

# RM-9

TECH  
REPAIR  
MANUAL



## Cementless Repair Methods

FOR RADIAL TRUCK TIRES





A **TRC** Company

# Cementless Repair Methods for Radial Truck Tires



TECH has developed a line of Thermacure repair units that can be used with or without retread cement. The new cushion gum bonding layer has 16% higher green tack than the previous formulas of cushion gum so that when heated, the repair unit will adhere to the inner liner of any brand tire without the use of black cement. These repair units also work with most brands of black retread cement and can also be used chemically with the use of Chemical Vulcanizing Fluid or Heavy Duty Blue Cement.

The repair process for using repair units without cement does require preheating of the repair to increase green tack of the bonding gum.

Cementless repairing of tires requires direct pressure on the repair unit. The use of an inside envelope is required when curing tires through a retread chamber. The repair system also works well within any mold cure retread system as well as in section mold repair curing systems. When installing a repair unit without cement, care must be taken to ensure that the repair is installed as quickly as possible to prevent the repair from cooling and reducing the tack on the cushion gum.

|  |    |
|--|----|
| Section Repair Unit<br>Installation Procedures         | 1  |
| Puncture Repair / Mold Cure,<br>Open or Closed Chamber | 7  |
| Radial Truck Tire Repair Chart                         | 11 |
| Contact TECH   | 12 |

# Section Repair Unit Installation Procedures

High tread tires can be repaired using a section mold such as a Monaflex TRM. Rework due to missed damage or a bridged repair unit can also be cured using the TRM. The section mold can also be used for rework or repairing injuries that were missed during the retread process.

A mold system must also be used for liner blister repairs. Use Tech GH200 type cushion gum for this repair. The gum will need to be preheated for 5 minutes at 140°F to 160°F (60°C to 72°C); it is then stitched into the tire. Cure in the mold for 25 minutes plus warm-up time.



**1.** Locate and mark all damage on both the inside and outside of the tire.



**2.** Using a probe, determine the size and angle of the injury while checking for rust and/or separation.



**3.** Pre-cleaning the inner liner is optional depending on the local requirements for combustible products such as 705C, Citrus Cleaner. Pre-cleaning can be accomplished using 705C Citrus Based Rubber Cleaner and a scraper 2 to 3 times to remove contaminants from the inner liner.



**4.** Remove all loose or damaged rubber using a knife or rotary gouge on a low RPM tool (5,000 RPM max) without damaging steel body cables. Then expose damaged cables with an encapsulated brush.



**5.** Separate damaged cables by cutting as close as possible to the damage with a sharp knife.



**6.** Remove all damaged steel at a 90° angle to the tire using a high RPM buffer (min. 20,000 rpm). Steel cables must be cut back into solid rubber. Inspect the area once the damage has been removed to assure that no damaged steel, splits, separations or rust remains in the tire.



**7.** Use an aluminum oxide stone on a high RPM buffer to dress any frayed steel cables into solid rubber. Aluminum oxide stones are only used to finish dressing steel, not to cut through steel cables, as they tend to scorch rubber.



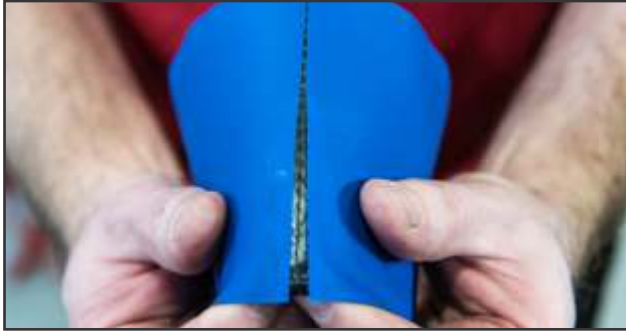
**8.** Remove any scorched or burned rubber using a soft wire skive brush on a low RPM buffer.



**9.** Buff the rubber above the body ply using a low RPM buffer and a medium grit rasp or encapsulated brush. Buff to an #2 or #3 buffed texture.



**10.** Measure the width and length of the injury at the widest opening of exposed ply to determine the section repair unit to be used. Refer to the radial repair chart for proper repair unit selection.



**11.** Any time that the repair is going to be heated, the slit in the poly must be broken prior to placing the repair unit in the oven so that the heated poly does not cause wrinkles in the repair gum. These wrinkles are very difficult to stitch out.



**12.** Repair units can be installed with or without floater gum. In order to achieve proper green tack, the repair unit must be heated to a temperature of between 140°F and 160°F (60°C to 72°C). 111R, 112R through CT-24R repairs should be pre-heated 5 to 7 minutes. For repairs larger than a CT-24R, the pre-heating time is 8 minutes. TECH recommends the use of an oven so that multiple repair units can be heated at the same time, saving time and money.

**NOTE:** Maximum time for the repair units in the oven should not exceed 2 hours.



**13.** Use the appropriate repair unit template and a tire crayon to mark an area on the inner liner for buffing.



**14.** Using an approved buffing wheel on a low RPM buffer, buff the inner liner area marked to a #1 or #2 buffed texture, staying inside the marked area. Be sure to completely remove all bladder patterns during this process to ensure a proper bond of the repair unit to the tire.

**NOTE:** When buffing the inner liner the buffing wheel must be used in the bead to bead direction to ensure proper surface texture. Running the buffing wheel up and down across the buffed surface will result in an uneven surface and may result in poor adhesion of the repair unit to the tire.



**15.** Clean the buffed areas, both on the inside and outside of the tire, using a soft wire brush on a low RPM buffer. Remove buffing dust by lightly brushing from the right side of the buffed surface to the left side. Repeat until all dust is removed.

**NOTE:** A #1 to #2 buffed texture is critical to ensuring proper bond of the repair to the tire. Inspect the buffed surfaces both inside and outside the tire after they are cleaned to ensure that the entire surface has a proper texture. If smooth or shiny areas are present, buff those areas until the proper texture is present.



**16.** Vacuum all buffing dust from the tire. Do not touch the buffed surface with the vacuum, as this could lead to contamination. Use of an air hose to remove dust is not recommended as it will lead to contamination of the repair area.

**NOTE:** If more than two hours are allowed to pass after the surface has been buffed and cleaned, then the surface must be wire brushed to remove any oxidation before the repair unit can be installed.



**17.** Remove the repair unit from the oven; peel back the poly half way in both directions as in any other repair method. It is also recommended that the poly be angled slightly so that one edge of the poly is outside of the edge of the repair. This makes it easier to remove the poly once the stitching process begins.

**NOTE:** The repair unit must be installed as quickly as possible once the repair unit is removed from the oven to provide maximum green tack of the cushion gum.



**18.** Center and align the repair using the hash marks. It is extremely critical that the alignment and centering are correct. To ensure that the repair remains warm throughout the installation it must be stitched as soon as it touches the buffed surface. If the repair unit is allowed to cool, it will not have enough green tack to properly bond to the inner liner.



**19.** Press down the repair with the side of your hand. Stitch the repair from the center out. Again, proceed quickly so that the repair unit does not cool.



**20.** Remove the remainder of the blue poly from under the repair unit. As the poly is removed, press down the repair.



**21.** Finish stitching to the outer edge of the gum on the repair. Then stitch the repair in the opposite direction from the center out.



**22.** Remove the clear poly from the repair unit.



**23.** Mark the date, repair technician initials (optional), and retread plant DOT code onto the repair unit. Use a dark ink pen or marker.



**24.** All injuries should be filled with a rubber that is approved for use without black retread cement. It is critical to apply one layer of rope rubber to the skive area due to the lack of black cement.





**25.** Support the repair unit on the inside of the tire. Stitch the rubber to work out any air and to assure good contact with the tire.



**26.** Finish filling the skive area to a level 1/8" (3 mm) above the tire's outer surface and stitch. The tire is now ready for cure.

## TECH Tips

- When preparing the buffed surface, TECH recommends the use of a Rubberhog 170 or 230 SSG grit buffing wheel. Use of a tungsten carbide grit buffing wheel will result in poor surface texture for a cementless repair and could result in repair unit failure.
- Buffing wheels should always be used in the bead to bead direction to ensure proper surface texture. Using the buffing wheel up and down or in the running direction of the tire will result in an uneven surface and could lead to a repair unit failure.
- When placing cementless repair units in an oven, the maximum temperature of the oven should not exceed 160°F (72°C).
- The maximum amount of time for any repair unit to remain in the oven is 2 hours. Leaving the repair unit in the oven too long can result in the repair unit curing in the oven.
- When filling a puncture repair with cushion gum, be sure not to fill excessively. Excessive overfill can result in air being trapped under the repair unit, leading to premature repair failure.

# Puncture Repair

## Mold Cure, Open or Closed Chamber



**1.** Inspect the damage with a probe to determine the size and angle of the injury. Also, check for any additional damage such as separations, looseness, or impact breaks. Always look for rusted cables when the tire has steel belts or steel body plies.



**2.** Use an approved marker to place indicating marks on the injury area. Remove the penetrating object. Observe the angle of the injury as you remove the object.



**3.** Place the tire so the repair area is in a 5 or 7 o'clock position to allow the buffing dust to fall to the bottom of the tire. Where permitted, the area can be cleaned by using a solvent free, pre-buff cleaner, such as 705C Citrus Based Rubber Cleaner, to prevent contamination of tools. Use a scraper tool to remove contaminants. Repeat this process 2 or 3 times until all contaminants have been removed from the repair area.

**Note:** if Citrus cleaner is not approved for use, proceed to the next step.



**4.** Damaged rubber and steel should be removed from the injury using the appropriate size carbide cutter on a low speed drill (maximum 1,200 rpm). Drill the injury from the inside of the tire 3 to 5 times, followed by 3 to 5 times from the outside of the tire to ensure complete damage removal.



**5.** Using a small ball rasp, remove a small area of the inner liner around the injury to inspect the casing. If splits in the rubber and/or loose cables are detected, the damage must be removed. This can be accomplished by using a larger carbide cutter. If the damage exceeds ½" (10mm), the injury must be processed as a section repair.



**7.** If a pencil stone was used, and/or scorched rubber is present, use a soft wire skive brush on a low rpm buffer to remove scorch without exposing steel cables.



**9.** Center the repair unit over the injury with the poly still remaining on the back of the repair, or use the appropriate template. Mark an area for buffing around the repair unit with paint crayon approximately ½" (13mm) larger than the repair unit.



**6.** If cable damage is detected, use a pencil stone on a high-speed air tool (minimum 20,000 rpm) to dress cables into solid rubber. Care must be taken so that scorching of the rubber does not occur.



**8.** Select the correct repair unit to be installed. Refer to chart on page 11. If repairing through a mold cure process, use a reinforced repair unit such as a 112R or CT-20R. In order to achieve proper green tack, the repair unit must be heated to a temperature of between 140°F and 160°F (55°C to 72°C). For repairs such as small nail hole repairs and the CT20R this takes 5 to 7 minutes.



**10.** Using an approved buffing wheel on a low RPM buffer, buff the inner liner area marked to an #1 buffed texture, staying inside the marked area. Be sure to completely remove all bladder patterns during this process to ensure a proper bond of the repair unit to the tire.



**11.** Clean the buffed area using a soft wire brush on a low RPM buffer. Remove buffing dust by lightly brushing from the right side of the buffed surface to the left side. Repeat until all dust is removed.



**12.** Vacuum all buffing dust from the tire. Avoid touching the buffed surface with the vacuum as this could lead to contamination.



**13.** Filling the injury must be performed with rope rubber that is approved for use without cement. Preheat the extruder gun to the appropriate temperature. Place a repair unit or a piece of poly over the hole on the outside of the tire. Hold firm pressure against the tire to avoid trapping air. Fill the hole from the inside of the tire until there is about 1/8" (3mm) of rubber above the inner liner.



**14.** When a non-reinforced repair unit is being applied, the hole must be slightly overfilled with extruder rope on the liner side to reduce the appearance of dimples that appear after curing. Stitch the rope rubber firmly in place on the inside of the tire.



**15.** Release the spreader so that the beads are in a relaxed position before installation of the repair unit. Remove the repair unit from the oven; break the perforation in the poly and peel back the poly approximately half way to expose the center of the repair unit's cushion gum. Use the poly to grasp the repair unit and keep the cushion gum clean.



**16.** Fold the repair unit and position it, aligning the bead arrows to the tire's beads if a reinforced repair is being used. Center the repair unit over the injury. Release the repair unit and check the alignment. If the repair unit is not centered and/or straight, lift and reposition.



**17.** Press down the center of the repair unit. Begin stitching from the center outward. Stitch out to the folded poly.



**18.** Remove the remaining poly from the repair unit and continue stitching using firm pressure. Stitch in both directions to eliminate any trapped air.

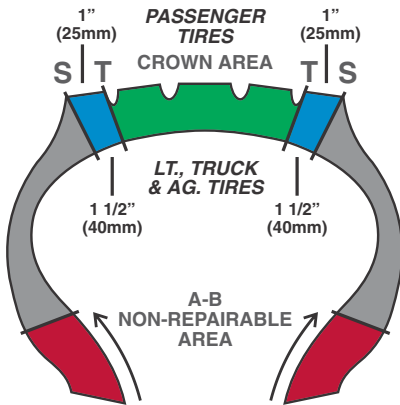
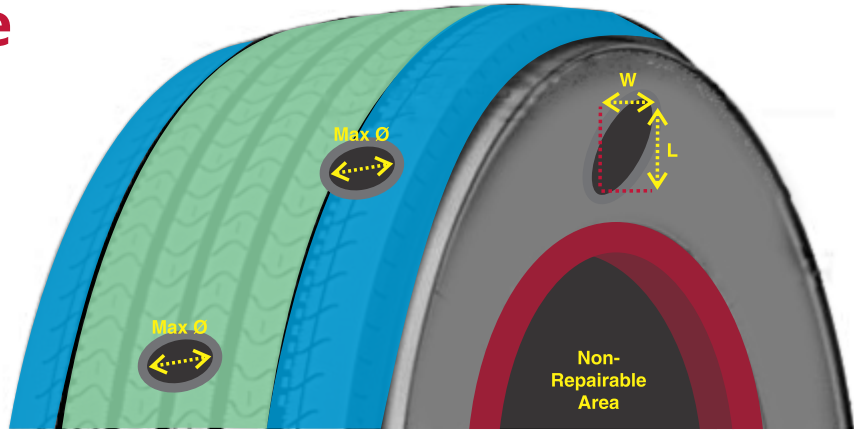


**19.** Remove the clear Mylar from the top of the repair unit by lifting from the edge of the repair and inspect the repair unit for trapped air. If trapped air is found, stitch the repair unit again. Extra attention should be paid to the repair unit edges to ensure they are thoroughly stitched.



**20.** Mark the date, repair technician initials (optional), and retread plant DOT code onto the repair unit. Use a dark ink pen or marker. The tire is now ready for cure. The tire can be cured the same day or the following day.

# Centech & Thermacure Radial Truck Tire Repair Chart



CROWN AREA BEGINS 1 1/2" (40mm) IN FROM TREAD EDGE

Tube-Type Tire Sizes █ Tubeless Tire Sizes █

| Sidewall Injury | Shoulder Injury Diameter (S-T Area) | Crown Injury Diameter (T-T Area) | Truck Tire Sizes                 |  |  |
|-----------------|-------------------------------------|----------------------------------|----------------------------------|--|--|
|                 |                                     |                                  | Heavy Truck                      |  |  |
|                 |                                     |                                  | Light Truck Through Load Range E | 7.50-10.00                             | 11.00-14.00  |
|                 |                                     |                                  | 6.50-12.50                       | 7.50-10.00                             | 11.00-14.00  |
|                 |                                     |                                  | LT 215-285                       | 8-11<br>235/80-275/80<br>225/75-295/75 | 12-16.5<br>295/80-315/80<br>305/75-445/65<br>425/50-495/45 |
| Width           | Length                              |                                  |                                  |  |  |
| 1/4" (6mm)      | 1/4" (6mm)                          | 1/4" (6mm)                       | 10 or 11                         | 10HD or 111                            | 10HD or 111  |
|                 |                                     | 1/4" (6mm)                       | 10                               | 20                                     | 20   |
|                 |                                     | 1/4" (6mm)                       | 22                               | 24                                     | 26   |
| 5/16" (8mm)     | 5/16" (8mm)                         | 5/16" (8mm)                      | 12 or 111                        | 12HD or 111                            | 12HD or 111  |
|                 |                                     | 5/16" (8mm)                      | 12                               | 20                                     | 20   |
|                 |                                     | 5/16" (8mm)                      | 22                               | 24                                     | 26   |
| 1 Cable         | 1 1/2" (40mm)                       | 3/8" (10mm)                      | 20 or 112                        | 20 or 112                              | 20 or 112  |
| 1 Cable         | 3 1/8" (80mm)                       |                                  | 20                               | 20                                     | 20   |
| 1 Cable         | 4 3/4" (120mm)                      |                                  | 22                               | 24                                     | 24   |
| 1 Cable         | 6" (150mm)                          |                                  |                                  | 24                                     | 24   |
| 2 Cables        | 3/4" (20mm)                         |                                  | 26                               | 26                                     | 26   |
| 2 Cables        | 1 1/2" (40mm)                       |                                  | 20                               | 20                                     | 24   |
| 2 Cables        | 2 3/8" (60mm)                       |                                  | 20                               | 24                                     | 24   |
| 2 Cables        | 2 3/8" (60mm)                       |                                  | 22                               | 24                                     | 26   |
| 2 Cables        | 5 1/8" (130mm)                      |                                  |                                  | 26                                     | 26   |
| 3/8" (10mm)     | 1 1/2" (40mm)                       |                                  | 20                               | 26                                     | 40   |
| 3/8" (10mm)     | 2 3/8" (60mm)                       |                                  | 22                               | 26                                     | 40   |
| 3/8" (10mm)     | 3 1/8" (80mm)                       |                                  | 26                               | 40                                     | 42   |
| 3/8" (10mm)     | 5 1/8" (130mm)                      |                                  |                                  | 42                                     | 44   |
|                 |                                     | 3/8" (10mm)                      | 24                               | 26                                     | 26   |
| 1/2" (13mm)     | 1 1/2" (40mm)                       | 1/2" (13mm)                      | 22                               | 33 or 40                               | 33 or 40   |
| 1/2" (13mm)     | 2 3/4" (70mm)                       |                                  | 22                               | 40                                     | 40   |
| 1/2" (13mm)     | 3 3/4" (95mm)                       |                                  | 22                               | 40                                     | 42   |
| 1/2" (13mm)     | 3 3/4" (95mm)                       |                                  | 40                               | 42                                     | 42   |
| 1/2" (13mm)     | 5 1/8" (130mm)                      |                                  |                                  | 44                                     | 44   |
|                 |                                     | 1/2" (13mm)                      | 40                               | 40                                     | 40   |
| 3/4" (20mm)     | 1" (25mm)                           | 3/4" (20mm)                      | 22                               | 33 or 40                               | 35 or 42   |
| 3/4" (20mm)     | 2 1/2" (65mm)                       |                                  | 22                               | 40                                     | 40   |
| 3/4" (20mm)     | 2 1/2" (65mm)                       |                                  | 24                               | 42                                     | 42   |
| 3/4" (20mm)     | 4 3/8" (110mm)                      |                                  |                                  | 42                                     | 44   |
| 3/4" (20mm)     | 5 1/8" (130mm)                      |                                  |                                  | 44                                     | 44   |
|                 |                                     | 3/4" (20mm)                      | 40                               | 42                                     | 42   |
| 1" (25mm)       | 2" (50mm)                           | 1" (25mm)                        | 33 or 40                         | 35 or 42                               | 37 or 44   |
| 1" (25mm)       | 3 1/4" (80mm)                       |                                  | 40                               | 42                                     | 44   |
| 1" (25mm)       | 4" (100mm)                          |                                  |                                  | 42                                     | 44   |
|                 |                                     | 1" (25mm)                        |                                  | 44                                     | 44   |
| 1 1/4" (32mm)   | 2" (50mm)                           | 1 1/4" (32mm)                    |                                  | 44                                     | 44   |
| 1 1/4" (32mm)   | 3 1/8" (80mm)                       |                                  |                                  | 35 or 42                               | 37 or 44   |
| 1 1/4" (32mm)   | 4" (100mm)                          |                                  |                                  | 42                                     | 44   |
|                 |                                     |                                  |                                  | 44                                     | 44   |
|                 |                                     |                                  |                                  | 44                                     | 46   |

## A-B NON-REPAIRABLE AREA

Passenger Tires 1 1/2" (40mm)

## TRUCK TIRE A-B NON REPAIRABLE AREA

6.50-7.00 (165-195) 2 1/2" (65mm)

7.50-16.00 (205-385) 3" (75mm)

17.5-23.5 (425-600) 3 1/2" (90mm)

## AG TIRE A-B NON REPAIRABLE AREA

13.6-16.9 (345-430) 4" (100mm)

18.4-20.8 (465-530) 4 1/2" (115mm)

23.1 & Larger (585 & larger) 5 1/2" (140mm)

NOTE: THIS SECTION REPAIR CHART IS A GUIDELINE ONLY. LOAD, SPEED AND HIGHWAY APPLICATION CAN AFFECT THE LIMITATIONS OF SECTION REPAIRS.

# Procurement Support



TECH has experience with many different procurement processes and programs.

Additionally, we offer our own online procurement portal called J.O.E. (Just Order Electronically). J.O.E. is an easy-to-use platform that features a virtual catalog for ordering, detailed product information, training materials, order status/tracking, invoices, and order history.

J.O.E. can be set up to include products and materials specific to each customer. Orders are sent directly to our shipping department once placed through J.O.E.

## Contact TECH



A **TRC** Company

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