

4 Inspection, Storage and Shipping

INSPECTING MOUNTED TIRES

Systematic inspection of mounted tires is strongly recommended for safety and tire economy. The frequency of the inspection should be determined by the use and normal tire wear of the particular aircraft involved. With some aircraft, tire inspection after every landing or at every turnaround is required. With all aircraft, a thorough inspection is advisable after a hard landing.

Treadwear

Inspect treads visually and check remaining tread. Tires should be removed when tread has worn to the base of any groove at any spot, or to a minimum depth as specified in aircraft T.O.'s.

Return To Base Limits

Goodyear tires can remain in service with visible cord in the tread area only as long as the top fabric layer is not worn through or exposed for more than 1/8 of the circumference of the tire, and not more than one inch wide. Tires within these limits can continue in service no longer than necessary to return to a maintenance base and be replaced. (This applies to the proper tires for the aircraft as specified in its Aircraft Maintenance Manual.) For all other circumstances, normal removal criteria are still recommended as per the rest of this manual. This does not apply to military tires with Maximum Wear Limits marked on the sidewall.

NOTE: Further use of tires beyond this point may render a tire unsafe or unretreadable.

Uneven Wear

If tread wear is excessive on one side, the tire can be demounted and turned around, providing there is no exposed fabric. Gear misalignment causing this condition should be corrected.

Tread Cuts

Inspect tread for cuts and other foreign object damage and mark with crayon or chalk. Follow the removal criteria below:

1. Follow specific cut removal criteria from Aircraft Maintenance manuals, Operation manuals, or tire cut limits on the tire sidewall when available.
2. When specific cut removal criteria are not available use the following Goodyear removal criteria: any cut into the casing plies on bias tires, any cut into the belt package on radial tires, any cut which extends across one or more rubber tread ribs to the fabric, rib undercutting at the base of any cut.

WARNING

Do not probe cracks, cuts or embedded foreign objects while tire is inflated.

Sidewall Damage

Remove tire from service if weatherchecking, cracking, cuts and snags extend down to the casing ply in the sidewall and bead areas. Cuts and cracks deeper than one ply require the tire to be scrapped.

Bulges

Bulges in any part of tire tread, sidewall or bead area indicate a separation or damaged tire. Mark with crayon and remove from service immediately.

Fabric Fraying/Groove Cracking

Tires should be removed from service if groove cracking exposes fabric or if cracking undercuts tread ribs.

Flat Spots

Generally speaking, tires need not be removed because of flat spots due to touchdown and breaking or hydroplaning skids unless fabric is exposed. If objectionable unbalance results, however, rebalance the assembly or remove the tire from service.

Casing Flat Spotting

Loaded tires that are left stationary for any length of time can develop temporary flat spots. The degree of this flat spotting depends upon the load, tire deflection and temperature. Flat spotting is more severe and more difficult to work out during cold weather. Under normal conditions, a flat spot will disappear by the end of the taxi run.

Radial Tire Sidewall Indentation

Remove from service with 3mm or greater sidewall indentation.

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Beads

Inspect bead areas next to wheel flanges for damage due to excessive heat, especially if brake drag or severe braking has been reported during taxi, take-off or landing. If damaged, remove tire from service.

Tire Clearance

Look for marks on tires, gear, and in wheel wells that might indicate rubbing due to inadequate clearance.

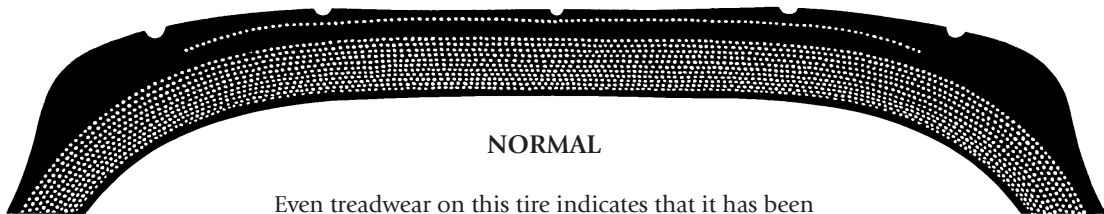
Wheels

Check wheels for damage. Wheels that are cracked or damaged should be taken out of service for repair or replacement in accordance with manufacturer's instructions.

Inflation Pressure Loss In Tire/Wheel Assemblies

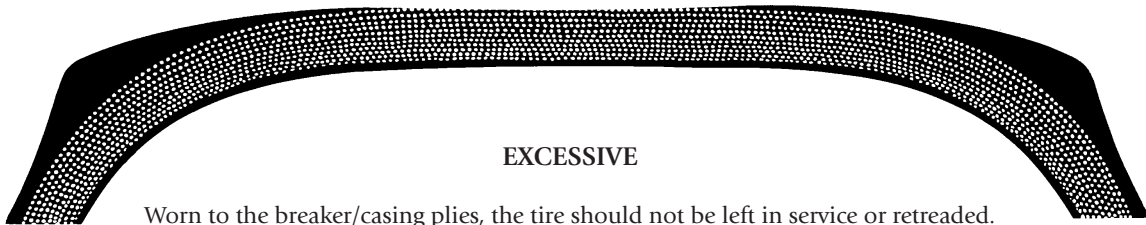
Refer to section on MOUNTING for a complete review of these procedures.

TYPICAL TREADWEAR PATTERNS



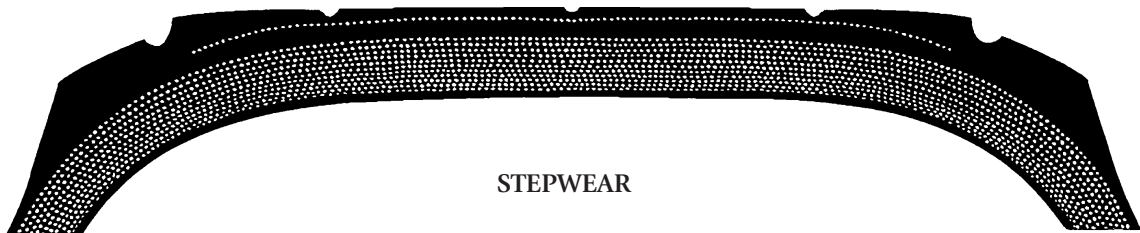
NORMAL

Even treadwear on this tire indicates that it has been properly maintained and run at correct inflation pressure.



EXCESSIVE

Worn to the breaker/casing plies, the tire should not be left in service or retreaded.



STEPWEAR

This is a normal wear pattern on some tires, particularly H-type tires. Can be caused or worsened by underinflation.



ASYMMETRICAL WEAR

Some aircraft tires exhibit faster shoulder wear on one shoulder versus the other due to non-tire influences (camber-type wear, etc.). If this condition exists, the tire's life can be extended by demounting and reversing ("flipping") the tire on the wheel as long as tire wear limit and the physical condition criteria are satisfied.

NOTE: "FLIPPING" MUST NOT BE DONE ON SINGLE CHINE TIRES.

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TREAD CONDITIONS



Cuts

Penetration by a foreign object. See Section 4, Inspection, Storage and Shipping; Inspecting Mounted Tires; Tread Cuts.



Spiral Wrap

Some retreads have reinforcing cords wound into the tread which become visible as the tire wears. This is an acceptable condition and not cause for removal. The wrap reduces chevron cutting and tread chunking.



Tread Chunking

A condition in the wearing portion of tread usually due to rough or unimproved runways. Remove if fabric is visible.

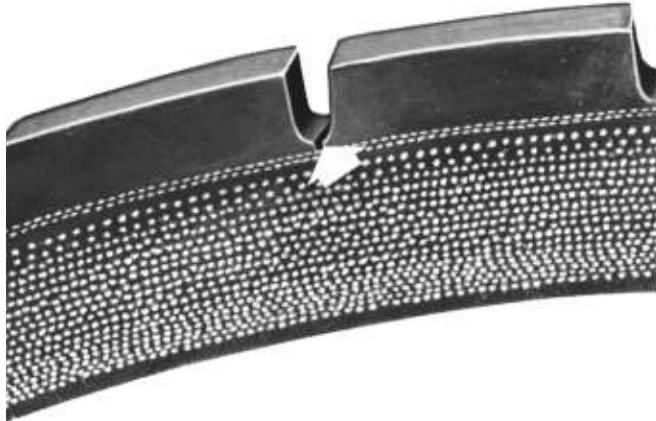


Tread Separation

A separation or void between components in the tread area due to loss of adhesion, usually caused by excessive loads or flex heating from underinflation. Remove immediately.

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TREAD CONDITIONS (Cont'd.)



Groove Cracking

A circumferential cracking at the base of a tread groove; remove if fabric is visible. Can result from underinflated or overloaded operation, or improper storage conditions.



Rib Undercutting

An extension of groove cracking progressing under a tread rib; remove from aircraft. Can lead to tread chunking, peeled rib or thrown tread.



Peeled Rib

Usually begins with a cut in tread, resulting in a circumferential delamination of a tread rib, partially or totally, to tread reinforcing ply. Remove from aircraft.

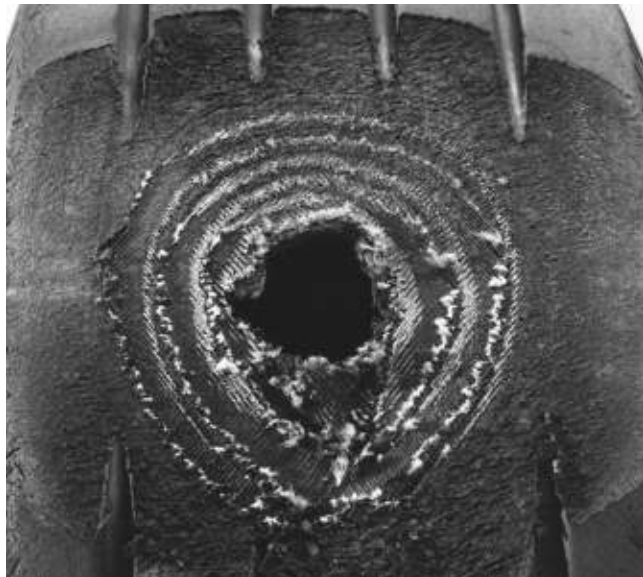


Thrown Tread

Partial or complete loss of tread down to tread fabric ply or casing plies. Remove from aircraft.

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TREAD CONDITIONS (Cont'd.)



Skid

An oval-shaped flat spot or skid burn in the tread rubber. May extend to or into fabric plies. Remove if balance is affected, fabric is exposed, or tire is ruptured.



Tread Rubber Reversion

An oval-shaped area in the tread similar to a skid, but where rubber shows burning due to hydroplaning during landing usually caused by wet or ice-covered runways. Remove if balance is affected.



Open Tread Splice

A crack in the tread rubber where the joint (splice) separates in a radial (sideways) direction. Tires with this defect should be removed from service.



Chevron Cutting

Tread damage caused by running and/or braking on cross-grooved runways. Remove if chunking to fabric occurs or tread cut removal criteria are exceeded.

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SIDEWALL CONDITIONS



Cut or Snag

Penetration by a foreign object on runways and ramps, or in shops or storage areas. Remove from aircraft if injury extends into fabric.



Ozone or Weather Checking/Cracking

Random pattern of shallow sidewall cracks usually caused by age deterioration, prolonged exposure to weather, or improper storage. Remove from aircraft if fabric is visible.



Radial or Circumferential Cracks

Cracking condition found in the sidewall/shoulder area; remove from aircraft if down to fabric. Can result from underinflated or overloaded operation.

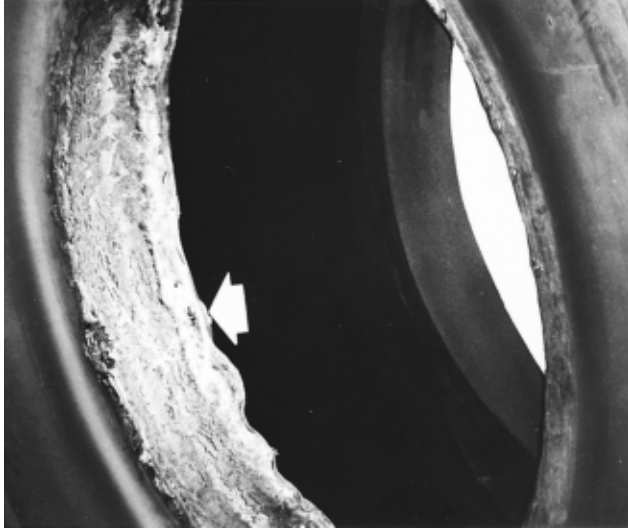


Sidewall Separation

Sidewall rubber separated from the casing fabric. Remove from aircraft.

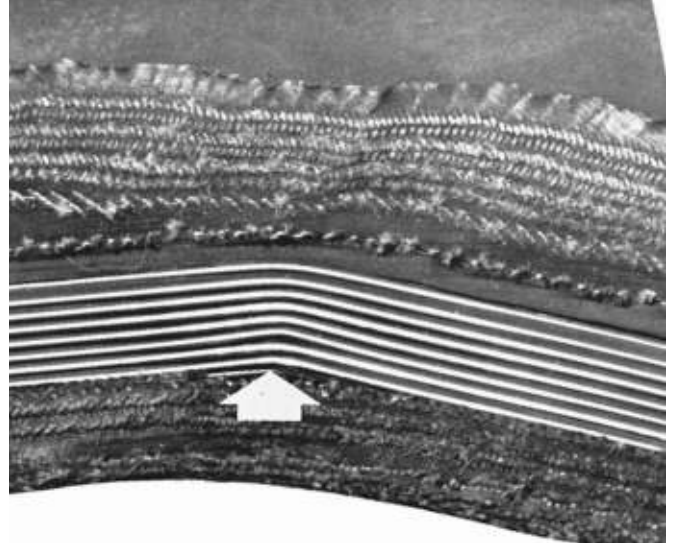
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BEAD CONDITIONS



Brake Heat Damage

A deterioration of the bead face from toe to wheel flange area; minor to severe blistering of rubber in this area; melted or solidified nylon fabric if temperatures were excessive; very hard, brittle surface rubber. Tire is to be scrapped.



Kinked Bead

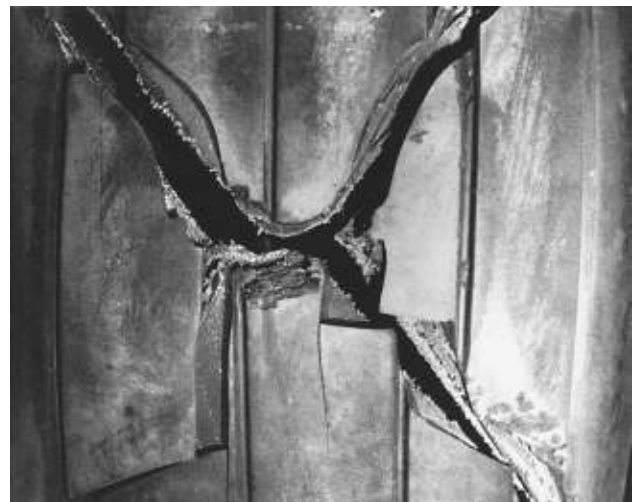
An obvious deformation of the bead wire in the bead toe, face or heel area. Can result from improper demounting and/or excessive spreading for inspection purposes. Tire is to be scrapped.

CASING CONDITIONS



Inner Tire Breakdown

Deterioration (distorted/wrinkled rubber of tubeless tire innerliner or fabric fraying/broken cords in tube-type) in the shoulder area usually caused by underinflated or overloaded operation. Tire is to be scrapped.



Impact Break

Rupture of tire casing in tread or sidewall area, usually from extremely hard landing or penetration by foreign object. Tire is to be scrapped.

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TIRE AND TUBE STORAGE

Ideally, both new and retreaded tires should be stored in a cool, dry place out of direct sunlight. Temperatures should be between 32°F (0°C) and 85°F (30°C). Particular care should be taken to store tires away from fluorescent lights, electric motors, battery chargers, electric welding equipment, electric generators and similar equipment. These items create ozone, which has a deteriorating effect on rubber.

Care should be taken that tires do not come in contact with oil, gasoline, jet fuel, hydraulic fluids or similar hydrocarbons. Rubber is attacked by these in varying degrees. Be particularly careful not to stand or lay tires on floors that are covered with these contaminants.

All tires and tubes should be inspected immediately upon receipt for shipping and handling damage.

Whenever possible, tires should be stored vertically on tire racks. The surface of the tire rack against which the weight of the tire rests should be flat and wide to minimize distortion.

Axial (circumferential) rotation of unmounted, vertically stored tires should not be required. With respect to the effect of storage time on rotation, we strongly suggest the use of first-in first-out (FIFO) storage. This helps to avoid overage, distortion and related field issues.

Stacking of most tires is permissible; however, care must be used to prevent distortion of the tires on the bottom of the stack. To prevent chine distortion, stacking chine/water deflector tires is not recommended. Tires stored in racks, but leaning on the chine, can also cause distortion. The following is the maximum recommended stacking height:

Tire Diameter	Maximum Recommended Stacking Height
Up to 40 inches	5
Over 40 inches to 49 inches	4
Over 49 inches	3

Tubes should be stored in their original cartons whenever possible. If stored without their cartons, they should be lightly lubricated with talc powder and wrapped in heavy paper.

Tubes can also be stored in matching tires. Tires should be clean and lightly lubricated with talc with tubes inflated just enough to round them out.

Under no circumstances should tubes be hung over nails, pegs or any object that might form a crease in the tube. Such a crease will eventually produce a crack in the rubber.

TIRE AND TUBE AGE LIMIT

Age is not a proper indicator of tire serviceability. Goodyear aircraft tires or tubes have no age limit restriction regardless of calendar age as long as all service criteria (Section 2 of this manual), visual criteria (Section 4), or individual customer-imposed restrictions are met.

Tubes are not reusable; they can grow as much as 25% in service. Reusing them can result in folded, pinched tubes which can fail or create an imbalance.

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STORAGE OF MOUNTED ASSEMBLIES

Set the pressure at operational pressure for the desired tire. The assemblies can be stored like this for up to 12 months. After that time, inflated assemblies that have not been used should be re-inspected by a qualified inspector. However, to maximize tire life, it is recommended to rotate inventory on a first-in-first-out (FIFO) basis.

The above inspections can be performed multiple times as long as the tire meets all inspection and inflation criteria. If these criteria cannot be met, the tire should either be scrapped or returned for retreading, depending on the defect found. For assemblies stored for extended periods of time, air retention checks should be performed to help re-verify the airworthiness of the assembly. Prior to putting the assembly in service, if nitrogen was not used for storage inflation, deflate the assembly and re-inflate with nitrogen (per industry standards).

These recommendations do not supersede local storage facility regulations, ground transportation restrictions, or prevailing aviation authority requirements. Depending on local regulations, it may be the operator's responsibility or that of the tire handler (shipping or storage) to ensure compliance with the requirements for the locations in which they operate, transport, and store mounted tire assemblies.

SHIPPING

SHIPPING INFLATION

Transportation of a serviceable aircraft tire/wheel assembly should be in accordance with the applicable regulatory body for the airline.

Transportation of a serviceable inflated aircraft tire is covered by the U.S. Department of Transportation Code of Federal Regulations, the International Air Transport Association (IATA), and other regulatory bodies.

While serviceable tires may be shipped fully pressurized in the cargo area of an aircraft, Goodyear's recommendation is to reduce pressure to 25% of operating pressure or 3 bars / ~40 psi, whichever is the lesser. Reinflate to operating pressure before mounting on the aircraft.

SHIPPING AND HANDLING DAMAGE

In Goodyear's manufacturing facilities, stringent finished tire inspection is performed to help ensure that Goodyear tires are shipped to the customer in first class condition. Because of the characteristics of rubber, special care is taken to inspect shipping containers, pallets and trucks for obvious conditions that could cause damage to these tires. However, aircraft tires may be damaged during shipping or handling after the tires leave the control of our facilities and prior to entering service. Damage of this nature is the responsibility of the freight carrier and needs to be handled between the receiving facility and the freight handler as soon as possible after receipt of the tire(s). The reader should keep in mind that some of this damage can be so slight that it escapes incoming inspection procedures and is noticed later or after the tire is mounted on the wheel assembly and inflated.

Cuts and snags can occur on tread areas, sidewalls and bead areas of tires. In many cases these cuts are caused by nails, wood, splinters, utility knives, forklift tines or sharp metal objects in transport trailers.