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AgustaWestland Products

SERVICE BULLETIN

N° 109EP-175

ALERT

DATE: April 26, 2021

REV. : /

TITLE

ATA 64 - INSPECTION OF TAIL ROTOR SHAFT ASSY P/N 109-0445-08-(ALL DASHES) AND TAIL ROTOR SLEEVE ASSY P/N 109-0130-90-117/-121

REVISION LOG

New Issue

1. PLANNING INFORMATION

A. EFFECTIVITY

All the Leonardo S.p.a. A109E helicopters installing a TR sleeve assy P/N 109-0130-90-117 all S/Ns, or P/N 109-0130-90-121 with S/Ns MO.001 to S/N MO.677 and with S/N MOR678 to MOR1140.

B. COMPLIANCE

NOTE

TR sleeve assy P/N 109-0130-90-117/-121 marked with letter "R" after S/N are not affected by Part II and Part III.

Part I:

Within and not later than 25 flight hours or 3 months whichever occurs first after the issue of this Service Bulletin.

Part II:

Every 25 flight hours after accomplishment of part I and until application of Part III of this Service Bulletin or until installation of a non affected sleeve.

Part III:

At any bushing replacement.

Part IV:

In conjunction with every 400 FH scheduled inspection after application of Part I of this Service Bulletin until next TGB overhaul or TGB special inspection (1600 FH).

C. CONCURRENT REQUIREMENTS

N.A.

D. REASON

This Service Bulletin is issued in order to provide the necessary instruction on how to perform a detailed inspection of tail rotor shaft assy P/N 109-0445-08-(all dashes) and tail rotor sleeve assy P/N 109-0130-90-117/-121.

E. DESCRIPTION

During tail rotor system inspections required after an abnormal vibration event, an extensive crack has been found on the tail rotor mast of an A109E helicopter at the interface with the tail rotor sleeve. In order to assure the airworthiness of the fleet and to collect data for the investigation, LH decided to issue this SB to perform (Part I) a tail

rotor and mast visual inspection together with a dye penetrant fluorescent liquid inspection in the area potentially affected by the issue and (Part II) a recurrent check for condition of the TR sleeve bushing. In case of sleeve bushing debonding is found, instructions are given to replace it (Part III). Part IV provides instruction to restore, if necessary, solid lubricant protection on the area inspected with dye penetrant fluorescent liquid.

F. APPROVAL

The technical content of this Service Bulletin is approved under the authority of DOA nr. EASA.21.J.005. For helicopters registered under other Aviation Authorities, before applying the Service Bulletin, applicable Aviation Authority approval must be checked within Leonardo Helicopters customer portal.

EASA states mandatory compliance with inspections, modifications or technical directives and related time of compliance by means of relevant Airworthiness Directives.

If an aircraft listed in the effectivity embodies a modification or repair not LHD certified and affecting the content of this Service Bulletin, it is responsibility of the Owner/Operator to obtain a formal approval by Aviation Authority having jurisdiction on the aircraft, for any adaptation necessary before incorporation of the present Service Bulletin.

G. MANPOWER

To comply with this Service Bulletin, the following MMH are deemed necessary:

Part I: 5 (five) MMH;

Part II: 0,5 (half an hour) MMH;

Part III: 4 (four) MMH (without considering the adhesive curing time);

Part IV: 0,25 (a quarter of hour) MMH.

MMH are based on hands-on time and can change with personnel and facilities available.

H. WEIGHT AND BALANCE

N.A.

I. REFERENCES

1) PUBLICATIONS

SECTION/PARAGRAPH	DESCRIPTION	PART
PAR01 00-20-1	Helicopter Safety	I, II, III

SECTION/PARAGRAPH		DESCRIPTION	PART
PAR02	64-00-14	Tail Rotor Hub and Blade Assembly, Removal/Installation	I, II, III
PAR03	64A-00-13	Tail Rotor Hub and Blade Assembly, Removal/Installation	I, II, III
PAR04	64-31-6	Pitch Change Mechanism, Removal/Installation	I, II, III
PAR05	64-31-8	Pitch Change Mechanism, Inspection	I, II
PAR06	65-21-6	90-Degree Gearbox, Removal/Installation	I
PAR07	00-10-9	Connection Of External Hydraulic Power	I, II
PAR08	00-10-10	Disconnection Of External Hydraulic Power	I, II
PAR09	67-00-29	Tail rotor control system adjustment	II
PAR10	CPCP 20-70-10	Application of solid lubricant film	IV

2) ACRONYMS

AMDI	Aircraft Material Data Information
AR	As Required
CPCP	Corrosion Protection and Control Publication
DOA	Design Organization Approval
IPC	Illustrated Parts Catalogue
LHD	Leonardo Helicopters
MM	Maintenance Manual
MMH	Maintenance Man Hours
P/N	Part Number
PTUM	Pictorial Tools Usage Manual
SB	Service Bulletin

3) ANNEX

Annex A	AW109 TR shaft localized penetrant inspection Type 1, Method C, Level 2, Form “d”.
Annex B	AW109 TR sleeve assy bushing replacement.
Annex C	S.B. N°109EP-175 Inspection form.

J. PUBLICATIONS AFFECTED

N.A.

K. SOFTWARE ACCOMPLISHMENT SUMMARY

N.A.

2. MATERIAL INFORMATION

A. REQUIRED MATERIALS

1) PARTS

PART I

N.A.

PART II

N.A.

PART III

#	P/N	ALTERNATIVE P/N	DESCRIPTION	Q.TY	LVL	NOTE	LOG P/N
1	109-0133-07-101		Bushing	1	.		-

PART IV

N.A.

Refer also to IPC for the spares materials required to comply with the MM Paragraphs referenced in the accomplishment instructions.

2) CONSUMABLES

The following consumable materials, or equivalent, are necessary to accomplish this Service Bulletin:

#	Spec./LHD code number	DESCRIPTION	Q.TY	NOTE	PART
2	SAE-AMS-2644, Type I, Method C, Level 2	Dye Penetrant	AR	(1)(2)	I
3	SAE-AMS-2644, Type I, Form “d”	Developer	AR	(1)(2)	I
4	SAE-AMS-2644 Cl II	Solvent (C290)	AR	(1)(2)	I
5	ASTM D740, Type I	Methyl-ethyl-ketone (C511)	AR	(1)	I, III
6	Commercial	Plastic bristled brush	AR	(1)	I
7	Commercial	Aluminum adhesive tape	AR	(1)	I
8	Commercial	Small soft clean brush	AR	(1)	I
9	Commercial	Clean, dry, lint-free cloth or absorbent toweling	AR	(1)	I
10	MIL-L-23398 Type IV	Solid film, lubricant	AR	(1)	I, IV
11	Commercial	Aluminium oxide, 80-grit (C208)	AR	(1)	III
12	199-05-002, Type II, Class 2	Adhesive, (C054)	AR	(1)	III
13	Commercial	Cloth, soft lint-free (C011)	AR	(1)	III
14	MIL-PRF-680, Type II	Cleaning solvent (C287)	AR	(1)	III

Refer also to AMDI for the consumable materials required to comply with the MM Paragraphs referenced in the accomplishment instructions.

3) LOGISTIC MATRIX

N.A.

NOTE

(1) Local supply.

(2) This material shall be certified in accordance with AMS2644, obtained from a supplier listed in QPL-AMS2644, supplied from the same manufacturer and in aerosol cans packaging.

B. SPECIAL TOOLS

#	P/N	DESCRIPTION	Q.TY	NOTE	PART
15	109-3130-32-1	Tail rotor retaining nut wrench (LSE NO 48)	1	(B1)	I
16	895-3130-02-101	Tool, T/R slider bushing installation (LSE NO 114)	1	(B1)	I
17	109-3130-53-111	Tool, T/R pitch change slider ring nut removal/installation (LSE NO 49)	1	(B1)	I
18	109-3130-54-101 or 109-3130-54-111	Tool, T/R pitch change housing ring nut removal/installation (LSE NO 130)	1	(B1)	I
19	109-3130-70-101	Tool, T/R pitch change housing duplex bearing removal (LSE NO 131)	1	(B1)	I
20	109-3130-69-101	Tool, T/R pitch change housing duplex bearing installation (LSE NO 132)	1	(B1)	I
21	109-3130-71-101	Tool, T/R pitch change slider installation (LSE NO 133)	1	(B1)	I
22	109-3130-55-117	Tool, T/R pitch change slider removal (LSE NO 101)	1	(B1)	I
23	Commercial	Endoscope	1	(B2)(B2)	I
24	Commercial	Dark curtain	1	(B2)	I
25	Commercial	Magnifying lens 5x	1	(B2)	I
26	Commercial	UV-A inspection lamp	1	(B2)(B3)	I
27	Commercial	UV-A/White light meters	1	(B2)	I
28	Commercial	Hydraulic system test bench	1	(B2)	I, II
29	Metal sheet 55x5 mm, thickness 1 mm.	Bushing displacement measuring tool	1	(B4)(B5)	I, II
30	Commercial	Environmental thermometer	1	(B2)	I
31	Commercial	Parallel lathe	1	(B2)	III
32	Commercial	Caliper	1	(B2)	III
33	Commercial	Dry abrasive blasting equipment	1	(B2)	III

Refer to PTUM for the special tools required to comply with the MM Paragraphs referenced in the accomplishment instructions.

Refer also to Annex A for the equipment/tools required for the liquid penetrant inspection.

Refer also to Annex B for the equipment/tools required for the sleeve assy bushing replacement.

SPECIAL TOOLS NOTE

(B1) Please contact Leonardo Helicopters Division order administration to request the tools supply on loan. As soon as the present Service Bulletin is implemented the tools supplied on loan shall be promptly returned to Leonardo Helicopters Division.

(B2) Item to be procured as local supply.

(B3) This lamp should emit at least 1200 μW/cm² and no more than 20lux at 38cm from the front of the filter to the face of the sensor.

(B4) Local manufacturing in accordance instructions given in Part I.

(B5) The metal sheet specifications may be different. For reference, some examples are given: 2024 T3 AMS-QQ-A-250/4; 2024 T3 AMS-QQ-A-250/5; CRES 301 ¼ H, AMS5517.

C. INDUSTRY SUPPORT INFORMATION

Owners/Operators who comply with the instructions of this Service Bulletin no later than the applicable date in the “Compliance” section will be eligible to receive REQUIRED MATERIALS on free of charge basis, except for Consumable Materials and Special Tools.

NOTE 1: Customers who fail to comply with the instructions in this Service Bulletin before the compliance date are not eligible for the aforementioned special policy.

Please Issue relevant MMIR form to your Warranty Administration Dpt accompanied by INSPECTION REPORT and PICTURE of the affected area.

NOTE 2: The INSPECTION REPORT and PICTURE are mandatory; in case the MMIR is not accompanied by these documents, it will be rejected.

3. ACCOMPLISHMENT INSTRUCTIONS

GENERAL NOTES

a) Place an identification tag on all components that are re-usable, including the attaching hardware that has been removed to gain access to the modification area and adequately protect them until their later re-use.

b) All lengths are in mm.

PART I

1. In accordance with MM Paragraph 00-20-1, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.
2. Gain access to the plug P/N 109-0133-18-103 (or P/N 109-0130-85-1) installed on the tail rotor hub removing balance flange and all the necessary components. Mark the installation position of the balance masses in order to reinstall them in the same location and reduce time for the TR balancing required at the end of the reassembly. Retain all the components.
3. In accordance with Figure 3, verify that plug P/N 109-0133-18-103 (or P/N 109-0130-85-1) is torqued at 59÷69 Nm.
   3.1 Record the torque value on the annexed Detailed Inspection Form and proceed with next step.
4. In accordance with MM Paragraph 64-00-14 or 64A-00-13, remove the tail rotor hub and blade assy.

NOTE

Before the removal of the TR sleeve as per MM Paragraph 64-31-6, check the bushing P/N 109-0133-07-101 for condition and bonding. In case it is found partially or completely displaced from its seat, before and after its removal, take pictures of bushing and sleeve, record the finding on the Detailed Inspection Form and proceed with the following step.

5. In accordance with MM Paragraph 64-31-6, remove the pitch change mechanism.
6. In accordance with MM Paragraph 64-31-8, inspect the removed tail rotor sleeve assy P/N 109-0130-90-117/-121 and bushing P/N 109-0133-07-101. Inspect the bushing in the tail rotor sleeve assy for debonding.

6.1 In case anomalies are detected, take pictures of the affected bushing and sleeve, record the findings on the Detailed Inspection Form, and contact Leonardo Helicopters to evaluate part serviceability. If necessary, in accordance with MM Paragraph 64-31-6, replace it with a serviceable TR Sleeve. In the meantime, proceed with step 7.

6.2 In case of no findings, proceed to next step.

7. With reference to Figure 1 and Figure 2 detail A, gain access to tail rotor shaft assy P/N 109-0445-08-(all dashes) and:

CAUTION

Pay particular attention to not damage the Tail Rotor Shaft Assy with the endoscope probe during the inspection.

7.1 perform internal surface endoscope inspection for abnormal wear condition, corrosion, fretting, crack and damage;

7.2 perform external surface visual inspection for abnormal wear condition, corrosion, fretting, crack and damage;

7.3 with reference to Figure 1 and Figure 2 detail B, in accordance with Annex A, perform surface Fluorescent Penetrant Inspection on the indicated area;

7.4 if no evidence of existing anomalous wear, corrosion, fretting, damage or crack is found, proceed to step 8;

7.5 if evidence of anomalous wear, corrosion, fretting, damage or crack is found, take relevant pictures, record the findings on the Detailed Inspection Form and contact Leonardo Helicopters to evaluate part serviceability. If necessary, in accordance with MM Paragraph 65-21-6, replace it with a serviceable 90-Degree Gearbox.

NOTE

Do not attach aft boot to pitch change slider assy.

8. In accordance with MM Paragraph 64-31-6, re-install previously removed pitch change mechanism.

9. In accordance with MM Paragraph 64-00-14 or 64A-00-13, re-install previously removed tail rotor hub and blade assy.

10. In accordance with MM Paragraph 00-10-9, connect the hydraulic test bench to the helicopter and operate it at 103.5 bar (1500 psi).

CAUTION

One assistant must position and hold right anti torque pedal full forward before beginning the following procedure.

11. In accordance with Figure 4, manufacture on site the bushing displacement measuring tool following the next steps:
    11.1 Starting from a metal sheet of 55x5 mm (1 mm thickness), bend it to obtain an “L” shape with the size indicated in Figure 4.
    11.2 In accordance with Figure 4 Detail E, insert the tool between pitch change slider assy and tail rotor shaft assy until reaching the bushing of the TR sleeve assy.

CAUTION

After trimming, remove all swarf and sharp edges to avoid to scratch the tail rotor shaft assy.

    11.3 If gap is present between the vertical leg of the tool and the pitch change slider assy, start trimming the short segment until gap is removed.
    11.4 Record the dimension of the tool and retain it for Part II inspection.
12. With reference to Figure 3, attach aft boot P/N 109-0130-96-101 on pitch change slider assy.
13. Return the anti torque pedal to center. In accordance with MM Paragraph 00-10-10, disconnect the hydraulic test bench from the helicopter.
14. Return the helicopter to a ready to flight condition and record for compliance with Part I of this Service Bulletin on the helicopter logbook.

NOTA

Send the Detailed Inspection Form and pictures with Subject line “ASB 109EP-175 - S/N XXXXX – Compliance to Part I”. “XXXXX” is the helicopter S/N.

15. Send the attached compliance form and the pictures taken during the inspections to the following mail box:

    engineering.support.lhd@leonardocompany.com

    As an alternative, gain access to My Communications section on Leonardo WebPortal and compile the “Service Bulletin Application Communication”.

PART II

NOTE

If tail rotor controls adjust procedure (ref. 67-00-29) has been performed after manufacturing the Bushing displacement measuring tool, discard the previous tool and manufacture a new one i.a.w. Part I, step 11.

1. In accordance with MM Paragraph 00-20-1, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.
2. In accordance with MM Paragraph 00-10-9, connect the hydraulic test bench to the helicopter and operate it at 103.5 bar (1500 psi).

CAUTION

One assistant must position and hold right anti torque pedal full forward before beginning the following procedure.

3. With reference to Figure 3, detach aft boot from pitch change slider assy.
4. With reference to Figure 4, move aft boot and, using bushing displacement measuring tool, verify that the distance from bushing to pitch change slider assy has not changed since last inspection. If the distance decreases (long side of tool not in contact with slider assy, ref. Figure 4 Detail E), proceed as follows, otherwise proceed to step 5:
   - 4.1 In accordance with MM Paragraph 00-10-10, disconnect the hydraulic test bench from the helicopter.
   - 4.2 Gain access to the plug P/N 109-0133-18-103 (or P/N 109-0130-85-1) installed on the tail rotor hub removing balance flange and all the necessary components. Mark the installation position of the balance masses in order to reinstall them in the same location and reduce time for the TR balancing required at the end of the reassembly. Retain all the components.
   - 4.3 In accordance with Figure 3, verify that plug P/N 109-0133-18-103 (or P/N 109-0130-85-1) is torqued at 59÷69 Nm.
   - 4.4 Record the torque value on the Detailed Inspection Form and proceed with next step.
   - 4.5 In accordance with MM Paragraph 64-00-14 or 64A-00-13, remove the tail rotor hub and blade assy.
   - 4.6 In accordance with MM Paragraph 64-31-6, remove the pitch change mechanism.
   - 4.7 On the tail rotor sleeve assy P/N 109-0130-90-117/-121 before its removal, inspect the bushing P/N 109-0133-07-101 for correct installation and debonding

4.7.1 In case the bushing is not found in the correct position or it is debonded so that can be moved off from its seat, take pictures of the bushing and sleeve, record the findings on the Detailed Inspection Form and replace the bushing in accordance with part III. If necessary, in accordance with MM Paragraph 64-31-6, replace the TR sleeve with a serviceable part.

4.7.2 In case of no findings, verify the bushing displacement measuring tool as per Part I, step 11.

4.8 In accordance with MM Paragraph 64-31-6, re-install previously removed pitch change mechanism.

4.9 In accordance with MM Paragraph 64-00-14 or 64A-00-13, re-install previously removed tail rotor hub and blade assy. Proceed to step 7.

5. With reference to Figure 3, attach aft boot P/N 109-0130-96-101 on pitch change slider assy.
6. Return anti torque pedal to center. In accordance with MM Paragraph 00-10-10, disconnect the hydraulic test bench from the helicopter.
7. Return the helicopter to a ready to flight condition and record for compliance with Part II of this Service Bulletin on the helicopter logbook.

NOTA

Send the Detailed Inspection Form and pictures with Subject line “ASB 109EP-175 - S/N XXXXX – Compliance to Part II”. “XXXXX” is the helicopter S/N.

8. Send the attached compliance form and the pictures taken during the inspections to the following mail box:

engineering.support.lhd@leonardocompany.com

As an alternative, gain access to My Communications section on Leonardo WebPortal and compile the “Service Bulletin Application Communication”.

PART III

1. In accordance with MM Paragraph 00-20-1, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.
2. In accordance with MM Paragraph 64-00-14 or 64A-00-13, remove the tail rotor hub and blade assy.
3. In accordance with MM Paragraph 64-31-6, remove the pitch change mechanism.
4. In accordance with Annex B, replace the bushing P/N 109-0133-07-101.
5. In accordance with MM Paragraph 64-31-6, re-install previously removed pitch change mechanism.
6. In accordance with MM Paragraph 64-00-14 or 64A-00-13, re-install previously removed tail rotor hub and blade assy.
7. Return the helicopter to a ready to flight condition and record for compliance with Part III of this Service Bulletin on the helicopter logbook.
8. Send the attached compliance form to the following mail box:

   engineering.support.lhd@leonardocompany.com

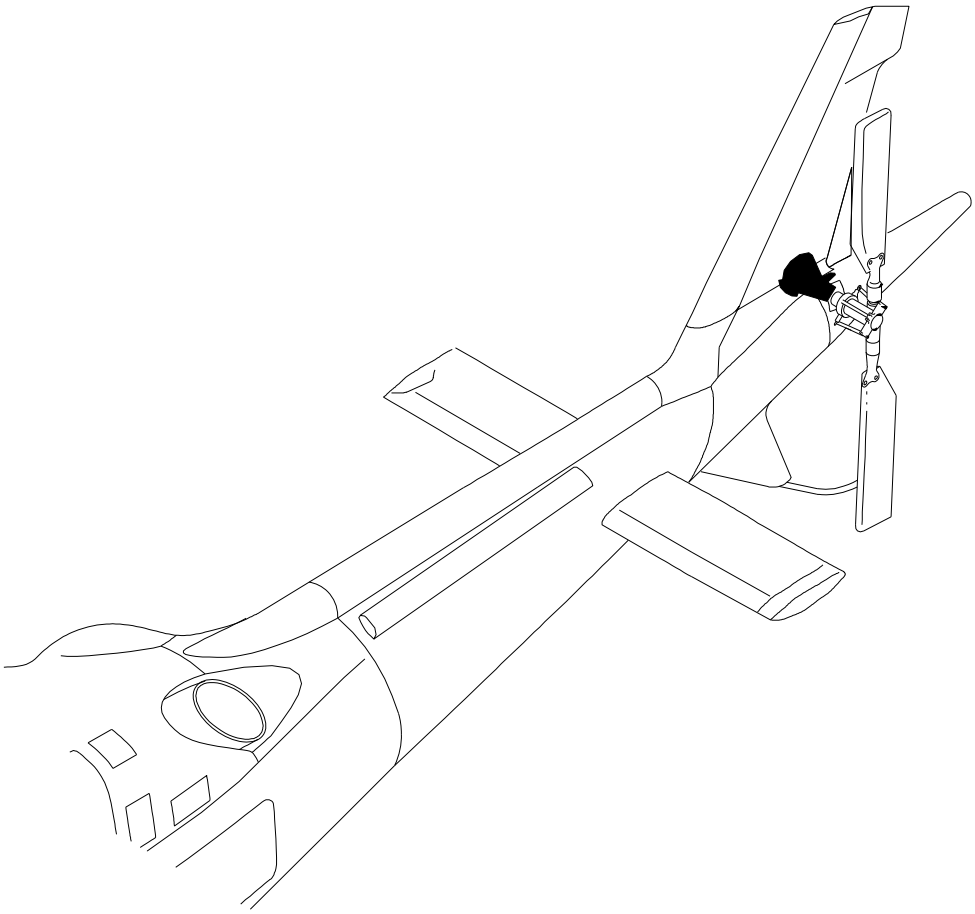
   As an alternative, gain access to My Communications section on Leonardo WebPortal and compile the “Service Bulletin Application Communication”.

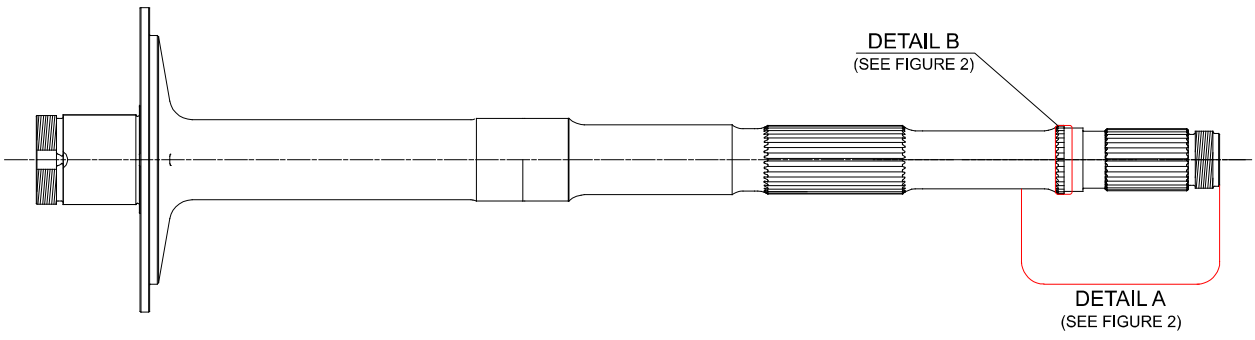
PART IV

1. During application of tail rotor gearbox 400 FH scheduled inspection, with reference to Figure 2 Detail B, verify the presence of solid film lubricant on “inspection area” (it should be present only on the “4.0mm section” and on vertical side of shoulder). If necessary, restore the layer of solid film lubricant MIL-L-23398 Type IV as follows:
   1.1 Mask off surrounding areas near the inspection zone (Figure 2, Detail B) with adhesive Aluminium tape.
   1.2 Clean the part with a clean cloth soaked with Class 2 solvent listed in QPL-AMS-2644.
   1.3 In accordance with CPCP 20-70-10, touch up where necessary with solid film lubricant with MIL-L-23398 Type IV product.
2. Record for compliance with Part IV of this Service Bulletin on the helicopter logbook.
3. Send the attached compliance form to the following mail box:

   engineering.support.lhd@leonardocompany.com

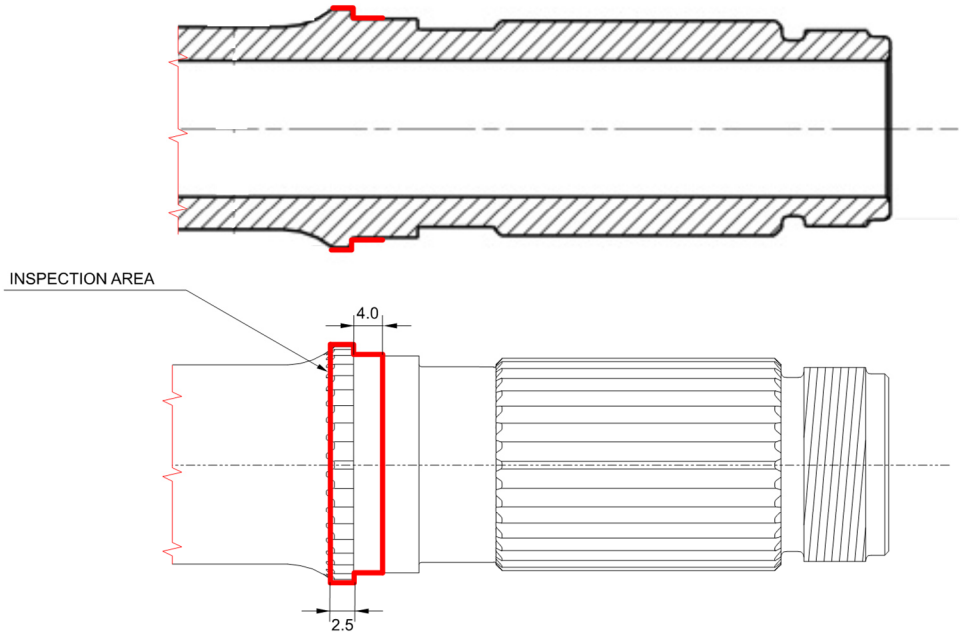
   As an alternative, gain access to My Communications section on Leonardo WebPortal and compile the “Service Bulletin Application Communication”.



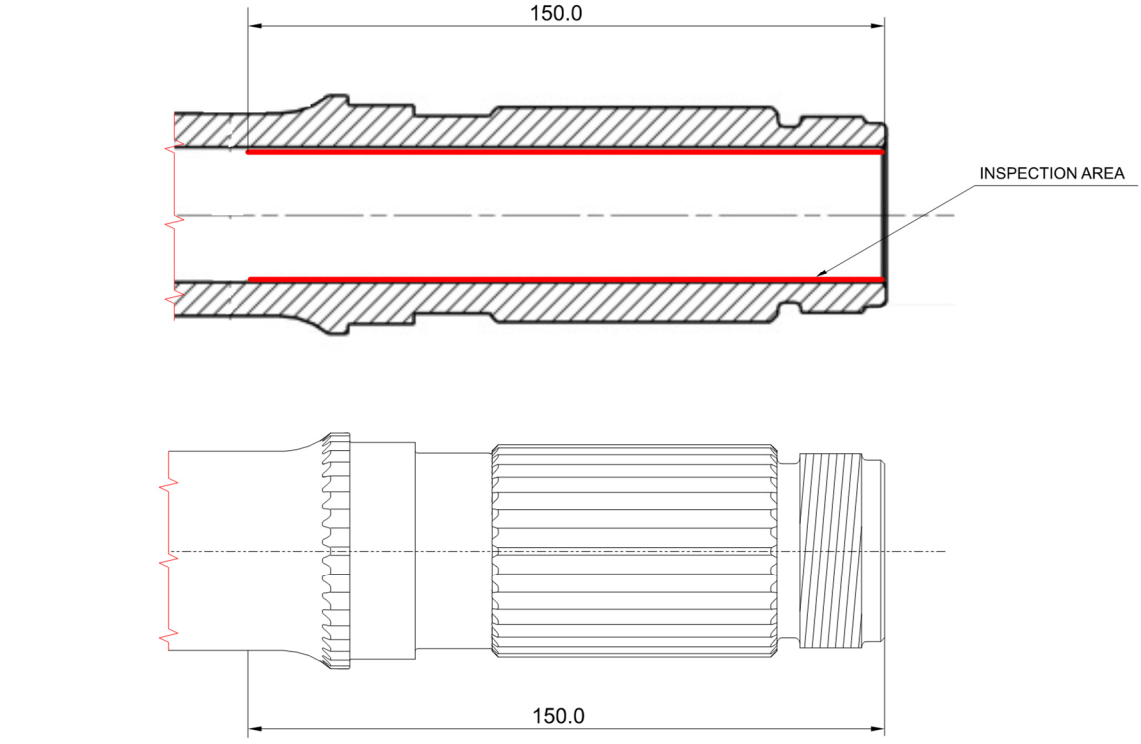


TAIL ROTOR SHAFT ASSY
STRUCTURE AND SYSTEMS ARE PARTIALLY OMITTED FOR BETTER CLARITY PURPOSE

Figure 1

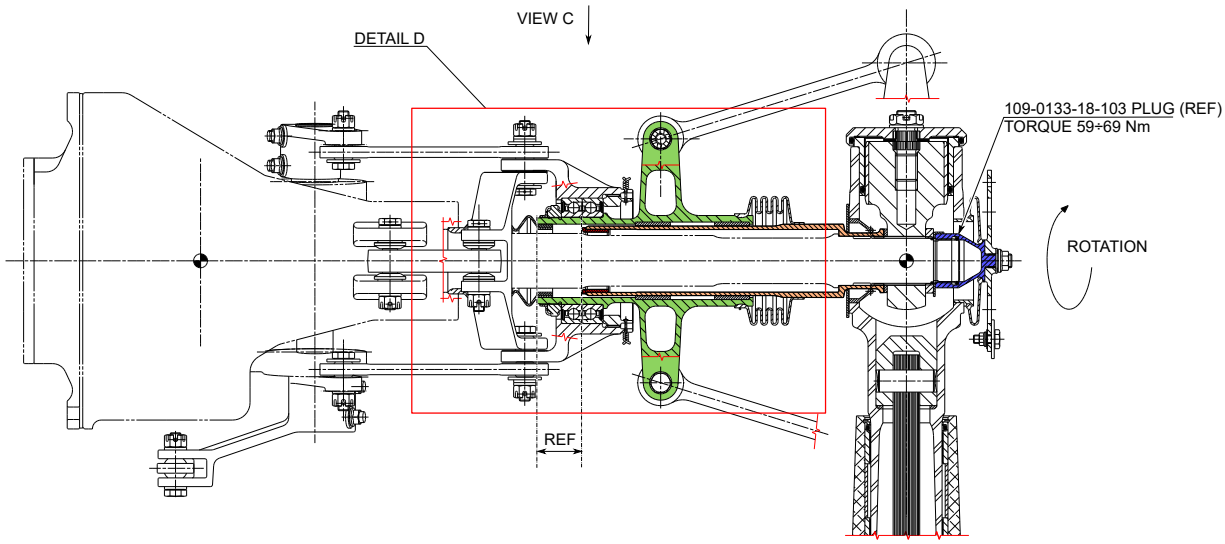


DETAIL B
PARTS OMITTED FOR BETTER CLARITY PURPOSE
(REFER TO FIGURE 1)



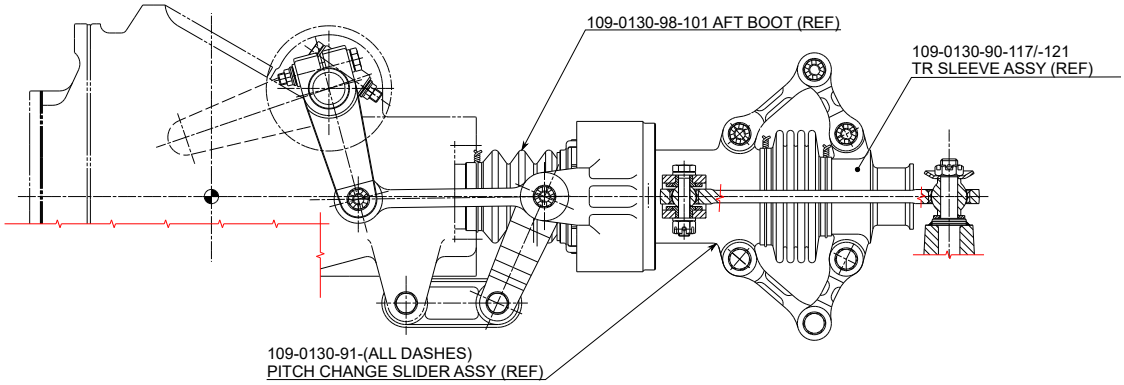
DETAIL A
PARTS OMITTED FOR BETTER CLARITY PURPOSE
(REFER TO FIGURE 1)

Figure 2



TAIL ROTOR INSTALLATION

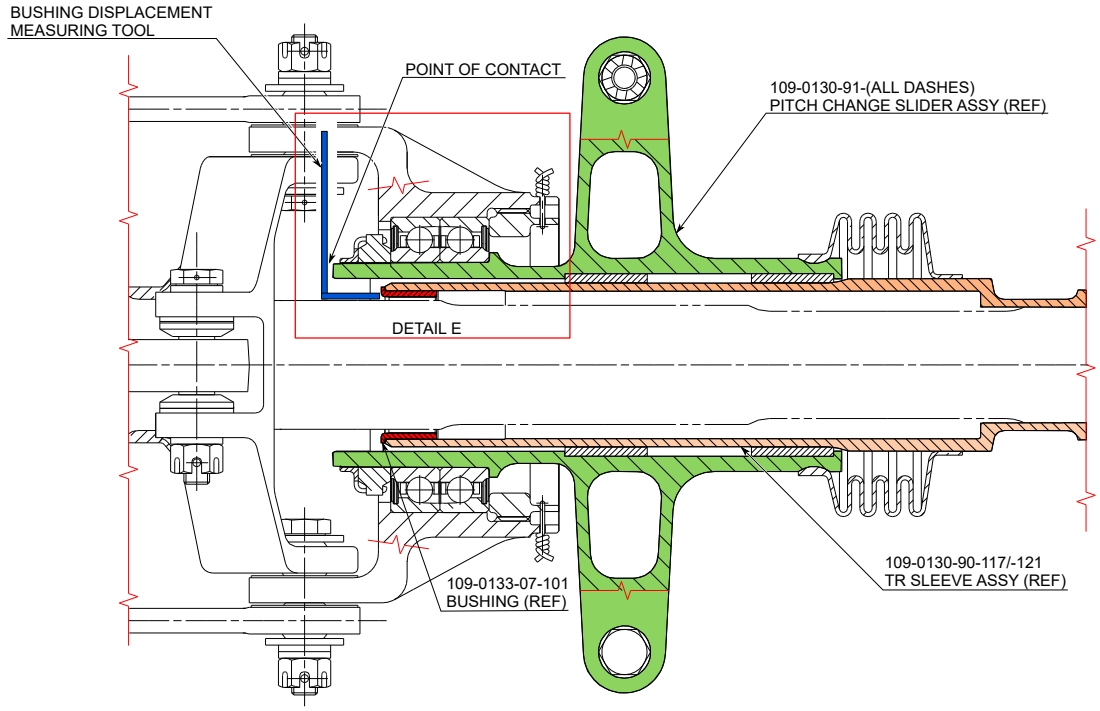
STRUCTURE AND SYSTEMS ARE PARTIALLY OMITTED FOR BETTER CLARITY PURPOSE



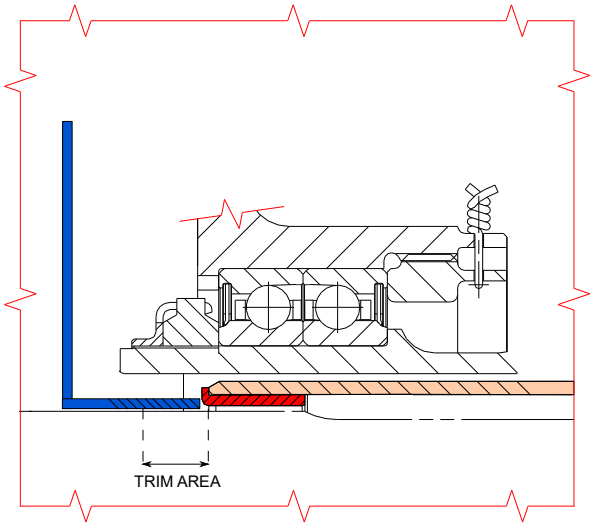
VIEW C

STRUCTURE AND SYSTEMS ARE PARTIALLY OMITTED
FOR BETTER CLARITY PURPOSE

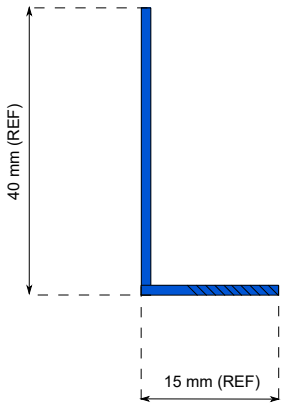
Figure 3



DETAIL D
STRUCTURE AND SYSTEMS ARE PARTIALLY OMITTED
FOR BETTER CLARITY PURPOSE



DETAIL E
STRUCTURE AND SYSTEMS ARE PARTIALLY OMITTED
FOR BETTER CLARITY PURPOSE



BUSHING DISPLACEMENT
MEASURING TOOL

Figure 4

ANNEX A

AW109 TR SHAFT LOCALIZED
PENETRANT INSPECTION
TYPE 1, METHOD C, LEVEL 2, FORM “d”

1 PURPOSE AND APPLICABILITY

This procedure details the requirements for the Liquid Penetrant Inspection (PT) on the Tail Rotor Shaft Assy. The specific Penetrant system to be used is Type I, Method C, Sensitivity Level 2, form “d”. Purpose of this inspection is the detection of any possible crack located on a specific surface of the tail rotor shaft assy.

2 REFERENCES

The following documents in their last revision are considered part of this procedure:

ASTM E1417	Standard Practice for Liquid Penetrant Testing;
ASTM E3022	Standard Practice for Measurement of Emission Characteristics and Requirements for LED UV-A Lamps Used in Fluorescent Penetrant and Magnetic Particle Testing;
EN4179/NAS410	Qualification and approval of personnel for non-destructive testing;
QPL AMS2644	Qualified Product List of Inspection Materials, Penetrant;
SAE AMS2644	Inspection Materials, Penetrant.

3 EQUIPMENT AND MATERIALS

The following materials, equipment and tools are requested.

3.1 MATERIALS

WARNING

SOLVENT CLEANERS AND DEVELOPER CARRIER FLUIDS ARE DANGEROUS. OBSERVE ALL RELEVANT SAFETY PRECAUTIONS TO PREVENT THE RISK OF INJURY, FIRE OR EXPLOSION.

a. Dye Penetrant SAE-AMS-2644 TY I, Method C, Level 2 (*);
b. Developer SAE-AMS-2644 Form “d” (*);
c. Solvent SAE-AMS-2644 Class 2 (*).
d. Methyl Ethyl Ketone (MEK) solvent.

(*) All the materials shall be certified in accordance with AMS2644, obtained from a supplier listed in QPL-AMS2644, supplied from the same manufacturer and in aerosol cans packaging.

3.2 EQUIPMENT/TOOLS

a. dark curtain;
b. UV-A inspection lamp emitting at least 1200 µW/cm² and no more than 20lux at 38cm from the front of the filter to the face of the sensor;

c. UV-A/White light meters;
d. plastic bristled brush;
e. small soft clean brush;
f. aluminum adhesive tape;
g. clean, dry, lint-free cloth or absorbent toweling;
h. a magnification lens (max 5X);
i. an environmental thermometer.

4 PERSONNEL

All Personnel performing this inspection and reporting results shall be approved to the appropriate level in accordance with EN4179/NAS410, or equivalent. The personnel shall also be familiar with the purpose of this procedure.

5 INSPECTION INSTRUCTION

5.1 PART PREPARATION

Make sure that the temperature of the part to be inspected is between 10°C and 45°C degrees (50-113 Fahrenheit).

WARNING

USE OF ANY ABRASIVE MATERIALS OR TOOLS IS STRICTLY FORBIDDEN.

Mask off surrounding areas near the inspection zone (Figure 2, Detail B) with adhesive Aluminium tape and remove dry film lubricant using both MEK and plastic bristled brush taking care to the area of the shoulder and related fillet radius.

Make sure that dry film lubricant is fully removed from all the inspection area and that part surface is degreased and dry. Clean white paper can be used to prove the complete removal of the dry film lubricant.

5.2 PENETRANT APPLICATION

NOTE

Do not spray the liquid penetrant directly on the inspection area.

After the solvent (MEK) is completely evaporated, apply Type 1, Method C, Sensitivity Level 2 liquid penetrant listed in QPL-AMS-2644 using a small soft clean dry brush. Take care to cover all the inspection area (Figure 2, Detail B). Penetrant Dwell Time shall be a minimum of 30 minutes and no more than 60 minutes.

5.3 PENETRANT REMOVAL

Excess penetrant removal shall be performed by using clean dry “lint free” cloths (or paper). Darken the part and switch on UV-A light lamp to achieve irradiance not less than 100 µW/cm² on the working surface and ambient white light illuminance not exceeding 100 lx.

NOTE

The surface of the component shall not be flushed with solvent and the cloth or towel shall not be saturated with solvent.

Removal shall be performed by first wiping the excess penetrant with a clean, lint-free, dry cloth or absorbent toweling and the remainder of the surface penetrant shall then be removed with a solvent-dampened lint-free cloth or towel (solvent Class 2 listed in QPL-AMS-2644). The masking tape can be removed before using the solvent-dampened cloth in order to achieve a better performance in excess penetrant removal. The surface will dry immediately at completion of this phase.

5.4 DEVELOPING

CAUTION

In case of any developer dripping, the part shall be carefully cleaned and the whole process repeated from “Part Preparation”.

In case of exceeding 60 minutes, the part shall be carefully cleaned and the whole process repeated from “Part Preparation”.

Shake Nonaqueous Developer can for at least 30 seconds and spray form “d” developer listed in QPL-AMS-2644 as a uniform thin coating over the entire inspection area. A correct application will result in a layer that gives an insight into the underlying metal. Development time shall be minimum 20 minutes and maximum 60 minutes.

5.5 EXAMINATION

Fluorescent Penetrant examination shall be carried out in conditions of subdued background lighting (maximum illuminance 20 lux) using UV-A inspection light source able to provide not less than 1200 µW/cm² at 38cm.

Inspector’s vision shall be dark adapted for a minimum of 1 min prior to examining components.

Inspectors shall not wear photochromic or permanently darkened lenses while processing or reviewing parts under UV-A light.

The use of magnifying lens (5x) to support the interpretation of liquid penetrant indications is recommended.

5.6 EVALUATION

In case any crack-like indication, considered as relevant indication, is found, contact Leonardo Helicopters for instructions.

5.7 POST INSPECTION CLEANING

At the end of the inspection, in case of no finding, carefully clean the part from any residual of the products used with a clean cloth soaked with Class 2 solvent listed in QPL-AMS-2644.

In accordance with CPCP 20-70-10, restore solid film lubricant MIL-L-23398 Type IV in the area of inspection.

6 RECORDS

Report the result of the inspection as necessary using pertinent documentation.

ANNEX B

AW109 TR SLEEVE ASSY
BUSHING REPLACEMENT

1 PURPOSE AND APPLICABILITY

This procedure details the instructions to replace the bushing P/N 109-0133-07-101 of the TR Sleeve Assy. This procedure has to be performed by qualified maintenance personnel in authorized facilities.

2 EQUIPMENT AND MATERIALS

The following materials, equipment and tools are requested.

2.1 MATERIALS

WARNING

SOLVENT FLUID IS DANGEROUS. OBSERVE ALL RELEVANT SAFETY PRECAUTIONS TO PREVENT THE RISK OF INJURY, FIRE OR EXPLOSION.

a. Bushing P/N 109-0133-07-101;
b. Aluminium oxide, 80-grit (C208);
c. Adhesive 199-05-002, Type II, Class 2 (C054);
d. Cloth, soft lint-free (C011);
e. Cleaning solvent MIL-PRF-680, Type II (C287).

2.2 EQUIPMENT/TOOLS

a. Parallel lathe;
b. Caliper;
c. Dry abrasive blasting equipment;

3 INSPECTION INSTRUCTION

NOTE

The tail rotor sleeve assy P/N 109-0130-90-117/-121 is considered already removed from the helicopter as per applicable MM.

3.1 Put the tail rotor sleeve assy P/N 109-0130-90-117/-121 on an applicable work table.

3.2 Visually examine the sleeve assy for damage. In case of evident signs of scratches, puncture or gouges, replace it.

CAUTION

Be careful to not damage the seat of the bushing in the sleeve.

NOTE

To decrease the thickness of the bushing, perform the operation in different steps in order not to exceed the internal diameter of 35.42 thru 35.52 mm.

NOTE

If a parallel lathe is not available, a screwdriver can be used as alternative. Be careful not to damage the sleeve.

3.3 Proceed to decrease the thickness of the bushing, in the sleeve, with a parallel lathe to remove the bushing and the adhesive. Remove and discard the bushing.

NOTE

Use an applicable light source, a mirror and a scriber to perform next step.

3.4 With reference to Figure B1, Detail F, examine the mating surface between the sleeve and the tail rotor shaft assy (X Area), for wear and stepping. No wear or stepping is permitted. In case of any doubt, clean with the cleaning solvent MIL-PRF-680, Type II and perform again the inspection. If the presence of damage is confirmed, replace the sleeve.

3.5 Verify that the internal diameter of the sleeve is 35.42 thru 35.52 mm.

3.6 Prepare the sleeve and the new bushing P/N 109-0133-07-101 for the bonding as follows:

3.6.1 Clean the areas in contact of the sleeve and the bushing with vapour degreasing procedure or with the solvent ASTM D740, Type I and the cloth, soft lint-free.

3.6.2 Prepare the seat of the bushing in the sleeve with the dry abrasive blasting procedure. To do this, use the Aluminium oxide, 80-grit at a constant pressure of 345 thru 552 kPa.

3.6.3 Clean again the areas in contact of the sleeve and the bushing with vapour degreasing procedure or with the solvent ASTM D740, Type I and the cloth, soft lint-free.

CAUTION

You must apply the adhesive within 4 hours from the cleaning.

3.6.4 Apply a thin film of the adhesive 199-05-002, Type II, Class 2 on the seat of the bushing in the sleeve.

3.6.5 Put the bushing into its seat in the sleeve.

3.6.6 Make sure that the bushing is correctly installed and centered in its seat.

3.6.7 Turn the bushing in its seat to make sure that the adhesive is equally applied along all the internal surface.

3.6.8 Verify the presence of an homogeneous squeeze out on the all the visible areas.

3.6.9 Remove the unwanted adhesive.

NOTE

Ensure firm contact during curing time.

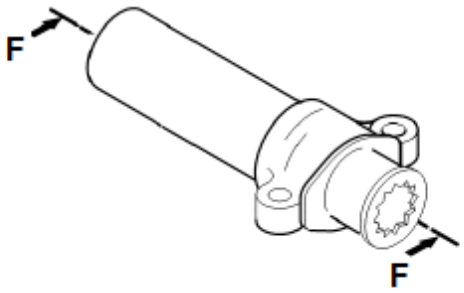
NOTE

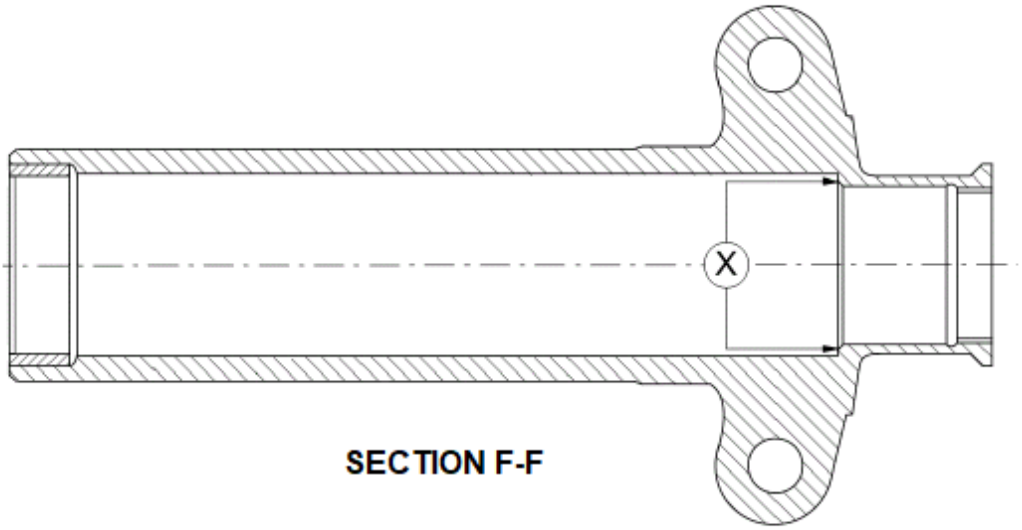
An alternative curing cycle at a temperature of 60 °C thru 70 °C (140 °F thru 158 °F) for 2 hours is allowed.

3.6.10 Let the adhesive to become hard at a temperature of 22 °C thru 26 °C (72 °F thru 79 °F) for 5-7 days or 80 °C thru 88 °C (176 °F thru 190 °F) for 1 hour.

3.6.11 Ream the bushing internal diameter to 31.42 thru 31.44 mm.

3.7 If not already present, mark a letter “R” after S/N on sleeve assy.





SECTION F-F

ANNEX C

S.B. N°109EP-175 INSPECTION FORM

Please send to the following address **LEONARDO S.p.A.** **CUSTOMER SUPPORT & SERVICES - ITALY** **PRODUCT SUPPORT ENGINEERING & LICENSES DEPT.** Via Giovanni Agusta, 520 21017 Cascina Costa di Samarate (VA) - ITALY Tel.: +39 0331 225036 Fax: +39 0331 225988	**DETAILED INSPECTION FORM**	**DATE**
	Number: S.B. N°109EP-175	
	Revision: /	
Customer Name and Address:	Telephone:	
	Fax:	
	S.B. Compliance Date:	

Helicopter Model	**S/N**	**Aircraft FH**	**Sleeve FH**	**T.S.O.**

Sleeve Assy P/N	**S/N**

Part I

Paragraph	**Topic**	**Remarks**
3.1	Torque Value [Nm]	
5	Findings on TR Sleeve Bushing P/N 109-0133-07-101 (before sleeve removal)	
6	Findings on TR Sleeve P/N 109-0130-90	
6.1	Findings on TR Sleeve bushing P/N 109-0133-07-101 (after sleeve removal)	
7.5	TR Mast inspection results	

ADDITIONAL REMARKS:
NOTE   *Provide to LHD all the pictures taken during the inspection.*
FILLING NOTES   • *3.1 Record the tightening torque.*   • *5 Brief description of the bushing status (e.g. Bonded and in place / Debonded and displaced)*   • *6 Brief description of the defects found on the sleeve (e.g. No defects found / Wear / Fretting / Spalling…)*   • *6.1 Brief description of the bushing status after detailed inspection (e.g. Bonded / Debonded)*   • *7.5 Description of the findings of the Dye liquid penetrant inspection and of any other defect found (Wear, fretting, corrosion, spalling, cracks..)*

Please send to the following address **LEONARDO S.p.A.** **CUSTOMER SUPPORT & SERVICES - ITALY** **PRODUCT SUPPORT ENGINEERING & LICENSES DEPT.** Via Giovanni Agusta, 520 21017 Cascina Costa di Samarate (VA) - ITALY Tel.: +39 0331 225036 Fax: +39 0331 225988	**DETAILED INSPECTION FORM**	**DATE**
	Number: S.B. N°109EP-175	
	Revision: /	
Customer Name and Address:	Telephone:	
	Fax:	
	S.B. Compliance Date:	

Helicopter Model	**S/N**	**Aircraft FH**	**Sleeve FH**	**T.S.O.**

Sleeve Assy P/N	**S/N**

Part II, III, IV

Paragraph	**Finding/Compliance Date**	**Remarks**
Part II		
Part III		
Part IV		

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AgustaWestland Products

Please send to the following address: **LEONARDO S.p.A.** **CUSTOMER SUPPORT & SERVICES - ITALY** **PRODUCT SUPPORT ENGINEERING & LICENSES DEPT.** Via Giovanni Agusta, 520 21017 Cascina Costa di Samarate (VA) - ITALY Tel.: +39 0331 225036 Fax: +39 0331 225988	**SERVICE BULLETIN COMPLIANCE FORM**	Date:
	Number:	
	Revision:	

Customer Name and Address:	Telephone:
	Fax:
	B.T. Compliance Date:

Helicopter Model	S/N	Total Number	Total Hours	T.S.O.

Remarks:

Information:

We request your cooperation in filling this form, in order to keep out statistical data relevant to aircraft configuration up-to-date. The form should be filled in all its parts and sent to the above address or you can communicate the application also via Technical Bulletin Application Communication Section placed in Leonardo AW Customer Portal - MyCommunications Area. We thank you beforehand for the information given.