MODELS AFFECTED: 407

SUBJECT: **FORWARD FREEWHEEL SEAL 407-340-102-101, INTRODUCTION OF.**

HELICOPTERS AFFECTED: 407 Serial Numbers 53000 through 53381.

[Helicopters Serial Numbers 53382 and subsequent will have the intent of this Technical Bulletin completed before delivery].

COMPLIANCE: At the option of the customer.

DESCRIPTION:

This bulletin is issued to introduce a new freewheel forward seal. The new seal is a double lip design, which has performed very well in laboratory tests and during field evaluations. It is anticipated that this seal will have a much longer service life than the seal now installed.

PART I of this bulletin gives the installation instructions for the new seal and wear sleeve. This installation uses a new adapter and a new seal retaining nut.

PART II of this bulletin gives the installation instructions for the new seal and wear sleeve. This installation uses a new adapter and modified existing seal retaining nut.

PART III of this bulletin gives instructions on the removal of the wear sleeve, if required.

APPROVAL:

The engineering design aspects of this Technical Bulletin are Transport Canada approved.

MANPOWER:

No additional manpower is required when you do this bulletin during overhaul.

WARRANTY:

TBD.

MATERIAL:

Required Material:

The material that follows is necessary to complete this Bulletin and can be procured through your Bell Helicopter Textron Supply Center.

PART I

PART NUMBER	NOMENCLATURE	QUANTITY
406-040-543-105	Seal Retaining Nut	1
406-040-542-107	Adapter	1
407-340-102-101	Seal	1
407-340-106-101	Wear Sleeve	1
M83248/1-238	Packing	1
M83248/1-034	Packing	1
M83248/1-033	Packing	1

PART II

PART NUMBER	NOMENCLATURE	QUANTITY
406-040-542-107	Adapter	1
407-340-102-101	Seal	1
407-340-106-101	Wear Sleeve	1
M83248/1-238	Packing	1
M83248/1-034	Packing	1
M83248/1-033	Packing	1
100-075-5W	Modification plate	1

Consumable Material:

The material that follows is necessary to complete the installation of the seal; however, this material is considered consumable (bench stock) material and may not required ordering depending on the operator’s consumable material stock levels. The material can be obtained through your Bell Helicopter Textron Supply Center.

PART I

PART NUMBER	NOMENCLATURE	REFERENCE NO.
MILS8802CLB2 PT	Sealant	(C-308)
ACETONE GALLON	Solvent	(C-316)
#1FLUID4OZ ULTRACHEM	Lubricant	(C-024)
P-C-451	Abrasive cloth (400 grit)	(C-406)

PART II

PART NUMBER	NOMENCLATURE	REFERENCE NO.
MILS8802CLB2 PT	Sealant	(C-308)
ACETONE GALLON	Solvent	(C-316)
#1FLUID4OZ ULTRACHEM	Lubricant	(C-024)
MAGNOBOND 6398 50 GM	Adhesive	(C-317)
P-C-451	Abrasive cloth (400 grit)	(C-406)

- NOTE -

The “C” Reference No. is a cross reference to the consumable list found in the Standard Practices Manual.

SPECIAL TOOLS:

PRESSING TOOL WORK AID (Figure 4)

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-407-MM-6, Rev. 6 – 14 April 1998.

Chapter 63, Main Rotor Drive System.

BHT-407-CR&O, Rev. 1 – 15 December 1997.

Chapter 63-30, Drive System Freewheel.

BHT-ALL-SPM, Reissue – 20 August 1999.

Chapter 13, Consumable.

PUBLICATIONS AFFECTED:

BHT-407-MM-6, Rev. 6 – 14 April 1998.

Chapter 63, Main Rotor Drive System.

BHT-407-CR&O, Rev. 1 – 15 December 1997.

Chapter 63-30, Drive System Freewheel.

BHT-407-IPB, Rev. 4 – 01 May 1998.

Chapter 63, Main Rotor Drive System.

BHT-ALL-SPM, Reissue – 20 August 1999.

Chapter 13, Consumable.

ACCOMPLISHMENT INSTRUCTIONS:

PART I: Installation of new seal, with "NEW SEAL RETAINING NUT".

1. Remove the engine to transmission driveshaft (Refer to BHT-407-MM-6, Chapter 63).

CAUTION

Make sure you remove the packing (5, Figure 1).

2. Remove the freewheel forward seal (Refer to Maintenance Manual BHT-407-MM-6, Chapter 63).

3. The adapter (1), retainer (2), and seal retaining nut (4) will not be re-used with new seal installation. Discard all packings and seal (3).

CAUTION

DO NOT REMOVE THE PROTECTIVE SHIPPING CUP (1, FIGURE 3) FROM SEAL (2) EXCEPT AS STATED BELOW.

4. Install the new seal (1, Figure 5) as follows:

   a. Heat the seal retaining nut (2) to $250^{o}F \pm 10^{o}$ ($121^{o}C \pm 5^{o}$).

CAUTION

DO NOT USE A HYDRAULIC PRESS TO INSTALL THE SEAL. USE A MANUAL ARBOR PRESS TO CONTROL THE FORCE APPLIED ON THE SEAL FACE.

   b. Temporarily remove the protective shipping cup (1, Figure 3) from the seal (2).

NOTE

Do not apply sealant to the outer diameter of the seal (1, Figure 5) or to the inside diameter of the seal retaining nut (2).

   c. Use the work aid (Figure 4) and press the seal (1, Figure 5) into the seal retaining nut (2) with felt wiper (3) facing outboard. Push the seal into the nut evenly and smoothly until seated.

   d. Install the protective shipping cup (1, Figure 3) into the seal (2).

   e. Apply a small bead of sealant (C-308) as shown in Figure 5.

5. Install the wear sleeve (4, Figure 5) on the adapter (5) as follows:

CAUTION

THE OUTER DIAMETER OF THE WEAR SLEEVE (4) HAS A CLOSELY CONTROLLED FINISH. DAMAGE TO THIS SURFACE CAN RESULT IN SEAL LEAKAGE.

a. Examine the inside diameter edge of the wear sleeve (4) for evidence of burrs that could damage the adapter (5) when the wear sleeve is installed. Deburr the wear sleeve with an abrasive cloth (400 grit) (C-406).

b. Clean the adapter (5) and the wear sleeve (4) with solvent (C-316).

c. Heat the wear sleeve (4) to $250^{o}F \pm 10^{o}$ ($121^{o}C \pm 5^{o}$).

d. Apply a thin layer of sealant (C-308) to the adapter (5).

e. Make sure that the inside diameter chamfer side of the wear sleeve (4) is installed pointing toward the flange of the adapter (5).

f. Use a press and install the wear sleeve (4) flush with the end of the adapter (5).

g. Apply a bead of sealant to the mating line of adapter (5) and the wear sleeve (4, Figure 5). Clean the wear sleeve (4) with solvent (C-316).

CAUTION

Do not allow the lubricant (C-024) to come in contact with seal (3, Figure 2).

6. Apply a layer of lubricant (C-024) to the new packing and install it on the seal retaining nut (4).

7. Remove the protective shipping cup (1, Figure 3) from the seal (2). Apply system lubricant to the seal lips (1), felt wiper (3), and wear sleeve (4).

8. Install the seal retaining nut (4, Figure 2) and adapter (1) on the freewheel assembly (Refer to Maintenance Manual BTH-407-MM-6, Chapter 63).

9. Re-identify freewheel assembly.

   406-040-500-~~122~~-127FM

10. Install the engine to transmission driveshaft (Refer to BHT-407-MM-6, Chapter 63).

11. Install the transmission fairing (Refer to BHT-407-MM-6, Chapter 53).

12. Make an entry in the helicopter Historical Records to show that this Technical Bulletin is completed.

13. Do a ground run of the helicopter and do a check for oil leaks.

PART II : Installation of new seal, with "EXISTING SEAL RETAINING NUT".

1. Remove the engine to transmission driveshaft (Refer to BHT-407-MM-6, Chapter 63).

CAUTION

MAKE SURE THAT PACKING (5, FIGURE 1) IS REMOVED.

2. Remove freewheel forward seal (Refer to BHT-407-MM-6, Chapter 63).

3. The adapter (1), and retainer (2), will not be re-used with new seal installation. Discard all packings and seal (3).

4. Modify the existing seal retaining nut (4, Figure 6) as follows:

   a. Fill the retainer groove with adhesive (C-317).

   b. Fair adhesive 0.005 inch (0.13 mm) below the nut inside diameter.

   c. Clean the excess adhesive from bore with solvent (C-316).

   d. Use a vibrating stylus, strikeout the old Part Number and re-identify the modified seal retaining nut as a 406-540-543-101. The depth of the vibroetch must not exceed 0.005 inch (0.13 mm).

CAUTION

DO NOT REMOVE THE PROTECTIVE SHIPPING CUP (1, FIGURE 3) FROM SEAL (2) EXCEPT AS STATED BELOW.

5. Install the new seal (1, Figure 5) as follows:

   a. Heat the seal retaining nut (2) to $250^{o}F \pm 10^{o}$ ($121^{o}C \pm 5^{o}$).

CAUTION

DO NOT USE A HYDRAULIC PRESS TO INSTALL THE SEAL. USE A MANUAL ARBOR PRESS TO CONTROL THE FORCE APPLIED ON THE SEAL FACE.

b. Temporarily remove the protective shipping cup (1, Figure 3) from the seal (2).

NOTE

Do not apply sealant to the outer diameter of the seal (1, Figure 5) or to the inside diameter of the seal retaining nut (2).

c. Use the work aid (Figure 4) and press seal (1, Figure 5) into the seal retaining nut (2) with felt wiper (3) facing the outboard. Push the seal into the nut evenly and smoothly until seated.

d. Reinstall the protective shipping cup (1, Figure 3) into the seal (2).

e. Apply a small bead of sealant (C-308) as shown in Figure 5.

6. Install the wear sleeve (4, Figure 5) on the adapter (5) as follows:

CAUTION

THE OUTER DIAMETER OF THE WEAR SLEEVE (4) HAS A CLOSELY CONTROLLED FINISH. DAMAGE TO THIS SURFACE CAN RESULT IN SEAL LEAKAGE.

a. Examine the inside diameter edge of the wear sleeve (4) for evidence of burr that can damage the adapter (5) when the wear sleeve is installed. Deburr the wear sleeve with an abrasive cloth (400 grit) (C-406).

b. Clean the adapter (5) and the wear sleeve (4) with solvent (C-316).

c. Heat the wear sleeve (4) to $250^{o}F \pm 10^{o}$ ($121^{o}C \pm 5^{o}$).

d. Apply a thin layer of sealant (C-308) to the adapter (5).

e. Make sure that the inside diameter chamfer side of the wear sleeve (4) is installed pointing toward the flange of the adapter (5).

f. Use a press and work aid (Figure 4) and install the wear sleeve (4, Figure 5) flush with the end of the adapter (5).

g. Apply a bead of sealant (C-308) to the mating line of the adapter (5) and the wear sleeve (4) as shown in Figure 5. Clean the wear sleeve with solvent (C-316).

CAUTION

DO NOT ALLOW THE LUBRICANT (C-024) TO COME IN CONTACT WITH SEAL (3, FIGURE 6).

7. Apply a layer of lubricant (C-024) on the new packing (5) and install it on the seal retaining nut (4).

8. Remove the protective shipping cup (1, Figure 3) from the seal (2). Apply system lubricant to the seal lips, felt wiper, wear sleeve.

9. Install the seal retaining nut (4, Figure 6) and the adapter (1) on the freewheel assembly. (Refer to Maintenance Manual BHT-407-MM-6, Chapter 63).

- NOTE -

The freewheel assembly will remain a 406-040-500-123 with Mod. 407-540-500-101 accomplished.

10. Mark Mod. Data plate as follows:

a. Use a vibrating stylus, and mark 407-540-500-101 on the Modification plate (1, Figure 7).

b. Use solvent (C-316) and clean the freewheel housing and the Modification plate.

c. Apply adhesive (C-317) to the Modification plate (1) and install it on the freewheel assembly housing.

11. Install the engine to transmission driveshaft (Refer to BHT-407-MM-6, Chapter 63).

12. Install the transmission fairing (Refer to BHT-407-MM-6, Chapter 63).

13. Make an entry in the helicopter Historical Records to show that this Technical Bulletin is completed.

14. Ground run the helicopter and check for oil leak.

PART III: Wear sleeve removal.

1. Remove the wear sleeve as follows:

   a. Clamp the adapter in a vise. Make sure the vise has jaw protectors to prevent damage to the adapter.

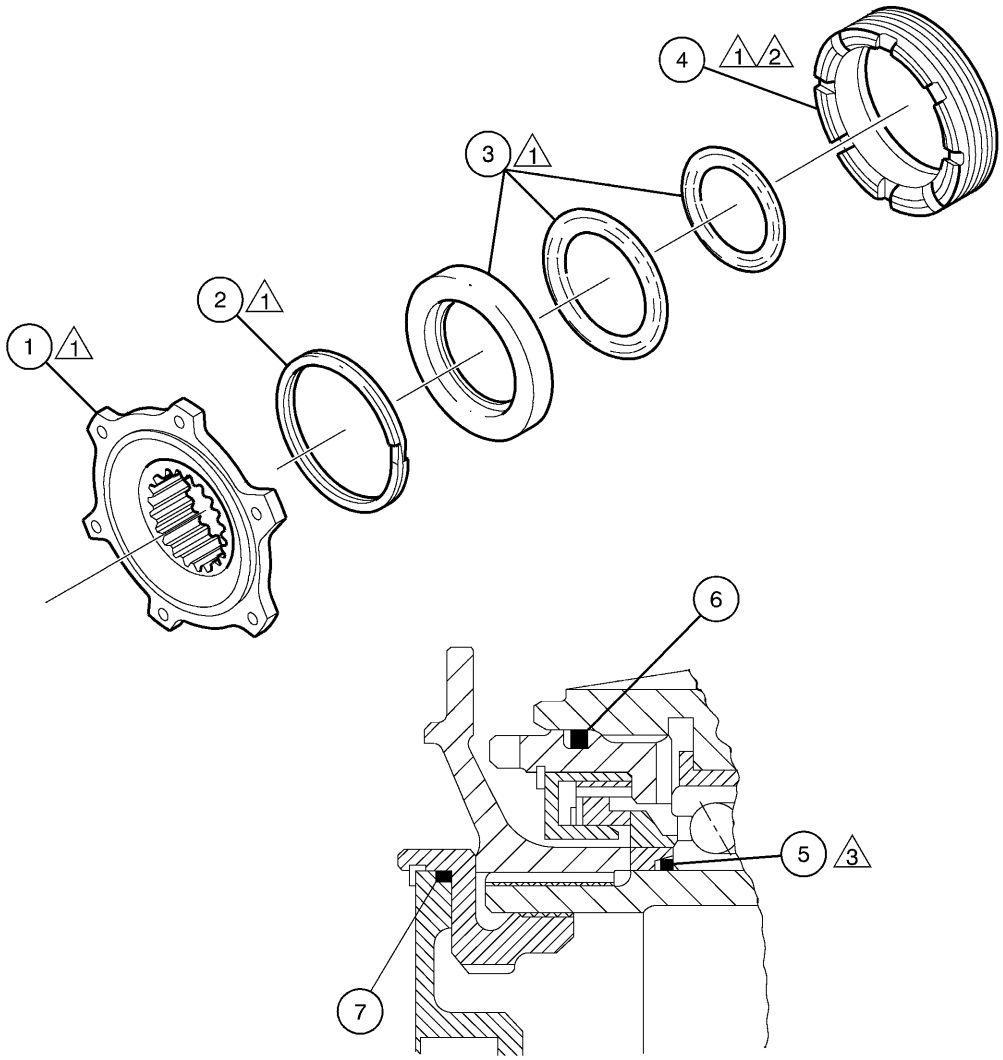
   b. Use a vibrating stylus and make a groove across the wear sleeve at two places 180 degrees apart.

CAUTION

MAKE SURE YOU DO NOT DAMAGE THE ADAPTER WHEN STRIKING THE WEAR SLEEVE WITH THE CHISEL AND HAMMER.

   c. Use a blunt chisel and hammer, and strike the grooves in the wear sleeve alternating back and forth to expand the wear sleeve.

   d. Remove the wear sleeve.



LEGEND

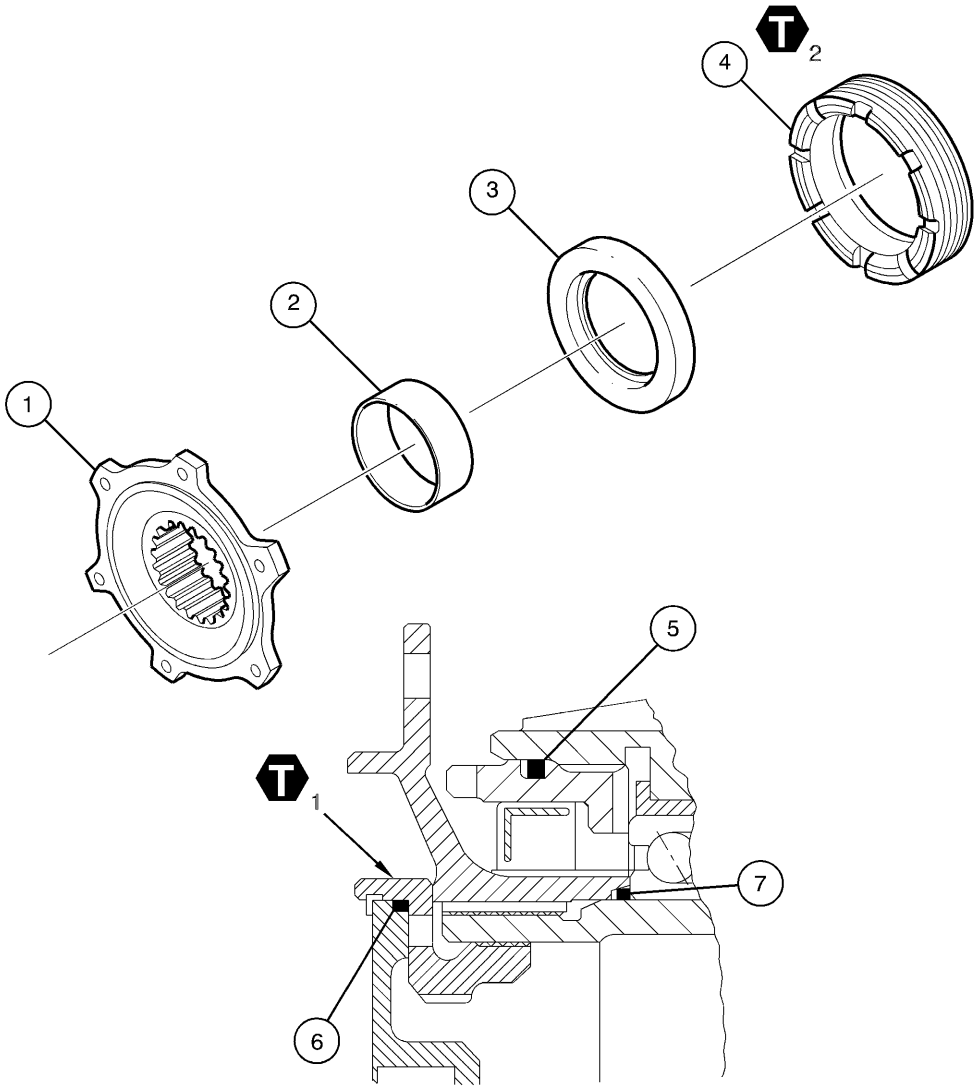
1. Adapter (406-040-542-103).
2. Retainer (UR-331CD).
3. Seal (406-340-102-101).
4. Seal retaining nut (406-040-543-103).
5. Packing (M83248/1-034).
6. Packing (M83248/1-033).
7. Packing (M83248/1-238).

NOTES

1. These items are not re-used when you accomplish this modification with PART I of the bulletin.
2. Only the seal retaining nut (4) is re-used when you accomplished this modification with PART II of this bulletin.
3. Make sure this packing is removed and discarded.

RTB02201

Figure 1. Adapter, Retainer, and Seal - Removal



LEGEND

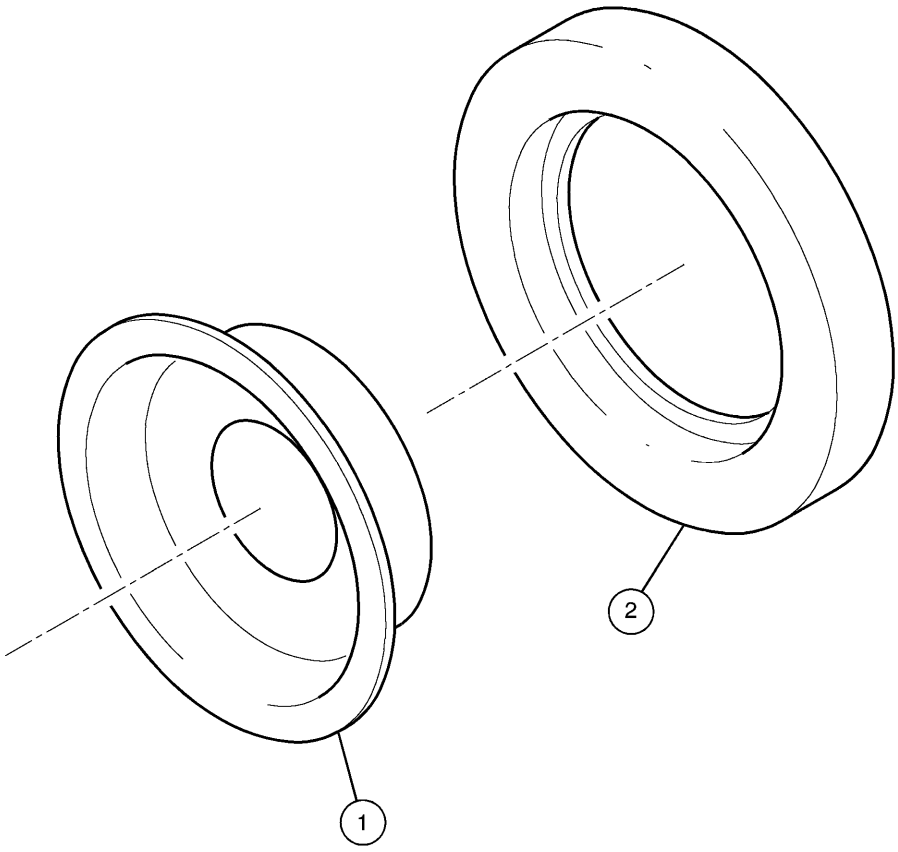
1. Adapter (406-040-542-107).
2. Wear sleeve (407-340-106-101).
3. Seal (407-340-102-101).
4. Seal retaining nut (406-040-543-105).
5. Packing (M83248/1-238).
6. Packing (M83248/1-033).
7. Packing (M83248/1-034).

T1 150 TO 175 FT-LBS (203.3 TO 237.2 Nm)

T2 150 TO 200 FT-LBS (203.3 TO 271.1 Nm)

RTB02202

Figure 2. Seal – Installation Part I



SEAL ASSEMBLY 407-340-102-101

LEGEND

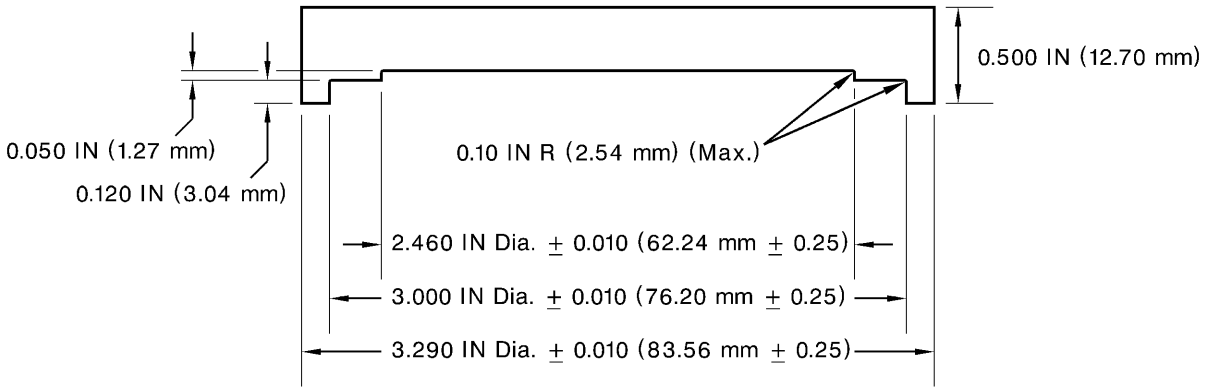
1. Protective shipping cup.
2. Seal.

NOTE

1. Do not remove the protective shipping cup (1) from seal (2) exept when pressing the seal on or immediately prior to the installation of the seal retaining nut.

RTB02203

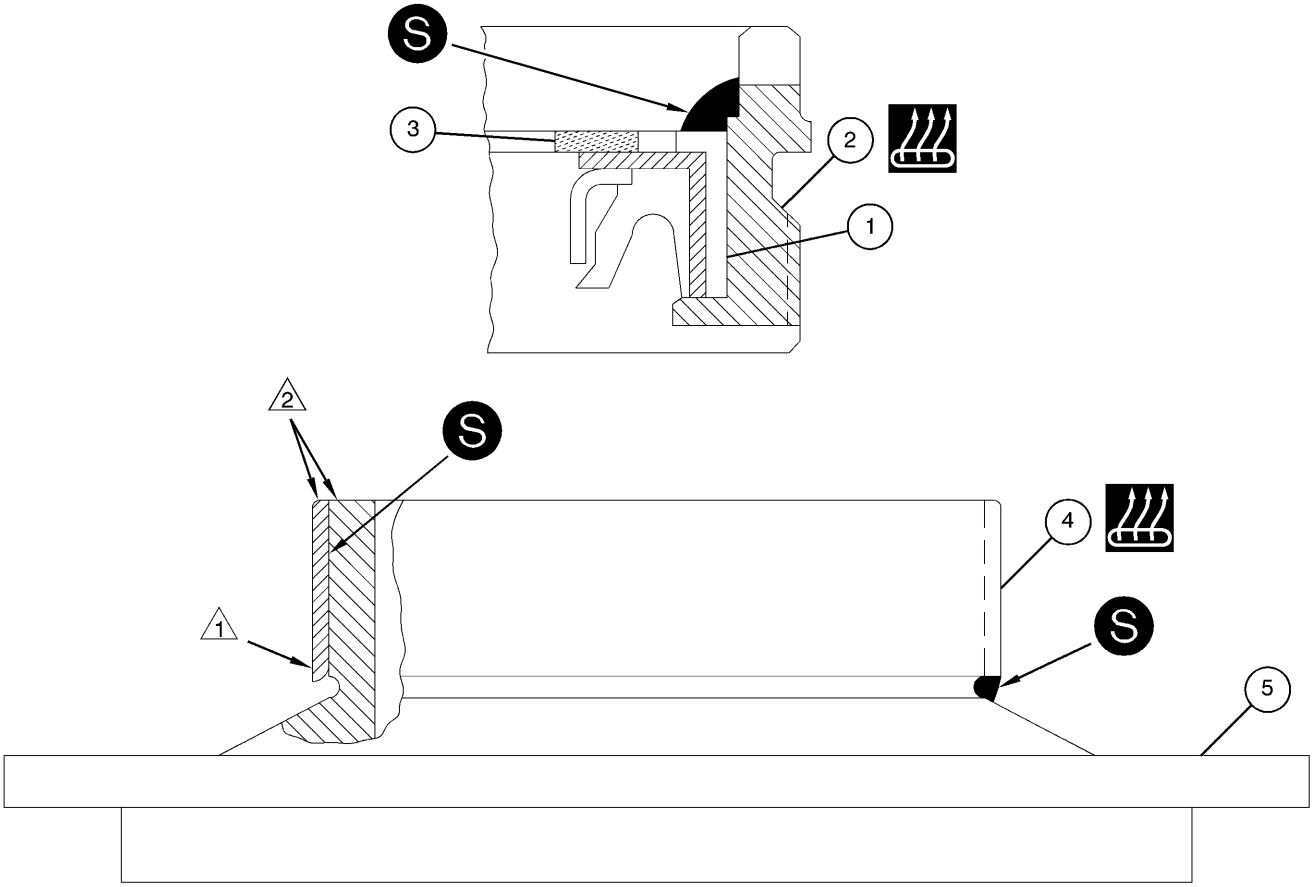
Figure 3. Protective Shipping cap - Removal



(MATERIAL : ALUMINUM)

RTB02204

Figure 4. Seal and Wear Sleeve Installation Work Aid



LEGEND

1. Seal.
2. Seal retaining nut.
3. Felt wiper.
4. Wear sleeve.
5. Adapter.

S SEALANT (C-308)

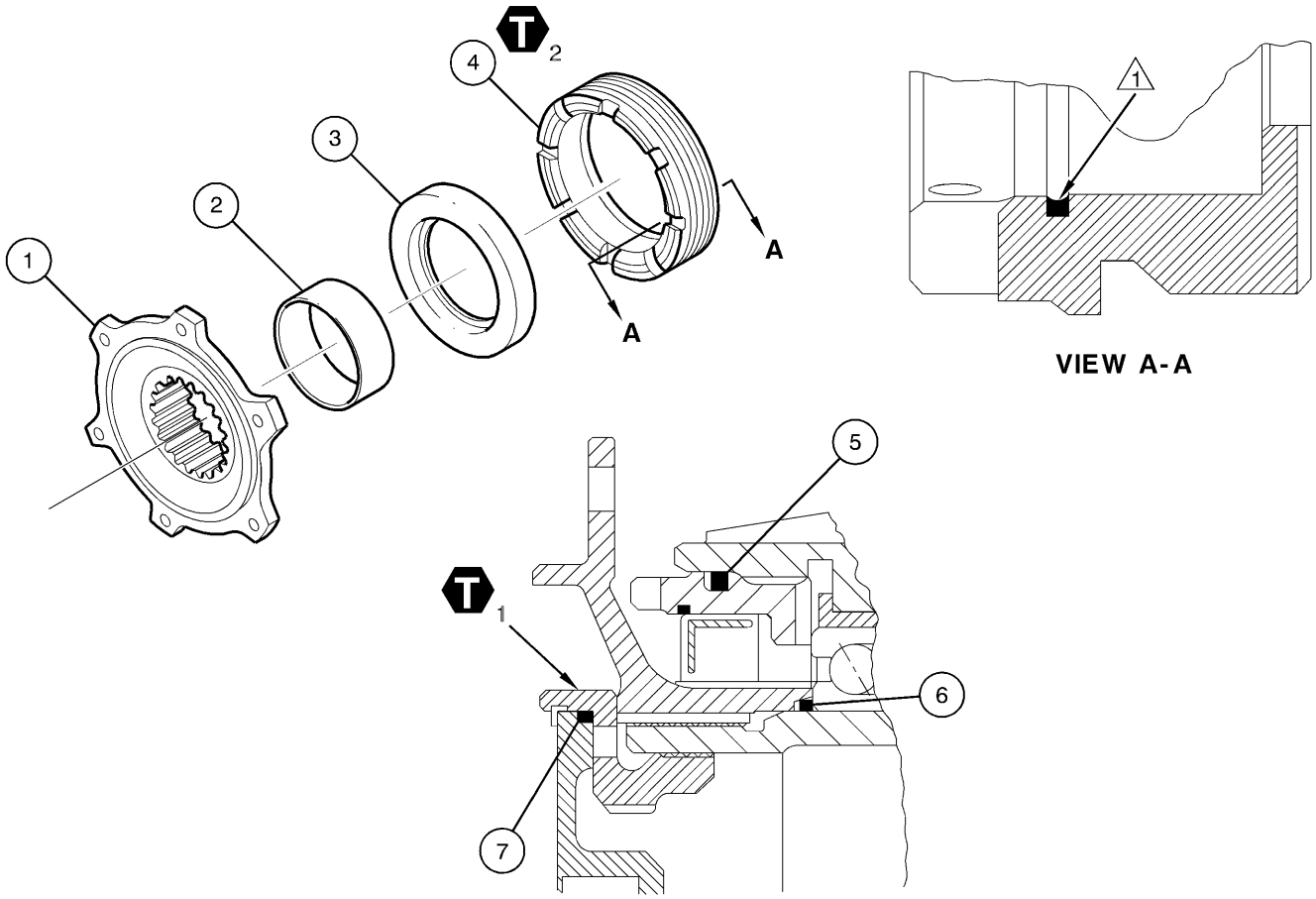
HEAT APPLICATION
WITH A HEAT GUN
OR A HEAT LAMP

NOTES

1. Make sure that the chamfered side of the wear sleeve (4) is installed pointing towards the flange of the adapter (5).
2. Install wear sleeve (4) flush with the adapter (5).

RTB02205

Figure 5 Seal and Wear Sleeve - Installation



LEGEND

1. Adapter (406-040-542-107).
2. Wear sleeve (407-340-106-101).
3. Seal (407-340-102-101).
4. Seal retaining nut (406-540-543-101).
5. Packing (M83248/1-238).
6. Packing (M83248/1-034).
7. Packing (M83248/1-033).

T1 150 TO 175 FT-LBS (203.3 TO 237.2 Nm)

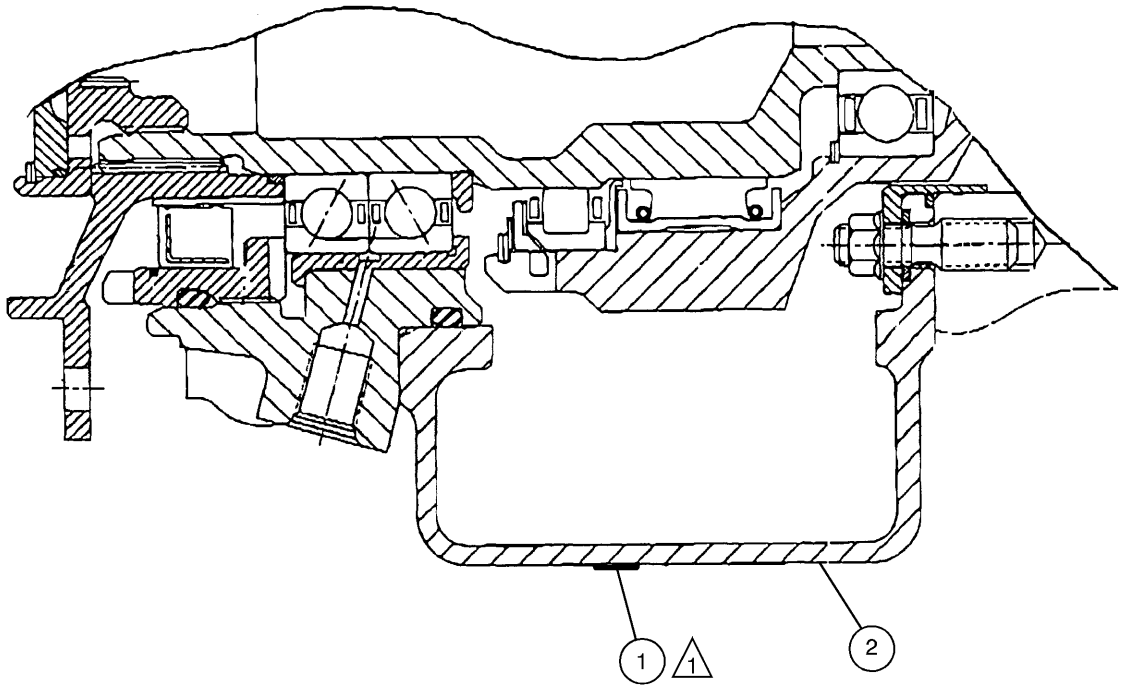
T2 150 TO 200 FT-LBS (203.3 TO 271.1 Nm)

NOTE

1. Modify seal retaining nut from a 406-040-543-103 to 406-540-543-101 as follows:
   - Fill retainer groove with adhesive (C-317).
   - Fair adhesive 0.005 inch (0.12 mm) below the inside diameter.
   - Clean excess adhesive with solvent (C-316).

RTB02206

Figure 6. Seal – Installation Part II



LEGEND

1. Mod. plate (100-075-5W).
2. Freewheel housing.

NOTE

1 Use adhesive (C-317) and bond the Mod plate (1) on the freewheel housing (2).

RTB02207

Figure 7. Mod Plate – Bonding