

<b>EASA</b>	<b>AIRWORTHINESS DIRECTIVE</b>	
	<p><b>AD No.: 2010-0228R1</b></p> <p><b>Date: 07 September 2011</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> ROLLS-ROYCE TURBOMECA Ltd</p>	<p><b>Type/Model designation(s) :</b> RTM 322 turboshaft engines</p>	
<p>TCDS Number :</p>	<p>EASA.E.009</p>	
<p>Foreign AD :</p>	<p>Not applicable</p>	
<p>Revision :</p>	<p>This AD revises EASA AD 2010-0228 dated 03 November 2010, which superseded EASA AD 2010-0114-E dated 14 June 2010.</p>	
<b>ATA 72</b>	<b>Engine - M01 Compressor - Second Stage Compressor Axial Wheel and Impeller – Inspection</b>	
<p>Manufacturer(s):</p>	<p>Rolls-Royce Turbomeca Ltd</p>	
<p>Applicability:</p>	<p>RTM 322-01/9 and RTM 322-01/9A turboshaft engines, all serial numbers. These engines are known to be installed on, but not limited to, NH Industries NH90 (military) helicopters.</p>	
<p>Reason:</p>	<p>There have been three incidents on RTM 322-01/9 and RTM 322-01/9A turboshaft engines installed in NH90 helicopters, causing two engine In-Flight Shut-Downs (IFSD) and one engine Shut-Down on ground.</p> <p>Strip inspections of the involved engines showed similar damage in all three cases.</p> <ul style="list-style-type: none"> <li>- Second stage compressor axial wheel: cracks on adjacent blades or partial/complete loss of adjacent blades.</li> <li>- Impeller: crack and/or partial loss of one leading edge fragment.</li> </ul> <p>Such damage, if not detected and corrected, could lead to further in-flight shutdowns.</p> <p>For the reason stated above, EASA EAD 2010-0114-E required repetitive borescope inspections of the second stage compressor axial wheel and centrifugal impeller. Furthermore, it precluded further engine operation if any evidence of cracks anywhere on blades and/or rubs on axial wheel blade tips was detected.</p> <p>Following issuance of EASA AD 2010-0114-E, Rolls Royce Turbomeca Ltd has completed further investigations and the results show that the most</p>	

	<p>probable scenario explaining blade cracks/rupture is as follows:</p> <ul style="list-style-type: none"> <li>- Compressor blade tip rubbing on compressor casing potentially generates a crack (possibly leading to blade rupture).</li> <li>- This blade tip rubbing is the result of gas generator spool bending due to extended stator lab seal rubbing which causes local overheating on curvic-couplings.</li> </ul> <p>The crack initiation is believed to occur during engine start, resulting in a hung start below ground Idle.</p> <p>Note 1: "stagnation at start", in the referenced ROLLS-ROYCE TURBOMECA Ltd Emergency Mandatory Service Bulletins and defined in Emergency Mandatory Service Bulletin SBP-M3-A-71-00-00-05A-A-A, is a particular type of "hung start" and is defined as follows:</p> <ul style="list-style-type: none"> <li>- T46 increase, confirming combustion chamber light-off, and</li> <li>- engine stabilises at a constant speed below 50% NG and at constant T46 for more than 10 seconds.</li> </ul> <p>"Hung start" as used herein implies these same characteristics.</p> <p>Based on the above scenario, EASA AD 2010-0228, which superseded EASA AD 2010-0114-E, partially retaining its requirements, requires checking the engine records to determine if a hung start occurred during the life of the engine, and, depending on the outcome of the record checks, accomplishment of repetitive borescope inspections. Furthermore, it precludes further engine operation in the event of a hung start, or if any evidence of cracks anywhere on blades and/or rubs on axial wheel blade tips is detected. This AD also requires the accomplishment of the applicable corrective actions.</p> <p>This revised AD is issued following RRTM review of engine bench test data. The compliance requirements have been updated to exempt from the borescope inspection requirements those engines whose Compressor Module (M01) had 0 (zero) hours since new or since last repair after the time hung starts were monitored, in accordance with RRTM Mandatory Service Bulletin SBP-M3-A-71-00-00-05A-A-A. In that case, after the effective date of this AD, those engines must only be monitored for a hung start.</p> <p>In addition, few minor modifications have been made to improve the readability of this AD.</p>
Effective Date:	<p>Revision 1: 21 September 2011</p> <p>Original issue: 17 November 2010</p>
Required Action(s) and Compliance Time(s):	<p>Required as indicated, unless accomplished previously:</p> <ol style="list-style-type: none"> <li>(1) Within 10 days after 17 November 2010 [the effective date of the original issue of this AD], check the engine records to identify any hung start occurrence in the engine operational history.</li> <li>(2) If a hung start is found, engine operation is not allowed. Contact the engine manufacturer for further instructions and accomplish them accordingly.</li> <li>(3) If a hung start is experienced after 17 November 2010 [the effective date of the original issue of this AD], engine operation is not allowed. Contact the engine manufacturer for further instructions and accomplish them accordingly.</li> <li>(4) Within the applicable compliance time as indicated in the table of the Appendix to this AD, accomplish a borescope inspection of the second stage compressor axial wheel and impeller, and inspect each second stage compressor axial wheel blade tip, in accordance with the</li> </ol>

	<p>Accomplishment Instructions of ROLLS-ROYCE TURBOMECA Ltd Emergency Mandatory Service Bulletin SBP-M3-A-72-31-00-05A-A-A.</p> <p>(5) Repeat the borescope inspection of the second stage compressor axial wheel and impeller, and the inspection of each second stage axial wheel blade tip, at the intervals described in the table of the Appendix to this AD and in accordance with the Accomplishment Instructions of ROLLS-ROYCE TURBOMECA Ltd Emergency Mandatory Service Bulletin SBP-M3-A-72-31-00-05A-A-A.</p> <p>(6) If the results of the inspections required by this AD show signs of blade tip rubs or blade cracks, engine operation is not allowed. Contact the engine manufacturer for further instructions and accomplish them accordingly.</p> <p>(7) Engines whose Compressor Module (M01) had zero hours since new (TSN=0h) or since last repair (TSR=0h) after the time hung starts were monitored in accordance with RRTM Mandatory Service Bulletin SPB-M3-A-71-00-00-05A-A-A must only comply with paragraph (3) of this AD.</p> <p>(8) After 17 November 2010 [the effective date of the original issue of this AD], do not install a Compressor Module (M01) in an engine, or an engine in a helicopter, unless that Compressor Module (M01) or that engine is in compliance with all the requirements of this AD.</p>
Ref. Publications:	<p>ROLLS-ROYCE TURBOMECA Ltd Emergency Mandatory Service Bulletin SBP-M3-A-72-31-00-05A-A-A Issue number 002.</p> <p>ROLLS-ROYCE TURBOMECA Ltd Emergency Mandatory Service Bulletin SBP-M3-A-71-00-00-05A-A-A Issue number 001.</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. The original issue of this AD was posted on 29 September 2010 as PAD 10-105 for consultation until 27 October 2010. No comments were received during the consultation period.</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 your usual or nearest TURBOMECA technical representative (refer to <a href="http://www.turbomeca-support.com">http://www.turbomeca-support.com</a>).</li> </ol>

## APPENDIX to EASA AD 2010-0228R1

<p>Records show that the engine has not experienced a hung start during a continuous period <b>ending on 17 November 2010 [the effective date of the original issue of this AD]</b>. During that continuous period, the engine accumulated X Engine Flight Hours (EFH) and Y Engine Starts (ES). The beginning of the continuous period may be before entry into service, taking into account bench pass-off test and helicopter/engine history, provided that relevant records exist. If no relevant records exist, then X = 0 and Y = 0.</p>		
Engine History	Initial Inspection	Repetitive Inspection Intervals
X ≤ 25 <u>or</u> Y ≤ 20	<p>As applicable, <b>either</b>: within 5 EFH or 4 ES from the last inspection performed in accordance with EASA AD 2010-0114-E, whichever occurs first;</p> <p><b>or</b>: if no inspections were performed in accordance with EASA AD 2010-0114-E, within 5 EFH or 4 ES after 16 June 2010 (the effective date of EASA AD 2010-0114-E), whichever occurs first</p>	<p>Not exceeding 5 EFH or 4 ES, whichever occurs first, until the engine accumulates both (25-X) EFH and (20-Y) ES after 17 November 2010 [the effective date of the original issue of this AD]. Then not exceeding 30 EFH or 25 ES, whichever occurs first, until the engine accumulates both (115-X) EFH and (100-Y) ES after 17 November 2010 [the effective date of the original issue of this AD]. Thereafter, no further inspection is required for compliance with the requirements of this AD.</p>
X > 25 <u>and</u> Y > 20	<p>As applicable, <b>either</b>: within 30 EFH or 25 ES from the last inspection performed in accordance with EASA AD 2010-0114-E, whichever occurs first;</p> <p><b>or</b>: if no inspections were performed in accordance with EASA AD 2010-0114-E, within 30 EFH or 25 ES after 16 June 2010 (the effective date of EASA AD 2010-0114-E), whichever occurs first</p>	<p>Not exceeding 30 EFH or 25 ES, whichever occurs first, until the engine accumulates both (115-X) EFH and (100-Y) ES after 17 November 2010 [the effective date of the original issue of this AD]. Thereafter, no further inspection is required for compliance with the requirements of this AD.</p>

Note 2: The parameters X and Y are introduced to allow credit for a continuous period, ending on 17 November 2010 [the effective date of the original issue of this AD], during which no hung starts were recorded.

Note 3: 115 EFH / 100 ES is the maximum usage following a hung start, presumed unrecorded, during which the symptoms identified by the borescope inspections are expected to develop. Thereafter, it is assumed that no unrecorded hung start occurred or will occur.