SERVICE BULLETIN

#110

TIRE INFLATION - NITROGEN

Nitrogen inflation in tires is gaining popularity in the light vehicle (passenger and light truck) market. Nitrogen inflation in tires is not new to the tire industry however, and has been used under severe service conditions such as in large off-road tires, aircraft tires (as fire prevention) and racing tires for many years. Nitrogen inflation does not harm tires nor does it affect the warranty.

One of the most important factors in tire care is maintaining proper inflation pressure. The proper tire inflation for a vehicle is specified by the vehicle manufacturer and can usually be found on the tire placard (or sticker) attached to the vehicle door edge, door post, glove box door or fuel door as well as the vehicle owner's manual. Proper tire inflation, whether nitrogen or normal air, helps tires wear longer, saves fuel and helps prevent accidents. Underinflation, regardless of the inflation gas, can make it harder to steer and stop your vehicle, result in loss of vehicle control, cause sudden tire destruction, and lead to serious injury or death.

Nitrogen inflation will not prevent damage or loss of inflation due to road hazards. Nitrogen inflation will also not prevent tire damage due to under inflation, overloading or off road service. Tire inflation should always be checked and adjusted to proper inflation pressure on a regular basis (at least monthly and before long trips), regardless of the inflation gas, to provide optimum tire performance.

SERVICE BULLETIN

Number 106

PROPER TIRE MOUNTING OF LOW ASPECT RATIO, HIGH PERFORMANCE PASSENGER AND LIGHT TRUCK TIRES

High performance tires are designed with stiff sidewalls for responsive handling. Because of stiff sidewalls, it is important to be sure the top bead is in the rim well area during mounting. Failure to follow these recommendations may make it appear to the tire service professional that a higher, and therefore unsafe, bead seating pressure is needed (see Warnings below).

⚠ WARNING

Excessive bead seat pressures (in excess of 40 psi) places extreme stresses on tire beads that are forced onto the rim flange in a distorted manner. Such stresses may cause damage to tire components and may result in tire failure.

⚠ WARNING

NEVER INFLATE BEYOND 40 POUNDS PRESSURE TO SEAT BEADS. NEVER STAND, LEAN, OR REACH OVER THE ASSEMBLY DURING INFLATION.

Inspect both sides of the tire to be sure that the beads are evenly seated. If tire is mounted on a machine that does not have a positive lock-down device to hold the wheel, inflation should be done in a safety cage or other restraining device. If both beads are not properly seated when pressure reaches 40 psi, completely deflate the assembly, reposition the tire and/or tube on the rim, relubricate, and reinflate. Inflating beyond 40 psi inflation pressure when trying to seat the beads is a DANGEROUS PRACTICE that may break a tire bead (or even the rim) with explosive force, possibly resulting in serious injury or death. After the beads are fully seated, pressure may be increased above 40 psi to operating pressures, not to exceed the maximum pressure molded on the tire sidewall.

Three main factors contribute to the possibility of damaging a bead during mounting or having difficulty in achieving proper bead seat. One factor is improperly installing the tire over the rim flanges. The second factor is that the tire and rim are not properly lubricated. The third factor is that the tire beads are not centered on the rim. This bulletin will focus on the second and third factors.

During the mounting process, never assume the bead is seated when it appears to have moved against the rim flange. Make sure that your service personnel are completely aware of the proper techniques for correctly seating a bead in the mounting process. Train your service personnel to strictly follow the RMA Demounting And Mounting Procedures For Passenger And Light Truck (LT) Tires wall chart.

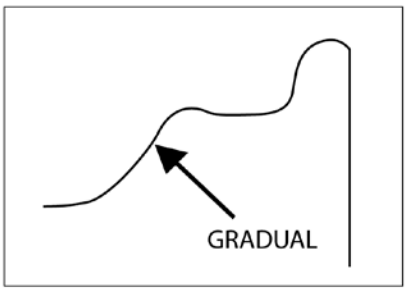
IMPORTANT

ALWAYS check the vehicle manufacturer's recommendations for the OE tire size, load range, load capacity, inflation pressure, and speed rating information before replacing a tire with a different size and construction. NEVER choose a smaller size, with less load carrying capacity than the specified size on the vehicle tire placard.

The following factors can make tire mounting more difficult:

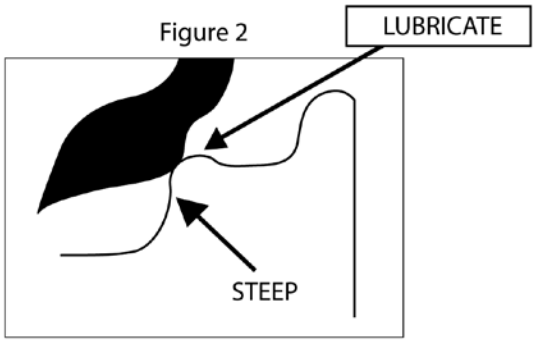
- Rim wells with steep transitions. See the comparison between Figs. 1 and 2 below.
- Variations in rim bead seat diameters
- Lack of lubricant or improper use of lubricant
- Stiffness of tire sidewall
- Short tire sidewall height (low aspect ratio)

Figure 1



Rim With Gradual Transition to Bead Seat

Figure 2



Rim With Steep Transition to Bead Seat

For complete tire demounting/mounting procedures, please see the RMA wall chart *Demounting and Mounting Procedures for Passenger and Light Truck Tires.* The information listed below addresses issues specific to mounting low aspect ratio tires and can be used in conjunction with the wall chart. Using the following steps and techniques will allow you to reduce the amount of time and effort required to achieve successful mounting of tires:

- **Only use equipment that is designed to accommodate low aspect ratio, high performance tires and wheels to mount tires.**

- **Automatic machines equipped with composite rollers and demount/mount heads, pressing arms and/or fitting heads, should be used to avoid any damage to the rim and tire bead. Plastic coated tire levers with rounded ends are strongly recommended.**

- **ALWAYS check the rim for potential problems.** Corroded or dirty rims should be cleaned thoroughly to ensure a clean bead seat area. Bent or cracked rims should be destroyed and replaced. Aluminum rims should be checked for corrosion and thoroughly cleaned to ensure proper inflation retention. This includes inspection and cleaning of the valve stem seating area (stem hole). **Failure to do so may result in rapid loss of inflation and possible tire failure.**

- **ALWAYS** remove and replace used snap-in valve stems. **NEVER REUSE SNAP-IN VALVE STEMS.** Only valve stems that are compatible with the rim being serviced should be used.

- **IMPORTANT:** In the case of tires/wheels equipped with Tire Pressure Monitoring System (TPMS) sensors, it is recommended to replace all components that are included in the TPMS valve replacement kit.

- **Use the proper non-petroleum lubricant (paste or liquid).** Follow the lubricant manufacturer's recommendations. Over-diluted mixtures will dry too fast, acting as if no lubricant was used. Under-diluted mixtures will not dry soon enough, which may permit rotation of the tire on the rim, thus contributing to balance variations and ride disturbances.

- **Apply lubricant properly.** Both tire beads and the rim must be lubricated. Bead lubrication of the tire must include application from each tire rim aligning ring to the bead toe. Rim lubrication must include the safety humps (1), the bead seating surfaces (2), and the top flange area (3) to allow for a smooth movement of the bead over the rim flange and complete seating of the bead against the rim flange. Lubricate the sides of rim drop well, rim flat area, and the tire rim aligning ring to the bead toe.

- Roll tire beads into the rim's "drop well" during the mounting process.

- After mounting but prior to inflation, rotate and center the tire on the rim.

- Match mount tire and rim; this may provide a more balanced assembly and reduce time required to reach the optimal balance.

- **NEVER inflate beyond 40 psi to seat beads** (see WARNING).

⚠ WARNING

NEVER INFLATE BEYOND 40 POUNDS PRESSURE TO SEAT BEADS. NEVER STAND, LEAN, OR REACH OVER THE ASSEMBLY DURING INFLATION.

Inspect both sides of the tire to be sure that the beads are evenly seated. If tire is mounted on a machine that does not have a positive lock-down device to hold the wheel, inflation should be done in a safety cage or other restraining device. If both beads are not properly seated when pressure reaches 40 psi, completely deflate the assembly, reposition the tire and/or tube on the rim, relubricate, and reinflate. Inflating beyond 40 psi inflation pressure when trying to seat the beads is a DANGEROUS PRACTICE that may break a tire bead (or even the rim) with explosive force, possibly resulting in serious injury or death. After the beads are fully seated, pressure may be increased above 40 psi to operating pressures, not to exceed the maximum pressure molded on the tire sidewall.

All of these steps may prevent the bottom bead from getting “hung up” on a steep rim taper (see figure 2).

ALWAYS check that the distance between the rim flange and the aligning ring (which is the rim protector on many low-aspect ratio tires) is uniform around the entire circumference on both sides of the tire. If so, the tire is properly seated. If not, completely deflate the tire/rim assembly, reposition, and repeat the procedure.

After both beads are properly seated, adjust inflation pressure to the vehicle manufacturer recommended inflation pressure as shown on the vehicle tire placard (or owner’s manual). In some cases, the vehicle placard inflation pressure may be different than the tire’s maximum inflation pressure as shown on the tire’s sidewall.

⚠ WARNING

TIRE CHANGING CAN BE DANGEROUS AND SHOULD BE DONE BY TRAINED PERSONNEL USING PROPER TOOLS AND PROCEDURES. ALWAYS READ AND UNDERSTAND ANY MANUFACTURER’S WARNING CONTAINED IN THEIR CUSTOMERS’ LITERATURE OR MOLDED INTO THE TIRE SIDEWALL.

Failure to comply with these procedures may result in faulty positioning of the tire and/or rim parts and cause the assembly to burst with explosive force, sufficient to cause serious physical injury or death. Never mount or use damaged tires or rims.

If you sell radial passenger or light truck tires to other dealers (sub-dealers) or fleet accounts, it is your responsibility to supply this Service Bulletin and related safety information. Each MUST receive a copy of this Service Bulletin. Please advise Cooper or your supplier of the number of Service Bulletins that are needed for your sub-dealers and we will provide them to you at no charge. You may order this Service Bulletin through the Consumer Relations Department, Cooper Tire & Rubber Company. To order copies of RMA’s DEMOUNTING AND MOUNTING PROCEDURES FOR PASSENGER AND LIGHT TRUCK (LT) TIRES, contact RMA.

SERVICE BULLETIN

No. 95

P-METRIC VS. EUROPEAN METRIC TIRE SIZE DESIGNATIONS

Two of the more common passenger tire size designation systems presently in use are the P-Metric and European Metric systems. The obvious difference in the size designation is the use of the prefix "P" for the P-metric size.

Example: P-metric designation - P195/70R14; Euro-metric designation - 195/70R14

The "P" indicates that the tire is designated as a passenger car size. The remaining characters in each of the referenced size designations are identical:

195 = Cross section width in millimeters

70 = Ratio of the section height to cross section width

R = Radial construction

14 = Rim diameter in inches

Standards for the P-metric system are developed and administered by the Tire and Rim Association Inc. (TRA) which has its headquarters in Copley, Ohio. This organization is composed primarily of domestic (U.S.) manufacturers of tires and rims. Standards for the European metric system are developed and administered by the European Tyre and Rim Technical Organisation (ETRTO) which has headquarters in Brussels, Belgium. As you would expect, this organization is composed primarily of European tire and rim manufacturers.

In comparing the standard tire dimensions, specifically design section width and design overall diameter (which relate to vehicle component clearance requirements), the P-metric and Euro-metric sizes are similar for the various tire sizes.

Continuing with our example, the following are design new tire dimensions:

Tire Size:	P195/70R14	195/70R14
Design Rim Width	6.00"	6.00"
Section Width	7.91"	7.91"
Overall Diameter	24.80"	24.80"

The most significant difference between systems involves variations in the load carrying capacity of correspondingly sized tires (P195/70R14 vs. 195/70R14). Generally, the maximum load carried by a P-metric size tire will be less than the correspondingly sized Euro-metric. This is the direct result of differences in the load formulas used by the respective TRA and ETRTO standardizing bodies.

In most instances, a Euro-metric size tire can be substituted for a corresponding P-metric size tire. This is because the tire dimensions are similar, and the Euro-metric has a greater load carrying capacity. These load capacity differences will be evident in the stamping information on the tire sidewall. The load capacity information stamped in the bead area, as well as the load index stamped on the sidewall near the tire size designation, will provide specific information between corresponding tire sizes.

Note the following example:

Tire Size:	P195/70R14	195/70R14
Design Inflation	240 kPa	250 kPa
Max. Load	1312 lbs.	1356 lbs.
Load Index	90	91

In determining a proper replacement tire for a passenger car, it is recommended that the RMA Replacement Guide for Passenger Car Tires be consulted. This guide will help you determine if a particular tire size can be substituted for another.

- Always refer to the vehicle owner's manual and vehicle tire information placard (located on the glove box door, door edge, or door post) for the correct tire size and inflation pressure.
- It is not always possible to select the same tire size for a replacement tire.
- **If a tire size, other than those shown on the vehicle tire information placard, is desired or used, remember that replacement tires must have:**

  1. **Adequate load-carrying capacity - equal to or greater than required on the vehicle tire information placard.**
  2. **Inflation pressure capability - equal to or greater than the operating pressure specified on the vehicle tire information placard.**
  3. **Sufficient tire/vehicle clearance.**

Again, it is recommended that you consult the RMA Replacement Guide for Passenger Car Tires to assist in determining and selecting the proper size replacement tire.