

RETREADING BIAS PLY MEDIUM TRUCK TIRES

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I. INTRODUCTION

Bias ply tires are made of layers of rubber coated fabric. Nylon is the type of fabric typically used. The layers run in an alternate, diagonal direction from bead to bead. Tires will usually have plies under the tread called breakers that run in the same direction as the body ply cords. These ply serve to add strength and integrity to the casing. See Figure 1.



Figure 1

Bias ply medium truck tires are identified with a dash (“-”) between the tire width (i.e., max width of inflated tire) and the rim size (e.g., 10.00-20).

There are two methods of retreading bias ply tires: precure and mold cure. This Recommended Practice (RP) contains industry best practices for both.

Precure retreading is more tolerant to specifications with regard to buff measurements. Precure tires do not have to fit in molds that have specific tolerances.

II. INITIAL INSPECTION

Casings should be inspected on equipment capable of spreading the beads for clear internal inspection. The preferred type of equipment for this process is Non-Destructive Testing (NDT) machinery. Adequate lighting (i.e., 200 footcandles (fc)/2153 lux (lx) minimum, 300 fc/3229 lx recommended) at the work surface, and a hand held light for even closer inspection, are a must.

Casings should be thoroughly dried inside and out, and allowed to continue to dry for a period of no less than 24 hours. Neglecting this step will often cause separations once heat is applied during the curing process.

Drill venting bias ply casings should be left to the discretion of the retread plant. Opinions on whether it actually helps or hinders the retread process vary widely.

Casings should be inspected by a trained and qualified retread technician. The technician should be familiar with casing rejection criteria.

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

When buffing, the proper size expandable hub must be used. Buffing on too wide or narrow of

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a rim could change the buff dimensions. If using a fixed plate style buffer, the running rim width of the tire size being buffed should be used on the plate settings. After releasing the pressure in the casing, remove it from the expandable rim and measure the buffed casing to verify that the width and circumference values are correct or match the target values recommended. Proper inflation pressure is also critical. A pressure of 20-23 psi must be maintained without leaking. In addition, the rubber belt of the hub should be lubricated frequently.

Sharp buffing blades and a working pollution control system are needed as bias ply tires generally buff hotter than radials. Because of this, expect to change blades more often.

Buff radius is critical. Buffing radii too round or too flat can result in tread edge lifting. Consult buff radius guidebooks for the make and model of the casing to be buffed.

Buff the casing to 1/32" - 2/32" of nylon cord. Although buffing into the nylon is accepted, provided proper cleaning and debris removal procedures are followed, the general idea is to maximize tread to casing adhesion. Buffing into the nylon also requires more work at subsequent stations. The buff operator should be trained to buff in a less aggressive manner, while looking to maximize adhesion.

Casings should be buffed to an RMA #3 to #4 texture. Texture that is too rough results in a thinner layer of cured cushion gum between the casing and the tread. When this occurs, cushion will flow into larger, deeper than normal grooves, resulting in a thinner and more inconsistent layer. This in turn, can lead to tread separations and groove cracking.



Figure 2

Do not trim the casing narrower than its natural footprint for precure processing. Mold cure buffing requires special templates for template buffers or specific programming specifications for computer buffers. Buff specifications depend on the specific mold in which the casing will be cured. Many molds require a full cap buff as pictured in Figure 2.

IV. SKIVING

If any tread or regrooved design remains after the buffing process, it must be fully removed during the skive process with an air tool and appropriate buffing wheels.

Any exposed nylon cord should be completely trimmed back providing a solid foundation of rubber to which cushion gum and tread will be adhered. After all skiving has been completed, a wire brush should be used to remove all dust and loose material produced by the process. The areas should then be coated with black cement and allowed to thoroughly dry before beginning the filling or cushion extrusion process.

V. SKIVE FILLING

Any area of the buffed casing that has nylon removed needs to be string vented and filled with extruded rubber. This can be done manually or through cushion extrusion. Single strand string vent or 6" web string vent can be used. The 6" web string is preferred by most volume bias ply retreaders that use the cushion extrusion method because it allows them to secure the string to the shoulders in multiple areas so that the cushion extrusion process does not tear the string out. If nylon has been exposed in a 360° area, multiple strings or webs should be used and placed approximately 12" apart. See Figures 3 and 4.



Figure 3



Figure 4

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VI. CEMENTING

Cementing is not required if using a cementless process, although some retreaders choose to do so regardless. If a cementless process is not used, an approved black vulcanizing cement should be spray applied to the surface of the casing. Cement must be fresh (i.e., within age requirements), and sufficiently agitated prior to use. Cement should be allowed to thoroughly dry before beginning the build process.

VII. PRECURE BUILD

When the precure method is used, retreaders should be sure to build on the proper size expandable hub using the appropriate inflation pressure (i.e., 20-23 psi). It is also important to use the proper width tread rubber. Tread should not be cut short and stretched to fit because doing so can result in open tread splices. Staples should be used to close the splice.

Venting is required through the use of a wick pad. Fabric or rubber wick pads are acceptable. Wick pads **must not** be placed in the area of a splice or a joint. In addition, wick pads should be properly maintained to ensure proper air removal.

Following tread application, high temperature poly film can be applied to the casing full circle, or a single piece, slightly larger than the wick pad, can be placed under the wick pad. Application of poly film is done to help prevent the excess cushion from sticking to the curing envelope. High-temperature poly film **must** be used so it does not melt during the curing process. In addition, the high-temperature poly film should be perforated, or the operator must cut slits in it to ensure that air does not get trapped under the tread.

Precure design selection for bias ply casings is limited. Only designs recommended for bias ply casing application should be used.

VIII. MOLD CURE BUILD

When the mold cure method is used, retreaders should be sure to build on the proper size expandable hub using the appropriate inflation pressure (i.e., 20-23 psi). Casings should be built

using the program number that is designated for that size tire and mold code. It is also important to verify that all diameter and bead to bead specifications are in tolerance, and that crown center and shoulders depths are correct.

The casing should be allowed to completely cool before being placed in the mold.

Mold temperature and pressures are dictated by the method of mold curing. Cure time is established by the rubber strip manufacturer through individual thermocouples specific to each mold.

IX. CHAMBER PREPARATION (PRECURE)

The preferred method of preparing the tire for cure, is to “bag and rim” using an envelope, tube, and a two-piece locking rim. The industry maintains that this is still the only way to cure bias ply tires, and alternative methods should not be used.

X. FINAL INSPECTION

For both precure and mold cure methods, final inspection should be done just as thoroughly as initial inspection. The end product should be inspected on equipment capable of spreading the beads for clear internal inspection. The preferred type of equipment for this process is NDT machinery.

Adequate lighting (i.e., 200 fc/2153 lx minimum, 300 fc/3229 lx recommended) at the work surface, and a hand held light for even closer inspection, are a must. All patch repairs should be checked to verify proper installation and adhesion. Spot repairs should be trimmed flush with the surrounding area.

Precure products should be checked for good cushion flow in both the shoulder and splice areas. Retreaders should verify the straightness of the tread and check for proper sizing. Mold cure tires should be checked for possible buckling.

ADDITIONAL NOTES

Repair procedures involving placement of a repair unit are not covered in this RP. Retreaders should

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refer to individual repair material suppliers for specific repair guidelines. There are a variety of repair suppliers that have their own system of matching repair units and cements for various applications. Because of this, a general overview of repairing is not possible in this RP.

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