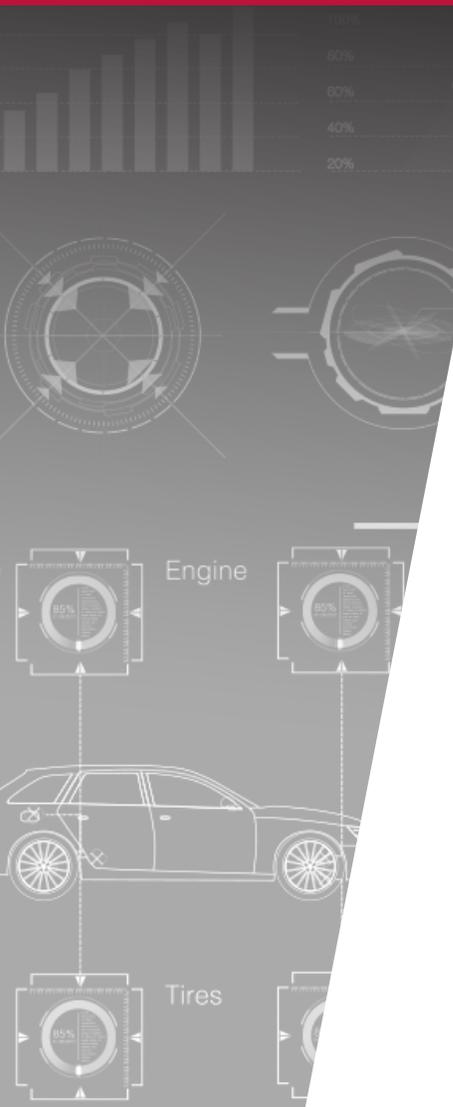


RM-5

TECH
REPAIR
MANUAL



Two-Piece Puncture Repair Method FOR PASSENGER, LIGHT TRUCK & TRUCK TIRES



TECH 2-Piece Repair System



The TECH Two-Piece Repair System is designed to produce a safe, permanent repair for passenger, LT and medium truck tires. A proper two-piece repair consists of a vulcanizing rubber stem or rope rubber to fill and permanently seal the injury channel, in conjunction with a separate repair unit which reinforces the tire and seals the inner liner. This repair system meets all tire industry guidelines for proper puncture repairs.

The TECH Two-Piece Repair System is widely used throughout the tire industry due to its reliability and versatility. One-piece patch/plug repairs like the TECH Uni-Seal Ultras are limited to a maximum angle, but a two-piece repair does not have this same restriction. The angle of the injury alone will not preclude a technician from using a two-piece repair. Another aspect of the two-piece method is the variety of types of repair units and filler materials that are available to fit your shop's needs. When filling the injury, the technician may utilize TECH's Uni-Seal Ultra Stems, such as the 250-1UL, 251-1UL or 291-1UL; TECH Permecure repairs such as the 220, 222, or 224; or TECH Flow-Seal repairs such as the 204, 206, 208 or 209. When reinforcing the tire on the inside, the technician may use TECH's Centech repair units for radial tires only, BP repairs for bias tires only, or TECH's All-Purpose and Multi-Purpose repairs which may be used for either type of tire. The two-piece method can also be adapted to fit any heat cure system, such as retreading with the use of TECH Thermacure repairs. With all of these options, there will be a solution for any needs your shop has for two-piece puncture repairs.



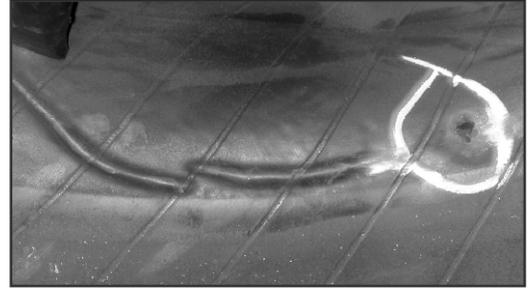
WARNING

Failure to properly repair tire could cause **SUDDEN TIRE FAILURE, RESULTING IN SERIOUS INJURY OR DEATH.** Carefully read and follow these instructions.

Repair Limitations

Repair of Run Flat Tires

Run Flat tires must be removed from the wheel and inspected. These tires have been engineered to support the load of the vehicle with little to no air pressure for a specified amount of time by the tire manufacturer. Distance traveled, driving speed and vehicle maneuvering at low pressure may affect the tire's integrity and repairability. These tires are susceptible to inner liner separations when run flat for extended periods of time.



This photo shows innerliner separation in a run flat tire. The tire should not be repaired if this condition is present.

Once the tire has been removed from the wheel, thoroughly inspected, and determined to be repairable, it may be repaired using either a TECH Uni-Seal® Ultra or Two-Piece Repair System. Punctures must be limited to the crown area as shown in Figure A. The maximum size injury is 6mm (1/4"). One injury per tire may be repaired.

Consult the tire manufacturer's warranty for specific information regarding repair of Run Flat tires. TECH's recommendations for repair of Run Flat tires are not to supersede any recommendations of new tire manufacturers. TECH's recommendations are based on tests conducted at TECH's test facility and at an independent lab. TECH is continuously testing new Run Flat technologies as they enter the market.

Repair of Performance Tires

Performance tires H, V, W, Y, and Z rated can be repaired using TECH's Two-Piece Repair System in the crown (T-T) area as shown in Figure A. One injury per tire up to 6mm (1/4") in diameter may be repaired. Test results in TECH's test facility and at an independent lab have shown the tire's speed rating is maintained. Additional repairs or repairs outside the crown area can be made, however the tire's speed rating is reduced below an "H". TECH's recommendations for repair of performance tires are not to supersede any recommendations of new tire manufacturers.

Repair of Standard Passenger Tires

Passenger tires T rated and below can be repaired using TECH's Two-Piece Repair System in the crown and shoulder areas as shown in Figure A. TECH places no limitations on the number of punctures repaired in a tire as long as no two injuries are in the same radial cord and the repair units do not overlap. TECH's recommendations are based on tests conducted at TECH's test facility and at an independent lab. TECH's recommendations for repair of standard passenger tires are not to supersede any recommendations of new tire manufacturers.

Repair of Light, Medium & Heavy Truck Tires

Steel body cord light, medium and heavy truck tires T rated and below can be repaired using TECH's Two-Piece Repair System in the crown and shoulder areas as shown in Figure A. TECH places no limitations on the number of punctures repaired in a tire as long as no two injuries are in the same radial cord and the repair units do not overlap. TECH's recommendations are based on tests conducted at TECH's test facility and at an independent lab. TECH's recommendations for repair of light and medium truck tires are not to supersede any recommendations of new tire manufacturers.

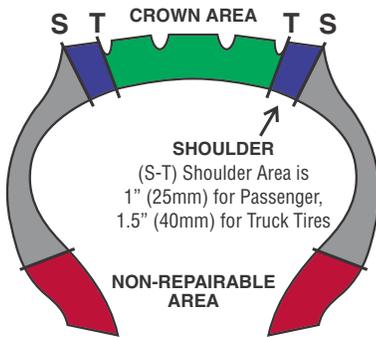
Tire Repair Limitations



WARNING

Failure to properly repair tire could cause **SUDDEN TIRE FAILURE, RESULTING IN SERIOUS INJURY OR DEATH.** Carefully read and follow these instructions.

Tire Repair Limitations (Figure A.)



All injuries larger than those defined in the chart, or outside the specified S-S area, must be treated as a section repair.

| Type of Tire | Prepared Injury Size | Uni-Seal Ultra Stem | Carbide Cutter | Crown Area Repair Unit | Shoulder Area Repair Unit | |
|---|---------------------------------|---------------------|----------------|------------------------|---------------------------|--|
|  Passenger Tires T Rated or Below & LT Tires Through Load Range D H, V, W, Y, or Z Rated Performance Tires Run Flat Tires | 6mm (1/4") | ULS6 (250-1UL) | CC6 (270) | CT-10 or 111 | CT-12HD |  REPAIRS MUST NOT OVERLAP! |
| | 6mm (1/4") 1 Per Tire | ULS6 (250-1UL) | CC6 (270) | CT-10 or 111 | - | |
| | 6mm (1/4") 1 Per Tire | ULS6 (250-1UL) | CC6 (270) | CT-10 or 111 | - | |
|  Light Truck Tires Load Range E & Above | 6mm (1/4") | ULS6 (250-1UL) | CC6 (270) | CT-10 or 111 | CT-22 |  REPAIRS MUST NOT BE IN THE SAME BODY PLY! |
| | 8mm (5/16") | ULS8 (251-1UL) | CC8 (271) | CT-12 or 111 | CT-22 | |
| | 10mm (3/8") | ULS10 (291-1UL) | CC10 (271/38) | CT-20 or 112 | CT-24 | |
|  Truck Tires | 6mm (1/4") | ULS6 (250-1UL) | CC6 (270) | CT-10HD or 111 | CT-24 |  REPAIRS MUST NOT BE IN THE SAME BODY PLY! |
| | 8mm (5/16") | ULS8 (251-1UL) | CC8 (271) | CT-12HD or 111 | CT-24 | |
| | 10mm (3/8") | ULS10 (291-1UL) | CC10 (271/38) | CT-20 or 112 | CT-26 | |

Please Read Before Performing Any Tire Repair:

- Protective eyewear must be worn while repairing tires.
- Tire industry standards state that all injuries must be filled with a rubber stem or suitable vulcanizing material and a repair unit applied to the inner liner.
- Failure to follow industry recommendations may result in premature tire failure.
- Tire manufacturers' warranties and policies regarding repair of radial passenger, performance, or run flat tires may differ. These policies supersede those of TECH.
- Although a tire may be rated for high speed, TECH does not endorse the operation of a motor vehicle in an unsafe or unlawful manner.
- Chemicals used during the repair process are extremely flammable. Do not use near sources of ignition.
- Failure to follow the procedures shown in this manual may result in premature tire failure. This could result in serious injury or death.
- Failure to follow procedures in this manual will void TECH's warranty. TECH will not be responsible for any damages or losses, direct or indirect, related to or associated with the failure to follow the instructions contained in this manual.

Tire Inspection & Pre-Cleaning

The tire inspection process is critical in determining if the tire can safely be repaired and returned to service. The inspection should be done with the tire removed from the wheel and placed on a tire spreader using adequate lighting. The technician must be able to examine the tire beads, interior and exterior sidewalls, and the tread area.

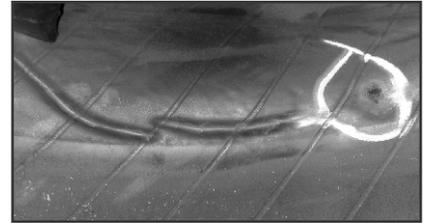
Non-Repairable Conditions



1. Injury no greater than 1/4" for passenger tires. Injury no greater than 3/8" for light truck/truck tires.



2. Run flat or under-inflated



3. Inner liner separation



4. Casing separation



5. Excessive tread wear



6. Exposed plies/cables



7. Deformed bead, exposed fabric or steel



8. If injury angle exceeds 35 degrees, a 2-piece repair must be used.



9. Ozone cracking



10. Tire damage from impacts

Tire Inspection & Pre-Cleaning



WARNING

All Passenger, Light Truck, Medium Truck and Heavy Truck Tires must be removed from the rim and inspected before any repair is made!



1. Locate and mark all damage on the inside and outside of the tire while checking for separation.



2. Determine the size and angle of the injury using the TRT105 injury measuring tool.



3. Pre-clean the inner liner with Rub-O-Matic Rubber Cleaner #704 or #704A and a scraper 2 to 3 times to remove contaminants. This will promote better repair unit adhesion and prolong the life of buffing wheels by preventing buildup of contaminants.

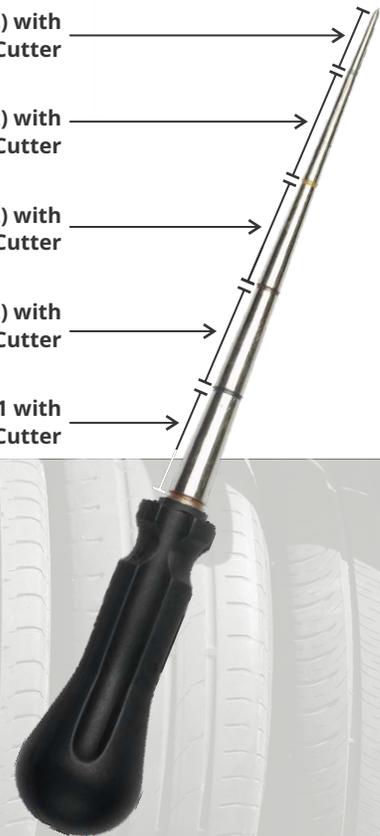
Use ULS6 (250-1UL) with
CC6 (270) Cutter

Use ULS6 (250-1UL) with
CC6 (270) Cutter

Use ULS8 (251-1UL) with
CC8 (271) Cutter

Use ULS10 (291-1UL) with
CC10 (271/38) Cutter

Use 252-1 with
CC13 (272) Cutter



TECH TIP:

Insert the **TRT105** measuring tool into the injury from the inside of the tire. Apply firm pressure to the handle while rotating the tool in a circular motion. When the tool meets resistance, find the closest visible line to the inner liner. Refer to the illustration (right) to determine the injury size.

Injury Preparation & Filling

Ensure the Carbide Cutter being used is in good condition. Using a worn out Carbide Cutter could lead to incomplete damage removal, which could lead to injury growth or difficulty installing Uni-Seal Ultra repairs and stems.



4. Damaged rubber and steel should be removed from the injury using a carbide cutter on a low speed air/electric drill, maximum 1,200 rpm. Drill the injury from the inside of the tire, following the angle of the injury. Repeat this procedure 3 to 5 times, completely removing the cutter from the injury after each pass. Repeat this process from the outside of the tire.



5. The injury should be inspected after drilling is complete by flexing the tire and probing the injury with a pointed awl to make sure all splits and loose material have been removed. If additional damage is detected, use a larger carbide cutter to remove the remaining damage. If the damage is beyond puncture repair limitations at this point, refer the tire to a full service repair facility for a section repair or scrap the tire.



6. Using the spiral cement tool in a clockwise direction, apply Chemical Vulcanizing Fluid #760 or Heavy Duty Blue Vulcanizing Fluid #775 into the injury 3 to 5 times.



7. Remove the protective poly from the stem.

TECH Uni-Seal Stems are slightly larger than the prepared injury, resulting in a compression fit with excellent adhesion. Placing a small amount of vulcanizing fluid on the stem just before inserting it into the tire injury provides lubrication for easier installation.



8. Apply a small amount of Chemical Vulcanizing Fluid to the black tapered portion of the stem.



9. Insert the lead wire through the injury. Grasp the wire on the outside of the tire with pliers. Pull the stem through the tire until approximately 1/8" (3mm) of the stem remains above the inner liner.

Permacure or Flow Seal Installation

TECH's Permacure reinforced inserts or Flow Seal inserts can be used as permanent injury filler material. After the damage has been removed with the appropriate carbide cutter, the prepared injury can be filled as shown below.

PERMACURE



P1. Install the Permacure insert in the injury using the 925 tool.



P2. Remove the 925 tool by pulling straight out of the tire. Cut off the insert 1/8" (3mm) above the inner liner.



P3. Buff the Permacure flush with the inner liner using a low rpm buffer and inner liner buffing wheel.

FLOW SEAL



F1. Install the Flow Seal insert using the 920 Insert-O-Matic tool and the 203 Insert-O-Mate tip to protect the insert from exposed steel. Release the handle and rotate the 920 tool 90°.



F2. Remove the 920 tool. Cut the Flow Seal to 1/8" (3mm) above the inner liner.



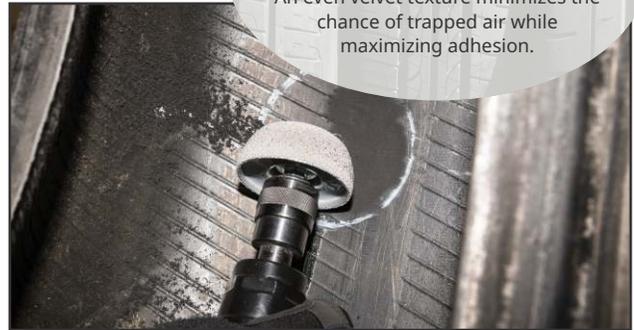
F3. Buff the Flow Seal flush with the inner liner using a low rpm buffer and inner liner buffing wheel.

Repair Installation & Finishing

Tire industry guidelines state that the inner liner should be buffed to a #1 or #2 buffed texture using a low speed air tool, maximum 5,000 rpm. An even velvet texture minimizes the chance of trapped air while maximizing adhesion.



10. Outline the area to be buffed 1/2" (13mm) larger than the repair being used, or use the appropriate repair template.



11. Using a low speed buffer (maximum 5,000 rpm) and an appropriate inner liner wheel, buff the stem flush to the inner liner. Buff the entire outlined area on the inner liner to a #1 or #2 texture.



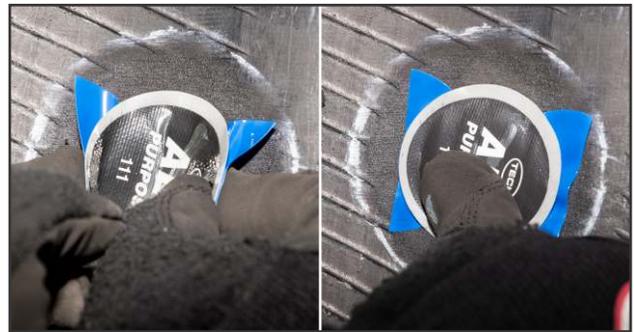
12. Use a soft wire brush on a low speed buffer to remove buffing dust and debris from the buffed area. Avoid applying excessive pressure, as this could remove texture and reduce adhesion of the repair unit to the tire. Remove the debris from the tire using a vacuum.



13. Apply a thin, even coat of Chemical Vulcanizing Fluid #760 or Heavy Duty Blue Vulcanizing Fluid #775 to the buffed surface. Allow 3-5 minutes drying time for #760 or 5-8 minutes for #775. Additional drying time may be required in adverse weather conditions.



14. Bend the repair back and push up on the edges of the repair with your fingers to break the perforation on the protective poly on the back of the repair. Partially remove the poly, exposing the middle portion of the repair.



15. Relax the beads of the tire. Center the repair unit over the filled injury. Press down the center of the repair unit with your thumb. (If the repair is a Centech or BP repair unit, be sure to align the bead arrows with the beads of the tire.)



- Do not use a compressed air line to clean the buffed area, as contamination from moisture and oil will occur.
- When cleaning the tire, care should be taken to not let anything touch the buffed surface.
- Rub-O-Matic rubber cleaner can be used to remove buffing dust and debris if it is applied using a clean, lint-free cloth. 3 to 5 minutes of drying time should be allowed before applying chemical vulcanizing fluid.
- Do not use any outside heat sources or open flame to shorten the drying time of chemical vulcanizing fluid. This will adversely affect the vulcanizing fluid and potentially lead to premature repair failure.

Repair Installation & Finishing



16. With the blue poly still positioned under the repair unit, stitch the repair unit from the center out, using firm pressure.



17. Remove the poly from under the repair unit, press down the edges of the repair and continue stitching toward the edges of the repair.



18. Remove the clear protective poly from the top of the repair.



19. Seal the edge of the repair and the over buffed area of the inner liner with Tech Security Coat #738 or Butyl Liner Repair Sealer #739.



20. With the stem relaxed, cut off the excess, leaving 1/8" (3mm) remaining above the tread surface.



21. The tire is now ready to return to service.



TECH TIP:

TECH Security Coat #738 and Butyl Liner Repair Sealer #739 are designed to replace the inner liner that was removed during the buffing process and promote better air retention.



World-Renowned Tire & Wheel Service Solutions

TECH distributes our products to more than 95 countries.



P.O. Box 486, Johnstown, Ohio 43031-0486, USA
PHONE: 740-967-9015 FAX: 740-967-1039 1-800-433-TECH or 1-800-336-TECH
www.techtirerepairs.com