

Hutchinson Wheel, VFI Runflat & Tire

User Manual Assembly/Disassembly Instructions

We make it **possible**

All Military
Inner Wheel Mount

Rev 1.0
Date 2013-12-06



▶ 460 Southard Street Trenton, NJ 08638 t: 609-394-1010 f: 609-394-2031 web: www.hutchinsoninc.com

Purpose & Table of contents

This manual provides instructions for applicable field service procedures of **Hutchinson 2-piece Wheel – Mobility Insert – and Tire.**

Inserts are also referred to as Enhanced Mobility Devices (EMD). These will typically consist of either a model VFI® runflat or a model BL beadlock.

WARNING: Tire and EMD are brand and size specific for this application. If a different tire brand or size is used, then a different EMD may be required. Failure to match the components can result in damage to components and possible loss of vehicle control.

▶ Quick reference & Preparation

- Wheel Assembly Specifications
- Rim Specifications
- List of Tools
- Assembly preparation

▶ EMD & Tire preparation

- Tire lubrication
- EMD Insertion

▶ Wheel assembly preparation

- Inner rim sub-assembly
- Inner rim to Outer rim assembly
- Tire inflation
- Balancing (if applicable)

▶ Disassembly & parts replacement

- Outer rim half removal
- Inner rim half removal
- EMD removal from tire
- Replacement – o-ring
- Replacement – assembly studs

▶ Maintenance & Operation (wheel)

- Operating conditions & storage requirements
- Maintenance requirements
- Parts replacement criteria

▶ Maintenance & Operation (EMD)

- Operating conditions & storage requirements
- Maintenance requirements
- Parts replacement criteria

▶ Terms and Definitions

▶ Tire selection notice

Quick Reference & Preparation

List of Tools

Tools that are essential for the assembly of this wheel, VFI[®] and tire:

- ▶ Torque Wrench, foot-pound increments (up to 350 ft-lb)
- ▶ Torque Wrench, inch-pound increments (up to 200 in-lb)
- ▶ US & Metric deep wall sockets
- ▶ 3/4" Deep Impact Socket (for assembly nuts)
- ▶ 1/2" Drive Wrench
- ▶ Tire Spoon (Tire Iron)
- ▶ Cleaning rags
- ▶ Bead lubricant (Tigre[®] grease / tire soap)
- ▶ 3lb. Rubber mallet
- ▶ Slide hammer (optional)
- ▶ Valve core remover
- ▶ Tire pressure gauge
- ▶ Valve stem installation tool
- ▶ Slotted (flat) tip screwdriver 7/16" wide blade

Assembly Preparation

IMPORTANT: Federal OSHA (Occupational safety & Health Administration) regulations require all employers to ensure that their employees who service rims/wheels understand the safety information contained in this manual. Do not permit your employees to service rims/wheels unless they are thoroughly trained and completely understand all related safety information.

WARNING: Serious injury or death may result from using damaged or worn parts. These parts may fail during inflation, later during handling, or while in service on the vehicle.

WARNING: Dirt or corrosion can prevent rim components from seating properly or cause a bead hang-up (tire bead not seated properly). Assembling such components can lead to explosive separation, resulting in serious injury or death.

WARNING: Failure to properly match tire and rim/ wheel sizes may result in serious injury or death. Mounting a smaller diameter tire on a larger rim diameter rim/wheel (for example, mounting a 16" tire on a 16.5" rim/wheel) can cause the bead to fail during mounting or when inflating the tire. The tire may then rupture during inflation or when placed in service on a vehicle. The resulting tire blowout can result in flying debris or cause loss of control of a moving vehicle. Be sure the diameter shown on the tire exactly matches the diameter stamped on the rim/wheel.

WARNING: Improperly applied or excess paint can cause unexpected wheel failure that could result in serious injury or death. Excess paint could cause wheel assembly nuts to loosen, resulting in a wheel failure and sudden loss of air pressure that could cause loss of control of a moving vehicle.

WARNING: Deflate tire before loosening assembly nuts. Disassembly of an inflated wheel may cause serious injury or death.

WARNING: Use an OSHA approved tire safety cage when inflating a tire.

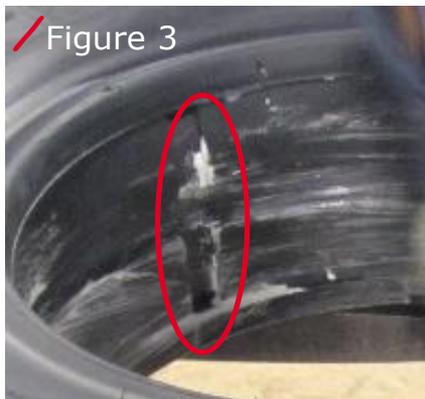
Wheel Assembly preparation

Assembly: Creating Inner Rim Sub-assembly

1. Lubricate the inner edge of the EMD and tire beads with tire soap to ease assembly onto the rim (Fig. 1).



3. Center the air passage groove of the EMD with the CTIS and/or fill valve hole on the inner rim (Fig. 3&4).



- ▶ Tools required:
 - Tigre® grease / soapy water
 - 3lb rubber mallet
- ▶ Materials and components:
 - Inner rim
 - Tire/EMD subassembly

2. Assemble the tire/EMD assembly to the Inner Rim by inverting the wheel and placing it through the center hole of the tire (Fig. 2).



4. Installing by hand, press firmly to ensure a snug fit to reduce the possibility of the section dropping out when picking up the inner rim subassembly

CAUTION: Be sure to hold the wheel securely while intersecting into tire or it may slip out and cause injury.

Assembly:

Creating Inner Rim Sub-assembly – o-ring

1. Turn the subassembly back over to insert the o-ring. Ensure both the O-ring and O-ring groove are clean and free of foreign debris.
2. Lay the O-ring over its groove. Press the o-ring in in various spots (Fig. 1 in green); do NOT roll the o-ring circumferentially in (Fig. 1 in red).

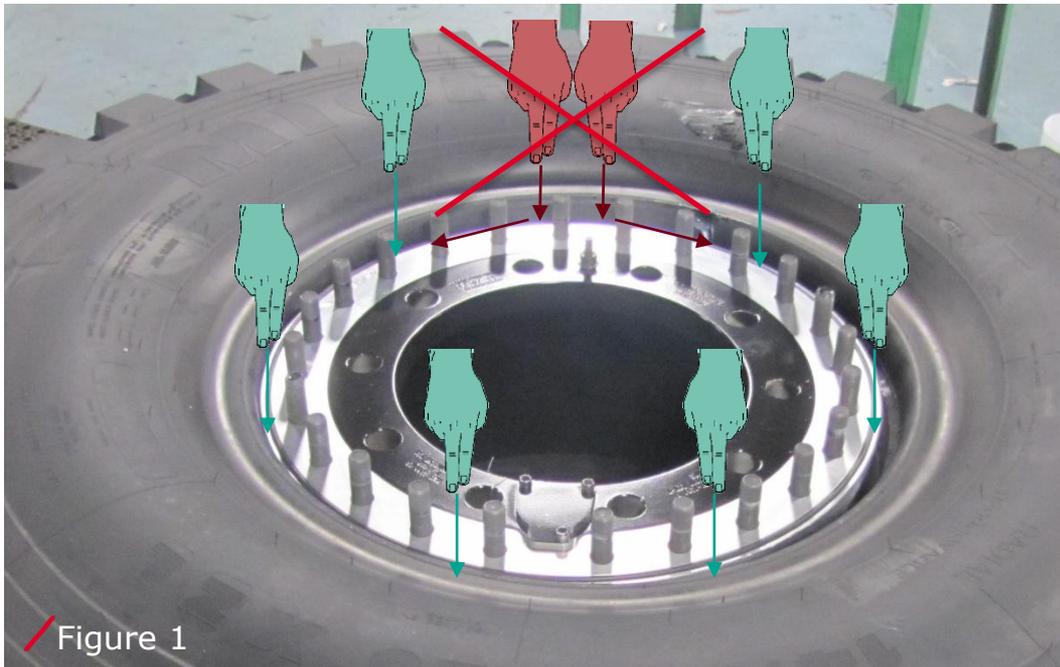
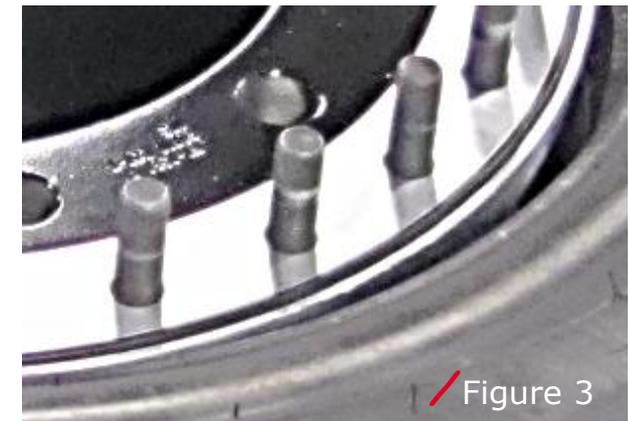
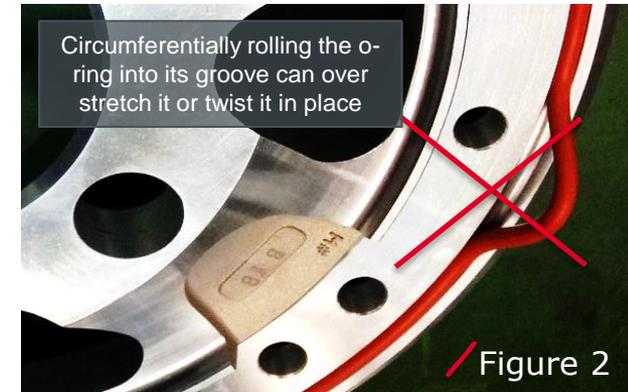


Figure 1

Materials and components:

- Inner rim
- O-ring
- Tactical™ Tire



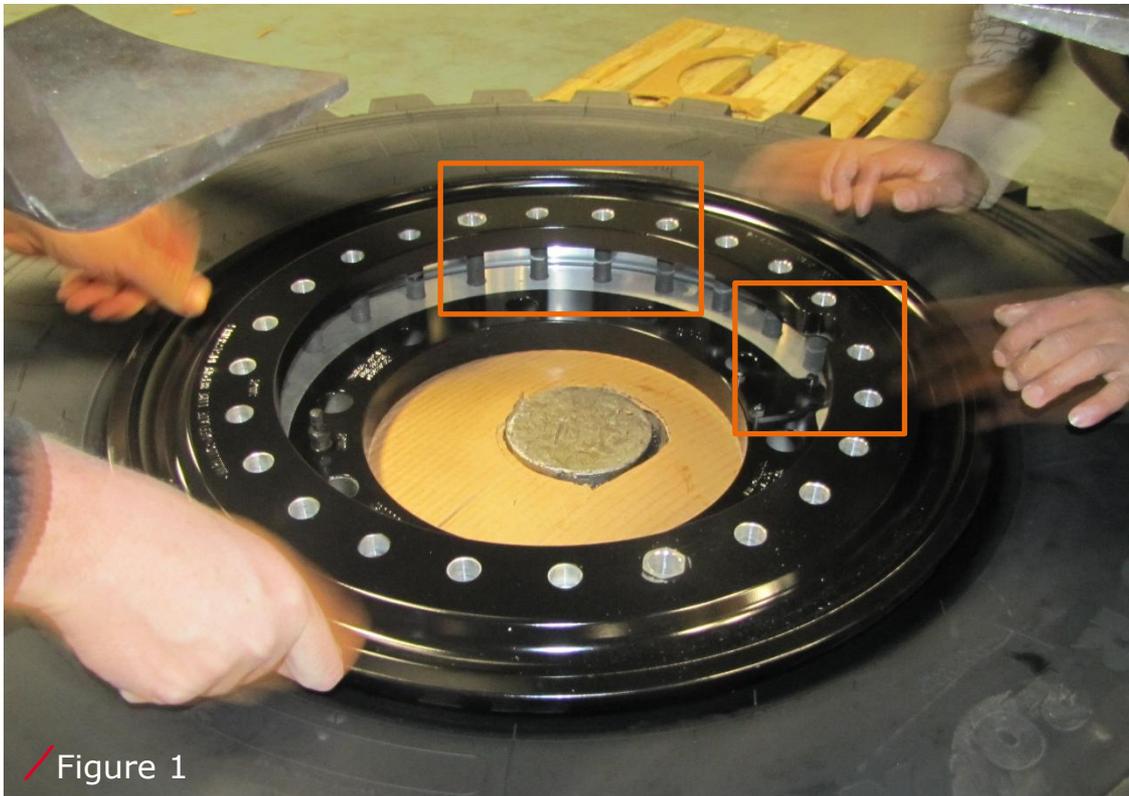
The O-ring should remain firmly in place during assembly to the outer rim.

CAUTION: Failure to keep O-rings and grooves clean and free of all foreign objects may result in air leakage from a poor seal.

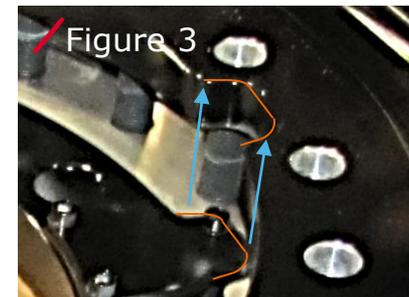
Assembly:

Inner Rim Sub-assembly to Outer Rim

1. Place the Inner Rim Sub-assembly onto a non-abrasive surface with studs facing up.
2. Place the Outer Rim Sub-assembly over top of the Inner Rim Sub-assembly (Fig. 1) and align protruding studs with holes in outer rim (Fig. 2).



- ▶ Tools required:
 - ½" Drive wrench
 - ½" Drive air wrench (optional)
 - Metric deep wall sockets
 - Torque wrenches (foot-pound)
 - 3lb. Rubber mallet
 - Tigre® grease/bead lubricant/soap
 - Tire pressure gauge
- ▶ Materials and components:
 - Inner Rim Subassembly
 - Outer Rim
 - Wheel assembly nuts



If applicable:
Align CTIS feature in inner rim with cutout in outer rim.
Alternate:
Align manual assembly holes.

Assembly:

Inner Rim Sub-assembly to Outer Rim – vertical press

- Using a vertical press (Fig. 1), press inner rim valves together. Use a non abrasive plate to prevent rim damage (Fig. 2).



Figure 2



Figure 1

- Using a star pattern, tighten the assembly nuts bringing the rim halves together (Fig. 3). Ensure the assembly does not have any obvious distortion or misalignment that may create a problem during inflation. *If using 2-piece nuts, both hex portions should be aligned.*
- Using a circular pattern (e.g. clock-wise), torque nuts to their final value with a calibrated wrench.

CAUTION: Both specified torque patterns are important. Improper sealing, damage to components or nuts missed during the star pattern may result, if not followed.

- If applicable, assemble CTI valve/plug onto inner rim with screws, using thread locker.*

=> Refer to Wheel Assembly/Rim Specifications for torques.

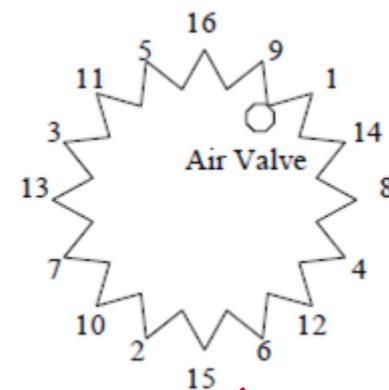


Figure 3

Tire inflation

1. Place the tire assembly into an OSHA* approved tire inflation safety cage and inflate to approximately 2 bar [30 PSI] (Fig. 1).
2. Check the tire bead seating.
 - A. Visually check the space between the rim flange and the tire while the tire is lying flat.
 - B. If spacing is uneven from side to side, deflate the tire.
 - C. Visually check the GG** Groove to ensure proper seating of tire on the rim.
3. If any of these conditions exist, disassemble and restart by examining the O-ring; replace if necessary.
4. If no problems are noted, continue to inflate the tire in the OSHA safety cage. Inspect for air leaks spraying soapy water.
=> Refer to Wheel Assembly Specifications for inflation pressure.
5. Verify if the assembly is leak proof by placing the wheel in a water tank or let sit for 48 hours. If the air loss leakage rate is less than 1 psi in 48 hours, the wheel, tire and EMD assembly is acceptable for use.

Note: Large variations in ambient temperature may influence the results. A temperature change of 5degC [10 F] will cause a pressure change of approx. 7kPa [1 PSI]. In order to assure that the product is not leaking, it is better to compare the results between assemblies.

* OSHA – Occupational Safety & Health Administration

** GG Groove – Line on a tire to ensure proper tire bead seating on a rim

WARNING: Inflating a tire with a hand held air chuck is dangerous. Use an OSHA approved tire inflation safety cage.



Figure 1

Disassembly & parts replacement

Disassembly Outer Rim from Tire

WARNING: Deflate tire before loosening assembly nuts. Disassembly of an inflated wheel may cause serious injury or death.

- ▶ Tools required:
- Valve core remover
 - Torque Wrench (foot-pound)
 - Slide hammer (optional)
 - Slotted (flat) tip screwdriver 7/16" wide blade
 - Tire Iron (Tire spoon)
 - Tigre® grease / soapy water

1. Prior to disassembly, remove air valve core. Run a fine wire into the valve to ensure air passage is not blocked (Fig. 1).



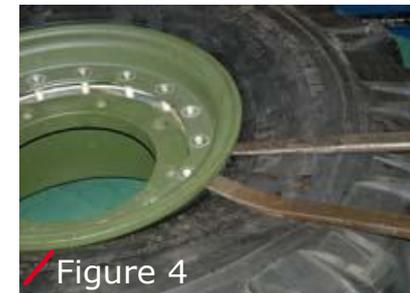
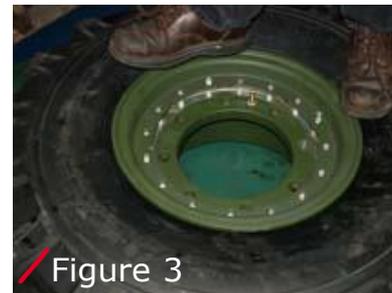
2. Remove all balance weights from wheel flange or rim.

3. Lay the wheel assembly face up on a horizontal surface with assembly nuts facing upwards.

4. Keep four assembly nuts secure (equally spaced) while gradually loosening the remaining nuts using the star pattern.



5. Apply tire soap to the edge of flange. Press down to pry bead away from flange.
6. Pry the edge of the outer rim away from the tire bead using a slide hammer or tire iron.



- ▶ Use the tire spoon between flange and tire, pull tire spoon down approximately horizontal to the floor to lift the wheel flange up.
- ▶ Place the screw driver between the flange and tire, push up. Blade of screwdriver will push tire down and off of the tapered bead seat.
- ▶ Work your way around the assembly with the tire spoon and screwdriver at intervals of 45 degrees. Outer will be removed after working once around.

Disassembly: Inner Rim from Tire

1. Flip the assembled components over and apply Tigre® grease / soapy water to the Inner rim flange. Press down to break bead loose from flange. (Fig. 1).



2. Pry the inner wheel half from the tire bead, following the same procedure as for outer rim-half



- Tools required:
- Slide hammer (optional)
 - Slotted (flat) tip screwdriver 7/16" wide blade
 - Tire Iron (Tire spoon)
 - Tigre® grease / soapy water

3. Remove the Inner Rim half from the tire and inspect for worn or damaged components and replace as needed.
4. Set the rim halves aside to make room for the removal of the insert from the tire. Ensure mating surfaces are face up or fitted together to avoid scratching.

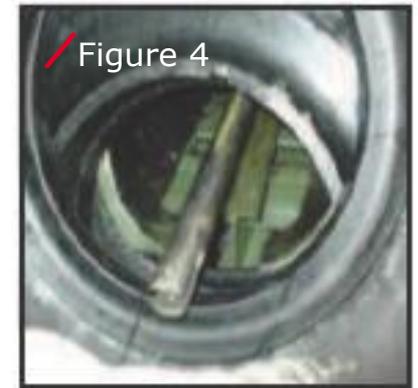
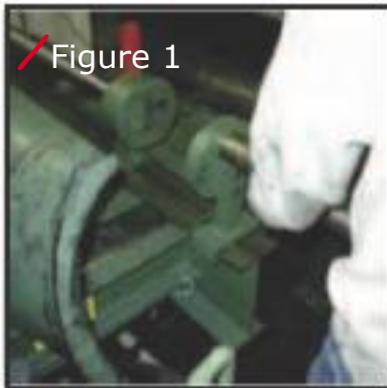


* An alternative method for unseating the tire beads from the rim can be done using a slide hammer. Apply tire soap around tire beads and rim flanges. Push tool between tire and rim flanges, lift the cylinder on the slide hammer and hammer down with impact to separate tire bead from wheel flange. Continue to unseat bead 360 degrees around the tire. This method will only work if wheel is spaced up from the floor.

Disassembly: VFI® Runflat from Tire

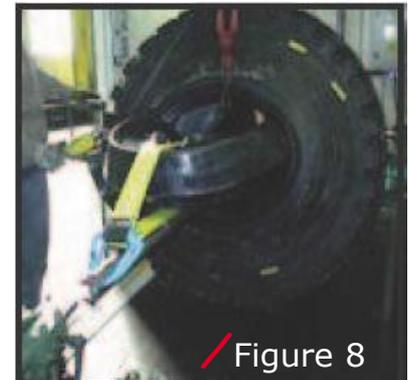
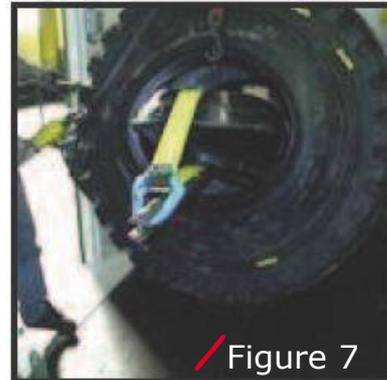
1. Remove “pusher ram” from horizontal press (Fig. 1).
2. Install “removal shaft” in place of the “pusher ram” (Fig. 2).
3. With the wheel now removed from the tire assembly, pick up tire assembly with overhead hoist. Carry to horizontal press (Fig. 3).
4. Slide tire assembly around removal shaft and mount on horizontal press jaws (Fig. 4).
5. Expand hydraulic jaws enough to elongate inside tire bead without tearing tire or bead. The force from the expanded jaws should suspend the tire, making the overhead hoist not essential.

- ▶ Tools required:
- Horizontal Press BM083
 - Overhead Hoist with special Tire Hooks
 - Removal Straps
 - Standard automotive technicians tool kit which include:
 - 1/2” drive air wrench
 - 1/2” drive ratchet wrench
 - Metric and U.S. deep well impact sockets
 - Tigre® grease or soapy water
 - Tire Spoons
 - Clean Rags



Disassembly: VFI® Runflat from Tire (Cont'ed)

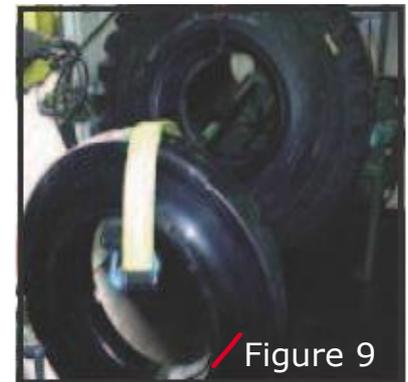
6. Wrap removal straps around top portion of the Runflat and secure with pin to the removal shaft (Fig. 5).
7. Apply Tigre® grease sparingly to both the tire and Runflat at the contact area (Fig. 6).
8. Stand aside and operate hydraulic ram, pulling Runflat out of tire carefully (Fig. 7&8).



9. If the Runflat has stopped moving forward, apply small amounts of hydraulic pressure to continue the forward movement pulling out the VFI Runflat.

WARNING: Do Not stand in front of Tire/Runflat Assembly during the extraction process. Physical harm could result if hit by the Runflat popping out of the tire.

10. The Runflat should shortly come out of the tire and rest on the removal shaft (Fig. 9).
11. Inspect the Runflat for signs of damage or wear. Repair or replace as needed.



WARNING: Do not extract too fast to cause runflat to tear.

Replacement: Inflation Valve

1. Manual fill valve will be installed on the front of the outer wheel half. Prior to assembling the valve, apply Loctite (Figure 1).
2. *(if applicable)* Apply the color indicator washer that matches the TPMS air sensor color to the tank valve.

- ▶ Tools required:
 - Torque wrench (in-lb)
 - Deep socket (14 mm)
- ▶ Materials required:
 - Wheel assembly
 - Valve, tank
 - Thread sealant (Loctite)

Terms and Definitions

□ **Beadlock** — Bead retention device that secures the tire beads to the flanges on a rim- enabling the driver to regulate the air pressure desired- pertaining to the driving conditions.

CTIS (Central Tire Inflation System) — Tire inflation controls that are centrally located and can regulate tire air pressure from inside the vehicle.

Enhanced Mobility Device (EMD) — Used interchangeably with Beadlock or VFI®.

GG-Groove — Line on a tire to ensure proper tire bead seating on a rim.

OSHA — Occupational Safety & Health Administration. This organization oversees that companies comply with safety standards to protect employees/ and rights to a safe and healthy working environment.

Tire Pressure Monitoring System (TPMS) — An air pressure monitoring device used to advise the driver of the air pressure in all tire locations.

Variable Functional Insert (VFI) — Runflat device-this enhanced mobility device is designed to support a vehicle with zero tire pressure for pre-determined distance and speed.

□ NOTICE: Concerning tire selection for Hutchinson Wheels

Hutchinson does **NOT** select or recommend specific tires. The selection of the internal beadlock in Hutchinson wheels, is based solely on the bead thickness of customer's tire. It is the customer's responsibility to assure that the tire selected is appropriate for the application and rim size.

Please contact your tire dealer to determine the proper tire and rim application.

We make it *possible*