

# PUNCTURE REPAIR PROCEDURES

## FOR PASSENGER AND LIGHT TRUCK TIRES

Tire Sizes for Light Vehicles Include All Radial Passenger Car Tires and Some Light Truck Radial Fabric Body Ply (Through Load Range E).

Light Vehicles are Defined by 49 Cfr & 571.139 of The Federal Motor Vehicle Safety Standards as Motor Vehicles with a Gross Vehicle Weight Rating of 10,000 Lbs. or Less



**WARNING!**  
TIRES MUST BE REPAIRED FOLLOWING INDUSTRY RECOMMENDED PROCEDURES. Failure to use these procedures may result in failure of the repair.

**PUNCTURE INJURY LIMIT**  
**1/4 inch (6 mm)**

This image is to show that puncture repairs are limited to the tread area.

**Repairable Area**  
Typical Injury Repair Within Belted Area

**DO NOT REPAIR**  
SHOULDER  
SIDEWALL

Steel Belts

Typical Injury Repair Within Belted Area

All Injuries Outside of Belted Area are Non-repairable

**For Passenger & Light Truck Tires Through Load Range E**

**Do NOT** make repairs, where the injury extends in to the shoulder, or where the injury extends at an angle in to the shoulder area.

**Do NOT** repair sidewall injuries.

For speed rated tires, you must contact the Manufacturer for their individual repair policy, and whether or not the speed rating is retained.

For example: (Q,S,T,U,H,V,W,Y, or ZR) These would appear on the tire sidewall or the vehicle tire placard. A properly repaired speed rated tire (per manufacturers recommendations) can be used for legal highway use, just as a non-speed rated tire.

- NEVER** use a plug only (stem).
- NEVER** use a patch only (always fill the injury).
- NEVER** repair tires with a tread puncture greater than 1/4" inch (6mm).
- NEVER** repair a tire that has been worn down to 2/32" or less.
- NEVER** repair a tire without removing it from the rim first, for a full inspection.
- NEVER** repair a tire that has a repair that does not meet the puncture procedures in this chart.
- NEVER** substitute an inner tube for a proper repair.
- NEVER** invert radial tires.
- NEVER** mount or use damaged tires or rims.
- NEVER** buff the tire too deep, allowing the body plies to be exposed. This type of damage requires the tire to be scrapped. A light velvet buff removing bladder lines and creating a smooth surface is recommended.

**WARNING!**  
DO NOT MIX PRODUCTS FROM DIFFERENT REPAIR MATERIAL MANUFACTURERS. Follow all instructions. Refer to the information on the product, or SDS, and follow the guidelines for handling and disposal.

**WARNING!**  
Serious bodily injury may result from not wearing adequate personal protective equipment (PPE), including eye protection (i.e., goggles or face shields), ear protection, respiratory protection, and gloves, while buffing tires. Always wear appropriate PPE for your safety.

**WARNING!**  
Tire changing can be dangerous. Properly trained personnel with the correct tools and procedures should be the only employees allowed to change tires. Always read and understand the manufacturer's warnings, contained in their manuals and on tire sidewalls.

**WARNING!**  
DO NOT perform an outside-in or ON-THE-WHEEL TIRE REPAIR.

**WARNING!**  
Permanent tire damage due to under inflation and/or overloading cannot always be detected. Any tire known, or suspected to have been run at less than the placard recommended operating inflation pressure and/or overloaded, could possibly have permanent structural damage (cord fatigue, particularly steel cords or belt material). Ply cords weakened by under inflation and/or overloading may break one after another until a rupture, commonly referred to as a "zipper", occurs in the upper sidewall with accompanying instantaneous air loss and explosive force. This can result in serious injury or death. These tires should be inflated by using a restraining device (or safety cage) that complies with OSHA regulations and an air line with a clip-on air chuck.

**TWO INDUSTRY RECOMMENDED REPAIR METHODS INCLUDE**

**1 A ONE-PIECE PATCH AND PLUG STEM COMBINATION UNIT.**  
This works well when the angle of the injury does not exceed 25 degrees.



**2 A TWO-PIECE STEM AND REPAIR UNIT, AND THEN BONDED TOGETHER DURING THE REPAIR PROCESS.**  
This works well when the angle of the injury exceeds 25 degrees.



**WARNING!**  
PATCH ONLY or PLUG ONLY repairs, are IMPROPER REPAIRS. Improper repairs can fail in service which could result in accidents causing serious personal injury or even death.

**1 EXTERNAL AND INTERNAL INSPECTION**

Check the valve and outer surface for leaks, using a leak seeker solution where practical, and mark the injury. Deflate and demount the tire from the rim. Mount the tire on a spreader and spread the beads. Mark the injury with a tire crayon. Remove the puncturing object and make note of the angle of the injury.



**2 PRE-CLEANING INNER LINER SURFACE**

Clean the area around the puncture with XtraSeal Rubber Prep Pre-Buff Cleaner and a scraper. This step is critical in removing dirt and mold lubricants that will reduce adhesions and contaminate buffing rasps. Repeat this process where needed.



**3 PREPARE THE INJURY CHANNEL**

When possible, drill the injury from the inside a minimum of three times with the appropriate carbide cutter on a low speed (1200 rpm max.) drill, or other suitable tool, to ensure complete removal of the damage, being careful not to elongate the hole. Repeat this process a minimum of three times from the outside of the tire to ensure complete damage removal. Use a probe to check for any splits in the plies surrounding the injury. Remove any additional damage found. Be sure injury remains 1/4 inch (6.0mm) or less.



**4 REPAIR UNIT SELECTION**

Select the appropriate size repair unit based on the 31 Inc/Xtra Seal recommendations. This would be either a one piece patch plug combination unit, or a two piece system utilizing a vulcanizing stem and the appropriate universal or radial/bias repair unit. Align the bead arrows where applicable towards the beads. Center the unit over the injury and outline an area about 1/2" (13.0mm) larger than the repair unit. This will help ensure the crayon marks are not removed when buffing.



**5 FILL THE INJURY CHANNEL**

For injuries greater than 25 degree angle, use a TWO-PIECE repair system. For a ONE-PIECE combination unit, please skip this step. Cement the puncture channel using a probe or spiral cement tool. Fill the injury using an XtraSeal vulcanizing stem and then cut just above the inner liner. Buff the stem flush with the liner repair area.



**6 BUFFING**

To prevent contamination and preserve the outline, buff within the marked area, evenly and thoroughly, using a low speed (5,000 rpm maximum) buffer with a fine gritted rasp. Take care not to buff too deep exposing the tire casing body (ply) cords or steel. Buff to a velvet looking surface. Remove any rubber dust and contaminants from the buffed surface with a brass brush or fine wire brush, then vacuum the tire to provide a clean, dry surface.



**7 CEMENTING**

Apply a thin coat of XtraSeal chemical vulcanizing cement to the entire buffed area. Allow the cement to dry completely. Stippling the cement into the inner liner can reduce dry time. Do not use forced air or an outside heat source to accelerate the dry time due to possible contamination. Adjustment of dry time will be needed according to temperature and humidity. While drying, rotate the injury to the 12 o'clock position to prevent possible contamination.



**WARNING!**  
Do not use flammable cement near fire, flame, or any other source of ignition. Explosive force and/or fire from ignition of cement could cause serious injury or death.

**8 APPLYING THE REPAIR UNIT**

The tire beads should be in a relaxed position when the repair unit is installed. When using a two piece repair system, align the bead arrows where applicable, towards the beads and center over the injury. When using a one-piece combination patch/stem repair unit, DO NOT cement the stem. Apply cement to the injury channel using a clean probe or spiral cement tool. Next, pull the stem through the injury until the patch slightly begins to dimple in the center, and stop.



**9 STITCHING**

For all methods, stitch the entire repair unit with a serrated stitcher vigorously working from the center outwards. This can remove any trapped air and assist in the vulcanization between the cement and the back of the patch. Cut the stem portion flush with the outer tread surface, making sure not to stretch or pull the stem while cutting.



**10 INNER LINER SEALER & FINAL INSPECTION**

Apply a coat of XtraSeal Inner Liner Sealer to the repair area, making sure to cover all exposed buffed surface, and over the edges of the patch. This helps to maintain the Integrity of the liner, for the life of the tire. After mounting and inflating the tire, be sure to conduct a final inspection. Using a leak detector, or dunk tank, be sure that the injury channel, valve stem, or beads no longer have any leaks. Return to service when completed.



**TEMPORARY TIRE REPAIR** is any system capable of temporarily retaining air pressure long enough for the driver to extend his/her mobility to be allowed to reach a professional Tire repair service facility. These methods include:

- Vehicle Original Equipment Mobility Kits
- After-market Sealants such as pressurized foam, and or compressor with liquids applied through the valve stem
- A rubber/ string type plug inserted into the injury channel while the tire is still mounted on the rim.

**None of these are considered Permanent Tire Repairs and may have speed and or distance warnings on the products labels.**



NOT ALL TIRES CAN BE REPAIRED. Check with the manufacturer for specific guidelines such as run flat technology tires, and commercial service applications.

For all tires, REPAIR UNITS CAN NOT OVERLAP. The number of repairs varies by manufacturer, so follow the Manufacturers specific repair policy regarding number of repairs allowed.

SOME RUN FLAT TIRES ARE NOT RECOMMENDED FOR REPAIR. Check with the manufacturer for their individual repair policy.