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# INSTALLATION AND MAINTENANCE MANUAL

Manuel référence :  
**BRG-ALTP-02**

Référence document :  
**MM-STC-008**

				Statut (à compléter, terminé, approuvé)	Signature du responsable conception
<b>Référence équipement: STC-008 De Havilland DHC-6</b>					
Révisions	Date	Sujet	Revised pages		
0	2012.10.30	Initial edition			
1	2012.12.04	Modification of §3	1, 6		
2	2012.12.04	Modification of §2	all	Terminé	

This document is the unique manual used for installation and day to day maintenance.

**“The Airworthiness Limitation Information (ALI) as defined in paragraph 3 are EASA approved under approval number: 10042599”**



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## TABLE OF CONTENTS

<b>1. GENERAL.....</b>	<b>3</b>
1.1 Component list.....	3
1.2 Mass and Balance.....	3
1.3 Specifications for quick reference.....	4
1.4 Cleaning.....	4
<b>2. SCHEDULED MAINTENANCE CHECKS.....</b>	<b>5</b>
2.1 100h / annual inspection.....	5
2.2 replacement schedule of wear parts.....	5
<b>3. AIRWORTHINESS LIMITATION INFORMATION.....</b>	<b>6</b>
<b>4. REMOVAL – INSTALLATION.....</b>	<b>7</b>
<b>5. PART LIST.....</b>	<b>9</b>
<b>6. MAINTENANCE AND OVERHAUL PROCEDURES.....</b>	<b>10</b>
6.1 Description.....	10
6.2 Illustrated part list.....	11
6.3 Disassembly – Reassembly – Tire change.....	12
6.4 Maintenance of wheel assembly.....	15
6.5 Overhaul of wheel assembly.....	18
<b>7. LUBRICANTS.....</b>	<b>18</b>
<b>8. TROUBLESHOOTING.....</b>	<b>18</b>



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## 1. GENERAL

This document gives the installation and maintenance procedures of BERINGER nose wheel STC on the De Havilland DHC-6 Twin Otter.

The BERINGER 8.90-12.5" wheel have been designed and qualified under next certification standards:

- ETSO C26c dated from 24, October 2003
- TSO C26d dated from 14, October 2004

**CAUTION:** Substitution of parts by other than originally certified parts may cause failure of brake system. BERINGER quality process assures that replacement parts are produced and controlled with the same quality level as originally certified.

### 1.1 Component List

The affected assemblies are listed next:

Part number *	Description
RA-008	Nose wheel assembly
AV-DEH-001	Bearing spacer
AV-DEH-002	Bearing spacer
AV-DEH-003	Axle nut
J-JTR-015N	O-ring seal

\* Please refer to document NP-STC-002 for complete and updated component list impacted by STC-002.

### 1.2 Mass and Balance

There is no significant influence on the mass of the parts.  
The balance of the aircraft is not required after installation of the parts.



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## 1.3 Specifications for quick reference

Tire:

Wheel	Tire Size	Type	Max. Inflation pressure
RA-008	8.90-12.5	Tubeless	30 PSI *

\* Tire inflation pressure is not changed : refer to the aircraft maintenance manual for the proper inflation pressure.

8.90-12.5 Nose wheel assembly RA-008:

Wheel screw:

Torque	12 N.m	105 in-lb
Threadlocker	medium strength (Loctite 243 recommended)	

Valve:

Torque	7 N.m	58 in-lb
Threadlocker	medium strength (Loctite 243 recommended)	

Lubrication:

O-ring	No lubrication required, install the o-ring seals dry.
Bearings	MIL-G-81322
Lipseal	MIL-G-81322
Tire lubricant	liquid soap (spray recommended)

## 1.4 Cleaning

The aluminium parts are protected from corrosion with an anodizing coating. This thin coating does not protect against basic agent with pH > 9.

**CAUTION:** Cleaning the wheel and brake parts with basic agent may remove totally the anodizing coating

Acid agent may also attack the anodizing and should not be used.

For cleaning the wheel and brake parts we recommend using only water and soap or dry clothes.

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## 2. SCHEDULED MAINTENANCE CHECKS

### 2.1 100h / Annual inspection

Inspection		Operation	
Component	Wear limit	125h	Annual inspection
Wheel	-	Visual inspection	Detailed inspection
lipseal	-	Visual inspection Check for leakage of grease	Detailed inspection
bearing	-	Check the rolling resistance	Detailed inspection
Nose wheel tire	-	Visual inspection Check inflation pressure and wear	

### 2.2 Replacement schedule of wear parts

Replacement schedule of wear parts		
Component - item	Note	Replacement schedule
Wheel assembly bolts	a	On condition Immediate replacement if corroded
Wheel bearings	b	On condition Immediate replacement if corroded or damaged
Wheel O-ring seals	-	On condition At each tire change

#### NOTE:

- a All screws of the assembly must be changed at the same time. It is not allowed to change only few of them
- b Parts must be changed by pair on both sides



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## 3. AIRWORTHINESS LIMITATION INFORMATION

### LIFE LIMITED PARTS:

The replacement time of life limited components listed next must be accomplished not later than the specified period of operation for that component.

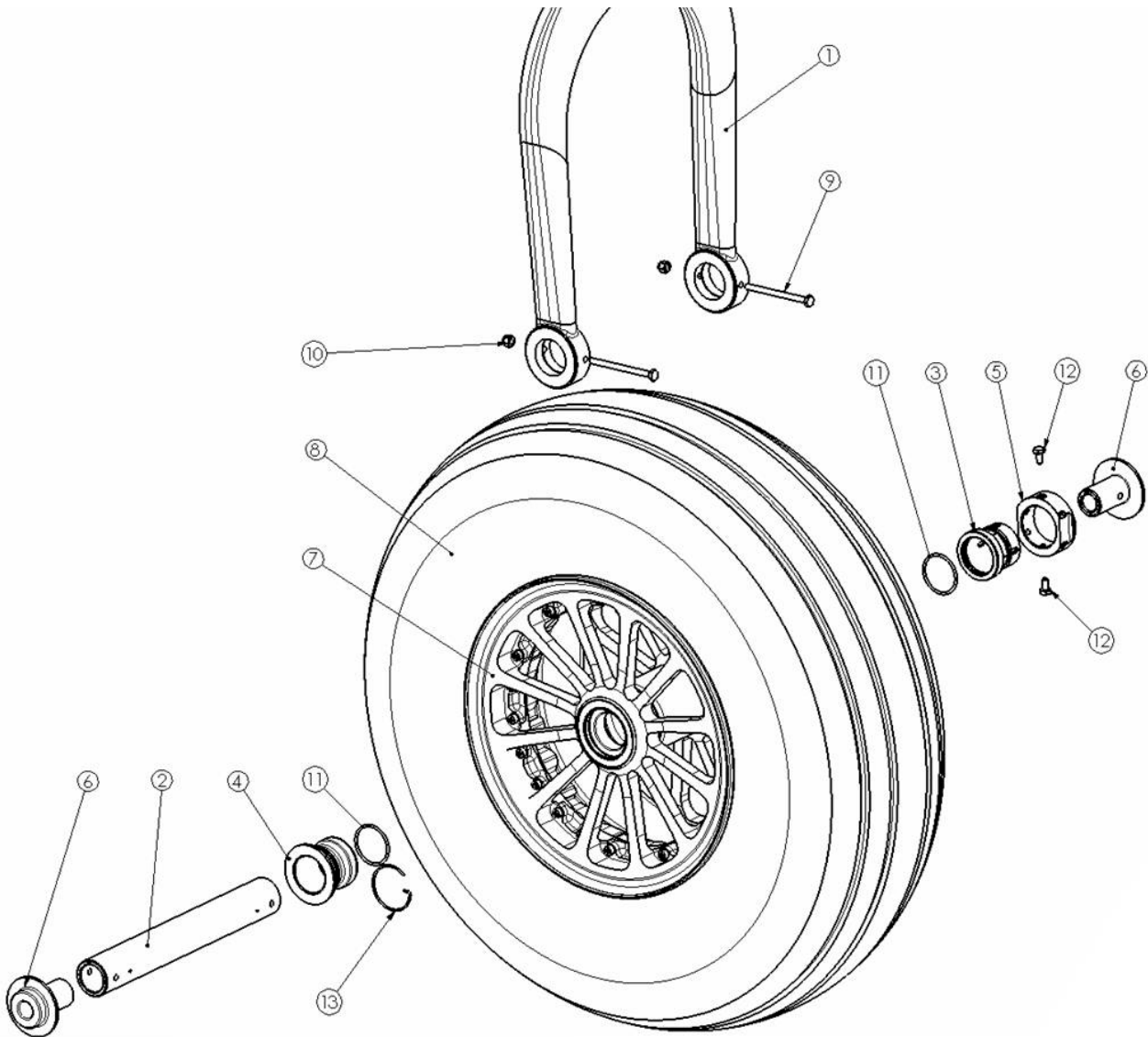
Component	Time limit	Maintenance interval	Complete overhaul interval
Wheel assembly	-	5000 flying hours or 10 years*	10,000 flying hours or 20 years*

\*Whichever limit occurs first

For replacement schedule of components please report to §2.2

A tolerance of 10% can be applied on maintenance intervals with a limitation to 500h and 6 months

## 4. REMOVAL - INSTALLATION



### REMOVAL:

- a) Remove original wheel - axle and parts from the gear leg

### **NOTE:**

Some original parts are not changed and must be kept to install the new system, please refer to the exploded view and part list.

- b) Part n° 3, 4, 5, and 7 replace original ones and are delivered in the STC. Part n° 11 is new and delivered in the STC.

## INSTALLATION:

**CAUTION:** Make sure that axle is completely clean before packing with new grease

a) Install the proper tire size 8.90-12.5" tubeless on the wheel as per procedure §6.3

**CAUTION:** Make sure that lipseal is good condition.  
 Do not reuse a lipseal that has been removed from wheel

b) Lubricate lipseal with a thin coat of grease MIL-G-81322

c) Insert o-ring n°11 in the parts n° 3 and 4

d) Place the parts n° 3, 4 and 5 on each side of the wheel

e) Position the wheel with parts n° 3, 4 and 5 inside the fork

f) Insert the axle through all

g) Insert axle ends n°6 and then insert bolts n°9 and nut n°10

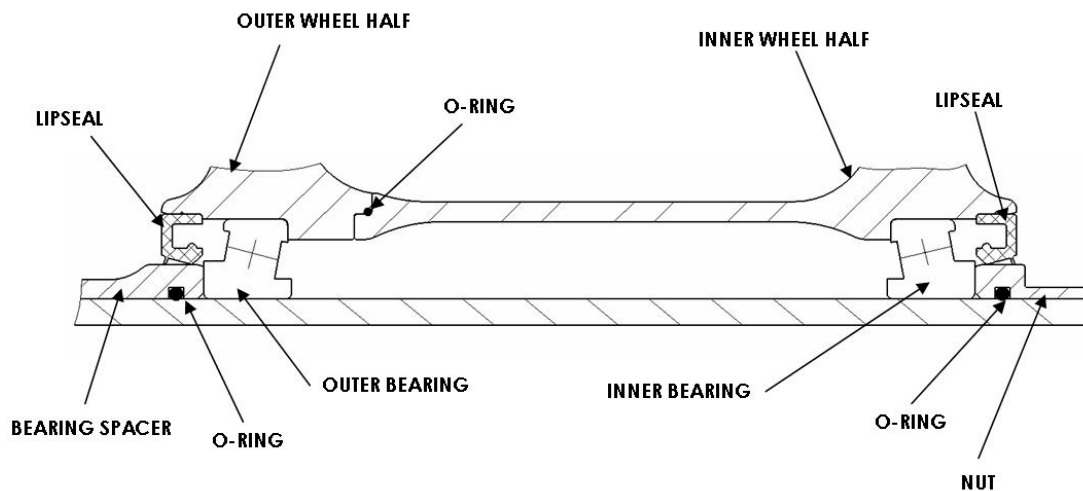
h) Place the ring n°13 onto the part n°4

i) Tighten the part n°3 and 5 to load the tapered roller bearings

j) Tighten the bolts 9 and 10 to the required torque

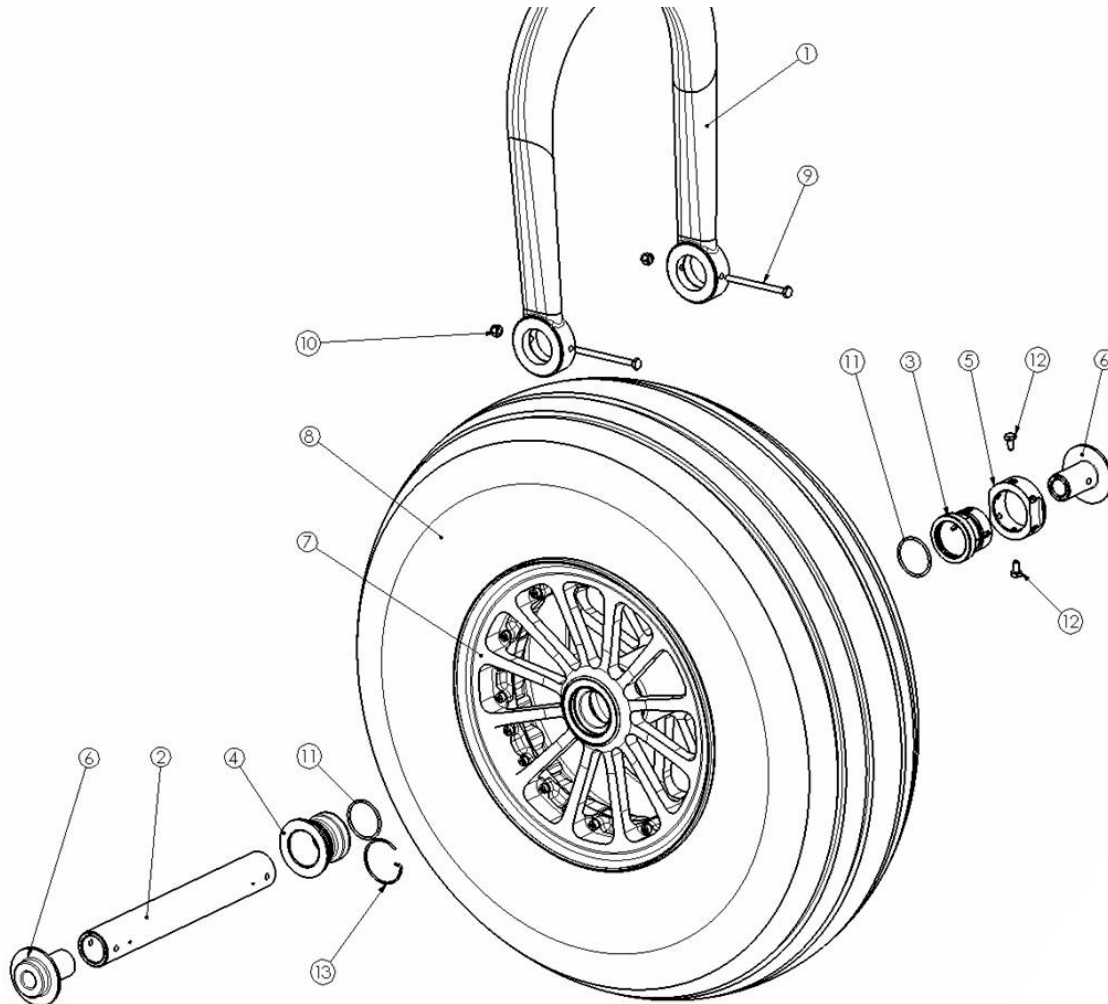
k) Adjust again the pre-load on tapered roller bearings, then secure with screws n°12

l) Adjust tire pressure when then wheel-tire assembly is loaded on ground





## 5. PART LIST



13	Original part - not included in the STC	Ring	1
12	Original part - not included in the STC	Screw	2
11	J-JTR-015N	O-Ring	2
10	Original part - not included in the STC	Nut	2
9	Original part - not included in the STC	Screw	2
8	Original part - not included in the STC	Tire 8.90-12.5" 6PR Tubeless	1
7	RA-008(A)	Wheel	1
6	Original part - not included in the STC	Axle End	2
5	AV-DEH-003(A)	Axle Nut	1
4	AV-DEH-001(A)	Bearing Spacer	1
3	AV-DEH-002(A)	Bearing Spacer	1
2	Original part - not included in the STC	Axle	1
1	Original part - not included in the STC	Fork	1
REP	PART NUMBER	DESCRIPTION	QTY.



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## 6. MAINTENANCE AND OVERHAUL PROCEDURES

### 6.1 Description

Wheel 8.90-12.5" P/N: RA-008 is made of aluminium alloy. A thin anodizing coating protects aluminium from corrosion. Anodizing does not protect from nicks and scratches.

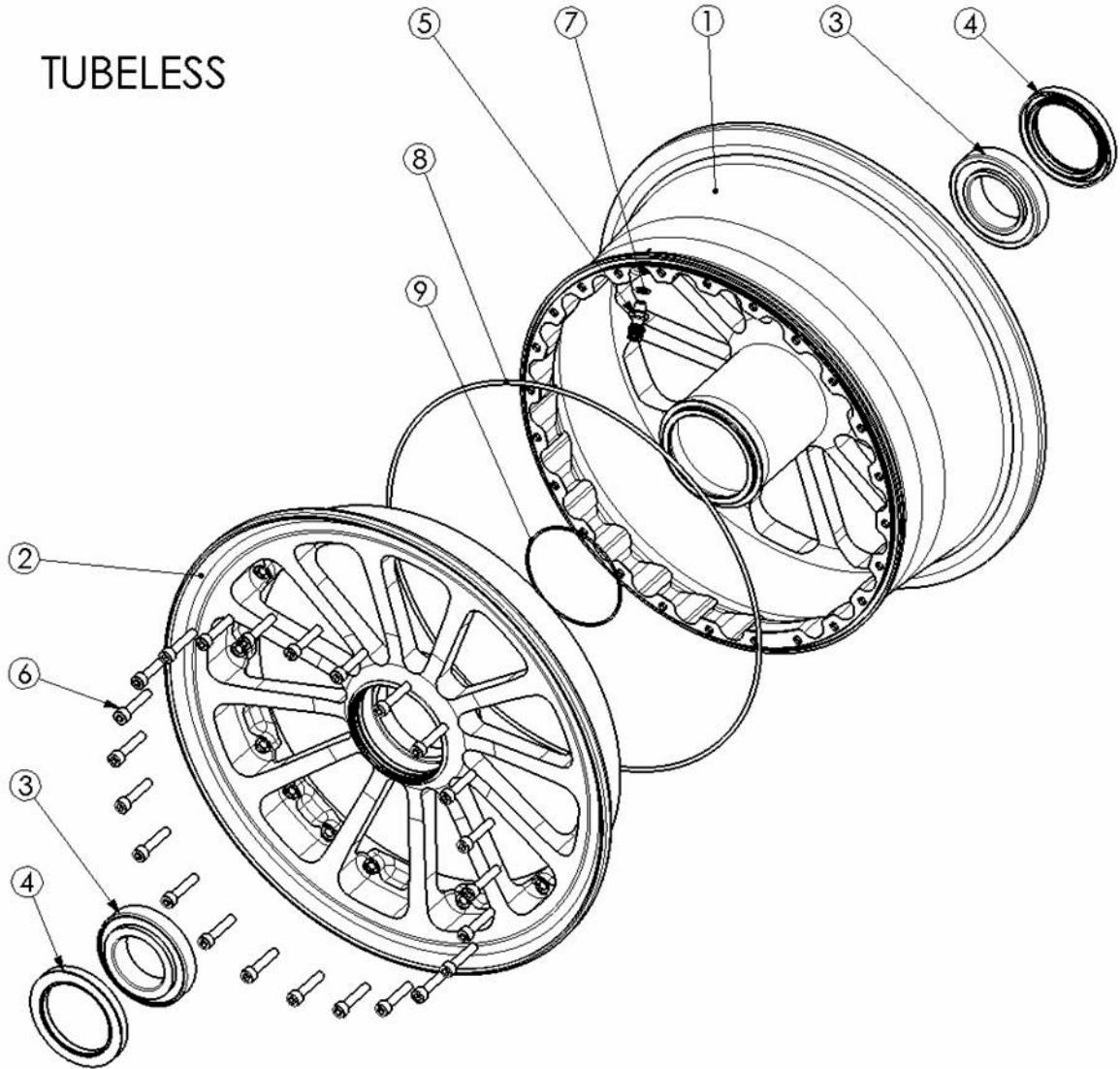
Inner and outer wheel flanges are held together by screws secured by threadlocker.

The wheel is Tubeless using a large o-ring and a small one between the 2 parts.  
Bearings are factory greased and sealed.

Nose wheel P/N: RA-008 cannot be used together with a brake.

## 6.2 Wheel illustrated Part List

TUBELESS



**Nose Wheel 8.90-12.5 P/N: RA-008**

9	J-JTR-009N	O-Ring	1
8	J-JTR-016N	O-Ring	1
7	J-JTR-017N	O-Ring	1
6	V-CHC-009	Screw	24
5	A-001	Valve	1
4	J-JBE-004N	LIPSEAL	2
3	B-RC-003	BEARING	2
2	JAE-014(A)	Outer Wheel Half	1
1	JAI-019(A)	Inner Wheel Half	1
REP	PART NUMBER	DESCRIPTION	QTY.



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## 6.3 Disassembly – Reassembly – Tire change

### DISASSEMBLY:

**WARNING:** Do not attempt to disassemble wheel until tire has been completely deflated. Otherwise, serious injury to personnel or damage to equipment can result.

**WARNING:** Do not attempt to remove valve core until tire has been completely deflated. Valve core will be ejected at high velocities if unscrewed before air pressure has been released.

- a) remove valve cap and apply a tire deflator to release tire pressure completely
- b) remove wheel from aircraft, be careful not to damage the lipseal
- c) break the beads away from the wheel flanges by applying pressure by hand or using a wood tool all around the entire sidewall as close to the tire bead as possible.

**CAUTION:** Do not pry between tire bead and wheel flange, this may destroy the structural and sealing properties of the wheel and tire.

- d) Remove all screws holding wheel halves together.
- e) Separate wheel halves and remove tire, carefully remove O-rings and lay on a flat clean surface.

**CAUTION:** Do not use impact or power wrenches

- f) Carefully lay the wheel halves on a flat clean bench.
- g) If bearing cones have to be checked or greased, Lipseal must be removed and replaced

**CAUTION:** Do not re-use a lipseal that has been removed from the wheel

### CLEANING:

- a) Clean all metal parts using water with soap and wipe dry with a clean cloth. The valve must not be cleaned with solvent.

**CAUTION:** Do not use basic or acid agent on wheel halves. Anodizing can be totally removed within few minutes in contact with basic agent. Make sure that cleaning soap is not basic.

- b) Clean wheel bead seat with dry-cleaning solvent and wipe dry with a clean cloth.

**CAUTION:** oily solvent must not be used on wheel bead seat because tire will not stick properly on the wheel.

c) Clean O-ring groove with dry-cleaning solvent and wipe dry with a clean cloth.

**WARNING:** Dry-cleaning solvents are toxic and volatile. Use a well-ventilated room. Avoid contact with skin or clothing. Do not inhale the vapor.

d) Apply air pressure to dry internal thread

**CAUTION:** oily solvent or oily air pressure must not be used on internal thread because threadlocker will not properly lock the screws.

REASSEMBLY:

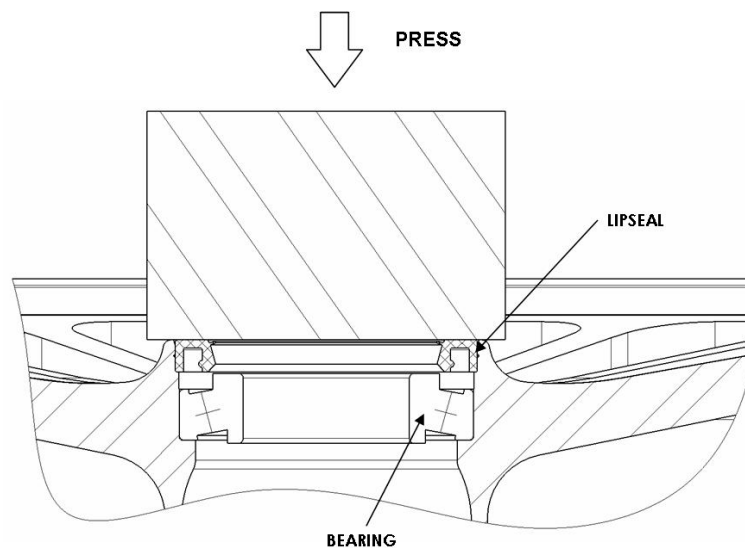
**NOTE:** It is recommended that O-rings be replaced at each tire change. The valve must be changed if damaged or corroded.

**CAUTION:** a Tubeless tire that has already been mounted on another wheel type should not be installed. Tubeless tire will not stick properly on the wheel and may leak.

a) If Lipseal has been removed, pack bearing cones with clean grease to specification MIL-G-81322 and press a new Lipseal in the wheel half.

**NOTE:** Lipseal must be replaced at each removal from inner wheel half

**NOTE:** Bearing cone cannot be removed without removing lipseal



b) place inner wheel half on a clean bench



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- c) clean tire bead seat with a cloth impregnated with dry-cleaning solvent to remove residual grease or wax

**CAUTION:** oily solvent must not be used on tire bead seat because tire will not stick properly on the wheel.

- d) Apply appropriate mounting soap from tire manufacturer on tire bead seats. Tubeless mounting soap in box or in spray (preferred) must be used.
- e) Install only the correct "tubeless" tire on the inner wheel half
- f) clean o-ring grooves with dry cloth and install small and large o-rings
- g) place the outer wheel half with the valve positioned at the red balance dot on the tire and align the bolt holes

**NOTE:** Assembly screw must be replaced if any signs of corrosion

- h) put a drop of threadlocker medium strength (Loctite 243 recommended) on each end of assembly screw

**CAUTION:** using a wrong threadlocker or not from recommended type may cause loose of screws or removal problem.

- i) install all screws to contact

**CAUTION:** Do not use impact or power wrenches

- j) torque all screws to 12 N.m (105 in-lb)
- k) torque all screws a second time to 12 N.m (105 in-lb)
- l) Inflate tire just enough to seat beads

**WARNING:** Place wheel in an inflation cage for initial inflation. Do not inflate tire to full operating pressure until wheel has been installed on aircraft. Tire and / or wheel failure may occur causing injury to personnel or damage to equipment if the tire is inflated from any high pressure source. Tire and wheel assemblies must be serviced with inflation equipment that has been specifically designed for this operation.

- m) Check bearing cups and cones
- n) Pack bearing cones with clean bearing grease to specification MIL-G-81322 and coat bearing cups with a light coat of grease.
- o) Press the lipseals



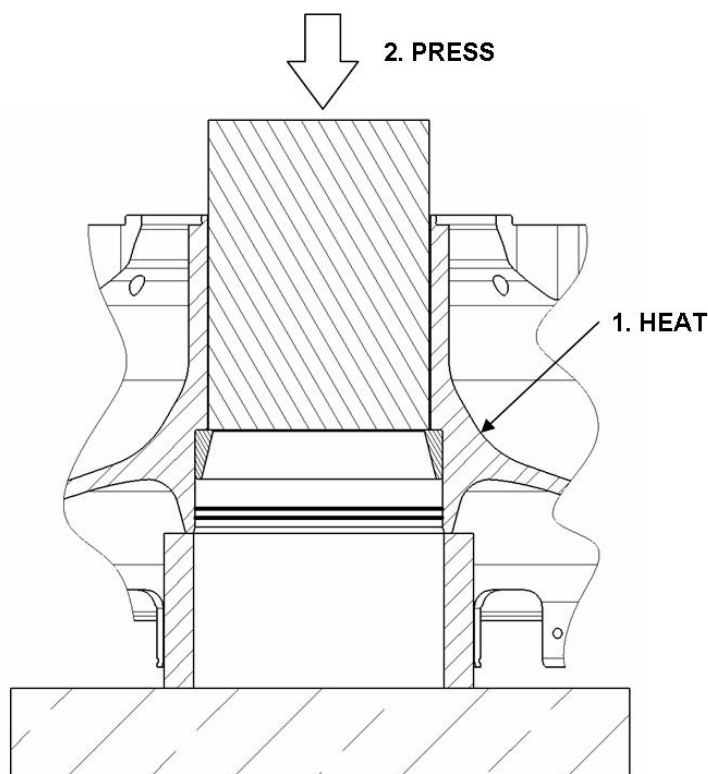
## 6.4 Maintenance of wheel assembly

The maintenance consists in the inspection of the wheel halves and if required the replacement of next parts:

- bearing cups and cones \* on condition
- O-rings and Lipseal
- Valve

### DISASSEMBLING:

- a) Disassemble wheel respecting procedure §6.3
- b) Remove the valve with o-ring
- c) Place wheel half in an oven at 110°C to 120°C for 30 minutes (never exceed 150°C)
- d) Remove wheel half from heat source and immediately remove bearing cup. If the bearing cup does not fall out, tap it evenly with a fiber drift pin or use a suitable arbor press.





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## CLEANING:

Clean all metal parts using water with soap or cleaning solvent and wipe dry with a clean cloth.

**CAUTION:** Do not use basic or acid agent on wheel halves. Anodizing can be totally removed within few minutes in contact with basic agent. Make sure that cleaning soap is not basic.

Apply air pressure to dry internal thread

**CAUTION:** oily solvent or oily air pressure must not be used on internal thread because threadlocker will not properly lock the screws.

## INSPECTION:

Visually inspect wheel halves for cracks, nicks, corrosion, or other damage.

Causes for replacement of wheel half:

1. Signs of corrosion
2. Anodizing color removed on more than 15% of external surface
3. Heavy nicks
4. Deformed flanges
5. Damaged bearing bore
6. Deep scratches on O-Ring contact surfaces

**CAUTION:** Anodizing coating must not be painted.

Do not use sandpaper on any parts. Sandpaper will remove anodizing coating.

**NOTE:** Contact BERINGER if any doubt on the wheel condition

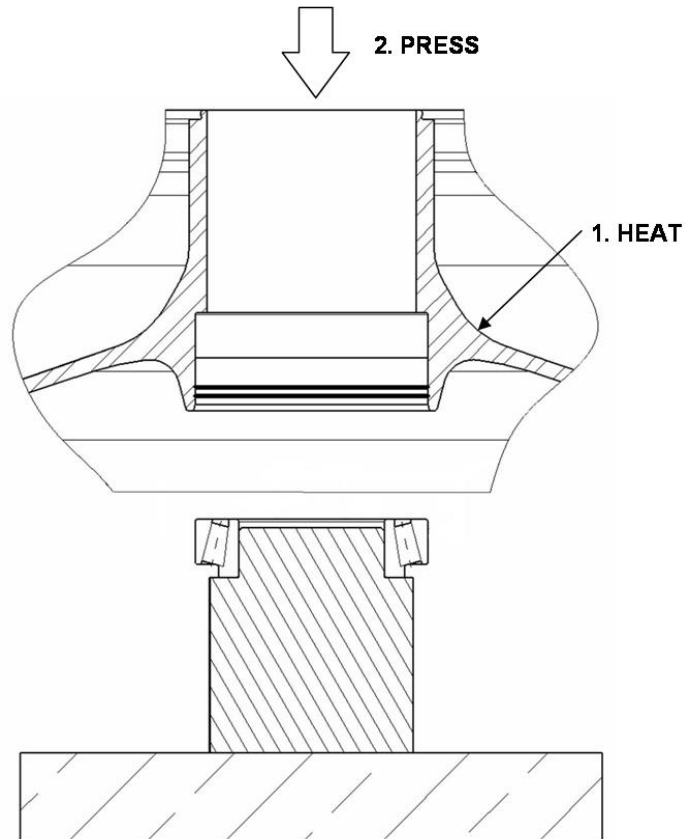
## REASSEMBLY:

- a) Place the wheel half in an oven at 110°C to 120°C for 30 minutes (never exceed 150°C)
- b) Use a new bearing cup with a light coat of oil
- c) Install the bearing cup into bearing bore of heated wheel half. Tap gently into place with a fiber drift making sure cup is evenly seated against shoulder of wheel half.

**CAUTION:** Do not attempt to install bearing cup without heating the wheel half it will damage bearing bore.

- d) After a cooling down period put a drop of medium threadlocker (Loctite 243 recommended) on valve thread and screw the valve with a new o-ring.
- e) Torque the valve to 7N.m (58 in-lb)





- f) Grease and install inner bearing cone and press a new lipseal in each wheel half.

**NOTE:** Lipseal must be replaced at each removal from inner wheel half

