TECHNICAL MANUAL

INSPECTION, MAINTENANCE, REPAIR, STORAGE AND DISPOSITION INSTRUCTIONS

ORGANIZATIONAL, INTERMEDIATE, AND DEPOT MAINTENANCE

AIRCRAFT TIRES AND TUBES

Includes IRACs 9 through 14.

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LIST OF TECHNICAL PUBLICATIONS DEFICIENCY REPORTS INCORPORATED

Report Control Number (RCN)	Location
NADEP CHERRY POINT, NC 65923-2006-P096	Pg 2-5
AIMD ATLANTA, GA 44486-2006-0005	Pg 3-14
VFA-14 09084-2003-0086	Pg 3-6
CSFWP DET AIMD 44321-2003-0125	Pg 4-17
AIMD ATSUGI, JA 44323-2004-0010	Pg 2-9
AIMD BRUNSWICK, MA 44314-2005-0046	Pg 4-5
VMGR-234, MAG 41 08344-2005-0019	Pg 1-4

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WARNINGS APPLICABLE TO HAZARDOUS MATERIALS

1. Warnings and cautions for hazardous materials listed are designed to apprise personnel of hazards associated with such items when they come in contact with them by actual use. Additional information related to hazardous materials is provided in Navy Hazardous Material Control Program NAVSUPPINST 5100.27, Navy Occupational Safety and Health (NAVOSH) Program Manuals OPNAVINST 5100.23 (Ashore) and OPNAVINST 5100.19 (Afloat) and the DOD 6050.5 Hazardous Materials Information System (HMIS) series publications. For each hazardous material used within the Navy, a Material Safety Data Sheet (MSDS) must be provided and available for review by users. Consult your local safety and health staff concerning any questions regarding hazardous materials, MSDS, personal protective equipment requirements, appropriate handling and emergency procedures and disposal guidance.

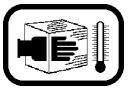
2. Under the heading HAZARDOUS MATERIALS WARNINGS, complete warnings, including related icon(s) and a numeric identifier, are provided for hazardous materials used in this manual. The numeric identifiers have been assigned to the hazardous material in alphabetical order by material nomenclature. Each hazardous material is assigned only one numerical identifier. Repeat use of a specific hazardous material references the numeric identifier assigned at its initial appearance. The approved icons and their application are shown below.

3. In the text of the manual, the caption WARNING is not used for hazardous material warnings. Hazards are cited with appropriate icon(s), the nomenclature of the hazardous material and the numeric identifier that relates to the complete warning. Users of hazardous materials shall refer to the complete warnings, as necessary.

4. EXPLANATION OF HAZARDOUS MATERIALS ICONS.

Chemical

The symbol of a liquid dripping onto a hand shows that the material will cause burns or irritation to human skin or tissue.



Cryogenic

The symbol of a hand in a block of ice shows that the material is extremely cold and can injure human skin or tissue.

Explosion

This rapidly expanding symbol shows that the material may explode if subjected to high temperature, sources of ignition or high pressure.

Eye Protection

The symbol of a person wearing goggles shows that the material will injure the eyes.

Fire

The symbol of a fire shows that the material may ignite or overheat and cause burns.

Poison

The symbol of a skull and crossbones shows that the material is poisonous or is a danger to life.

Vapor

The symbol of a human figure in a cloud shows that material vapors present a danger to life or health.

HAZARDOUS MATERIALS WARNINGS

INDEX	MATERIAL	WARNING
1	Nitrogen, BB-N-411 	Nitrogen is nontoxic and inert but may displace the air used for breathing and cause asphyxiation. Use only in well ventilated areas. Releases of compressed nitrogen can blow small particles into eyes, causing damage. Wear face shield to prevent eye injury.
2	Leak Detection Compound, MIL-PRF-25567, Type I 	Leak detection compound, MIL-PRF-25567, Type I is a skin and eye irritant. Avoid contact with strong oxidizing agents and reducers, particularly alkaline materials. Wear goggles and gloves to prevent eye and skin contact. If eye contact occurs, flush immediately with large amounts of water. If skin contact occurs, wash with soap and water.
3	Solvent, Degreasing, MIL-PRF-680, Type III 	Degreasing solvent, MIL-PRF-680, Type III is toxic and flammable. **DO NOT** breathe vapors. Avoid contact with eyes, skin and clothing. **DO NOT** use near open flame, sparks or heat. Use only in well ventilated areas. Avoid contact with strong oxidizing agents. Wear goggles and butyl gloves to prevent eye and skin contact. Wear faceshield and protective clothing when splashing is possible or expected. Half-mask respirator with organic vapor cartridge required in poorly ventilated areas. If eye contact occurs, flush immediately with large amounts of water. If skin contact occurs, wash with soap and water.
4	Grease, Aircraft, General Purpose, Wide Temperature Range, MIL-PRF-81322, Grade A 	Wide temperature range, general purpose aircraft grease, MIL-PRF-81322, Grade A is an eye irritant, and upon prolonged exposure, a skin irritant. Product may contain chromium compounds and suspected carcinogens. Avoid contact with eyes, skin and clothing. **DO NOT** use near open flame, sparks, heat or oxidizing agents. Store in a cool dry place. Wear goggles and rubber gloves to prevent eye and skin contact. If eye contact occurs, flush immediately with large amounts of water. If skin contact occurs, wash with soap and water.

HAZARDOUS MATERIALS WARNINGS (Cont.)

INDEX	MATERIAL	WARNING
5	Grease, Pneumatic System, SAE AMS-G-4343 	Pneumatic system grease, SAE AMS-G-4343 is a mild eye and skin irritant. Avoid contact with eyes, skin and clothing. Wear goggles and gloves to prevent eye and skin contact. If eye contact occurs, flush immediately with large amounts of water. If skin contact occurs, wash with soap and water.
6	Talc, Technical, A-A-59303, Type T1 	Technical talc, A-A-59303, Type T1 is a respiratory system irritant that may cause lung irritation. Avoid excessive dusting. When using talc, no protective equipment is normally required. However, use a dust mask if excessive dusting occurs.
7	Compound, Thread, Antiseize, MIL-PRF-83483 	Antiseize thread compound, MIL-PRF-83483 is an eye and skin irritant upon prolonged or repeated exposure. Keep away from open flame, sparks, or heat. Avoid contact with strong oxidizing agents. Wear goggles and butyl gloves to prevent eye and skin contact. If eye contact occurs, flush immediately with large amounts of water. If skin contact occurs, wash with soap and water.
8	Enamel, Low VOC, A-A-2787, Type I 	Low VOC enamel, A-A-2787, Type I is toxic and flammable. **DO NOT** breathe vapors. Avoid contact with eyes, skin, and clothing. **DO NOT** use near open flame, sparks, or heat. Use only in well ventilated areas. Wear goggles, gloves, and protective clothing to prevent eye and skin contact. Half-mask respirator with organic vapor cartridge required in poorly ventilated areas. Launder contaminated clothing prior to reuse. If eye contact occurs, flush immediately with large amounts of water for 15 minutes; seek medical attention. If swallowed, do not induce vomiting; seek medical attention. If skin contact occurs, wash with soap and water.

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SECTION I

INTRODUCTION

1-1. PURPOSE. The purpose of this technical manual is to provide instruction for inspection, maintenance, storage, repair, and disposition for all aircraft tires and tubes. It is intended to conserve time and materials by serving as a basic guide for all personnel concerned with aircraft tires and tubes. Table 1-1 gives the user a quick review of key elements in this manual that concern tire related issues. The manual is periodically updated to revise inspection criteria, service life criteria and maintenance procedures. The instructions in this manual take precedence over all other directives where conflict exists. Any conflict between this manual and other publications shall be reported in accordance with COMNAVAIRFORINST 4790.2 (series).

1-2. SCOPE. These instructions are intended for use on all pneumatic tires and inner tubes installed on Naval/Marine aircraft including Unmanned Aerial Vehicles (UAV's). UAV aircraft tires with stock numbers starting with National Stock Number (NSN) 2620 shall comply with all safety, tire/wheel building, and handling procedures/requirements within this manual unless otherwise specified in UAV specific manuals.

1-3. APPLICATION. These instructions are applicable to all Naval and Marine Corps activities concerned with aircraft tires.

1-4. RESPONSIBILITY FOR INSPECTION AND MAINTENANCE PROGRAMS. Inspection and maintenance of aircraft tires shall be handled as follows:

a. Organizational Level. Organizational level personnel shall be directly responsible for the safe condition of the tires on aircraft in their custody. All tires shall be inspected in accordance with Section III and all defective tires shall be marked, as specified in paragraph 3-17, indicating the nature and cause of their rejection and then forwarded for further evaluation to the Intermediate Maintenance Activity.

b. Intermediate Maintenance Activity (IMA Tire Shop). The IMA is responsible for the disassembly and assembly of the tire/wheel assembly for use by the organizational level. Tires and wheels shall be inspected in accordance with instructions in Sections III, IV, and V and other applicable manuals referenced in Sections III, IV, and V. Tires which are not returned to service shall be marked in accordance with Section V and forwarded to the local Supply Department for appropriate disposition.

c. Depot Maintenance Level. Personnel associated with tires and tubes on aircraft undergoing rework shall be responsible for all functions outlined in paragraphs 1-4a and 1-4b.

1-5. RESPONSIBILITIES. The Commander, Naval Air Systems Command, with the assistance of the Commander, NAVAIR In-Service Support Center (formerly Naval Air Depot) North Island Aircraft Tire Fleet Support Team (FST) and the Commander, Naval Inventory Control Point Command is assigned overall responsibility for the management of the aircraft tire program. The following outlines the policies governing the management of the aircraft tire program, and includes:

a. Naval Air Systems Command Headquarters, Patuxent River, MD.

(1) Provide overall management, policy guidance, and technical direction.

(2) Ensure the development and use of uniform DoD specifications.

(3) Specify types and sizes of aircraft tires to be included in the aircraft tire retreading program.

(4) Qualify the design of all new aircraft tires.

b. NAVAIR In-Service Support Center, Aircraft Tire Fleet Support Team (FST), North Island CA.

(1) Provide fleet support for maintenance engineering on all aircraft tires.

(2) Answer/resolve all fleet Engineering Investigations (EI's), Quality Deficiency Reports (QDRs) and Safety Reports concerning aircraft tires.

(3) Represent the Navy on the Tri-Service Aircraft Tire Coordinating Group.

(4) Qualify designated aircraft tires for retreading.

Table 1-1. Quick Start User's Guide for the Aircraft Tire and Tube Manual

The following is **key information** from this manual that everyone handling aircraft tires should know. Sections identified should be reviewed in detail.	
Personnel and Equipment Safety Review the following to prevent personnel injury, catastrophic failure, and/or aircraft damage.	
Section 3-3	Tire pressures on operating aircraft shall be checked **during each daily inspection** with an approved calibrated gage.
Section 3-3a	Tire pressures exceeding 50 psi on aircraft that have not been towed or taxied for over 7 days, shall be checked and serviced at least once every 7 days.
Section 3-3c	Underinflation is the single most frequent occurring tire problem in the Navy.
Section 3-4c	During carrier operations, never check and adjust tire pressures while parked on the hot catapult tracks.
Section 3-9	Replace dual landing gear tires as a matched set unless otherwise specified.
Section 3-11	Embedded foreign objects shall never be removed from the tire while inflated.
Section 3-16	Never remove a tire/wheel assembly from the aircraft until deflated and a tire flag is in place.
Section 3-24	Ground personnel precautions are covered in this section. Use caution when inspecting tire discrepancies (e.g. skids, Foreign Object Damage, cuts, etc.) and approach fore and aft from the **opposite side of the discrepancies** after the assembly has cooled.
Section 4-5	Verify the tire has been **completely deflated** before attempting to disassemble tire/wheel assembly.
Section 4-11	Always use a calibrated torque wrench to properly torque the wheel bolts. Never completely tighten with a pneumatic impact wrench or guess at the torque values.
Section 6-9	The use of razorblades and knifes to remove stretch wrap from tires can cause sidewall and tread damage resulting in excessive tire scrapping.
General Tire Information	
Section 1-5b	Aircraft tire related questions can be directed to NAVAIRDEPOT North Island, Code 4.3.4.4., 619-545-8675.
Section 2-3i	Each tire has a unique serial number molded into the sidewall that gives the date of manufacture and can be trace back through the manufacturer should a tire discrepancy or failure occur.
Section 3-8	Tread wear removal criteria for tires without wear indicators (most Navy tires). Worn to the **bottom of the tread groove at any one spot** on the tire, regardless of whether wear is the result of skidding or normal use.
Section 3-18	Always verify the wheel has the correct bearing part number. Incorrect bearings have caused numerous destroyed wheels and landing gear.
Section 4-1	Ensure the correct tire is selected for the applicable aircraft, as identified by the NSN, size, and ply rating.
Section 6-1	Tires and tubes shall be stored indoors in a dark, cool, dry room under such conditions as to be protected from strong air currents, dampness, dirt, oils, greases and solvents.
Section 7-2	When a tire discrepancy occurs and an Engineering investigation is requested, hold tire, **including any tire pieces** and wheel to assist in determining the root cause of the tire failure.

(5) Conduct facility inspections at government and contractor installations and audit retreading processes at contractor/facilities plants.

(6) Provide Engineering support for the Performance Based Logisitics (PBL) Aircraft Tire program.

(7) Manage and coordinate the Life Cycle Cost (LCC) evaluation program for Navy aircraft tires.

c. Naval Inventory Control Point, Philadelphia, PA.

(1) Maintain administrative cognizance of the procurement and replenishment of aircraft tires.

(2) Ensure the maximum possible recovery of aircraft tire carcasses to be retreaded.

1-6. ENGINEERING INVESTIGATIONS, HAZARDOUS MATERIAL REPORTS AND PRODUCT QUALITY DEFICIENCY REPORTS. All reports of unsatisfactory aircraft tires shall be addressed to Aircraft Tire Fleet Support Team, NAVAIR In-Service Support Center North Island CA using the Naval Air Systems Command (NAVAIR) Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP) web site https://NAMDRP.NAVAIR.NAVY.MIL. This web site allows submission and complete processing of Engineering Investigations (EIs), Hazardous Material Reports (HMRs), combination HMR/EI reports, and Product Quality Deficiency Reports (PQDRs) as detailed in COMNAVAIRFORINST 4790.2 and 4790.15. See Section 7-2 for further details.

1-7. REPORTING OF ERRORS. Reporting of errors, omissions, and recommendations for improving this publication by individual user is encouraged. This manual is periodically updated to revise tire data. Any aircraft tire conflict between this manual and other publications shall be reported on the Naval Air Technical Data and Engineering Command (NATEC) web site at www.natec.navy.mil by completing a Technical Publication Deficiency Report (TPDR) in accordance with COMNAVAIRFORINST 4790.2.

1-8. RETREAD AIRCRAFT TIRES. Most military and commercial aircraft tires are designed to be retreaded. Retreading an existing casing can provide more landings per tire at a lower cost per tread giving a significantly lower overall cost. Data shows that a retreaded tire gives service comparable to a new tire. The General Accounting Office and the Department of Defense policy mandates aircraft tires will be retreaded in all cases where economics can be realized without affecting safety of personnel and/or equipment. The Tri-Services have established a retreading criteria consistent with the recent advances in tire technology and service experience. By this carefully engineered approach, functionally sound tire carcasses are returned to qualified contractors for retreading. In conjunction with these procedures, the Aircraft Tire FST monitors production of retread tires to assure that the fleet receives a satisfactory product. During construction, retreaded tires are subjected to quality control procedures far more stringent than those imposed on new tires. Each high-speed/high performance retreaded tire receives final nondestructive inspection by laser beam optical holographic or shearographic methods. This procedure detects separations, voids, and multiple cord fractures within the casing. Tires containing discrepancies are rejected, thus preventing a failure in the fleet.

Table 1-2. Abbreviations and Symbols

Abbreviations/ Symbol	Definition
DoD	Department of Defense
FOD	foreign object damage
FST	Fleet Support Team
IMA	intermediate maintenance activity
LCC	life cycle cost
MIM	maintenance instruction manual
MS	military specification
NSN	national stock number
P/N	part number
PR	ply rating
psi	pounds per square inch
S/N	serial number
QDR	quality deficiency report
QTR	qualification test report

1-9. REQUISITIONING AND AUTOMATIC DISTRIBUTION OF NAVAIR TECHNICAL MANUALS. Procedures to be used by Naval activities and other Department of Defense activities requiring NAVAIR technical manuals are defined in NAVAIR 00-25-100.

Table 1-3. Reference Material

Title	Number
Aircraft Wheel Assembly Fixture, P/N 66F-40999-1	Air Force T.O. 35D25-9-3-1
Aircraft Wheel Holder and Bead Breaking	NAVAIR 19-1-55
Aircraft Wheel Maintenance Instructions	NAVAIR 04-10-1
Aircraft Tire Inflator/Monitor	NAVAIR 17-15G-1
Aircraft Tire Reporting System	NALDA AV-3M
Application Table for Aircraft Tires and Tubes	NAVAIR 04-10-508
Bead Breaker, Tire, Model 8137	Air Force T.O. 34Y9-6-4-1
Distribution of NAVAIR Technical Publications	NAVAIRINST 5605.5
Hazardous Material Information System	DOD 6050.5
Interchangeability and Replaceability of Component Parts for Aerospace Vehicles	MIL-I-8500
Military Standard Abbreviations for Use On Drawings, and in Specifications, Standards and Technical Documents	MIL-STD-12
Naval Aviation Maintenance Program	OPNAVINST 4790.2
Navy Occupational Safety and Health (NAVOSH) Program Manual	OPNAVINST 5100.23
Navy Environmental Health Center Technical Manual	NEHC-TM-91-6
Naval Air Systems Command Technical Manual Program	NAVAIR 00-25-100
Nitrogen Servicing Unit, A/M26U-4	AG-750AO-0MM-000
Nitrogen Servicing Unit, A/M26U-4B	AG-750AO-0MM-100
Nondestructive Inspection Methods	NAVAIR 01-1A-16
Operation and Maintenance Instructions with Illustrated Parts Breakdown, Nitrogen Servicing Unit	NAVAIR 19-25B-15
Service Suitability (Flight) Testing of Rebuilt Navy Aircraft Tires	MS 14147 (AS)
Tapes, Identification, Color Code for Aircraft Tires	MS 14113
Tire Inflator Assembly Kit Part Number M875352/4, Dual Chuck Stem Gage Part Number M85352/4	NAVAIR 17-1-123
Tube, Pneumatic Tire, Aircraft	SAE AS 50141
U.S. Navy Aircraft Fire Fighting and Rescue Manual	NAVAIR 00-80R-14

1-10. WARNINGS AND CAUTIONS APPLICABLE TO HAZARDOUS MATERIALS. Warnings and cautions for hazardous materials listed in this manual are designed to apprise personnel of hazards associated with such items when they come in contact with them by actual use. Additional information related to hazardous materials is provided in OPNAVINST 5100.23 Navy Occupational Safety and Health (NAVOSH) Program Manual and the DoD 6050.5 Hazardous Materials Information System (HMIS) series publications. Consult your local safety and health staff concerning specific personnel protective requirements and appropriate handling and emergency procedures.

1-11. ABBREVIATIONS AND SYMBOLS. Table 1-2 lists abbreviations and symbols that do not appear in MIL-STD-12.

1-12. REFERENCE MATERIAL. All references applicable to this manual are listed in Table 1-3.

SECTION II

GENERAL INFORMATION

2-1. TIRE FUNCTION. The primary purpose of an aircraft tire is to provide mobility for the aircraft when on the ground. In addition, they assist the shock strut in reducing the impact of landing and absorb much of the roughness of takeoff and provide traction for stopping.

2-2. TIRE TYPES, SIZES AND DESIGNATIONS. Pneumatic aircraft tires are supplied as tubeless and tube-type tires. There are four types described below which are procured under MIL-PRF-5041. In addition, most Type VII and VIII tires supplied to the Navy must meet more stringent test requirements of various Military Standards and aircraft manufacturer Procurement Specifications. Tire sizes are illustrated and explained by Figure 2-1.

a. Type III, Low Pressure. Type III, comparable to Type I, has beads of smaller diameter, larger volume, and lower pressure.

b. Type VII, Extra High Pressure. Type VII is in universal service on today's military and civilian jets and prop-jets. It has a high load capacity and narrow width.

c. Type VIII, Low Profile High Pressure. Type VIII is a design created for very high takeoff speeds. It has a high load capacity and is wider than a comparable Type VII tire.

d. Radial. Designed with the casing plies running radially from bead to bead, and fabric plies running circumferentially under the tread.

2-3. NEW TIRE IDENTIFICATION MARKINGS. (See Figure 2-2). The following information, as applicable, is engraved or embossed on the tires:

a. Manufacturer's Name or Trademark Name. The Navy utilizes three different aircraft tire manufacturers; Goodyear, Michelin, and Dunlop. The Michelin tires may also use the trademark name of Aviator.

b. Manufacturer's Mold Number.

c. Type.

d. Size.

e. Ply Rating (PR).

f. "Tubeless" on tubeless tires. "Tube-Type" on tires that utilize tubes.

g. Type of Tread Construction. See paragraph 2-7.

h. National Stock Number (NSN). All aircraft tires have stock numbers starting with 2620.

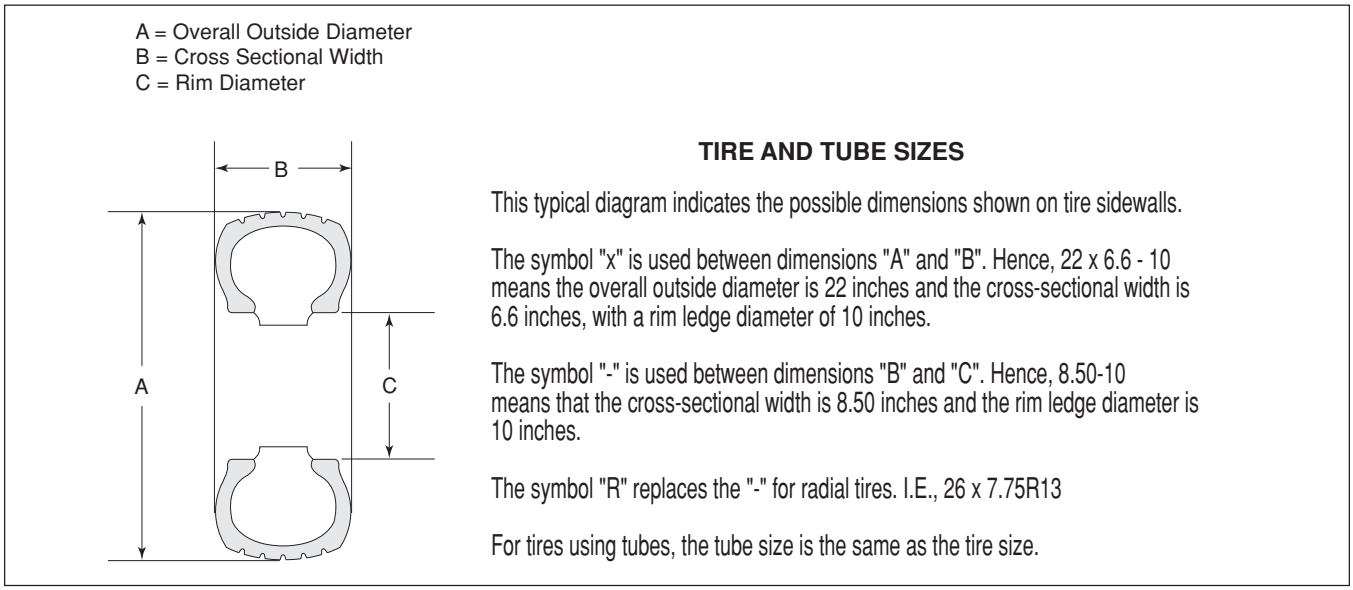
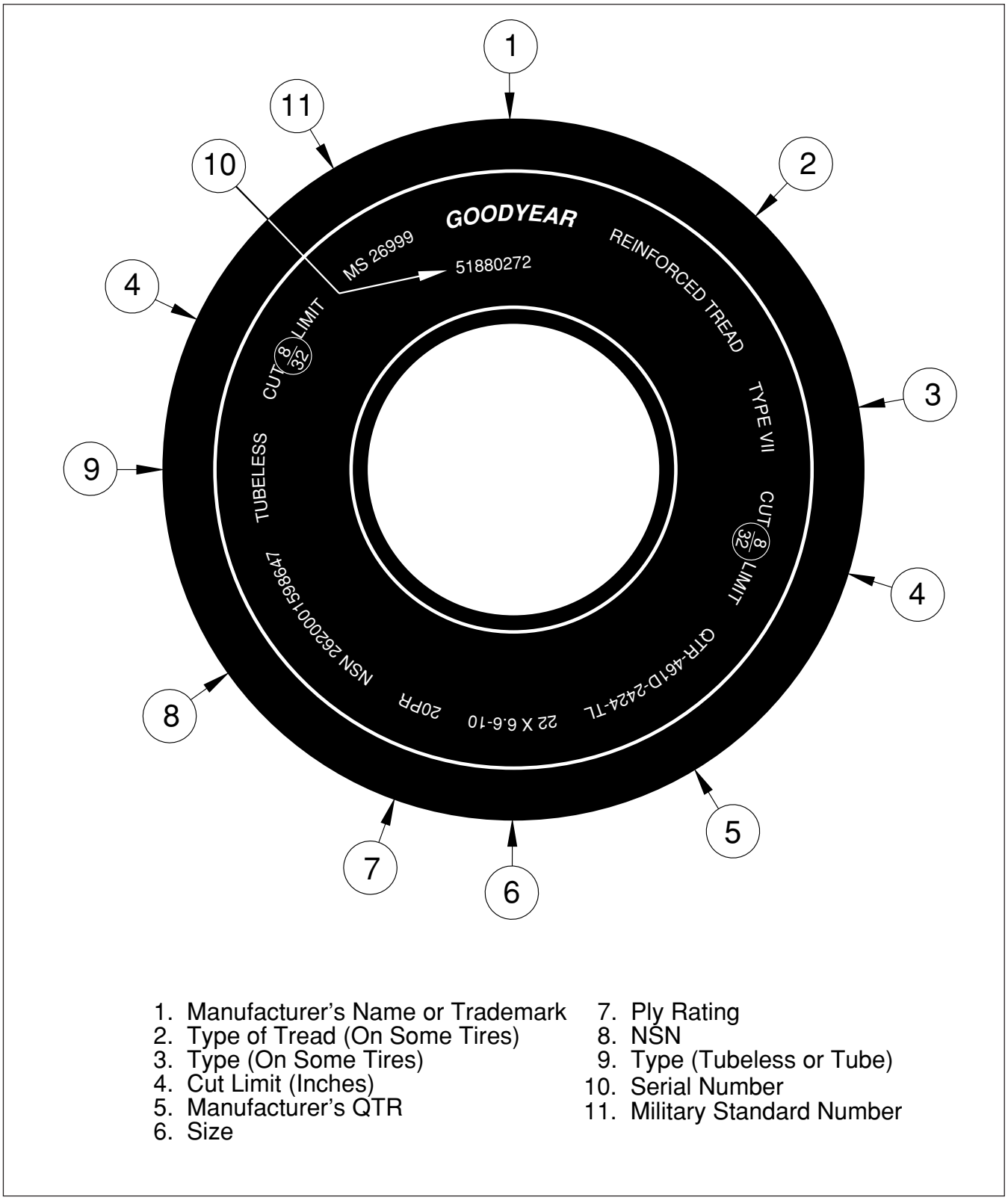


Figure 2-1. Cross-Sectional View Illustrating Tire and Tube Sizes



1. Manufacturer's Name or Trademark
2. Type of Tread (On Some Tires)
3. Type (On Some Tires)
4. Cut Limit (Inches)
5. Manufacturer's QTR
6. Size
7. Ply Rating
8. NSN
9. Type (Tubeless or Tube)
10. Serial Number
11. Military Standard Number

Figure 2-2. New Tire Identification Markings

WARNING

Tires without a serial number engraved or embossed on the sidewall are not to be used on aircraft.

i. Serial Number. The serial number (S/N) consists of a maximum of 10 characters. For tires manufactured by Goodyear and Michelin, the first four positions show the date of manufacture in the form of a Julian date (last digit of the year followed by the Julian day of the year, e.g., 17 Oct. 1998 is 8290). Tires manufactured by Dunlop, the first 5 positions show the date of manufacture in the form of a Julian date (last two digits of the year followed by the Julian day of the year, e.g., 01 Jan. 1999 is 99001). The next positions selected by the manufacturer may be either numbers/letters, and are used to create a unique S/N for a particular tire.

j. Cut-Limit Dimension. This dimension is expressed in thirty-seconds of an inch, and is used to determine if a tire with a cut in the tread area needs to be replaced. Refer to paragraph 3-11 for detailed instructions.

k. Military Specification drawing number (MS).

l. Country of manufacture (if other than USA).

m. Colored dots for ventholes. See paragraph 2-15.

n. Balance Mark. A balance mark (a red dot placed on the sidewall by the manufacturer to signify the light spot on the tire) is no longer required. Tires are evenly (zero) balanced during manufacturing eliminating this requirement.

o. Qualification Test Report (QTR). The number assigned by the manufacturer to identify a particular tire construction and qualification test. It is prefixed by "QTR" on the tire. This number is unique to each manufacturer and will be different on tires of the same size, ply rating, and NSN.

p. Additional markings as required by applicable MS standards or drawings.

q. Manufacturer's Part Number. Ensures traceability between tire design changes. This number is unique to each manufacturer and will be different on tires of the same size, ply rating, and NSN.

2-4. RETREAD TIRE IDENTIFICATION MARKINGS. (See Figure 2-3). In addition to the markings that are on a new tire, the following information is engraved or embossed into the shoulder area of a retread tire:

a. Number of Times Tire has been Retread. "R" followed by a number, for example R-2 represents a tire retreaded twice. This designation is also referred to as the "R-Level".

b. Julian Date of Retread. These numbers show the date the tire was retreaded and is made up of four digits in the form of a Julian date (last digit of the year followed by the Julian date of the year, e.g., 17 Oct. 2001 is 1290).

c. The name of the retreader and plant location.

NOTE

The retreader's name could be different from the tire manufacturer's name, e.g., "Michelin" retread on shoulder of a "Goodyear" manufactured tire.

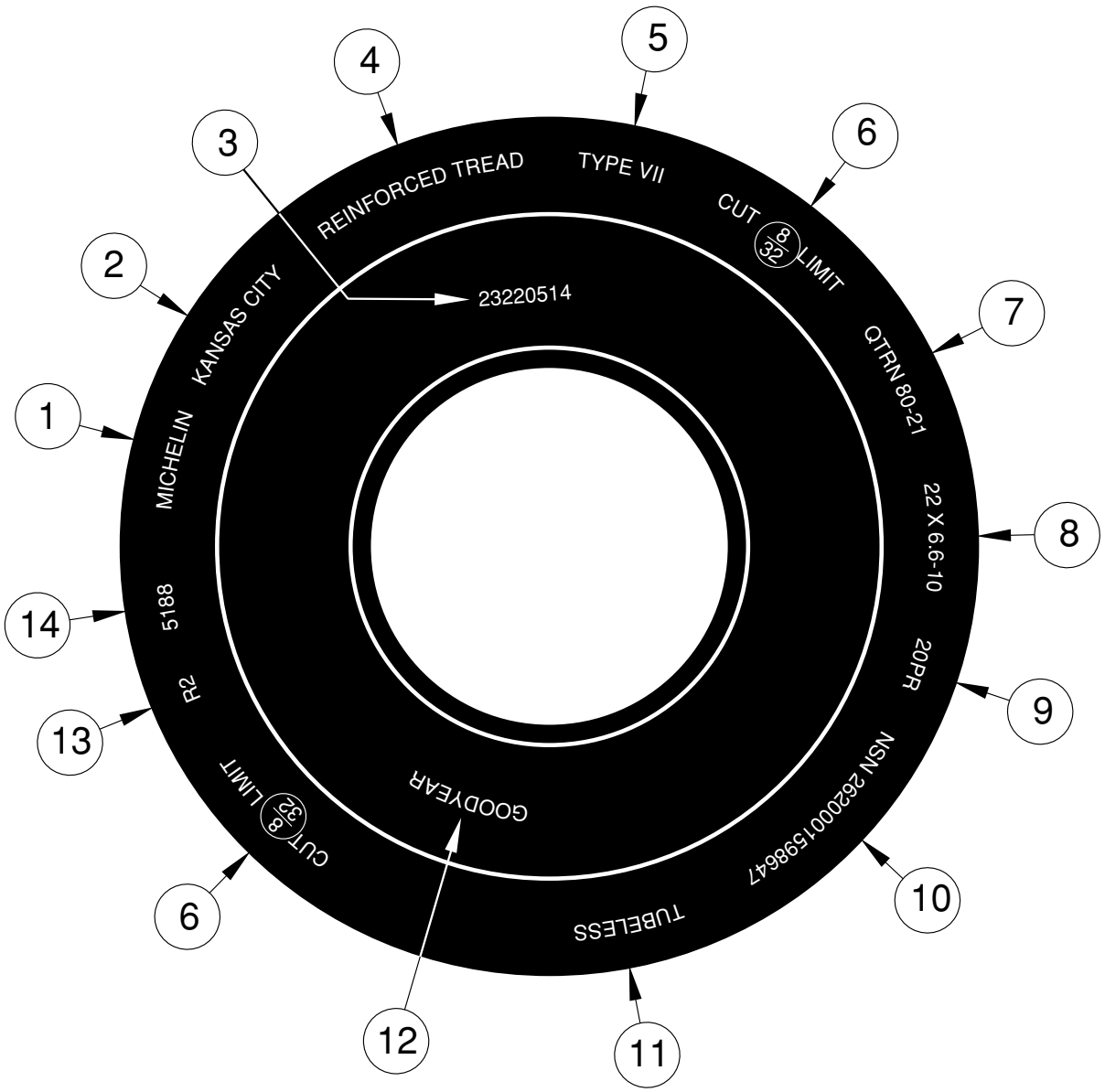
d. Type of Tread Construction. See paragraph 2-7.

2-5. IDENTIFICATION OF AIRCRAFT TIRES BY COLOR-CODED TAPE. Color-coded tape is used by supply for stock control identification, and is applied by the manufacturer on all aircraft tires. The color and year found on the tape represent the year the tire was originally manufactured (not the retread date). A diamond on the tape identifies the tire as a retread. A straight $\frac{1}{2}$ inch bar represents a new tire. The unique colors of the diamond or bar will identify the retreader or manufacturer. (See Figure 2-4).

2-6. TIRE CASING CONSTRUCTION.

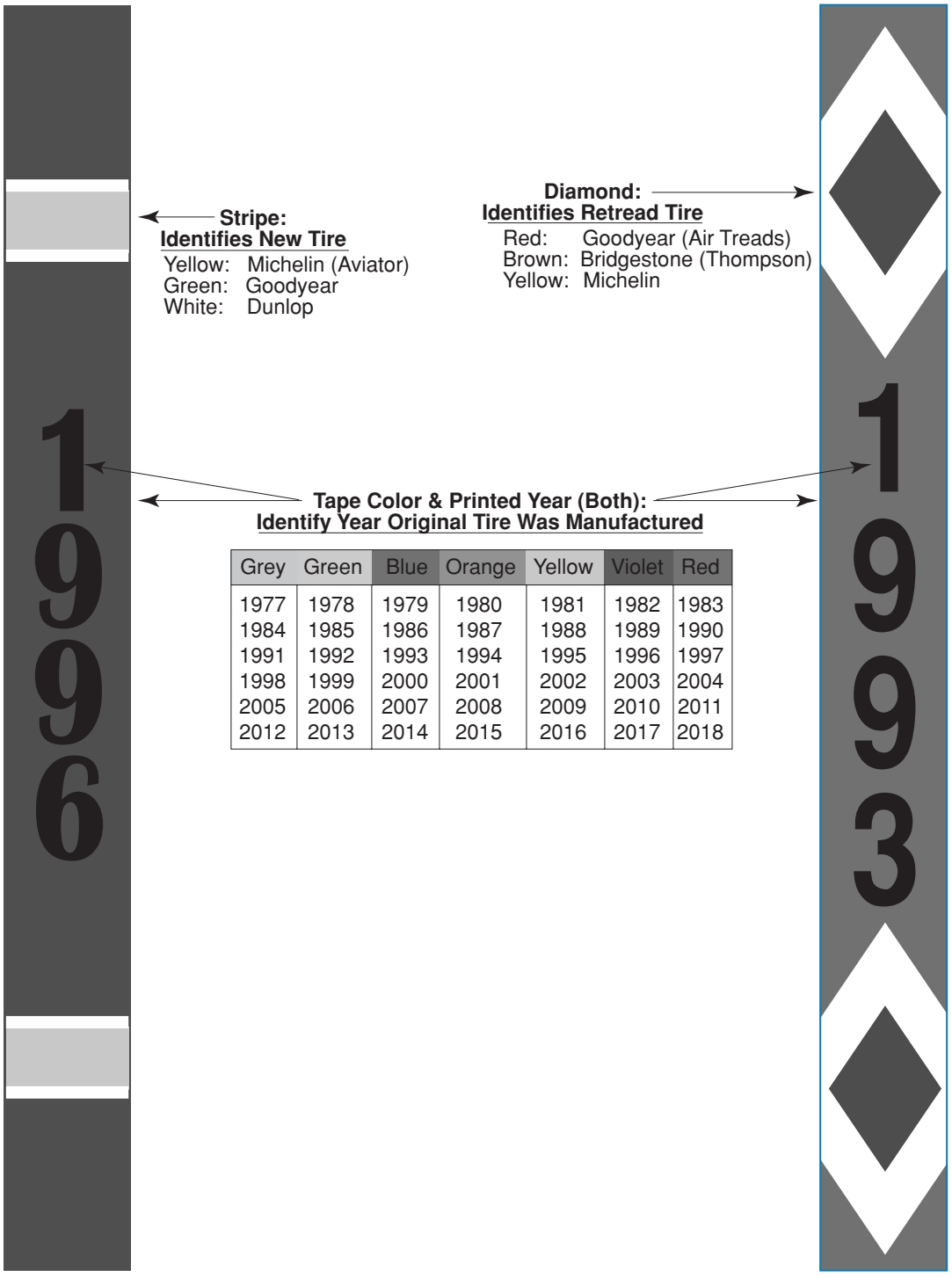
a. General. Pneumatic aircraft tires have two different and distinct tire constructions, the Bias tire and the Radial tire. Both nomenclatures describe the angular direction of the casing plies. Bias tires can be either a tubeless or tube-type construction. Radial tires are tubeless construction.

(1) Bias Aircraft Tire. The Bias tire features plies which are constructed of alternating layers of rubber coated ply cords which extend under the beads and are at alternating angles between 30 and 60 degrees to the centerline of the tread or the direction of tire rotation. Figure 2-5 shows the construction details.



1. Retreader
2. Retreader's Plant Location
3. Serial Number
4. Type of Tread
5. Type (On Some Tires)
6. Cut Limit
7. Manufacturer's QTR
8. Size
9. Ply Rating
10. NSN
11. Type (Tubeless or Tube Type)
12. Original Manufacturer
13. Number of Times Retreaded
14. Julian Date of Retread

Figure 2-3. Retread Tire Identification Markings



Grey	Green	Blue	Orange	Yellow	Violet	Red
1977	1978	1979	1980	1981	1982	1983
1984	1985	1986	1987	1988	1989	1990
1991	1992	1993	1994	1995	1996	1997
1998	1999	2000	2001	2002	2003	2004
2005	2006	2007	2008	2009	2010	2011
2012	2013	2014	2015	2016	2017	2018

Figure 2-4. Aircraft Tire Tape Identification

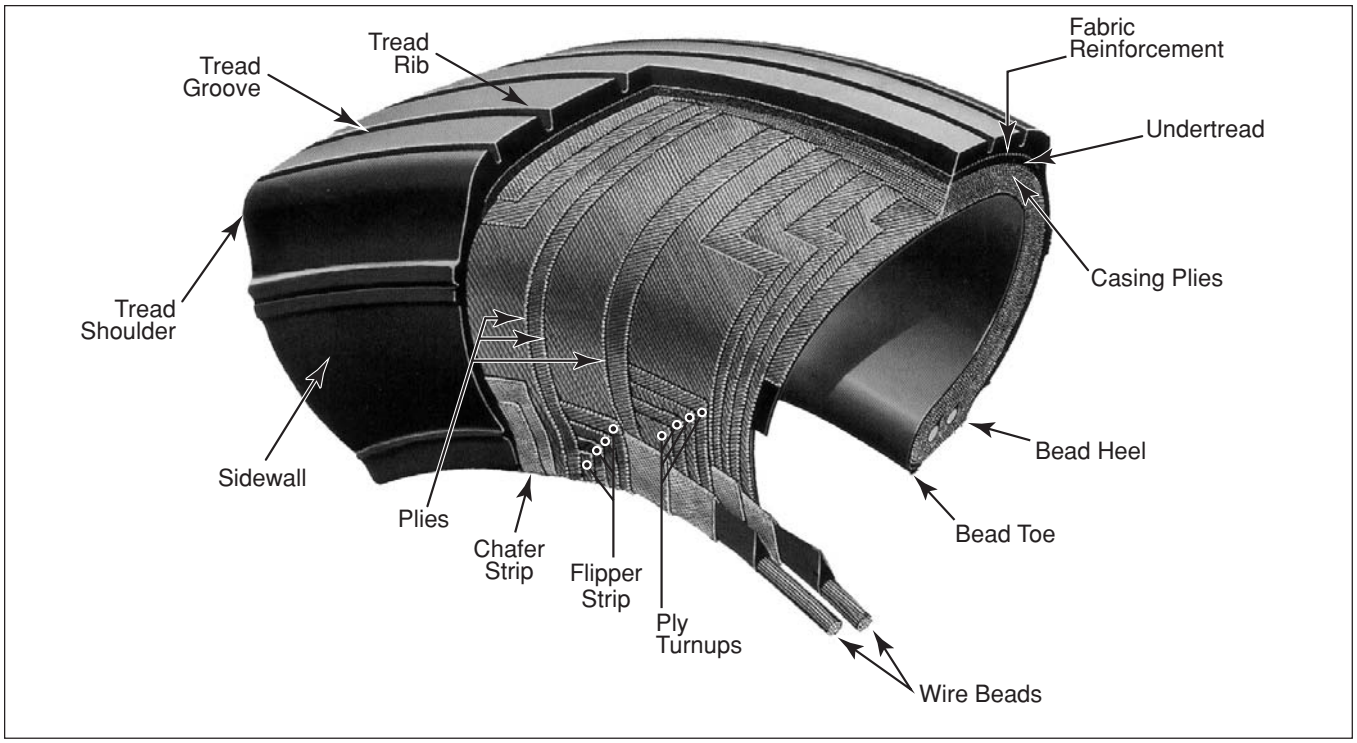


Figure 2-5. Sectional View of Bias Aircraft Tire Showing Construction Details

(2) Radial Aircraft Tire. The radial tire features casing plies constructed of layers of rubber coated ply cords, which extend under the beads and are laid at approximately 90 degrees to the centerline of the tread or 90 degrees to the direction of tire rotation. Radial tires also have nylon plies running circumferentially under the tread. Figure 2-6 shows the construction details.

b. Plies. The casing plies, also referred to as cord body, are the structural part of the tire. They consist of multiple layers of individual nylon cords arranged parallel to each other and completely encased in rubber. Each layer of coated fabric constitutes one ply of the casing and is anchored by wrapping around the bead wires, thus forming the ply turn-up. Depending on whether the tire is a radial or bias construction will determine the adjacent casing plies angle layup. This provides a strong and flexible construction that distributes impact shocks over a wide area. The main function of the casing plies is to give the tire tensile strength to resist internal pressures and to maintain tire shape. They must be able to withstand severe flexing, heat, and impact shocks during service.

2-7. TREAD CONSTRUCTION. The tread construction is one of the following types:

a. Rubber Tread. A rubber tread is constructed without nylon ply material between the tread wearing surface and casing plies.

b. Fabric Reinforced Tread. A reinforced tread consists of a single fabric ply or multiple plies constructed in the material between the outer casing plies and the bottom of the tread groove (Figure 2-7). These plies help to strengthen and stabilize the crown area, by reducing tread distortion and increase stability for high-speed operations. This feature is identified with one of the following terms on the sidewall: Reinforced Fabric Tread; Reinforced Tread; Fabric Reinforced; or Fabric Reinforced Cut Resistant.

c. Fabric Tread. A fabric tread consists of a fabric ply or plies constructed in the tread ribs above the bottom of the tread grooves. As the tire wears, the fabric ply or plies becomes exposed as part of the wear surface. Also referred to as a floating ply, it is identified by the term "Fabric Tread" on the sidewall.

d. Other. Other tread types may be provided under specific circumstances or as required by applicable MS standards or drawings.

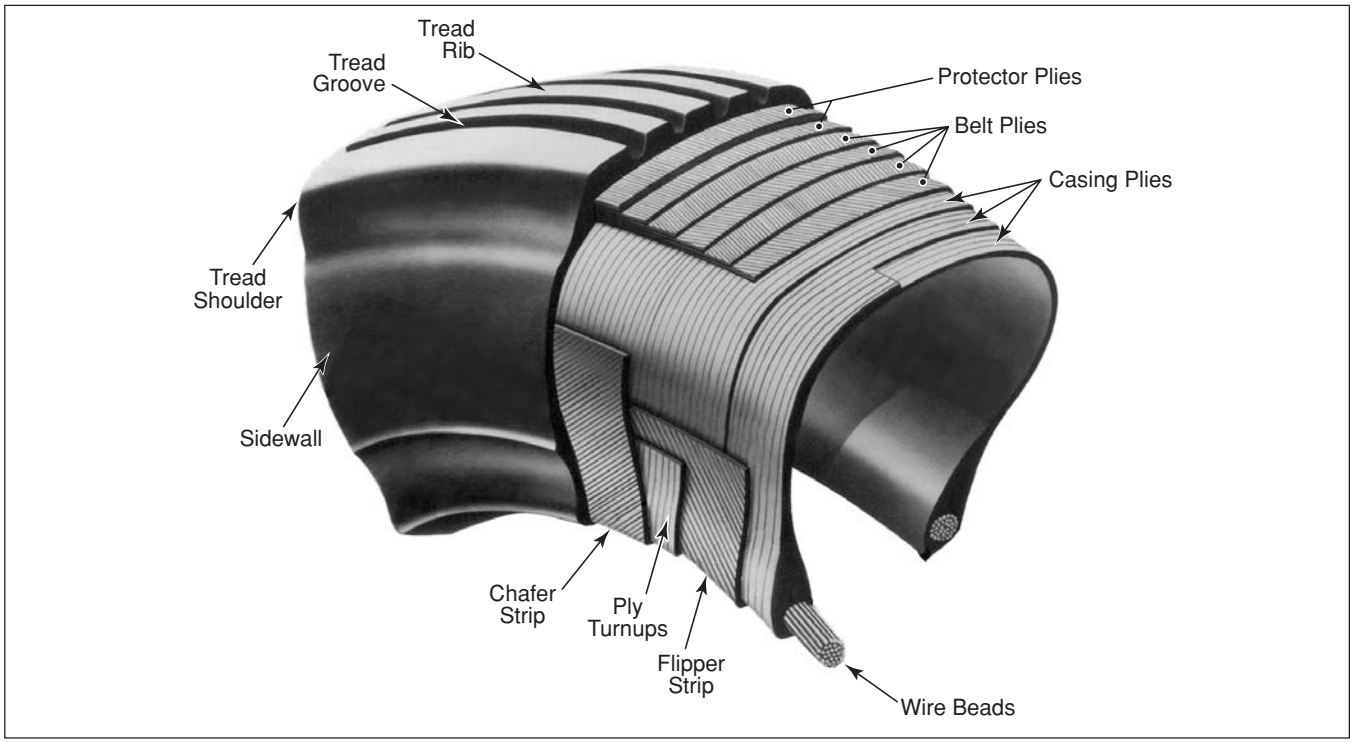


Figure 2-6. Sectional View of Radial Aircraft Tire Showing Construction Details

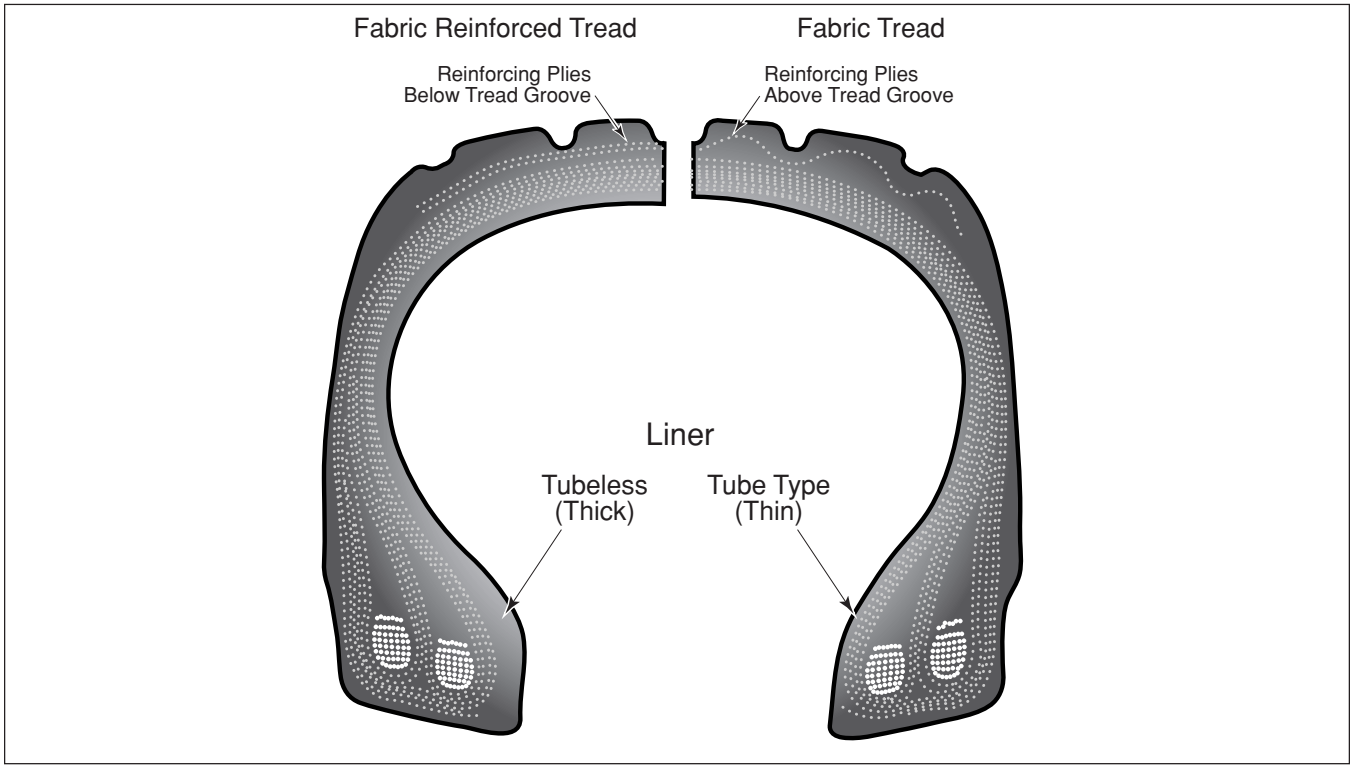


Figure 2-7. Sectional View of Two Aircraft Tires Showing Different Construction Details

Figure 2-8. Chine Sidewall Design

2-8. TREAD PATTERN. The tread is made of rubber, compounded for toughness, durability, and wear. The tread pattern is designed in accordance with aircraft operational requirements. The circumferential ribbed tread with tread grooves is widely used today to provide good traction under varying runway conditions. Tread grooves help to improve adhesion with the ground surface and provide a mechanism to channel water away from the area between the tire and runway surface.

2-9. SIDEWALL. The sidewall is the outer layer of rubber adjoining the tread and extending down to the beads. The sidewall protects the casing plies from abrasions, cuts, bruises, moisture, and ozone. The sidewall rubber contains antioxidants that are slowly released over time to protect the tire from ultraviolet and ozone attack, preventing weathercracking. Certain tires for nose wheel applications incorporate a flange or chine on the upper sidewall designed to deflect water away from engine intakes (see Figure 2-8).

2-10. UNDERTREAD. Undertread is a layer of specially formulated rubber, which provides adhesion of the tread to casing plies, and acts as the interface for buffing during retreading (see Figure 2-5).

2-11. PLY RATING (PR). Ply rating is a comparitive term used to identify a tire's maximum recommended load for specific types of service. It does not represent the actual number of casing plies in a tire. There is no direct relationship between the ply rating and actual number of nylon fabric casing plies. Most nylon cord tires have ply ratings greater than the actual number of fabric plies in the casing.

2-12. BEADS. The beads are constructed of multiple strands of high tensile strength steel wire embedded in rubber and wrapped in strips of fabric. They give a base around which the casing plies are anchored and provide a firm fit on the wheel.

2-13. CHAFER STRIPS. Chafer strips are plies of rubber-impregnated fabric that are wrapped around the outside of the beads. They protect the casing plies from damage when mounting/dismounting the tire, and minimize the effects of chafing contact with the wheel.

2-14. LINER. The liner, also referred to as "innerliner" is the inside surface of a tubeless tire (Figure 2-7) and is made of a layer of rubber extending from bead to bead that resists diffusion of nitrogen. This liner serves the same purpose as the inner tube in a tube-type tire for air retention. In tube-type tires, a thin liner is provided to prevent tube chafing and moisture penetration into the casing plies.

2-15. TIRE VENTING. Aircraft tires are vented to prevent pressure buildup within the casing plies. Pressure buildup within the casing plies can cause tread, sidewall, or ply separations.

a. Tube-Type. Tube-type tires are vented in two ways. The first uses air bleed ridges on the inside tire surface, and grooves on the bead faces. The ridges and grooves channel to the outside the air trapped between the inner tube and the tire. The second method uses four or more vent holes that extend completely through each tire's lower sidewall. They relieve gases that accumulate in the casing plies from normal diffusion through the inner tube and tire. Tube-type tire vent holes are marked with a silver or white dot as shown by Figure 2-9.

b. Tubeless Type. Tubeless tires have vent holes that penetrate from the outside of the tire's lower sidewall into the middle casing plies. They relieve gases that accumulate in the casing plies from normal diffusion through the innerliner and tire casing. Bleeding of trapped gases from the vent holes is normal occurrence especially after initial tire/wheel build up. Vent holes in tubeless tires are marked with a green dot or triangle as shown in Figure 2-9.

NOTE

Retread tires may not have the vent holes clearly identified.

2-16. TUBELESS TIRE VALVES. Tubeless tire valves are installed on wheels with threaded fittings and an O-ring seal or gasket. Figure 2-10 shows a typical tubeless tire valve.

2-17. TUBES. Aircraft inner tubes are procured under specification AS50141 and are identified by the type and size of the tire in which they are to be used.

a. Fabric Base Inner Tubes. Inner tubes required to operate at 100 psi or higher inflation pressures are usually reinforced with a ply of nylon cord fabric around the inside circumference. The reinforcement extends a minimum of ½ inch beyond that portion of the tube which contacts the rim.

b. Inner Tube Venting. Certain inner tubes have radial vent ridges molded on the surface. The ridges relieve air trapped between the casing and tube during inflation.

c. Inner Tube Valve. Inner tube valves are designed to fit specific wheel rims. Special valve bending configurations or extensions may be required to provide access to the valve stem when servicing the tire. Figure 2-11 shows a cross section of a typical metal valve stem and inner tube construction.

d. Balance Mark. The balance mark on a tube is a stripe 2 inches long x ½ inch wide. The balance mark is no longer required on any tube.

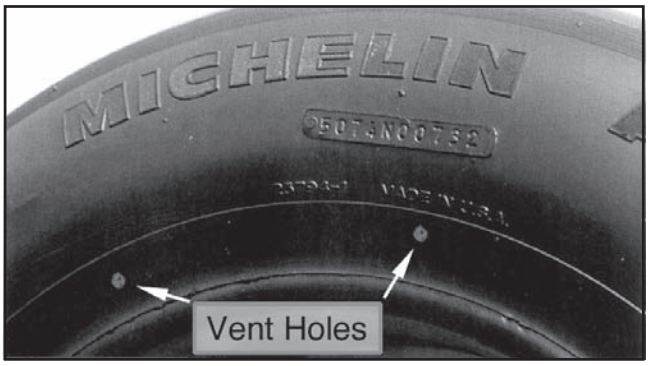


Figure 2-9. Vent Hole Markings on Sidewall

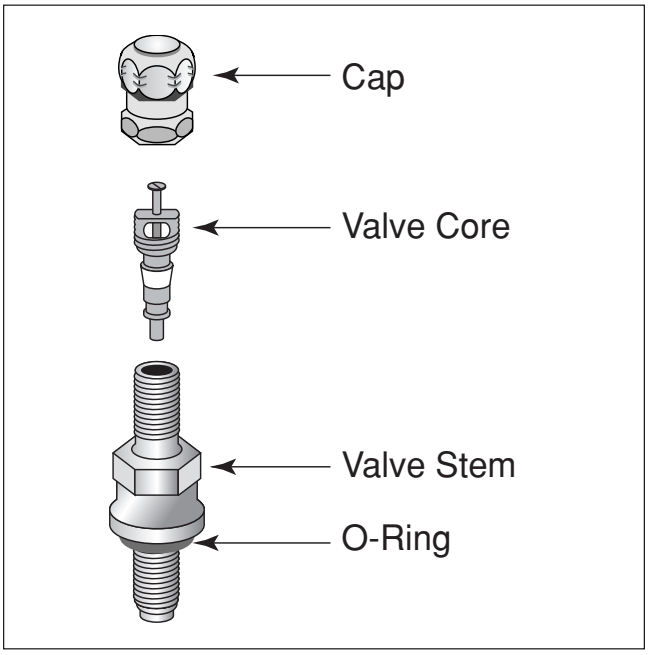


Figure 2-10. Tubeless Tire Valve

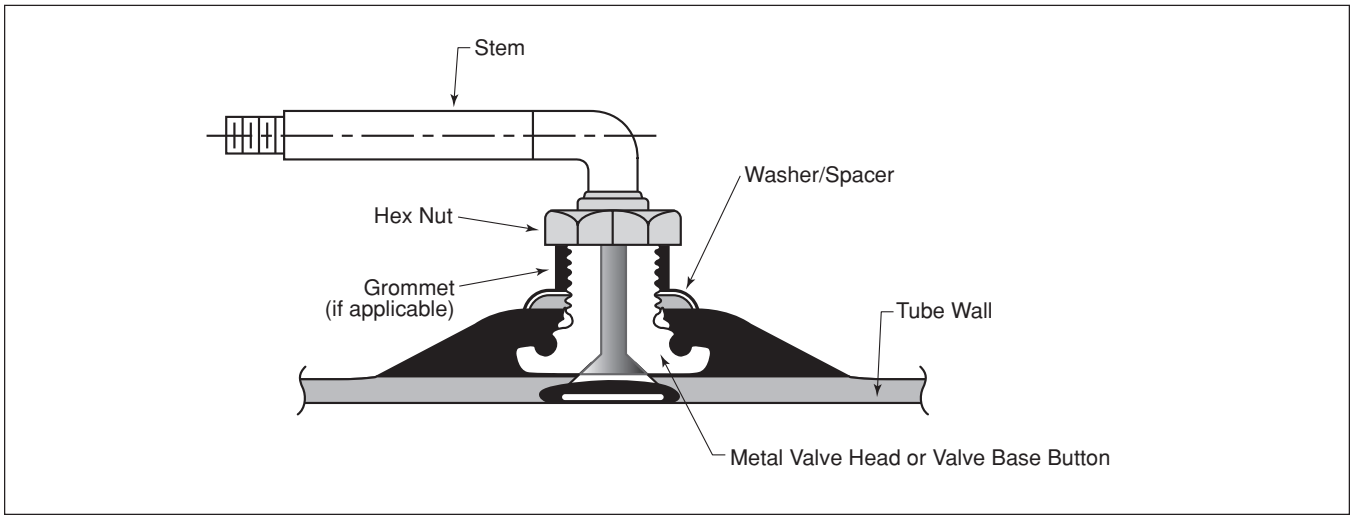


Figure 2-11. Metal Valve Stem and Inner Tube Construction

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SECTION III

INSPECTION AND MAINTENANCE OF TIRES INSTALLED ON AIRCRAFT AT ORGANIZATIONAL LEVEL

3-1. IMPORTANCE OF CLOSE INSPECTION AND MAINTENANCE AT ORGANIZATIONAL LEVEL.

a. Aircraft tire inspection and maintenance has become more critical through the years because of increased aircraft weight and higher landing and takeoff speeds. Carrier operations place extra demands on tire maintenance. In many cases tire failures are attributed to material failures, and/or manufacturing defects when actually improper maintenance was the underlying cause. Poor inspection, improper buildup, operation of tires in an underinflated or overinflated condition are common causes of tire failure. These instructions herein are mandatory for both flight and ground crew personnel to ensure that sound tires with minor discrepancies will not be removed prematurely; unsafe tires will be replaced before flight; and worn tires will be removed at the proper time to permit retreading.

b. A complete review of tire servicing procedures and equipment within an activity should be conducted periodically. This review is intended to uncover and correct deficiencies in equipment condition, calibration requirements, inflation and inspection procedures, or standard operating procedures.

3-2. INSPECTION OF INSTALLED TIRES. Tires and wheels shall be examined during each turnaround inspection for damage that may have been caused during or after the previous flight. Adhere to safety precautions addressed in paragraphs 3-23 through 3-26 during inspections. Defective tire/wheel assemblies and those of questionable suitability shall be replaced with satisfactory equipment. On daily inspections, the tires shall be examined for the following conditions:

a. Correct inflation pressure (paragraph 3-3).

b. Defective or damaged valves (paragraph 3-5).

c. Installation of valve cap (paragraph 3-6).

d. Tire slippage (where required by paragraph 3-7).

e. Extent of tread wear (paragraph 3-8).

f. Uneven tread wear (paragraph 3-9).

g. Separations/bulges (paragraph 3-10).

h. Cuts and embedded objects (paragraph 3-11).

i. Contact with deteriorating fluids (paragraph 3-12).

j. Sidewall damage (paragraph 3-13).

k. Tread damage (paragraph 3-14).

l. Tire clearance (paragraph 3-15).

3-3. INFLATION PRESSURES.

CAUTION

After checking inflation pressure, check for valve core leaks per paragraph 3-5c.

Never tow or taxi aircraft that have underinflated tires. Tire damage may occur, resulting in a subsequent failure.

a. Maintaining the correct inflation pressure in an aircraft tire is essential in obtaining maximum service life. Nitrogen will diffuse through the materials of aircraft tires resulting in a daily pressure loss and the need for frequent checks. Tire pressures exceeding 50 psi on operating aircraft shall be checked and serviced during each daily inspection. Tire pressures exceeding 50 psi on aircraft that have not been towed or taxied for over 7 days, shall be checked and serviced at least once every 7 days. Pressures shall not be checked by visually inspecting the deflection of the tire. Pressure checks shall be made using an approved, calibrated dual chuck stem gage kit, P/N M85352/4 (see Figure 3-1). The inflation pressure varies according to the gross weight of the aircraft or whether shore or carrier operations are planned. Refer to the applicable aircraft Maintenance Instruction Manual for the correct inflation pressures. Tire pressure information is also generally found on placards attached to or painted on the landing gear or landing gear well doors. See Table 3-1 for the tolerances to apply when inflating aircraft tires to a specified pressure.

b. The inflation pressure of paired tires on dual or multiple landing gear systems shall be within the tolerances specified in Table 3–1. Underinflation of one tire causes the other tire to carry a disproportionate amount of load. As a result, both tires can be deflected considerably beyond their operating range, potentially causing casing separations or catastrophic failure.

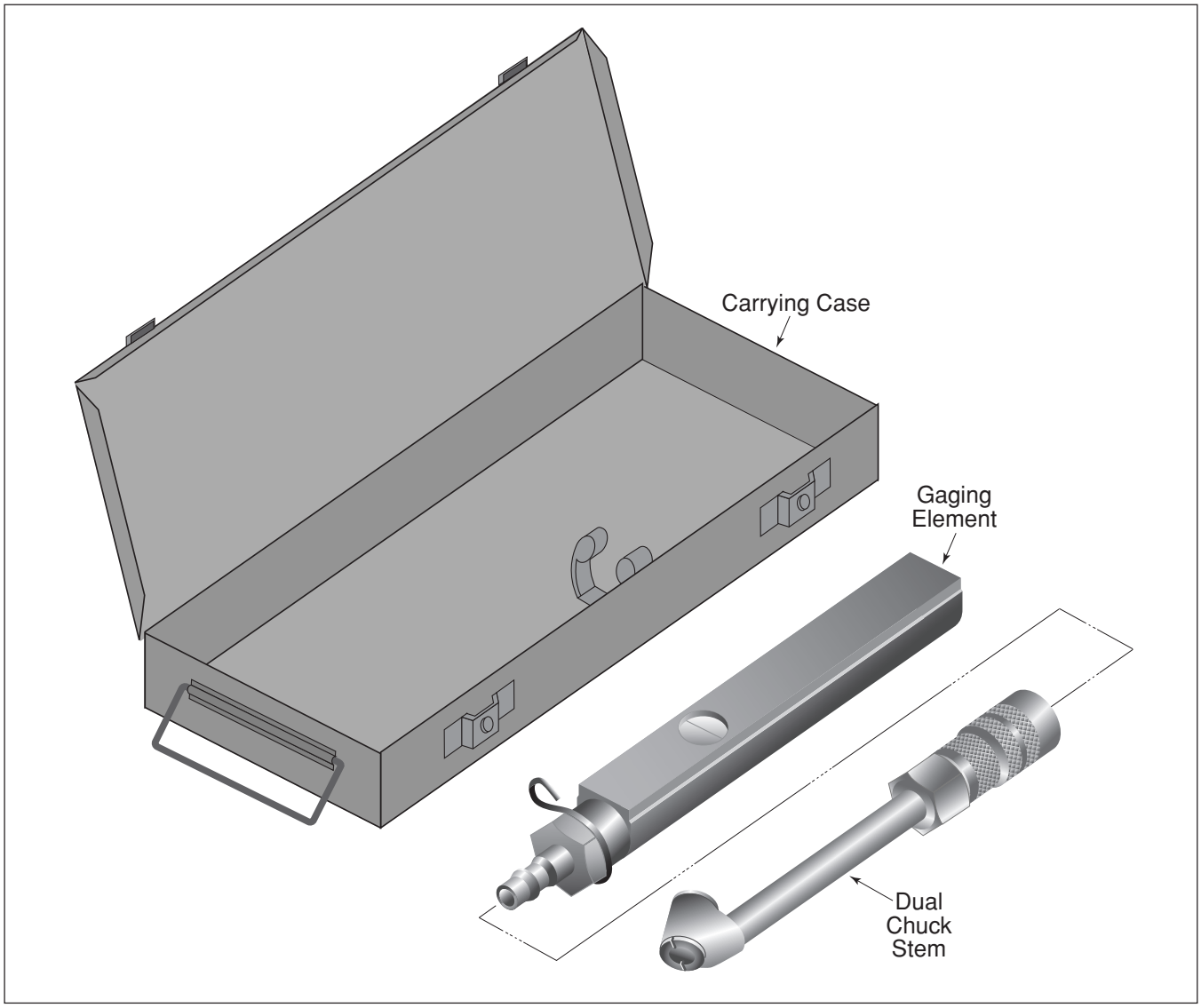


Figure 3-1. Dual Chuck Stem Gage Kit

Table 3-1. Inflation Tolerances

Inflation Pressure (psi)	Maximum Allowable Tolerances (psi)
100 or less	+5, -5
Greater than 100	+10, -5

c. Consequences of Underinflation. Underinflation is the single most frequently occurring tire problem in the Navy. Underinflation causes the tire to wear rapidly and unevenly at the outer edges of the tread, as shown in Figure 3-2. Operation of a tire in an underinflated condition will cause the tire to flex beyond its design parameters. This excessive flexing causes heat buildup in the casing with the eventual breakdown of tire components resulting in failures by blowout or thrown tread. Squadrons experiencing a high number of blowouts, or thrown treads should institute a program of closely monitoring their tire inflation pressures. Additionally, the gages used to measure tire pressures should be checked to ensure proper calibration.

d. Consequences of Overinflation. Overinflation reduces the tread contact area causing the tire to wear faster in the center as shown in Figure 3-2. Operation of overinflated tires can result in reduced traction and make the tread more susceptible to cutting.

e. Excessive Pressure Loss. When a tire/wheel assembly shows a repeated pressure loss exceeding 5% of the correct operating inflation pressure in a 24 hour period, it shall be removed from the aircraft and sent to the IMA.

CAUTION

Ensure aircraft are not spotted with the tires on the carrier deck catapult tracks.

Never check and adjust tire pressures of aircraft tires parked on catapult track. The catapult's high temperatures will result in an incorrect tire pressure reading.

NOTE

Temperature changes affect tire pressure. A change of 5°F produces approximately 1% change in pressure. Pressure measurements should be made at least 2 hours after a flight to allow tire/wheel assembly to cool.

3-4. AIRCRAFT TIRES DURING SHIPBOARD OPERATION. Naval aircraft tires have unique requirements compared to any other military or commercial aircraft tire. Besides the normal land base operations, Naval tires require extremely high inflation pressures to reduce the possibility of damage during carrier catapult and landing operations. These high inflation pressures tend to wear the center tread area faster than the shoulders.

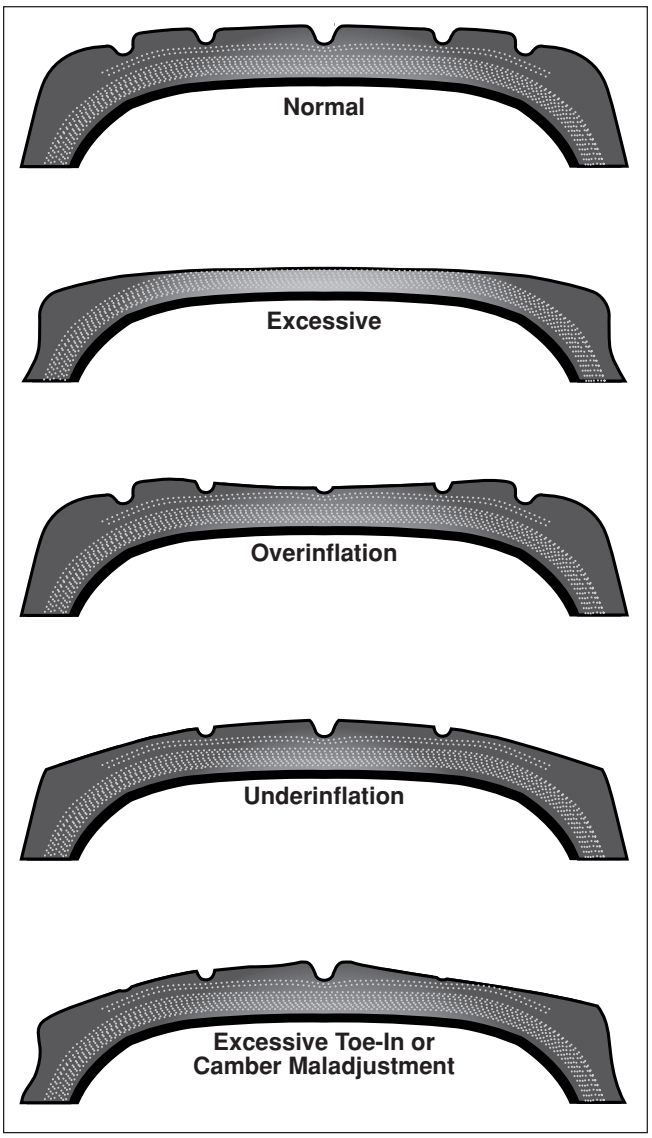


Figure 3-2. Tire Wear Patterns

a. Nose landing gear tires tend to wear with small lateral cuts in a scrubbing/abrasion pattern. The scrubbing is caused by a combination of slow tire rotation speeds and the tight turning requirements while performing shipboard maneuvering. The non-skid shipboard deck material is very abrasive especially when new and tends to increase tire wear rate resulting in fewer landings compared to land base operations.

b. Correct tire inflation pressures are extremely important. Underinflation or the mismatching of inflation pressure on dual tire installation will allow flexing of the sidewall beyond the design parameters. This condition can lead to casing fatigue or catastrophic failure.

CAUTION

Never check and adjust tire pressures of aircraft tires parked on catapult tracks.

c. Ensure aircraft are not parked with the tires on the carrier deck catapult tracks. Excessive high temperatures from the steam catapults will result in an incorrect tire pressure reading.

d. Always replace both tires on a dual landing gear as a matching set.

e. Shipboard operations tend to damage tires more than land base operations. Tires are more susceptible to foreign object damage because of the increased tire inflation pressure and the striking of shipboard deck gear. This cut damage will increase with the exposure to hydraulic fluid, fuel and sea spray found on the carrier deck.

3-5. DEFECTIVE OR DAMAGED VALVES. Tire valve stems shall be inspected for damaged threads, position of valve stems, leaking valve cores, and the presence and proper fit of valve caps.

a. Damaged Valve Threads. Tubeless tire valves and inner tubes for tube-type shall be replaced if the threads are damaged so that the valve cap cannot be installed properly. Valve cores that will not seal and continue to leak shall be removed from service and forwarded to the IMA.

b. Position of Valve Stems. The position of the valve stem shall be inspected to make sure it is not rubbing against the wheel. When this condition is found, the wheel assembly shall be replaced and the damaged assembly forwarded to the IMA for repair.

CAUTION

Always verify valve is not leaking after daily inflation inspection is performed.

c. Valve Leaks. When checking tire pressures, the valve shall be checked for leaks by placing MIL-PRF-25567 Type I, Leak Detection solution on the end of the valve and watching for air bubbles. If bubbles appear, the valve core shall be replaced per paragraph 3-16b and the test repeated. Aircraft tire valve cores (P/N TR C4) are identified by a slot in the head of the pin. The pin and cup are either brass or copper-colored (Figure 4-19). If leakage continues the tire/wheel assembly shall be removed and forwarded to the IMA for inspection and repair.

CAUTION

Wheel assemblies not using valve caps can lead to leaking valve cores, potentially leading to premature wear and possible tire failure.

3-6. VALVE CAPS. Every valve shall have a valve cap (P/N MS20813-1) installed. Seat valve cap finger tight. Then, turn an additional one-half turn using a $\frac{3}{8}$ inch wrench. Valve stems without caps allow foreign contaminants (moisture, salt, oil, and dirt) to enter the valve core area during the inflation servicing process. The cap also serves as a secondary seal if a leak develops in the valve core.

NOTE

The valve cap eliminates foreign contaminants and leaks, making it an important component of the tire/wheel assembly. While valve caps are considered by some to be a FOD hazard, the proper installation of the valve cap makes it as reliable as any other fastener.

3-7. TIRE SLIPPAGE MARKS. All tube-type aircraft tires with inflation pressure of 150 psi or less and all helicopter tube type tires shall be inspected for tire slippage (Figure 4-20). If the markings do not align within ¼ inch the tire/wheel assembly shall be replaced and forwarded to the IMA for repair. Tires that remain on the aircraft for a long period of time may wear off the slippage markings. In these cases, inspect the tire/wheel for slippage. If no movement is noted the organizational level is authorized to reapply the slippage markings as shown in paragraph 4-20.

3-8. TREAD WEAR. The tire tread shall be inspected to determine the extent of wear. When the tread pattern (groove depth) of the tire reaches the maximum tread wear given below, that tire/wheel assembly shall be removed from the aircraft and forwarded to the IMA for tire replacement. Operating requirements that may cause maximum tread wear to exceed the removal criteria may dictate early replacement.

NOTE

Wearing of the tire beyond the designated limits can leave insufficient tread grooves to displace water and reduce wet weather traction.

a. Tires Without Tread Wear Indicators. The maximum allowable tread wear for tires not having wear depth indicators shall be when the tread pattern is worn to the bottom of the tread groove at any spot on the tire, regardless of whether wear is the result of skidding or normal use.

NOTE

Wear depth indicators are holes (oblong or circular) in the ribs of the tire tread. The exposure of nylon plies (fabric reinforcement, casing, etc.) is not considered a wear depth indicator.

b. Tires With Tread Wear Indicators. The maximum allowable tread wear for tires having tread wear indicators shall be when the tread pattern is worn to the bottom of the wear depth indicator or the bottom of the tread groove (at any spot), whichever occurs first, regardless of whether wear is the result of skidding or normal use.

c. Tread Wear for Transport and Cargo Aircraft (i.e., C-9B, CT-39, UC-12, C-20, C-130).

(1) At Squadron Maintenance Facilities: The tire shall be removed when the tire has less than $\frac{1}{32}$ inch of tread groove remaining at any spot on the tire, regardless of whether wear is the result of skidding or normal use. Any area on the tread that reaches the bottom of the tread groove is cause for immediate removal.

(2) At Transit Facilities: The maximum allowable tread wear for tires shall be when the tread pattern is worn to the bottom of the tread groove at any spot on the tire, regardless of whether wear is the result of skidding or normal wear.

d. T-45 nose landing gear tires shall be removed when the tire has two of the nylon plies visible (at any one spot) or is worn to the bottom of the tread groove (at any one spot), whichever occurs first.

3-9. UNEVEN TREAD WEAR. Tread wear patterns can be a good maintenance tool to detect wheel alignment or tire inflation problems.

a. Figure 3-2 shows rapid and uneven tire wear caused by incorrect alignment. The alignment shall be corrected in accordance with the applicable aircraft manual to avoid further wear and mechanical problems.

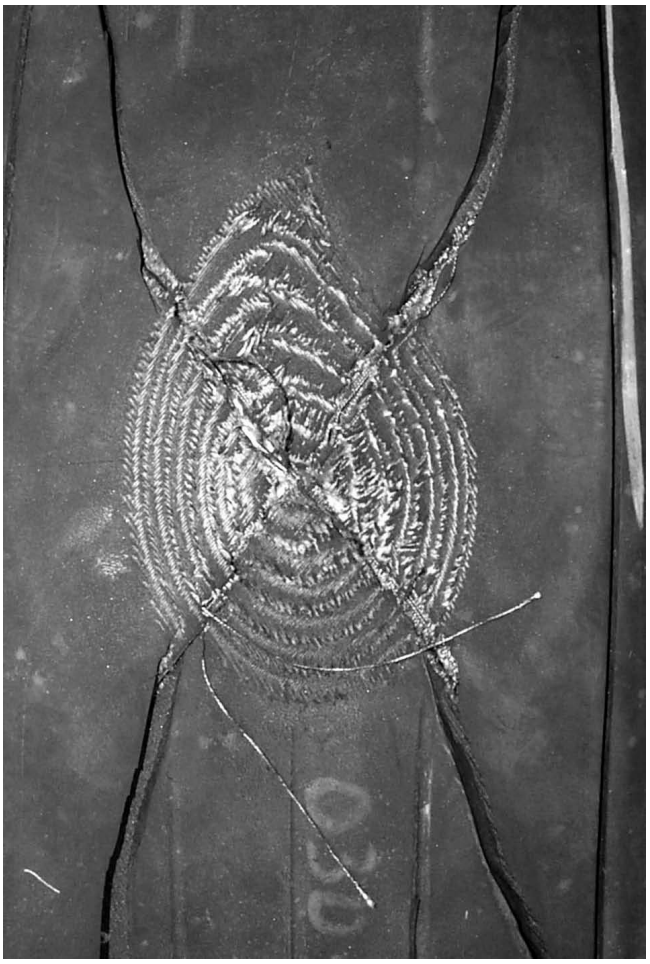


Figure 3-3. Skid Spot Caused by Severe Brake Application

WARNING

Tires with exposed casing plies may be severely weakened and can fail catastrophically after aircraft is parked. Allow tire to cool (approximately 2 hours) to ambient temperature before approaching. Use caution when inspecting tires, and approach fore and aft from the opposite side of the discrepancy.

b. Locked wheels from severe brake application or seized bearings will cause skid spots on tires (Figure 3-3). See paragraphs 3-23 through 3-26 for safety precautions when working on damaged or overheated tires and wheels. Evaluate the wear caused by skidding in accordance with the tread wear change criteria given in paragraph 3-8. However, remove tire if objectionable unbalance results.

c. If the aircraft stands in one place for several days, the tire may develop a temporary flat spot condition. This may result in thumping during takeoff and landings. Flat spotting is a normal condition for a nylon tire, which will usually disappear after the aircraft has been taxied and is therfore not a reason to change the tire.

d. Tires worn unevenly on a dual landing gear shall have both tires replaced as a matched set. Use criteria given in paragraph 3-8 to identify tire wear limits and paragraph 3-21 for removal criteria.

WARNING

Tires with separations/bulges can fail catastrophically after aircraft is parked. Allow tire to cool to ambient temperature before approaching. Use caution when inspecting tires, and approach fore and aft from the opposite side of the discrepancy.

3-10. SEPARATIONS/BULGES. A separation results from the loss of adhesion between components in the tire and, if large enough, appears as a bulge on the tire (Figure 3-4). If the tire exhibits a bulge, the discrepant area shall be marked with a grease pencil and the tire removed from service.

Figure 3-4. Bulge on Tire Tread

WARNING

Tires with cuts or embedded objects can fail catastrophically after aircraft is parked. Allow tire to cool to ambient temperature before approaching. Use caution when inspecting tires, and approach fore and aft from the opposite side of the discrepancy.

3-11. CUTS AND EMBEDDED OBJECTS. The tread and sidewall shall be examined for cuts and embedded foreign objects. Removal of a foreign object shall never be attempted while the tire is inflated. Tires shall be removed from the aircraft if the sidewall casing plies are exposed or if cuts in the tread exceed the depth specified on the sidewall of the tire. Figure 3-5 gives the method for measuring the depth of cuts, cracks, and holes. Cut depth shall be measured by either tread depth gage P/N 448 or P/N 940. Tires in question shall have the foreign objects or cuts marked using a light colored grease pencil and removed from service.

3-12. TIRE DETERIORATING FLUIDS. Aircraft shall not be parked where the tires stand in a spillage of hydraulic fluids, lubricating oils, greases, fuels, organic solvents, or similar materials. These fluids can cause the tread to swell, soften and weaken. The deteriorated rubber would then abrade during subsequent takeoffs and landings. Accidental spillage of these materials on the tires shall be immediately wiped dry with a clean, absorbent cloth, and the tires then washed with detergent MIL-D-16791, Type I and water and thoroughly rinsed. Installed tires that might be exposed to leaking fluids shall be protected with MIL-PRF-131 (vaporproof barrier material) as shown in Figure 3-6 or a fluid resistant cover if available.

3-13. SIDEWALL CONDITIONS The sidewall has a thin layer of rubber covering the outside of the casing plies. The purpose of the sidewall is to protect the casing plies from exposure to cuts and deteriorating fluids. Inspect the sidewall area for cracks, cuts, abrasions, bulges, and gouges. Care must be taken during tow bar installation and removal to prevent tire sidewall damage.

a. Bulges and Separations. If sidewall exhibits a bulge or separation as described in paragraph 3-10, deflate and remove tire/wheel assembly from aircraft.

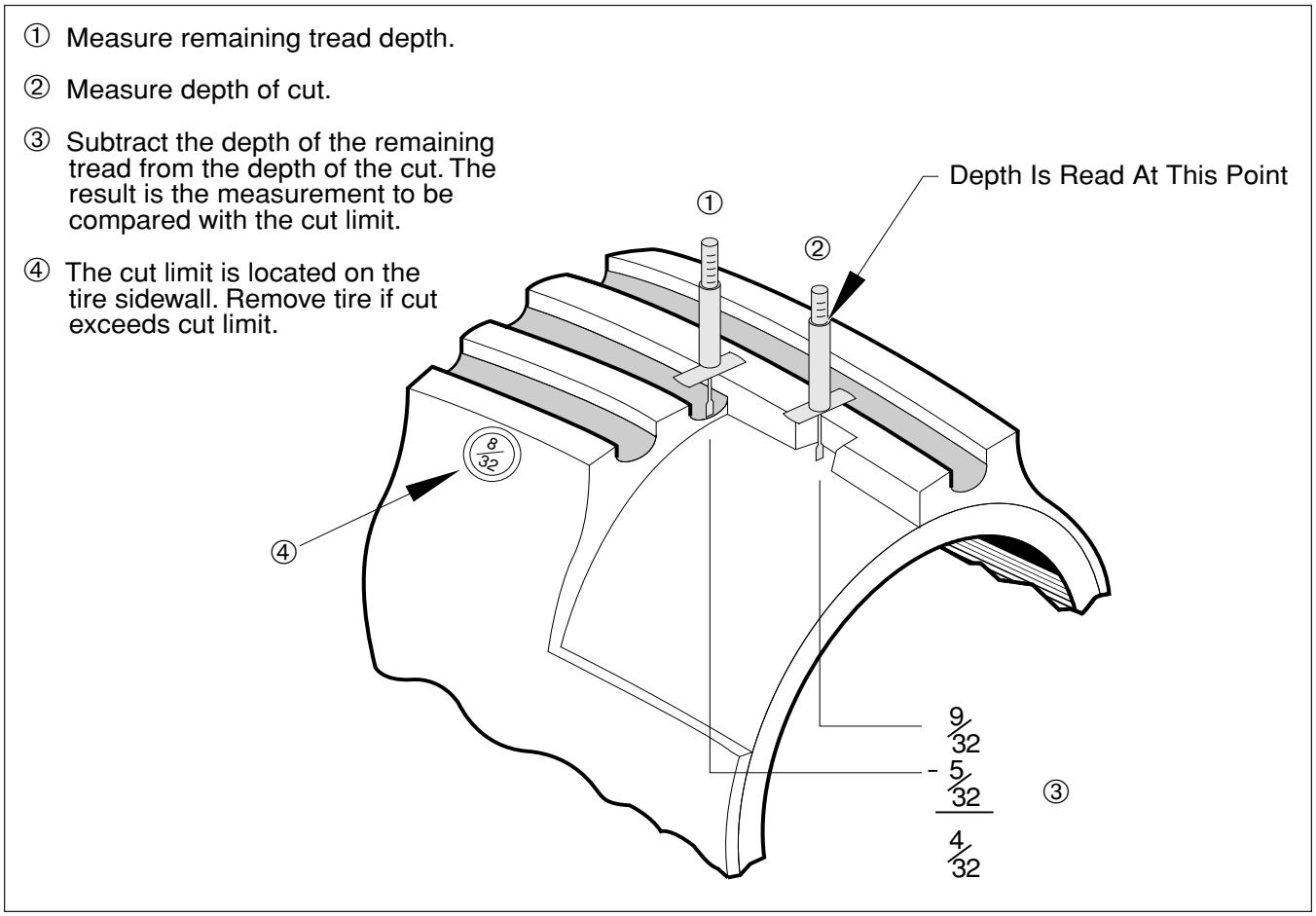


Figure 3-5. Method of Measuring Depth of Cuts, Cracks, and Holes

After deflating, mark discrepant area with a light colored grease pencil and forward to the IMA for tire replacement.

b. Cuts and Abrasions. If the sidewall exhibit cuts that expose the nylon casing plies, deflate and remove tire/wheel assembly from aircraft. Removal of a foreign object shall never be attempted. After deflating, mark discrepant area with a light colored grease pencil and forwarded to the IMA for tire replacement. Superficial cuts, abrasions or cracks not exposing the nylon casing plies are acceptable for continued use.

c. Weathercracking. Weathercracking or weatherchecking as shown in Figure 3-7 is due to the normal oxidation of the rubber from exposure to sunlight and traces of ozone in the atmosphere. Minor weathercracking is not a cause to reject the tire from

Figure 3-6. Protective Cover for Aircraft Tire

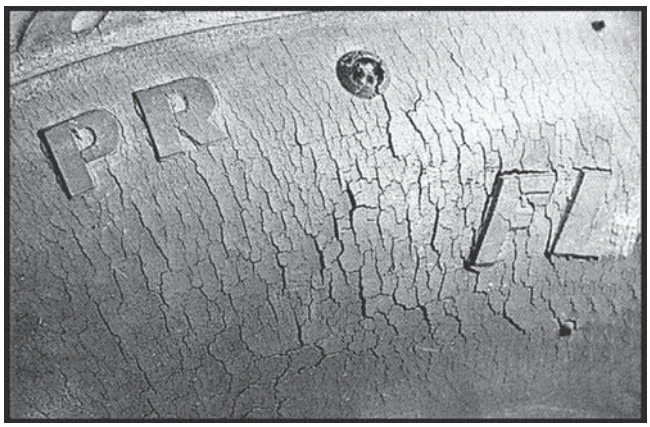


Figure 3-7. Weathercracking of Tire Sidewall

service. However, if weathercracking exposes sidewall nylon casing plies, remove tire/wheel assembly from aircraft and forward to the IMA for tire replacement.

d. Circumferential Cracks. Circumferential cracks as shown in Figure 3-8, are usually found in the lower sidewall area and can be caused by improper mold flow during manufacturing. If cracks expose sidewall nylon casing plies, remove tire/wheel assembly from aircraft. Mark discrepant area with a light colored grease pencil and forward to the IMA for tire replacement.

e. Radial Cracks. Radial cracks usually appear on the upper sidewall shoulder area and are caused by improper sidewall venting. If cracks expose sidewall nylon casing plies, remove tire/wheel assembly from aircraft and forward to the IMA for tire replacement.

3-14. TREAD DAMAGE. The tread area shall be examined for the following conditions:

a. Tread Chunking. Pockmarks, gouges, or chunks of rubber missing from the wearing surface of the tread as shown in Figure 3-9 are typically caused by operating the tire on rough/unimproved runways or carrier decks. Removal criteria shall be based on the amount of tread worn away as outlined in paragraph 3-8 and the depth of the discrepancy as defined in paragraph 3-11.

b. Tread Flaking and Chipping. Certain tires incorporate a fabric tread construction that allows the fabric to “float” near the wearing surface of the tread. Because of this construction, thin pieces of rubber sometimes chip or flake from the wearing portion of the tread (Figure 3-10). Removal criteria shall be based on the amount of tread worn away as outlined in paragraph 3-8.

Figure 3-8. Circumferential Cracks on Tire Sidewall

Figure 3-9. Tread Chunking and Groove Cracking

Figure 3-10. Tread Chipping

c. Peeled Rib/Thrown Tread. Both of these discrepancies usually begin with a cut or anomaly in the tread area. The end result, as shown in Figures 3-11 and 3-12, is a circumferential delamination of the tread from the tire casing. If tires exhibit peeled ribs or thrown treads, remove tire/wheel assembly from aircraft and forward to the IMA for tire replacement. If an Engineering Investigation is initiated (paragraph 7-2) save all tire pieces, including the tire casing. The sections that are thrown often give the cause to the failure mechanism.

d. Groove Cracking and Rib Undercutting. The tread shall be examined for groove cracking and rib undercutting (Figure 3-13). Tires shall be removed from the aircraft if the sidewall casing plies are exposed or if the groove cracking or rib undercutting in the tread exceed the depth specified on the sidewall of the tire.

e. Chevron Cutting. Operating tires on grooved runways may result in the cutting of the tread surface, a condition termed chevron cutting (Figure 3-14). Evaluate chevron cuts in accordance with the cut limit criteria set forth in paragraph 3-11. When the depth of the cut exceeds the cut limit printed on the sidewall, remove tire/wheel assembly from aircraft and forward to the IMA for tire replacement. A tire will wear normally even though it contains many areas of chevron cuts. Newly installed tires are more susceptible to chevron cuts due to thicker tread ribs. As the tire is worn down, the tendency for chevron cutting will diminish.

Figure 3-11. Tread Rib Peeled from Tire

Figure 3-12. Tread Thrown From Tire Casing

f. Hydroplaning. Tread damage from hydroplaning results in an oval-shaped skid in the tread area with the appearance of melted rubber (Figure 3-15). It is caused by a locked or non-rotating wheel during a landing on a wet or ice-covered runway. Removal criteria shall be based on the amount of tread worn away as outlined in paragraph 3-8.

g. Embedded Objects. See paragraph 3-11.

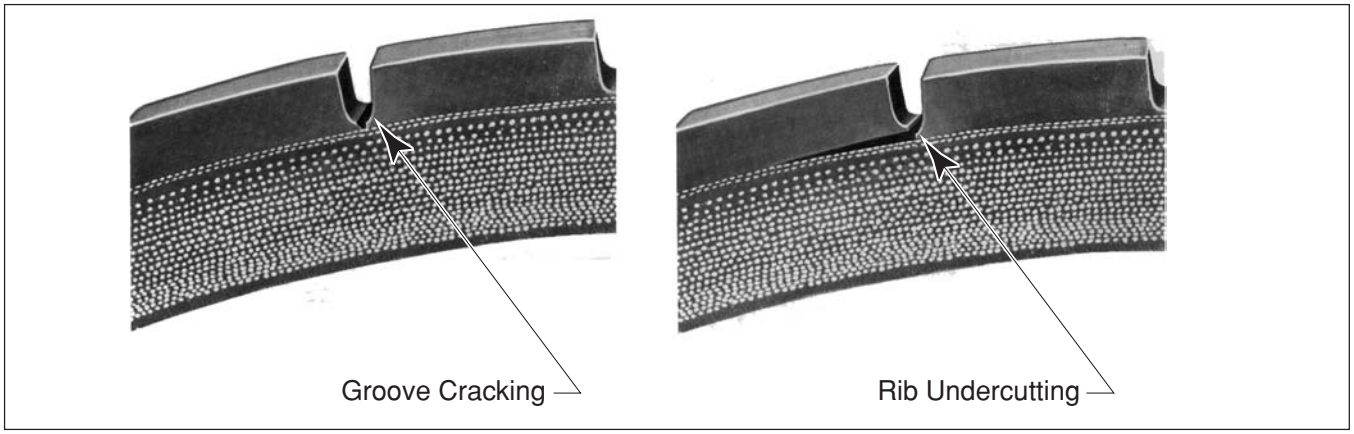


Figure 3-13. Groove Cracking and Rib Undercutting

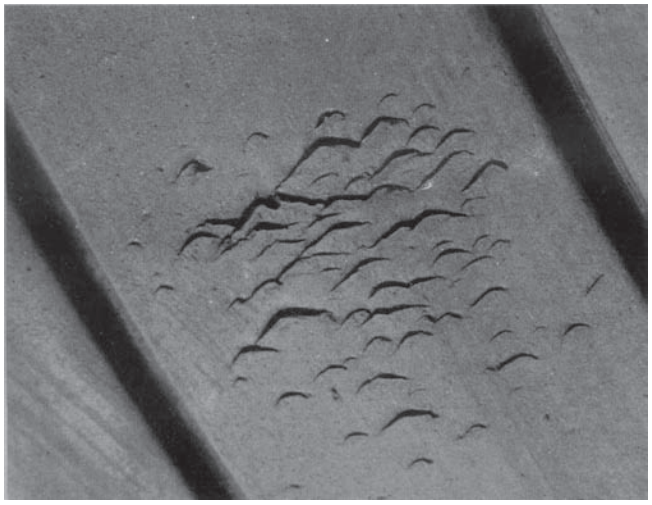


Figure 3-14. Chevron Cuts on Tread

Figure 3-15. Hydroplaning

3-15. TIRE CLEARANCE. Inspect tires for abrasion damage caused by inadequate clearance in the wheel well. Look for rubbing marks on wire bundles, hydraulic lines, landing gear, and in the wheel well. If damage occurred to the tire, use the removal/continue-in-use criteria given in paragraphs 3-8 through 3-14 and correct the cause of the clearance problem. Inspect the assembly to verify the correct tire NSN.

3-16. REMOVAL OF AIRCRAFT WHEEL ASSEMBLIES. When the removal of a wheel assembly is required, the following procedure shall apply:

a. The aircraft landing gear shall be jacked up in accordance with the applicable Maintenance Instruction Manual (MIM) ensuring that the aircraft is chocked and/or tied down to prevent slipping off the jack.

b. Remove the valve cap and deflate the tire using the following method.

(1) Install Safe-Cor Valve Tool (P/N 968RB or NSN 5120-00-223-8653). This tool (Figure 3-16) screws onto the tire valve stem and allows the operator to safely remove the valve core from a pressurized tire and greatly reduces deflation time. The expelled core is captured inside the body of the tool.

(2) Deflate tire completely before removing tool.

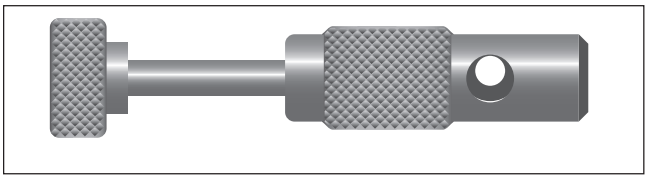


Figure 3-16. Safe-Cor Valve Tool

WARNING

If the valve stem is equipped with a valve extension, remove the extension and make sure that the second valve core is removed.

c. Install deflated tire flag (Figure 3-17, View A or B) to indicate that the tire is deflated and the valve core is removed.

d. The alternate tire flag prevents foreign object damage by providing a place to store a valve core and cap that has been removed from a tire/wheel assembly (Figure 3-17, View C).

WARNING

Do not attempt to remove an aircraft tire assembly until the tire is deflated, the valve core removed, and the deflated tire flag is installed. The axle nut may be all that is preventing a damaged wheel from failing.

e. Remove the tire/wheel assembly in accordance with the applicable MIM.

3-17. DISPOSITION OF TIRE AND WHEEL ASSEMBLIES.

a. Discrepant tire/wheel assemblies removed from aircraft shall be forwarded to the Intermediate Maintenance Activity (Tire Shop) for further inspection, evaluation, repair and classification. Properly completed maintenance documents shall accompany the removed assembly. Protect exposed wheel bearings, bearing cups, wheel bores areas from water and contaminates. In addition, the defective area, if any, shall be marked with a grease pencil to ensure its detection after deflation.

b. When a blown tire occurs on a dual wheel installation, remove both tires, and conspicuously mark the blown tire and its companion for condemnation at the IMA (tire shop).

CAUTION

Do not re-inflate the tire until the axle nut is properly installed and safetied on the aircraft.

c. When a tire/wheel assembly will be immediately reinstalled after being removed from the aircraft to gain access to hidden/obstructed components for maintenance/inspection purposes, the following steps shall be performed.

(1) Inspect that, in the interim, the tire bead seal has not been broken.

(2) Install valve core and reinstall wheel assembly on aircraft per paragraph 3-18. Inflate per paragraph 3-19.

d. If the maintenance/inspection operation and wheel reinstallation on aircraft cannot be completed in a continuous, uninterrupted process then the wheel assembly will require proper storage per paragraph 3-17e.

e. Ready for Issue (RFI) tire/wheel assemblies that require storage and the bead seal is not broken or displaced, shall be inflated by the IMA per initial inflation requirements (paragraph 4-14 or 4-15) and stored on racks per paragraph 6-5. Storage of deflated tires could lead to a breach of the tire/wheel interface allowing foreign object and moisture intrusion. Always store RFI tire/wheel assemblies at storage inflation pressure. Tire/wheel assemblies with bead seal broken or displaced shall be reworked per Section IV.

3-18. INSTALLATION OF WHEEL ASSEMBLIES. The tire/wheel assembly shall be installed on aircraft in accordance with the applicable MIM for the specific aircraft. Inspect the assembly for the correct tire size, ply rating, and NSN and the correct wheel part number. Verify the presence of an engraved or embossed serial number on the tire's sidewall before using on aircraft. Ensure that the wheel bearings, bearing cups, wheel bores are cleaned, inspected and packed with grease in accordance with NAVAIR 04-10-1. Check the condition of the bearings and grease prior to installation especially if the assembly has been stored for extended periods (e.g. pack up kits) or in dirty, hot conditions. Ensure axle nut is properly torqued and safetied.

NOTE

For aircraft that use directional tires (i.e. asymmetrical design), ensure correct mounting direction is established prior to wheel installation.

3-19. INFLATION OF TIRE/WHEEL ASSEMBLIES. Inflation procedures for aircraft tires are found in NAVAIR 17-1-123, NAVAIR 17-15G-1, and NAVAIR 17-600-174-6-1. These manuals contain detailed instructions for the operation, calibration, and maintenance of:

a. Tire Inflator Assembly Kit (Figure 3-18), P/N M85352/1 or M008348-1-1.

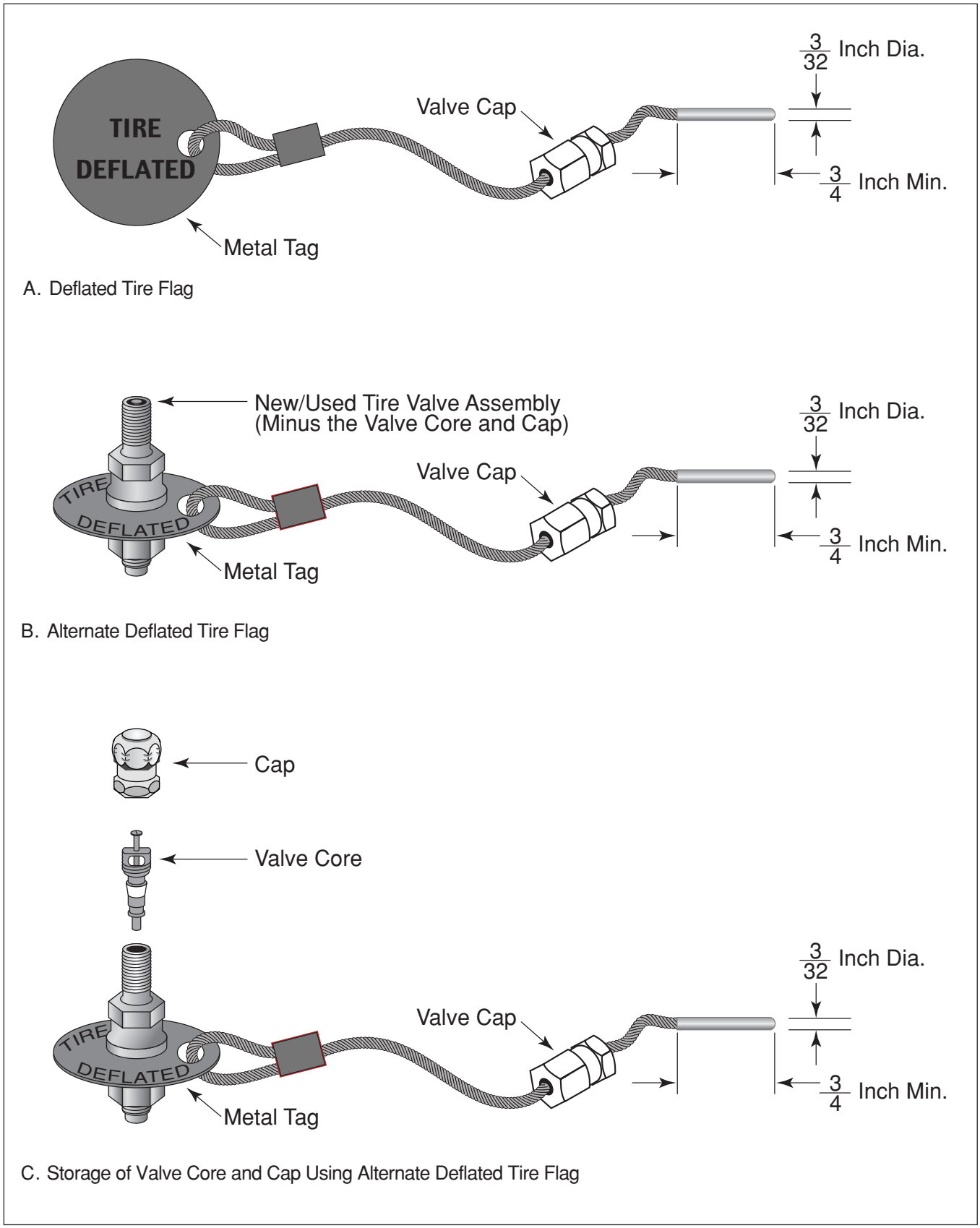


Figure 3-17. Deflated Tire Flags

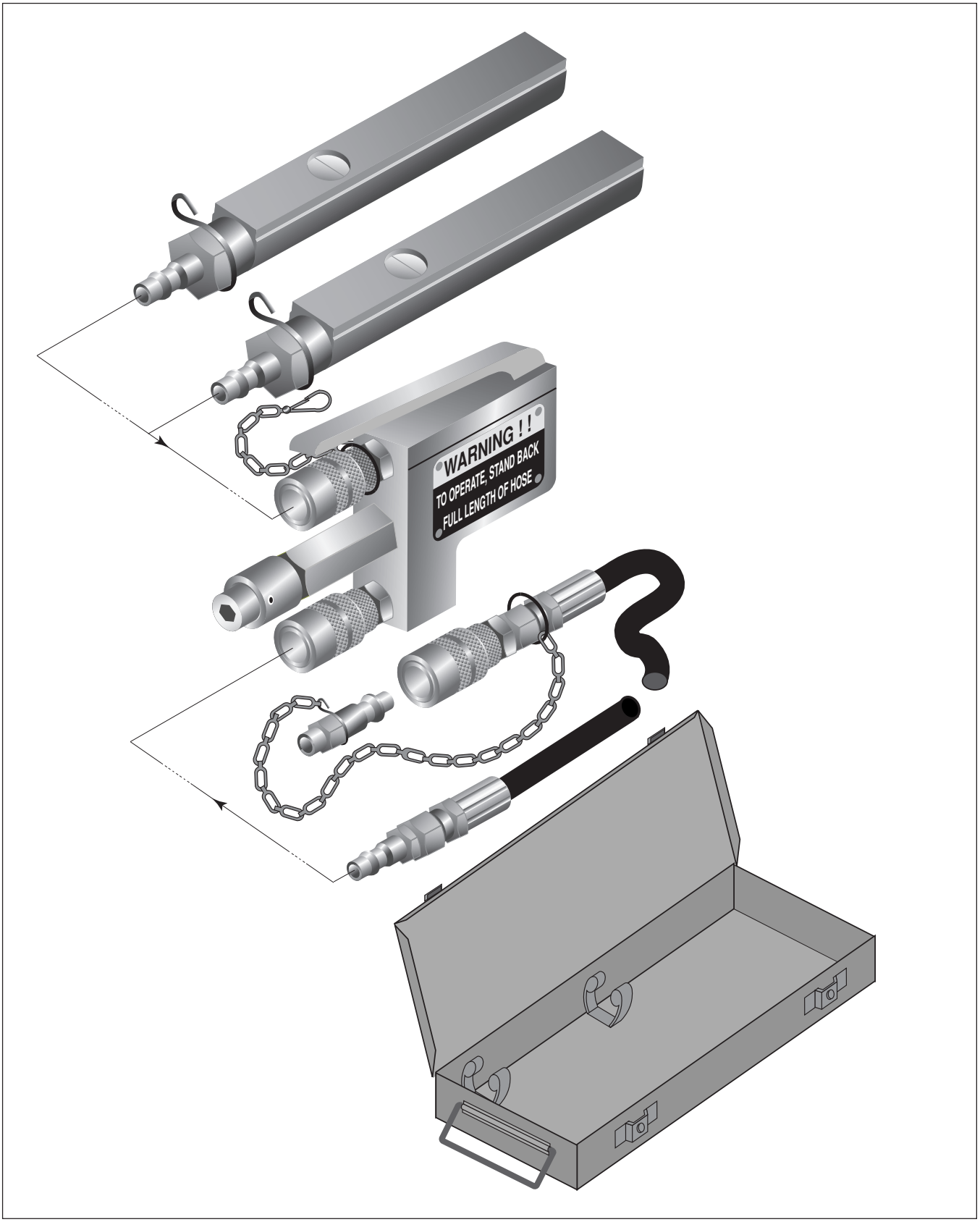


Figure 3-18. Tire Inflator Assembly Kit

b. Remote Tire Inflator Assembly, P/N AS1675, not approved for use.

d. Dual Chuck Stem Gage (Figure 3-1), P/N M85352/4 or 1063.

e. Aircraft tire inflator/monitor P/N 631AS100-1.

Nitrogen 1

CAUTION

Do not inflate tire above storage pressure until the axle nut is properly installed and safetied on the assembly.

3-20. NITROGEN. Water pumped nitrogen A-A-59503, Type I, Grade B, Class 1 shall be used to inflate tires. When nitrogen is not available, dry, oil-free air may be used. Nitrogen servicing equipment includes:

WARNING

Under no circumstances will a tire be pressurized directly from a nitrogen cart or other pressure source without the use of a tire inflator assembly kit, or tire inflator/monitor. Only certified NAN cart operators are authorized to inflate tires using NAN cart equipment.

a. Model A/M26U-4 Nitrogen Servicing Unit, P/N 1317AS100-1, also referred to as NAN-4, is the most commonly used mobile nitrogen servicing trailer for inflating aircraft tires. For the proper operation of the NAN-4, consult NAVAIR AG-750AO-OMM-000 and the operating instruction plates attached to the vehicle.

b. Model A/M26U-4B Nitrogen Servicing Unit, P/N 1317AS100-1, also referred to as NAN-4B (Figure 3-19), is the Navy's latest version of a mobile nitrogen servicing trailer. The NAN-4 units are being converted to NAN-4B units. For the proper operation of the NAN-4B, consult NAVAIR AG-750AO-OMM-100 and the operating instruction plates attached to the vehicle.

c. Model NAN-3 Nitrogen Servicing Unit, P/N 322AS100-1, referred to as NAN-3 (Figure 3-20) is an older unit that may still be utilized at some locations. For the proper operation of the NAN-3, consult NAVAIR 19-25B-15 and the operating instruction plates attached to the vehicle.

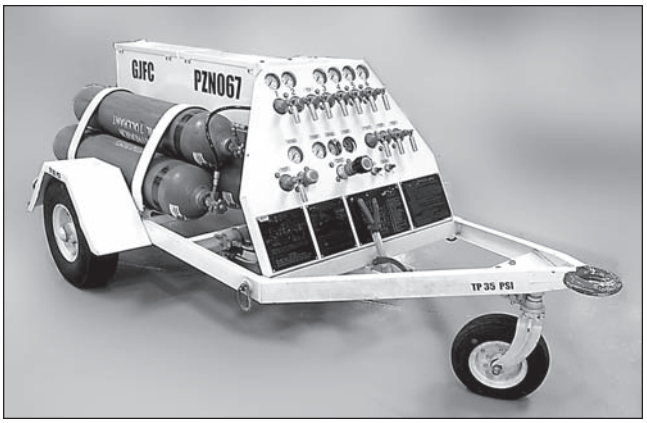


Figure 3-19. NAN-4B Nitrogen Servicing Unit

d. Tire shops are generally equipped with a bulkhead outlet or through a series of nitrogen bottles and a manifold system. For remote or confined areas the portable high pressure cylinder, P/N 60A80D1, Figure 3-21 is available. Consult the applicable handbooks for the proper operation of this equipment.

3-21. MATCHING TIRES FOR DUAL INSTALLATION.

NOTE

Tires do not need to be matched by the same number of tread grooves or tread pattern.

When a blowout occurs on a dual wheel installation, both tires shall be removed from service and sent to the intermediate Maintenance Activity (IMA) for condemnation.

a. Nose Landing Gear Tires. Matching tires are required for nose landing gear applications only. Matching nose tires will reduce shimmy and balance problems. Inspect the tires identification markings and pair by the same tire size, ply rating (PR) and NSN. Where possible, pair tires by same manufacturer. Do not match new with retread tires. Both nose landing gear tires shall be replaced as a matched set.

b. AV-8B Main Landing Gear Tires. Due to the unique design of the AV-8B main landing gear and the use of a radial tire design, the tires shall be paired by NSN and manufacturer.

c. V-22 Nose Landing Gear Tire Application. Replace both as a matched set if a blowout occurs. Tires worn lightly and less than $\frac{1}{4}$ inch outside diameter to a new tire diameter may have a new tire matched to the worn.

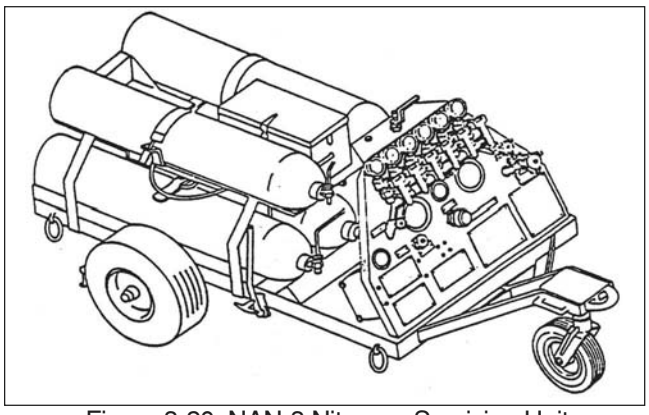


Figure 3-20. NAN-3 Nitrogen Servicing Unit

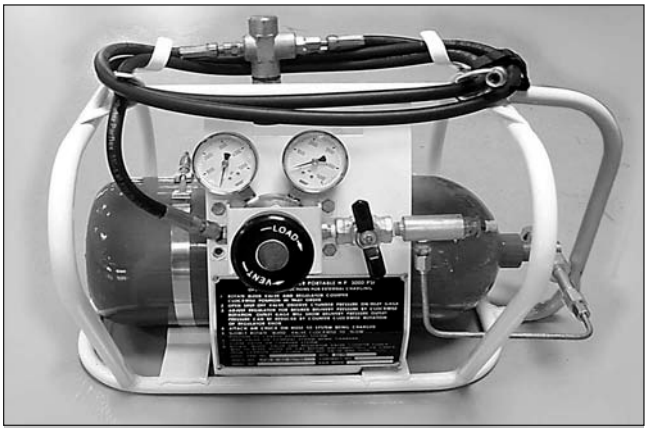


Figure 3-21. Portable High Pressure Cylinder

3-22. PREVENTION OF DEBRIS DAMAGE. Aircraft tires are designed to operate at higher inflation pressures than auto and truck tires. This makes them more susceptible to damage from foreign objects. If an aircraft runs off the edge of a concrete surface, over potholes, stones, or other foreign objects, serious tire damage may result. Figure 3-22 shows typical items that may cause tire damage. Runways, carrier decks, aprons, hangars and shop floors shall be kept free of debris at all times by use of rotary sweepers, Foreign Object Damage (FOD) walk-downs or other approved methods. It is important to remember that FOD to aircraft tires can result in the loss of life, and the destruction of aircraft.

3-23. OVERHEATED/MALFUNCTIONING BRAKES. When brakes malfunction or are used excessively, extremely high temperatures may develop and be transmitted to the tire/wheel assembly causing deterioration of the rubber and nylon casing plies. An overheated tire/wheel assembly can explode violently causing fatal injuries to personnel as well as major damage to aircraft. The dangers of explosion are considerably increased when a fire occurs since the extreme heat of the fire is added to the heat generated by the brake.

3-24. GROUND PERSONNEL PRECAUTIONS. The fire department should be alerted immediately when an aircraft has been subjected to excessive braking.

WARNING

Required personnel should approach overheated wheels with extreme caution. Always approach the wheel in a fore or aft direction, never in line with the axle.

a. When an overheated wheel and brake assembly or brake fire occurs, all personnel not required for fighting the fire or cooling the assembly should evacuate the immediate area.

b. An overheated wheel may fracture or fly apart upon sudden cooling. This could hurl bolts or fragments through the air with sufficient speed to injure personnel. Explosive failure of the wheel or tire will not occur if the tire is deflated.

c. Heat transfer to the wheel will continue for some period of time after heavy braking. Therefore, the danger of explosive failure may exist after the aircraft is secured if action is not taken to cool the overheated brake.

WARNING

Tires with skid spots can fail catastrophically after aircraft is parked. Allow tire assemblies to cool to ambient temperature before approaching. Use caution when inspecting tires, and approach fore and aft from the opposite side of the skid spot.

Tires found with skid spot or cut damage beyond limits shall be deflated and removed from aircraft before other maintenance actions are performed.

d. Tires with skid spots through half the tire carcass may blowout after the aircraft has been parked. Residual brake heat from normal braking will cause an increase in tire temperature and pressure, and may be enough to cause the tire to blowout.

Figure 3-22. Common Debris Found on Runways and Aprons

3-25. COOLING OVERHEATED WHEEL, BRAKE, AND TIRES. The primary means recommended for cooling overheated wheel, brake, and tire assemblies is to park the aircraft in an isolated location and allow the assembly to cool in ambient air (allow at least 3 hours). The use of agents for accelerated cooling is cautioned against. Their application exposes personnel to danger by requiring proximity to the overheated assembly. However, if it is necessary to accelerate cooling, either of the following methods may be used:

CAUTION

The use of CO_2 for cooling is not recommended.

a. Spray water fog to the brake side of the wheel. Concentrate the cooling agent primarily to the brake, not to the wheel, making direct contact with the exposed portion. Apply in 10-15 second periodic spurts, not a continuous discharge. Each application should be separated by a wait period of at least 20 seconds. Use as many applications as necessary. Permit the wheel to cool sufficiently in ambient air. A crosswind or fan will assist in cooling the wheel. Do not move the aircraft for at least 15 minutes following cooling application.

b. Water may be used by directing a stream to the brake. Apply water in 10-15 second periodic spurts, not a continuous discharge. Each application should be separated by a wait period of 30-60 seconds. A minimum of 3-5 applications is necessary. Do not move the aircraft for at least 15 minutes following cooling application.

WARNING

Approach the discrepant tire/wheel assembly from the forward to aft edge of the tire. If the wheel explodes, fragments may travel outboard/inboard along the path of the axle. Approach fore and aft from the opposite side of a tire skid spot.

3-26. EMERGENCY PROCEDURE FOR DEFLATING AIRCRAFT TIRES. The emergency tire deflator shown in Figure 3-23 is used when normal deflation through the valve core is considered unsafe, or to prevent a wheel assembly explosion. This situation may arise due to overheated brakes, a damaged tire, a damaged valve stem, or when examination of the wheel discloses cracks or missing pieces. The procedure involves laying the tire deflator in front of the discrepant tire/wheel assembly and taxiing/towing the aircraft across the board to puncture the tire and release the pressure.

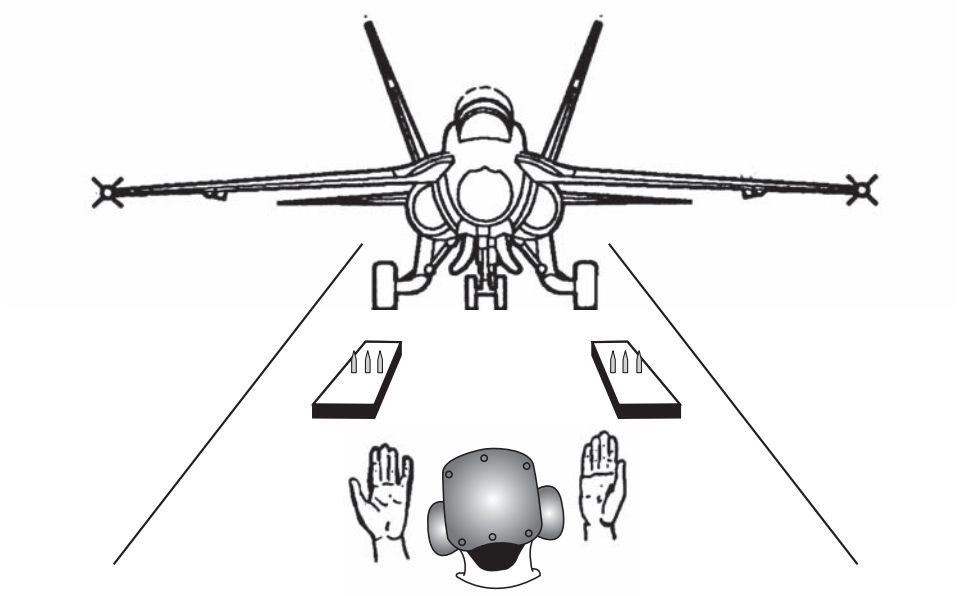
Because of the possibility of a wheel explosion all personnel and equipment outboard/inboard along the path of the axle should be cleared.

3-27. FIRE FIGHTING. The fire fighting procedures specified in the U. S. Navy Aircraft Fire Fighting and Rescue Manual, NAVAIR 00-80R-14, should be followed. However, it should be remembered that with a landing gear fire the possibility of an exploding wheel or tire is increased and extreme caution should be used. Once the fire is extinguished, do not discharge additional agent for the purpose of cooling the wheel assembly. Proceed as recommended in the cooling instructions.

NOTE

The presence of thermal fuse plugs in wheels is not a guarantee of safety in a hot brake situation. Refer to procedures outlined in paragraph 3-23 through 3-26.

3-28. THERMAL FUSE PLUGS. Thermal fuse plugs are incorporated in newer main landing gear wheels using tubeless tires. The fuse plug is designed to melt and relieved the pressure at a temperature below the danger level for the wheel assembly. If not relieved, the excessive pressure may cause the tire to blowout or an explosive wheel failure, with possible injury to personnel and damage to aircraft. All wheel assemblies in which the thermal fuse plug has been blown shall be removed from the aircraft and sent to the IMA for inspection/ repair.



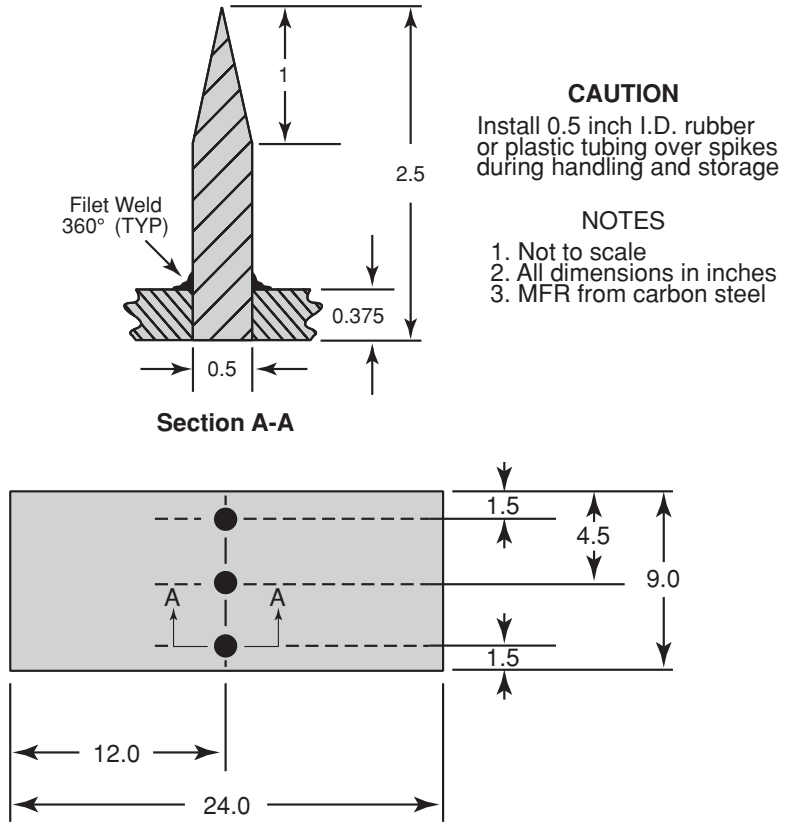


Figure 3-23. Emergency Tire Deflator

SECTION IV

DISMOUNTING AND MOUNTING AIRCRAFT TIRES AND TUBES AT THE INTERMEDIATE MAINTENANCE LEVEL

4-1. TIRE SHOP WORKING AREAS. Tire shop floors and work benches workbenches in the buildup and breakdown areas shall be covered with a ½ inch thick rubber matting (MIL-R-6855, Class II, Grade 60), 3M cushion matting (part number 5270YE), or equivalent. This cushioning reduces the possibility of leak producing scratches and gouges, and drop damage to wheel rims that can occur during the buildup and breakdown process on hard-surface work areas.

4-2. TIRE DEFLATION. All aircraft tires must be completely deflated and the valve core removed before any attempts are made to dismount tires and disassemble the wheels. Failure to do so has resulted in fatal injury to personnel. The deflated tire flag (Figure 3-17) is installed by the organizational level in accordance with paragraph 3-16 to show that the tire has been deflated and the valve core removed. Manufacture flags locally (Figure 3-17) ensuring that the pin extends a minimum of ¼ inch beyond the open end of the valve cap when the cap is shouldered against the pin. Pin diameters shall not exceed 3⁄32 inch.

WARNING

Pin lengths of less than ¾ inch enable the deflated tire flag to be screwed on the valve stem while the valve core is installed. Such action can result in serious injury or death if any attempt is made to disassemble an inflated tire/wheel assembly. The presence of a deflated tire flag on a valve stem is not a guarantee that the valve core has been removed. Always inspect valve stem to ensure that valve core is removed before disassembly.

4-3. BEAD BREAKING EQUIPMENT. Aircraft tires, tubes, and wheels can be damaged beyond repair by improper dismounting procedures and use of unauthorized tools. Tubeless tire bead sealing surfaces and the relatively soft aluminum and magnesium alloy wheels are easily damaged. Figure 4-1 shows a tubeless tire bead that has been damaged beyond repair by using tire irons to pry the bead loose. The equipment shown in Figure 4-2 and Figure 4-3 shall be used for breaking tire beads loose from wheel flanges. The Navy Models (Lee-1) and Regent 8137 meet the general requirements and provide satisfactory service. Navy Model (Lee 1X) is an explosion proof version of the Lee-1 and is mandatory for shipboard use. The

Figure 4-1. Damaged Tire Beads

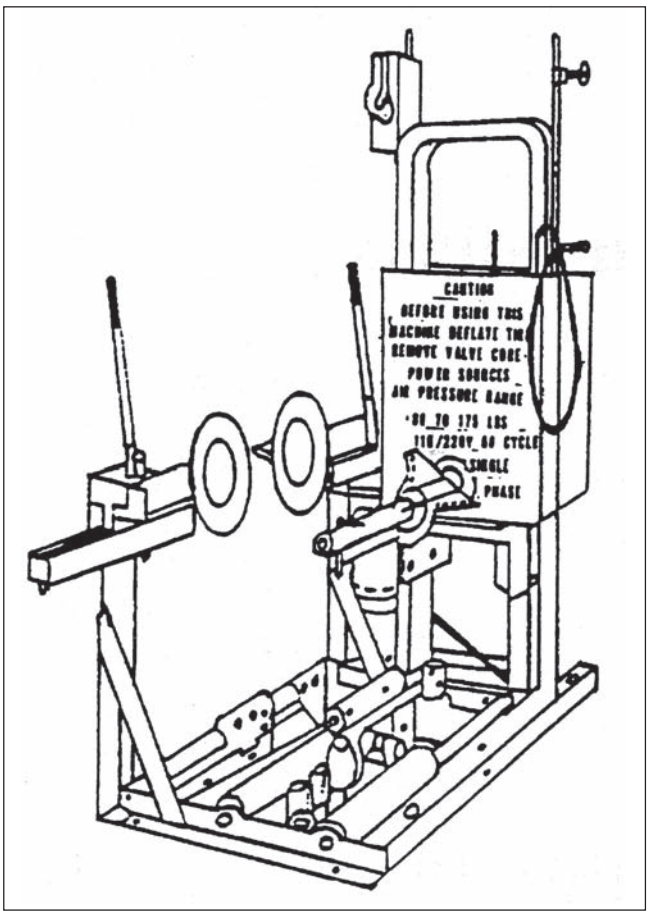


Figure 4-2. Tire Breaker (Model-Lee-1)

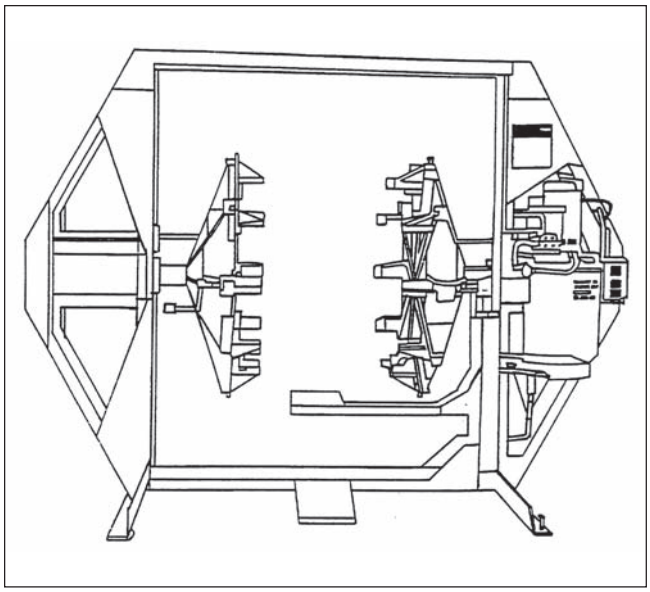


Figure 4-3. Tire Bead Breaker (Model-Regent 8137)

NAVAIR 19-1-55 manual provides detailed instructions for the use of the Lee-1/Lee-1X bead breakers, and Air Force T.O. 34Y9-6-4-1 provides instructions on the Regent Model 8137 bead breaker.

4-4. WHEEL ASSEMBLY EQUIPMENT. Stiff tires sometimes make it difficult to draw the wheel halves/ demountable flange together enough to engage the bolts. If this is the case, the following equipment and methods may be used:

a. Aircraft Wheel Assembly Fixture. The unit (Figure 4-4), P/N 66F-40999-1, is designed to hold the two wheel halves under uniform compression for installation of the bolts. Air Force T.O. 35D25-9-31 provides instruction on the use of the fixture.

b. Hydraulic Press. A hydraulic or mechanical press may be used to pull the wheel halves together.

c. Nonspecified Bolts. Two or more bolts of extra length may be used to pull the wheel halves together sufficiently to permit installation of the specified bolts so that the nut engages a minimum of three threads. The long bolts shall be removed, and the specified bolts installed.

4-5. DISMOUNTING SPLIT OR DIVIDED WHEELS. Figure 4-5 shows a split or divided wheel.

a. Ensure tire is deflated in accordance with paragraph 3-16, steps b and c.

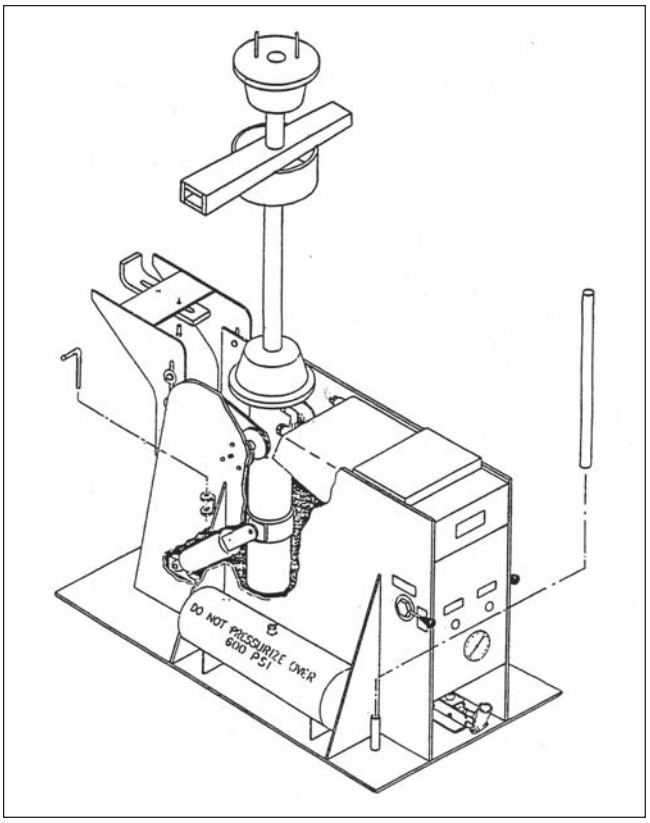


Figure 4-4. Aircraft Wheel Assembly Fixture

WARNING

Before any attempt is made to break the tire beads loose from the wheel flanges, verify that the tire has been completely deflated and that the valve core has been removed. If the valve stem is equipped with a valve extension, remove the extension and make sure that the second valve core has also been removed. Never attempt to remove wheel bolts or break beads loose until this check has been made. A tire not completely deflated is as dangerous as an armed bomb.

b. If the tire is a tube-type, remove the hex nut (if any), and push the valve away from the seated position to prevent damage to the tube valve.

c. After all pressure has been released, loosen the beads from the rim flanges with the equipment described in paragraph 4-3. Some wheel diameters are too small to use the equipment described and will require tapping on the tire with a rubber, plastic or rawhide faced mallet to loosen the bead from the wheel flange.

Figure 4-5. Split or Divided Wheel

d. Remove the nuts and tie-bolts. Avoid damaging the threads or bending the bolts.

e. Remove each wheel half from the tire.

f. If the tire is a tubeless type, remove the wheel O-Ring seal carefully from the wheel half and place on clean surface. Wheel O-Ring seals in good condition may be reused if replacements are not available.

g. If the tire is a tube-type, remove the tube. Tubes may be reused if in satisfactory condition. See paragraph 5-9 for inspection.

4-6. DISMOUNTING DEMOUNTABLE FLANGE WHEELS. Figure 4-6 shows a demountable flange wheel.

a. Ensure tire is deflated in accordance with paragraph 3-16, steps b and c.

b. If the tire is a tube-type, remove the hex nut (if any), and push the valve away from the seated position to prevent damage to the tube valve attachment when breaking the beads loose.

WARNING

Before any attempt is made to break the tire beads loose from the wheel flanges, verify that the tire has been completely deflated and that the valve core has been removed. If the valve stem is equipped with a valve extension, remove the extension, and make sure that the second valve core has also been removed. Never attempt to pry up locking rings or break beads loose until this check has been made. A tire not completely deflated is as dangerous as an armed bomb.

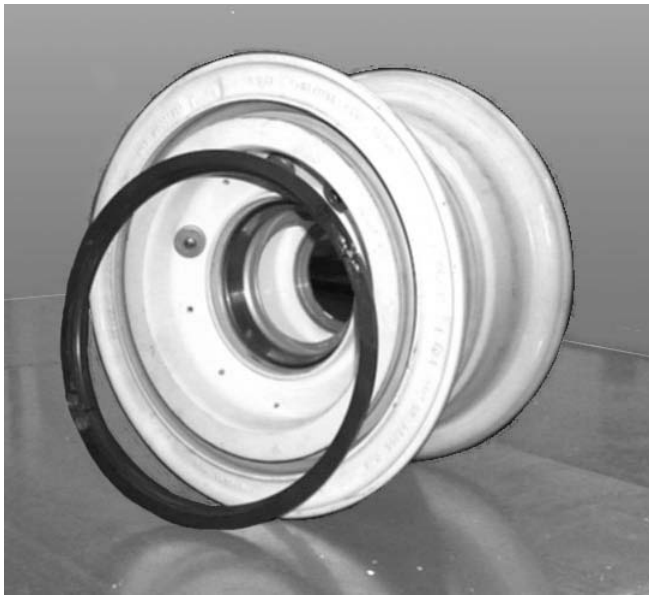


Figure 4-6. Demountable Flange Wheel with Locking Ring

CAUTION

The most extreme care must be taken when breaking the beads loose and when removing the locking ring on some demountable flange wheels. The toe of the demountable flange on these wheels extends very close to the tube valve stem. Excessive travel of the demountable flange, when removing the locking ring, or of the tire bead, when breaking the beads loose, will damage the rubber base of the tube valve.

c. Break the tire beads loose from the ring flanges with the equipment described in paragraph 4-3. Some wheel diameters are too small to use the equipment described and will require tapping on the tire with a rubber, plastic or rawhide faced mallet to loosen the bead from the wheel flange.

d. After the beads have been freed of the flanges, lay the tire/wheel assembly flat with the demountable flange side up. Loosen demountable flange and lock ring by tapping with a rubber, plastic or rawhide faced mallet.

Figure 4-7. Removing Locking Ring

e. Remove the locking ring as shown in Figure 4-7.

CAUTION

Exercise care to avoid bending or otherwise damaging the demountable flange.

f. Remove the demountable flange. If it is too tight for easy removal tap it with a rubber, plastic or rawhide faced mallet until free, and pry evenly from opposite sides.

g. If the tire is a tubeless type, remove the wheel O-Ring seal carefully, and place it on a clean surface. Wheel O-Ring seals in good condition may be reused if replacements are not available.

h. Turn the tire/wheel assembly over, and lift the wheel out of the tire.

i. If the tire is a tube-type, remove the tube. Tubes may be reused if in satisfactory condition.

j. Keep the wheel flange and locking ring together as a unit to avoid possible mismatching during remounting.

4-7. TIRE MOUNTING. The following precautions shall be observed before mounting aircraft tires.

a. Service and inspect wheels and related parts in accordance with NAVAIR 04-10-1 and the applicable MIMS. Use only wheels that have been inspected and found to be completely serviceable and safe.

b. All wheel halves shall be matched by year and month of manufacture as closely as possible. Wheel assemblies received from overhaul having matching overhaul dates on both rims shall be maintained as matched assemblies. In the event a wheel assembly is received or made up of wheel halves having different overhaul dates, the wheel overhaul shall be based upon the earlier date. All wheels shall fit together easily without forcing. Mismatching wheels by part numbers is not authorized.

c. All wheel bolts to be reused shall be magnetic particle inspected in accordance with NAVAIR 01-1A-16. V-22 wheel bolts require fluorescent penetrant inspection inspected in accordance with NAVAIR 01-1A-16.

d. Use only tires and tubes which have been closely inspected for conformance to the requirements of Section V.

Leak Detection Compound 2

e. Use MIL-PRF-25567 Type I, Leak Detection solution on the tire beads.

f. P-3 Main Land Gear tires (NSN 2620-00-928-4502) can be difficult to mount due to a narrow outside bead-to-bead dimension. This condition is caused by tires being stacked horizontally, which collapses the bead width of the tires. P-3 tires with a narrow bead-to-bead condition can be corrected by performing the following steps:

CAUTION

Do not exceed an outside bead-to-bead dimension of12 inches during tube inflation.

(1) Install a special tube inside the tire. Only a tube with NSN 2620-00-269-7268, or a tube authorized by the Aircraft Tire FST, North Island may be used.

(a) Inflate the tube using shop air until the outside bead-to-bead dimension is 12 inches.

(b) Recheck this dimension after approximately 10 minutes. If the dimension is less than 12 inches, re-inflate the tube until an outside bead-to-bead dimension of 12 inches is achieved.

NOTE

This tube inflation process can be performed outside the inflation cage since the inflation pressure will not exceed 10 psi.

(2) Allow tube to remain inflated inside the tire for a minimum of 4 hours. The tire should be stored vertically on its tread.

(3) Deflate and remove tube from tire.

(4) Measure outside bead-to-bead dimension. For mounting, a minimum of 10.25 inches or greater is required. Repeat steps (1) through (3) until this minimum outside bead-to-bead dimension is achieved.

4-8. INSPECTING TIRES, TUBES, AND WHEELS BEFORE MOUNTING.

a. Tires.

(1) Ensure the correct tire is selected, as identified by the NSN, size, and ply rating, as listed in Table 4-1.

(2) Check the tire sidewall for the word “Tubeless” or "Tube-Type". Treat all tires not so marked as tube-type tires.

(3) With a collateral duty inspector, verify the inside of the tire is free of foreign material.

(4) Examine the tire bead-sealing area for defects and shipping or handling damage.

(5) Tubeless tires of the same size and ply rating may be used in tube-type applications. The tube still must be used.

(6) Make sure tires without a serial number engraved or embossed on the sidewall are not used on aircraft.

Figure 4-8. Clean Wheel with a Cloth Prior to Installation In the Tire

NOTE

Fabric base tubes with metal valve stems may have exposed cords around the threaded base of the valve stem. This is a normal condition that is sometimes mistaken for a defect. Do not reject tubes with this condition unless it is determined that the valve base attachment is structurally weak or unless a leak is discovered.

b. Tubes.

(1) Examine the tube for the correct size and valve configuration.

(2) Make sure the threads on the valve stem are in good condition.

c. Wheels and Related Parts.

(1) Ensure the correct wheels and related parts NSN and part number are selected in accordance with NAVAIR 04-10-1 and the applicable MIMS.

Solvent, Degreasing 3

(2) Clean wheel of built-up dirt, rubber, and grease deposits (see Figure 4-8).

(3) Examine the seal O-Ring groove mating surface for scratches, nicks, dirt, and paint chip debris.

(4) Clean the O-Ring surfaces with a cloth dampened with MIL-PRF-680 Type III solvent.

(5) Examine the wheel assembly for scratches, nicks, corrosion and other defects that would affect the sealing and the mating of wheel parts.

Solvent, Degreasing 3

(6) Clean the wheel O-Ring seal with MIL-PRF-680, Type III solvent, and examine for defects cracking, cuts, or other damage. Particular attention should be given to permanent deformations in the O-Ring. Replace the seal O-Ring if deteriorated, damaged, or deformed.

Grease, Aircraft, General Purpose 4

Grease, Pneumatic System 5

(7) Lubricate the O-Ring seal with AMS-G-4343 or MIL-PRF-81322, Grade 2, Grease.

(8) Check the valve stem for proper seating.

d. Valves. See paragraph 4-21.

4-9. MOUNTING TUBE-TYPE TIRES ON DIVIDED WHEELS. The following instructions are a step-by-step procedure for mounting the tube-type tires on divided wheels.

Talc, Technical 6

a. Dust the tube with a small amount of talc, A-A-59303, Type T1 and shake off the excess. Fold and insert the tube in the tire as shown by Figure 4-9.

b. Position the tube in the tire so that the balance mark on the tube is located at the balance mark (red dot) on the tire. If the tire has no balance mark (red dot), align the tire serial number with the valve stem.

c. Install the valve core, and inflate the tube until it is rounded out. Probe between the tube and the inside of the tire with the fingers to relieve trapped air as shown by Figure 4-10.

NOTE

Some wheels (i.e. the C-130 nose assembly) require a grommet installed on the stem to eliminate chafing between the stem and wheel.

d. Insert the wheel half containing the valve hole section of the wheel in the tire, with the tire serial number on the same side as the valve hole. Push the valve stem through the valve hole and secure with hex nut as applicable.

Compound, Thread, Antiseize 7

CAUTION

When countersunk washers are used on bolts, the countersink shall face the bolt head. When countersunk washers are used under the nut, the countersink shall face the nut. (Improper installation may cause bolt or wheel failures.) When Lubtork is specified on the wheel half, coat all threads and bearing surface of bolt head with MIL-PRF-83483 anti-seize compound.

e. Insert the other half of the wheel. Be careful not to pinch the tube between the wheel halves, or between the tire and the wheel flange. Align the bolt holes, and compress the tire beads enough to allow the wheel mating surfaces to seat. Install four bolts, nuts and washers 90 degrees apart. The wheel tie bolts shall be installed from the inner wheel half with nuts on the valve stem side of the wheel. Start the bolts by hand and draw up evenly until the wheel halves seat; then install the remaining bolts, nuts and washers. Tighten the bolts in a crisscross order to prevent distorting the wheel. A pneumatic powered impact wrench may be used as shown in Figure 4-11, provided the torque obtained does not exceed 25 percent of the specified final torque required for the wheel.

Figure 4-9. Inserting Tube in Tire

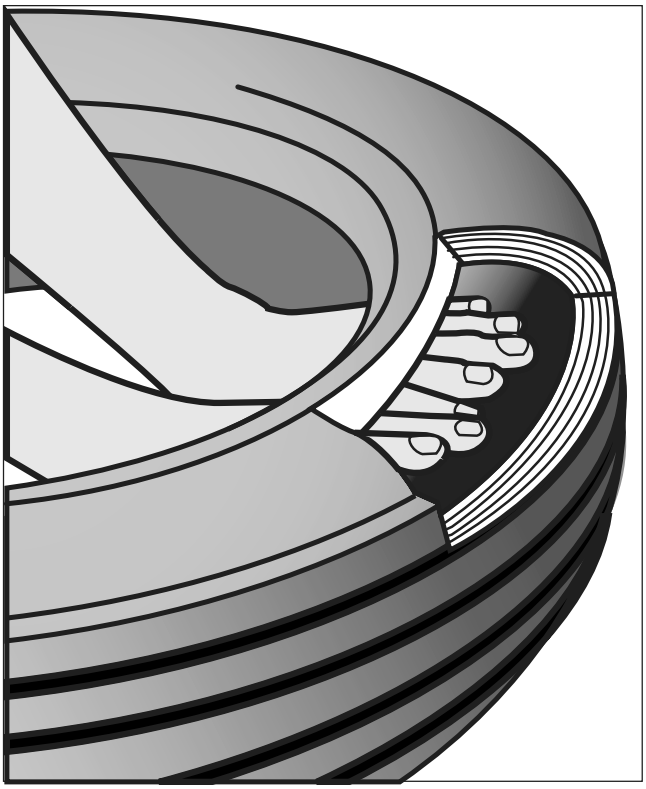


Figure 4-10. Probing to Relieve Trapped Air

CAUTION

The proper torque value is listed in NAVAIR 04-10-1. Torque values marked on the wheel are for reference only and may not be current values. Do not guess at the applied torque. Always use a currently calibrated torque wrench. Never use a pneumatic powered impact wrench as a substitute for a torque wrench. Do not use bolts or nuts having defective threads as this will cause inaccurate bolt torque. Improper wheel bolt torque can cause wheel failure.

f. With a collateral duty inspector, tighten each nut in increments of 25% of the specified torque value (see Figure 4-12) in a crisscross order until the total torque value required for each bolt in the wheel has been reached.

NOTE

Do not add sealant over wheel bolts or nuts unless specifically instructed in the applicable wheel manual.

g. The wheel assembly is now ready for inflation in accordance with paragraph 4-14.

Figure 4-11. Tightening Wheel Bolts with a Pneumatic-Powered Impact Wrench

Figure 4-12. Tightening Wheel Bolts with a Torque Wrench

Figure 4-13. Installing the Demountable Flange

4-10. MOUNTING TUBE-TYPE TIRES ON DEMOUNTABLE FLANGE WHEELS. The following are step-by-step procedures for mounting tube-type tires on demountable flange wheels.

Talc, Technical 6

a. Dust the tube with a small amount of talc, A-A-59303, Type T1, and shake off the excess. Insert the tube in the tire as shown in Figure 4-9.

b. Position the tube in the tire so that the balance mark on the tube is located at the balance mark on the tire.

c. Install the valve core and inflate the tube until it is rounded out. Probe between the tube and the inside of the tire with the fingers to relieve trapped air or creases as shown in Figure 4-10.

d. Place the wheel in a horizontal position on a flat surface with the fixed flange down. Push the tire on the wheel assembly as far as it will go, guiding the valve stem into the valve slot. The tire serial number shall be located on the same side as the wheel valve stem. A blunt tool may be used to guide the valve stem. If required, screw a valve stem extension onto the valve stem.

e. Install the demountable flange on the wheel, and secure the locking ring in accordance with the assembly instructions required by the applicable wheel overhaul manual as shown in Figure 4-13. A rubber, plastic or rawhide faced mallet may be used to tap the demountable flange gently into place as shown in Figure 4-13. Make sure that the demountable flange is installed evenly, without binding, and do not force it into position. Check to make sure the tube is not pinched between the tire bead and the wheel flanges. If the flange does not fit easily, recheck the mating parts for burrs, nicks, bent condition, excessive paint thickness or other defects, and recheck the demountable rim flange for proper type and size. When Lubtork is specified, coat all threads and friction surfaces of the wheel bolts, nuts and washers with MIL-PRF-83483 anti-seize compound.

f. The wheel assembly is now ready for inflation in accordance with paragraph 4-14.

4-11. MOUNTING TUBELESS TIRES ON DIVIDED WHEELS. The following instructions are a step-by-step procedure for mounting tubeless tires on divided wheels.

a. Install the valve stem. Torque in accordance with NAVAIR 04-10-1.

b. Remove the valve core to prevent unseating the wheel O-Ring seal by pressure buildup when the tire is installed.

NOTE

For aircraft that use directional tires (i.e. asymmetrical design), ensure correct mounting direction is established prior to wheel installation.

c. Insert the valve stem wheel-half in the tire on the same side as the tire serial number as shown in Figure 4-14.

Grease, Aircraft, General Purpose 4

Grease, Pneumatic System 5

d. Lubricate the wheel O-Ring seal with a light coat of AMS-G-4343 or MIL-PRF-81322, Grade 2. Grease lubricant as shown in Figure 4-15.

e. Install the wheel O-Ring seal in the wheel seal O-Ring groove as shown in Figure 4-16.

CAUTION

Do not use excessive amounts of grease and avoid stretching the rubber excessively when lubricating the wheel O-Ring seal. Equalize the wheel O-Ring seal, and make sure it is not twisted after installation.

Compound, Thread, Antiseize 7

f. Install the wheel section and align the bolt holes. Align the tire balance dot, if present, adjacent to the valve stem. If no tire balance dot is present, align the valve stem with the tire serial number. Compress the tires tire beads enough to allow the wheel mating surface to seat. Install four bolts, nuts and washers 90 degrees apart. The wheel tie bolts shall be installed from the inner wheel half with nuts on the valve stem side of the wheel. Start the bolts by hand, and draw up evenly until the wheel halves seat. Install the remaining bolts, nuts and washers. Tighten the bolts in a crisscross order to prevent distorting the wheel. A pneumatic-powered impact wrench may be used as shown in Figure 4-11 if the torque obtained will not exceed 25 percent of the specified final bolt torque required for the wheel. When Lubtork is specified, coat all threads and friction surfaces of the wheel bolts, nuts and washers with MIL-PRF-83483 anti-seize compound.

Figure 4-14. Inserting One Wheel Half into Tire

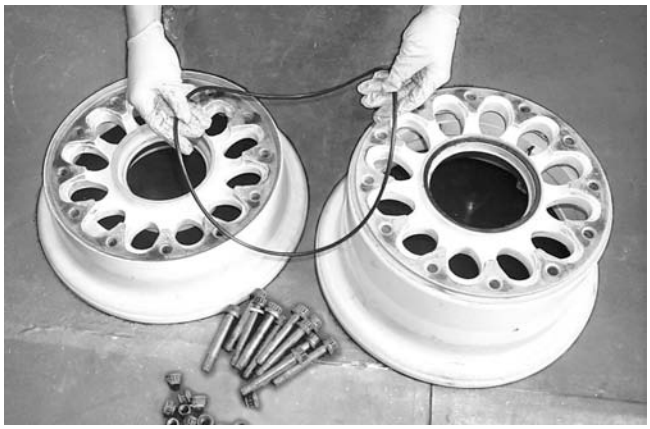


Figure 4-15. Lubricating Wheel Seat

Figure 4-16. Installing Wheel Seal in TubelessTire Wheel

CAUTION

The proper torque is listed in NAVAIR 04-10-1. Torque values marked on the wheel are for reference only and may not be current values. Do not guess at the applied torque. Always use a currently calibrated torque wrench. Never use a pneumatic powered impact wrench as a substitute a torque wrench. Do not use bolts or nuts having defective threads as this will cause inaccurate bolt torque. Improper wheel bolt torque can cause wheel failure or leaks in tubeless tire wheel assemblies. When countersunk washers are used on the bolts, the countersink shall face the bolt head. When countersunk washers are used under the nut, the countersink shall face the nut. Improper installation may cause bolt or wheel failure.

g. With a collateral duty inspector, tighten all bolts in increments of 25 percent of the specified torque value until the total value required for the wheel is reached. Use a currently calibrated torque wrench as shown in Figure 4-12 and tighten the nuts in a crisscross order.

NOTE

Do not add sealant over wheel bolts or nuts unless specifically instructed in the applicable wheel manual.

h. The wheel assembly is now ready for inflation in accordance with paragraph 4-15.

4-12. MOUNTING TUBELESS TIRES ON DEMOUNTABLE FLANGE WHEELS. The following instructions are a step-by-step procedure for mounting tubeless tires on demountable flange wheels.

a. Install the valve stem. Torque in accordance with NAVAIR 04-10-1.

b. Remove the valve core to prevent unseating the wheel seal by pressure buildup when the tire is installed.

c. Place the wheel in a horizontal position on a flat surface with the fixed flange down. Align the tire balance dot, if present, adjacent to the valve stem. If no tire balance dot is present, align the valve stem with the tire serial number. Push the tire on the wheel assembly as far as it will go.

NOTE

For aircraft such as the F/A-18E/F, whose main landing gear use directional tires (i.e. asymmetrical design), ensure correct mounting direction is established prior to wheel assembly.

Grease, Aircraft, General Purpose 4

Grease, Pneumatic System 5

d. Lubricate the wheel O-Ring seal with a light coat AMS-G-4343 or MIL-PRF-81322 Grade 2 lubricant, and install the seal O-Ring on the flange groove or channel sealing surface.

CAUTION

Do not use excessive amounts of grease and avoid stretching the rubber excessively when lubricating the wheel seal O-Ring. Equalize the wheel seal O-Ring and make sure it is not twisted after installation.

e. Install the demountable flange on the wheel, and secure the locking ring in accordance with the assembly instructions required by the applicable wheel overhaul manual as shown in Figure 4-13. A rubber, plastic or rawhide faced mallet may be used to gently tap the demountable flange in place. Make sure that the demountable flange is installed evenly, without binding, and do not force it into position. If the flange does not fit easily, check the mating parts for burrs, nicks, bent condition, excessive paint thickness or other defects, and recheck the demountable flange for proper type and size.

WARNING

Excessive primer between the interfacing flange surfaces on F/A-18E/F demountable main landing gear wheels will result in inflation and/or deflation discrepancies. Prior to assembly, verify that these two mating surfaces do not bind together.

f. The wheel assembly is now ready for inflation in accordance with paragraph 4-15.

4-13. INFLATION OF TIRE/WHEEL ASSEMBLIES. The following equipment is used for inflating aircraft tire/wheel assemblies. The manual NAVAIR 17-1-123 contains detailed instructions for the operation, calibration, and maintenance of:

a. Tire Inflator Assembly Kit (Figure 3-18), P/N M85352/1.

b. Remote Inflator Assembly P/N AS1675, not approved for used.

c. Dual Chuck Stem Gage (Figure 3-1), P/N M85352/4-1.

d. Aircraft Tire Inflator Monitor (Figure 4-17), P/N 631AS100-1 is covered by the manual NAVAIR 17-15G-1.

4-14. INITIAL INFLATION OF TUBE-TYPE TIRES.

WARNING

The tire/wheel assemblies shall be placed in a safety cage during the initial inflation. Tire/wheel assemblies sometimes explode violently during the initial tire inflation because of defects in the tire/wheel assembly or because of improper wheel assembly procedures.

Inflate tube-type tires as follows:

a. Remove the valve core and place the tire/wheel assembly in a safety cage. (Figure 4-18).

b. Attach to the valve stem a tire inflation gage assembly of the type shown in Figure 3-18 or Figure 4-17.

c. Check to make sure the tube is not pinched between the bead and the wheel flange.

d. Check demountable flange wheels to make sure the demountable flange and locking ring are seated properly.

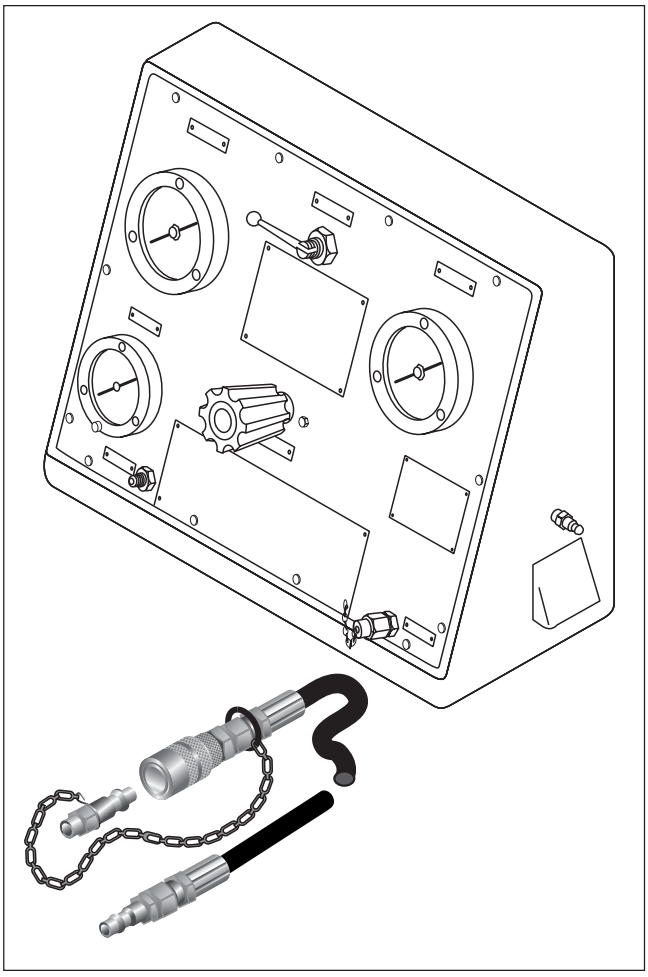


Figure 4-17. Aircraft Tire Inflator/Monitor

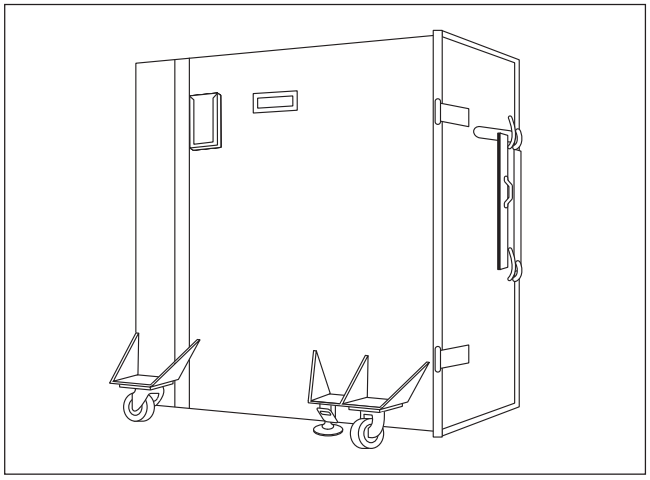


Figure 4-18. Tire Inflation Safety Cage, NSN 1730-00-624-6971

CAUTION

Tube-type tires are susceptible to sidewall and tread blister formation if extreme care is not taken during mounting. It is very important to first inflate, then completely deflate tube-type tires before inflation to the required pressure. This procedure helps to eliminate air trapped between the tube and the tire casing, and allows the tube to equalize in the casing, thereby eliminating folded, stretched, or thinned tube sections. Trapped air is usually relieved by tire vent holes, tire vent ridges and tube vent ridges described in paragraphs 2-15 and 2-17.

e. Secure the tire safety cage door.

f. Using Table 4-1, locate the applicable aircraft and tire size test pressure listed to seat the tire beads against the rim flanges.

f. Release pressure and deflate the tire completely. Open the safety cage door, remove the pressure line and install the valve core. Aircraft tire valve cores, P/N TR C4, are identified by a slot in the head of the pin (Figure 4-19). Reattach pressure line and secure the safety cage door. Using Table 4-1, locate the applicable aircraft and tire size. Inflate tire to the test pressure listed.

g. The inflated tire shall remain in the safety cage for a minimum of 10 minutes after the test pressure has been reached. At the end of the 10 minute period, there shall be no detectable pressure loss. If none is detected, the tire pressure shall be reduced to 50% of the test pressure or 100 psi whichever is the lesser.

h. The tire/wheel assembly shall be removed from the safety cage and a valve cap (P/N MS20813-1) installed. Protect bearings and bearing cups in accordance with NAVAIR 04-10-1. The assembly shall be stored in a rack ready for issue.

CAUTION

Upon installation of bearings, verify the part number on the bearing with the applicable Illustrated Parts Breakdown. On a number of aircraft, bearings or the wrong type can be inadvertently interchanged with the proper bearings

i. If there is a significant pressure loss, the tire pressure shall be reduced to 50% of the test pressure or 100 psi whichever is lesser, the assembly removed from safety cage and the cause of the leak determined (refer to paragraph 4-18).

j. If a slow leak is detected, the air retention test shall be extended to 24 hours, and conducted in accordance with paragraph 4-16. The tire shall not be issued until remedial action is taken if the leakage exceeds 5%.

4-15. INITIAL INFLATION OF TUBELESS TIRES. Inflate tubeless tires as follows:

a. Place the tire/wheel assembly in a safety cage (Figure 4-18) and install the valve core. Aircraft tire valve cores, P/N TRC4 are identified by a slot in the head of the pin and the copper or brass colored pin and cup (Figure 4-19).

b. Attach to the valve stem a tire inflator assembly of the type shown in Figure 3-18 or Figure 4-17.

c. Secure the safety cage door.

d. Using Table 4-1, locate the applicable aircraft and tire size. Inflate tire to the test pressure listed.

e. The inflated tire shall remain in the safety cage for a minimum of ten minutes after test pressure has been reached. At the end of the ten minute period, there shall be no detectable pressure loss. If none is detected, the tire pressure shall be reduced to 50% of the test pressure or 100 psi whichever is less.

f. The tire/wheel assembly shall be removed from the safety cage and a valve cap (P/N MS20813-1) installed. Protect bearings and bearing cups in accordance with NAVAIR 04-10-1. The assembly shall be stored in a rack ready for issue.

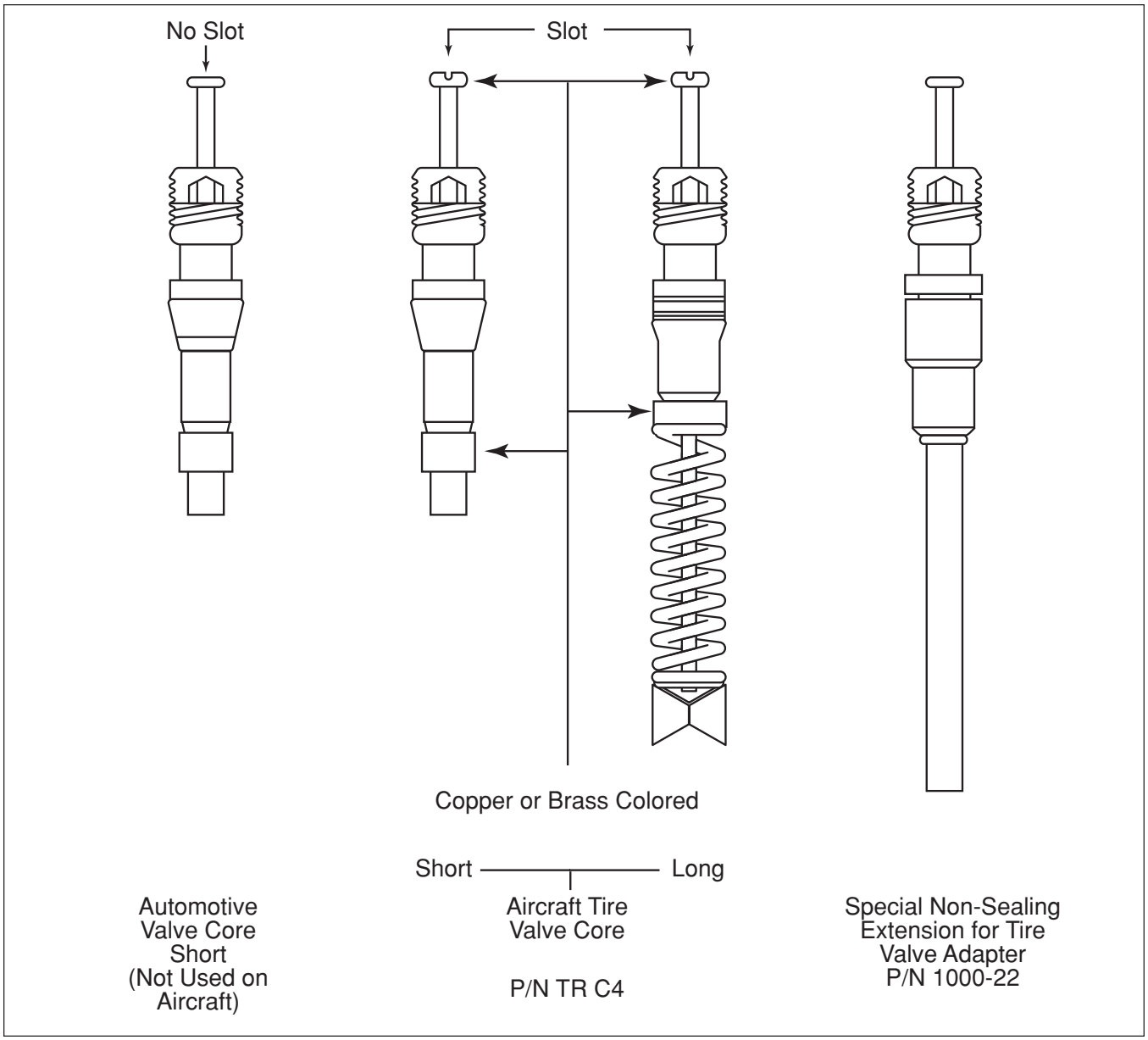


Figure 4-19. Valve Cores

CAUTION

Verify the bearing part number with the applicable Illustrated Parts Breakdown. When bearings from a different type of aircraft are interchanged with the proper bearings, catastrophic wheel failure can occur.

NOTE

F/A-18A-D Main Landing Gear wheels have had numerouse wheel failures due to incorrect bearing installation. Verify correct bearing part number.

g. If there is a significant pressure loss, the tire pressure shall be reduced to 50% of the test pressure or 100 psi whichever is less, the assembly removed from the safety cage and the cause of the leak determined as in paragraph 4-18.

h. If a slow leak is detected, the air retention test shall be extended to 24 hours and conducted in accordance with paragraph 4-16. The tire shall not be issued until remedial action is taken if the leakage exceeds 5%.

4-16. AIR RETENTION TEST. The following is a step-by-step procedure for a 24 hours air retention test of the tire/wheel assembly. The assembly shall not be issued if the pressure loss is greater than 5% in 24 hours. Causes for leaks in the assembly are outlined in paragraph 4-17.

a. Secure the safety cage door.

b. inflate the tire to the applicable aircraft tire size test pressure indicated in Table 4-1.

c. Allow the assembly to rest 4 hours and measure the pressure (P). This is the initial pressure reading for the test. The 4 hour rest is required to allow the tire to stretch and stabilize.

d. Measure the pressure (P) after 24 hours.

e. The percentage pressure loss is calculated as follows:

$$\% \text{ Loss} = \frac{P \text{ (step b)} - P \text{ (step c)}}{P \text{ (step b)}} \times 100$$

f. Temperature variations will affect the pressure. A temperature increase of 5°F produces approximately a one-percent increase in psi.

4-17. COMMON CAUSES OF LEAKS IN TIRE/ WHEEL ASSEMBLIES. With as many as five sealing surfaces on a wheel, many leaks noted during initial inflation occur at the various O-Ring locations. Leaks are usually caused by one or more of the following defects:

a. Defective valve cap.

b. Defective or incorrect valve core.

c. Loose valve stem or damaged O-Ring.

d. Defective wheel O-Ring seal.

e. Damaged or contaminated O-Ring seal surface area.

f. Cracks in the wheel.

g. Excessive porosity in the wheel casting or forging.

h. Defective drive-key screw seal.

i. Defective tire liner.

j. Damaged wheel flange.

k. Leaking fuse plugs or plug O-Ring seals.

l. Puncture.

Leak Detection Compound 2

4-18. PROCEDURE FOR LOCATING LEAKS. The tire/wheel assembly shall be inflated in the safety cage to 50% of the test pressure or 100 psi, whichever is less. Remove the assembly from the safety cage and apply MIL-PRF-25567 Type I Leak Detection solution to the valve stem, core, and any sealing surface. Inspect the complete assembly even though one or more leaks have been located. Mark all leaks with a wax crayon pencil. It is very important that leaks be clearly identified to assist tire shop personnel in taking corrective action. A recently inflated tube-type tire will often show leakage around the valve stem and vent grooves on the bead. This apparent leakage should stop when all the trapped air has worked out and must not be mistaken for a real leak.

NOTE

Aircraft tires have vent holes in the lower sidewall for relieving trapped air in the tire casing. These vent holes prevent separations by relieving pressure trapped within the casing plies. It is normal for tires to leak profusely at the vent holes after initial inflation. Small foamy bubbles that do not increase in size may appear at the vent holes after the excess air has worked out. This is a normal condition caused by slow air diffusion through the casing and is not cause for rejection of the tire.

4-19. MARKING OF TIRES AND WHEEL RIMS TO DETERMINE TIRE SLIPPAGE. Tire slippage marks are required on all tube-type aircraft tires inflated to less than 150 psi and on all helicopter tube-type tires.

Enamel, Low VOC 8

4-20. APPLYING TIRE SLIPPAGE MARKINGS. Using Specification A-A-2787, Type I red enamel, mark a one inch wide and two inch long shall be painted across the tire sidewall and wheel rim to extend one inch on the sidewall and one inch on the rim as shown by Figure 4-20.

4-21. INSPECTION OF VALVES. Tire valve stems shall be inspected for damaged threads, position of valve stems, condition of valve cores, and proper fit of valve caps.

Figure 4-20. Tire Slippage Index Marking

a. Damaged Valve Thread. Tubeless tire valves and tubes shall be replaced if the threads are damaged so that the valve core or valve cap cannot be installed properly.

b. Position of Valve Stems. The position of the valve stem shall be inspected to make sure it is not rubbing against the wheel. When this condition is found the wheel assembly shall be disassembled and repaired.

c. Valve Cores. Aircraft tire valve cores, P/N TRC4 (79934), are identified by a slot in the head of the pin. The pin and cup are either brass or copper-colored (Figure 4-19). The valve core pin should be flush with the top of the valve stem. A recessed pin will not depress properly during inflation and false readings or improper inflation may occur. Replace the valve core if it is recessed too deep (greater than 0.035 inch).

Table 4-1. Aircraft Tire Applicability and Test Pressure

ACFT	SIZE	PR	LANDING GEAR POSITION	FSC TIRE 2620-	FSC TUBE 2620-	BEAD SEAT (PSI)	TIRE TEST PRESSURE (PSI)
A-4	24x5.5	16	Main	00-051-9925	00-294-6632	200	480
	18x5.7	14	Nose	00-946-1108	TL	200	365
A-6, EA-6A	36x11	24	Main	00-834-7441	TL	200	290
	20x5.5	14	Nose	00-936-9416	TL	200	290
EA-6B	36x11	24	Main	00-834-7441	TL	200	350
	20x5.5	16	Nose	00-169-0143	TL	200	400
A-7	28x9.0-12	22	Main	00-935-0771	TL	200	375
	22x5.5	12	Nose	00-204-4820	TL	200	265
C-130	20.00-20	26	Main	00-142-5161	TL	100	115
	12.5-16	12	Nose	00-834-6673	00-267-3050	100	60
C-2A	36x11	24	Main	00-834-7441	TL	200	290
	20x5.5	14	Nose	00-936-9416	TL	200	260
TC-4C	7.50-14	12	Main	Contractor Supplied	TL	130	90
	18x5.5	12	Nose	00-269-7674	00-269-7701	200	175
C-9B	40x14	24	Main	Contractor Supplied	TL		
	26x6.6	10	Nose	Contractor Supplied	TL		
C-12	22x6.75-10	8	Main	Contractor Supplied	TL		
	18x5.7	14	Nose	Contractor Supplied	TL		
E-2	36x11	24	Main	00-834-7441	TL	200	260
	20x5.5	14	Nose	00-936-9416	TL	200	260
E-6A	46x16	28	Main	00-255-8723	TL	150	210
	39x13	16	Nose	00-993-1278	TL	100	115
F4N, RF-4B (EARLY)	30x8.0	26	Main	00-726-0119	TL	200	475
	18x5.7	16	Nose	00-946-1108	TL	200	300
F4J/S, RF-4B (LATE)	30x11.5-14.5	26	Main	00-165-4043	TL	200	475
	18x5.7	14	Nose	00-946-1108	TL	200	300
F-5	24x8.0-13	18	Main	00-070-0785	TL	200	285
	18x6.5-8	12	Nose	00-779-1194	TL	200	180
F-14	37x11.5-16	28	Main	00-159-8648	TL	200	350
	22x6.6-10	22	Nose	01-464-6078	TL	200	375

Table 4-1. Aircraft Tire Applicability and Test Pressure (Cont.)

ACFT	SIZE	PR	LANDING GEAR POSITION	FSC TIRE 2620-	FSC TUBE 2620-	BEAD SEAT (PSI)	TIRE TEST PRESSURE (PSI)
F-18A-D	30x11.5-14.5	26	Main	00-165-4043	TL	200	350
	22x6.6-10	22	Nose	01-464-6078	TL	200	375
F-18E-F	32x11.5-15	26	Main	01-455-4869	TL	200	350
	22x6.6-10	22	Nose	01-464-6078	TL	200	375
UH-1	7.00-6	6	Ground Handling	00-269-7553	00-269-7267	40	40
H-2	17x6.25-11	8	Main	00-902-1599	TL	200	250
	5.00-5	10	Tail	00-542-1366	00-288-0246	100	160
H-3	6.50-10	10	Main	00-142-5280	TL	50	95
		6		00-060-3833	TL	50	95
	6.00-6	8	Tail	00-060-7013	00-269-7266	50	75
H-46	18x5.5	8	Main	00-277-5398	TL	100	185
	18x5.5	8	Nose	00-277-5398	TL	100	185
H-53A,D	8.50-10	12	Main	01-530-5087	TL	100	125
	8.50-10	12	Nose	01-530-5087	TL	100	125
CH-53E, MH-53E	8.50-10	12	Main	01-530-5087	TL	100	160
	8.50-10	12	Nose	01-530-5087	TL	100	160
MH-60S	26x10.00-11	10	Main	01-118-5543	TL	50	135
	17.5x6.25-6	10	Tail	Contractor Supplied	TL	50	110
SH-60	26X10.00-11	10	Main	01-118-5543	TL	50	100
	6.00-6	8	Tail	00-060-7013	01-161-8182	50	85
P-3A/B/C	40x14	28	Main	00-928-4502	TL	200	200
	28x7.7	14	Nose	061-4108	TL	100	170
S-3	30x11.5-14.5	26	Main	00-165-4043	TL	200	320
	22X6.75-10	18	Nose	00-351-5855	TL	200	320
T-2	24x5.5	12	Main	00-580-0999	TL	200	220
	20X4.4	10	Nose	00-287-5248	TL	200	175
T-28	24x7.7	10	Main	00-270-3598	00-269-7705	100	110
	20X4.4	10	Nose	00-269-7796	00-270-3659	100	150
T-34B	6.50x8	6	Main	00-269-7626	00-288-0247	50	34
	5.00-5	4	Nose	00-288-0248	00-288-0246	50	40
T-34C	19.5x6.75-8	10	Main				
	5.00-5		Nose				

Table 4-1. Aircraft Tire Applicability and Test Pressure (Cont.)

ACFT	SIZE	PR	LANDING GEAR POSITION	FSC TIRE 2620-	FSC TUBE 2620-	BEAD SEAT (PSIG)	TIRE TEST PRESSURE (PSI)
T-38	20x4.4	12	Main	00-269-7553	TL	200	225
	18x4.4	6	Nose	00-554-2459		100	100
T-39D	26x6.6	14	Main	00-835-4179	TL	200	180
	18x4.4	6	Nose	00-177-6848	TL	100	75
CT-39E/G	26x6.75-14	14	Main	Contractor Supplied	TL		
	18x4.4	10	Nose	Contractor Supplied	TL	100	100
T-44	8.50-10	10	Main	Contractor Supplied	TL		
	6.50-10	6	Nose	Contractor Supplied	TL		
T-45	24x7.7	20	Main	Contractor Supplied	TL	200	350
	19x5.25-10	12	Nose	Contractor Supplied	TL	200	350
U-1	11.00-12	8	Main	00-752-8651	00-528-9251	50	45
	6.00-6	8	Tail	00-060-7013	00-269-7266	50	45
U-3A	6.50-10	6	Main	00-277-4824	00-269-7268	100	108
	6.00-6	6	Nose	00-542-0127	00-269-7266	50	42
U-6A	8.50-10	8	Main	00-528-8875	00-269-7270	50	55
	5.50-4	8	Tail	00-915-0820	00-269-7709	50	50
OV-1B	8.50-10	12	Main	00-938-5964	TL	100	126
	6.50-8	8	Nose	00-466-0897	00-288-0247	100	75
OV-10	29x11.00-10	10	Main	01-019-0759	TL	50	65
	7.50-10	12	Nose	00-935-7357	00-935-7396	100	80
AV-8B	26x7.75R13	10	Main	01-252-2753	TL	100	140
	13.5x6.0-4	14	Outrigger	01-168-4622	TL	100	160
	26x8.75R11	16	Nose	99-783-3900	TL	100	140
V-22	8.50-10	12	Main	01-530-5087	TL	100	115
	18x5.7	14	Nose	00-946-1108	TL	200	260

SECTION V

INSPECTION AND DISPOSITION OF USED TIRES AND TUBES AT INTERMEDIATE MAINTENANCE LEVEL (TIRE SHOP)

5-1. POLICY. The Navy considers all aircraft tires to be potentially retreadable. Used aircraft tires and tubes shall not be discarded or scrapped until it has been definitely determined that they are unfit for further use. Successful operation of the tire retreading program makes it mandatory for all personnel concerned with aircraft tires to adhere strictly to the requirements of this manual.

5-2. TIRE DISPLAY. All Intermediate Maintenance Activities (Tire Shop) should prominently display wall panels containing actual cross-sections of each type Navy tire for which they are responsible (similar to Figure 2-7) in order to familiarize themselves with the various tire constructions. Cross sections shall be cut from condemned tires only.

5-3. INSPECTION CRITERIA. After the tire/wheel assembly has been removed from the aircraft by organizational level personnel, in accordance with Section III, it shall be carefully inspected by competent tire shop personnel and classified as being serviceable or non-serviceable. Refer to NAVAIR 04-10-1 or the applicable MIM for appropriate wheel maintenance inspection criteria.

5-4. SERVICEABLE TIRES. Serviceable tires are those judged suitable for continued service use by the tire shop personnel. They shall be retained in service until the wear limit criteria of paragraph 3-8 are exceeded. Defects permitted are cuts not exceeding the limits specified on the sidewall and cuts in the sidewall that do not penetrate to the nylon casing plies.

5-5. NON-SERVICEABLE TIRES. Non-serviceable tires will be inspected, and marked in accordance with paragraphs 5-6 through 5-8.

5-6. RETREADABLE TIRES. All tires removed from service, which are not condemned, are potentially retreadable and shall be condition coded "F" (BCM-1). Unless modified by other directives, the number of times a tire can be retreaded shall be based solely on carcass integrity as determined by applicable inspection criteria during retreading.

5-7. NON-RETREADABLE TIRES. Non-retreadable tires shall be condition coded "H" (BCM-9) for condemnation. Table 5-1 list tires which are not being retreaded, and are code "H" regardless of condition. The following inspection criteria shall be used by the tire shop personnel to determine those tires that are non-retreadable:

a. Blowouts and the mating tire if a dual wheel assembly.

b. Punctures extending through the entire casing.

c. Tread cuts or skid damage which exposed the casing plies.

d. Loose, frayed or broken cords evident on the inner tire surface.

e. Casing ply damage visible to the naked eye without the use of mechanical devices.

f. Kinked, broken, or exposed wire beads.

g. Tread separation and bulges exceeding 1 inch.

h. Tires saturated with rubber deteriorating liquids.

i. Tires exposed to excessive heat as evidenced by tackiness of the rubber near the wheel rim.

NOTE

Exposure of tread reinforcing cords on high speed/high performance aircraft tires is permissible. These tires can be identified by one of the following terms embossed on the sidewall: FABRIC TREAD, REINFORCED TREAD, REINFORCED FABRIC TREAD, REINFORCED, FABRIC REINFORCED, or FABRIC REINFORCED CUT RESISTANT. Condition code these tires “F”.

5-8. DISPOSITION OF USED, INSPECTED TIRES. Tires marked “ENGINEERING INVESTIGATION” or "EI" shall be held pending disposition instructions from the Navy Aircraft Tire Fleet Support Team (FST), North Island, CA as outlined in COMNAVAIRFORINST 4790.2 (series). All other used, inspected tires, whether “H” or “F” condition-coded, shall be sent to the local supply department for disposition as outlined in FASOINST 13421.1 (series). The only exception is at certain Naval Air Stations where, through local supply/IMA arrangements “H” condition coded carcasses are

Table 5-1. Tires Not Being Retreaded

NSN	Application	Size and Ply Rating	
2620-00-060-7013	H-3/H-60 TLG	15x6.00-6	8PR
2620-00-142-5280	H-3 MLG	6.50-10	10PR
2620-00-269-7626	T-34B MLG	6.50-8	6PR
2620-00-277-5398	H-46 MLG/NLG	18x5.5	8PR
2620-00-288-0248	T-34B NLG	5.00-5	8PR
2620-00-542-1366	H-2 TLG	5.00-5	10PR
2620-00-726-0118	F-4N MLG	30x8.0	26PR
2620-00-902-1599	H-2 MLG	17.8x6.25	8PR
2620-00-946-1108	A-4/F-4/V-22 NLG	18.5.7	14PR
2620-01-118-5543	H-60 MLG	26x10-11	10PR
2620-01-168-4622	AV-8B OR	13.5x6.00-4	14PR
2620-01-252-2753	AV-8B MLG	26x7.75R13	10PR
2620-99-783-3900	AV-8B NLG	26x8.75R11	16PR
2620-01-464-6078	F-14/F-18 NLG	22x6.6-10	22PR
2620-00-159-8648	F-14 MLG	37x11.5-16	28PR
2620-00-938-5964	H-53E/V-22	8.50-10	12PR
2620-00-528-9235	H-53	8.50-10	10PR

sent directly to the Defense Reutilization and Marketing office. In such instances, it is extremely important that only “H” tires are sent for disposal. All tires which are marked “F” and sent to a contractor for retreading are not necessarily retreaded. Further plant inspections with specialized equipment may uncover defects that are not detectable by the IMA tire shop personnel, and result in the tire being scrapped.

NOTE

The disposition codes “H” and “F” shall be painted, using a light, quick-drying spray on the tread area of the tire carcass, ensuring clear visibility to handling personnel. Staples or other puncturing devices shall not be used for affixing tags to tires. Labels or cements shall not be applied to the bead area of the tires because of the possibility of ruining the bead sealing surface. Methods that would damage the tire shall not be used.

5-9. INSPECTION PROCEDURE FOR USED TUBES. Tubes shall be inspected and classified as serviceable or non-serviceable.

a. Serviceable Tubes. Tubes shall be classified serviceable if they are found to be free of leaks and other defects when inflated with a minimum of nitrogen required to round out the tube and then immersed in water. A satisfactory condition tag “RFI” shall be attached to each tube found to be serviceable. These tubes shall be used for remounting and further service use.

b. Repairable Tubes. Non-serviceable tubes with the following defects shall be classified as repairable:

(1) Bent, chafed, or damaged metal valve threads.

(2) Replaceable leaking valve cores.

c. Non-Serviceable Tubes. When tested as above, tubes containing a defect shall be classified as non-serviceable, non-repairable, and will be condition coded "H" (BCM9) for condemnation.

d. Non-Repairable Tubes. The following defects are non-repairable:

(1) Any tear, cut, or puncture which penetrates the tube.

(2) Fabric reinforced tubes with blisters.

(3) Chafed or pinched areas caused by beads or tire breaks.

(4) Valve stems pulled out of fabric-base-type tubes.

(5) Deterioration or thinning due to brake heat.

(6) Folds or creases.

(7) Severe surface cracking.

SECTION VI

STORAGE AND SHIPMENT OF AIRCRAFT TIRES AND TUBES

6-1. STORAGE ENVIRONMENT FOR AIRCRAFT TIRES AND TUBES. Tires and tubes shall be stored indoors in a dark, cool, dry room under such conditions as to be protected from strong air currents, dampness, dirt, oils, greases and solvents of all kinds. The tires and tubes shall not be stored near steam pipes and the storeroom windows shall be painted over to exclude sunlight. With the development of solar protective materials for covering windows and skylights, solar film with an ultraviolet transmission rating less than 10% may be utilized in lieu of painted windows. The storeroom shall not contain fluorescent lights or any kind of sparking electrical equipment that would produce ozone.

6-2. CAUSES FOR RUBBER DEGRADATION IN STORAGE. Rubber, like all organic materials, ages and eventually deteriorates. Under poor conditions of storage, the aging process is accelerated. The most common causes for rapid rubber deterioration are heat and contact with ozone, grease, oil, and organic solvents. Heat accelerates oxidation causing the rubber to harden and crack; ozone causes rubber to crack; greases and oils soak into the rubber causing it to soften and become spongy and lose strength; organic solvents extract various components from the rubber causing it to harden and crumble.

6-3. SHELF LIFE OF AIRCRAFT TIRES AND TUBES. There is no shelf life for aircraft tires and tubes. Aircraft tires and tubes are considered RFI as long as the storage requirements (paragraphs 6-1, 6-2, 6-3 and 6-6) and the inspection criteria (paragraph 4-8) have been met. Tires and tubes not complying with these requirements shall be reported to the Aircraft Tire FST, North Island.

CAUTION

Stored tires shall not be stacked horizontally as this distorts the shape and causes mounting problems.

6-4. TIRE STORAGE RACKS. Aircraft tires shall be stored vertically in racks as shown in Figure 6-1. The edges of the racks shall be chamfered or designed so that the tire tread does not rest on a sharp edge. Minor flat spots may develop on treads of tires stored in the vertical position, but such spots usually disappear when the tire is mounted and inflated.

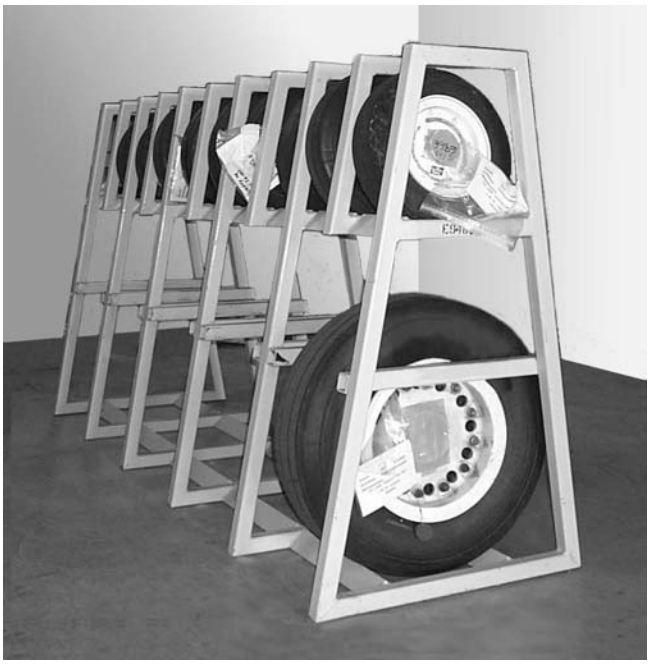


Figure 6-1. Suitable Tire Rack for Tire Shop Application (Varied Size Tires)

CAUTION

Stored tire/wheel assemblies shall not be stacked horizontally as this distorts the shape and causes mounting problems.

6-5. STORAGE OF AIRCRAFT TIRE/WHEEL ASSEMBLIES. After the tire has been mounted on the wheel and checked as required in paragraphs 4-14 or 4-15 and found to be in RFI condition, the tire pressure shall be reduced to 50% of its test pressure or 100 psi, whichever is lower, and the tire then placed in racks as shown in Figure 6-1.

Talc, Technical 6

6-6. STORAGE OF TUBES. New tubes shall be stored in the original containers or stored in the manner of used tubes. Used tubes shall be partially inflated (to avoid creasing in storage), dusted with talc, A-A-59303,Type T1 (to prevent sticking) and stored in the same vertical manner as aircraft tires. Each tube

container shall be plainly marked to identify contents, size, type, and stock number. Under no circumstances shall tubes be hung over nails or hooks.

6-7. ISSUE OF TIRES AND TUBES. All issues from the storeroom shall be strictly on the basis of age from date of tire manufacture. The oldest tires and tubes in the storeroom shall be issued first, with no distinction being made between new or retread tires. Tires are marked with color-coded tape by the manufacturer in accordance with MS14113 (see Figure 2-4). The color and year found on the tape represent the year the tire was originally manufactured (not the retread date). (See Figure 2-4).

CAUTION

Do not stack tire/wheel assemblies on top of each other during shipment. Tire/wheel assemblies may be only be stored horizonally single high during shipment.

6-8. SHIPMENT OF BUILT-UP AIRCRAFT TIRE/WHEEL ASSEMBLIES. All Ready For Issue (RFI) tire/wheel assemblies shipped in an inflated condition shall be inspected and found free of damage prior to release to the carrier. Packing may be required to ensure the assembly is not damaged during shipping. Tire/wheel assemblies shall be stored horizonally single high during shipment. RFI tire/wheel assemblies may be shipped within the air station at storage pressure (Section 6-5). However, when RFI tire/wheel assemblies are shipped off station by any mode they shall be inflated to a maximum of 25 psi. Non-RFI tire/wheel assemblies shall be transported non-inflated with deflated tire flag installed (Figure 3-17, View A or B).

CAUTION

Shipped tires shall not be stacked higher than 4 tires high (see Figure 6-2).

Shipped radial and chined tires shall not be stacked on top of each other. These tires may be only be stored horizonally single high during shipment.

6-9. SHIPMENT OF AIRCRAFT TIRES (NON-ASSEMBLED).

a. Tires shall not be shipped with steel banding that will come in contact with the tires. Place a piece of wood or thick cardboard between banding and tire. The vibration of the tires during transportation will cause cutting of the tire carcass resulting in tire scrapping. When wood pallets are used to move tires, a thorough inspection of the pallet shall be made prior to use. Do not use wooden pallets with protruding nails, damaged or broken boards. When possible, use thick cardboard between tire and pallet to eliminate potential tire damage. Figure 6-2 is an example of properly palletized tires for shipment.

NOTE

Staples or other puncturing devices shall not be used for affixing tags to tires. Labels or cements shall not be applied to the bead area of the tires because of the possibility of ruining the bead-sealing surface. Methods that would damage the tire shall not be used.

b. When stacking tires horizontally for shipment, they shall not be stacked higher than 4 tires high (see Figure 6-2).

c. Radial tires and chined tires shall not be stacked for shipment. These tires may be only be stored horizonally single high during shipment.

NOTE

Do not use razorblades and/or knifes to remove stretch wrap from tires. Sidewall and tread damage may occur, resulting in tire scrapping.

d. When removing stretch wrap, de-bagging, or de-banding of tires, no sharp instruments shall come in contact with any portion of the tire.

Figure 6-2. Properly Palletized Tires (Non-Assembled) for Shipment

SECTION VII

TIRE FAILURE REPORTING AND 3M AVIATION MAINTENANCE DATA SYSTEM

7-1. POLICY AND PROCEDURE. Performance and maintenance data for Navy aircraft tires is collected via the Naval Aviation Logistics Command Management Information System (NALCOMIS). The procedures used in documenting maintenance actions on tires are contained in COMNAVAIRFORINST 4790.2 (series). The tire is reported as a repairable subassembly of the tire/wheel assembly. Table 7-1 lists the Work Unit Codes for the tire/wheel assembly and the wheel for Navy aircraft. Table 7-2 lists the Malfunction Codes and descriptions to be used for removal of the tire/wheel assembly resulting from the tire related causes. Table 7-3 lists the aircraft tire manufacturers and retreaders.

7-2. SAFETY, ENGINEERING INVESTIGATION, HAZARDOUS MATERIAL REPORTS, AND QUALITY DEFICIENCY REPORTS. The reporting requirements and formats are presented in COMNAVAIRFORINST 4790.2 (series). Reports are to be sent to the NAVAIR In-Service Support Center, North Island Aircraft Tire Fleet Support Team (FST), NAVAIR North Island, CA using the NAMDRP website (see Section 1-6). Within the initial EI or HMR report include digital photographs of the tire discrepancy to assist in determining the cause of the discrepancy. Hold discrepant tire (including any tire pieces) and wheel to assist in determining the root cause of the tire failure. Tire pieces are as important as the tire casing because they give valuable historical information (wear pattern, cut or separation) without the run out landing damage. It is important that the following information on the tire (see Figure 2-2 or Figure 2-3) be furnished in the Report message:

a. National Stock Number: paragraph 5 of the Report message.

b. Manufacturer: paragraph 6 of the Report message.

c. Serial Number: paragraph 9 of the Report message.

d. New or Retread: paragraph 11 of the Report message.

e. Julian Date of Retread: paragraph 12 of the Report message.

Table 7-1. Tire/Wheel Work Unit Codes

Aircraft	MLG Wheel/Tire Assembly	MLG Wheel	NLG Wheel/Tire Assembly	NLG Wheel
A-4	13143	1314	13233	13234
A-6	13511	13513	13512	13516
A-7	13131	13133	13161	13163
C-2	13E2E20	none	13E2210	none
TC-2	13511	13513	13512	13516
C-4	13141	13142	13241	13242
C-9	13141	13142	13241	13242
C-12				
C-130	13C1400	13C1410	13D1110	13D1112
E-2	13E2E20	none	13E2210	none
E-6	1311D		1318A	
F-4	1325100	1325110	1333100	1333110
F-5	13QEA	13QAA	13QEB	13QCA
F-14	13511	13512	13521	13522
F-18 A-D	13C17	13C1710	13C27	13C2710
F-18 E-F	13A2Y00	13A2Y10	13B2Z00	13B2Z10
H-2 (Note 1)	13315	none	133A2	none
H-3 (Note 1)	13131	13138	1321G	1321H

Aircraft	MLG Wheel/Tire Assembly	MLG Wheel	NLG Wheel/Tire Assembly	NLG Wheel
H-46 (Note 2)	13612	1361210	13634	none
H-53	13A1340	none	13A3520	none
TH-57A	13117	N/A	N/A	N/A
SH-60 (Note 1)	1311120	1311120	1316140	1316141
AV-8 (Note 3)	Note 3	Note 3	13413	1341310
P-3	1375J	none	13677	none
S-3	13A6K	13A6K10	13A2P	N/A
T-2	13511	13513	13512	13516
T-28	13411	13413	13412	13516
T-33	13511	13513	13512	13516
T-34	13T3511	none	13T3110	13T3111
T-38				
T-39	13911	13913	13912	13916
T-44				
T-45A	13F3100	13F3120	13F3500	13F3520
U-12	13511	13513	13512	13516
U-11	13511	13513	13512	13516
V-22	Note 4	Note 4	Note 5	Note 5

Note 1 Denotes tail vice nose landing gear.

Note 2 Denotes auxiliary vice nose landing gear.

Note 3 For AV-8 the WUC for the RH wing tire/wheel assembly is 13414 and the LH is 13415.
The WUC for the RH MLG tire/wheel assembly is 13412 and the LH is 13411.
The WUC for the RH MLG wheel is 1341210 and the LH is 1341110.

Note 4 For V-22 the UNS for the RH MLG Outboard tire/wheel assembly is 324002.
The UNS for the RH MLG Inboard tire/wheel assembly is 324014.
The UNS for the LH MLG Outboard tire/wheel assembly is 324001.
The UNS for the LH MLG Inboard tire/wheel assembly is 324013.
The UNS for the RH MLG Outboard wheel is 32400201.
The UNS for the RH MLG Inboard wheel is 32401401.
The UNS for the LH MLG Outboard wheel is 32400101.
The UNS for the LH MLG Inboard wheel is 32401301.

Note 5 For V-22 the UNS for the RH MLG tire/wheel assembly is 324003, and the LH is 324001.
The UNS for the RH MLG wheel is 32400301 and the LH is 32400101.

Table 7-2. Malfunction Codes for Tire/Wheel Assembly Removal

Malfunction Code	Problem
781	Tire Leakage Excessive or Blowout
782	Tire Tread Defective or Damaged Tire Sidewall, Tread, Bead, etc.
787	Tire Removal for Normal Wear
846	Delamination, Tread (partial or entire) Stripped Off the Tire Carcass
525	Pressure Incorrect (assembly reinflated but not removed)(See 781)
416	Out of Round
458	Out of Balance
Note: Malfunction Codes 020 and 070 should not be used as they are too general	

Table 7-3. Tire Contractor Codes

Contractor	Original Manufacturer New Tire Code	Retread Contractor Retread Tire Code	Numerical Code
Dunlop	DU	-----	U8018
Goodrich	GR	GE	83187
Goodyear	GY	-----	73842
Goodyear (Air Treads)	-----	AT	2A617
Michelin	MI	MR	OA1K8
Bridgestone (Thompson)	-----	TT	26515

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