

Component Maintenance Manual

Main Wheel Assembly Aircraft Wheel and Brake, LLC Part No. 40-170A

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Manufacturer:



Aircraft Wheel and Brake, LLC
1160 Center Road
Avon, Ohio 44011

Cleveland
Wheels & Brakes

TO: HOLDERS OF CM40-170A COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-170A.

Attached to this transmittal letter is Revision NC of CM40-170A (dated July 01, 2005)

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REVISION NC CONTAINS ALL PAGES OF THE MANUAL. Pages that have been added or revised are outlined below together with the highlights of the revision.

Please retain all **REVISION HIGHLIGHTS** pages, inserting them into the manual for future reference.

REVISION HIGHLIGHTS

Section/Page No.

Description of Change

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TO: HOLDERS OF CM40-170A COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-170A.

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REVISION HIGHLIGHTS

Section/Page No.

Description of Change

All Follows	Per ECO-0066231
Title Page/T-1	Add data rights and export statement revision
Record of Revisions/RR-1	Updated to reflect current revision
List of Effective Pages/LEP-1	Updated to reflect current revision
Introduction/ INTRO-1	Update data rights statement to latest in use.
Description and Operation/ Pg 1 Operation/1	Para 4. Specifications (NOW) Bearing Lubricant...Mobil Aviation Grease SHC 100 (WAS) Bearing Lubricant...MIL-PRF-81322 Grade 2 or DOD-G-24508A or alternate approved bearing lubricant...Mobil Aviation Grease SHC 100 Para 2.B.(7)(b)1 (NOW) outboard wheel half (55). (WAS) outboard wheel half (45).
Testing and Fault Isolation/ Pg 1006	Page 1006 date correction (NOW) July 01, 2005 (WAS) November 01, 2004
Repair/Pg 6001	Table 6001 (DELETED) Bearing Grease: Aeroshell Grease 22, MIL-PRF-81322 Grade 2 or DOD-G-24508A, Shell Oil Company, Lubricant Division (NOW) Bearing Grease: Mobil Aviation Grease SHC 100, Exxon-Mobil Oil Company, Aviation Lubricants (WAS) Alternate Bearing Grease

Revision A Highlights (continued)

<u>Section/Page No.</u>	<u>Description of Change</u>
Assembly/Pg 7001	Table 7001 (DELETED) Bearing Grease: Aeroshell Grease 22, MIL-PRF-81322 Grade 2 or DOD-G-24508A, Shell Oil Company, Lubricant Division (NOW) Bearing Grease: Mobil Aviation Grease SHC 100, Exxon-Mobil Oil Company, Aviation Lubricants (WAS) Alternate Bearing Grease Para 2.B. (NOW) CAUTION: (DELETED) (WAS) CAUTION: IF USING AN ALTERNATE OR EQUIVALENT SUBSTITUTE FOR THE GREASE SPECIFIED IN TABLE 7001, DO NOT MIX BEARING GREASES OR GREASE INCOMPATIBILITY CAN RESULT IN CONTAMINATION AND LOSS OF GREASE PERFORMANCE.
Fits and Clearances/ Pg 8001	Table 8002 (NOW) torque for Nut (85): 60 to 80 in-lb (6,8 to 9,0 N-m) (WAS) 75 to 100 in-lb (8,4 to 11,3 N-m)
Special Equipment/ Pg 9001	Table 9001 (DELETED) Bearing Grease: Aeroshell Grease 22, MIL-PRF-81322 Grade 2 or DOD-G-24508A, Shell Oil Company, Lubricant Division (NOW) Bearing Grease: Mobil Aviation Grease SHC 100, Exxon-Mobil Oil Company, Aviation Lubricants (WAS) Alternate Bearing Grease
Illustrated Parts List/ Pg 10005	4. Detailed Parts List (ADD) Item 130A, 166-19700, Nameplate (SUPSDS ITEM 130) for Items 35 and 50. (ADD) Item 65A, 160-01101, Air Valve Assembly (SUPSDS ITEM 65) (NOW) Item 65, 160-01100, Air Valve Assembly SUPSD BY ITEM 65A)
Pg 10006	Page was blank
Pg 10007	(ADD) new page to accommodate parts list additions (ADD) Item 135, 166-20000, Nameplate Warning for Item 50. (NOW) Item 130, 166-15900, Nameplate (SUPSD BY ITEM 130A) (ADD) Note regarding ordering replacement nameplates.
Pg 10008	(ADD) blank page for document formatting
Storage/Pg 15001	Para. 1.A.(2) list correction (NOW) grease seal (110) (WAS) grease seal (85) (NOW) hubcap assembly (115) (WAS) hubcap assembly (90) Para. 1.B.(2)(b) correction (NOW) bearing cones (100), (105) (WAS) bearing cones (75, 80)

TO: HOLDERS OF CM40-170A COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR MAIN WHEEL ASSEMBLY PART NO. 40-170A.

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REVISION HIGHLIGHTS

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Record of Revisions/RR-1	Updated to reflect current revision
Service Bulletin List	(NOW) Aircraft Wheel and Brake, LLC (WAS) Parker Hannifin
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Repair/ Pg 6001	Table 6001 (NOW) Updates to bearing cup tools equipment specifications (WAS) Sub-Zero Freezer or Dry Ice, Oven

Revision B Highlights (continued)

<u>Section/Page No.</u>	<u>Description of Change</u>
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Pg 10002	(NOW) IPL Figure 1 (WAS) IPL description sections B. and C.
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Pg 10004	(NOW) Detailed Parts List Sheet 2 of 2 (WAS) IPL Figure 1
Pg 10005	(NOW) Removed (WAS) Detailed Parts List Sheet 1 of 2
Pg 10006	(NOW) Removed (WAS) IPL Figure 1
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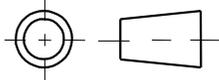
INTRODUCTION

1. General

 **SAFETY WARNING: ALL TORQUE AND SPECIFIC LIMITS OR VALUES CONTAINED HEREIN MUST BE STRICTLY OBSERVED. IGNORING OF TORQUE LIMITS AND OTHER SPECIFIC VALUES GIVEN BY THIS MANUAL CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.**

This manual is published for the guidance of personnel responsible for the overhaul and/or general maintenance of the Aircraft Wheel and Brake, LLC Assembly covered in this publication.

THIRD ANGLE PROJECTION



Third angle projection is used in this manual. All weights and measurements are in U.S. English units with metric units in parentheses.

The manual for the aircraft shall take precedence for the component's interface connections with the functional features as used in the aircraft. This manual may also describe functional features that may or may not be used when installed as a component of a system in the aircraft.

The manufacturer recommends that you ask for the latest revision of the manual before continuing with overhaul or maintenance operations. Ask the Technical Services Department of Aircraft Wheel and Brake, LLC (AWB) for the latest revision.

Substitutions of critical parts or changes of processes or materials are not permitted without the written approval of the manufacturer.

Aircraft Wheel and Brake, LLC
1160 Center Road
Avon, Ohio 44011 U.S.A.
Attn: Technical Services/Hotline

E-mail: clevelandwbhelp@kaman.com
Fax: (440) 937-5409
Tel: 1-800-BRAKING (1-800-272-5464)
Websites: www.kaman.com
www.kaman.com/cleveland
www.clevelandwheelsandbrakes.com

2. Data rights

(Deleted)

INTRODUCTION

3. TSO notice

This assembly is certified for FAR Part 23 usage. It is identified with a “TSO-C26c” marking. This assembly has been tested and qualified to FAA (Federal Aviation Administration) requirements and specifications.

4. Manual use

This manual is divided into various section blocks such as Testing and Fault Isolation, Disassembly, Inspection / Check, Repair, etc. Refer to the Table of Contents for the location of the applicable section.

5. Warnings, cautions, and notes

These adjuncts to the text shall be used to highlight or emphasize important points when necessary. Refer to the descriptions of these statements that follow:

- A “**SAFETY WARNING**” flagged by this symbol  , calls attention to possible serious or life threatening situations if procedures are not followed.
- A “**WARNING**” calls attention to use of materials, processes, methods, procedures, or limits which must be followed precisely to avoid injury to persons.
- A “**CAUTION**” calls attention to methods and procedures, which must be followed to avoid damage to equipment.
- A “**NOTE**” calls attention to an essential operating or maintenance procedure, condition, or statement, which must be highlighted.

6. Replacement parts

 **SAFETY WARNING:** AIRCRAFT WHEEL AND BRAKE, LLC (AWB) DOES NOT WARRANT OR ASSUME THE RISK OF THE USE OF REPLACEMENT PARTS NOT AUTHORIZED FOR USE BY AWB. OPERATORS WHO USE REPLACEMENT PARTS NOT AUTHORIZED BY AWB DO SO AT THEIR OWN RISK AND TAKE FULL RESPONSIBILITY FOR ALL PROPERTY DAMAGE, PERSONAL INJURY OR DEATH CAUSED BY SUCH REPLACEMENTS.

Use only the approved parts that are listed in the illustrated parts list of this manual.

DESCRIPTION AND OPERATION

5. Brake Disc Wear and Warpage Limits

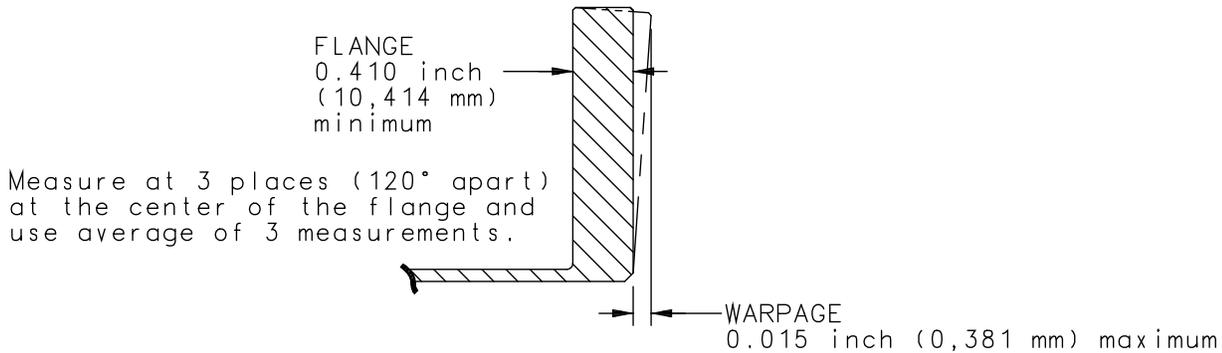


Figure 1 Disc Limits

6. Maintenance schedule

The maintenance schedule is a guideline based on laboratory testing environments that simulate normal conditions. Field operating requirements can vary from aircraft to aircraft. These variations will directly affect the wear rate of the wheel assembly components. Operating conditions must be evaluated to determine a suitable schedule to maintain the equipment.

NOTE: Except as noted, all tasks in Table 1 refer to procedures in the CHECKS section.

Table 1 Maintenance schedule

SCHEDULED INTERVAL	ITEM	TASK
At every tire change	All components	a. Paragraph 1.B., visual examination and b. Paragraph 2., detailed examination as necessary
	Bolts (5)	Paragraph 2. A., detailed examination including magnetic particle inspection.
	Preformed packings (20)	Replace.
At the following tire changes: 5 th , 8 th , 10 th , 18 th , 12 st , 14 th ; and 16 th tire changes	Wheel halves (40) and (55)	Paragraph 2. H., detailed examination including liquid penetrant inspection.
	Grommet (70)	Replace (more often at discretion of end user)
At the 17 th tire change and every tire change after	Wheel Halves (40) and (55)	Paragraph 2. H., detailed examination including Liquid Penetrant Inspection.
	Grommet (70)	Replace
	Bolts (5)	Paragraph 2. A., detailed examination including magnetic particle inspection.
Every tire change – or – every 12 months (which ever occurs first)	Bearing Cones (100, 105)	Clean and repack then grease. Refer to paragraph 1.B, in the <u>ASSEMBLY</u> section.

TESTING AND FAULT ISOLATION

1. General

Refer to IPL Figure 1 for component identification.

This section contains test procedures that can be used both as troubleshooting measures and means to test overhauled wheel assemblies. A test data sheet is included at the end of this section for reference.

SAFETY WARNING:  **FULLY ASSEMBLE WHEEL BEFORE TESTING. SERIOUS INJURY OR DEATH CAN OCCUR FROM TESTING A WHEEL THAT IS NOT FULLY ASSEMBLED.**

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and consumables

The term "Commercial Source" allows the repair facility to acquire the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 1001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Tire inflation safety equipment	Not applicable	Commercial
Dry Nitrogen	Not applicable	Commercial
Tire pressure gage	Not applicable	Commercial
Standard tools (inch units)	Wrenches/sockets: <ul style="list-style-type: none"> • 12pt, external (inch, units) • Hex head, external (inch, units) Torque wrench	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Brushes	Not applicable	Commercial

2. Test the Wheel Assembly

SAFETY WARNING:  **ALWAYS PLACE THE TIRE IN AN INFLATION CAGE BEFORE YOU INFLATE THE TIRE. INFLATING THE TIRE CAN BE VERY DANGEROUS. THE TIRE CAN EXPLODE. FAILURE TO USE AN INFLATION CAGE CAN CAUSE SERIOUS INJURY OR DEATH.**

TESTING AND FAULT ISOLATION

A. Pretest Check

Do these examinations and check procedures to approve the wheel assembly for testing.

- (1) Do a visual check of the wheel for corrosion, cracks, loose bearing cups, or other visible damage.
- (2) Examine all threaded components to make sure they have not become loose or have lost their self-locking feature. These include the bolts (5), nuts (15), and the nut on the air valve assembly (65). If a loose component is found, tighten it. Refer to Table 8002, Torque Values.
 - (a) If you cannot tighten a component, then examine for damage to the threads of the component. Also examine the self-locking feature of the nuts (15). Refer to the CHECKS section.
- (3) Examine the tires for cuts, flat spots, or damage to the tread or sidewall.

NOTE: Refer to the tire manufacturer's service and maintenance manuals for tire service procedures.

B. 24 Hour Pressure Test

CAUTION: COVER THE HUB OPENINGS OF THE WHEEL HALVES TO PREVENT CONTAMINATION OF THE BEARINGS.

- (1) Put the wheel and tire assembly in an inflation cage.
- (2) Inflate the tire to the service inflation pressure with dry nitrogen.
 - (a) Allow 12 hours minimum for a new tire to stretch.
 - (b) Measure the tire pressure. If necessary, re-inflate to the service inflation pressure again.
- (3) The wheel and tire assembly must hold the service inflation pressure for 24 hours. A maximum five percent pressure drop is allowed.
- (4) If the pressure drop is less than five percent:
 - (a) The test is completed. Remove the wheel and tire assembly from the inflation cage.
- (5) If the pressure drop is more than five percent:
 - (a) Put the wheel and tire assembly in an inflation cage. Inflate the tire to the service inflation pressure with dry nitrogen.
 - (b) For a tube type tire, apply a soap and water solution to:
 - the tire tube valve stem area.Examine for air leaks.
 - (c) For a tubeless tire, apply a soap and water solution to:
 - the air valve assembly (65)

TESTING AND FAULT ISOLATION

- the tire bead area
- the area where the wheel halves contact each other (known as the wheel register area)

Examine for air leaks.

- (6) For a tube type tire, air leaks can occur at or around the tube valve stem area.
- (a) Check the valve core for leakage and replace if necessary.
 - (b) Repeat the pressure test.
 - 1 If the leakage continues, Refer to the DISASSEMBLY section and remove the tire from the wheel assembly.
 - 2 Check the tube for leaks and replace the tube if necessary.
 - 3 Repeat the pressure test.
- (7) For a tubeless tire, air leaks can occur around or through the air valve assembly (65).
- (a) The inflation valve assembly nut can be loose. Refer to Table 8002, Torque Values and tighten it.
 - (b) Repeat the pressure test.
 - 1 If the part continues to leak, remove the part and examine the mating surfaces on the outboard wheel half (55). Examine the grommet and replace if necessary.
 - 2 Examine the air valve components (75, 80, 85, 90) and if damaged, replace the air valve assembly (65).
 - 3 Repeat the pressure test.
- (8) For a tubeless tire, air leaks occur around the tire bead
- (a) Deflate the tire and remove the wheel and tire assembly from the inflation cage.
 - (b) Refer to the DISASSEMBLY section and remove the tire from the wheel assembly.
 - (c) Examine the tire bead and wheel bead seat for damage. Use the instructions that follow.
 - 1 Examine the tire bead. If the tire is cut or damaged, install a new tire. Refer to the ASSEMBLY section.
 - 2 Disassemble the wheel. Refer to the DISASSEMBLY section.
 - 3 Examine the wheel bead seat. Refer to the CHECKS section.
 - 4 If the wheel bead seat is damaged, repair the wheel. Refer to the REPAIR section.

TESTING AND FAULT ISOLATION

- 5 Assemble the wheel. Refer to the ASSEMBLY section.
 - 6 Install the tire. Refer to the ASSEMBLY section.
 - 7 Repeat the 24 hour pressure test.
- (9) For a tubeless tire, air leaks occur through the wheel
- (a) Deflate the tire and remove the wheel and tire assembly from the inflation cage.
 - (b) Refer to the DISASSEMBLY section and remove the tire from the wheel assembly.
 - (c) Examine the wheel. Use the instructions that follow.
 - 1 Disassemble the wheel. Refer to the DISASSEMBLY section.
 - 2 Liquid penetrant inspect the wheel halves (40 and 55) for cracks. Refer to the CHECKS section. If cracks are found, replace the wheel half.
 - 3 Assemble the wheel. Refer to the ASSEMBLY section.
 - 4 Install the tire. Refer to the ASSEMBLY section.
 - 5 Repeat the 24 hour pressure test.
- (10) For a tubeless tire, air leaks occur where the wheel halves contact each other (known as the wheel register area)
- (a) Deflate the tire and remove the wheel and tire assembly from the inflation cage.
 - (b) Refer to the DISASSEMBLY section and remove the tire from the wheel assembly.
 - (c) Examine the register area of each wheel half for damage. Examine the seal groove area of each wheel half for damage. Examine the preformed packing (20) for damage. Use the instructions that follow.
 - 1 Examine the preformed packing. If the preformed packing is cut, torn, deformed or has other damage, install a new preformed packing. Refer to the ASSEMBLY section.
 - 2 Disassemble the wheel. Refer to the DISASSEMBLY section.
 - 3 Examine the wheel halves. Refer to the CHECKS section.
 - 4 If the wheel register is damaged, repair the wheel. Refer to the REPAIR section.
 - 5 If the sealing groove area is damaged, replace the wheel half.
 - 6 Assemble the wheel. Refer to the ASSEMBLY section.
 - 7 Repeat the 24 hour pressure test.

TESTING AND FAULT ISOLATION

3. Troubleshooting

Table 1002 lists the possible problems you can find while operating the wheel assembly. The table cannot list all possible problems and is intended to assist with troubleshooting the wheel assembly.

Table 1002 Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTION
Loss of tire pressure.	The packing (20) on the wheel register is worn, damaged or twisted on the mating groove.	Replace the packing and align on mating groove taking care not to twist packing.
	The rubber grommet (70) on the air valve assembly is damaged.	Replace the grommet.
	An air valve component (75, 80, 85, 90) is damaged.	Replace the air valve assembly (65).
	Damage to the sealing surface on the outer wheel half where the inflation valve rubber grommet seals.	Replace the outboard wheel half subassembly (50).
	Loss of the preload on wheel bolts (5).	Examine and replace the self-locking nuts (15) if the locking feature is defective.
	The wheel half (40 or 55) is cracked. NOTE: Use Liquid Penetrant Inspection to examine the wheel half for cracks at or near the surface. Refer to paragraphs 2.D. (4) in the <u>CHECKS</u> section. Liquid Penetrant Inspection will not detect cracks below the wheel surface. This method only scans the near surface.	Examine the wheel half for cracks. Refer to the <u>CHECKS</u> section. NOTE: A cracked wheel half cannot be repaired.
Excessive drag on the wheel when rotating.	Incorrect preload or torque on the axle nut.	Loosen and re-tighten the axle nut. Refer to the <u>ASSEMBLY</u> section.
	Damage to the bearing cones (100, 105) or bearing cups (45, 60).	Examine the bearing cones and cups. Replace any parts that are damaged or corroded. Pack the new cones with bearing grease. Refer to the <u>ASSEMBLY</u> section.

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Table 1002 Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTION
Cracked or damaged wheel half (40 or 55). NOTE: Use Liquid Penetrant Inspection to examine the wheel half for cracks at or near the surface. Refer to paragraphs 2.D. (4) in the <u>CHECKS</u> section. Liquid Penetrant Inspection will not detect cracks below the wheel surface. This method only scans the near surface.	Foreign object damage during landing or takeoff.	Visually examine the wheel half for cracks and other damage. Refer to the <u>CHECKS</u> section. Find out if the part can be repaired. Refer to the <u>REPAIR</u> section. NOTE: A cracked wheel half cannot be repaired.
	Use of sharp objects to break the tire bead.	Replace the grommet.
	Hard landing or landing with a flat tire.	Replace the air valve assembly (65).
	Wheel fatigue.	Replace the wheel or wheel half.
Damaged bearing cones (100, 105) or bearing cups (45, 60).	Bearings are not in alignment.	Replace the damaged part.
	Incorrect axle nut torque.	replace the damaged part. tighten the axle nut in accordance with the axle nut torque procedure in the <u>ASSEMBLY</u> section.
	Contaminated bearing grease.	Replace the damaged part. Examine the bearing grease seal (110) for damage. Replace damaged seal. Be sure the bearing grease is clean.
	Low or no bearing grease in the bearings.	Replace the damaged part.

TEST DATA SHEET

Test Date: _____ **Wheel P/N:** _____ **Wheel Serial No.:** _____

Pretest examination of product refer to para. 2.A.

- | | | |
|---------------------------------------|-------------------|-------------------|
| (1) Wheel condition | Pass _____ | Fail _____ |
| (2) Wheel assembly hardware condition | Pass _____ | Fail _____ |
| (3) Tire condition | Pass _____ | Fail _____ |

Comments: _____

24 hour pressure retention test refer to para. 2.B. **Pass** _____ **Fail** _____

Tire inflation pressure: _____ psig Required: Service inflation pressure

Pressure after 24 hr: _____ psig Pressure Drop: 5% allowed

Pass ____ less than 5%

Fail ____ greater than 5%

Leakage from tire tube valve stem or from tire tube: Yes ____ No ____

Leakage around inflation air valve (65): (if so equipped) Yes ____ No ____

Leakage around bead seat: Yes ____ No ____

Leakage through wheel: Yes ____ No ____

Leakage around wheel register: Yes ____ No ____

Comments: _____

Tester: _____ **Date:** _____

DISASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

NOTE: Unless performing a complete overhaul, the wheel assembly should only be disassembled as far as necessary to repair or replace defective parts.

A. Equipment and consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 3001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Preformed packing tool set	199-18	Aircraft Wheel and Brake, LLC or distributor
Standard tools (inch units)	Wrenches/sockets: <ul style="list-style-type: none"> • 12pt, external, (inch, units) • Hex head, external, (inch, units) 	Commercial
Portable tire bead breaker	Not applicable	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Valve core tool	Not applicable	Commercial
Screw Driver	Standard-Flat Head	Commercial

DISASSEMBLY

2. Remove the wheel assembly

SAFETY WARNING:  MAKE SURE THE AIRCRAFT IS SECURE AND STABLE BEFORE BEGINNING ANY WORK. WORKING AROUND AN AIRCRAFT THAT IS NOT SECURE AND STABLE CAN CAUSE INJURY OR DEATH.

SAFETY WARNING:  FULLY DEFLATE THE TIRE BEFORE REMOVING THE VALVE CORE. THE AIR IN A TIRE PUTS PRESSURE ON THE VALVE CORE. THE VALVE CORE CAN EJECT WITH GREAT FORCE AND CAN CAUSE INJURY OR DEATH.

- A. Refer to the airframe manufacturer's instructions to lift and support the aircraft.
- B. Deflate the tire:
 - If equipped with a tube type tire, remove the cap from the tube valve stem deflate the tire by pushing the valve stem plunger until air can no longer be heard escaping from the tube.
 - If equipped with a tubeless tire, remove the cap from the air valve assembly (65) and deflate the tire by pushing the valve stem plunger until air can no longer be heard escaping from the tire.
- C. When all the tire pressure is released, then:
 - If equipped with a tube type tire, remove the valve stem from the tube valve.
 - If equipped with a tubeless tire, remove the valve stem from the air valve assembly (65).
- D. Remove the remainder of the air valve assembly (65) from the outboard wheel half (55).
- E. Support the wheel and tire assembly and remove the axle mounting hardware.
- F. Move the wheel and tire assembly back and forth to unseat the outboard bearing.
- G. Remove the wheel and tire assembly from the axle and put on a clean flat surface.

3. Disassembly the Wheel Assembly

SAFETY WARNING:  **DO NOT DISASSEMBLE THE WHEEL UNTIL THE TIRE IS COMPLETELY DEFLATED. SERIOUS INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN RESULT.**

NOTES: The bearing cups (45, 60) are pressed into the hub of the wheel halves (40, 55). Do not remove them unless replacement is necessary. Replacement will be necessary if the bearing cups are damaged or if a more thorough inspection of the wheel is to be made.

- A. Make sure the tire is completely deflated.
- B. Refer to Figure 3001. Use a flathead screwdriver to remove the snap ring (120) from the inboard wheel half. Then remove the grease seal (110) and inboard bearing cone (100).
- C. Then use the flathead screwdriver to also remove the snap ring (125) from the outboard wheel half. Then remove the hubcap assembly (115) and outboard bearing cone (105).

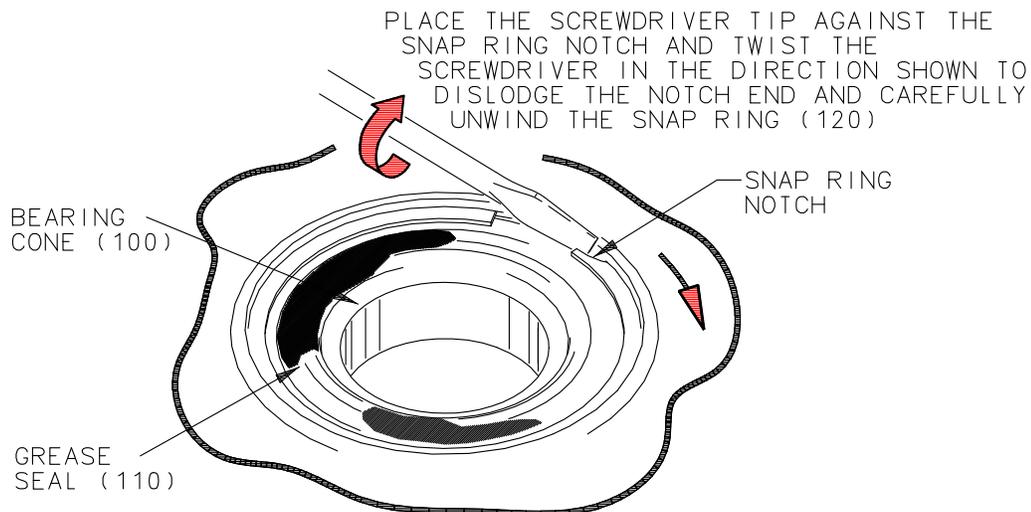


Figure 3001 Snap Ring Removal – Inboard Wheel Half Shown

- D. Apply a mild dish soap and water solution around the tire bead and wheel flange to help loosen the tire from the bead seat.

CAUTION: DO NOT USE TIRE IRONS OR SCREWDRIVERS TO PULL THE TIRE AWAY FROM THE WHEEL. SHARP METAL TOOLS CAN DAMAGE THE SEALING SURFACE OF THE WHEEL.

- E. Use a tire bead breaker and separate the tire beads from both wheel flanges. Apply the same pressure around the entire sidewall as close to tire beads as possible.

DISASSEMBLY

CAUTION: DO NOT USE AN IMPACT WRENCH OR A POWER WRENCH TO REMOVE THE WHEEL NUTS AND BOLTS. THESE TOOLS CAN DAMAGE THE BOLTS AND NUTS.

F. Remove the nuts (15), bolts (5) and washers (10).

G. Separate the wheel halves. Then, remove the tire.

H. Remove the preformed packing (20) from the wheel register groove of the inboard wheel half (40).

CLEANING

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and consumables

The term "Commercial Source" lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 4001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Blast stripping equipment for plastic blast media	Plastic media: MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max.	U.S. Technology Corp.
Air supply	30 psig maximum (2.1 bar)	Commercial
Clean cloths	Lint free	Commercial
Brushes	Non-metallic soft and stiff bristle	Commercial
Stoddard solvent	Type 1 per MIL-PRF-680	Commercial
Cleaner/degreaser	AMS1526	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Mineral spirits	Not applicable	Commercial

CLEANING

2. Cleaning procedures

SAFETY WARNING:  MAKE SURE THAT THE AREA WHERE YOU WILL USE THE CLEANING SOLVENTS HAS GOOD AIRFLOW. DO NOT TOUCH OR GET FLUID ON YOUR BODY AND DO NOT BREATHE VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE.

SAFETY WARNING:  USE NO MORE THAN 30 PSIG (2.1 BAR) AIR PRESSURE. EYE PROTECTION IS NECESSARY. EYE INJURY FROM DIRT PARTICLES OR SOLVENT SPRAY IS POSSIBLE WHEN COMPRESSED AIR IS USED.

A. Clean the Metal Components

NOTE: The rubber grommet (70) on the air valve stem (75) will not be harmed if the air valve assembly (65) is cleaned with the Stoddard Solvent.

(1) Clean metal parts that follow with Stoddard Solvent (MIL-PRF-680): (5, 10, 15, 30, 65, 120, 125). Use a non-metal soft bristled brush to help remove the heavy dirt deposits:

CAUTION: CAREFULLY CLEAN BEARING CONES (100, 105) IN A SEPARATE CONTAINER OF CLEAN SOLVENT TO PREVENT CONTAMINATION.

(2) Clean the bearing cones in mineral spirits. Use a non-metallic soft bristled brush to help remove all deposits. Remove the solvent chemical residue in a water based cleaner/degreaser per AMS 1526.

NOTE: Bearing cones can be packed with grease just before installation. Refer to the ASSEMBLY section. If bearing cones are packed after cleaning and drying, then place them in a clean, closed container to prevent contamination.

(3) Dry the parts using compressed air and lint-free cloths.

B. Clean the Non-Metal Components

(1) Wipe the following rubber-based components with a clean soft cloth dampened in a mild soap and water solution or with the wheel bearing grease and a clean cloth. This will loosen the dirt:

- The nitrile preformed packing (20)
- The nitrile seal material of the grease seals (110)
- The nitrile seal material of the hubcap assembly (115)
- The rubber-based grommet (70) of the air valve assembly (65)

CLEANING

C. Clean the Aluminum Components

- (1) Clean the parts that follow with Stoddard Solvent (MIL-PRF-680): (25, 40, 55). Use a non-metal soft bristle brush to remove the heavy dirt deposits.
 - (a) Use a soft wire brush to remove any corrosion on the air valve and fuse plug port threads.
- (2) To remove the solvent chemical residue, clean parts in a water based cleaner / degreaser (per AMS 1526).
- (3) Rinse the parts with a mild soap and water solution.
- (4) Rinse the parts in clean water.
- (5) Dry the parts using compressed air and lint free cloths.

D. Protective Coating Removal for the Aluminum Wheel Halves (40, 55) and Spacer (25)

SAFETY WARNING:  DUE TO THE TOXICITY AND VOLATILITY OF CHEMICAL STRIPPING SOLVENTS, THEY ARE A HEALTH CONCERN AND NOT A RECOMMENDED SOURCE OF PROTECTIVE COATING REMOVAL.

NOTES: Removal of the protective coating (primer and topcoat) is necessary prior to conducting the liquid penetrant inspection of the wheel halves.

To achieve best results, always refer to the manufacturer's instructions for use and disposal of blast media.

- (1) Clean the parts in accordance with paragraph 2.C.
- (2) Blast the parts per MIL-STD-1504 with plastic media per MIL-P-85891, Type II or V, Grade 20/30, maximum media hardness of 3.5 MOH.

E. Protective Coating and Corrosion Removal for the Steel Brake Disc (30)

SAFETY WARNING:  DUE TO THE TOXICITY AND VOLATILITY OF CHEMICAL STRIPPING SOLVENTS, THEY ARE A HEALTH CONCERN AND NOT A RECOMMENDED SOURCE OF PROTECTIVE COATING REMOVAL.

NOTE: To achieve best results, always refer to the manufacturer's instructions for use and also for disposal of abrasive blast media.

- (1) Clean the parts in accordance with paragraph 2.A.
- (2) Abrasive blast the parts per MIL-STD-1504 with 80 grit aluminum oxide media.

CHECKS

1. General

Refer to IPL Figure 1 for component identification.

After a check is performed on a component, refer to the REPAIR section for applicable repairs.

Refer to Table 1 Maintenance Schedule in DESCRIPTION AND OPERATION for a timetable of recommended scheduled maintenance tasks for the wheel assembly components. All parts must be cleaned before examination. Refer to the CLEANING section.

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

A. Equipment and consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 5001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Magnetic particle inspection kit	ASTM E1444	Commercial
Liquid penetrant inspection kit	ASTM E1417 or MIL-STD-6866, Type 1, method A, sensitivity level 2	Commercial
Magnifier	X10 Magnification	Commercial
Vernier dial calipers	No specification / no part no.	Commercial

A. Visual Examination

Examine all of the parts for cuts, tears, cracks, breaks, nicks, scratches, gouges, corrosion, wear, distortion, scoring, stripped or crossed threads and other damage. Replace a part that is cracked, has thread damage, is worn beyond limits, has exceeded allowable repair or is not a repairable part.

SAFETY WARNING:  THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH (5), (10), (15), (115). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

2. Detailed Wheel Examination

A. Examine the Hardware: Bolts (5), Washers (10), Nuts (15) and Snap Rings (120, 125).

CHECKS

CAUTION: REWORK OF BOLTS IS NOT ALLOWED.

(1) Examine the bolts (5) for distortion, cracks, corrosion, or thread damage. Closely examine for cracks in the radius under the bolt head and in the threaded area next to the bolt shank. Use magnetic particle inspection (ASTM E1444).

NOTE: If one or more of the bolts are damaged, replace all of the bolts.

(2) Examine the washers (10) for corrosion, distortion or damage. Replace a part that is distorted or damaged.

(3) Examine the nuts (15) for damage to the self-locking feature. The self-locking feature can be a deformation of the nut (elliptical), segmented beam lock, or a non-metallic insert that provides the self-locking effect. The self-locking feature is defective if:

➤ The self-locking feature does not tighten when you turn the nut onto the mating thread of the bolt (5).

➤ The nut is loose and you cannot tighten the nut to the necessary torque value.

NOTE: If one or more of the nuts are damaged, then replace all of the nuts.

(4) Examine the snap rings (120, 125) for distortion, cracks, nicks, burrs, pitting, corrosion, or other signs of damage. Replace a part that is damaged.

B. Examine the Bearing Cups (45, 60) and Cones (100, 105)

NOTE: The bearing cups (45, 60) are pressed into the hub of the wheel halves (40, 55). They should not be removed unless replacement is necessary because of damage or loose fit or for a more thorough inspection of the wheel. Refer to the REPAIR section for cup removal.

(1) Examine the bearing cups in the wheel half for loose fit, wear, corrosion, spalling, brinelling, nicks, scratches, water staining, pitting, and heat discoloration.

(2) Examine the roller surfaces of the bearing cones for wear, corrosion, spalling, pitting and heat discoloration.

(3) Examine the bearing cone cage for dents or distortion, and for wear of the roller pocket sides, corners and ends.

NOTE: ¹ Refer to the bearing manufacturer's manual for more instruction.

¹ How to Recognize and Prevent Tapered Roller Bearing Damage
available from Timken Company, Canton, Ohio 44706 U.S.A.

CHECKS

C. Examine the Brake Disc (30)

Refer to Figure 1, DESCRIPTION AND OPERATION section and examine for minimum flange thickness and warpage. Replace disc when flange is worn to 0.410 inch (10,41 mm). Replace if warpage exceeds 0.015 inch (0,381 mm).

D. Examine the Grease Seal (110)

Examine for cuts, nicks, distortion, and other damage. Examine the rubber to metal bond. Replace a seal that has a tear in the rubber to metal bond. If the rubber is cracked replace the seal.

E. Examine the Hubcap Assembly (115)

Examine for cuts, nicks, distortion, and other damage. Examine the rubber to metal bond. Replace a seal that has a tear in the rubber to metal bond. If the rubber is cracked replace the hubcap assembly.

F. Examine the Air Valve Assembly (65)

- (1) Examine the threads and replace if there is thread damage.
- (2) Examine and replace the rubber grommet if it has cuts, tears, cracking, and other damage.

G. Examine the Spacer (25)

- (1) Examine the spacer for surface cracks, nicks, corrosion, or other damage.

H. Examine the Wheel Halves (40 and 55)

SAFETY WARNING:  **MAKE SURE THAT THE AREA WHERE YOU WILL USE THE LIQUID PENETRANT FLUID HAS GOOD AIRFLOW. DO NOT TOUCH OR GET FLUID ON YOUR BODY AND DO NOT BREATHE VAPORS. KEEP CONTAINERS COVERED WHEN NOT IN USE. LIQUID PENETRANT FLUID CAN BE TOXIC AND EXPLOSIVE.**

- (1) Examine the exterior surface for missing paint caused by erosion, wear, or inspection techniques.
- (2) Examine the wheel halves for surface cracks, nicks, corrosion, or other damage.

NOTE: Look closely at the bead seat area for corrosion.

- (3) Examine the inboard and outboard wheel half register grooves. Examine for burrs, corrosion, or other raised edges. Replace the wheel half if damage to the register areas can cause damage to the packing or prevent a good seal of the packing.
- (4) Examine the sealing surface of the inflation valve where the rubber grommet seats and provides the sealing. Examine for corrosion, burrs, or other raised edges that could damage the grommet during installation or operation and cause leakage.

CHECKS

- (5) When it is necessary to examine the wheel half for cracks at or near the surface use Liquid Penetrant Inspection (ASTM E1417 or MIL-STD-6866, Type 1, Method A, Sensitivity Level 2).

NOTE: The paint (topcoat and primer) must be removed from the part. The part must be clean before doing a liquid penetrant inspection procedure. Refer to the CLEANING section for paint removal and cleaning instructions.

- (6) Refer to Figure 5001. Examine the wheel half for cracks and structural damage. Examine these areas carefully to find out if the wheel is serviceable:

- tire bead seat area on the inboard and outboard wheel halves

NOTE: The tire bead seat area can be damaged by tools that are used to remove the tires.

- the bolt bosses on the inboard and outboard wheel halves
- the air valve area on the outboard wheel half

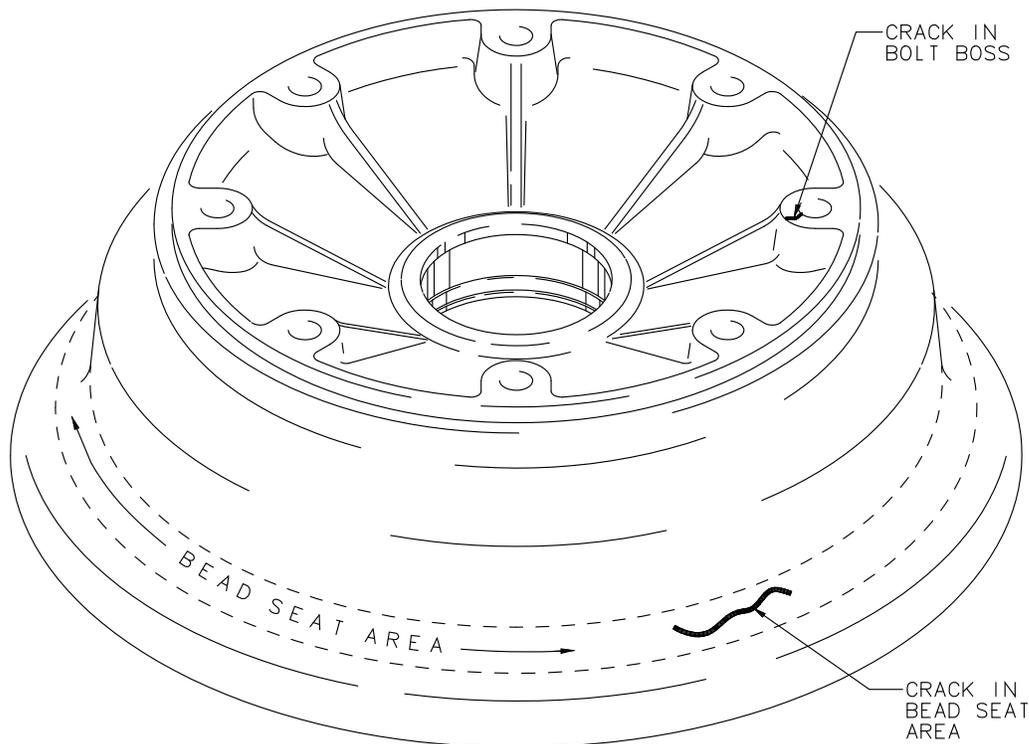


Figure 5001 Wheel Half Examination – Inboard Wheel Half Shown

REPAIR

1. General

Refer to IPL Figure 1 for component identification.

WARNING: WEAR PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK.

NOTE: Repairs are limited to the components listed in this section. All remaining components must be replaced.

A. Equipment and consumables

The term "Commercial Source" lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 6001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Aluminum oxide cloth	400 to 600 grade or finer, wet or dry	Commercial
Alodine 1200 or equiv.	MIL-DTL-5541, Type I or Type II, Class 1A (Ref. QPL-81706)	Commercial
Paint application equipment	Not applicable	Commercial
Coatings for wheel halves (40, 55): Primer coat and topcoat	Refer to Table 6002	Refer to Table 6002
Hand Files	Not applicable	Commercial
Arbor press	Not applicable	Commercial
Feeler gauge	No specification / no part no. 0.002 inch (0.051 mm)	Commercial
Tools for outboard wheel half bearing cups (45, 60): Inner hub tools Outer hub tools Heat source methods	Figures 9001, 9002 Figures 9001, 9002 Range capacity: up to 200°F (93°C): <ul style="list-style-type: none"> • Infrared lamp • Continuous run temperature chamber • Temperature control LOCALIZED thermal A/C Cover (TACCO) • Induction heating system 	Fabrication Fabrication Commercial
Refrigeration source methods	Range capacity: -25°F to -65°F (-32°C to -54°C): <ul style="list-style-type: none"> • Subzero freezer • Dry ice 	Commercial
Bearing grease	Mobil Aviation Grease SHC 100	ExxonMobil Oil Corporation

B. General Repairs

CAUTION: DO NOT TRY TO REPAIR A SEALING SURFACE FOR A PREFORMED PACKING.

- (1) Replace all parts that have cracks or distortions. Replace all parts with damage that you cannot repair. Replace all parts that are damaged or worn more than the specified limits.
- (2) Use 400 to 600 grade or finer, wet or dry aluminum oxide cloth to remove small burrs, nicks, and scratches.

REPAIR

CAUTION: DO NOT USE ABRASIVES CONTAINING IRON OR COPPER (STEEL WOOL, IRON OXIDE, BRASS OR STEEL WIRE). IRON OR COPPER PARTICLES WILL BECOME EMBEDDED IN THE ALUMINUM AND MAGNESIUM COMPONENTS AND WILL INCREASE THE AMOUNT OF CORROSION.

2. Detailed Repairs

A. Repair the Wheel Halves (40 and 55)

The wheel halves are made from an aluminum alloy casting.

(1) Surface damage repair

(a) Blend out small nicks, gouges, scratches and light corrosion.

(2) Clean and surface treat the repaired areas

(a) Clean the wheel halves. Refer to paragraph 2.C., CLEANING section.

(b) Apply a corrosion preventative (Alodine 1200 or equivalent) to the repaired areas. Refer to MIL-C-5541, Class 1A.

B. Repair the Spacer (25)

The spacer is made from an aluminum alloy casting.

(1) Surface damage repair

(a) Blend out small nicks, gouges, scratches and light corrosion.

(2) Clean and surface treat the repaired areas

(a) Clean the spacer. Refer to paragraph 2.C., CLEANING section.

(b) Apply a corrosion preventative (Alodine 1200 or equivalent) to the repaired areas. Refer to MIL-C-5541, Class 1A.

C. Painting the Wheel Halves (40, 55) and Spacer (25)

SAFETY WARNING:  PAINT MATERIALS CAN BE TOXIC AND VOLATILE. USE ONLY IN WELL VENTILATED AREAS. AVOID PHYSICAL CONTACT WITH PAINTS AND DO NOT INHALE VAPORS. KEEP PAINT CONTAINERS COVERED WHEN NOT IN USE. OBSERVE FIRE PRECAUTIONS.

NOTE: Because of local EPA low VOC requirements, Aircraft Wheel & Brake uses Columbia or Sherwin Williams primers and topcoats in the production of the wheel assembly. Alternative products can be used by the repair facility.

REPAIR

- (1) For small areas requiring a paint touchup.
 - (a) Prepare the area by sanding lightly with 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.
- (2) Clean the surfaces to be painted.

CAUTION: DO NOT GET PAINT ON THE BEARING CUPS. PAINT ON THE BEARING CUPS CAN CAUSE BEARING FAILURE.

- (3) Mask the parts from the primer and topcoat as follows:
 - (a) For the wheel halves, mask the bearing bores, inflation valve ports and the inflation valve cross drilled holes.
 - (b) The spacer does not require masking.
- (4) Apply the primer and topcoat per Table 6002.

NOTE: To achieve best results, always refer to the manufacturer’s instructions for mixing, pot life, application and use and also for disposal of primer and topcoat media.

Table 6002 Primer and Topcoat Product Characteristics

MANUFACTURER	PRIMER	TOPCOAT	DRY FILM THICKNESS AND AIR DRY TIMES ¹
Columbia Paint Corp. Huntington, WV	P/N 18-017A (water reducible) No mixing required.	P/N 17-250A (524 Aluminum) (water reducible) No mixing required.	Primer: 0.0002-0.0005 in. 15 minutes min. (to touch or topcoat) 60 minutes (to handle) 4-24 hours (dry hard)
		It is desirable to apply topcoat without thinning, however, topcoat material may be thinned up to 10% by volume with either water (use distilled) or a mixture of 4 parts water to 1 part butyl cellosolve.	Topcoat (includes primer): 0.0008-0.0014 in. 15 minutes (to touch) 30 minutes (to handle) 48 hours (dry hard)
Alternate: Sherwin Williams Co. Cleveland, OH	2 parts washcoat (P/N P60G2) 3 parts catalyst reducer (P/N R7K44)	P/N F63BXS58-4337 6 parts base 1 part catalyst (P/N V66V27) Thin using up to 20% polane reducer (P/N R7K84).	Primer: 0.0002-0.0004 in. 3-10 minutes (to touch) 10-60 minutes (to topcoat) Topcoat (includes primer): 0.0008-0.0014 in. 20 minutes (to touch) 60 minutes (to handle) 24 hours (dry hard)

¹ Refer to the manufacturer’s data sheet for forced dry (oven heating) schedule.

REPAIR

D. Replacement of the Bearing Cups (45, 60)

The bearing cups are pressed into the hub of the wheel halves (40, 55). Do not remove them unless replacement is necessary. Replacement will be necessary if the bearing cups are damaged or if a more thorough inspection of the wheel is to be made.

WARNING: PUT ON PROTECTIVE CLOTHING AND EYEWEAR BEFORE DOING THE WORK. DRY ICE AND HOT PARTS CAN BE THE CAUSE OF INJURY.

CAUTION: BEARING CUPS AND CONES MUST BE REPLACED AS A SET.
REMOVE THE AIR VALVE ASSEMBLY (65) BEFORE HEATING THE WHEEL HALVES.
WORK SWIFTLY. THERMAL EXPANSION AND CONTRACTION OF PARTS WILL AFFECT THE INSTALLATION PROCESS.
DO NOT HEAT WHEEL HALF ABOVE 93.3° C (200° F).
DURING BEARING CUP REMOVAL AND INSTALLATION, SUPPORT THE WHEEL HALF ON THE HUB, NOT ON THE FLANGE. SUPPORTING THE WHEEL HALF ON THE FLANGE CAN DAMAGE THE FLANGE.

NOTE: ² Refer to the bearing manufacturer's manual for damage allowances.

- (1) Removal
Refer to Figure 6001 and remove the bearing cups using the following procedure.

NOTE: Oven heating is the preferred method for heating the wheel half. If oven heating is not possible, use a container of clean, boiling water.

- (a) Heat one of the wheel halves (40 or 55) to 79 to 93.3° C (175 to 200° F). Do not heat the wheel half for more than 30 minutes.
- (b) Remove the wheel half from the heat source and place it on the support base (Figure 9001B or 9002B).
- (c) Place the one of the bearing cup presses (Figure 9001A or 9002A) over the support base guide pin and rest it on the back face of the bearing cup (45 or 60).
- (d) Use an arbor press to apply even pressure to the cup press. The bearing cup will then drop out.
- (e) Repeat steps (a) thru (d) for the remaining wheel half.

² How to Recognize and Prevent Tapered Roller Bearing Damage
available from Timken Company, Canton, Ohio 44706 U.S.A.

REPAIR

(2) Installation

Refer to Figure 6002 and install the bearing cups using the following procedure.

NOTE: The installation of the bearing cup is made easier when the bearing cup is frozen.

- (a) Make sure that the bearing bores and the bearing cups are clean and free of burrs.
- (b) Before installing, use a sub zero freezer or dry ice and freeze the bearing cups to between -34° to -51°C (-30° to -60°F).
- (c) Remove the bearing cup from the freezer or the dry ice.
- (d) Dry the bearing cups to remove the condensation.

NOTE: Do not let the primer coating dry before installing the bearing cup.

- (e) Apply a coat of primer to the bearing bore surface where the bearing cup will be installed. This will help prevent corrosion.
- (f) Place one of the wheel halves on the support base (Figure 9001D or 9002D). Align the mating bearing cup over the bore. Place one of the cup pushers (Figure 9001C or 9002C) on the front face of the cup.
- (g) Press the bearing cup into the bearing bore by applying even pressure to the cup installation tool. Make sure that the back face of the bearing cup is flush against the surface (shoulder) of the bearing bore. See Figure 6002.
- (h) See Figure 6002. Check for proper seating of the cup against the housing shoulder. Try to insert a 0.002 inch feeler gauge between the back surface of the bearing cup and the bearing bore shoulder.
 - (1) The feeler gauge must not be able to be inserted at any location between the back surface of the cup and the bearing bore shoulder.
- (i) Wipe off excess primer and let the wheel half cool to room temperature.
- (j) Apply a light coat of bearing grease to the bearing cup I.D. to prevent corrosion.
- (k) Repeat steps (a) thru (j) for the remaining wheel half.

REPAIR

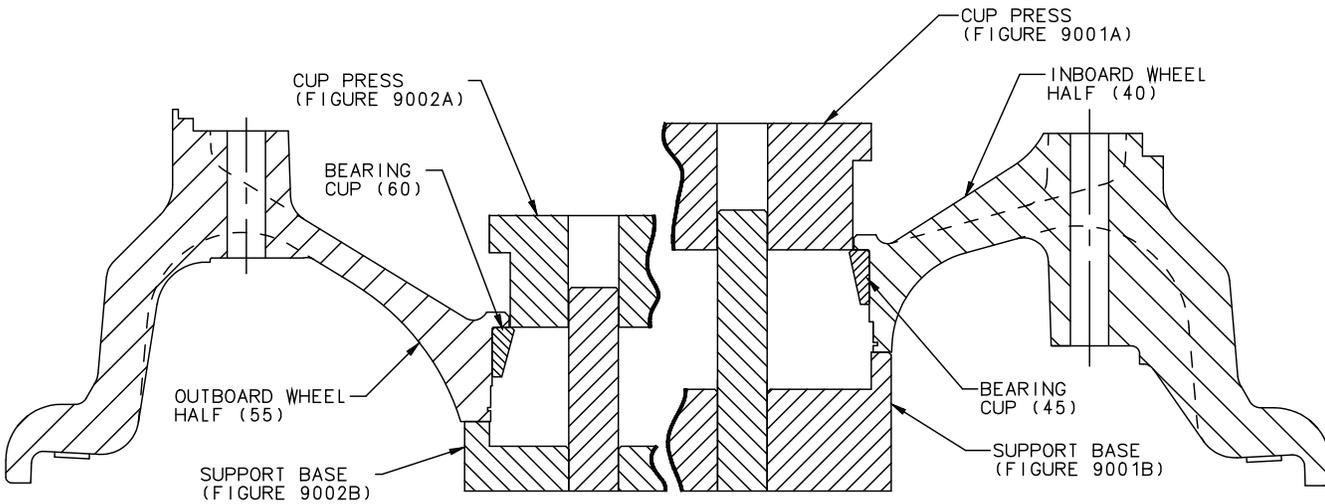


Figure 6001 Bearing Cup Removal

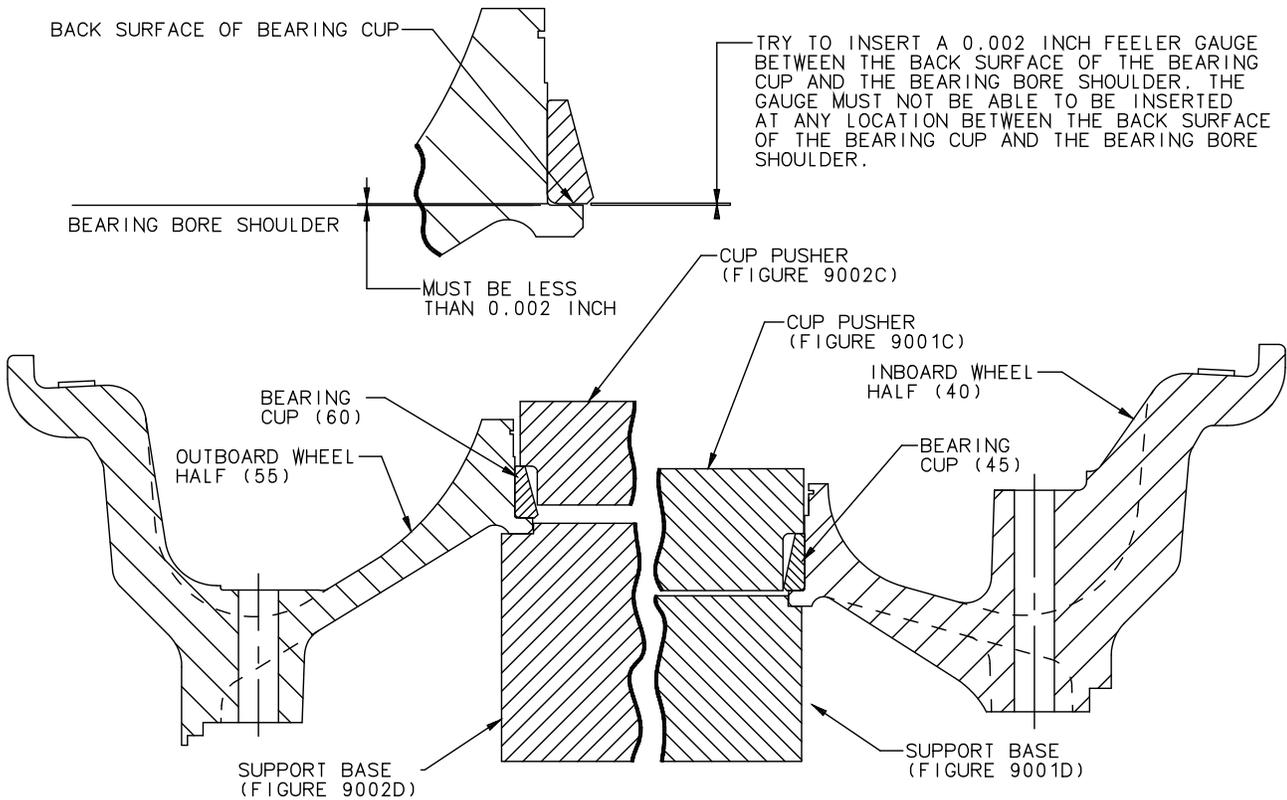


Figure 6002 Bearing Cup Installation

ASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

Assemble the wheel in a clean environment. Use flat work surfaces that provide adequate support.

A. Equipment and consumables

The term “Commercial Source” lets the repair facility get the product from a supplier of choice.

NOTE: Unless specified differently, equivalent alternatives can be used for the items listed.

Table 7001 Equipment and consumables

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Bearing grease	Mobil Aviation Grease SHC 100 (equivalent alternatives are not allowed)	ExxonMobil Oil Corporation
Preformed packing tool set	199-18	Aircraft Wheel and Brake, LLC or distributor
Standard tools (inch units)	Wrenches/sockets: <ul style="list-style-type: none"> • 12pt, external (inch, units) • Hex head, external (inch, units) Torque wrench	Commercial
Tire inflation safety equipment	Not applicable	Commercial
Tire pressure gage	Not applicable	Commercial
Dry nitrogen	Not applicable	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Clean cloths	Lint free	Commercial
Lubricant for preformed packing	Dow Corning 55 Lube or lube per MIL-G-4343	Dow Corning Corporation or Commercial Source

ASSEMBLY

B. Bearing Cone Grease Packing Procedure

The correct application of grease to the tapered roller bearing will reduce friction, dissipate heat and maintain a rust and corrosion proof coating on the operating surfaces of the roller bearings.

CAUTION: (DELETED)

NOTE: Pack the bearing cones just before installation to prevent contamination or pack the bearing cones immediately after cleaning and drying and then place them in a clean, closed container.

NOTE: Packing the bearings with grease is best performed with the use of a mechanical lubricating fixture such as a bearing greaser.

- (1) If necessary, clean the bearing cones. Refer to the CLEANING section.
- (2) Push the grease up between the rollers, cone and cage. Make sure that all empty spaces inside the cone are filled (see Figure 7001). Make sure that a thick coat of grease is applied to the roller surfaces on the outside of the cone.

NOTE: Shaded area shows the recommended quantity of grease.

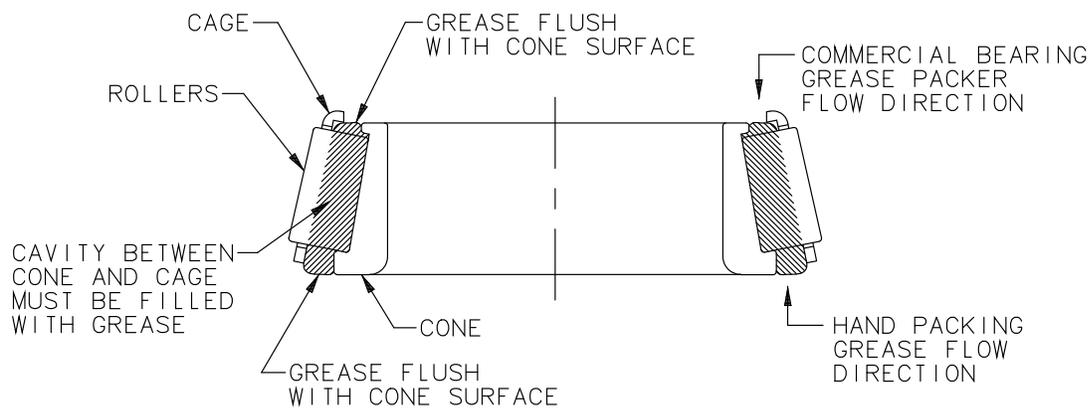


Figure 7001 Packing Bearing Cones

ASSEMBLY

2. Assembly Procedures

A. Install the Bearing Cups (45, 60)

If new bearing cups are necessary, install them now. Refer to the REPAIR section. If it is not necessary to replace them, continue to step 2.B.

B. Wheel and Tire Pre-Assembly Preparation

- (1) Examine the bead seat area of the wheel halves. If necessary, remove all lubricant, grease or foreign material with a clean cloth moistened with a mild soap and water solution or with denatured alcohol.
- (2) The mating surfaces of the wheel halves should not have nicks, burrs, small dents, or other damage. Damaged mating surfaces can prevent the wheel halves from mating or sealing.
- (3) The preformed packing (20) groove in each wheel half should be examined for damage or other debris that would prevent the packing from properly seating. Remove any lubricant, grease or foreign material with a clean cloth moistened with a mild soap and water solution or with denatured alcohol.
- (4) Examine the air valve grommet (70) for damage such as cuts, tears, cracking. Replace if necessary.
 - (a) Install the air valve assembly (65) in the outboard wheel half (55). Torque the air valve nut (85) to the values shown in Table 8002.

C. Tire Mounting

- (1) Place the inboard wheel half subassembly (35) on a clean work surface with the register side facing up.
- (2) Examine the wheel register preformed packing (20) for damage. Replace if necessary.
 - (a) Apply a light coat of Dow Corning 55 O-ring lube or a lube per MIL-G-4343 or an equivalent to the preformed packing before installation.

NOTE: A light coat of the wheel bearing grease can be used as an alternate.

CAUTION: THE PREFORMED PACKING (20) MUST BE INSTALLED UNIFORMLY. IT SHOULD BE FREE OF KINKS AND TWISTS.
 - (b) Install the preformed packing in the wheel register groove of the inboard wheel half (40).

ASSEMBLY

CAUTION: COMPOUNDS SUCH AS TALC INCREASE TIRE SLIPPAGE. REMOVING TALC WILL MINIMIZE TIRE SLIPPAGE ON THE WHEEL.

- (3) Make sure that the tire is clean inside. If it is not clean or is coated with a talc compound, then wipe the bead base with a clean cloth moistened with a mild dishwashing soap and water solution or a suitable rubber cleaner.

CAUTION: WHEN YOU INSTALL A TIRE, DO NOT APPLY A LUBRICANT TO THE TIRE OR THE WHEEL BEAD SEAT. A LUBRICANT CAN CAUSE THE TIRE TO SLIP IN SERVICE AND DAMAGE THE WHEEL BEAD SURFACE.

- (4) Place a serviceable tire (see airframe manufacturer's manual) over the inboard wheel half (40) being careful not to move the preformed packing (20).
- (5) Position the spacer (25) on the hub section of the inboard wheel half (40) then position the outboard wheel half (55) inside the tire and align the bolt holes of both wheel halves.
- (6) Align the red balance dot on the tire with the air valve hole.
- (a) If there is no balance dot on the tire.
- 1 Align the tire serial number with the air valve hole.

D. Attach the Wheel Half Subassemblies (35) and (50)

- (1) Install a washer (10) onto each bolt (5).

NOTE: The nuts (15) must be located on the outboard wheel half side.

- (2) Install the following equally spaced: a minimum of three bolts (5) [with installed washers (10)] through the holes in the brake disc (30) and align the brake disc on the bosses of the inboard wheel half (35), then:
- (a) Compress the wheel halves and install a washer (10) and nut (15) on each bolt. Tighten the nuts by hand.
- (3) Repeat steps (1) and (2) for the remaining bolts, washers and nuts.

CAUTION: DO NOT USE IMPACT OR POWER WRENCHES TO TORQUE THE WHEEL NUTS AND BOLTS. THE USE OF IMPACT OR POWER WRENCHES CAN CAUSE OVER TIGHTENING.

NOTE: The fasteners must be tightened by applying the torque to the nut while holding the bolt head.

NOTE: While tightening the fasteners, ensure that both ends of the spacer (25) are properly aligned and engaged on each wheel hub.

ASSEMBLY

- (5) Use the following steps and torque all of the nuts (15).
- (a) Step one: (1/3 final torque): Torque to 100 in-lb (11,3 N-m) in a criss-cross pattern.
 - (b) Step two: (2/3 final torque): Torque to 200 in-lb (22,6 N-m) in a criss-cross pattern.
 - (c) Step three: (final torque): Torque to 300 in-lb (33,9 N-m) in a criss-cross pattern.

NOTE: The application of “torque stripe” can be applied at the junction of the nut and the bolts. This will provide a monitor for torque retention. This can be done at the discretion of the maintenance facility

E. Tire Inflation

SAFETY WARNING:  ALWAYS PLACE THE TIRE IN AN INFLATION CAGE BEFORE INFLATING. INFLATING THE TIRE CAN BE VERY DANGEROUS. THE TIRE CAN EXPLODE. FAILURE TO USE AN INFLATION CAGE CAN CAUSE SERIOUS INJURY OR DEATH. SERVICE THE TIRE WITH INFLATION EQUIPMENT DESIGNED FOR THIS OPERATION.

DO NOT INFLATE THE TIRE TO THE OPERATING PRESSURE UNTIL THE WHEEL/TIRE ASSEMBLY HAS BEEN MOUNTED ON THE AIRCRAFT.

- (1) Inflate the tire to the service inflation pressure to seat the tire beads on the wheel. Then reduce the tire pressure to the recommended storage pressure and remove the wheel/tire assembly from the inflation cage.

F. Final Assemble the Wheel

- (1) Place the wheel/tire on a clean surface.
- (2) If not already done, pack the bearing cones (100, 105) with wheel bearing grease and put aside. Refer to paragraph 1.B. for the grease packing procedure.
- (3) Before installing the bearing cone, apply a light coat of wheel bearing grease to the following:
 - Exposed surfaces of the bearing cups (45, 60).
 - The outside profile of the grease seal (110).
 - The molded rubber of the hubcap assembly (115).

ASSEMBLY

- (4) Install a bearing cone (100) in the inboard wheel half subassembly (35) and then install the following in the hub of the inboard wheel half:
 - The grease seal (110).
 - The snap ring (120). Install the end of the snap ring into the groove in the hub of the inboard wheel half and wind or spiral the ring into the groove.
- (5) Install a bearing cone (105) in the outboard wheel half subassembly (50) and then install the following in the hub of the outboard wheel half:
 - The hubcap assembly (115).
 - The snap ring (125). Install the end of the snap ring into the groove in the hub of the outboard wheel half and wind or spiral the ring into the groove.
- (6) Put a cover on the inboard hub opening of the wheel to prevent the bearing from being contaminated with dirt and moisture. Keep the cover on until the wheel assembly is installed on the aircraft.
- (7) Test the wheel assembly. Refer to the TESTING AND FAULT ISOLATION section.

G. Install the Wheel and Tire Assembly On the Aircraft

- (1) Remove the hubcap assembly (115) and snap ring (125) from the outboard wheel half subassembly (50), then install the wheel and tire assembly on the axle.
- (2) Use the following steps to install the axle attaching hardware and tighten the axle nut.
 - (a) install the wheel bearing retaining washer and then the axle nut on the axle.
 - 1 Tighten the axle nut.
 - a. Tighten the axle nut to 300 in-lb (33,9 N-m) while rotating the wheel to make certain that the bearing cones are seated. Then back the torque off to 0 in-lb or a snug condition.

CAUTION: DO NOT EXCEED 120 IN-LB (13,5 N-M) ON FINAL TORQUE WHEN ADVANCING THE AXLE NUT TO ALIGN THE COTTER PIN HOLE OF THE AXLE AND ONE OF THE AXLE NUT SLOTS.
 - b. While rotating the wheel, re-torque the axle nut to 80 to 100 in-lb (9,0 to 11,3 N-m). If one of the slots in the axle nut do not line up with the cotter pin hole in the axle, continue to tighten the axle nut until the first available alignment is reached, but do not advance the axle nut using torque in excess of 120 in-lb (13,5 N-m).
 - c. Install the hubcap assembly (115) in the hub of the outboard wheel half subassembly (50) and secure with the snap ring (125).

FITS AND CLEARANCES

1. General

Refer to IPL Figure 1 for component identification.

A. Assembly wear limits

Table 8001 In-service wear limits

PART NAME (IPL item number)	FIGURE	WORN AREA DESCRIPTION	WORN DIMENSION
Brake Disc	1	Flange Thickness Warping	0.410 inch (10,414 mm) minimum 0.015 inch (0,381 mm) maximum

B. Assembly torque values

Table 8002 Assembly torque values

PART NAME (IPL item number)	TORQUE LIMITS
Nut (15)	300 in-lb (33,9 N-m) final torque apply anti-seize compound ¹
Nut (85) of the Air Valve Assembly (if so equipped)	60 to 80 in-lb (6,8 to 9,0 N-m)

¹ **NOTE:** Refer to ASSEMBLY section for applying anti-seize compound.

SPECIAL EQUIPMENT AND CONSUMABLES

1. General

This section contains source of supply information for all applicable sections of this manual.

A. Source of supply

NOTES:

- Unless specified differently, equivalent alternatives can be used for the items listed.
- Fabricated tools are for reference only. They are meant to provide design guidance and can be adjusted to meet the needs of the Repair Facility.

Table 9001 List of manufacturers

PRODUCT NOMENCLATURE	SPECIFICATION OR REQUIREMENT	SOURCE OF SUPPLY	DISASSEMBLY	CLEANING	CHECKS	REPAIR	ASSEMBLY
Preformed packing tool set	199-18	Aircraft Wheel and Brake, LLC Avon, OH 44011 U.S.A.	X				X
Plastic Media for stripping paint	MIL-P-85891, Type II or V, Grade 20/30, 3.5 MOH max	U.S. Technology Corp. Canton, OH 44702 U.S.A.		X			
Lubricant for preformed packing	Dow Corning 55 Lube or lube per MIL-G-4343	Dow Corning Corporation or Commercial Source					X
(Deleted)							
Bearing grease	Mobil Aviation Grease SHC 100 (equivalent alternatives are not allowed)	Exxon-Mobil Oil Company Aviation Lubricants Fairfax, VA U.S.A					X
Bearing Cup Tools	Figure 9001 and 9002	N/A				X	

SPECIAL EQUIPMENT AND CONSUMABLES

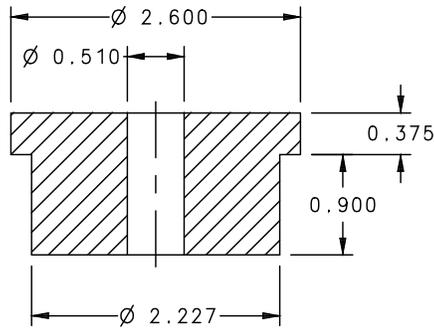


FIGURE 9001A
REMOVAL CUP PRESS
(INBOARD WHEEL HALF)

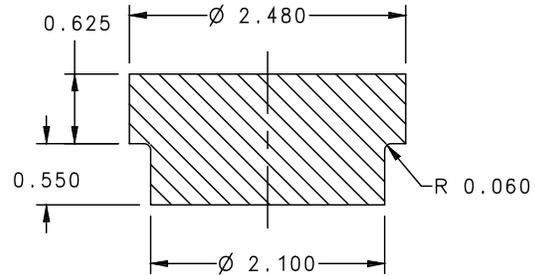


FIGURE 9001C
INSTALLATION CUP PUSHER
(INBOARD WHEEL HALF)

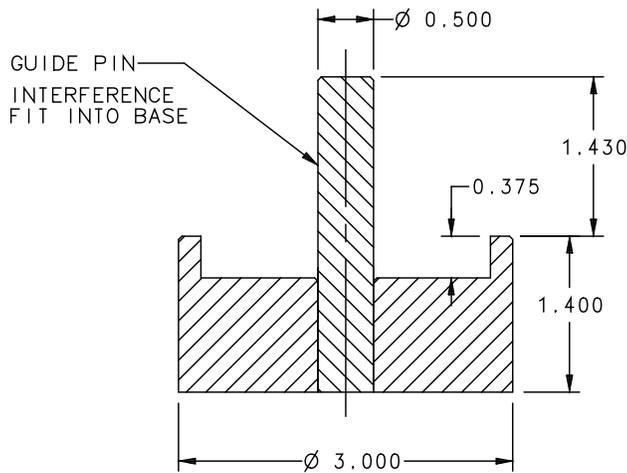


FIGURE 9001B
REMOVAL SUPPORT BASE
(INBOARD WHEEL HALF)

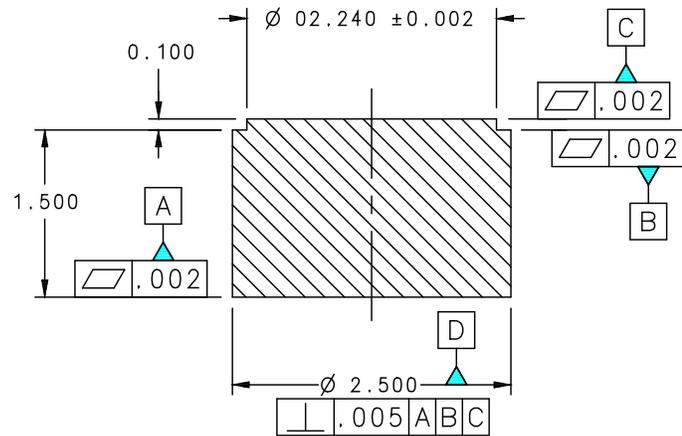


FIGURE 9001D
INSTALLATION SUPPORT BASE
(INBOARD WHEEL HALF)

Figure 9001 Inboard Wheel Half Bearing Cup Tools

Notes for Figure 9001:

1. Material: 4130 steel or equivalent
Heat treat to 40-45 Rc
2. Tolerances unless otherwise specified:
.XXX ± 0.010 inch
3. Break unspecified sharp edges
0.005-0.015 inch

SPECIAL EQUIPMENT AND CONSUMABLES

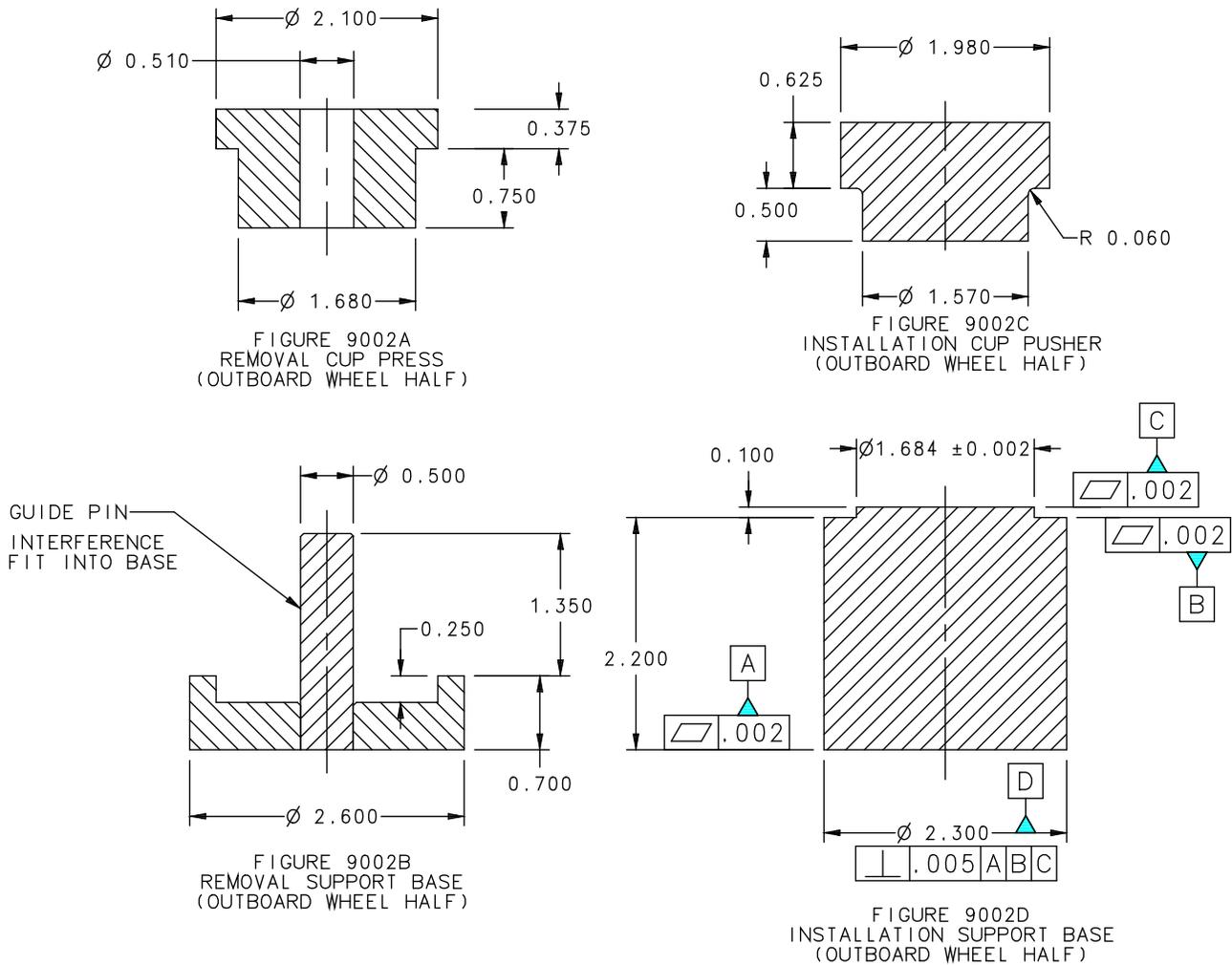


Figure 9002 Outboard Wheel Half Bearing Cup Tools

Notes for Figure 9002:

1. Material: 4130 steel or equivalent
Heat treat to 40-45 Rc
2. Tolerances unless otherwise specified:
.XXX \pm 0.010 inch
3. Break unspecified sharp edges
0.005-0.015 inch

ILLUSTRATED PARTS LIST

1. General

All parts are listed, except parts, which lose their identities by being permanently fastened to other parts of assemblies and cannot be disassembled.

A. Explanation of Columns

- (1) Fig: Refers to the applicable illustrated parts figure. A hyphen “-“ is used to indicate that the item is not illustrated.
- (2) Item: Refers to the applicable item in the illustrated parts list figure.
- (3) Units per assembly: Number of units required for the next higher assembly.
AR..... As Required (for bulk items) REF..... Reference
NP..... Item is Non-procurable
- (4) CAGE: Commercial And Government Entity code of part supplier.
- (5) Part No.: Part number of the item.
- (6) Description: This column identifies the parts being listed by noun name followed by modifiers when applicable. An indenture system using dots are used to show the relationship of the parts to the assembly.
Assembly
 - Subassembly or Item
 - • Item
- (7) Usable on code: This code is used to identify more than one configuration of the basic part number. Effectivity codes only apply to the figure in which they are used.

B. Part Numbering System

Unless specified differently by contract, the assigned Aircraft Wheel and Brake, LLC part number will be used in the part number column for all purchased and government standard off-the-shelf parts (such as MS, AN, NAS, etc.). If required by contract or if the original manufacturer of a purchased part has FAA manufacturing approval then; the original manufacturer’s part number along with the manufacturer’s federal supply code will be shown in parentheses following the part description. The letter “V” will precede the federal supply code.

C. Parts Replacement Data

The interchangeability relationship between parts is identified in the Nomenclature column of the parts list. A list of the terms used to show interchangeability and their definition is as follows:

<u>Term</u>	<u>Abbreviation</u>	<u>Definition</u>
Optional	OPT	This part is optional to and interchangeable with other parts in the same item number variant group or other item number if designated.
Superseded by	SUPSD BY	The part is replaced by and is not interchangeable with the item listed.
Supersedes	SUPSDS	The part replaces and is not interchangeable with the item listed.
Replaced by	REPLD BY	The part is replaced by and interchangeable with the item listed.
Replaces	REPLS	The part replaces and is interchangeable with the item listed.

D. Alpha Variant Item Numbers

Alpha variants A through Z (except I and O) are assigned to existing numbers when necessary to show:

- (1) Added items
- (2) Modification or configuration differences
- (3) Optional parts

Alpha variant item numbers are not shown on the exploded view when the appearance and location of the alpha variant item is the same as the basic item.

ILLUSTRATED PARTS LIST

2. Detailed parts list – main wheel assembly (Sheet 1 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY.
1 - 1	40-170A		MAIN WHEEL ASSEMBLY		RF
5	103-32500		• BOLT (MS21250-06056)		8
10	095-03100		• WASHER (MS20002C6)		16
15	094-15800		• NUT (NAS1804-6N)		8
20	101-24100		• PREFORMED PACKING (MS28775-266)		1
25	067-04100		• SPACER		1
30	164-20900		• BRAKE DISC		1
- 35	161-14900		• SUBASSEMBLY, WHEEL HALF, INBOARD		1
40	151-14200		• • WHEEL HALF, INBOARD		NP
45	214-01300		• • CUP, BEARING		1
- 130A	166-19700		• • NAMEPLATE (when item 35 is ordered as spares) (SUPSDS ITEM 130)		1
- 50	162-13700		• SUBASSEMBLY, WHEEL HALF, OUTBOARD		1
55	152-14000		• • WHEEL HALF, OUTBOARD		NP
60	214-03400		• • CUP, BEARING		1
65	160-01100		• • AIR VALVE ASSEMBLY (Tire & Rim P/N 716-05) (SUPSD BY ITEM 65A)		NP
- 65A	160-01101		• • AIR VALVE ASSEMBLY (Tire & Rim P/N 716-13) (SUPSDS ITEM 65)		1
70	-----		• • • GROMMET (Tire & Rim P/N RG-65)		RF
75	-----		• • • STEM, VALVE (Tire & Rim P/N 716-12)		RF
80	-----		• • • CORE, VALVE (Tire & Rim P/N C-4)		RF
85	-----		• • • NUT (Tire & Rim P/N HN-4)		RF
90	-----		• • • SPACER (Tire & Rim P/N S-10)		RF
95	-----		• • • CAP, VALVE (Tire & Rim P/N VC-5)		RF

ILLUSTRATED PARTS LIST

2. Detailed parts list – main wheel assembly (Sheet 2 of 2)

FIG. ITEM	PART NUMBER	AIRLINE STOCK NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	EFF CODE	UNITS PER ASSY.
- 130A	166-19700		• • NAMEPLATE (when item 50 is ordered as spares) (SUPSDS ITEM 130)		1
- 135	166-20000		• • NAMEPLATE, WARNING		1
100	214-01400		• CONE, BEARING, INBOARD		1
105	214-01000		• CONE, BEARING, OUTBOARD		1
110	154-03600		• GREASE SEAL		1
115	158-01900		• HUBCAP ASSEMBLY		1
120	155-00100		• SNAP RING, INBOARD		1
125	155-00600		• SNAP RING, OUTBOARD		1
- 130	166-15900		• NAMEPLATE (SUPSD BY ITEM 130A)		NP

Note: When ordering a replacement nameplate for the top assembly level, i.e. 40-170A, order P/N 166-19700, qty 1 which will identify the top assembly P/N. When ordering a replacement nameplate for the wheel half subassembly level, i.e. 161-14900 or 162-13700, order item 130A for the applicable subassembly. At the wheel half subassembly level, each nameplate identifies the wheel half subassembly P/N.

STORAGE

CAUTION: WHEELS STORED IN CARDBOARD BOXES, WHICH HAVE BECOME WET OR HAVE BEEN EXPOSED TO HIGH HUMIDITY, CAN BECOME CORRODED.

CAUTION: WHEELS STORED IN CARDBOARD BOXES, WHICH HAVE BECOME WET OR HAVE BEEN EXPOSED TO HIGH HUMIDITY, CAN BECOME CORRODED.

1. Procedures

The storage instructions are for wheels stored without the tires mounted.

A Rubber Based Components

The shelf life of components that are made of or contain a rubber based material is listed below. The serviceable life can be decreased by exposure to sunlight, very high or low temperatures, low humidity, ozone, contamination of fluids or lubricants, severe operating conditions, etc.

- (1) The preformed packing (20) has a shelf life of 15 years from the date of manufacture (also known as the cure date).
- (2) The following components that contain rubber based material have a shelf life of 15 years from the date of manufacture:
 - The air valve assembly grommet (70).
 - The grease seal (110) has bonded rubber.
 - The hubcap assembly (115) has bonded rubber.

B. Storage Time

NOTE: Wheel assemblies stored without the rubber based components installed have an indefinite storage life.

- (1) Use the instructions below to store a wheel assembly up to a maximum of 90 days.
 - (a) Plug or cover the wheel hub openings to help prevent dirt and moisture contamination.
- (2) Use the instruction below to store a wheel assembly for longer than 90 days:
 - (a) Remove and store all components that are made of or contain a rubber based material in separate ultraviolet protective containers.
 - (b) Remove and store the bearing cones (100), (105) in a clean, dry container.
 - (c) Apply a coat of bearing grease to the exposed surfaces of the installed bearing cups (45, 60) to prevent corrosion and plug or cover the wheel hub openings.
 - (d) Install a minimum of three sets of bolts, washers, and nuts (5, 10, and 15) at equally spaced locations. Tighten the nuts enough to keep the wheel halves secure. Do not tighten to the assembly torque value until the equipment is ready to be installed on the aircraft. Keep the remaining bolts, washers, and nuts in a clean, dry container.

- (3) Storage Conditions

The wheel assembly should be stored in a clean, dry environment. The desirable temperature range is from 10° to 25°C (50° to 77°F). Exposure to extreme temperatures can affect service life.

