



REPAIR METHODS FOR SOUND SUPPRESSION PASSENGER TIRE PUNCTURE REPAIR

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I. PURPOSE

The purpose of this Recommended Practice (RP) is to provide step-by-step procedures for repairing tires with sound suppression foam material inside the tire to reduce harmonics generated by road noise. These tires are commonly used on Electric Vehicles (EV) and hybrid vehicles to reduce the cabin noise generated by tires.

II. INSPECTION

- A. Careful inspection should be carried out with the tire dismounted and placed on a spreader with adequate lighting (i.e. 200 footcandles (fc)/2153 lux (lx) minimum, 300 fc/3229 lx recommended) to allow for a complete visual of beads, sidewalls and crown for evaluation of condition.
- B. Using a probe to follow the injury channel, penetrate the foam with the probe and mark the spot with a tire crayon.
- C. Measure 2" (50mm) from the penetration indicator in each direction of the circumference of the tire to additionally mark the foam for removal to the tire liner surface.
- D. Using a knife, cut the foam across the tread surface on each side of the injury mark, and remove by peeling it from one edge to the other until detached (see Figure 1).
- E. Any signs of collateral penetration damage, run flat indications or ply separations would give cause to reject the tire.



Figure 1

III. PERMISSIBLE REPAIRS

- A. The repairable area is specified as the crown area of the tire, over the tread belt area (see Figure 2).



Figure 2

- B. The maximum injury size in passenger tires is 1/4" (6mm) in diameter. (Injury location and injury size are standard puncture Industry Standard specifications for passenger tires.)

IV. REPAIR METHODS

- A. For a one-piece repair unit, use the following repair sequence to repair the injury.
 - 1. Pre-clean the preparation area with solvent and use a liner scraper to remove contaminants from the surface.

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2. Use the appropriate carbide cutter (maximum 1/4", 6mm) to drill the penetration cavity, starting from inside-out, then outside-in, up to three (3) strokes each.
 3. Buff the liner with a low-speed (i.e. 5000 rpm maximum) buffer, fitted with a fine grit cup rasp, to a size that completely accepts the repair unit body.
 4. Clean the buffed surface of the prepared area with a vacuum and/or a wire brush to remove any rubber dust and contaminants.
 5. Apply an even coat of chemical cement to the prepared area and penetration cavity, and allow to dry for 3 – 5 minutes, or longer if cold or humid conditions exist. Refer to your repair manufacturer's drying times if needed.
 6. Remove the protective poly from the one-piece repair unit and apply minimal cement to the taper of the stem, or re-cement the injury channel with a clean probe or cement tool from the tread side of the tire to allow for easy pull-through of the stem into the hole.
 7. Insert the stem from the inside of the tire, and pull through the cavity until the base of the repair unit is snug against the prepared and cemented surface of the inner liner and has a slight indentation on the surface.
 8. Stitch the repair unit starting from the center, and work outwards in a cross stitch pattern.
 9. Apply liner sealant around the edge of the patch and over any exposed buffed area.
 10. Cut the stem off on the tread side of the tire, flush with the tread surface.
 11. Remount the tire for installation on the vehicle.
- B. For a two-piece repair system, use the following repair sequence to repair the injury.
1. Pre-clean the preparation area with solvent and use a liner scraper to remove contaminants from the surface.
 2. Use the appropriate carbide cutter (maximum 1/4", 6mm) to drill the penetration cavity, starting from inside-out, then outside-in, up to three (3) strokes each.
 3. Install the correct size stem into the injury cavity, leaving 1/8" (3mm) to 1/4" (6mm) of the stem remaining above the liner surface.
 4. Buff the liner with a low-speed (i.e. 5000 rpm maximum) buffer, fitted with a fine grit cup rasp, to a size that completely accepts the patch body.
 5. Clean the buffed surface of the prepared area with a vacuum and/or a wire brush to remove any rubber dust and contaminants.
 6. Apply an even coat of chemical cement to the prepared area and penetration cavity, and allow to dry for 3 – 5 minutes, or longer if cold or humid conditions exist. Refer to your repair manufacturer's drying times if needed.
 7. Remove the protective poly from the repair unit and install on the cemented surface.
 8. Stitch the repair unit starting from the center, and work outwards in a cross stitch pattern.
 9. Apply liner sealant around the edge of the patch and over any exposed buffed area.
 10. Cut the stem off on the tread side of the tire, flush with the tread surface.
 11. Remount the tire for installation on the vehicle.

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Note:

If the foam liner is attached to the liner surface with a soft adhesive, the following **modified procedure** should be used. This procedure is recommended to prevent contamination or damage of the tools used in the repair process, and to keep the time required to properly repair the injury at a reasonable range. This method meets the industry standards for tire repair because the “injury channel is filled and the liner is sealed with chemical cure rubber material”.

C. The Modified Repair Method only uses a one-piece repair unit.

1. Once the foam is removed, use the liner scraper to push and pull the adhesive away from the injury area, slightly larger than the one-piece repair unit size.

Note:

Do not use solvent on the soft adhesive material.

2. Use the appropriate carbide cutter (maximum 1/4”, 6mm) to drill the penetration cavity, starting from inside-out, then outside-in, up to three (3) strokes each.
3. Cement an area the size of the one-piece repair unit and allow to dry thoroughly. **DO NOT BUFF.**

4. Remove the protective poly from the one-piece repair unit and apply minimal cement to the taper of the stem, or re-cement the injury channel with a clean probe or cement tool from the tread side of the tire to allow for easy pull-through of the stem into the hole.
5. Insert the stem from the inside of the tire, and pull through the cavity until the base of the repair unit is snug against the prepared and cemented surface of the inner liner and has a slight indentation on the surface.
6. Stitch the repair unit starting from the center, and work outwards in a cross stitch pattern.
7. Apply liner sealant around the edge of the patch and over any exposed buffed area.
8. Cut the stem off on the tread side of the tire, flush with the tread surface.

Note:

Reinstalling the foam is optional. If desired, you may use a repair sealer to prepare the area for adhering the foam if the adhesive has lost its tack.

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