

# RETREADING BIAS PLY OFF-THE-ROAD TIRES

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## I. IDENTIFICATION OF BIAS PLY OTR TIRES

Bias ply off-the-road (OTR) tire sizes are designated with a hyphen rather than the “R” used for radial ply OTR tires (see Figure 1). For example, a tube-type 18.00-25 tire is bias ply, while the 18.00R25 is radial ply. Tires may also show the generic name of the cord material.

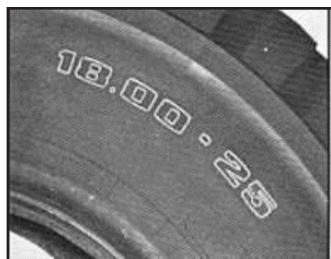


Figure 1

## II. BASIC CONSTRUCTION OF BIAS PLY OTR TIRES

While one manufacturer’s bias ply OTR tire may differ in individual features from another manufacturer’s tire, certain basic features remain constant (refer to Figure 2). These include:

### A. Body Ply (Plies)

A major difference between the construction

of a bias ply OTR tire and a radial ply OTR tire, is the direction in which the ply cords are built into the tire. In a bias ply OTR tire, the cords are placed at an angle from bead to bead. In a radial ply OTR tire, the cords are placed perpendicularly across the tire from bead to bead.

### B. Belt/Breaker Plies

Bias ply OTR tires have belt/breaker plies, which run circumferentially around the tire under the tread. These breaker plies provide protection to the body plies and give some rigidity to the tread.

### C. Body Ply and Belt Materials

Bias ply OTR tire body plies and belts generally are nylon cord, but can be made of other materials.

### D. Steel Fortified Treads

These treads feature a layer or layers of wire ply or shredded wire added just above the breakers for cut protection. This layer should not normally be removed during retreading.

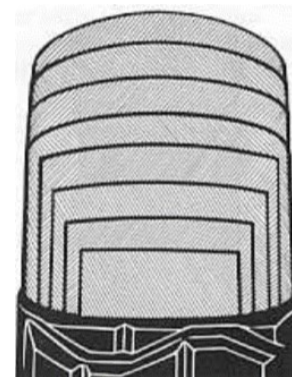


Figure 2

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### III. RETREAD PROCESSING OF BIAS PLY OTR TIRES

#### A. Inspection

Carefully inspect tires under adequate lighting (i.e., 200 footcandles (fc) / 2153 lux (lx) minimum, 300 fc / 3229 lx recommended at the work surface). Reject and do not retread tires with the following defects:

1. Ply separation in the crown, shoulder or bead areas.
2. Damaged beads including excessively bent or broken bead wires or damaged beads which expose the body cords.
3. Badly worn tires with large areas of exposed cord which cannot be repaired.
4. Injury of the cords beyond repairable limits.
5. Multiple deep cuts which cannot be rebuilt.
6. Sidewall breaks which cannot be repaired.

Examine all tires thoroughly for minor internal bulges or irregularities. These occasionally occur in newly manufactured tires, but do not impact the service qualities of the tires. It is suggested that any tires with these irregularities be identified in some manner so that after cure and at final inspection it will be recognized as an original condition of the casing and not one induced in the retreading process.



#### 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. Always wear appropriate PPE for your safety.

#### B. Buffing

Bias ply OTR tires can be buffed on any conventional buffing equipment.

Buffing is very important in the actual processing of bias ply OTR tires to attain proper end results, particularly for matrix curing. Like any buffing operation, it has three major objectives:

1. Size the tire, if required, to fit a matrix.

Since the built tire must fall within close circumferential measurements to fit the matrix, sizing starts on the buffer. Tires should be measured before buffing is started, and the operating chart consulted to determine the amount of tread to be removed to prepare the tire for the matrix.

All measurements must be circumferential around the tire at the center of the tread for maximum accuracy. The circumference after final buffing should be recorded on the tire tag or marked on the tire for use by the builder.

2. Shape the tire to the proper contour and width for the curing system used.

Crown radius and width should be as specified on the operating charts. These show the proper shape for the buffed tire. Make certain shoulders are the same height on both sides.

In addition, proper buffing will allow those tires which are to be used in a matrix to enter the matrix without interference, but will still provide sufficient contact with the matrix skirt to seal the rubber in the tread area.

3. Prepare the surface for the application of the new rubber to attain proper adhesion.

The best possible adhesion is obtained by bonding new rubber to original rubber. Highest adhesion is not obtained when bare cords are exposed. Therefore,

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every effort should be made to avoid exposing cord during buffing unless breaker damage is suspected.

Buff to a TRMG BT3, BT4, or BT5 texture (see RP 01/02-23 “BTS6 - Standard Buffing Textures for Tire Retreading and Repairing”). This can be controlled and regulated by the buffer through use of the proper rasp, regulation of the speed of rotation, and pressure of the rasp on the tire.

Tread cuts should be cleaned out removing as much rubber as needed to ensure that all damage is removed.

Inspect the tire during the buffing operation for any possible injuries or defects that might require special attention or make the tire unsuitable for retreading.

Care should be taken to avoid removal of identification labeling.

### C. Cementing and Repairing

Buffed bias ply OTR tires may be cemented and built on regular equipment.

It is important to cement any exposed cord at the completion of the buffing operation. Cement must be allowed to dry thoroughly before proceeding with further processing of the tire.

Fill cavities after cement has dried with repair gum and stitch firmly.

**BE SURE TO ADD CURING TIME FOR FILLED CAVITIES IF REQUIRED.** Mark any additional cure time on side of tire before it goes to curing.

Cement the buffed and repaired tire in preparation for the application of tread rubber.

### D. Tread Rubber Application

#### 1. Matrix Cure - Strip Application:

Build to the tread rubber die size speci-

fied on the operation chart to correspond with the buffed diameter.

Check the tread rubber for accuracy of gauge. If it is necessary to adjust the gauge of the tread rubber to obtain the desired built-up dimensions, an increase of 2/32” represents about 3/8” increase in the circumference and approximately 1/8” in the diameter of the tire.

#### 2. Autoclave Cure:

Bias ply OTR tires processed in autoclaves do not usually have a restricted diameter tolerance.

## IV. LOADING AND CURING

### A. Two-Piece Center Split Matrices

Center the tire on the bottom half of the matrix. Bring the top half into contact with the tire, keeping it parallel to the bottom half. Slowly close the mold allowing the tread rubber to warm up and displace as the mold is being closed.

### B. Segmented Matrices (Three-Piece Type)

Back jack the tire uninflated into the back section of the hinged mold. Slowly close the mold until the tire begins to distort. Partially inflate the tire and continue to close the mold very slowly. Fully inflate the tire after the mold is closed.

Close independent movement section segmented molds until the tire begins to distort. Partially inflate the tire and continue to close the mold very slowly, allowing the tread rubber to warm up and move without distorting the tire. Fully inflate the tire after the mold is closed.

### C. Autoclave

Bias ply OTR tires can normally be cured in an autoclave in the same manner as radial ply OTR tires.

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## V. FINAL INSPECTION

Inspect all tires for nonfills, porosity, and/or separations. Correct the procedures contributing to these conditions.

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