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| <b>EASA</b>   | <b>AIRWORTHINESS DIRECTIVE</b>   |
|    | <p><b>AD No.: 2009-0243</b></p> <p><b>Date: 10 November 2009</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 Airworthiness Directive applies, except in accordance with the requirements of that Airworthiness Directive 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>ROLLS-ROYCE PLC</p>  | <p><b>Type/Model designation(s) :</b></p> <p>RB211-524 Series Engines<br/> RB211-535 Series Engines<br/> RB211 Trent 700 Series Engines<br/> RB211 Trent 800 Series Engines</p>  |
| <p>TCDS Number : EASA.E.042, UK-CAA TCDS Numbers 1046, 1048, 1051, 1044 and 1049</p>  |  |
| <p>Foreign AD : None</p>  |  |
| <p>Supersedure : Not applicable</p>   |  |
| <b>ATA 72</b>   | <b>Engine – Front Combustion Liner Inner Wall – Inspection</b>   |
| <b>Manufacturer(s):</b>   | Rolls-Royce plc  |
| <b>Applicability:</b>   | <p>1. RB211-524 Series Engines, models RB211-524G2-T-19, RB211-524G3-T-19, RB211-524H2-T-19, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Boeing 747-400 series aircraft.</p> <p>2. RB211-524 Series Engines, models RB211-524H-T-36, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Boeing 767 series aircraft.</p> <p>3. RB211-535 Series Engines, models RB211-535E4-37, RB211-535E4-B-37, RB211-535E4-C-37, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Boeing 757 series aircraft.</p> |

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|  | <p>4. RB211-535 Series Engines, model RB211-535E4-B-75, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Tupolev Tu204 series aircraft.</p> <p>5. RB211-Trent 700 Series Engines, all models, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Airbus A330 series aircraft.</p> <p>6. RB211-Trent 800 Series Engines, all models, all serial numbers, if Rolls-Royce RB211 Service Bulletin No. 72-D133 or Rolls-Royce RB211 Service Bulletin No. 72-E902 is incorporated.</p> <p>These engines are known to be installed on, but not limited to Boeing 777 series aircraft.</p>   |
| Reason:                                    | <p>Cracking has been found on the inner wall between intermediate dilution chutes on a total of five front combustion liners of the standard corresponding to Rolls-Royce RB211 Service Bulletin No. 72-D133. The lives of two of these liners were confirmed to be below the currently valid borescope inspection interval.</p> <p>Ultimately, crack propagation could result in hot gas breakout with potential of downstream component distress and multiple turbine blade release beyond containment capabilities of the engine casings. Thus, cracking of this nature constitutes a potentially unsafe condition.</p> <p>Since Rolls-Royce Service Bulletin No. 72-E902 introduces further developments of Rolls-Royce RB211 Service Bulletin No. 72-D133, engines incorporating Rolls-Royce RB211 Service Bulletin No. 72-E902 are also considered to be potentially affected and are therefore included in the applicability of this AD.</p> <p>This AD requires a change to the initial and repeat borescope inspection intervals for the front combustion liner.</p>  |
| Effective Date:                            | 24 November 2009   |
| Required Action(s) and Compliance Time(s): | <p><b><u>A. Definition</u></b></p> <p>In the following LIFE will be referred as the lowest of the following lives:</p> <ul style="list-style-type: none"> <li>- life of the combustion liner since new,</li> <li>- life of the combustion liner since inner wall replacement</li> <li>- life of the combustion liner since last combustion liner borescope inspection.</li> </ul> <p><b><u>B. Action Required</u></b></p> <p>It is required to carry out the borescope inspections as specified in section 3. Accomplishment instructions, subsection A. Borescope Inspection of Rolls-Royce RB211 Series Propulsion System Series Non-Modification Service Bulletin No. RB211-72-AF458 Revision 4 or later approved revision before the limits specified in paragraph C. below.</p> <p><b><u>C. Inspection Requirements</u></b></p> <p>i) <u>Initial Inspection Requirements</u></p> <p>1. If the engine has a combustion liner installed with a LIFE (see A. above) that is equal to or greater than the initial inspection threshold specified in Table 1 column (b) included in C.iii) below at the effective date of this airworthiness directive</p> |

or

the engine has a combustion liner installed with a LIFE (see A. above) that is not known

Carry out the action specified in B. above within 250 cycles from the effective date of this Airworthiness Directive.

2. If the engine has a combustion liner installed with a LIFE (see A. above) that is less than the initial inspection threshold specified in Table 1 column (b) included in C.iii) below at the effective date of this airworthiness directive, carry out the action specified in B. above before the LIFE (see A. above) has reached the limit specified in Table 1 column (c) included in C.iii) below.

ii) Repeat Inspection Requirements

Following accomplishment of the Initial Inspection Requirement identified above, carry out the action specified in B. above at repeat intervals not exceeding those specified in Table 1 column (d) included in C.iii) below.

iii) Table 1: Initial Inspection Thresholds and Limits.

| <b>Column (a)</b>   | <b>Column (b)</b>                   | <b>Column (c)</b>   | <b>Column (d)</b>                 |
|---|-------------------------------------|---|-----------------------------------|
| <b>Engine Model</b>   | <b>Initial Inspection Threshold</b> | <b>Initial Inspection Limit<br/>If<br/>LIFE &lt; Initial Inspection Threshold</b> | <b>Repeat Inspection Interval</b> |
| RB211-524G2-T-19, 524G3-T-19 and 524H2-T-19 as per Applicability section 1. | 1150 Cycles                         | 1400 Cycles   | 1400 Cycles                       |
| RB211-524H-T-36 as per Applicability section 2.                             | 550 Cycles                          | 800 Cycles  | 800 Cycles                        |
| RB211-535E4-37, E4-B-37 and E4-C-37 as per Applicability section 3.         | 550 Cycles                          | 800 cycles  | 800 cycles                        |
| RB211-535E4-B-75 as per Applicability section 4.                            | 550 Cycles                          | 800 cycles  | 800 cycles                        |
| RB211-Trent 700 Series Engines, all models as per Applicability section 5.  | 1250 Cycles                         | 1500 Cycles   | 1500 Cycles                       |
| RB211-Trent 800 Series Engines, all models as per Applicability section 6.  | 750 Cycles                          | 1000 Cycles   | 1000 Cycles                       |

Ref. Publications:

Rolls-Royce RB211 Series Propulsion System Series Non-Modification Service Bulletin No. RB211-72-AF458 Revision 4.

The use of later approved revisions is acceptable for compliance with the requirements of this AD.

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| 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. This AD was posted on 28 September 2009 as PAD 09-114 for consultation until 26 October 2009. The Comment Response Document can be found at <a href="http://ad.easa.europa.eu">http://ad.easa.europa.eu</a>.</li><li>3. Enquiries regarding this AD should be referred to the Airworthiness Directives, Safety Management &amp; Research Section, Certification Directorate, EASA. E-mail <a href="mailto:ADs@easa.europa.eu">ADs@easa.europa.eu</a>.</li><li>4. For any questions concerning the technical content of the requirements in this AD, please contact:<br/><b>Rolls-Royce plc.</b>, P.O. Box 31, Derby, DE24 8BJ, United Kingdom<br/>Telephone: +44 (0) 1332 242424 Fax: +44 (0) 1332 249936<br/>E-mail: <a href="mailto:tech.help@rolls-royce.com">tech.help@rolls-royce.com</a> or download the publication from <a href="https://www.aeromanager.com">https://www.aeromanager.com</a></li></ol> |
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