Component Maintenance Manual

Nose Wheel Assembly
Cleveland Wheel & Brake Systems
Part No. 40-204

Publication No.: CM40-204, Revision A

Manufacturer:

CLEVELAND WHEEL & BRAKE SYSTEMS

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REVISION HIGHLIGHTS

TO: HOLDERS OF CM40-204 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR WHEEL ASSEMBLY PART NO. 40-204.

Revision NC, Dated 1983-09-15

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REVISION HIGHLIGHTS

TO: HOLDERS OF CM40-204 COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST FOR WHEEL ASSEMBLY PART NO. 40-204.

Revision A, Dated 2025-10-15

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RECORD OF REVISIONS

Check in the following record that all earlier changes have been incorporated.

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SERVICE BULLETIN LIST

Cleveland Wheel & Brake Systems Service Bulletins are issued in order to provide general information on product line concerns. The bulletin listings contained herein identify subject matter directly related to the support and function of the assembly and components.

Number	Subject	Rev	Date incorporated at manual revision

LIST OF EFFECTIVE PAGES

SUBJECT	PAGE	DATE	SUBJECT	PAGE	DATE
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				6002	2025-10-15
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				6004	2025-10-15
				6005	2025-10-15
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List of Effective Pages	LEP-1	2025-10-15		6009	2025-10-15
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	4002	2025-10-15		10003	2025-10-15
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N = New page No.
C = Changed page

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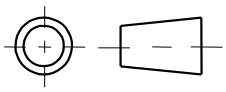
INTRODUCTION

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 Cleveland Wheel & Brake Systems 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, when applicable, 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 Cleveland Wheel & Brake Systems for the latest revision.

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

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INTRODUCTION

2. 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.

3. 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 injury and serious or life-threatening situations if 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.

4. Replacement parts

SAFETY WARNING: CLEVELAND WHEEL & BRAKE SYSTEMS (CWBS) DOES NOT WARRANT OR ASSUME THE RISK OF THE USE OF REPLACEMENT PARTS NOT AUTHORIZED FOR USE BY CWBS. OPERATORS WHO USE REPLACEMENT PARTS NOT AUTHORIZED BY CWBS 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

1. Description

Refer to IPL Figure 1 for component identification.

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH: (45), (50), (55), (80), (85). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

The nose wheel assembly is designed for use with both 6.50-10-6 ply or 22 x 6.75-10-8 ply tubeless or tube type tires. Bearing lubricant is Mobile Aviation Grease SHC 100.

Each wheel assembly is composed of the following base parts:

- two wheel halves: inboard (10) and outboard (30). The wheel halves are made from aluminum alloy and are surface treated and painted for corrosion protection.
- two sets of tapered roller bearings consisting of cups (15) and cones (70).
- one inflation valve (60) to inflate and deflate a tubeless tire.
- high-strength bolts (45), single countersunk washers (50), flat washers (85) and self-locking nuts (55).

A preformed packing (90) provides an air seal at the juncture of the wheel halves.

Bearing cups (15) are press-fit into each bearing hub of the wheel halves. Elastomer based seals (75) provide protection and lubricant retention for the bearings.

2. Operation

The nose wheel assembly provides the primary interface between the nose landing gear strut and tire during landing, turning, and taxiing.

3. Handling procedures

Handle the wheel bearing cones with extreme care. Many bearing failures can be traced to dropping or mishandling the bearings during maintenance.

Handle and maintain the wheel components properly to protect all paint and surface finishes.

4. Leading particulars

Wheel material ..... Aluminum alloy
Bearing lubricant ..... Refer to the REPAIR section
Wheel half coatings
Surface treatment:..... Refer to the REPAIR section
Primer coating:..... Refer to the REPAIR section
Finish coating:..... Refer to the REPAIR section

DESCRIPTION AND OPERATION

5. 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.

Table 1 Maintenance schedule

INTERVAL	ITEM	TASK (refer to the CHECKS section)
At every tire change	All components	Visual and detailed examination.
	Preformed packings (90) Grommet (65)	Replace.
At the following tire changes: 5th, 10th, 15th, 18th, 21st, 24th.	Wheel halves (10) and (30)	➢ Visual and detailed examination. ➢ Liquid penetrant inspection.
	Bolts (45)	➢ Visual examination. ➢ Magnetic particle inspection. ➢ Liquid penetrant inspection.
At the 25th tire change and every tire change thereafter	Wheel halves (10) and (30)	➢ Visual and detailed examination. ➢ Liquid penetrant inspection.
	Bolts (45)	➢ Visual examination. ➢ Magnetic particle inspection. ➢ Liquid penetrant inspection.
Every tire change or every 12 months (whichever occurs first)	Bearing cones (70)	Clean and repack with clean grease. Refer to the ASSEMBLY section.

TESTING AND FAULT ISOLATION

1. General

Refer to IPL Figure 1 for component identification.

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

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	Commercial source	Commercial
Dry nitrogen	Commercial source	Commercial
Standard tools (inch units)	Wrenches/sockets: • 12pt, external: for (45) and (55) • Hex head, external: for (60) Torque wrench Tire pressure gage	Commercial
Soap solution	Mild dishwashing liquid	Commercial

TESTING AND FAULT ISOLATION

2. Testing

Examine all wheel assemblies that do not meet the test standards of this section. Refer to Table 1002 Troubleshooting for possible causes.

SAFETY WARNING: DO NOT PERFORM TESTING ON ANY WHEEL ASSEMBLY THAT SHOWS SIGNS OF DAMAGE.

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

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

A. Tire inflation guidelines

- Use a clip-on chuck and an extension hose.
- Use a direct reading or dial type pressure gauge that is calibrated on a regular basis.
- When inflating a tire, regulate the supply line to a pressure no more than 50% higher than the tire service pressure.
- Use only dry nitrogen to inflate the tire.
- Inflate the tire to no more than the tire rated inflation pressure to seat the tire beads, then adjust inflation pressure to the airframe manufacturer's recommended inflation pressure.

B. Pretest examination of product

(1) Examine the wheel for corrosion, loose bearing cups, or visible damage.

(2) Examine all fasteners and threaded components for loose fit. Tighten loose fasteners to the torque value shown in FITS AND CLEARANCES section. Refer to Table 8001, Assembly torque values.

NOTE: The self-locking feature of the nuts (55) is defective if the nut can be turned onto the bolt by hand, past the nut's locking section or the nut cannot be tightened to the required torque value. If one nut is defective, then replace all of the nuts.

(3) Examine the tires for cuts, flat spots, or damage to the tread or sidewall.

NOTE: Refer to tire manufacturer's service and maintenance manual.

TESTING AND FAULT ISOLATION

C. 24 hour pressure retention test

CAUTION: COVER OR PLUG THE BEARING HUB OPENINGS OF THE OUTBOARD WHEEL HALF TO PREVENT CONTAMINATION OF THE BEARING BORE AREAS.

(1) Use the proper tire inflation safety equipment.

(2) Inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure.

(a) Deflate the tire to equalize stretch.

(b) Re-inflate the tire to the airframe manufacturer's recommended inflation pressure.

(c) Allow 12 hours minimum for a new tire to stretch.

(d) Measure the tire pressure. If necessary, re-inflate the tire to the airframe manufacturer's recommended inflation pressure.

(3) The wheel/tire assembly must hold the airframe manufacturer's recommended inflation pressure for 24 hours. A maximum 5% pressure drop is allowed.

(4) If pressure drop is 5% or less:

(a) The pressure retention test is successfully completed.

(b) Refer to F. Preparation for return to service.

(5) If pressure drop is greater than 5%:

(a) Inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure.

(b) Apply a soap and water solution to the following:

- juncture around the inflation valve (60)
- the tire bead area

(c) Examine for air leaks. Refer to D. Leakage diagnosis for additional procedures.

D. Leakage diagnosis

(1) Perform the following examinations to determine if an air leak exists at the inflation valve (60).

(a) Inflation valve could be loose and not seated. Refer to Table 8001 and torque to specification. Inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure.

1 If the leakage continues, deflate the tire completely and remove the leaking component. Examine the components for damage.

a Examine the component grommet (65) for cuts, tears, deformation or other damage that would prevent the grommet (65) from properly sealing and replace as necessary.

TESTING AND FAULT ISOLATION

(b) Outboard wheel half (30) could be damaged. Examine the mating surfaces of the inflation valve (60) for damage that would prevent the corresponding preformed packing (90) or grommet (65) from properly sealing.

1 Wheel half must be replaced if the mating surface is damaged.

(c) After leakage diagnosis has been resolved and corrected, inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure and perform the 24 hour pressure retention test.

(2) Perform the following examinations to determine if an air leak exists at the tire bead area.

(a) Deflate the tire completely.

(b) Remove the tire from the wheel assembly.

(c) Examine the tire bead and wheel bead seats for damage.

1 Examine the tire bead for cuts or other damage that would prevent the tire from properly sealing. Replace tire, if damaged.

2 Examine the wheel bead seat on both wheel halves (10) and (30) for damage that would prevent the tire from properly sealing.

a Repair the damaged area in accordance with the repair limits or replace the part if damage exceeds the repair limits.

(d) After leakage diagnosis has been resolved and corrected, then:

1 Reassemble the wheel/tire and inflate the tire with dry nitrogen to the airframe manufacturer's recommended inflation pressure.

2 Perform the 24 hour pressure retention test.

(3) An air leak can occur through the wheel if the wheel half (10) or (30) is cracked. Perform the following examinations to determine if an air leak exists due to a cracked wheel half.

(a) Deflate the tire completely.

(b) Remove the tire from the wheel assembly and disassemble the wheel to the level necessary to examine the wheel halves.

1 Liquid Penetrant inspect the wheel halves (10) and (30) and check for cracks. If cracks are found, replace the wheel half.

(c) After leakage diagnosis has been resolved and corrected, reassemble the wheel/tire and perform the 24 hour pressure retention test.

E. Preformed packing (90)

It is possible for leakage to occur where the wheel halves mate. If the wheel is disassembled for other possible leakage examinations, check the following:

(1) Examine the preformed packing (90) for cuts, tears, deformation, or other damage that would prevent a positive seal.

(2) Examine the wheel halves (10) and (30) in the register/sealing groove areas for damage that would prevent a positive seal.

(3) Ensure wheel half is lubricated with Dow Corning 55 O-ring lubricant.

F. Preparation for return to service

(1) Complete the final assembly of the wheel by installing any remaining components. Refer to the ASSEMBLY section.

TESTING AND FAULT ISOLATION

3. Troubleshooting

Table 1002 cannot list all possible problems and is intended to assist with troubleshooting.

Table 1002 Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTION
Loss of tire pressure at the: • inflation valve	Damage to the inflation valve (60) or grommet (65).	Replace the damaged part.
	Damage to the mating sealing surface on the outboard wheel half (30).	
Loss of tire pressure at the tire bead	Damage to the tire	Replace the damaged part.
	Damage to the bead seat area of the wheel half (10) or (30).	
Loss of tire pressure - other	Loss of the preload on wheel bolts (45).	Examine bolts (45) for damage and the nuts (55) for damage to self-locking feature.
	A possible cracked wheel half (10) or (30).	Use Liquid Penetrant Inspect to examine the wheel half for cracks. Refer to the CHECKS section.
	Possible damage to preformed packing (90) or register/sealing groove areas of wheel halves (10), (30).	Replace preformed packing. Examine wheel halves.
	Grommet (65) not lubricated with Dow Corning 55.	Examine preformed packing for lubricant. Apply lubricant as needed.
Excessive drag on the wheel when rotating.	Incorrect preload or torque on the axle nut.	Loosen and retighten the axle nut to the aircraft manufacturer's specifications.
	Damage to a bearing cone (70) or cup (15). **NOTE:** Damage could result from incorrect axle nut torque, misalignment of bearings; lack of or contamination of bearing grease.	Examine the bearing cones and cups. If a cup or cone is damaged or corroded, replace all cups and cones. Cups and cones should be replaced as a matched set. Pack new cones with clean bearing grease. Refer to the ASSEMBLY section.

TESTING AND FAULT ISOLATION

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

Pretest examination of product

(1) Wheel condition **Pass** _____ **Fail** _____

(2) Wheel assembly hardware condition **Pass** _____ **Fail** _____

(3) Tire condition **Pass** _____ **Fail** _____

Comments: _____

_____

_____

_____

24 hour pressure retention test **Pass** _____ **Fail** _____

Tire inflation pressure: _____ psig

Pressure after 24 hr: _____ psig Pressure Drop Allowed: 5% max.

Pass ____ 5% or less.

Fail ____ greater than 5%.

Leakage at inflation valve (60): Yes ____ No ____

Leakage at bead seat: Yes ____ No ____

Leakage through wheel: Yes ____ No ____

Leakage due to damage at wheel register/sealing groove or preformed packing (90): Yes ____ No ____

Comments: _____

_____

_____

_____

Tester: _____ **Date:** _____

DISASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

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	Cleveland Wheel & Brake Systems or distributor
Standard tools (inch units)	Wrenches/sockets: • 12pt, external: for (45) and (55) • Hex head, external: for (60)	Commercial
Portable tire bead breaker	Commercial source	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Valve core tool	Commercial source	Commercial

2. Replace Components

A. In addition to replacement at the scheduled maintenance interval, replace the preformed packings (90) and grommet (65) if they are removed for any reason. Seals can take a set over time and should not be reused.

3. Remove the wheel assembly

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

SAFETY WARNING: FOLLOW THE AIRFRAME MANUFACTURER’S INSTRUCTIONS AND SAFETY WARNINGS WHEN WORKING WITH AND AROUND THE AIRCRAFT.

A. Refer to the airframe manufacturer’s instructions to lift and support the aircraft.

B. Refer to the airframe manufacturer’s instructions to remove the wheel/tire unit from the aircraft.

DISASSEMBLY

4. Disassemble the wheel assembly

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

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.

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

NOTE: The bearing cups (15) are press-fit into both hub ends of the wheel halves (10), (30). Removal is based on the following conditions or requirements:

- For replacement due to damage.
- For a more thorough inspection of the wheel half, e.g. liquid penetrant inspection.

Refer to the REPAIR section for removal/installation instructions.

A. Remove air from the tire by depressing the valve stem plunger in the inflation valve (60) until air can no longer be heard escaping from the tire.

B. When all the tire pressure is released, then carefully remove the valve core from the valve stem.

CAUTION: INFLATION VALVE REMOVAL IS REQUIRED TO ENSURE TIRE DEFLATION.

C. Unthread and remove the inflation valve (60). Remove and discard the grommet (65).

D. Remove the snap rings (80) from the hub ends of the wheel halves (10), (30). Then, remove the grease seals (75) and bearing cones (70).

E. 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 WILL DAMAGE THE SURFACES OF THE WHEEL.

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

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

G. Remove the nuts (55), bolts (45), and washers (50) and washers (85).

H. Separate the wheel halves.

I. Remove and discard the preformed packing (90).

CLEANING

1. General

Refer to IPL Figure 1 for component identification.

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	Alkaline based	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Mineral spirits	Commercial source	Commercial

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

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

2. Clean the hardware

The following hardware is made from steel: (45), (50), (55), (60), (80).

SAFETY WARNING: FOLLOW THE MANUFACTURER’S INSTRUCTIONS AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

A. Use an alkaline based degreasing solution or Stoddard Solvent (per MIL-PRF-680) and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

CLEANING

CAUTION: CLEAN THE BEARING CUPS (15) AND CONES (70) CAREFULLY IN A SEPARATE CONTAINER OF CLEAN SOLVENT TO AVOID CONTAMINATION.

CAUTION: DO NOT USE COMPRESSED AIR TO DRY BEARING CONES. SPINNING CAN RESULT IN DAMAGE TO THE BEARINGS. LET THEM AIR DRY.

C. Clean bearing cups (15) and cones (70) in a separate container of mineral spirits. Use a non-metal soft bristle brush to remove all deposits of dirt, grease, and other contamination, then dry thoroughly.

NOTE: Repack bearing cones with clean grease in accordance with ASSEMBLY section.

3. Clean the grease seals (75)

The grease seals have a bonded nitrile material on a metal ring. Wipe the seals with a clean soft cloth dampened in a mild soap and water solution, then dry thoroughly.

4. Clean the wheel halves (10), (30)

The wheel halves are made from aluminum alloy.

SAFETY WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

A. Use an alkaline based degreasing solution and a non-metal soft bristle brush to remove any hardened dirt or grease deposits.

B. Rinse in clean water and dry thoroughly.

C. Remove the protective coatings (primer and topcoat).

CAUTION: IN ADDITION TO REMOVING THE COATING, THE PLASTIC MEDIA WILL ALSO REMOVE ANY NAMEPLATES (20), (35), (40) THAT ARE ATTACHED. A NAMEPLATE THAT IS DAMAGED OR REMOVED DURING THE PLASTIC MEDIA PROCESS WILL REQUIRE REPLACEMENT. REFER TO IPL FIGURE 1 FOR THE NAMEPLATE PART NUMBER.

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

(1) Part must be clean. This will remove dirt and other deposits that can contaminate the blast media.

(2) Blast the part per MIL-STD-1504 with plastic media.

CHECKS

1. General

Refer to IPL Figure 1 for component identification.

NOTE: All parts must be cleaned before examination. Refer to the CLEANING section.

NOTE: In addition to the general inspection, follow detailed inspection of applicable components.

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
Inspection surface plate	Commercial source	Commercial
Magnifier	X10 Magnification	Commercial
Micrometers	Commercial source	Commercial
Vernier dial calipers	Commercial source.	Commercial
Magnetic particle inspection kit	ASTM E1444	Commercial
Liquid penetrant inspection kit	ASTM E1417	Commercial

CHECKS

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH: (45), (50), (55), (80), (85). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

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

CAUTION: REPAIR OR REWORK OF PLATED HARDWARE INCLUDING STRIPPING AND RE-PLATING IS NOT ALLOWED. DO NOT STRIP PLATING MATERIAL TO INSPECT A BOLT. REMOVAL OF PLATING MATERIAL WILL CAUSE THE BOLTS TO CORRODE.

2. General inspection

A. Examine visible surfaces of the following for corrosion, distortion, wear, burrs, pitting, nicks, cracks, chips, or other visible signs of damage: (10), (15), (30), (45), (50), (55), (60), (70), (80), (85).

NOTE: Replace hardware that has damage to any protective coating, such as cadmium plating.

(1) Examine parts with sealing surfaces and grooves. Damage to the sealing surfaces could damage preformed packings during installation.

(2) Examine parts with threads for damage to threaded areas.

3. Examine the bolts (45) and nuts (55)

SAFETY WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS FOR USE AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

A. In accordance with the maintenance schedule (Table 1, DESCRIPTION AND OPERATION), use magnetic particle inspection (ASTM E1444; acceptance criteria per MIL-STD-1907, Grade A) or liquid penetrant inspection (ASTM E1417, Type 1, Method A, Sensitivity Level 2; acceptance criteria per MIL-STD-1907, Grade B) to inspect the bolts for cracks in the radius under the bolt head and in the threaded area next to the bolt shank.

NOTE: If a bolt or nut needs to be replaced, then replace all of the bolts and nuts at the same time.

B. Examine and replace the nuts for damage to the self-locking feature. If the nut can be turned onto the bolt by hand, past the nut's self-locking section or the nut cannot be tightened to the required torque value, then replace.

4. Examine the grease seals (75)

A. Examine the elastomer to metal bond. Replace the seal if there is a tear in the elastomer to metal bond or if the elastomer shows signs of damage.

CHECKS

5. Examine the bearing cups (15) and cones (70)

The bearing cups are press-fit into both hub ends of the wheel halves (10), (30). Refer to the REPAIR section for removal/installation instructions.

NOTE: [1] Refer to the bearing manufacturer's brochure/manual for detailed information.

NOTE: Replace bearing cups and cones as a matched set. It is recommended that both inboard and outboard sets of cups and cones be replaced at the same time.

A. Examine the cups in the wheel half for loose fit, wear, corrosion, spalling, brinelling, nicks, scratches, water staining, pitting, and heat discoloration.
B. Examine the roller surfaces of the bearing cones for wear, corrosion, spalling, pitting and heat discoloration.
C. Examine the bearing cone cage for dents or distortion. Examine the roller pocket sides, corners, and ends for wear.

6. Examine the wheel halves (10), (30)

NOTE: Wheel halves are not procurable at the 151- or 152- part level and must be obtained at the 161- or 162- wheel half subassembly level.

NOTE: Replace bearing cups and cones as a matched set. If replacing a wheel half subassembly, replace the bearing cup of the remaining wheel half subassembly and both bearing cones.

A. Examine the exterior surface for missing paint.
B. Examine the wheel halves for surface cracks, nicks, corrosion, or other damage.
   NOTE: Look closely at the bead seat area for corrosion.
C. Examine the inboard and outboard wheel half register grooves. Examine for burrs, corrosion, or other raised edges that could damage the preformed packing (90) during installation or prevent an effective seal during operation.
D. Examine the outboard wheel half (30) for the following:
   (1) The inflation valve (60) boss for corrosion, burrs, or other raised edges that could damage the grommet (65) during installation or prevent an effective seal during operation.

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

CHECKS

SAFETY WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

E. In accordance with the maintenance schedule (Table 1, DESCRIPTION AND OPERATION), examine the wheel halves for cracks using liquid penetrant inspection (ASTM E1417, Type 1, Method A, Sensitivity Level 2; acceptance criteria per MIL-STD-1907, Grade B).

(1) Refer to Figure 5001 and visually inspect wheel halves for surface cracks, nicks, corrosion or other damage. Examine these areas carefully to determine if the wheel is serviceable. Replace the wheel half if cracks are found.

NOTE: The protective coatings (primer and topcoat) must be removed from the part before using liquid penetrant inspection methods. Refer to the CLEANING section for paint removal and cleaning instructions.

- Examine the bead seat area. The tire bead seat area is typically an area of stress concentration and possibly subjected to trauma from tire beads and tools used to remove tires.
- Examine the bolt bosses.
- Examine the inflation valve area on the outboard wheel half.

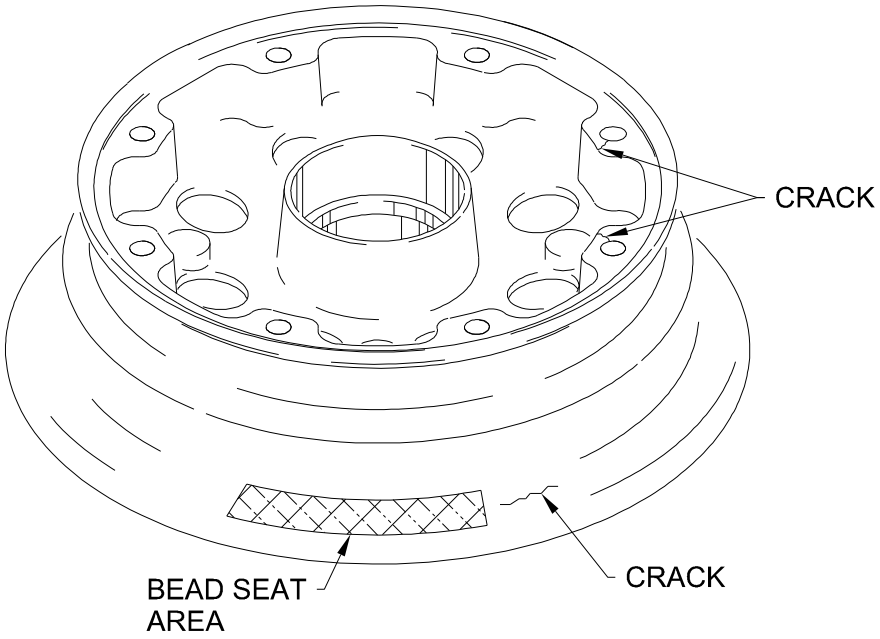


Figure 5001 Wheel half inspection

REPAIR

1. General

Refer to IPL Figure 1 for component identification.

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
Surface treatment for (10), (45)	Alodine 1200 or equivalent MIL-DTL-5541, Type I or Type II, Class 1A (Ref. QPL-81706)	Commercial
Paint application equipment	Commercial source	Commercial
Protective coatings for (10), (30)	Refer to Table 6003	Refer to Table 6003
Tools for bearing cups (15)		
Removal tools Installation tools	Figures 9001, 9002 Figures 9003, 9004	Fabrication
Heat source methods for (10), (30)	Range capacity: up to 200°F (93°C): • Infrared lamp • Continuous run temperature chamber • Temperature control LOCALIZED thermal A/C Cover (TACCO) • Induction heating system	Commercial
Refrigeration source methods for (15)	Range capacity: -25°F to -65°F (-32°C to -54°C): • Subzero freezer • Dry ice	Commercial
Primer	MIL-PRF-23377, Type 1, Class C2	Commercial
Arbor press	Commercial source	Commercial
Feeler gauge	0.002 inch (0.051 mm)	Commercial
Bearing grease (equivalent alternatives are not allowed)	Mobil Aviation Grease SHC 100	ExxonMobil Oil Corporation
	Aeroshell Grease 58 per AMS3058	Shell Aviation
	NYCO GN 3058 per AMS3058	NYCO

REPAIR

SAFETY WARNING: THIS ASSEMBLY CONTAINS PARTS THAT HAVE A CADMIUM PLATING FINISH: (45), (50), (55), (80), (85). REMOVING THE CADMIUM PLATING CAN CREATE EXPOSURE TO CADMIUM DUST AND CADMIUM COMPOUNDS. THIS CAN BE A POTENTIAL HEALTH HAZARD.

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 COMPONENTS AND WILL CAUSE CORROSION.

CAUTION: REPAIR IS LIMITED TO THE PARTS LISTED IN THIS SECTION. THE FOLLOWING ITEMS ARE NOT REPAIRABLE AND MUST BE REPLACED IF WORN OR DAMAGED:

- HARDWARE: (45), (50), (55), (60), (80), (85)
- COMPONENTS THAT CONTAIN ELASTOMERS: (65), (75), (90)

CAUTION: THE FOLLOWING ITEMS ARE NOT PROCURABLE. ORDER THE NEXT HIGHER ASSEMBLY IF ITEM CANNOT BE REPAIRED:

- INBOARD WHEEL HALF (10). MUST ORDER ITEM (5).
- OUTBOARD WHEEL HALF (30). MUST ORDER ITEM (25).

NOTE: New and overhauled wheel assemblies shipped from Cleveland Wheel & Brake Systems will have wheel bearings packed with SHC 100 grease.

2. Repair and paint the wheel halves (10), (30)

The wheel halves are made from an aluminum alloy. Repair is limited to the following.

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

A. External surface damage repair.

Remove all corrosion and surface damage from the wheel halves. Refer to the limits shown in this paragraph, Table 6002, Figure 6001 and 6002.

CAUTION: THE REPAIR LIMITS ARE GIVEN BASED ON THE ORIGINAL MATERIAL THICKNESS.

CAUTION: DO NOT REMOVE MATERIAL FROM AN AREA IF MATERIAL ON THE SURFACE DIRECTLY OPPOSITE WAS REMOVED. REFER TO FIGURE 6001 and 6002.

NOTE: Replace wheel halves with corrosion or damage beyond the limits shown in Table 6002.

(1) Remove all sharp corners and raised edges which can result in stress concentrations. Blend out small nicks, gouges, scratches, and light corrosion. Remove the material to produce a blended contour from the repaired surface to the adjacent surface. Unless specified differently, local repairs must be within the areas specified in Figure 6001 and 6002 and at least 3.00 inch (76.2 mm) apart.

B. Clean the wheel halves. Refer to the CLEANING section.

SAFETY WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

C. Apply a surface treatment (Alodine 1200 or equivalent) to repaired areas.

REPAIR

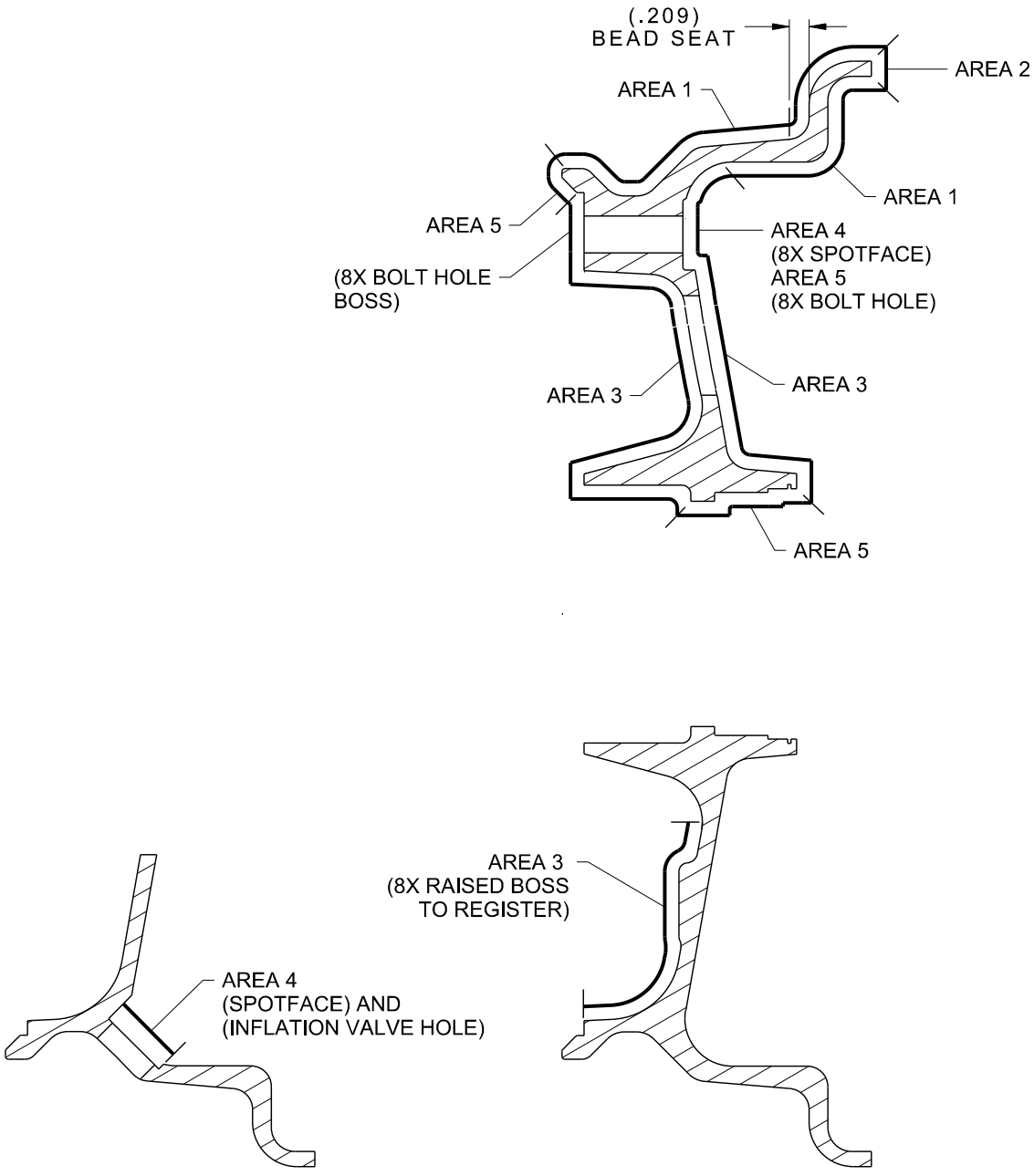


Figure 6001 Inboard Wheel Half Repair Limits

REPAIR

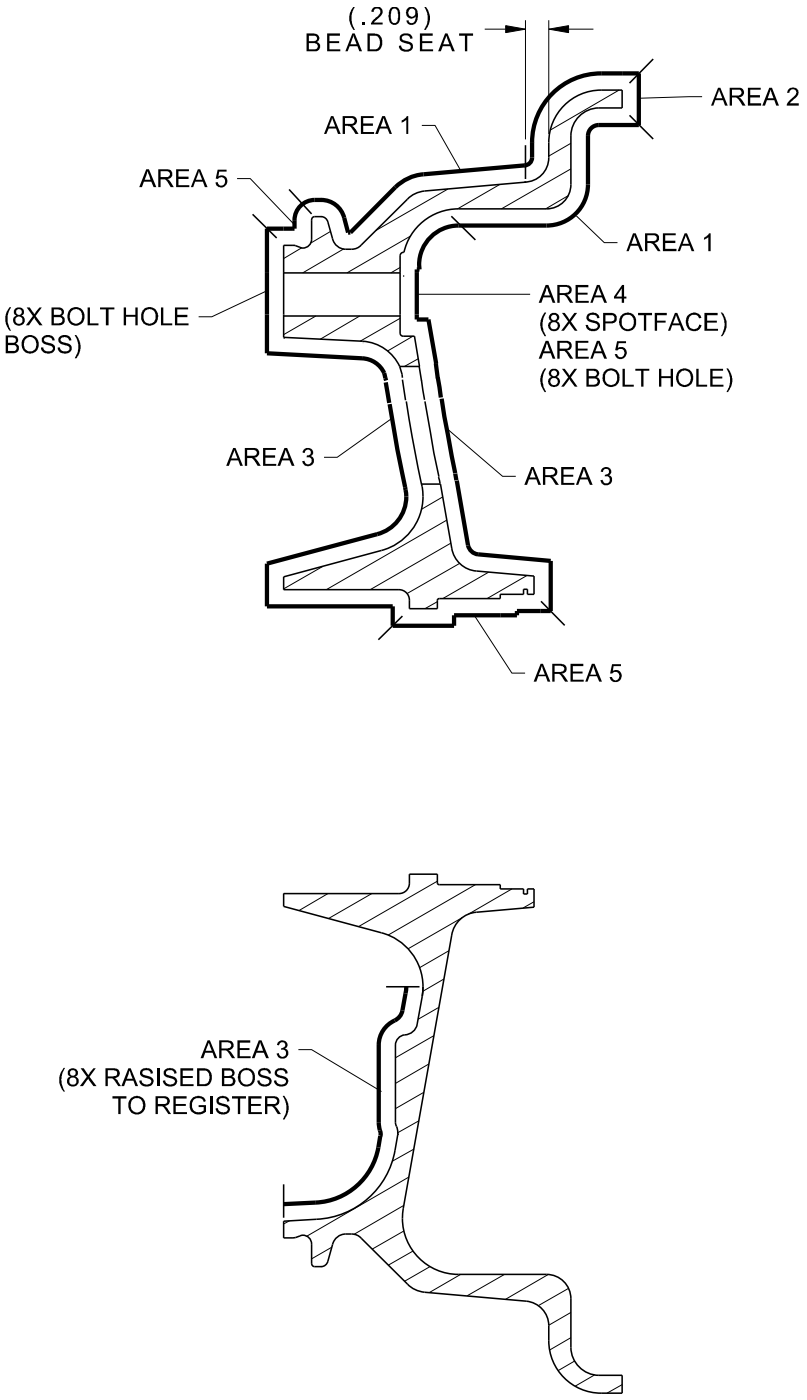


Figure 6002 Outboard Wheel Half Repair Limits

REPAIR

Table 6002 Repair Limits

AREA	TYPE OF REPAIR	MAX. DEPTH	REPAIR LIMIT/AREA	√ FINISH (RMS)	SPECIAL INSTRUCTIONS
1	Blend	0.010 IN max (0.25 mm)	1.00 IN^2 (645.16 mm^2)	32 √	Not in opposing areas. Maximum of 2 places equally spaced. Surface in bead seat to be 32 microfinishes RMS.
2	Blend	0.020 IN max (0.51 mm)	1.00 IN^2 (645.16 mm^2)	-----	Not in opposing areas. Minimum distance between areas: 3 inch (76.2 mm).
3	Blend	0.010 IN max (0.25 mm)	0.50 IN^2 (322.60 mm^2)	64 √	Not in opposing areas. Minimum distance between areas: 3 inch (76.2 mm).
4	Remove Corrosion, Do Not Blend to Adjacent Surface	0.010 IN max (0.25 mm)	0.020 IN^2 (12.90 mm^2)		
5	None Permitted	-----	-----	-----	-----

REPAIR

D. Paint the wheel halves

SAFETY WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND REFER TO THE MATERIAL DATA SAFETY SHEET FOR SAFETY INSTRUCTIONS.

(1) For small area paint touchup.

(a) Prepare the area by sanding lightly with 400 to 600 grade or finer, wet or dry aluminum oxide cloth and feather out all edges of the adjacent area.

(b) Clean the area.

(c) Touch up the area with primer and topcoat.

(2) For complete primer and topcoat application:

NOTE: Performed if primer and topcoat was removed from entire part by plastic media blasting.

(a) Confirm that the part has been cleaned and surface treatment applied if repair work was performed.

(b) Mask the wheel halves. Refer to Figures 6003 and 6004.

(c) Apply the primer and the topcoat.

NOTE: Results can vary and depend on the environment and the equipment used. To achieve the best results, always refer to the manufacturer's instructions for mixing, application and use.

Table 6003 Wheel halves primer and topcoat specifications

MANUFACTURER	PRIMER	TOPCOAT
Sherwin Williams Co. Cleveland, OH	P/N P60G2 primer (2 parts) P/N R7K44 reducer (3 parts) -or- P/N P60G10 primer P/N R2K4 reducer (as needed)	P/N F63W13 (white) (2 component polyurethane) 6 parts base 1 part catalyst, P/N V66V27 P/N R7K84 reducer (as needed)
	Primer Thickness: 0.0002-0.0004 inch Drying Time (air dry): [1] To touch: 3 to 10 minutes Tack free: 10 to 15 minutes To topcoat: 10 to 60 minutes	Topcoat Thickness: 0.0008-0.0014 inch (including primer) Drying Time (air dry): [1] To touch: 20 minutes To handle: 60 minutes Dry hard: overnight

[1] Refer to the manufacturer's data sheet for the forced dry (heat accelerated cure) schedule.

REPAIR

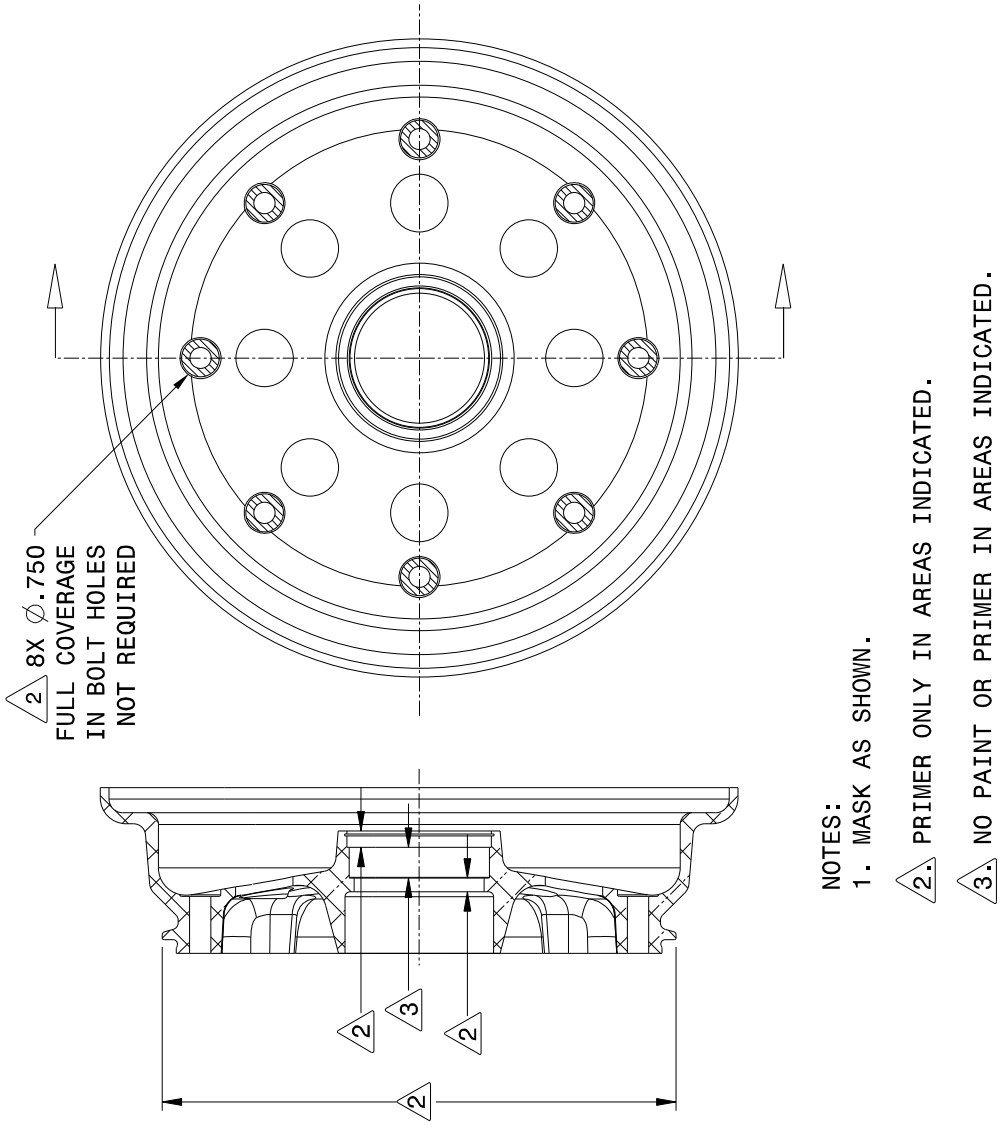


Figure 6003 Mask the inboard wheel half (10)

REPAIR

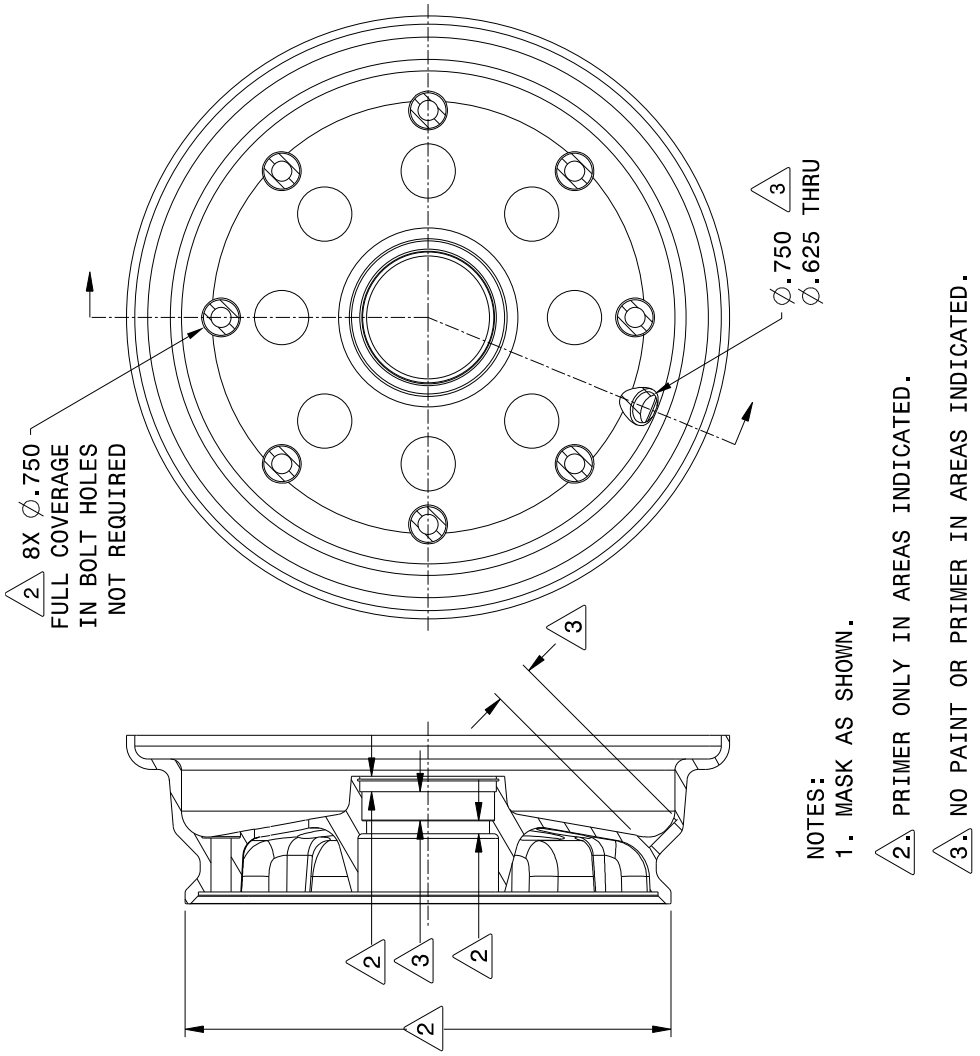


Figure 6004 Mask the outboard wheel half (30)

REPAIR

3. Replace the bearing cups (15)

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

CAUTION: BEARING CUPS AND CONES MUST BE REPLACED AS A SET. WHEN REPLACING BEARING CUPS, ALSO REPLACE THE BEARING CONES. REPLACE BOTH INBOARD AND OUTBOARD SETS OF CUPS AND CONES AT THE SAME TIME.

CAUTION: REMOVE THE INFLATION VALVE (60) BEFORE HEATING THE INBOARD WHEEL HALF.

CAUTION: WORK SWIFTLY. THERMAL EXPANSION AND CONTRACTION OF PARTS WILL AFFECT THE INSTALLATION PROCESS.

CAUTION: 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.

CAUTION: AVOID RAISING BURRS IN THE WHEEL HALF BORE WHEN REMOVING AND INSTALLING THE BEARING CUP.

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

A. Removal

Refer to Figure 6005 and the following procedure to remove a bearing cup from the inboard and outboard wheel half.

CAUTION: DO NOT HEAT THE WHEEL HALF ABOVE 200°F (93°C).

NOTE: As an option, the removal of the bearing cups can be made easier when the wheel half is heated to 175°F (79°C). See Table 6001 for a list of methods.

(1) If wheel half was heated, remove from the heat source.

(2) Position the wheel half on the support base so that the end with the counter bore diameter is positioned facing up.

(3) Position the push plate on the back face of the bearing cup.

(4) Use an arbor press to apply even pressure to the push plate until the bearing cup drops out of the hub.

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

REPAIR

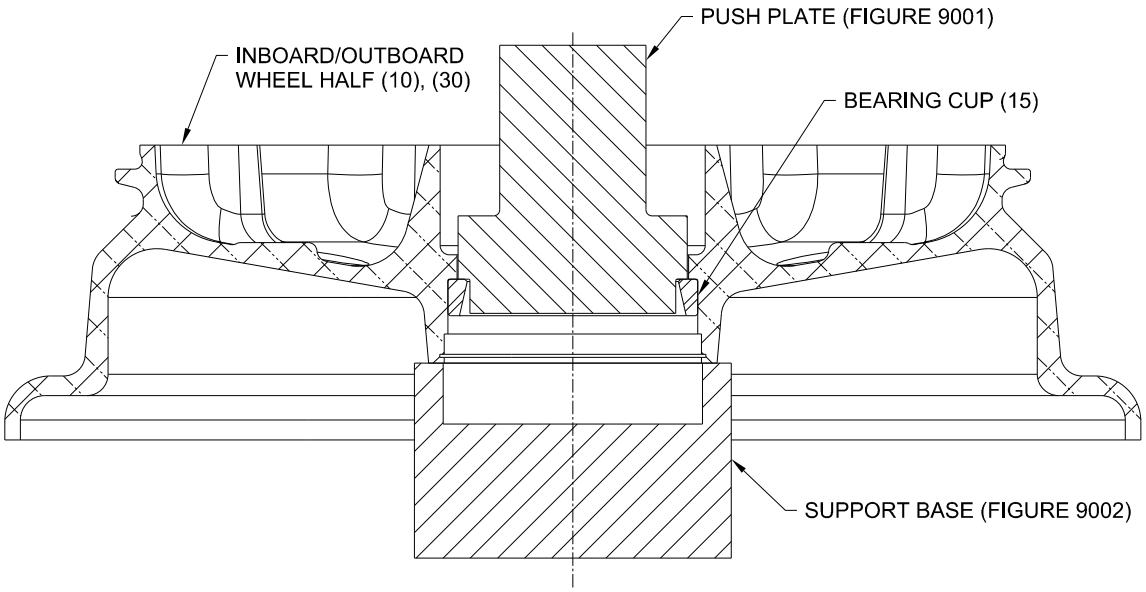


Figure 6005 Remove the bearing cup – inboard/outboard wheel half (10), (30)

REPAIR

B. Installation

Refer to Figure 6006. Install the bearing cups into the inboard and outboard wheel halves using the following procedure.

CAUTION: THE FOLLOWING PROCEDURE SHOULD BE ACCOMPLISHED QUICKLY WITH SPECIAL ATTENTION GIVEN TO ALIGNMENT OF PARTS. THIS PROCEDURE SHOULD NOT BE DELAYED AS THE PRIMER WILL BEGIN TO CURE IN THE BORE AND LOSE IT'S LUBRICITY.

CAUTION: DO NOT LET THE PRIMER COATING DRY BEFORE INSTALLING THE BEARING CUP.

CAUTION: AVOID COCKING THE CUP DURING INSTALLATION.

CAUTION: DO NOT CHILL THE BEARING CUP BELOW -65°F (-54°C).

NOTE: The installation of a bearing cup is made easier when the bearing cup is chilled to between -25° to -65°F (-32° to -54°C).. See Table 6001 for a list of refrigeration methods.

(1) Make sure that the bearing bore and the bearing cup are clean and free of burrs.

(2) If the bearing cup was chilled, remove the cup from the refrigeration source and wipe off any condensation.

(3) Brush a light wet coat of the MIL-PRF-23377, Type 1, Class C2 primer into the bearing bore. This will help prevent corrosion.

(4) Position the wheel half on the support base and align the bearing cup over the bore.

(5) Position the bearing cup press on the front face of the cup (15).

(6) Use an arbor press to apply even pressure to the cup press. Make sure that the back face of the bearing cup is flush against the surface (shoulder) of the bearing bore.

(7) 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.

(a) 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.

(8) Remove excess primer with a clean shop towel so that a fillet of not more than .08 inch (2.0 mm) wide extends beyond the cup.

(9) Apply a light coat of bearing grease to the I.D. of the bearing cups to prevent corrosion.

(10) Repeat for the remaining wheel half.

REPAIR

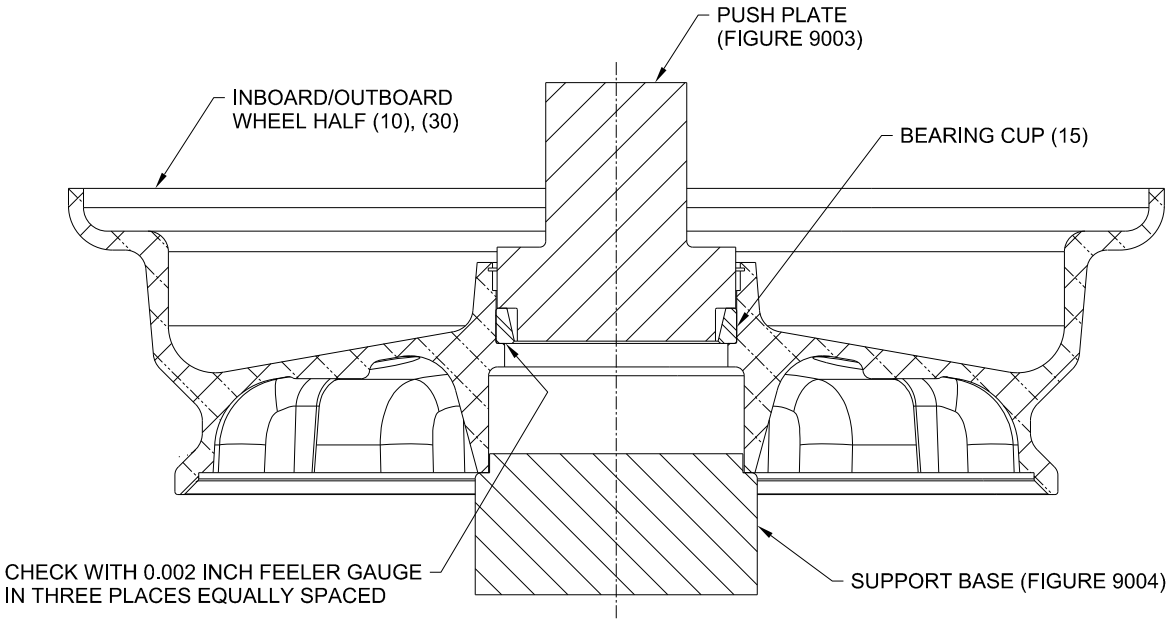


Figure 6006 Install the bearing cup – inboard/outboard wheel half (10), (30)

ASSEMBLY

1. General

Refer to IPL Figure 1 for component identification.

NOTE: The term dry torque refers to the torquing of hardware without the application of anti-seize compound.

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 (equivalent alternatives are not allowed)	Mobil Aviation Grease SHC 100	ExxonMobil Oil Corporation
	Aeroshell Grease 58 per AMS3058	Shell Aviation
	NYCO GN 3058 per AMS3058	NYCO
Preformed packing tool set	199-18	Cleveland Wheel & Brake Systems or distributor
Standard tools (inch units)	Wrenches/sockets: • 12pt, external: for (45) and (55) • Hex head, external: for (60) Flat blade screwdriver: for (80) Torque wrench Tire pressure gage	Commercial
Anti-seize compound for (45), (50), (55), (85)	AMS2518 (equivalent alternatives are not allowed)	Commercial
Tire inflation safety equipment	Commercial source	Commercial
Dry nitrogen	Commercial source	Commercial
Soap solution	Mild dishwashing liquid	Commercial
Clean cloths	Lint free	Commercial
Lubricant for (65), (90)	Dow Corning 55 Lube	Dow Corning Corporation

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.

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

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

(1) Make sure the bearing cones are clean. 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: New and overhauled wheel assemblies shipped from Cleveland Wheel & Brake Systems will have wheel bearings packed with SHC 100 grease.

NOTE: Shaded area shows the recommended quantity of grease.

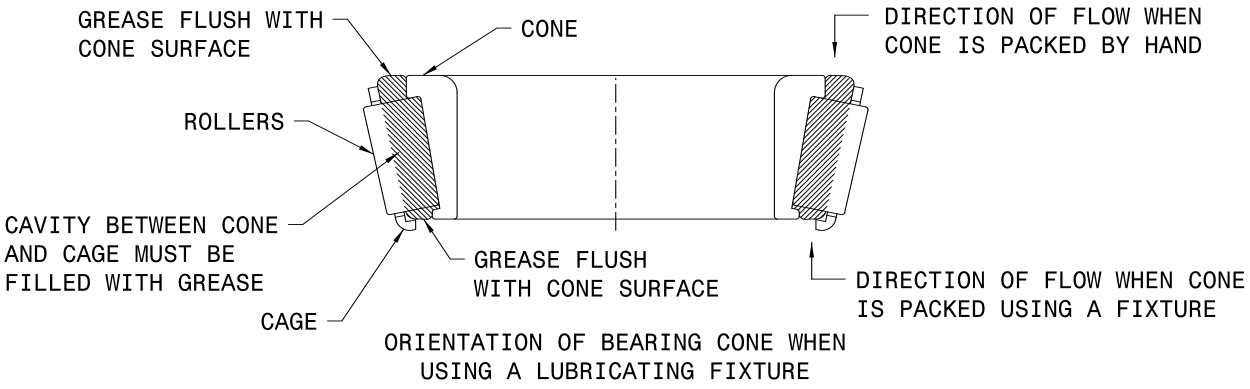


Figure 7001 Pack the bearing cones (70)

ASSEMBLY

C. Wheel pre-assembly verification

(1) Verify that the bearing cups (15) have been installed in the wheel halves (10), (30).

2. Wheel and tire pre-assembly preparation

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

A. Examine the bead seat area of the wheel halves. If necessary, remove dirt with a clean cloth moistened with a mild soap and water solution or with denatured alcohol.

B. 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.

C. The preformed packing groove in each wheel half should be examined for damage or other debris that would prevent the packing (90) 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.

D. Verify that the tire is clean inside. If it is not cean, then wipe the bead base with a clean cloth dampened with a mild dishwashing soap and water solution or a suitable rubber cleaner.

E. Install the inflation valve (60) in the inboard wheel half.

NOTE: The term dry torque refers to the torquing of hardware without the application of anti-seize.

(1) Examine the grommet (65) for damage such as cuts, tears, cracking. Replace if necessary.

(3) Lubricate grommet (65) with Dow Corning 55 O-ring lubricant

(3) Install the grommet (65) on the inflation valve (60). Install the inflation valve and tighten to 35 to 45 in-lb (4.0 to 5.1 N-m) dry torque.

ASSEMBLY

3. Mount the tire

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

A. Position the inboard wheel half (10) with the flange side down.

B. Examine the preformed packing (90) for damage such as cuts, tears, cracking. Replace if necessary.

CAUTION: THE PREFORMED PACKING MUST BE INSTALLED UNIFORMLY. IT SHOULD BE FREE OF KINKS AND TWISTS.

(1) Apply a light coat of Dow Corning 55 O-ring lube to the preformed packing (90) and install carefully in the wheel register groove of the inboard wheel half without stretching or twisting.

C. Position the tire on the inboard wheel half being careful not to disturb the preformed packing (90). Lay the inboard wheel half subassembly and tire on a flat work surface with the inside of the inboard wheel half subassembly facing up.

D. Position the outboard wheel half subassembly (30) into the tire aligning the red balancing dot on the tire adjacent to the inflation valve (60).

(1) If there is no balance dot on the tire, then align the tire serial number with the inflation valve.

4. Attach the wheel halves

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

A. Prior to installing, lubricate the wheel half fasteners (45), (50), (55), (85) with anti-sieze compound AMS2518.

NOTE:

1. APPLY ANTISEIZE COMPOUND TO THE FOLLOWING AREAS:

   A. CONTACT SURFACE UNDER BOLT HEAD.
   B. BOTH FACES OF WASHER.
   C. THREADS ON BOLT SHANK.
   D. CONTACT SURFACE OF NUT.

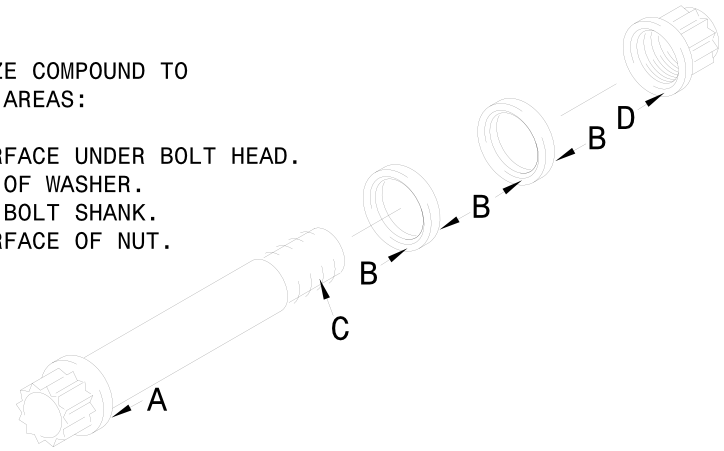


Figure 7002 Apply anti-seize compound

ASSEMBLY

B. Slide a single countersunk washer (50) onto each bolt (45).

NOTE: The countersunk side of washer (50) shall be installed toward the bolt (45) head.

NOTE: The nuts (55) and wahsers (85) must be located on the inboard wheel half (10) side.

C. Install at least three bolts (45) [with washer (50)] into the outboard wheel half (30) side. Compress the wheel halves together and thread one washer (85) and nut (55) onto each bolt.

D. Install the remaining bolts (45), washers (50), (85) and nuts (55). Run the nuts down by hand as far as possible.

CAUTION: DO NOT USE POWER TOOLS FOR THE INSTALLATION OF WHEEL FASTENERS. POWER TOOLS CAN CAUSE OVER TIGHTENING.

CAUTION: THE FASTENERS MUST BE TIGHTENED BY APPLYING THE TORQUE TO THE NUT (55) WHILE SECURING THE BOLT HEAD.

CAUTION: DO NOT DAMAGE THE PREFORMED PACKING (90) DURING THE TORQUING PROCEDURE.

E. Wheel nuts should first be snugged in a criss-cross pattern to seat the flange. Apply the final torque evenly in a criss-cross pattern using calibrated tools until all nuts are properly torqued. Final torque is 290 to 300 in-lb (32.8 to 33.9 N-m).

5. Test the wheel/tire assembly

A. Refer to the TESTING AND FAULT ISOLATION section.

6. Final assembly of the wheel

After successfully completing the 24-hour pressure retention test, complete the remaining assembly procedures as follows.

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

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

NOTE: Make sure the bearing cones (70) have been packed with fresh, clean grease.

A. Apply a light coat of wheel bearing grease to the following:

- Exposed surfaces of the bearing cups (15).
- The elastomer of the grease seals (75).

B. Install the following into each hub of the wheel halves (10), (30) in the order listed:

- Bearing cone (70).
- Grease seal (75).
- Snap ring (80). Install the end of the snap ring into the groove in each hub of the wheel halves and wind or spiral the ring into the groove.

ASSEMBLY

7. Return to service

SAFETY WARNING: FOLLOW THE AIRFRAME MANUFACTURER'S INSTRUCTIONS AND SAFETY WARNINGS WHEN WORKING WITH AND AROUND THE AIRCRAFT.

SAFETY WARNING: ALWAYS FOLLOW PROPER TIRE INFLATION SAFETY PRACTICES. SERVICE THE TIRE WITH INFLATION SAFETY EQUIPMENT DESIGNED FOR THIS OPERATION.

A. Inflate the tire to the airframe manufacturer's recommended inflation pressure.

B. Slide the wheel/tire unit onto the axle.

(1) Make sure the bearing cones are seated.

C. Install the axle hardware in accordance with the airframe manufacturer's manual.

FITS AND CLEARANCES

1. General

Refer to IPL Figure 1 for component identification.

A. Assembly torque values

NOTE: The term dry torque refers to the torquing of hardware without the application of anti-seize.

Table 8001 Assembly torque values

PART NAME (IPL item number)	TORQUE LIMITS
Nut (75)	290 to 300 in-lb (32.8 to 33.9 N-m). Apply anti-seize compound to items (45), (50), (55), (85). Refer to ASSEMBLY.
Inflation valve (80)	35 to 45 in-lb (4.0 to 5.1 N-m) dry torque.

SPECIAL EQUIPMENT AND CONSUMABLES

1. General

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

A. Source of supply

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

NOTE: 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

NOMENCLATURE	SPECIFICATION / PART NO.	SOURCE
Preformed packing tool set	199-18	Cleveland Wheel & Brake Systems Avon, OH 44011 U.S.A. www.clevelandwheelandbrake.com
Blast stripping equipment for plastic blast media	Plastic media: MIL-P-85891, Type II or V, Grade 20/30, 3.5 Mohs max.	U.S. Technology Corporation www.ustechnology.com
Tools for bearing cups (15) Removal tools Installation tools	 Figure 9001, 9002 Figure 9003, 9004	Fabrication
Bearing grease (equivalent alternatives are not allowed)	Mobil Aviation Grease SHC 100	ExxonMobil Oil Corporation
	Aeroshell Grease 58 per AMS3058	Shell Aviation
	NYCO GN 3058 per AMS3058	NYCO
Anti-seize compound for (45), (50), (55), (85)	AMS2518 (equivalent alternatives are not allowed)	Commercial
Lubricant for (65), (90)	Dow Corning 55 Lube	Dow Corning Corporation Midland, MI, 48640 U.S.A.

SPECIAL EQUIPMENT AND CONSUMABLES

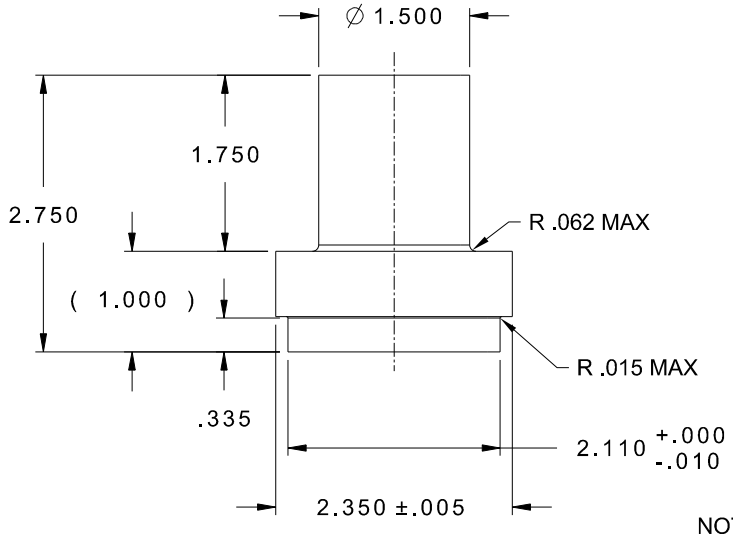


FIGURE 9001 REMOVAL PUSH PLATE

NOTES: FOR FIGURES 9001, 9002:
1. MATERIAL: 4130 STEEL OR EQUIVALENT
2. TOLERANCES UNLESS OTHERWISE SPECIFIED:
   .XXX ±0.005
   .XX ±0.03
3. BREAK CORNERS 0.010 MAX
4. DIMENSIONS IN INCH UNITS

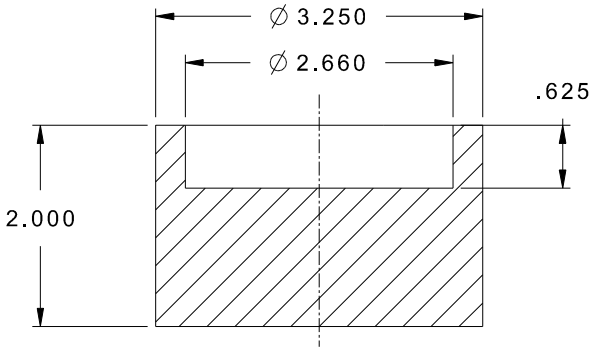


FIGURE 9002 REMOVAL SUPPORT BASE

Figures 9001 and 9002 Bearing cup removal tools

SPECIAL EQUIPMENT AND CONSUMABLES

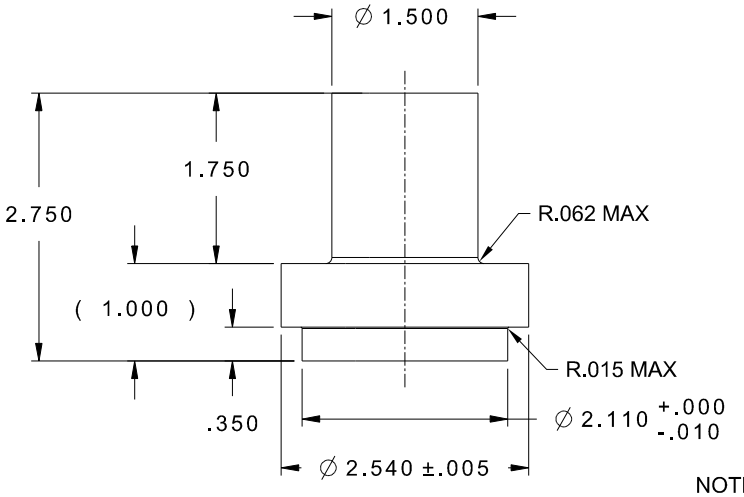


FIGURE 9003 INSTALLATION PUSH PLATE

NOTES: FOR FIGURES 9003, 9004:
1. MATERIAL: 4130 STEEL OR EQUIVALENT
2. TOLERANCES UNLESS OTHERWISE SPECIFIED:
   .XXX ±0.005
   .XX ±0.03
3. BREAK CORNERS 0.010 MAX
4. DIMENSIONS IN INCH UNITS

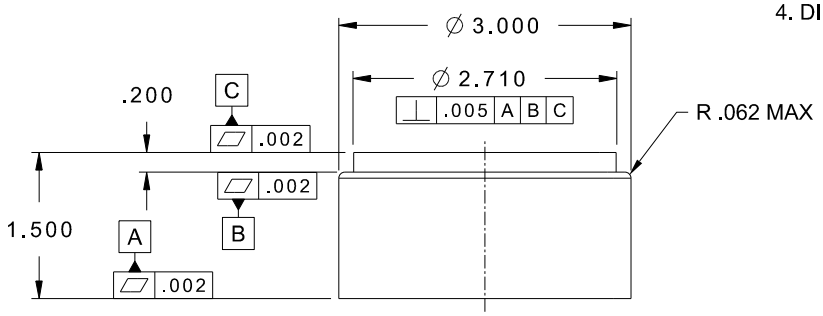


FIGURE 9004 INSTALLATION SUPPORT BASE

Figures 9003 and 9004 Bearing cup installation tools

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 Not 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 Cleveland Wheel & Brake Systems 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.).

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:

Term	Abbreviation	Definition
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

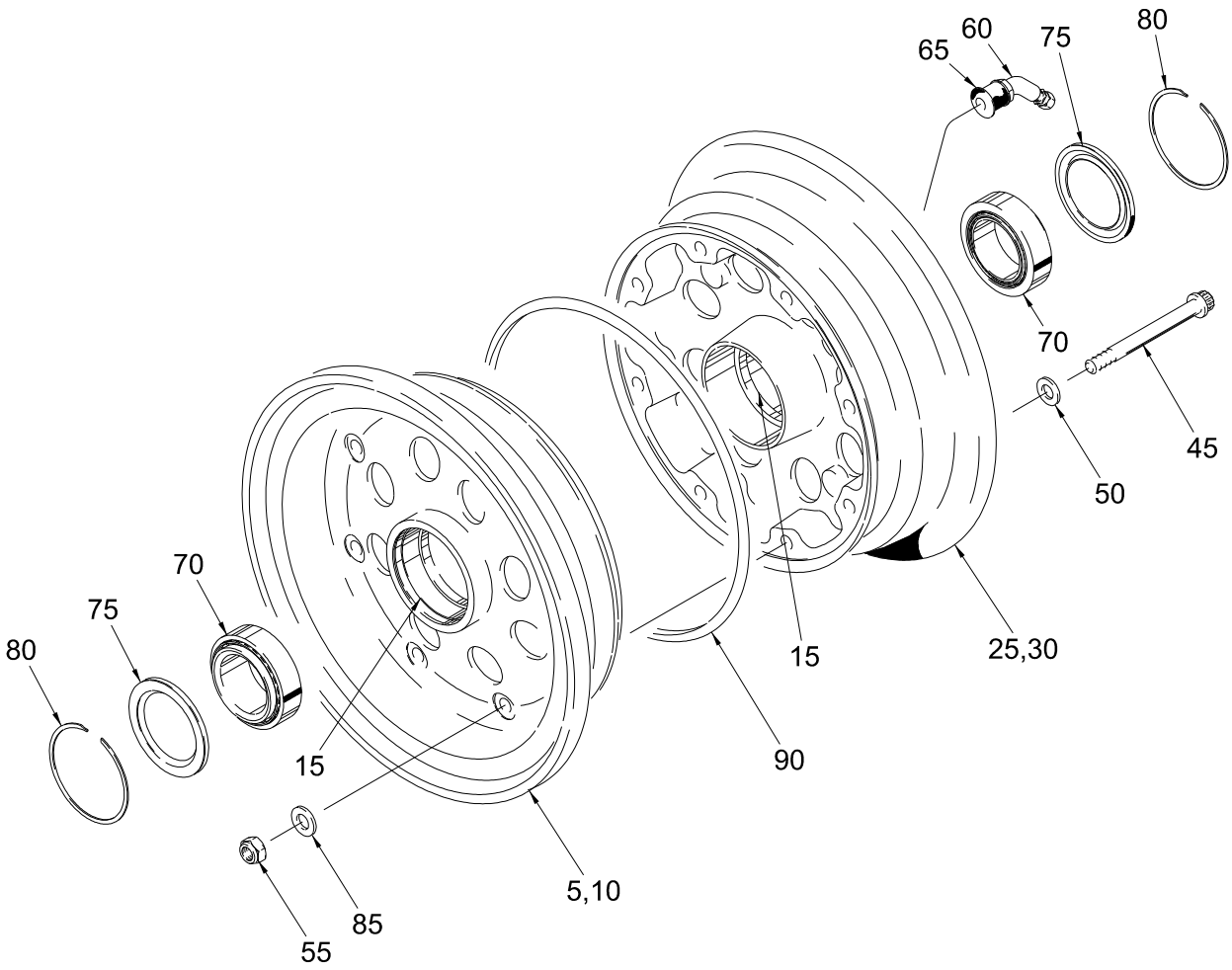
Alpha variants A through Z (except I and O) are assigned to existing numbers when necessary to show:

(1) Added items

(2) Modification or configuration differences

(3) Optional parts

ILLUSTRATED PARTS LIST



IPL Figure 1 Nose wheel assembly, exploded view

ILLUSTRATED PARTS LIST

2. Detailed parts list

Fig	Item	Units per assembly	CAGE	Part No.	Description	Usable on code
1	1	REF	33269	40-204	Wheel assembly, nose	
	5	1		161-12500	• Subassembly, wheel half, inboard	
	10	NP		151-12000	• • Wheel half, inboard	
	15	1		214-00100	• • Cup, bearing	
–	20	1		166-19700 [1]	• • Nameplate (when item 5 is ordered as spares)	
	25	1		162-11500	• Subassembly, wheel half, outboard	
	30	NP		152-11900	• • Wheel half, outboard	
	15	1		214-00100	• • Cup, bearing	
–	35	1		166-19700 [1]	• • Nameplate (when item 40 is ordered as spares)	
–	40	1		166-20000	• Nameplate, warning	
	45	8		103-31200	• Bolt	
	50	8		095-03100	• Washer, single countersunk	
	55	8		094-91500	• Nut, self-locking	
	60	1		160-01200	• Valve, inflation	
	65	1		217-01400	• • Grommet	
	70	2		214-00200	• Cone, bearing	
	75	2		154-03600	• Seal, grease	
	80	2		155-00100	• Ring, retaining	
	85	8		095-10600	• Washer	
	90	1		101-25800	• Packing, preformed	

[1] P/N 166-19700 is used on the top assembly level to identify the 40-204 and on the wheel half subassembly level to identify the 161-12500 and 162-11500 when ordered as spares.

STORAGE

1. General

Refer to IPL Figure 1 for component identification.

2. Procedures

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

CAUTION: AVIATION BEARING GREASES SHOULD NOT BE INTERMIXED WITH EACH OTHER. THE INCORRECT GREASE OR INTERMIXED GREASES CAN DECREASE THE PERFORMANCE OF THE GREASE AND CAUSE THE FAILURE OF THE BEARING OR WHEEL. REFER TO CLEANING FOR INSTRUCTIONS ON CLEANING THE BEARING CUPS, CONES, AND SEALS PRIOR TO REPACKING WITH NEW GREASE.

NOTE: New and overhauled wheel assemblies shipped from Cleveland Wheel & Brake Systems will have wheel bearings packed with SHC 100 grease.

A. Wheels stored with tires installed

NOTE: The length of time that a wheel assembly can be stored is governed by the storage life of its rubber components. Basically, rubber components are considered to have a usable life of up to 10 years from the date of cure. The usable life may be shortened by exposure to sunlight, extreme temperatures, low humidity; and contamination by fluids; severe operating conditions, etc.

(1) Lubricate the bearing cups (15) and cones (70) with the wheel bearing grease and plug or cover bearing hub area during storage to prevent contamination.

(2) Plug or cover bearing hub area to prevent contamination of grease or bearing damage during storage of wheel.

(3) The wheel assembly should be stored in a clean, dry storeroom. The desirable storeroom temperature range is from 50°F to 77°F (10°C to 25°C). If this temperature range cannot be maintained, temperatures as high as 125°F (51.7°C) and as low as -20°F (-28.9°C) can be tolerated for shorter periods. Total time above 100°F (37.8°C) shall not exceed three months. The recommended storage pressure for tires is 10 psig (0.7 bar).

B. Wheels stored without tires installed

NOTE: Short term storage of tubeless wheel assemblies may be stored with the wheel preformed packing installed between the two halves.

NOTE: Storage of components containing rubber longer than two years should be assembled without the preformed packing. Preformed packings to be placed in an ultraviolet protective package.

NOTE: The storage life of wheel assemblies (stored without rubber components installed) depends upon the storage conditions. Under ideal conditions, the storage life is indefinite. However, humid conditions will eventually lead to corrosion. Dust, dirt, or water will contaminate the wheel bearing grease etc.

(1) Plug or cover bearing hub area to prevent contamination of grease or bearing damage during storage of wheel.

(2) The wheel assembly should be stored in a clean, dry storeroom. The desirable storeroom temperature range is from 50°F to 77°F (10°C to 25°C). If this temperature range cannot be maintained, temperatures as high as 125°F (51.7°C) and as low as -20°F (-28.9°C) can be tolerated for shorter periods. Total time above 100°F (37.8°C) shall not exceed three months.