ARRIEL 1B post-mod TU 148, ARRIEL 1D, ARRIEL 1D1 and ARRIEL 1S1 turboshaft engines, with gas generator second stage turbine wheels Part Numbers (P/N) listed in Appendix 2 of this AD.</p> <p>Note: Engines which have been modified with Turboméca modification TU347 in production, or by Turbomeca Service Bulletin (SB) 292 72 0347 in-service do not have these second stage turbine wheels installed.</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 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</p> | |

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| | <p>new Turbine incorporates improvements that are the terminating action for 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 2nd stage turbine blades, and lowering replacement thresholds of the 2nd stage turbine disks and blades installed on the pre-TU347 2nd stage turbine wheels, for single-engine applications.</p> <p>Since issuance of EASA AD 2009-0236, further modifications of post-TU347 2nd stage turbine wheels have been approved, and those modified 2nd stage turbine wheels are also not affected by the requirements of this AD. It has therefore been possible to establish the list of pre-TU347 2nd stage turbine wheels to which the AD requirements are still applicable.</p> <p>For the reasons described above, this AD is revised to limit the list of affected pre-TU347 2nd 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> |
| Effective Date: | <p>Revision 1: 29 June 2012</p> <p>Original issue: 12 November 2009</p> |
| 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 the original issue of this AD], once the 2nd 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"> - Do checks in accordance with the following tables and associated Turboméca Mandatory Service Bulletins (MSBs): <p>Table 1.a: 2nd Stage Turbine Inspection Requirements and 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 2nd Stage Turbine Blades:</p> <p>After 12 November 2009 [the effective date of the original issue of this AD], the life limits of the 2nd stage turbine blades must be set to the values provided in:</p> <p>Table 2: Life Limits of the 2nd Stage Turbine Blades</p> <p>(3) Replacement of the 2nd 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 Table 3.2: 2nd Stage Turbine Replacement Requirements – ARRIEL 1D,</p> |

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| | <p>1D1</p> <p>Note 3: Inspection intervals for ARRIEL 1S1 engines are unchanged compared to the requirements of AD 2007-0018R1.</p> <p>Note 3: Inspection requirements, 2nd 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> |
| 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>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"> 1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD. 2. The original issue of this AD was posted on 31 July 2009 as PAD 09-096 for consultation until 28 August 2009. No comments were received during the consultation period. 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 questions 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 www.turbomeca-support.com. |

Appendix 1

| Table 1.a: 2nd Stage Turbine Inspection Requirements | | | | |
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| Once the 2nd stage turbine has accumulated 1 200 EFH or 3 500 cycles since new or since inspection in a repair centre: | | | | |
| Configuration | Condition | Action | Compliance Time | Repetitive Interval (Not to Exceed) |
| ARRIEL 1B, ARRIEL 1D, ARRIEL 1D1 | 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 ⁽¹⁾ | Do a check of the relative position of the 2 nd stage turbine blades, in accordance with MSB A292 72 0807 Version E, Par. 2B(1)(a)&(b) or 2B(2)(a) | Within 50 EFH | Every 150 EFH, until installation of an inspected pre-TU347 turbine fitted with new blades, or a post-TU347 turbine |
| | If the blades have been in operation for less than 100 EFH since a check done according to relevant MSB ⁽¹⁾ | | Within 150 EFH since the last check | |
| ARRIEL 1S1 | 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 ⁽²⁾ | Do a check of the relative position of the 2 nd 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 | Every 150 EFH, until installation of an inspected pre-TU347 turbine fitted with new blades, or a post-TU347 turbine |
| | If the blades have been in operation for less than 100 EFH since a check done according to relevant MSB ⁽²⁾ | | Within 150 EFH since the last check | |

Notes:

⁽¹⁾&⁽²⁾: Refer to Table 1.b

EFH = Engine Flight Hours

| Table 1.b: Acceptability of checks performed in accordance with previous and latest MSBs | | | |
|---|----------------------------------|---|----------------------------|
| Note | Variant | Previous MSBs | Latest MSBs |
| ⁽¹⁾ | ARRIEL 1B | 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 |
| ⁽¹⁾ | ARRIEL 1D, ARRIEL 1D1 | 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) | |
| ⁽²⁾ | ARRIEL 1S1 | 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 Limits of the 2nd Stage Turbine Blades | |
|--|---|
| Configuration | 2 nd Stage Turbine Blade Life Limit |
| ARRIEL 1B, ARRIEL 1D, ARRIEL 1D1 | 1 200 hours (except allowances as defined in Table 3) |

| Table 3.1: 2nd Stage Turbine Replacement Requirements – ARIEL 1B | | | | |
|--|---|---|---|---|
| Configuration | Condition | Action | Compliance Time | Repetitive Interval (Not to Exceed) |
| ARRIEL 1B | Engines with 2 nd stage turbine blades having accumulated more than 3 000 EFH since new, <u>or</u> 2 nd stage turbine disk having accumulated more than 2 200 EFH since new or inspection <i>whichever comes first</i> | | Before next flight <i>Note: Already required by AD 2007-0018R1</i> | |
| | Engines with 2 nd stage turbine blades having accumulated more than 1 800 EFH and less than 3 000 EFH since new | Replace the 2 nd 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) | Within the next 400 EFH, <u>or</u> Before 2 nd stage turbine blades have accumulated 3 000 EFH since new, <u>or</u> Before 2 nd 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> | For pre-TU347 turbine: Repeat replacement before 2 nd stage turbine blades have accumulated 1 200 EFH since new |
| | Engines with 2 nd stage turbine blades having accumulated more than 900 EFH and less than 1800 EFH | | Within the next 800 EFH, <u>or</u> Before 2 nd 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> | For post-TU347 turbine: Not applicable |
| | Engines with 2 nd stage turbine blades having accumulated less than 900 EFH since new | | Before 2 nd stage turbine blades have accumulated 1 200 EFH since new | |

Note: EFH = Engine Flight Hours

Appendix 1 (continued)

| Table 3.2: 2nd Stage Turbine Replacement Requirements – ARRIEL 1D, 1D1 | | | | |
|--|---|---|---|--|
| Configuration | Condition | Action | Compliance Time | Repetitive Interval (Not to Exceed) |
| ARRIEL 1D, 1D1 | Engines with 2 nd stage turbine blades having accumulated more than 1 500 EFH since new, <u>or</u> 2 nd stage turbine disk having accumulated more than 1 500 EFH since new or inspection <i>whichever comes first</i> | Replace the 2 nd 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> | For pre-TU347 turbine: Repeat replacement before 2 nd stage turbine blades have accumulated 1 200 EFH since new For post-TU347 turbine: Not applicable |
| | Engines with 2 nd stage turbine blades having accumulated more than 900 EFH and less than 1 500 EFH since new | | Before 2 nd stage turbine blades have accumulated 1 500 EFH since new, <u>or</u> Before 2 nd 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 nd stage turbine blades having accumulated less than 900 EFH since new | | Before 2 nd stage turbine blades have accumulated 1 200 EFH since new | |

Note: EFH = Engine Flight Hours

Appendix 2

List of pre-TU347 gas generator 2nd
stage turbine wheels P/N affected by
this AD

0292 25 802 0
0292 25 832 0
0292 25 852 0
0292 25 853 0
0292 25 857 0
0292 25 765 0
0292 25 767 0
0292 25 778 0
0292 25 788 0
0292 25 122 0
7292 25 857B
7292 25 802B
7292 25 122B
7292 25 802A
7292 25 852A
7292 25 853A
7292 25 857D
7292 25 802D
7292 25 122D