P.O. Box 31, DERBY
DE24 8BJ, UK
Telephone: 44 (0) 1332 242424
Fax: 44 (0) 1332 249936

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Date May. 9/22

TRENT XWB SERIES PROPULSION SYSTEMS NON-MODIFICATION SERVICE BULLETIN

# ALERT

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This document transmits Revision 3 to Service Bulletin TRENTXWB-72-AK188

Document History

| Service Bulletin Revision Status | | Supplement Revision Status |
|---|---|---|
| Initial Issue | Aug.13/19 | |
| Revision 1 | Sep.20/19 | |
| Revision 2 | Dec.17/19 | |

Bulletin Revision 3

| Remove | Incorporate | Reason for change |
|---|---|---|
| All pages of the Service Bulletin | Pages 1 to 23 of the Service Bulletin | To update 1.C. Description, 2. Material Information and 3.B. Accomplishment Instructions |
| All pages of Appendix 1 | Page 1 and 2 of Appendix 1 | To update 1.C. Description, 2. Material Information and 3.B. Accomplishment Instructions |
| All pages of Appendix 2 | Page 1 of Appendix 2 | To update 1.C. Description, 2. Material Information and 3.B. Accomplishment Instructions |



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LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 3 are as follows:

| | Page | Revision Number | Revision Date |
|---|---|---|---|
| | Bulletin | | |
| R | 1 | 3 | May 9/22 |
| R | 2 | 3 | May 9/22 |
| R | 3 | 3 | May 9/22 |
| R | 4 | 3 | May 9/22 |
| R | 5 | 3 | May 9/22 |
| R | 6 | 3 | May 9/22 |
| R | 7 | 3 | May 9/22 |
| R | 8 | 3 | May 9/22 |
| R | 9 | 3 | May 9/22 |
| R | 10 | 3 | May 9/22 |
| R | 11 | 3 | May 9/22 |
| R | 12 | 3 | May 9/22 |
| R | 13 | 3 | May 9/22 |
| R | 14 | 3 | May 9/22 |
| R | 15 | 3 | May 9/22 |
| R | 16 | 3 | May 9/22 |
| R | 17 | 3 | May 9/22 |
| R | 18 | 3 | May 9/22 |
| R | 19 | 3 | May 9/22 |
| R | 20 | 3 | May 9/22 |
| R | 21 | 3 | May 9/22 |
| R | 22 | 3 | May 9/22 |
| R | 23 | 3 | May 9/22 |
| | Appendix 1 | | |
| R | 1 | 3 | May 9/22 |
| R | 2 | 3 | May 9/22 |
| | Appendix 2 | | |
| R | 1 | 3 | May 9/22 |

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ENGINE - RING, ASSY OGV OUTER MOUNT - FLUORESCENT PENETRANT INSPECTION OF THE MOUNT RING OUTER RAIL LUG FILLETS - NON-MODIFICATION SERVICE BULLETIN - MOD.72-AK188

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1. Planning Information

A. Effectivity

Airbus A350-900

All Trent XWB-75 Engines

All Trent XWB-79 Engines

All Trent XWB-79B Engines

All Trent XWB-84 Engines

B. Reason

(1) Problem

The purpose of the engine mount is to position the engine relative to the aircraft pylon and to transfer all loads and rotational moments between engine and aircraft pylon.

The front Engine Mount Support Structure (EMSS) comprises of the LP Compressor Outlet Guide Vane (OGV) assembly and OGV Outer Mount Ring Assembly (CSN 72354601150).

Revised analysis of these parts when the Front Mount Catcher Lug is engaged in the failsafe condition has now been undertaken using more advanced modelling techniques. This gives a more comprehensive understanding of the loading and therefore stresses in the structure. This analysis predicts that once the Front Engine Mount is in the failsafe condition, the most highly stressed LP Compressor OGV (CSN 72354601500) has a life that could be substantially lower than one shop visit.

This Non-Modification Service Bulletin (NMSB) introduces an inspection to protect against the front engine mount entering the failsafe condition via a failure of the OGV Outer Mount Ring Assembly outer rail lug fillet.

(2) Safety Intent

The safety intent of this Non-Modification Service Bulletin (NMSB) is to confirm that the OGV Outer Mount Ring Assembly lug fillet area is not cracked, to prevent any potential progression to failsafe operation when the life of the EMSS is predicted to be low and failure of the EMSS could occur.



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C. Description

This NMSB instructs the repeat inspection of the OGV Outer Mount Ring Assembly using a fluorescent penetrant technique (FPI).

R Accomplishment of this NMSB 72-AK188 is to be recorded in accordance with local Service Bulletin tracking system procedures and a completed copy of Appendix 1 (or similar form) returned to your Rolls-Royce Representative upon completion of the inspection.

Revision 1 of this NMSB was issued to correct a cleaning procedure reference in 3.B In-Shop Accomplishment Instructions.

R Revision 2 of this NMSB was issued to clarify the limits for redeposited material/blackspots in 3.A. and 3.B. Accomplishment Instructions and to clarify labelling of the fillets in Appendix 1.

R Revision 3 of this NMSB is issued to increase the required inspection interval
R to align with an engine refurbishment shop visit (Level 3 or 4 on the HP system
R module) and remove the on-wing compliance.

D. Compliance

(1) On-Wing

R Not applicable

(2) In-Shop

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R This Non-Modification Service Bulletin is subject to the incorporation
R requirements of an EASA Airworthiness Directive.

R Carry out the inspection in accordance with 3. Accomplishment Instructions
R at every engine refurbishment shop visit (Level 3 or 4 on the HP system
R module).

E. Approval

The technical content of this Non-Modification Service Bulletin was approved under the authority of Design Organisation Approval EASA.21J.065 on Aug.12/19 and was re-approved Dec.17/19.

R NMSB 72-AK188 was approved by Rolls-Royce on May. 5/22. The technical content
R of this document is approved under the authority of the DOA ref. EASA.21J.065.

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F. Manpower

(1) On-wing

R Not applicable.

(2) In-shop

R (a) Time to inspect

R 2 hours (1 person * 2 hours) - Estimated

R The Fluorescent Penetrant Inspection (FPI) defined in this NMSB shall
R only be performed by personnel qualified to FPI level 2 or higher and
R in possession of up-to-date eyesight record in accordance with
R EN4179/NAS410 or alternative standards/guidelines accepted by the
R applicable National Aviation Authority.

R NOTE: The parts affected by this NMSB are accessible in-shop when
R carrying out a Level 1 or above workscope.

G. Material Price and Availability

For Material price and availability contact your assigned Rolls-Royce Representative.

H. Tooling Price and Availability

| Part | Description | Quantity |
|---|---|---|
| Fan case access ladders | RRT081482 (or equivalent) | 1 |
| Dark Non-Reflective cover to darken the area for inspection | No specific | As necessary |
| Battery powered Ultraviolet Light Source capable of providing a minimum UV radiation intensity of 1200 microwatts per square centimetre at the inspection surface. | No specific | 1 |



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| | | |
|---|---|---|
| Battery powered White light source, capable of providing a minimum of 1000 Lux at the inspection surface | No specific | 1 |
| Temporary stand/tripod for positioning inspection lights | No specific | 1 |
| Calibrated light radiometer, containing both UV and visible sensor | No specific | 1 |

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I. References

(1) Overhaul Process Manual (TSD594J):

(a) TASK 70-00-00-100-101 - Overhaul Process 101 - Non-Aqueous Vapour and Liquid Degreasing.

(b) TASK 70-00-00-200-210 - Overhaul Process 210 - Fluorescent Penetrant Inspection.



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2. Material Information

A. Consumables, materials and expendables

| | Name | Quantity | Remarks |
|---|---|---|---|
| | AMS2644 Type 1, Method D, Level 2 (1D2) compliant aerosol penetrant (Fluorescent, Post Emulsified, Medium Sensitivity) | As necessary | OMat 650 |
| | AMS2644 Type 1, Method D, Level 4 (1D4) compliant aerosol penetrant (Fluorescent, Post Emulsified, Ultra-high Sensitivity) | As necessary | OMat 652 |
| | AMS2644 Type 1, Method A, Level 3 (1A3) compliant aerosol penetrant (Fluorescent, water washable, High Sensitivity) | As necessary | OMat 632 |
| | AMS2644 Form D - Non-Aqueous Wet Developer - Aerosol | As necessary | OMat 617 |
| | Acetone based solvent degreaser | As necessary | OMat 150 |
| R R | Solvent penetrant remover | As necessary | OMat 616 |
| | Penetrant 1D2 test panel (TAM Panel) | As necessary | OMat 677 |
| | Penetrant 1D4 test panel (TAM Panel) | As necessary | OMat 677 |
| | Penetrant 1A3 test panel (TAM Panel) | As necessary | OMat 677 |
| | Absorbent Cloths, Lint Free | As necessary | OMat 2-101 |



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| | | |
|---|---|---|
| Scotch-brite | As necessary | OMat 582 |
| Scotch-brite | As necessary | OMat 583 |
| Sponge type cotton buds | As necessary | No specific |
| Disposable plastic nitrile gloves | As necessary | No specific |
| Waterproof, Silicon Carbide | As necessary | OMat 5/36 |
| Waterproof, Silicon Carbide | As necessary | OMat 5/32 |
| Emery, Polishing Paper | As necessary | OMat 5/60 |
| Emery, Polishing Paper | As necessary | OMat 5/54 |

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3. Accomplishment Instructions

A. On-wing

R Not applicable.

B. In-shop

WARNING: BE CAREFUL WHEN YOU DO THIS PROCEDURE. OBEY THE EQUIPMENT MANUFACTURER'S HEALTH AND SAFETY INSTRUCTIONS AND YOUR LOCAL REGULATIONS. INJURY CAN OCCUR IF YOU DO NOT OBEY THESE INSTRUCTIONS.

WARNING: DO NOT OPERATE AN ULTRAVIOLET SOURCE IF IT DOES NOT HAVE A FILTER OR THE FILTER DOES NOT HAVE THE CORRECT FIT OR THE FILTER HAS A CRACK. ULTRAVIOLET RADIATION THAT IS NOT FILTERED CAN CAUSE INJURY TO YOUR EYES AND SKIN.

WARNING: BE CAREFUL WHEN YOU USE CONSUMABLE MATERIALS. OBEY THE MATERIAL MANUFACTURER INSTRUCTIONS AND YOUR LOCAL REGULATIONS.

CAUTION: THE FLUORESCENT PENETRANT SHOULD BE ONLY APPLIED ON THE INSPECTION SURFACE. DO NOT LET THE FLUORESCENT PENETRANT GO INTO ANY LOCATION OTHER THAN THE INSPECTION SURFACE. IF THE FLUORESCENT PENETRANT GOES INTO ANY LOCATION OTHER THAN THE INSPECTION SURFACE, STOP THE PROCEDURE AND CONTACT ROLLS-ROYCE FOR FURTHER INSTRUCTIONS.

CAUTION: THE USE OF HAND HELD AIR AND ELECTRICAL POWER TOOLS IS NOT PERMITTED.

CAUTION: MAKE SURE THAT ONLY PERSONS WHO ARE APPROVED BY THE APPLICABLE AUTHORITY DO THESE PROCEDURES. PERSONS WHO ARE NOT APPROVED CAN POSSIBLY GET AN INCORRECT RESULT, WHICH CAN SUBSEQUENTLY CAUSE COMPONENT FAILURE.

CAUTION: USE ONLY THE CONSUMABLE MATERIALS GIVEN IN THIS TASK. IF YOU DO NOT OBEY THIS INSTRUCTION, YOU CAN GET AN UNSATISFACTORY RESULT.

CAUTION: DO NOT LET THE FLUORESCENT PENETRANT REMOVER STAY ON THE SURFACE FOR MORE THAN THE SPECIFIED TIME. IF THE REMOVER STAYS ON THE SURFACE FOR MORE THAN THE SPECIFIED TIME, YOU CAN GET AN INCORRECT RESULT. THIS CAN SUBSEQUENTLY CAUSE COMPONENT FAILURE.

CAUTION: DO NOT USE A TEST PANEL TAM (PSM-5) THAT WAS USED WITH A FLUORESCENT PENETRANT WITH A DIFFERENT OMAT NUMBER. IF YOU DO, YOU CAN GET AN INCORRECT RESULT AND THIS CAN SUBSEQUENTLY CAUSE COMPONENT FAILURE

(1) For the following Fluorescent Penetrant Inspection (FPI), use OMat 652 Penetrant where Penetrant is referred to and use OMat 677 Penetrant 1D4 test panel (TAM panel) where an OMat 677 Penetrant test panel is referred to unless otherwise instructed.

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(2) Prepare the Ring, Assy OGV Outer Mount outer rail fillets (72-35-46, 01-150), see Figures 1 to 5 for inspection area, for Fluorescent Penetrant Inspection in accordance with the following steps.

(a) Clean the inspection areas prior to FPI in accordance with the following steps, refer to TSD594J OP 101 Section 9. (Subtask 70-00-00-110-101-A03).

WARNING: IT IS THE RESPONSIBILITY OF THE OPERATOR TO OBTAIN AND OBSERVE THE MANUFACTURER'S MATERIAL SAFETY DATA SHEETS FOR CONSUMABLE MATERIALS. THIS WILL CONTAIN INFORMATION SUCH AS, HAZARDOUS INGREDIENTS, PHYSICAL/CHEMICAL CHARACTERISTICS, FIRE, EXPLOSION, REACTIVITY, HEALTH HAZARD DATA, PRECAUTIONS FOR SAFE HANDLING, USE, CONTROL MEASURES, ENVIRONMENTAL EFFECTS. IT IS ALSO THE OPERATOR'S RESPONSIBILITY TO TAKE LOCAL REGULATIONS INTO CONSIDERATION.

CAUTION: TO MAINTAIN THE CLEANLINESS OF THE WIPING SOLVENT, YOU MUST POUR THE SOLVENT ONTO THE WIPING CLOTH. THE CLOTH MUST NOT BE DIPPED INTO THE SOLVENT CONTAINER. IF YOU DO NOT OBEY THIS INSTRUCTION, YOU CAN CAUSE CONTAMINATION OF THE SOLVENT IN THE CONTAINER.

NOTE: The inspection surface must be clean, dry and free from soils, oil, grease, paint, coatings, corrosion products, scale, smeared metal, welding flux, chemical residues or any other material that could prevent penetrant from entering a discontinuity and affect the process performance or produce unacceptable background.

(i) Apply OMat 150 Acetone based solvent degreaser to a clean OMat 2-101 Absorbent cloth, lint free.

(ii) Clean the inspection surfaces as shown in Figures 2-5 with a clean and moist OMat 2-101 Absorbent cloth, lint free.

(iii) Ensure that all contaminants have been removed. If necessary repeat the swabbing using fresh lint free cloth and solvent until the area is clean and free of soil and grease.

(iv) Allow 10 minutes for the area to be completely dry prior to penetrant application.

NOTE: You can use a clean lint free cloth to remove the unwanted solvent.

(v) Safely discard the used materials.

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(3) Visually examine the 4-off outer rail lug fillets on the Ring, Assy OGV Outer Mount in accordance with the following limits, refer to Figures 1-5.

| | Damage | Limit | Action |
|---|---|---|---|
| R | Corrosion | No permitted limit | Reject the OGV outer mount ring assembly |
| R | Dents | One dent not more than 4.5 mm (0.177 in.) in diameter | Repair, FRS3253 SPM TASK 70-42-11-300-001. Dress diameter to depth aspect ratio 10:1 |
| R | | Two or more dents not more than 4.5 mm (0.177 in.) in diameter and minimum distance between dents is more than 10.0 mm (0.394 in.) | Repair, FRS3253 SPM TASK 70-42-11-300-001. Dress diameter to depth aspect ratio 10:1 |
| R | | More than above permitted limits | Reject the OGV outer mount ring assembly |
| R | Nicks/scratches | One nick/scratch not more than 0.6 mm (0.024 in.) in depth and not more than 9.0 mm (0.354 in.) in length | Repair, FRS3253 SPM TASK 70-42-11-300-001. Dress length and width to depth aspect ratio 10:1 |
| R | | Two or more nicks/scratches and not more than 0.6 mm (0.024 in.) in depth and not more than 9.0 mm (0.354 in.) in length, minimum distance between nicks/scratches is more than 10.0 mm (0.394 in.) | Repair, FRS3253 SPM TASK 70-42-11-300-001. Dress length and width to depth aspect ratio 10:1 |
| R | | More than above permitted limits | Reject the OGV outer mount ring assembly |



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| | | | |
|---|---|---|---|
| R | | Fretting/galling | One area of fretting/galling not more than 0.6 mm (0.024 in.) in depth and area not more than 6.5 mm (0.256 in.) in width by 6.5 mm (0.256 in.) in length | Repair, FRS3253 SPM TASK 70-42-11-300-001 |
| R | | | Two or more areas of fretting/galling not more than 0.6 mm (0.024 in.) in depth and area not more than 6.5 mm (0.256 in.) in width by 6.5 mm (0.256 in.) in length, minimum distance between fretting/galling is more than 10.0 mm (0.394 in.) | Repair, FRS3253 SPM TASK 70-42-11-300-001 |
| R | | | More than above permitted limits | Reject the OGV outer mount ring assembly |

Table.1 Damage acceptance limits

(4) The local penetrant processing for this component must be performed in accordance with the following steps, refer to TSD 594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.

(a) Cover the region of the engine with a dark non-reflective cover in order to reduce the white light levels.

(b) Prepare the portable Ultraviolet (UV) light source:

(i) Examine the portable UV light source to make sure that it is serviceable, then set the lamp to the ON position.

(ii) Let the lamp become warm for approximately 10 minutes so that it is in a stabilized condition.

R NOTE: For LED UV lamps the stabilising time is declared by the
R manufacturer and it may not be necessary to wait 10 minutes

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(iii) Do a check of the light intensity:

NOTE: It may be necessary to mount UV light source in a fixed position for certain parts of the process e.g. removing penetrant whilst viewing with mirror under UV illumination.

(1) Hold the lamp at a distance of 0.38 m (15 in.) above the lamp monitor.

(2) Make sure that there is a minimum light intensity of 1200 microwatts per square centimetre.

(c) Prepare the OMat 677 Penetrant test panel (TAM Panel) for the inspection:

R NOTE: A known defective test panel that has been approved by the NDT
R Level 3 certification holder may be used as an alternative to a
R TAM Panel.

(i) Remove the OMat 677 Penetrant test panel (TAM Panel) from the storage container of approved solvent.

(ii) Dry the OMat 677 Penetrant test panel with an OMat 2-101 Absorbent cloth, lint free or a paper-tissue.

(iii) If the OMat 677 Penetrant test panel (TAM Panel) has been used before, visually examine it below the portable UV light source. Make sure that there are no penetrant indications remaining. If remaining penetrant indications are found, do the following steps:

(1) Remove the penetrant processing materials from the inspection surface by wiping with a clean OMat 2-101 Absorbent cloth, lint free moistened with OMat 150 Acetone based solvent degreaser.

(2) Clean the Penetrant test panel (TAM Panel) with clean water to remove the OMat 617 Non-Aqueous Wet Developer.

(3) Dry the Penetrant test panel (TAM Panel) with a clean OMat 2-101 Absorbent cloth, lint free or a paper-tissue.

(4) Soak the Penetrant test panel (TAM Panel) in one of the approved non-aqueous liquid degreasers for a minimum time of 15 minutes, refer to Overhaul Process Manual (TSD594J) TASK 70-00-00-100-101.

(5) Visually examine the Penetrant test panel (TAM Panel) below the portable UV light source for penetrant indications. If penetrant indications are found, repeat Steps (4) (c) (iii) 1 - 5.



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(d) Apply Penetrant to the inspection areas, refer to Figures 2-5, by brush or sponge applicator. The penetrant may be dispensed from an aerosol into a suitable container for brush or sponge application. Penetrant must comply with manufacturer's shelf life and any unused penetrant must go to waste.

(e) If an aerosol penetrant is not available, it is permissible to use Penetrant taken from an approved penetrant processing line and fully traceable with batch numbers as an alternative. The penetrant must be taken from the processing line on the day of inspection, stored in a clean container and discarded after the inspection has been completed.

(f) Ensure that the inspection area is fully covered with penetrant with the aid of a UV light source. Use of an inspection mirror is required to check coverage where direct line of sight is not available to the inspector.

(g) Apply Penetrant to the OMat 677 Penetrant test panel (TAM Panel).

(h) Leave the penetrant in contact with the components for 20 minutes.

CAUTION: THE PENETRANT CONTACT TIME MUST NOT EXCEED 1 HOUR. IF IT EXCEEDS 1 HOUR, THEN PENETRANT MUST BE RE-APPLIED AND A FURTHER 5 MINUTES CONTACT TIME IS ALLOWED.

(5) After the 20 minutes contact time, remove the excess penetrant from the inspection surface and the OMat 677 Penetrant test panel (TAM Panel) by wiping thoroughly with a clean and dry OMat 2-101 Absorbent cloth, lint free.

CAUTION: DO NOT LET THE FLUORESCENT PENETRANT REMOVER STAY ON THE SURFACE FOR MORE THAN THE SPECIFIED TIME. IF THE REMOVER STAYS ON THE SURFACE FOR MORE THAN THE SPECIFIED TIME, YOU CAN GET AN INCORRECT RESULT. THIS CAN SUBSEQUENTLY CAUSE COMPONENT FAILURE.

CAUTION: USE THE MINIMUM APPLICATION NECESSARY TO ACHIEVE ACCEPTABLE BACKGROUND FLUORESCENCE AND ENSURE THAT ACETONE IS NOT ALLOWED TO FLOW ON THE INSPECTION SURFACE.

(6) Whilst illuminating with UV light, wipe off the penetrant from the inspection surface with a clean OMat 2-101 Absorbent cloth, lint free moistened with OMat 150 Acetone based solvent degreaser. A twice folded (4 layer) lint free cloth is considered to be optimum to achieve this.

(7) Use of inspection mirror to check removal is required where direct line of sight is not available to the inspector.

R (8) Use OMat 2-101 Absorbent cloth, lint free moistened with OMat 150 Acetone based solvent degreaser or OMat 616 solvent penetrant remover to clean the OMat 677 Penetrant test panel (TAM Panel).

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R (9) Ensure that all traces of the OMat 150 Acetone based solvent degreaser and
R (where used on TAM panel only) OMat 616 solvent penetrant remover have been completely removed by evaporation.

(10) If necessary, repeat the steps (6) to (9) to remove the excess penetrant from inspection surface and Penetrant test panel (TAM panel). This step should not be carried out more than 2 times. If the background still remains after 2 penetrant removal steps (wipes), the part should be re-cleaned from the start before undergoing repeat FPI technique (repeat from Step (2) onwards).

(11) Apply a light, even coating of OMat 617 Non-Aqueous Wet Developer from a sealed aerosol can to the inspection area and OMat 677 Penetrant test panel (TAM Panel).

(12) Allow 10 minutes contact time for the developer.

(13) Inspect the inspection surface and Penetrant test panel (TAM Panel) in accordance with the following steps, refer to TSD594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.

(a) Ensure there are no white light sources or fluorescent items (including clothing) within the inspection area or the inspector's field of vision.

(b) Do not wear darkened or light sensitive glasses.

(c) Allow 1 minute for eye adaptation to the darkened area.

(d) Illuminate the OMat 677 Penetrant test panel (TAM Panel) with UV light at an intensity of no less than 1200 microwatts per square centimetre in the darkened area.

(e) Inspect the OMat 677 Penetrant test panel (TAM Panel) and check that the largest indications are visible and match the control photograph for that individual panel.

(f) Illuminate the inspection surface with UV light at an intensity of no less than 1200 microwatts per square centimetre in the darkened area.

(g) Examine the Penetrant test panel (TAM Panel) under UV light-source for crack indications. Make sure that there is the correct number of known indications for the OMat 677 Penetrant test panel used as follows:

(i) If OMat 652 Penetrant was applied, look for five indications in view, refer to TSD 594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.

(ii) If OMat 650 Penetrant was applied, look for three indications in view, refer to TSD 594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.



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(iii) If OMat 632 Penetrant was applied, look for four indications in view, refer to TSD 594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.

(iv) If the number of crack indications found is less than that specified above, do the following steps:

(1) Remove the penetrant processing materials from the inspection surface by wiping with a clean OMat 2-101 Absorbent cloth, lint free moistened with OMat 150 Acetone based solvent degreaser.

(2) Clean the Penetrant test panel (TAM Panel) with clean water to remove the OMat 617 Non-Aqueous Wet Developer.

(3) Dry the Penetrant test panel (TAM Panel) with a clean OMat 2-101 Absorbent cloth, lint free or a paper-tissue.

(4) Soak the Penetrant test panel (TAM Panel) in one of the approved non-aqueous liquid degreasers for a minimum time of 15 minutes, refer to Overhaul Process Manual (TSD594J) TASK 70-00-00-100-101.

(5) Then on the Penetrant test panel (TAM Panel) only, do the full penetrant inspection again.

NOTE: A second unsatisfactory result on the Penetrant test panel (TAM Panel), materials and/or procedure is unsatisfactory. You must find the cause of the unsatisfactory result, and then do the full penetrant inspection of the part and Penetrant test panel (TAM Panel) again.

(h) Inspect the Ring, Assy OGV Outer Mount Outer Rail Lug Fillets for crack indications. Use of inspection mirror is required where direct line of sight is not available to inspector.

CAUTION: THE USE OF HAND HELD AIR AND ELECTRICAL POWER TOOLS IS NOT PERMITTED.

(i) Where an indication is highlighted, similar to the example shown in Figure 6, due to a surface feature (known as redeposited material or blackspots) it shall be removed by surface cleaning or non-smearing hand polishing removal using the following steps (capture all details of the surface features including whether it was bonded to the parent material in Appendix 2):

(i) Lightly hand polish using OMat 582 Scotch-brite.

(ii) Where hand polishing using OMat 582 does not remove the surface features, lightly hand polish using OMat 583 Scotch-brite.

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(iii) Where hand polishing using OMat 583 does not remove the surface features, lightly hand polish using OMat 5/36 Waterproof Silicon Carbide or Omat 5/60 Emery, polishing paper for no more than 5 minutes, ensuring that the emery paper is clean and free from debris at all times. Ensure that the polished surface does not become hot to the touch. Follow this by lightly hand polishing with OMat 5/32 Waterproof Silicon Carbide or OMat 5/54 Emery, polishing paper for no more than 5 minutes, ensuring that the emery paper is clean and free from debris at all times. Ensure that the polished surface does not become hot to the touch.

(j) If surface cleaning or non-smearing hand polishing removal technique was carried out in Step (i), then repeat the complete procedure from step 3. B. (2). If no surface cleaning or non-smearing hand polishing removal was required, skip step (k) and continue the inspection by doing step (l).

(k) If any surface features (redeposited material/ blackspots) are identified during the second FPI procedure, evaluate the blackspot with following criteria:

| Damage | Limit | Action |
|---|---|---|
| Blackspot/redeposited material | One blackspot/redeposited material or cluster of blackspot/redeposited material not more than 4.0 mm (0.158 in.) in diameter | Accept |
| | One or more blackspot/redeposited material or cluster of blackspot/redeposited material not more than 4.0 mm (0.158 in.) in diameter and minimum distance between blackspot/redeposited material is more than 10.0 mm (0.394 in.) | Accept |
| | More than above permitted limits | Reject the OGV outer mount ring assembly |

Table.2 Redeposited material/blackspots acceptance limits



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(l) Examine the inspection area under UV light source for crack indications:

(i) If crack indications are found, use a MAGNIFYING GLASS POWER 10X to make sure that there is a defect.

NOTE: When a mirror is being used where direct line of sight is not available to the inspector, the use of a magnifying glass power 10X may not be possible and the defect may need to be assessed using a lower magnification.

(ii) If crack indications can be seen, visually examine the area below a white light. Use a MAGNIFYING GLASS POWER 15X and MAGNIFYING GLASS POWER 30X to make sure that there is a defect.

NOTE: When a mirror is being used where direct line of sight is not available to the inspector, the use of a magnifying glass power 15X and 30X may not be possible and the defect may need to be assessed using a lower magnification.

(iii) To aid the evaluation of the indication, the wipe-off technique can be used as specified in TSD594J OP 210 SUBTASK 70-00-00-230-210-078.

(14) If there are any cracks or crack indications on the inspection surface:

(a) Reject the OGV outer mount ring.

(b) Record the damage in Appendix 1.

(15) If there is damage observed during the Fluorescent Penetrant Inspection which was not observed during the visual inspection in Step 3.B.(3), assess the damage against the limits defined in Step 3.B.(3).

(16) If fretting and galling was observed and accepted in Step 3.B.(3)(e) but the background fluorescence is too high to assess the region for cracks repeat Steps 3.B. (2) to (16) only using OMat 650 penetrant where Penetrant is referred to. Where OMat 677 Penetrant test panel (TAM panel) is referred to, ensure that a Penetrant 1D2 test panel (TAM panel) which has only been used with OMat 650 is used.

(17) If after Step (16) the background fluorescence is still too high to assess the region for cracks repeat Steps 3.B. (2) to (16) only using OMat 632 penetrant where Penetrant is referred to. Where OMat 677 Penetrant test panel (TAM panel) is referred to, ensure that a Penetrant 1A3 test panel (TAM panel) which has only been used with OMat 632 is used.

(18) Once all indications have been evaluated and recorded, remove the penetrant processing materials from the inspection surface by wiping with a clean OMat 2-101 Absorbent cloth, lint free moistened with OMat 150 Acetone based solvent degreaser.

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(19) Clean the Penetrant test panel (TAM Panel) used in accordance with the following steps, refer to TSD 594J OP210 (TASK 70-00-00-200-210) - Fluorescent Penetrant Inspection.

(a) Clean the Penetrant test panel (TAM Panel) with clean water to remove the OMat 617 Non-Aqueous Wet Developer.

(b) Dry the Penetrant test panel (TAM Panel) with a clean OMat 2-101 Absorbent cloth, lint free or a paper-tissue.

(c) Soak the Penetrant test panel (TAM Panel) in one of the approved non-aqueous liquid degreasers for a minimum time of 15 minute.

(d) Visually examine the Penetrant test panel (TAM Panel) below the portable UV light source for penetrant indications.

(e) If penetrant indications are found, repeat step (19).

(20) Make sure that the work area is clean and clear of tools and other items.

(21) Complete and return Appendix 1, or similar form, to your Rolls-Royce Overhaul Support Team representative.



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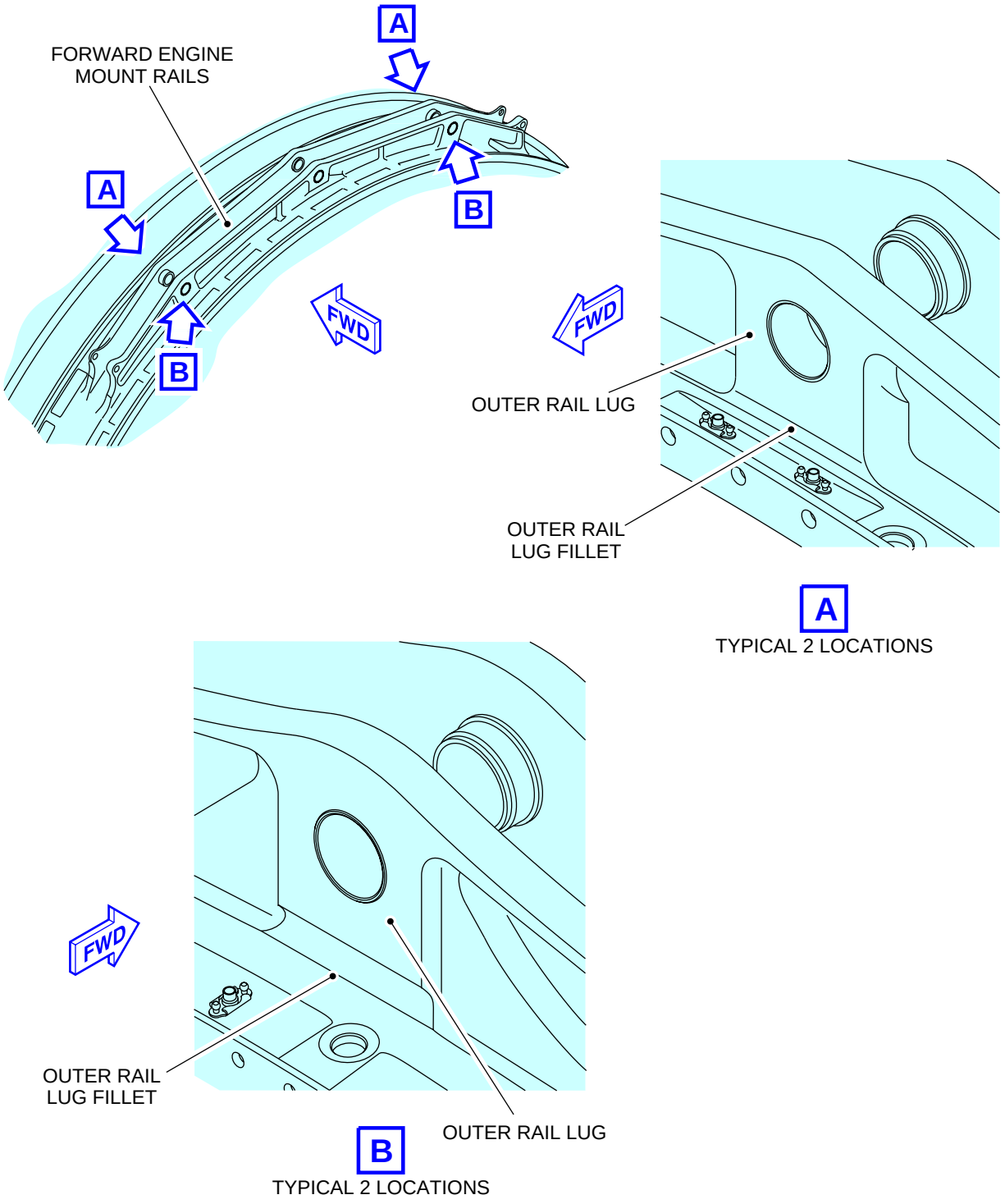



Figure 1 - OGV Outer Mount Ring - Inspection Locations

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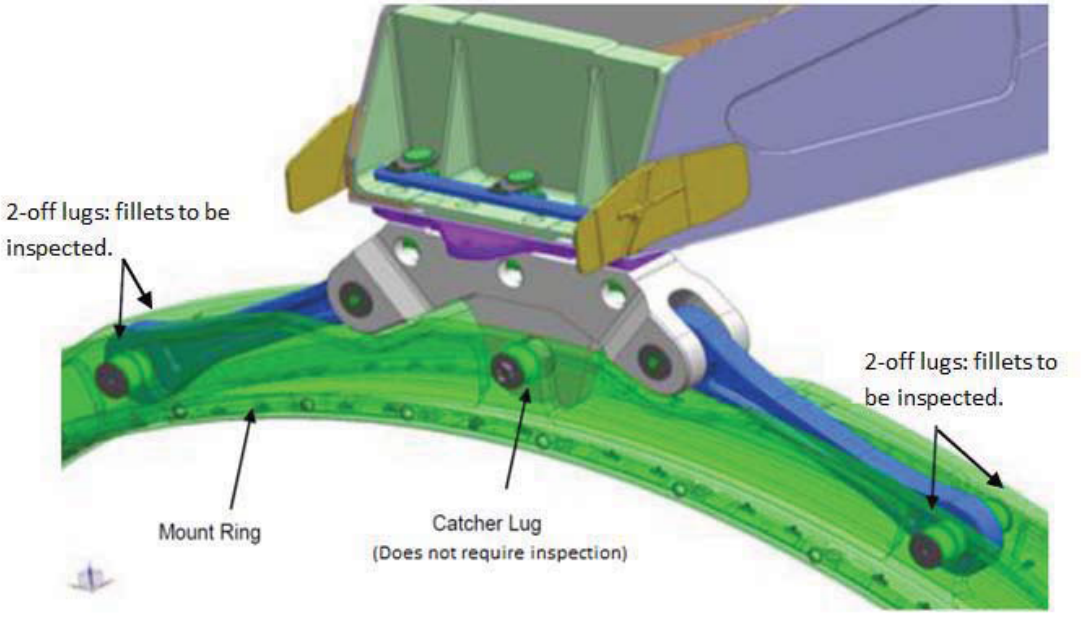



Figure 2 – Front Mount Ring with Mount Assembly showing 4-off OGV Outer Mount Ring Outer Rail Lug Fillets Inspection Areas



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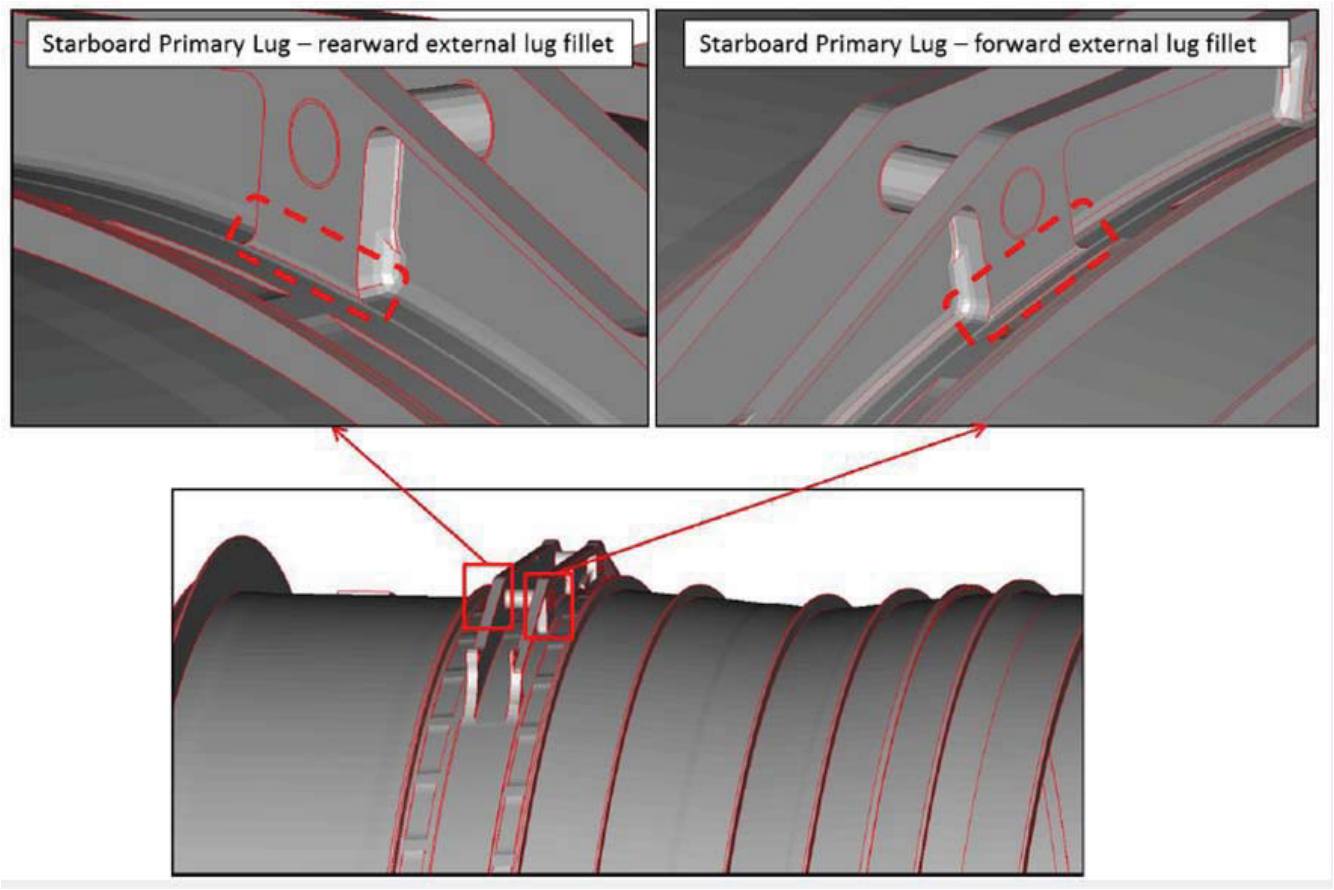



Figure 3 - Definition of Extent of Inspection Areas



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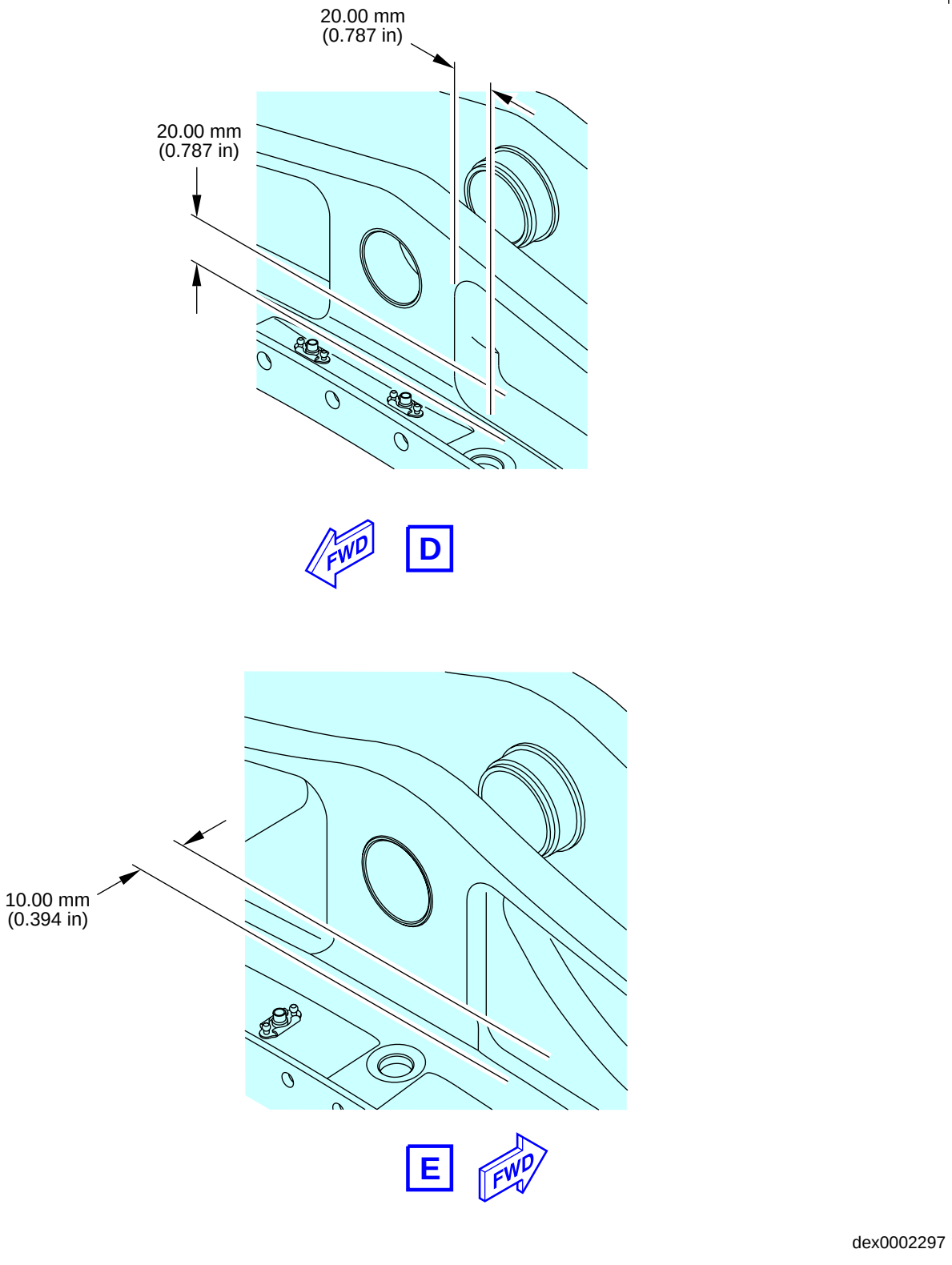



Figure 4 - Definition of Extent of Inspection Areas



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Inspection Areas:

Fillet radius including circumferential and axial extents and pockets (green).

Inspect starboard and port lugs on forward and aft rails– 4-off lug inspections.

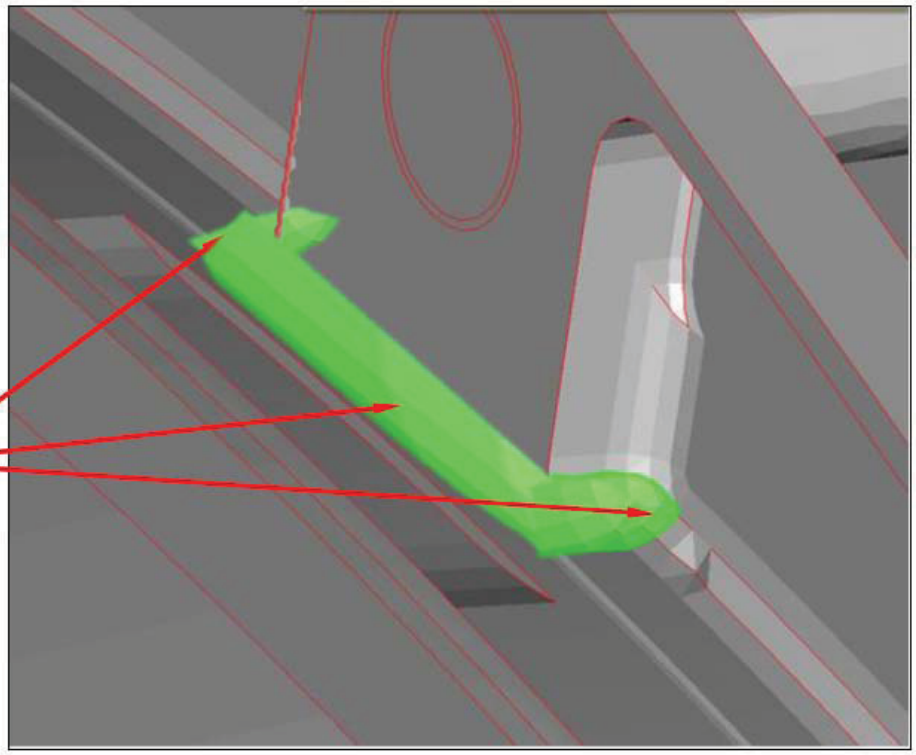


Figure 5 - Areas required to undergo FPI processing and inspection

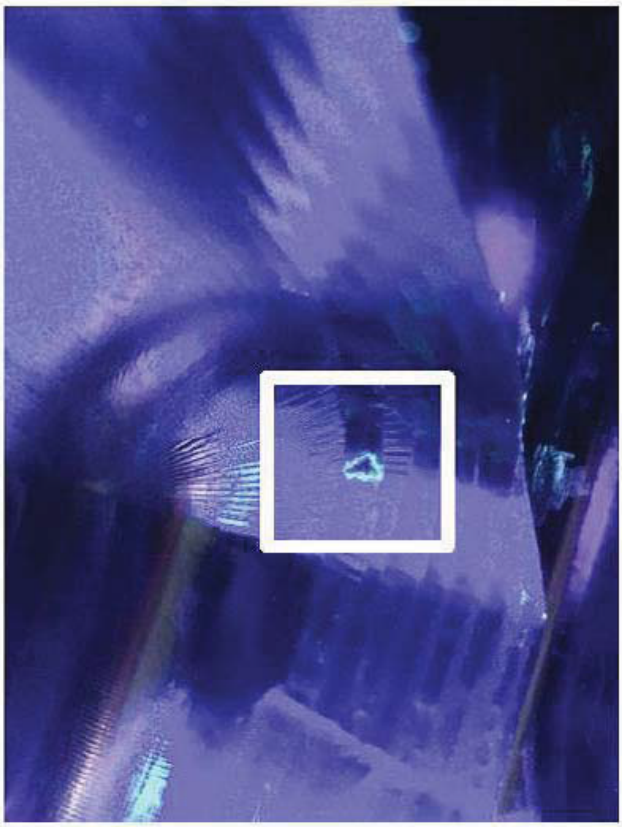


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Pre Wipe Off



Post Wipe Off

Figure 6 - Surface feature (known as redeposited material or blackspot) shown in the pre and post wipe-off condition.



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APPENDIX 1

This form (or similar) to be completed for every OGV Outer Mount Ring inspected.

Results to be sent to Rolls-Royce via your Rolls-Royce Representative.

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| Feedback Sheet NMSB 72-AK188 | |
|---|---|
| Overhaul Base / Operator | |
| Date of Inspection | |
| Engine Serial Number | |
| Engine Hours Since New | |
| Engine Cycles Since New | |
| OGV Outer Mount Ring Part Number (Identification: Outer circumference of the mount ring, right angle to center catcher lug position) | |

| | Inspection result (accept/reject) and if applicable details on the reason for rejection |
|---|---|
| Inspection of Lug 1 (Forward port) (refer to Figure 2) | |
| Inspection of Lug 2 (Rearward port) (refer to Figure 2) | |
| Inspection of Lug 3 (Forward starboard) (refer to Figure 2) | |
| Inspection of Lug 4 (Rearward starboard) (refer to Figure 2) | |



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| | |
|---|---|
| Attach photographic evidence of damages if any. | |

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APPENDIX 2

This form (or similar) to be completed for every surface feature (redeposited material/blackspot) identified during the OGV Outer Mount Ring inspection.

Results to be sent to Rolls-Royce via your Rolls-Royce Representative

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| Details of surface feature (redeposited material/blackspot) identified during NMSB 72-AK188 | |
|---|---|
| Overhaul Base / Operator | |
| Date of Inspection | |
| Engine Serial Number | |
| Engine Hours Since New | |
| Engine Cycles Since New | |
| OGV Outer Mount Ring Part Number (Identification: Outer circumference of the mount ring, right angle to center catcher lug position) | |
| | |
| | Remarks |
| Has a surface feature (redeposited material/blackspot appeared during inspection. | Yes / No |
| If Yes, was the feature removable? | Yes / No |
| If Yes, were the features removed and what removal method was carried out? | |
| Details of surface feature (redeposited material/blackspot) identified during second FPI procedure. | Number of occurrences:<br>Locations:<br>Diameter of feature: |
| Add the photographic evidence of redeposited material/blackspots which remained during second FPI procedure, if any. | |



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