

SOUL



# **SUNSOUL REPAIR MANUAL**

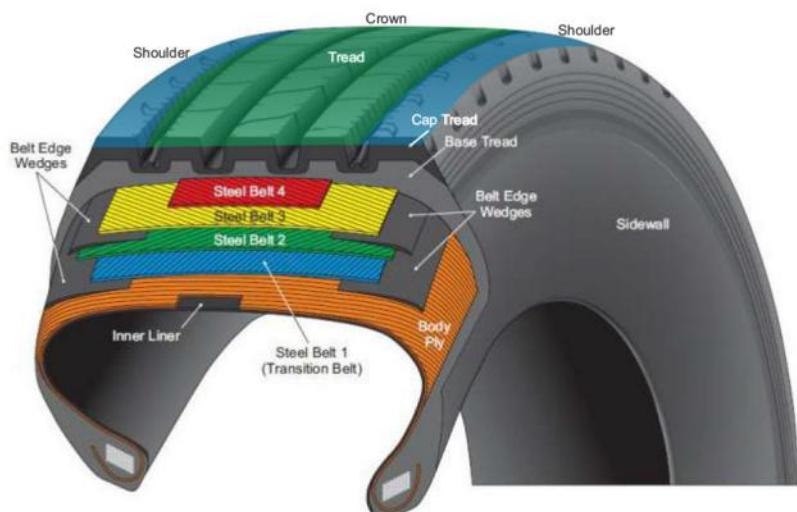
## **Radial Tire Patch Repair Methods**

FOR CAR, LIGHT TRUCK, MEDIUM & HEAVY TRUCK  
TRACTOR, GRADER & EARTH MOVER AND INDUSTRIAL TIRES

# TIRE CONSTRUCTION BASICS

## TIRE CONSTRUCTION BASICS

### Radial Tires



Radial tires are constructed by placing one to two layers of fabric cords or a single layer of steel cords from the bead on one side of the tire, directly across to the bead on the other side. The cords run at a 90° angle to the beads and wrap around the steel bead bundles. The crown area of the tire is reinforced and stabilized by multiple layers of belts wrapped around the circumference of the tire. These belts may be a combination of fabric and steel layers, or all steel depending on whether the tire is a light truck or medium truck tire.

The beads of the tire serve as the anchoring points of the tire's internal reinforcement structure and must precisely fit the rim's mating surface. This part of the tire is considered non-repairable if the body plies or steel bead bundle is exposed or damaged.

Radial tires flex differently than bias tires. The sidewalls, reinforced with a single ply, flex outward as they pass through the footprint of the tire. The tread or crown area of the tire remains flat, providing an even footprint due to the belts acting as stabilizers.

In order to successfully repair a radial tire, the repair unit must flex in the same manner as the tire. When aligning a radial repair unit in the tire, it is extremely important to align the repair's reinforcement with the radial ply. The repair unit has directional arrows that must point toward the beads.

The dimensions of a tire are identified in the tire's size. For example, the information provided in tire size **P265/60R18** gives the following information:

**P** = Passenger Tire (light truck tires begin with prefix LT)

**265** = Section Width in millimeters (measured at the widest part of the tire sidewall to sidewall)

**/60** = Aspect Ratio or section height to width ratio in % (for this tire, 265mm X .60 = 159mm sidewall height)

**R** = Radial tire

**18** = Rim diameter in inches

An example of a truck tire size is **11R22.5**

**11** = Section width in inches

**R** = Radial tire

**22.5** = Rim diameter and type (Rims with ".5" in the rim size are tubeless or drop-center rims, while rim sizes which are whole numbers such as 20, are typically multi-piece, tube-type rims)

On passenger and LT tires, a service description is stamped next to the tire's size. This service description will identify the tire's load index and speed rating.

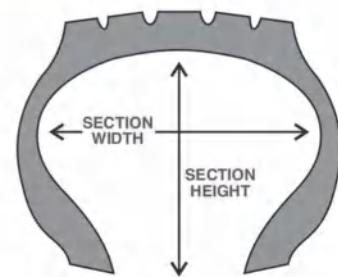
The load index will consist of a two or three digit number indicating the tire's load carrying capacity.

Speed Index is a letter designation identifying the tire's maximum speed threshold. Exceeding either of these limitations may lead to premature tire failure due to over-flexing and/or heat fatigue.

For example: **P265/60R 18 110H**

**110** = maximum load of 2337 pounds

**H** = maximum speed of 130 MPH



SPEED RATINGS		
Letter	MPH	km/h
S	112	180
T	118	190
U	124	200
H	130	210
V	149	240
Z	149+	240+
W	168	270
Y	186	300
(Y)	186+	300+

Another component of the tire to be aware of is the date the tire was manufactured. Every tire used in highway applications is required to have a DOT code stamped on the sidewall. This code starts with the letters "DOT" to signify that the tire meets Department of Transportation standards for highway use. The last four digits of the DOT code identify the date the tire was manufactured by week and year. The first two digits of the date signify the week the tire was manufactured in while the last two digits indicate the year. For example, a tire manufactured 3516 was manufactured the 35th week of the year 2016. There are currently no regulations stating a maximum age for tires in use, but age should be a factor in determining whether a tire should remain in service.

When inflating a passenger tire, always refer to the Tire and Loading Information placard located on the driver side door jamb. This placard will identify the proper inflation pressure and maximum load for the OE tires. When inflating LT, medium and heavy tires, it is recommended to refer to the Tire and Rim Association's Load & Inflation tables for recommended operating pressure. Failure to maintain proper inflation pressure can result in many unfavorable conditions for the tire. Under inflation will result in faster, irregular wear of the tire's tread and may also lead to higher fuel consumption for the vehicle. This condition may also lead to premature tire failure.

# Tire Inspection

A thorough inspection of the casing is critical to ensuring that the repair being performed will be worth the investment. In order to perform a proper inspection of the casing, the technician will need to be well educated on inspection procedures and have a few basic tools and proper lighting at their disposal.

## Recommended Tools for Tire Inspection:

- Tire thread depth gauge such as: AB002P
- TRT08A Probe
- Minimum 200 lumens work light such as: SSLP-408

Tires should not be repaired if any of the following conditions are present:

### 1. External

- Damage to the cords that exceeds the limitations in the Standard Bias Tire Patch Application Chart
- Broken, damaged, kinked or exposed bead bundle (See Image 7 on page 5)
- Weather checking which exceeds 2/32" (1.6mm) (See Image 9 on page 5)
- Multiple injuries to the same body cord(s)
- Tires with 2/32" (1.6mm) or less remaining tread depth unless planned for retreading (See Image 5 on page 5)
- Radial and/or circumferential cracking
- Any signs of a potential zipper rupture (ripples, bulges, or softness in the upper sidewall, or crunching or popping sounds when flexed)

### 2. Internal

- Porous or loose inner liners
- Open liner splices which expose body cords
- Injuries to the body cords beyond repairable limits
- Evidence of run-flat or overloading damage such as wrinkled, creased or discolored inner liner (See Image 2 on page 5)
- Injuries in the non-repairable bead area to the body cords
- Impact breaks (See Image 10 on page 5)

When inspecting Steel body ply LT, medium or heavy truck tires returning to service, it is important to understand the risks of potential zipper ruptures. When working with these tires, it is required by the Occupational Safety and Health Administration to check the tire pressure prior to servicing the tires. If the pressure is at 80% or less of its recommended operating pressure, the tire must be dismounted and inspected for a potential zipper rupture.

Zipper ruptures are circumferential ruptures in the sidewall caused by operating the tire in an under inflated and/or overloaded condition. These conditions allow for over flexing of the sidewall which can result in overheating of the casing and potential catastrophic tire failure. It is always recommended to inflate these tires with the valve core removed, in a safety cage with a clip-on chuck and sufficient length of air hose to keep the technician away from the sidewall of the tire during the inflation process.



Zipper Rupture in a Light Truck Tire with steel body plies.

# Tire Inspection

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



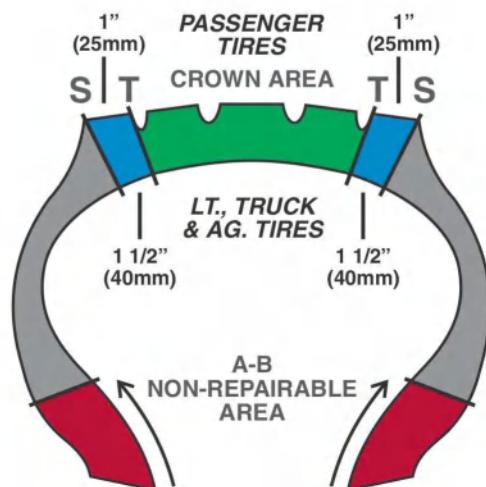
10. Tire damage from impacts



# PROPER PUNCTURE REPAIR

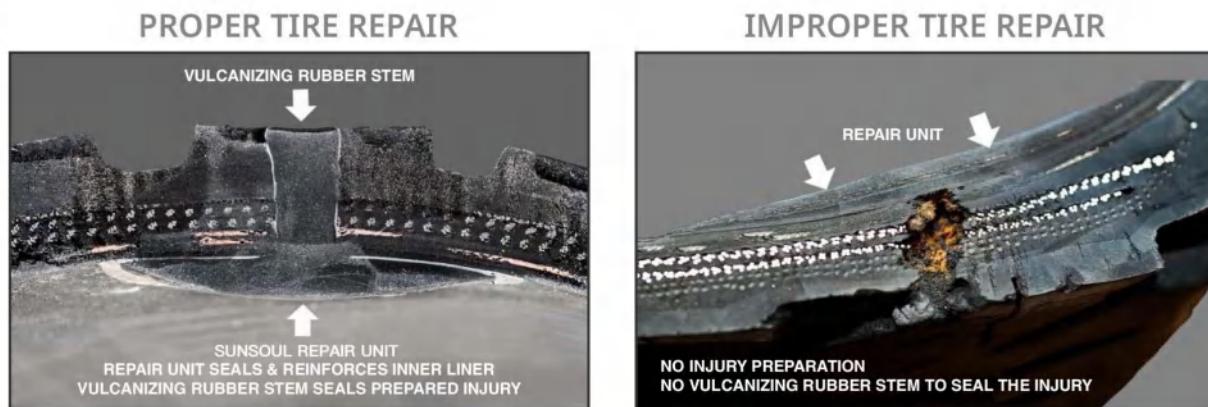
## Industry Guidelines

When repairing punctures in tires it is important to be aware of tire industry guidelines and recommendations. When repairing tires, puncture repairs are limited to the Crown (T-T) area of the tire. The maximum size is dependent upon the type of tire being repaired. Passenger and fabric body ply LT tires have a maximum puncture repair size of 4" (6mm) after damage removal. Steel body ply LT, medium and heavy truck tires have a maximum puncture repair size of 3/8" (10mm) after damage removal.



In order to perform a proper, permanent puncture repair on a tire, the following steps must always be used:

- Removal of the tire from the rim so proper inspection may be performed
- Removal of the damaged material with a carbide cutter
- Fill the injury with a vulcanizing rubber stem (or rope rubber in a heat cure application)
- Reinforce and seal the injury with a repair unit
- NEVER use a plug only or patch only repair



There is no tire industry limit to the number of puncture repairs that may be performed in standard passenger, LT, medium or heavy truck tires. Multiple repairs may be performed so long as the injuries are far enough apart that the repair units will not overlap and they are offset so that the injuries are not damaging the same body plies in a radial tire. In a bias tire, the injuries must be limited to one per quadrant. When repairing high-performance tires with speed ratings of H or higher, or run-flat tires, does place a limit of one repair on the tire.



# SUNSOUL Radial Tire Patch-SRD



## • Features

- Each reinforcing ply is specifically end-cut and wrapped to "float" inside the patch to prevent end cracking or breakout common in competitive products. Extremely strong yet very flexible.
- Sunsoil radial-ply repair units to meet the diverse demands of passenger, truck and OTR tires applications.
- Designed to vulcanize chemically in low temperature or high heat curing systems.
- Due to our fully-integrated green bonding layer and center over injury design. Sunsoil radial-ply repair units are suitable for use with all current vulcanizing system.

SUNSOUL code	Description	Plies	Size(mm)	pcs/box	box/ctn	Car	Truck	OTR	Excavator	Tractor
SRD-110	Radial repair unit	1	55*75	20	48	●				
SRD-112	Radial repair unit	1	70*120	10	48	●				
SRD-114	Radial repair unit	1	85*130	10	36	●				
SRD-115	Radial repair unit	1	75*90	20	36	●				
SRD-116	Radial repair unit	1	70*100	10	48	●				
SRD-120	Radial repair unit	2	80*125	10	36		●			●
SRD-122	Radial repair unit	2	75*175	10	32	●	●			●
SRD-124	Radial repair unit	2	75*220	10	24	●	●			
SRD-125	Radial repair unit	3	115*125	10	24			●		
SRD-126	Radial repair unit	3	75*260	10	16			●		
SRD-128	Radial repair unit	3	75*320	10	12			●		
SRD-135	Radial repair unit	4	150*200	10	8	●	●			
SRD-140	Radial repair unit	3	100*195	10	12	●	●			
SRD-142	Radial repair unit	4	130*260	10	8	●	●	●		
SRD-144	Radial repair unit	4	130*335	5	8		●	●		
SRD-146	Radial repair unit	4	180*440	5	8		●			●

# List of Radial Tire Patch Repair Materials



Number	Product Name	Model
1	Inner Liner Scraper	ABT-14B
2	Wood Handle Stitcher	T-15-6
3	Injury Checking Tool	TRT08A
4	Air Drills	AT-4031B
5	Carbide Cutter	SSCB-346-6
6	T-Handle Knurled Probe	TRT10-2F
7	Tire Nail Removal	NT-240
8	Wire Brushes	SSS-1080
9	Tire Crayon	TC-12Y/TC-12W
10	Radial Tire Patch	SRD Series
11	Gloves	SSNPG-02
12	Rubber Cement	GRC-250
13	Inner Liner Sealer	ILS-500
14	Liquid Tire Buff and Cleaner	LCR-946
15	Safety Glasses	SG-01
16	Spray Rubber Buff Cleaner	SRC-450
17	Air Vacuum	FVG-300P
18	Buffing Wheel	SSS-1009
19	Air Buffer	AT-7070C

# Buffing & Cement Application



**1** Locate and use Crayon to mark all damage on the inside and outside of the tire. Mark the area according to the size of the patch on the inside.



**2** Apply Pre-buff cleaner. Scrape away contaminants while the pre-Buff still wet. Repeat process 2 - 3 times.



**3** Lightly buff the repair area using a low-speed buffer (< 5000 RPM) with a buffering rasp, 18 to 36 grit. Use a low-speed wire brush buffer (< 5000 RPM). Remove buffering dust and debris from the buffed area.



**4** Use an air vacuum to thoroughly remove any scraps and residue. Apply Rubber Cement GRC-250 to the buffed surface. Allow to dry 1-3minutes. Allow additional drying time in cold or humid conditions.



Pls always choose sunsoul  
rubber cement GRC-250 series



## SUNSOUL TIP:

- 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.
- Always use SUNSOUL #SSS-1080 wire brush to remove buffering dust and debris which should be applied before use air vacuum.
- Do not use any outside heat sources or open flame to shorten the drying time of vulcanizing fluid. This will adversely affect the vulcanizing fluid and potentially lead to premature repair failure.

# Roller Compaction & Sealing



**5** Remove the poly film from the back of the repair. Exposing only the middle portion of the repair. Center the repair over the injury. Press down the center with your thumb.



**7** Continue stitching toward the edges of the repair till press completely.

**8** Use Inner Liner Sealer to Seal the edges of the repair unit and the over buffed area.



**SUNSOUL  
TIP:**

## SUNSOUL Inner Liner Sealer ILS-500

are designed to replace the inner liner that was removed during the buffing process and promote better air retention.

**Warranty** Radial Tire Patch repair is 24 months and storage in room temperature 15-26°C.



**Focus on Tire Repair,Tire Retreading and Car workshop 20+ Years**

Sunsoul export our products to more than 60+ countries

Our complete line of Radial Tire Patch Repair all have a specific advantage. Watch this quick video to learn more!



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