I. Tire Care and Maintenance

1. Purpose

This manual is intended to provide maintenance and servicing information for Bridgestone aircraft tires. It is also intended to provide in a concise format information for safe utilization of tires, and to ensure maximum tire life by outlining inspection, maintenance and storage procedures for new and in-service tires.

2. Inspection Prior to Mounting

Upon receipt and before installation on aircraft wheels, tires should be visually inspected to detect damage that may have occurred during shipment. Check also for absence or deterioration of sidewall markings which may prevent positive tire identification. Ensure that the manufacturer's name, the tire size, ply rating, serial number, part number, authorization number (TSO, etc.) and fabrication date are clearly visible. Tires with missing or illegible identification are unusable.

Before mounting, also check for permanent deformation of tire profile or ovalization of nominal diameter which is generally caused by unsatisfactory storage conditions. Should deformation exist, mount the tire on its wheel and inflate to nominal pressure. If the deformation disappears, the tire can be used on the aircraft. If inspection reveals a bent or kinked bead wire, the tire is not usable.

Finally, check for contaminating agents such as oil or grease, etc. smeared on the tire surface causing surface deterioration. After washing with soap and water, examine whether contaminating materials have caused cracking or have visibly affected the rubber causing loss of flexibility, softening or swelling in the rubber. If so, the tire is unusable. Also, if blisters are present and do not disappear within 24 hours, the tire is not usable.

3. Mounting Tires on Wheels

The mounting of aircraft tires requires careful attention and adherence to established procedures.

Care should be taken to abide by wheel/airframe manufacturer's instructions for assembling wheels and mounting tires.

Bridgestone commercial aircraft tires are tubeless. It is prohibited to mount these tires with an inner tube unless otherwise specified.

Standard tire/wheel mounting procedure

In general, it is recommended to mount without grease or lubricated agents on the tire bead area. A tire with adjusted balance is stamped with a red dot on the sidewall immediately above the bead to indicate the lightweight point of the tire.

The following step-by-step instructions generally apply for mounting tubeless tires on split wheels :

1) Make sure that the tire is clean inside. Visually inspect the bead area and wipe them clean with a cloth moistened with denatured alcohol, allow the tire beads to dry.
2) Wipe the "O-ring" seal of the wheel halves with an alcohol dampened cloth. Lubricate the O-ring seal with a light coat of grease following manufacturer's instructions, if any. Place seal carefully in its groove without stretching or twisting.
3) Place the tire on the inboard wheel half being careful not to disturb the "O-ring".
4) Place outboard wheel half inside the tire. Align red balance dot on tire with the wheel valve or if indicated on the wheel, with the wheel's heavy point. Align bolt holes following manufacturer's instructions.
5) Install wheel bolts, washers and nuts, tighten in a criss-cross fashion, and torque according to the wheel manufacturer's instructions.
6) Inflate in a safety cage to the rated inflation pressure.
7) Visually check that the rim line is perfectly concentric to the wheel flange edge on both sides.

Alternate tire/wheel mounting procedure

Occasionally it is possible that tire bead does not seat properly on the rim. In such case the following alternate procedure can be used.

Follow same procedure as above from step 1 to 5.

6) Before inflation spray a mist of de-ionized water on both tire beads.
7) Inflate in a safety cage to the rated inflation pressure.
8) Visually check that the tire rim line is perfectly concentric to the wheel flange edge on both sides.

4. Inflation in the Tire Shop

Aircraft tires are designed to operate at a specific deflection. When tires are used with incorrect inflation pressure, tire durability can be seriously affected. Not only may tire resistance to flexing fatigue decrease, but also problems such as tire burst or separation may occur.

A. Recommended Inflation procedures

Inflate tire with nitrogen in a safety cage to Rated Inflation Pressure. Check for leaks. Nitrogen is the recommended inflation medium as it prevents combustion which can occur with oxygen and reduces degradation of the innerliner due to oxidation.
When a new tire with a nylon carcass is mounted on a rim and is inflated, the nylon cord will stretch or grow, causing the inflation pressure of the new tire to decrease. Consequently, the inflated tire must be stabilized for a given period (refer to Table 1), and the pressure adjusted again to rated pressure.

This procedure requires a pressure gauge of 0.25 percent accuracy or better and capability to indicate a pressure change of 2psi.

Table 1: Period for Stabilization

Period	Procedure
Min. 12 hours*	Normal
Min. 2 hours	Alternate

* : "Min. 12hours" for the stabilization is recommended in AC 20-97B issued by FAA.

After the initial stabilization period, the tire must be capable of retaining inflation pressure with a loss of pressure not exceeding the criteria specified below. (refer to Table 2) Then unloaded service pressure (PNO) can be used as the initial pressure.

Table 2: Air Retention Criteria

Period	Criteria of pressure loss	Procedure
24 hours**	5 percent	Normal
12 hours	2.5 percent	Alternate

** : "Min. 24hours" for the retention test is recommended in AC 20-97B issued by FAA.

Should the pressure drop during these next periods be greater than the criteria specified in Table 2, apply the following procedures:

a) Check the temperature variation in the tire fitting shop as it may generate an abnormal pressure variation. For every 10°C of temperature decrease, the decrease in the tire pressure will be approximately 3.7%.
b) If temperature variation is not the cause, experience shows that air retention problems are often wheel-related. Proceed to the following air retention verifications;

1)Examine the air retention of the wheel. Check with water or soap solution for loose or defective valve, valve core and for other loose or defective wheel components.
2)When the cause is not detected, demount the wheel, check the wheel elements and readjust.
3)If the problem persists, the tire should be remounted on a different wheel. If the problem still persists, put the tire aside for investigation by Bridgestone engineers.

[Emergency inflation procedure]

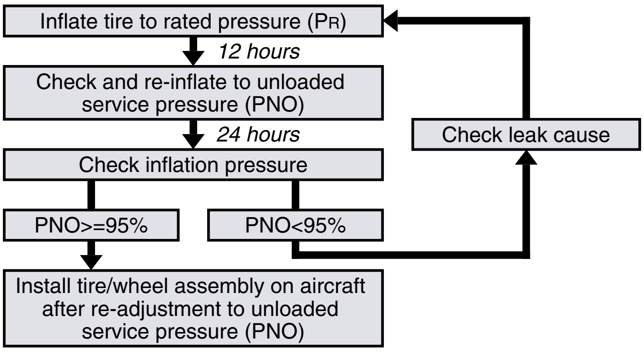
When time does not allow the above procedure to be applied, the following procedure may be applied for pressure retention check.

The inflated tire must be stabilized for a period of at least 1 hour with adjustment to 105% of unloaded service pressure, then use water or soap solution for leak detection. If a stream of bubbles is not found on wheel or at tire vent holes, the tire/wheel assembly can be installed on aircraft.
During the first 48 hours after the installation, the inflation pressure must be checked before each flight. If the pressure retention is below 90 percent of the service pressure, the tire should be removed.

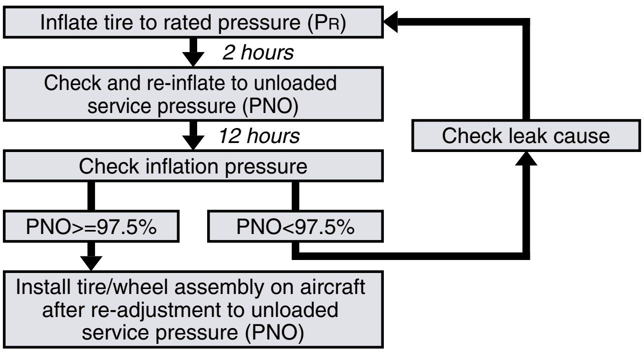
Flow chart

[Recommended Procedure]

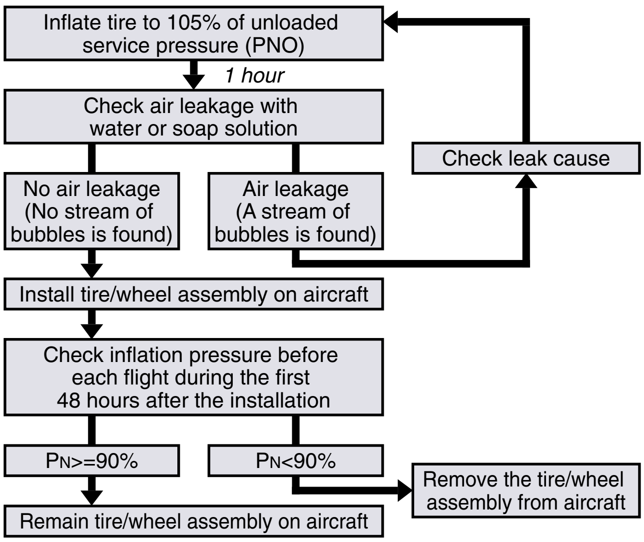
• Normal Procedure



• Alternate Procedure



[Emergency Procedure]



> ***WARNING***
>
> Aircraft tires should not be operated at higher than rated inflation pressure. Extremely high inflation pressures may cause the aircraft tire or wheel to explode which may lead to serious or fatal injury. Aircraft tires must always be inflated with a properly regulated inflation source. The high pressure side should never be used. Always inflate aircraft tires from the low pressure side of the regulated source. Tires should always be inflated in a safety cage.

B. Inspection Before Installing Tire on Aircraft

Once tire is stabilized, check for permanent tire deformation or cracking of the tire grooves. Should there be major tire *asymmetry, blisters or bulges, the tire is not usable. Furthermore the tire is not usable if there is damage to the sidewall reaching to the carcass plies.

* When the wheel and rim are not in straight alignment.

Note that undulation of the grooves in a zig-zag pattern which is seen on radial tires is acceptable and does not affect tire performance. (Cut protector pattern.)

Should the reinforcing fabric (bias) or aramid cord protector (radial) be exposed in the groove area, the tire is unusable. However, if the cracks or splits are shallow and neither the reinforcing fabric (bias) nor aramid cord protector (radial) is exposed, the tire may be utilized.

5. Inflation Pressure Control

It is recommended that inflation pressure of each aircraft tire be checked daily, and that the pressure gauge be calibrated regularly. Maintaining correct tire inflation pressure is the most important factor in any preventive maintenance program.

A. Pressure Readjustment After Installing Tire on Aircraft

When loaded, a tire's gas chamber volume is reduced due to tire deflection. Thus, if PNO has been specified, that number should be increased by four percent (4%) to obtain the equivalent loaded pressure (PNZ).

- Aircraft on Jacks: Readjustment pressure is PNO
- Aircraft on Wheels: Readjustment pressure is PNZ

1.04×PNO (Unloaded)=PNZ (Loaded)

B. Inflation Control During Service

Inflation pressure checks should be executed only on cold tires, cold tires being those for which tire temperature equals ambient temperature. Any tire, whatever its size, its utilization or the temperature of the brakes, is considered to be cold after 3 hours except when exposed to direct sunlight.

C. Normal Pressure Loss During Service

A tire may lose as much as 5 percent (5%) of its initial inflation pressure in a given 24 hour period and still be considered normal. A small amount of gas diffusion through the vents in the lower sidewall is a normal mechanism designed to bleed off trapped air, preventing ply separation or blistering. However, such air leakage should not be detectable by hand. If pressure is found to be less than the minimum pressure, refer to Table 3.

Table 3: Tire Pressure Verification

Tire Pressure	Verification	Recommended Action
P > PN +5%	Overinflation	Readjust to maximum of normal operating range if tire is at ambient temperature.
PN + 5% > P > PN	Normal Operating Range	No action if within Normal Operating Range (NOR).
PN > P > 95%PN	Allowable Daily Pressure Loss	Reinflate to specified service pressure.
95%PN > P > 90%PN	Moderate Pressure Loss	Reinflate to specified service pressure. Record in aircraft log book. Remove if pressure loss reoccurs within 24 hours.
90%PN > P > 80%PN	Large Pressure Loss	Replace the tire.
80%PN > P > 0	Extreme Pressure Loss (Underinflation)	Replace tire and its axle mate.
P = 0	Complete pressure loss due to; • Tire perforation • Blown fuse plug	Replace tire and its axle mate.

P: Tire Pressure Reading
PN: Loaded Service Pressure
NOR: Normal Operating Range (Service Pressure)

D. Identification of Axle Mate

When a tire is removed for any of the following reasons, the axle mate tire must be identified and the serial number must be provided to the appropriate retreader (Refer to Table 3).

1. Large pressure loss
2. Extreme pressure loss
3. Perforation
4. Blown fuse plugs

E. Adverse Effects of Underinflation

Underinflation will cause high tire deflection and heat build-up, which in turn may lead to ply separation. Low inflation pressure may also cause uneven wearing of the tread and rapid wearing of the shoulder. It may also increase the tire footprint, possibly leading to damage of the tire sidewall during landing.

An example of Casing Break Up (CBU) in a bias tire at the lower sidewall caused by running the tire at pressures below those recommended.

F. Tire Deflection and Durability

Figure 1 shows the relationship between the changes in tire deflection at various inflation pressures and the durability of the tire carcass. With aircraft tires, an increase in deflection during operation greatly weakens the carcass.

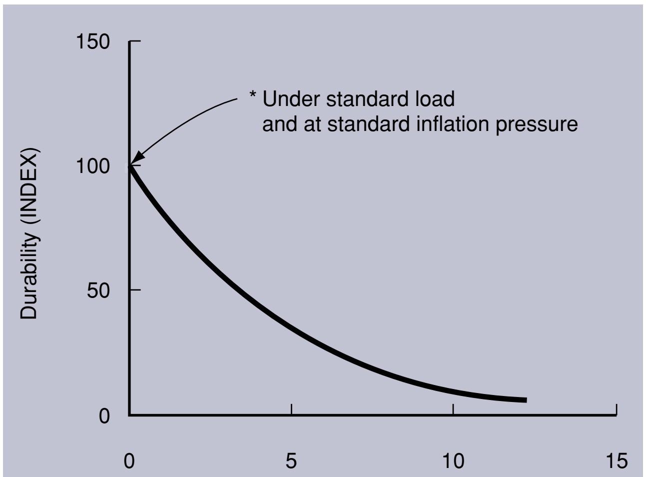


Fig. 1 **Increment in tire deflection from nominal (%)**

G. Adverse Effects of Overinflation on Tires

Excessive inflation pressure may cause uneven tread wear (Wearing of the tread center), less braking efficiency, abnormal tire growth, and may make the tread more susceptible to cutting by foreign objects.

H. Adjusting for Temperature Differences

When an aircraft takes off for a destination where ambient temperatures are significantly lower (≧25°C) from those of the airport of departure, adjust tire pressure before departure so that the tires are inflated at their nominal pressure at the coldest airport. The minimum required inflation pressure must be maintained for the cooler climate.

Rule: Tire pressure must be increased by 3.7% for each −10°C difference.

Example:

Temperature of departing airport: 25°C
Temperature of destination: −10°C

Required pressure adjustment: $\frac{35}{10} \times 3.7 = 13\%$

I. Pressure Control for "Hot Tires"

A "Hot Tire" is defined to be a tire heated by aircraft operation (Braking) or by exposure to sunlight and having a surface temperature higher than ambient temperature by at least 30°C. A "Hot Tire" may also result from operating with an abnormally large tire deflection.

If a "Hot Tire" is identified, the following actions should be taken:

- Compare tire pressure for tires of the same gear (nose or main gear). Tire pressure should be in the same range for all tires on the same gear and always greater than PNZ. Tire pressure can be much greater than PNZ+5% after long taxiing or severe braking maneuvers. Leave the tire in service.
- Tire pressure should always be greater than PNZ. If pressure is lower than PNZ, conduct pressure verification after cooling of the tire in accordance with Table 3 (p43).
- If all tire pressures are greater than PNZ, but not all in the same range (unusually large variation), check for brake malfunctions or incorrect pressure adjustment during a previous check.

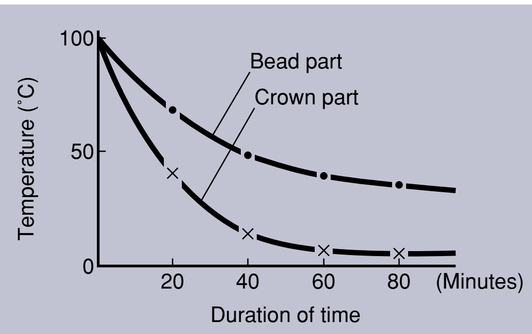


Fig. 2

Reference: Tire cooling curve

The graph above shows a natural cooling curve (as a typical example) from a temperature of 95°C for each the bead and crown section of the tire at a room temperature of 25°C. As compared to the crown section of the tire, the bead section cools slowly. These curves are based on typical examples obtained through bench testing. When other factors such as heat build-up from braking, etc., are taken into consideration, the cooling rate will become slower. Accordingly, the tires must be artificially cooled or else left at rest for a longer period of time.

J. Excessively Hot Tire

If from the experience of the operator, the temperature of the tire appears excessively high, tire pressure verification should be carried out only after cooling of the wheel assembly.

Tires are not recommended for further use when the tire surface temperature exceeds 225°F (107°C), or when the brake heat creates temperatures that exceed 300°F (149°C) at points where the tire is in contact with the wheel surface.

WARNING

Never bleed off excess inflation pressure from a hot tire. Any adjustments to inflation pressure should be conducted after tires have cooled to ambient temperatures.

6. Caution in Taxiing

Aircraft tires are designed for service with deflections of as high as 32 to 35 percent. When the aircraft taxies for longer than normal distances, tire temperatures rise sharply. This is further compounded by increases in speed. Such increases in temperature accelerate deterioration of nylon cords, shorten the serviceability of the carcass, increase wearing of the tread, and lower the adhesion between ply cords.

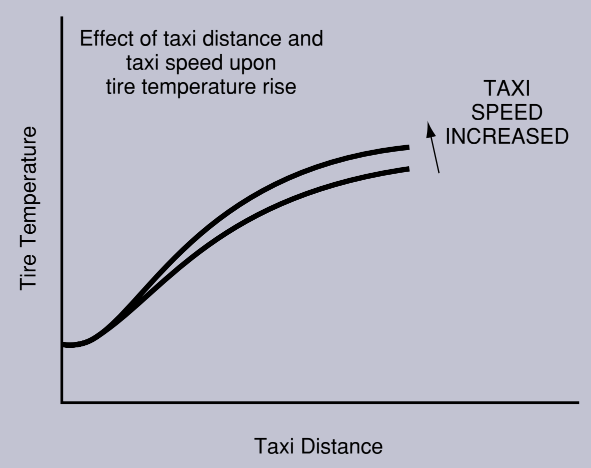


Fig. 3

As shown by Figure 3, tire temperatures continue to rise as taxiing distances increase. Although these values differ depending upon the type of aircraft, the general trend is the same. Increases in taxiing distances cause increased deterioration in aircraft tires. Note that taxiing speeds are also a factor affecting increases in tire temperatures.

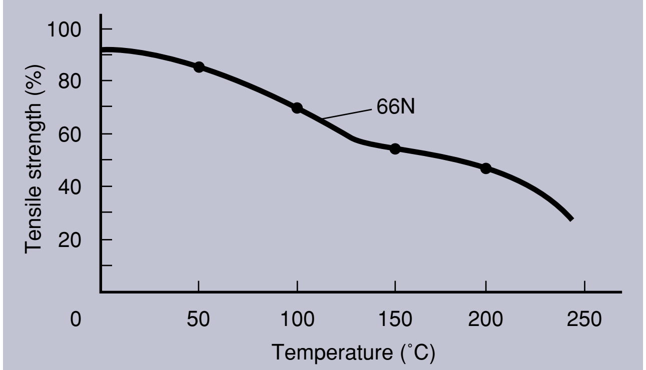


Fig. 4 Tensile Strength of Nylon Cord vs. Temperature Rise

Figure 4 illustrates the trend in the influence that a combination of underinflation and increased deflection will have on internal heat build-up. Operating under such conditions may cause the tire to exceed tire temperature limits. As shown by the graph, nylon cord strength decreases as temperature rises.

7. Inspection After Landing

Aircraft tires should always be inspected for damage after each landing. The inspector must check carefully for evidence of cuts, bulges and blisters, severe cracking, slippage on the wheel, evidence of severe overheating and other types of tire failure. Removal criteria is contained in "*Examination and Recommended Action*" p55.

8. Normal Wear Removal Criteria

Extreme wearing of the tire may cause wet-skidding or hydroplaning, or may damage the tire. Therefore, it is advisable to remove tires when the remaining tread reaches a depth of 1.0mm.

9. Removal After Abnormal Use

Tires experiencing operating conditions such as the abnormal braking energies of a "Rejected Takeoff," and dually mounted tires carrying a greater than rated capacity load due to a puncture of an axle mate, should be removed immediately and scrapped. Also, tires operated for long periods of time at less than service pressure can be weakened from lack of support, and although visual inspection may show no apparent damage, tires may have sustained incipient permanent damage that could result in failure.

THESE TIRES SHOULD BE REMOVED IMMEDIATELY AND SCRAPPED!

10. Criteria for Removing Tires from Aircraft

It is essential to demount the following tires for examination by Bridgestone.

A. Mounted as an axle mate of a burst tire.
B. With cuts reaching the carcass ply or belt cut limits, or cuts exceeding cut length limits.
C. Tires losing more than 10% of pressure between daily pressure checks.
D. With separation or casing break-up (CBU)
E. With reverted tread
F. With open tread splice
G. With chevron cuts reaching the reinforcing fabric (bias) or aramid cord protector (radial).
H. Experienced Rejected Take-off (RTO).
I. With signs of cord melting from overheating at the bead.

BRIDGESTONE SHOULD JUDGE WHETHER THESE TIRES COULD BE RETREADABLE/REPAIRABLE.

11. Demounting Bias Tires

Tires should be deflated completely before removing the tire from the wheel assembly. Internal pressure can project a valve core with dangerous speed and force.

When releasing bias tires from their wheels, release the tire beads from both flanges by applying pressure in even increments around the entire sidewall as close to the beads as is possible. The bead-breaking press should have cylindrical rims that come in contact with the entire sidewall of the tire. Tire beads should not be excessively pressed after spreading from the wheel flanges.

12. Demounting Radial Tires

For instructions on demounting radial tires, refer to Section II, "Instructions Specific to Radial Tires."

13. Tires to be Scrapped

The following tires should be demounted and are unretreadable:

A. Tires with cuts penetrating into the innerliner and with cuts reaching to more than 40% of the actual number of plies. For Radial tires, cuts reaching 40% of the belt plies.
B. Tire with cuts and weathering reaching the carcass plies on the sidewall and the bead area.
C. Tires with spot wearing exposing the carcass or belts in an area greater than 10 $inches^2$.
D. Tires with signs of cord-melting from overheating at the bead base.
E. Tires with broken, bent or exposed bead wire.
F. Tires with wrinkles on the innerliner surface.
G. Dually mounted tires where one has burst in operation (Both should be scrapped).
H. Tires with casing separation.
I. Tires demounted for RTO should be scrapped.

14.Matching Tire Diameters

It is recommended that tires mounted on dual wheels have similar inflated outside diameters to ensure that each tire bears an equal load. The outside diameter of Bridgestone tires should be measured at operating pressure and pairs matched within the tolerances prescribed in Table 4.

Table 4

Tire Outside Diameter Inch (mm)		Maximum Tolerance Inch (mm)	
Up to 24"	(610)	1/4"	(6.4)
24~32	(611~813)	5/16"	(7.9)
32~40	(814~1016)	3/8"	(9.5)
40~48	(1017~1219)	7/16"	(11.1)
48~55	(1220~1397)	1/2"	(12.7)
55~65	(1398~1651)	9/16"	(14.3)
66~over	(1652~over)	5/8"	(15.9)

15.Tire Flatspotting

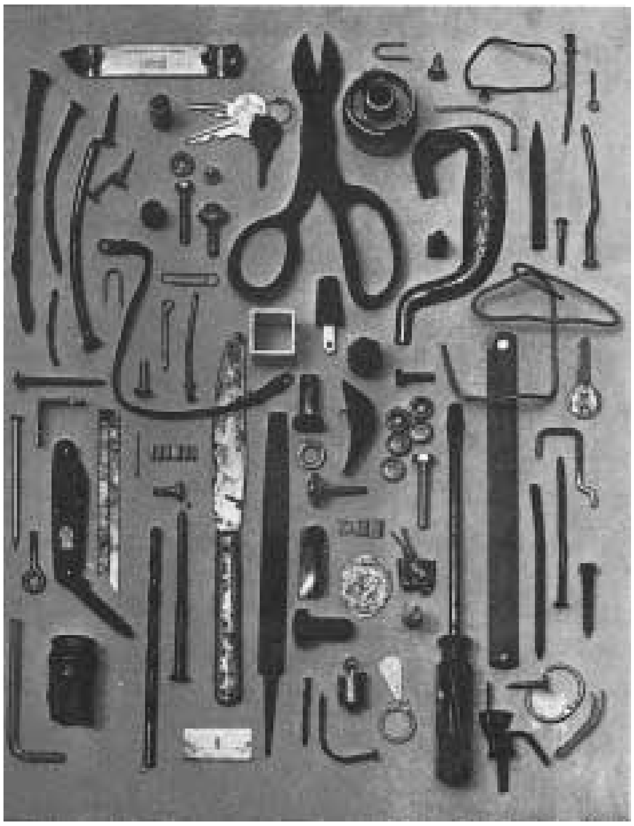
If an aircraft is grounded for a long period of time, the tire can become permanently deformed in the part of the tire which is in contact with the ground. The distortion is caused when the bottom of the tire supporting the weight of the aircraft is pushed flat on the ground surface at a lower temperature than the rest of the tire. Often the condition will disappear during taxiing. If it does not and vibration continues, the tire should be removed from service. To prevent permanent flatspotting, it is recommended to place the aircraft on jacks when parked for long periods of time.

16.Protection from Contamination

Care should be taken that tires do not come into contact with oil, gasoline, jet fuel, hydraulic fluids or similar hydrocarbons. Such substances have deteriorating effects on rubber. When servicing aircraft, cover tires. Be especially careful not to stand or lay tires on floors that are covered with these contaminants.

17.Maintenance of Airport Surfaces

Airport surfaces require excellent maintenance. If airport surfaces and runways are rough or poorly maintained (holes, cracks, foreign objects) aircraft tires are liable to be damaged. Strict control of hanger, runways, ramps and other field areas is especially important where large, high speed aircraft operate. Bolts, nuts, rivets, tools and other foreign objects will easily cut into aircraft tires.



The items in the photograph were picked up from taxi ramps, service areas and runways. These objects present a potential danger to tires and to aircraft.

18.Tires in Other than Aircraft Service

Bridgestone aircraft tires are designed and manufactured for use only on aircraft. Any unauthorized use of Bridgestone aircraft tires for ground use is strictly prohibited.

19.Storage of Tires

1. Storage areas must be clean and tidy with the floors and walls always kept spotless, and any oil or water that may contaminate the tires and all nails, stones, wood chips or any other object that may damage the tires must be removed.
   Ensure that no rain leaks through the roof, windows or doors in the storage location.
2. Direct sunlight speeds up the ageing process of tires. Particular care must be taken to avoid strong sunlight.
3. Ideally, tires should be stored in a cool, dry location. Particular care should be taken to store tires away from electric motors, battery chargers, electric welding equipment, electric generators and similar equipment. Such equipment creates ozone which has a deteriorating effect on rubber. Relative humidity should be kept low and tires kept away from radiant heat. Fluorescent lights may accelerate deteriorating of rubber by ozone. Recommend to keep away from tires.
4. Recommend to store tires upright, preferably in tire racks, in order to avoid deformation and subsequent difficulty in mounting on wheels.

20.Transportation & Storage of Tire/ Wheel Assemblies

When storing or transporting serviceable tire/wheel assemblies, it is permissible to inflate with nitrogen to full service pressure. Take care to ensure that the valve cap is installed and tightened to the specified torque value.

Worn assemblies and/or those deemed unserviceable for any reason should be shipped and/or stored at low inflation pressure.

21.Precautions during Unloading

Strictly observe the following precautions when unloading tires.

1. Do not throw, sit on or kick tires. Failure to observe this may result in scratches, cracking and malformations, so extreme care is required.
2. Check the insides of trucks to ascertain there is no oil or water that may contaminate the tires or nails, stones, wood chips etc. that may damage the tires on the truck bed or walls during transportation. Use rugs or other padding to prevent the tires from becoming scratched or soiled.

22.Service Claim Memorandum

In the case that a product claim is initiated, fill out the Service Claim Memorandum shown on the next page, or an authorized alternative form, with the necessary information and mail it to Bridgestone.

By observing the basic procedures mentioned in the foregoing pages, tire life can be maximized and unnecessary damage to tires and to aircraft avoided. External damage can usually be detected, but if internal damage appears evident, the damaged tire should be returned to Bridgestone for inspection.

BRIDGESTONE

Service Claim Memorandum

Tire size, ply rating, speed rating	
Serial number	
In case of recapped tires, the number of times they have been recapped and the shop which recapped them last	
Type of aircraft	
The positions in which the dameged tires were mounted	
Date when the tires were damaged	
Circumstances under which the tires were damaged	
Particulars of the damage (preferably with illustrations or photos)	
Customer's signature	
Date when the customer served notice	

Ⅱ. Instructions specific to radial tires

The care and maintenance of bias and radial tires is for the most part very similar. However, it is necessary to emphasize certain important differences.

1. Radial Tire Mixability

When operated under similar conditions, radial aircraft tires may exhibit different characteristics than those of bias aircraft tires. Bridgestone recommends that the following guidelines be heeded.

a. Aircraft need to be certified for use of radial tires in place of bias or vice versa. Questions arising concerning the certification of a given aircraft must be taken up with the airframe manufacturer.
b. Radial tires should not be mounted on wheels designed for bias ply tires or bias tires on wheels designed for radial tires without first checking with the wheel or airframe manufacturer.

Mixability of Bridgestone radial tires with bias tires is permitted only as expressly stated in the official airframe manufacturer's bulletin or specification. Any other use in unauthorized by Bridgestone Corporation.

2. Radial Tire Demounting Procedure

A. Deflation

Before demounting the tire from the wheel, completely release all remaining inflation pressure. Remove the valve core only after all pressure has been relieved.

WARNING

Removal of the wheel valve core on an inflated tire could project the core with dangerous speed and force.

B. Recommended Bead-breaker Press Design

The lower sidewalls of radial aircraft tires are significantly more flexible than those of bias tires, and are easily damaged by inappropriate dismounting procedures and/or equipment. For demounting radial aircraft tires from their wheels, Bridgestone recommends the use of either a full-circle ring or a conical pressure roller to ease the tire beads away from the wheel flanges.

B-1 Full-circle Bead Ring Type

With this type of bead-breaker, a bead removal ring sized to fit specific tire size is used to apply pressure as close to the bead as possible on the area directly above the bead (Fig. 5). The space or distance between the removal ring and the wheel flange should be approximately 10mm (Fig. 6). Furthermore, the range of motion of the removal ring towards the tire center should be greater than 150mm, and the removal ring should be constructed to allow observation of the tire bead during demounting. This may be achieved by designing "windows" in the removal ring (Fig. 7).

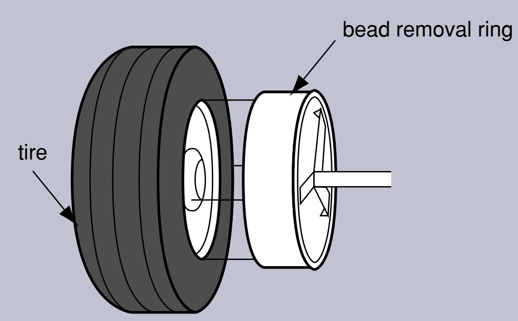


Fig. 5 Bead Removal Ring

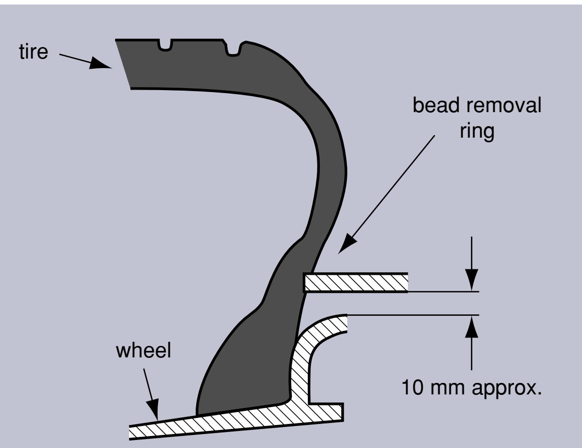


Fig. 6 Distance between Bead Removal Ring and Wheel Flanges

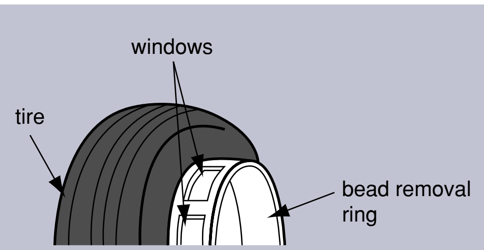


Fig. 7 "Windows" in Bead Removal Ring

B-2Conical Pressure Roller Bead-breaker (Fig. 8)

Bridgestone has found that this type of bead-breaker is most effective for radial aircraft tires. A conical roller is slightly forced against the lower sidewall immediately above the wheel flange as the tire is slowly rotated. This technique will result in the tire bead begin gradually moved away from the wheel flange after several revolutions with no damage to either the tire bead area or the wheel flange.

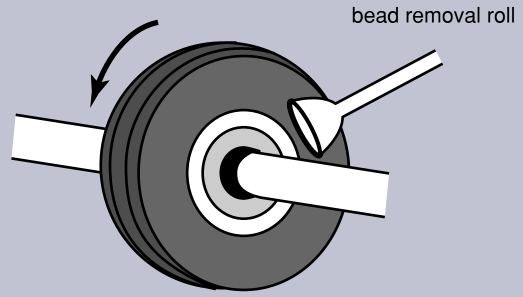


Fig. 8 Bead Removal Roll

C. Procedure for Demounting Using Full-circle Bead Rings

Roll the tire into bead-breaker press and position the removal ring so that it evenly contacts the entire circumference of the bead. More than one technique may be applied to ease the tire bead away from the wheel flange. The preferred method is to reduce the bead-breaker press speed to 5mm/second and press the tire bead continually until the bead is demounted. Using this method, the bead should separate smoothly from the wheel, often with the first application of force.

In the event that there may be concern about bead "Turn Over" (Fig. 9), an alternative method is recommended. Extend the bead ring laterally against the bead for a distance not exceeding 100mm, hold for two to three seconds, and retract the bead ring. Repeat this procedure until the bead is dismounted. The lateral speed of the bead ring should typically be about 30mm/second using this method.

The latter method should be used when the tire cannot be demounted using the first method, or when the bead-breaker press cannot be set for low speeds.

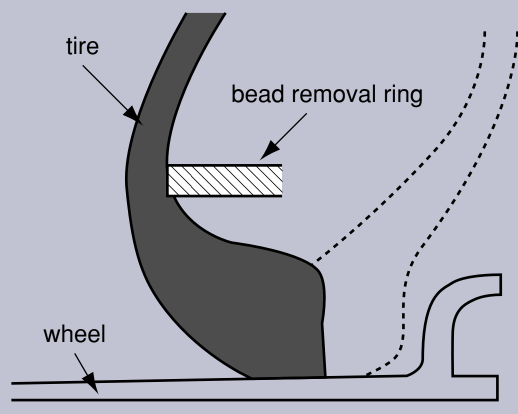


Fig. 9 "Turn Over" of Bead Area

D. Procedure for Demounting Using a Conical Pressure Roller

Mount the tire/wheel assembly in the bead-breaker press. Position the conical roller against the bead as close as to the top of the wheel flange. While rotating the tire/wheel assembly, slowly apply force against the bead with the roller.

As with the full-circle bead ring method, care must be taken to avoid excessive sidewall deformation that could result in bead "Turn Over". The stroke of the conical pressure roller should not exceed 100mm.

E. Recommended Demounting Procedure

Loosen the wheel tire bolts only after confirming that the tire beads have been completely released from the wheel. If the wheel tie bolts are loosened before the beads are completely released, the possibility exists that the wheel may be scratched or gouged.

After the tire bead is released from the wheel flange, insert a block of rubber or other material of appropriate size between the tire and the wheel flange to prevent the tire from returning to its original position. Inserting the block will facilitate the demounting process.

The use of water or a soap solution as a lubricant will facilitate demounting. Application of the water or soap solution while simultaneously applying pressure with the removal ring increases the effectiveness of the solution.