Recommended Practice - RP-01-11
Updated 5/2020

PRECURED RETREADING OF TRUCK TIRES

Tread Rubber and Tire Repair Materials Manufacturers' Group

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I. INTRODUCTION

This Recommended Practice (RP) categorizes methods of retreading truck tires with precured treads. Retreading methods using precured treads are those in which the tread is supplied to the retreader with the tread design fully cured into the rubber. The tread is adhered to the buffed casing by means of a vulcanizable cushion.

II. INSPECTION

As in any good retreading system, a retread is only as good as its basic casing. Careful casing selection and strict inspection standards must be followed. Follow the inspection procedures recommended by the precured tread manufacturer, a recognized retreading association or new tire manufacturer. Detailed inspection guidelines can also be found in the TRMG Industry Recommended Practices for Tire Retreading and Tire Repairing (IRPs).

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.

III. BUFFING

Accurate buffing of the tire crown is essential due to the fixed base dimensions of the cured tread rubber and casing. Care must be taken to follow precure tread and buffer manufacturer's inflation pressure, and other recommended operating procedures.

A. Radius - For bias and radial tires, the radius of the buff must be selected so as to remove all existing tread design grooves and reduce the undertread. In addition, for radial tires, it is important to determine how much undertread is over the top belt. To do this make three pilot skives down to the belt equally spaced around the casing.

Buff the tire until the depth of the pilot skive is 2/32" to 4/32" (1.5 mm to 3 mm) deep. Do not buff into the protector belt on radials, or protector or breaker cords on bias tires.

The designated radius should be centered on the tire with equal shoulder heights. The finished tire should be as close as possible to the tire manufacturer's specified retreading radius. For this information, consult the precured supplier or new tire supplier.

B. Buffed Surface - All frayed cord should be trimmed back to solid rubber. The buffed surface should be free from contamination and have a texture equivalent to a TRMG BT3 or BT4 buffed texture (see RP 01/02-23 "BTS6 - Standard Buffing Textures for Tire Retreading and Repairing"). Be sure to follow precured tread/cushion manufacturer's recommendations. In addition, the buffed surface should be examined and penetrations of tread cuts skived to remove injured material.

C. Buffed Crown Width - The buffed crown width must fit the base of the precured tread chosen. Tire shoulders should be trimmed 3/8" (10 mm) maximum with an angle of 30° to 45°, if necessary, to blend with the tread width after cure.

Deep fluted shoulders should be trimmed so that the precured tread edges are adequately supported. Hand buffing and build-up may be necessary.

D. Tread Design - Follow the precured tread/tire manufacturer's recommendations to select a proper tread design for the tire application, and tread width for tire condition. Generally, the specified tread width will be as close to the original new tread width as possible, or a maximum of 3/8" (10 mm) less than the tread specified.

NOTE:
From this point on, store tires only by hanging them on a "T" rack or monorail to prevent contamination. Also, wait time to build should be minimized in order to avoid contamination or oxidation. If wait time exceeds two hours, the surface should be brushed to remove possible contamination or oxidation before applying cement or cushion.

IV. REPAIRING

In general, follow recommendations shown in the RP documents listed below and the TRMG IRPs:

- RP-02-02 - Repairing Bias Ply Truck Tires In A Full Service Repair Facility
- RP-01-03 - Retreading Bias Ply Medium Truck Tires
- RP-02-17 - Section Repair of Radial Ply Truck Tires in Full Service Repair Facility

All repair materials used in filling skives should be trimmed flush with the buffed surface to avoid distortion in the finished tread. To prevent contamination or scorching on uncured repair material, do not use a hot knife.

V. CEMENTING

Cementing should be done in accordance with the method and material recommended by the precured tread supplier. See also RP-01/02-04 - Solvent-Based Cements Used for Tire Retreading and Repairing and the TRMG IRPs.

VI. BUILDING

Care must be taken to follow precured tread and builder manufacturer's inflation pressure and other recommended procedures when applying cushion and building the tire.

Treads and cushions are supplied in three ways:

1. Rolls of cushion applied to tread with a film protector.
2. Cushion in the form of strip or any other form to be applied to the tire by means of an extruder.
3. Tread buffed, cemented, and film protected.

A. Cushion

Several application methods are used:

1. Cushion applicator - cushion applied to buffed base of precured tread.
2. Cushion applied separately to buffed casing on builder.
3. Builder - cushion and tread simultaneously being applied to the tire.

In all cases, the cushion should be centered on the tread or casing depending on the method used, and then stitched to the buffed surface under pressure to remove trapped air.

NOTE:
If the cemented surface of the casing or tread is contaminated by dirt or dust, or is dull, dry, or oxidized, etc., it must be cleaned and recemented before applying cushion gum.

Follow manufacturer's recommendations for age limits and storage requirements of precured treads, cushion gums, cements, and repair materials.

B. Tread

1. The tread and cushion should be centered around the buffed circumference of the tire +/- 1/8" (3.0 mm) from the centerline.

2. Cut the tread to approximately the same length as the center line circumference of the tire. Tread design should match as closely as possible at the splice.

3. Cut tread ends squarely to ensure a proper match. Then, tread ends should be texturized, cemented, and a layer of cushion gum applied between the ends. Consult precured tread manufacturer for proper type and application.

4. The splice should be made with the tread in a relaxed condition or under slight compression. A blunt tool should be used to force the precured tread ends against the splice gum to ensure good adhesion at the splice. To ensure the splice remains closed, use staples as necessary. Stitch down the complete tread with a stitcher or builder-applicator to avoid trapping air, pulling the tread off center, and distorting, folding or wrinkling in the shoulders.

VII. HANDLING BUILT TIRES

A. Do not stand or roll tires on the tread prior to curing.

B. Store tires only by hanging them on a monorail or "T" rack.

C. Follow precured tread and cushion gum manufacturer's recommendations for storage.

VIII. CURING

There are four basic methods of curing which are used to bond a precured tread with uncured cushion to a properly prepared casing through the proper application of heat, pressure, and time. Specifications for curing time, temperature, pressure, and proper use of curing envelopes, curing tubes, and curing rims (when used) should always follow equipment manufacturer's recommendations. It is also necessary to follow precured tread rubber and cushion manufacturer's specifications and recommendations for proper use of their materials to achieve a completely satisfactory bond between casing and precured tread. **All safety requirements must be followed.**

Additionally, these four basic methods of curing could be used with horizontal and/or vertical chambers. Since various curing temperatures are recommended for different methods of curing, it is important that the curing characteristics of all materials be compatible with each other and the method chosen. The materials' suppliers should be consulted for recommended cure times and temperatures for the methods used. In addition, sufficient pressure is required to ensure proper cushion flow and adhesion to the tread and casing. The amount of pressure applied, is based on the type of retread system being used.

Chambers should have **all** safety features recommended by the chamber manufacturer or by the safety recommendations given by the local authorities.

When using these methods, select envelopes to properly fit and seal on the tire. Inspect the envelopes for damage or leaks before loading the chamber and after curing. Wicking material may be specified by the equipment or tread rubber manufacturer to allow air to escape from between the envelope and the tread.

A. Method I: Module System

1. The tire forms an integral part of the vessel.

2. The tire is inflated with a curing tube and mounted on a rim. Use low pressure (i.e., 20 psi maximum) to load the chamber.

3. Envelope seal is tire to tire, tire to seal plates, or tire to vessel. (One side of the top tire and one side of the bottom tire seals to the vessel.)

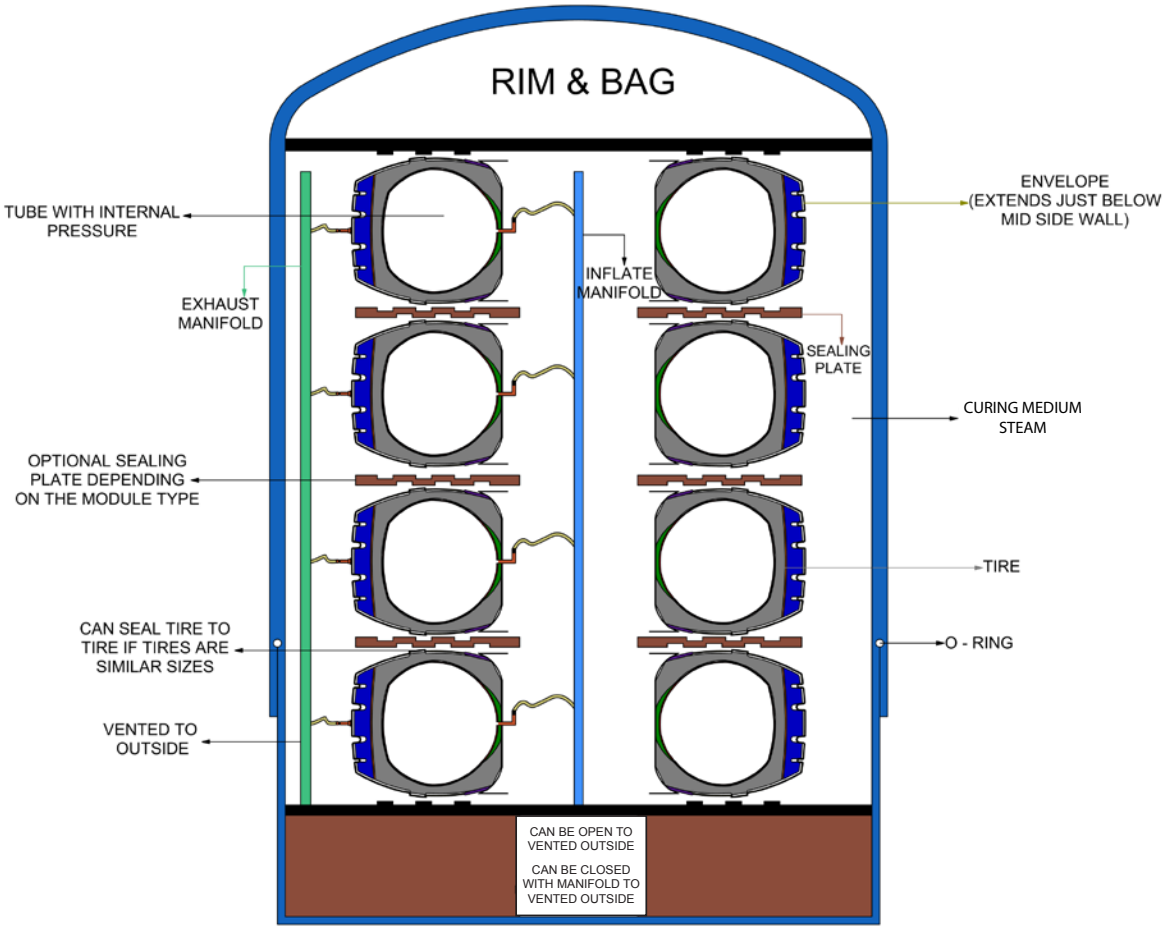
Internal air (i.e., raising the pressure to the curing pressure recommended) and steam pressure causes the tires to seal sidewall to sidewall using the sealing plates and both sides of the vessel. The tire becomes an integral part of the vessel, and thus will not hold pressure unless inflated.

Steam is injected into the sealed chamber to provide the necessary heat and pressure for curing. The internal tire pressure is higher than the external pressure within the chamber.

WARNING

Not all curing rims are designed for use in this high pressure method. Use only manufacturer approved high pressure rims with this method. Failure to follow these recommendations could result in the tire and/or rim bursting with explosive force causing serious injury or death.

METHOD I
MODULE SYSTEM



B. Method II: Rim and Bag System

1. The tire is not an integral part of the vessel.

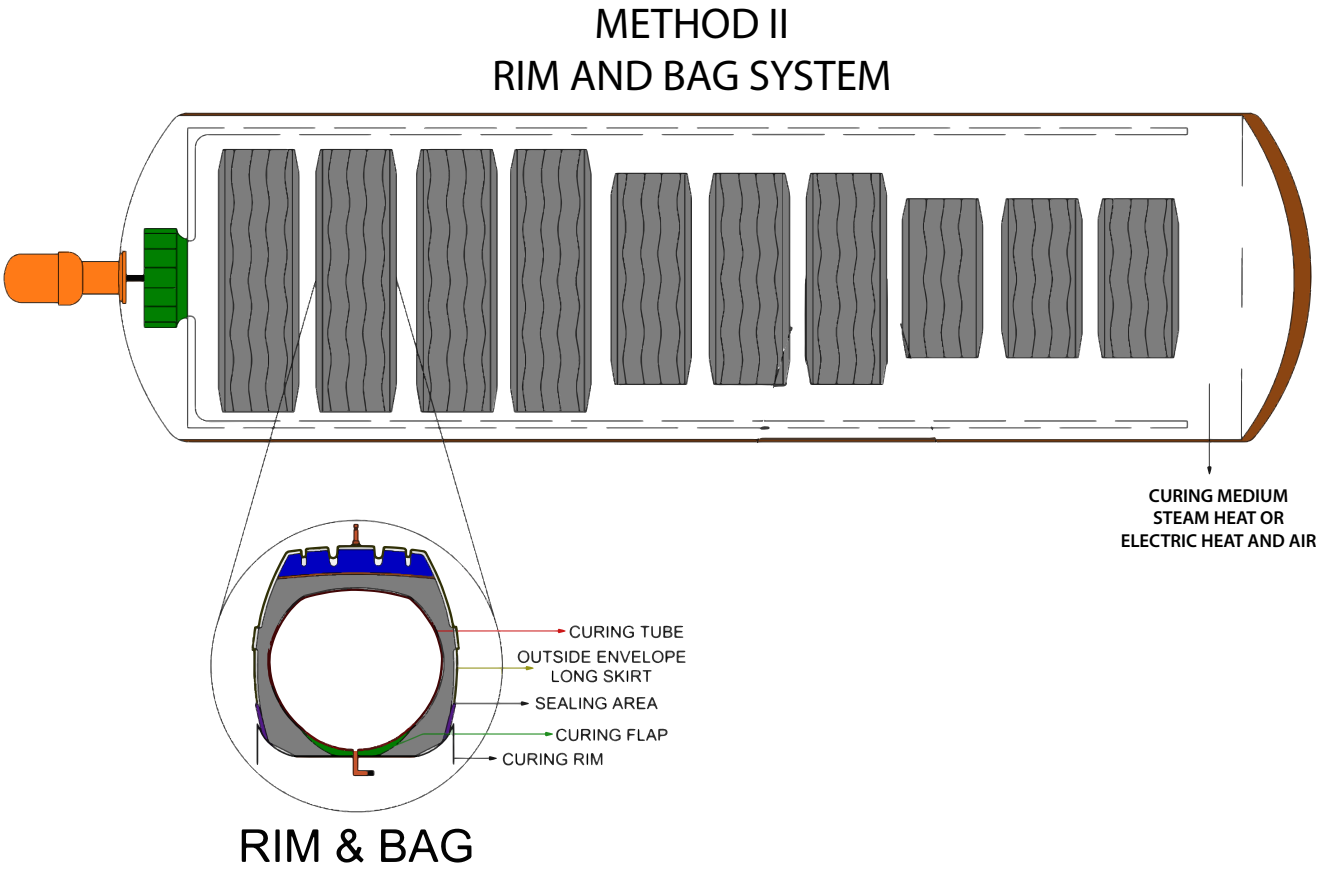
2. The tire is equipped with a curing tube and mounted on a rim and inflated. (Note: Do not inflate the tire with more than 20 psi). During the curing cycle, air pressure inside the tire is higher than pressure in the vessel.

3. The outside envelope is sealed between the tire and rim flange assembly by the air pressure in the tire (15 -20 psi).

Tire internal air pressure causes the tire and envelope to seal at the tire bead area.

Use an approved curing rim with this method, as recommended by the manufacturer. During the cure cycle, the internal inflation pressure is regulated to maintain higher pressure than the vessel pressure. At no time should the tire's internal pressure exceed 20 psi when outside the vessel or inside an unpressurized vessel. Follow the rim manufacturer's instructions for safety procedures.

Steam heat or electric heat and air are used to provide the necessary heat and pressure for curing. The envelope must be exhausted to the outside of the vessel. The entire tire assembly is enclosed within the vessel during curing.



C. Method III: Rimless Sealing Ring System

1. The tire is not an integral part of the vessel.

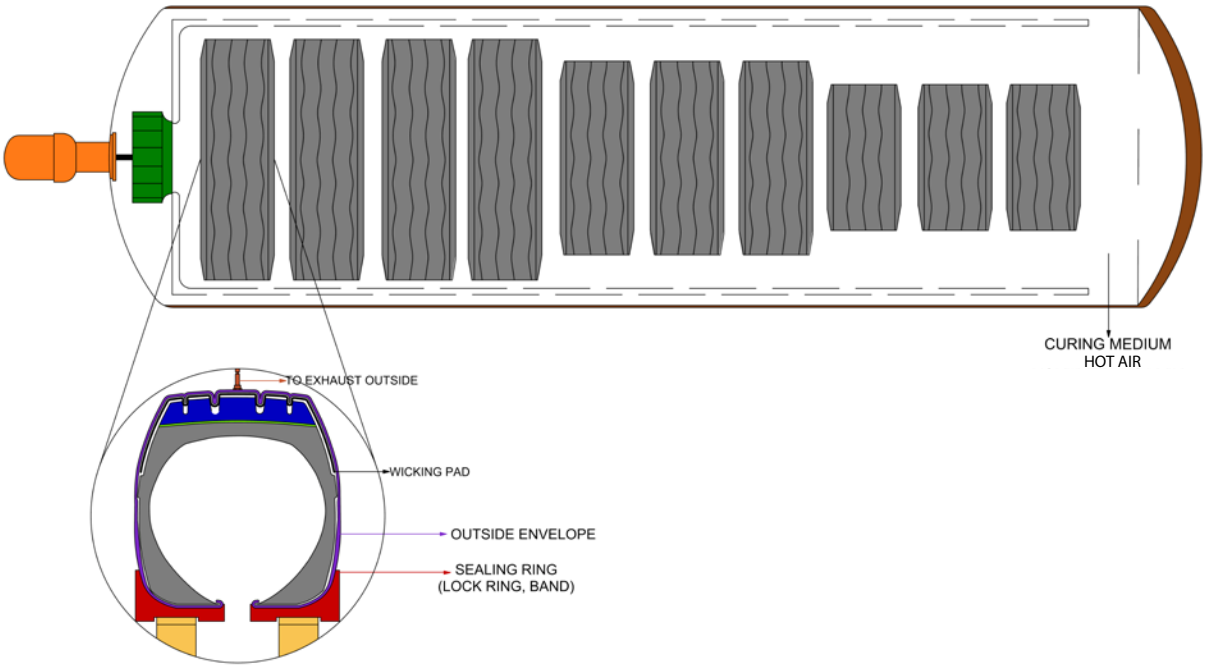
2. The inside liner of the tire is open to the vessel curing medium.

3. The individual tire's envelope is sealed with the bead base through mechanical means.

A mechanical assembly (e.g., springs, lock mechanisms, etc.) seals the envelope against the beads of the tire. The tire is open to the curing medium inside the vessel.

The tires are not mounted on a rim. Hot air inside the sealed chamber is exerted on both the inside and outside the tire equally. The entire tire assembly is enclosed within the vessel during curing. This method is recommended for radial tires only.

METHOD III
RIMLESS SEALING RING SYSTEM



RIMLESS - SEALING RING

D. Method IV: Rimless Inner Envelope System

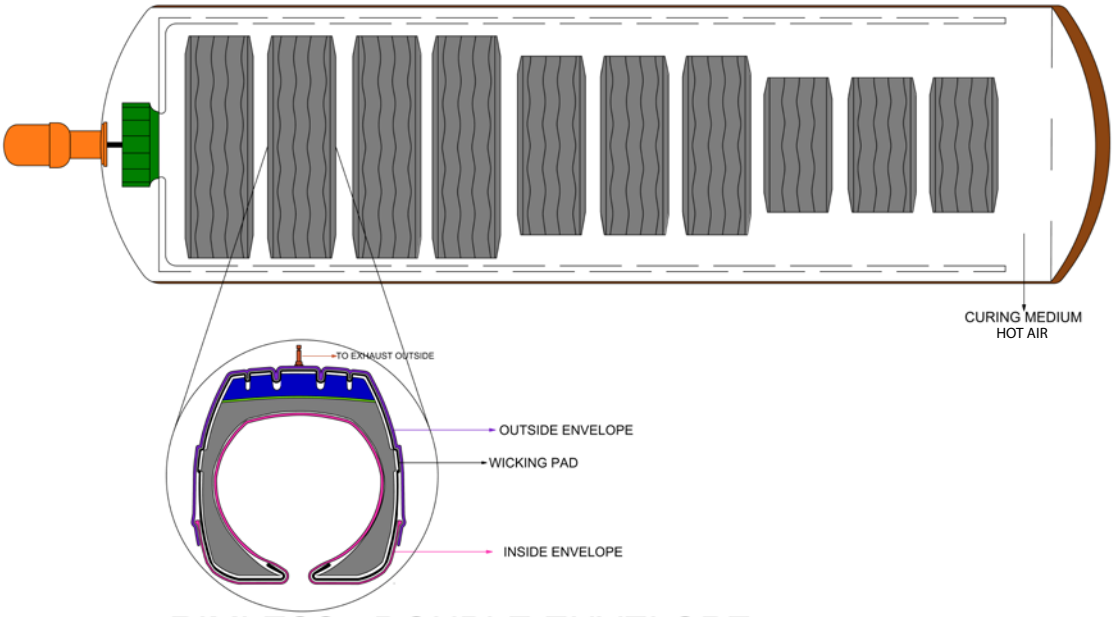
1. The tire is not an integral part of the vessel.

2. The tire is totally enclosed by overlapping inside and outside envelopes.

3. The seal is located between the envelopes.

Hot air is used to provide the necessary heat and pressure for curing. The envelope is vented to outside the vessel. The entire tire assembly is enclosed within the vessel during curing.

METHOD IV
RIMLESS INNER ENVELOPE SYSTEM



RIMLESS - DOUBLE ENVELOPE

IX. FINAL INSPECTION - TIRE AND CHAMBER

After curing, each tire, while still hot, must be placed on a well-lighted (i.e., 200 footcandles (fc) / 2153 lux (lx) minimum) spreader, and given a thorough final inspection before it leaves the shop. Any tires with non-repairable conditions must be rejected. If the tire casing has repairable conditions and the casing is sound, consider reprocessing.

Check for:

1. **Soundness of casing.** Check to see if the casing is sound after curing. Check the casing and liner for separations. Check tubeless liners and beads; bulges indicate a separation. These checks should be made while the tires are still hot.

2. **Repairs.** Check to make sure all necessary repairs were properly installed and cured with no dimples, lumps or flaws.

3. **Cushion flow.** Cushion flow at the tread junction point must be smooth, uniform, and well defined. Look for excessive cushion migration in the tread voids.

4. **Splice.** Check for open or defective splices. Remove any remaining metal staples.

5. **Tread straightness**. Make sure the tread is straight and centered.

6. **Markings.** Check retread identification for accuracy and completeness to ensure all DOT retread marking requirements are intact or replaced.

7. **Venting.** If recommended, check to see if the tire is properly vented. (Do not vent steel belted radial tires because venting allows water in which can rust the steel.)

8. **Equipment**. Check the chamber recording equipment for correct cure time (plus warm-up), temperature, and pressure.

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