TIRE & RIM SERVICING INFORMATION

⚠ IMPORTANT SAFETY INSTRUCTIONS & WARNINGS ⚠

IMPORTANT: Make sure that everyone who services tires or vehicles at your facility reads and understands these warnings. ⚠ **WARNING! SERIOUS INJURY OR DEATH CAN RESULT FROM FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS & WARNINGS.**

PROPER INSPECTION

- **ALWAYS** inspect the rim and tires during service. No matter how well a tire is constructed, punctures, impact damage, improper inflation, improper maintenance or service factors may cause tire failure creating a risk of property damage and serious or fatal injury to you and/or your customer.
- **EDUCATE** your customers to examine their tires frequently for snags, bulges, excessive treadwear, separations or cuts. If such conditions appear, advise them to replace with their spare, and to see you immediately. If you spot any of the above conditions, bring them to the customer's attention immediately.

PROPER COMPONENTS

- **NEVER** use a damaged rim or tire, as the assembly can burst apart with explosive force. Any inflated tire mounted on a rim contains explosive energy. ⚠ **WARNING! IF YOU ARE STRUCK BY AN EXPLODING TIRE, RIM PART OR THE AIR BLAST, YOU CAN BE SERIOUSLY INJURED OR KILLED**.
- **NEVER** mount and/or inflate a tire on rims assembled from mismatched parts; ⚠ **WARNING! IT CAN EXPLODE AND CAUSE SERIOUS INJURY OR DEATH**. Before assembling a rim, make sure that all of the pieces belong together, and form a proper match.
- **NEVER** mismatch a tire with a different rim diameter; ⚠ **WARNING! IT CAN EXPLODE AND CAUSE SERIOUS INJURY OR DEATH**. This warning applies to any combination of mismatched components, such as mounting a 14" tire on a 14.5" wheel, or similar tire and rim combinations: 15" and 15.5", 16" and 16.5", 17" and 17.5", 18" and 18.5" or 19" and 19.5". NEVER assemble a tire and rim unless you have positively identified and correctly matched the parts. The RMA offers a Multipiece Rim Matching Chart, Publication # RMC 4/93. The chart may be ordered through their web site at www.rma.org.

PROPER INSTALLATION

- Tire and rim servicing can be dangerous and must be done only by trained personnel using approved procedures.

⚠ **WARNING! FAILURE TO FOLLOW PROPER PROCEDURES MAY RESULT IN SERIOUS INJURY OR DEATH TO YOU OR OTHERS**.

- **DO NOT** re-inflate any type of tire and rim assembly that has been operated in a run-flat or underinflated condition (i.e., 80% or less of recommended operating pressure). The tire may be damaged on the inside and can explode while you are adding air, or the rim parts may be worn, damaged or dislodged and can explosively separate. ⚠ **WARNING! THE RESULTING EXPLOSION CAN CAUSE SERIOUS INJURY OR DEATH**. Refer to RMA Tire Information Service Bulletin on potential "zipper ruptures" (TISB 33 number 2). Bulletins may be ordered from the RMA at www.rma.org.
- **NEVER** use starting fluid, ether, gasoline or any other flammable material to lubricate, seal or seat the beads of a tubeless tire; ⚠ **WARNING! IT CAN CAUSE THE TIRE TO EXPLODE OR CAUSE THE EXPLOSIVE SEPARATION OF THE TIRE/RIM ASSEMBLY AND CAUSE SERIOUS INJURY OR DEATH**.
- **NEVER** attempt to dismount the tire while the assembly is still installed on the vehicle. Use proper tools to demount or mount rim parts. **NEVER** use a steel hammer to seat rim parts; use only rubber, plastic, or brass tipped mallets. Striking a wheel/rim assembly with a hammer of any type can damage the tire or wheel and endanger the installer. Use a steel duck-billed hammer only as a wedge. Do not strike the head of a hammer with another hard-faced hammer; use a rim mallet.

PROPER LUBRICANTS

- **ALWAYS** use a fresh supply of tire lubricant each day, drawing from a clean supply and placing the lubricant in a clean portable container. **ALWAYS** make sure that the tire lubricant is clean and free of dirt, sand, metal shavings or other hard particles.
- Provide a cover for the portable container and /or other means to prevent contamination of the lubricant when not in use. For lubricants in solution, use a cover with a funnel-like device attached; it is a proven method for minimizing contamination and preventing excess lubricant from entering the tire casing. The small opening of the funnel should be sized so that when a swab is inserted through the opening into the reserve of lubricant and then withdrawn, the swab is compressed, removing excess lubricant. This allows the cover to be left in place, providing added protection. A mesh false bottom in the container is a further safeguard against contaminants. The tire should be mounted and inflated promptly before the lubricant dries.

GENERAL INSTRUCTIONS FOR TUBELESS TIRE MOUNTING/DEMOUNTING

The following are general instructions for mounting and demounting tires. For detailed instructions on mounting and demounting tires on particular types of rims and wheels, refer to the rim or wheel manufacturer's instructions, or the Multipiece Rim Matching Chart, Publication # RMC 4/93.

TUBELESS TIRES

Selecting Proper Components and Materials:

a. Tires must always be mounted on the rim/wheel having the correct dimensions as specified in the data books-such as The Tire and Rim Association Year Book.

b. Always install new valve cores, and metal valve caps containing plastic or rubber seals.

d. Always replace the rubber valve stem when mounting a tire on a 16" through 19.5" size wheel.

e. Always use a safety device such as an OSHA approved inflation cage or other restraining device that will contain all rim/wheel components in the event of an explosive separation of a multi-piece rim/wheel, or during the sudden release of air from a single piece wheel. Never stand over a tire or in front of a tire when inflating. Always use a clip-on valve chuck and stand to the side when inflating.

Tire and Rim Lubrication:

An approved tire mounting lubricant should always be used when mounting a tire. Preferred lubricants include vegetable oil soaps or animal soaps solution. Never use antifreeze, silicones, or petroleum-base lubricants. Improper ratios of approved lubricants and water may have a harmful effect on the tire and wheel.
The lubricant serves the following three purposes:

- Minimizes the possibility of damage to the tire beads from the mounting tools.
- Eases the insertion of the tire onto the rim by lubricating all contacting surfaces.
- Assists proper bead seating (tire/rim centering) and helps to prevent eccentric mountings.

Avoid using excessive amounts of lubricant, which can become trapped between the tire and tube and can result in tube damage and rapid air loss.

Preparation of Wheels, Rims and Tires:

Never weld or apply heat to a rim or wheel on which a tire is mounted.

a. Always wear safety goggles or face shields when buffing or grinding rim or wheels.

b. Inspect wheel/rim assemblies for cracks, distortion, and deformation of flanges. Using a file and /or emery cloth, smooth all burrs, welds, dents, etc. that are present on the tire side of the rim. Inspect the condition of bolt holes on the wheels.

c. Remove rust with a wire brush and apply a rust inhibiting paint on steel wheels.

d. Remove any accumulation of rubber or grease, which might be stuck to the tire, being careful not to damage it. Wipe the beads down with a dry rag.

Demounting the Tubeless Tire:

a. Before loosening any nuts, deflate the tire by removing the valve core.

b. With the tire assembly lying flat, break the bead seat of both beads with a bead-breaking tool. Do not use hammers of any type. Striking a wheel/rim assembly with a hammer of any type can damage the tire or wheel and endanger the installer. Use a steel duck-billed hammer only as a wedge. Do not strike the head of a hammer with another hard-faced hammer – use a rim mallet.

c. Apply the lubricant to all surfaces of the bead area of the tire. When applying lubricant to the rim, lubricate the entire rim surface from flange to flange. The tire should be mounted and inflated promptly before the lubricant dries.

d. Beginning at the valve, remove the tire using tire irons designed for this purpose. Starting at the valve will minimize chances of damaging the bead. Make certain that the flange with the tapered ledge that has the shortest span to the drop center is facing up. Always attempt to keep the bead not being worked by the irons, in the full depth of the drop center cavity.

Mounting the Tubesless Tire:

a. Inspect the condition of the bolt holes on the wheels; discard any wheels with cracks, excessively worn mating surfaces and/or worn or "wallowed" stud holes. Check flanges of aluminum wheels for excessive wear by using the wheel manufacturer's flange wear indicator.

b. Replace valve seals and inspect valve stem for damage and wear. Replace valve stem if necessary.

c. Apply lubricant according to previous instructions. The tire should be mounted and inflated promptly before the lubricant dries.

d. With the short ledge up, lay the tire over the rim at the valve side and work it on with proper tubeless tire tools, making full use of the drop center well. The 19.5-inch tire should be mounted from the short side. Care should be taken to insure any internal monitoring system (e.g. tire pressure monitoring system) is not damaged or dislodged during this service.

e. Do not use any kind of hammer. Bead damage may occur leading to tire destruction.

Inflating the Tubeless Tire:

a. Lay tire/wheel assembly horizontally and inflate to no more than 5 psi to position the beads on the flanges.

b. To complete the seating of the beads, place the assembly in an approved safety cage and inflate to 20 psi. Check the assembly carefully for any signs of distortion or irregularities from run flat. If run flat is detected, scrap the tire.

c. If no damage is detected, continue to inflate to the maximum air pressure marked on the sidewall. RMA recommends that a tire suspected of being under-inflated be over-inflated by 20 psi and remain in the cage for 20 minutes prior to handling.

d. Insure that the guide rib is positioned concentric in relation to the rim flange with no greater than 2/32" of difference found circumferentially. If bead(s) did not seat, deflate tire, re-lubricate the bead seats and re-inflate.

e. After beads are properly seated, adjust tire pressure to recommended operating pressure. Check valve core for leakage, then install a metal or quality "air-through" type cap.

f. Never inflate or re-inflate any tires known or suspected to have been operated at or less than 80% of the vehicle or tire manufacturer's recommended normal operating inflation pressure.

TUBE-TYPE TIRES

Selecting Proper Components and Materials:

a. All tires must be mounted with the tube and flap that is properly matched to the rim or wheel.

b. Make certain that rim/wheel components are properly matched and of the correct dimensions for the tire.

c. Always fit a new tube in a new mounting. Since a tube will exhibit growth in size through normal use, an old tube used in new mounting increases the possibility of tube creasing and chafing, possibly resulting in failure.

d. Always use tubes designed for radial tires with radial tires.

e. Always install a new flap in a new mounting. A flap, through extended use, becomes hard and brittle. After a limited time, it will develop a set to match the tire and rim in which it is fitted. Therefore, it will not exactly match a new tire/rim combination.

f. Always install new valve cores, and metal valve caps containing plastic or rubber seals. For tires requiring 'O' Rings, be sure to properly install a new silicone 'O' Ring at every tire change.

g. Always use a safety device such as an OSHA approved inflation cage or other restraining device that will contain all rim/wheel components in the event of an explosive separation of a multi-piece rim/wheel, or during the sudden release of air from a single piece wheel. Never stand over a tire or in front of a tire when inflating. Always use a clip on valve chuck and stand to the side when inflating.

⚠ **WARNING! Make sure the interior of the tire is perfectly dry prior to inserting the tube. Failure to observe this rule may cause moisture permeation through the tire's casing, which can result in premature casing and tire failure!**

Tire and Rim Lubrication:

An approved tire mounting lubricant should always be used when mounting a tire. Preferred lubricants include vegetable oil soaps or animal soaps solution. Never use antifreeze, silicones, or petroleum-base lubricants. Improper ratios of approved lubricants and water may have a harmful effect on the tire and wheel.
The lubricant serves the following three purposes:

- Minimizes the possibility of damage to the tire beads form the mounting tools.
- Eases the insertion of the tire onto the rim by lubricating all contacting surfaces.
- Assists proper bead seating (tire/rim centering) and helps to prevent eccentric mountings.

Apply a clean lubricant to all portions of the tire bead area and the exposed portion of the flap using sufficient but sparing quantities of lubricant. Also lubricate the entire rim surface. Avoid using excessive amounts of lubricant, which can become trapped between the tire and tube, which can cause tube damage and rapid air loss.

Preparation of Wheels, Rims and Tires:
Never weld or apply heat to a rim or wheel on which a tire is mounted.

a. Always wear safety goggle or face shield when buffing or grinding rims or wheels.
b. Inspect wheel/rim assemblies for cracks, distortion, deformation of flanges, side rings, lock rings, etc. Using a file and/or emery cloth, smooth all burrs, welds, dents, etc. that are present on the tire side of the rim. Inspect the condition of bolt holes on the wheels.
c. Remove rust with a wire brush and apply a rust inhibiting paint.
d. Remove any accumulation of rubber or grease that might be stuck to the tire, being careful not to damage it. Wipe the beads down with a dry rag.

Demounting the Tube-type Tire:

a. If a tire has been running under inflated or if any damage to the tire or wheel is suspected, the valve core should be removed prior to removing the tire/wheel assembly from the vehicle axle. This is to prevent a possible accident.
b. Before unlocking any side ring or lock ring, remove the valve core and allow the tire to deflate completely.
c. Remove all rim or wheel parts.

Mounting the Tube-type Tire:

a. Insert the proper size tube into the tire and partially inflate (3 psi) to round out the tube (with larger sizes it may be necessary to use bead spreaders-see below for mounting instructions).
b. Insert the valve through the flap valve hole. Then insert the remainder of the flap into the tire.
c. Check the flap wings to ensure against folding. This is easily accomplished by placing your hand into one tire side, then the other, and then running your hand along the entire flap wing.
d. Inflate the tube until the flap is secured against the tire wall and the beads start to spread apart, making sure not to exceed 3 psi.
e. Apply a proper tire lubricant to both beads and the exposed flap. Make sure that excess lubricant does not run down into the tire.
f. Place tire, tube and flap on the wheel or rim, taking care to center the valve in the slot.
g. Fit side ring and lock ring, ensuring that they are properly positioned, locked, and are correct for the 'fitment.'

Mounting the Tube-type Tire Using Manual Spreaders:

a. Follow Steps A through C of the "Mounting of Tube-Type Tires." However, before inserting the flap into the tire, position two bead spreaders in the following manner:
    1. Place the first at a 90-degree angle to the valve. (Flap is positioned between the spreader and the tube).
    2. Place the second directly opposite the first.
    3. Spread the beads and insert the flap.
    4. Close the beads, remove spreaders.
b. Follow Step d through g of the "Mounting the Tube-Type Tires" section.

Mounting of Tube-type Tires Using Automatic Spreaders:

a. Spread the tire beads.
b. Inflate the tube to approximately 3 psi.
c. Insert the tube into the tire. Apply a proper tire lubricant to the inside and outside surfaces of both beads and to the portion of the tube that appears between the beads. Make sure that excess lubricant does not run down into the tire.
d. Insert the valve through the flap valve hole. Insert the remainder of the flap into the tire.
e. Close the beads.
f. Follow Steps 4 through 7 of the "Mounting of Tube-Type Tires."

INFLATION OF TUBE-TYPE TIRES:

a. An air line with an extension (30" minimum), in-line gauge, and a clip-on valve chuck should be used for inflation. Remove valve core and lay the assembly flat on the ground. Using an approved restraining device, inflate partially to seat beads. While the tire is still in the restraining device, make sure all rim components are centered and locked properly. If not, the tire must be deflated, broken down, re-lubricated and re-inflated. Do not attempt to seat the lock ring by means of a hammer.
b. Deflate the tire by removing the air line. This is to allow the tube to relax, thus, eliminating any wrinkles or uneven stretching that may have occurred during primary inflation.

c. Install the valve core and, using a safety cage or other approved restraining device meeting OSHA standards, re-inflate the tire to the pressure shown on the sidewall in order to ensure proper bead seating. Then adjust the tire to the proper operating pressure. Never stand over a tire or in front of a tire when inflating. Always use a clip-on valve chuck and stand to the side when inflating.

d. Re-inspect the assembly for proper positioning of all components.

e. Check for leaks and install a suitable valve cap.

f. Do not re-inflate any tires that have been run under-inflated or flat without careful inspection for damage. If runflat damage is detected, scrap the tire. A tire is considered runflat when it is found to be 80% below recommended operating pressure.

SAFETY WARNINGS

SAFETY WARNING FOR MOUNTING
15.5" DIAMETER RIMS AND TIRES

Certain Isuzu, Chevrolet, and General Motors light commercial trucks (11,050 lbs. Gross Vehicle Weight) are being imported into North America with 15.5" diameter rims and tires on the rear axle. This is a unique rim and tire size for which no North American produced replacement tire sizes are currently available. Toyo does not produce 15.5" tires, but is concerned that its 15" tires could be misapplied.

A MISMATCH OF TIRE SIZE AND RIM SIZE MAY RESULT IN TIRE FAILURE AND SERIOUS OR FATAL INJURY. ANY ATTEMPT TO MOUNT A 15" OR 16" BEAD DIAMETER TIRE ON A 15.5" DIAMETER RIM OR A 15.5" BEAD DIAMETER TIRE ON A 15" OR 16" DIAMETER RIM WOULD BE A MISMATCH.

WARNING
EXCESSIVE SPEED IS DANGEROUS

Although a tire may be speed rated, we do not endorse the operation of any vehicle in an unsafe or unlawful manner. Speed ratings are based on laboratory tests which relate to performance on the road, but are not applicable if tires are underinflated, overloaded, worn out, retreaded, damaged, or altered. Furthermore, tire speed ratings do not imply that vehicles can be safely driven at the maximum speed for which the tire is rated, particularly under adverse road and weather conditions or if the vehicle has unusual characteristics.

OPERATION OF VEHICLES AT EXCESSIVE SPEEDS FOR OPERATING CONDITIONS MAY RESULT IN AN ACCIDENT AND DEATH OR INJURY.

WARNING
UNDERINFLATION IS DANGEROUS

FAILURE TO MAINTAIN RECOMMENDED AIR PRESSURES MAY RESULT IN TIRE FAILURE AND POSSIBLE ACCIDENTAL DEATH OR INJURY.