AGRO TIRE RETREADING MANUAL

VIPAL® UNIVIPAL

INTRODUCTION

Considering the importance of retreaded tyres/tires sold in the country, this manual is a reference in the tyre/tire retreading process for the Vipal, providing indication of product use and application methods concerning tyre/tire retreading, both with cold and hot cures. At the same time, this manual helps the retreader to elaborate the description of the processes/ procedures of tyre/tire retreading, which aims at meeting current legal and local standards.

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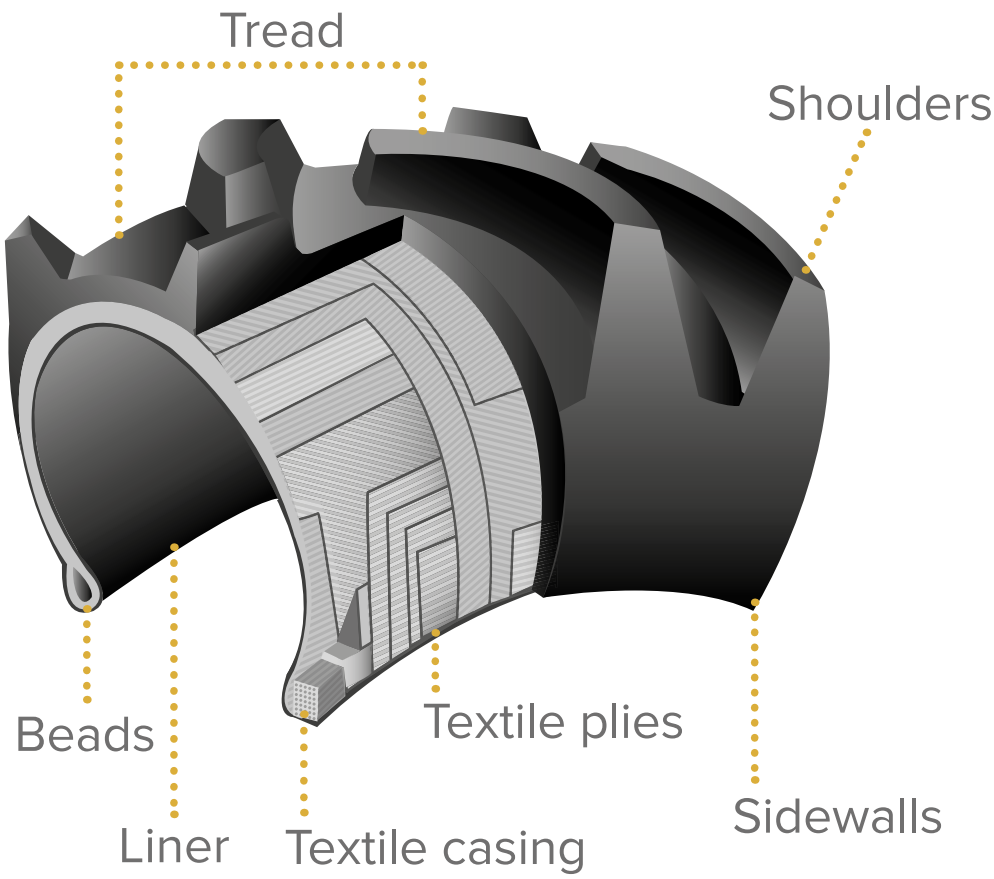
GETTING TO KNOW THE TYRE/TIRE

Tire construction



Casing: Resistant structure formed by a set of plies and eventual protection or working belts.

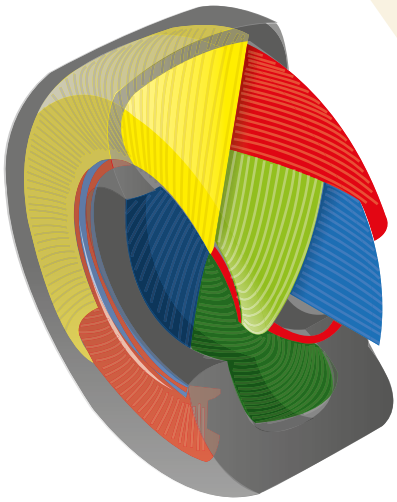
Beads: Tyre/tire part that comes in contact with the rim, ensuring its fixation to it.

Sidewalls or sides: Parts of the tyre/tire understood as the area between the tread and the beads.

Tread: Part of the tyre/tire that keeps contact with the ground. Offer wear resistance due to the composition of rubber and special chemical agents. Its carefully studied designs aim to provide good traction, stability and safety.

Liner: The layer lining the inside of the tire. In tubeless tires, it forms an air-tight seal layer.

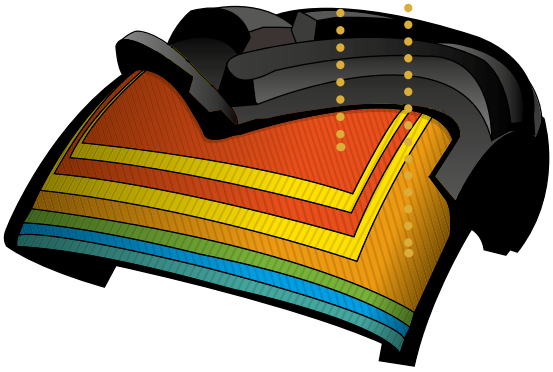
Bias ply versus radial tyre/tire



Bias ply tyre/tire: tyre/tire whose resistant structure is formed by a set of overlapped textile plies whose cables extend from bead to bead, creating alternated angles in relation to the central line of the tread.

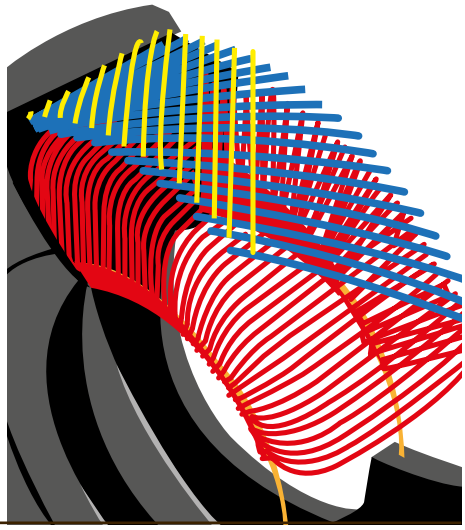
The tire's casing is stabilized by a non-expanding circumferential band

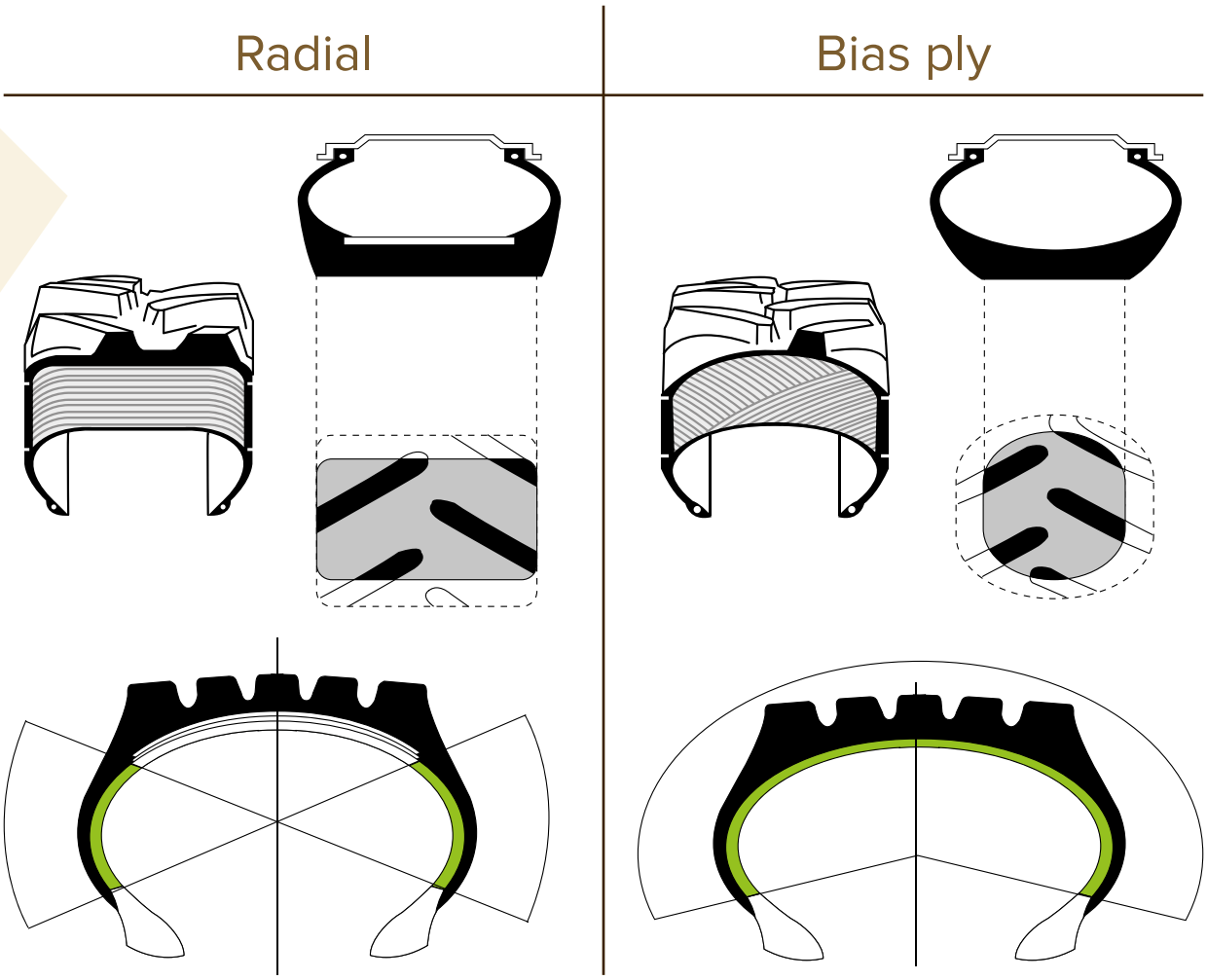
Structure of the bias-ply tire



Mixed tyre/tire construction: a carcass with bias-ply structure and steel and nylon circumferential belts.

Radial tyre/tire: Tyre/tire whose resistant structure is formed by plies whose cables extend from bead to bead, creating angles of about 90° in relation to the central line of the tread. This structure is stabilized by a set of circumferential belts.





The tires are designed to withstand as much deflection as possible according to the manufacturer's instructions.

Tire behavior according to build:

• **Radial:** the sides of radial tires follow operator commands better. They offer greater deflection due to their structure type while maintaining a wider area of contact with the ground.

• **Bias-ply:** the sides of bias-ply tires present less deflection due to the structure type (more plies used in construction).

• **Belted Bias-ply:** these are tires with combined radial and bias-ply build. The tire has a radial tread and bias-ply sidewall. Their main feature is high fluctuation, with wide contact area.

TUBETYPE SET:

Tube type tire: consisting of a tire and an inner tube mounted on a rim with specific dimensions. Possible components of the pneumatic assembly are:

a) Rim: Rigid part of the pneumatic set, with determined profile and diameter, destined to support the tyre's/tire's beads.

b) Inner tubes: Toroidal-shaped tubes, with valve, whose function is to contain the fluids under pressure of the interior of the pneumatic set.

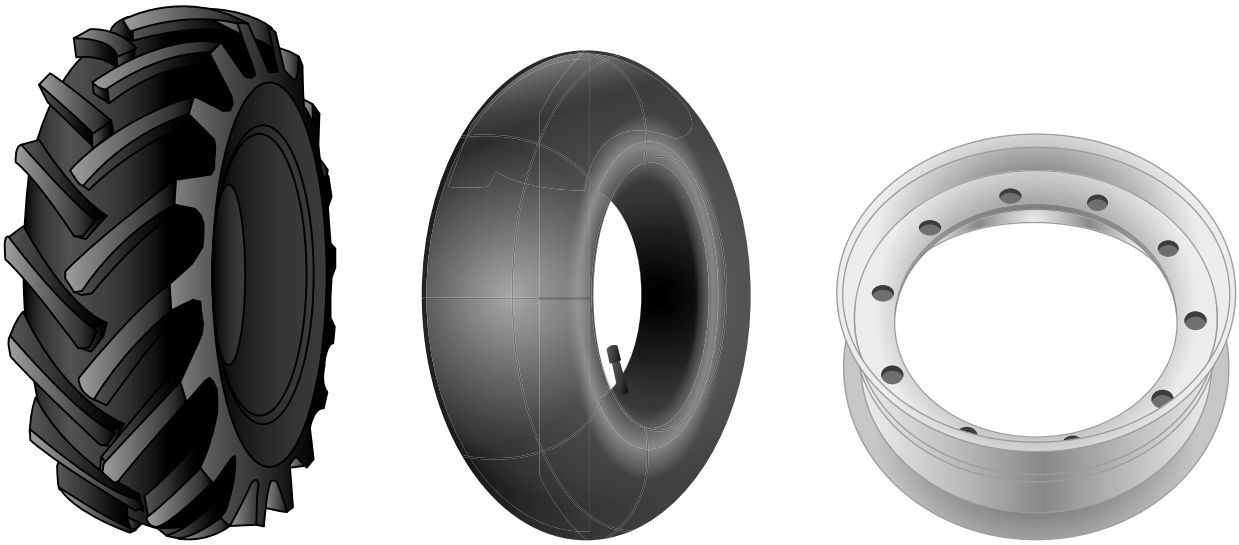
c) Tyre/tire: Part of the pneumatic set that is mounted over a rim and is destined to keep contact with the ground, establishing a link between ground and vehicle.

TUBETYPE:

A. Rim

B. Inner tube

C. Tyre/Tire



SET OF TUBELESS TYRES/TIRES:

Tubeless tyres/tires: Constituted by a tyre/tire, with valve, mounted over a rim of determined dimensions and inflated with pressure higher than the atmospheric pressure. The possible components of the pneumatic set are:

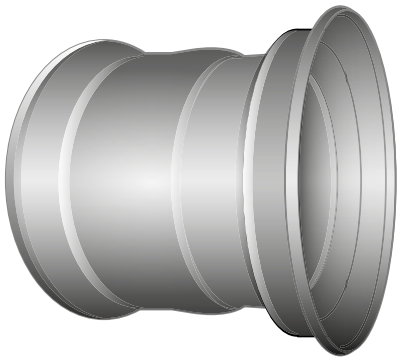
a) Rim: Rigid part of the pneumatic set, with determined profile and diameter, destined to support the tyre's/tire's beads.

b) Tyre/tire: Part of the pneumatic set that is mounted over a rim and is destined to keep contact with the ground, establishing a link between ground and vehicle.

TUBELESS TYRES/TIRES:

A. Rim

B. Tyre/Tire



Interpreting the agricultural tyre/tire

The information stamped on the sidewall of a tire indicates its primary characteristics. The chart below shows an example of the main markings that appear on the sidewall of a tire.

Agricultural tyre/tire classification	Tyre/tire 18.4 - 34	Tyre/tire 18.4 R34	Tyre/tire 480/70R34
Manufacturer name and tyre/tire type	XXX YY	XXX YY	XXX YY
Nominal width of the section in inches/mm	18.4	18.4	480
Section height	*	*	70
Structure type	(-) Bias ply	(R) Radial	(R) Radial
Nominal rim diameter in inches	34	34	34
Load capacity (PR)	12	32	32
Rotation direction (when applicable)	→	→	→
Registration	xxx000	xxx000	xxx000
Type of service	R-1	R-1	R1W

* Manufacturer doesn't provide information about section height.

General information about agricultural tires

CODE	PATTERN
F-1	Regular (1 rib) - flooded or soft terrain
F-2	Regular (2 or 3 ribs) - general services
F-3	Multi-rib - industrial tractors
R-1	Regular traction - low rib, dry terrain
R1W*	Extra traction
R-2	Extra traction (deep rib) - flooded terrain
R-3	Low traction (shallow rib) - golf courses and sand
R-4	Industrial - consistent terrain
I-1	Multi-rib - agricultural implements
I-3	Traction - powered implements
G-1	Traction
LS-1	Regular traction
LS-2	Intermediate traction
LS-3	Extra traction (deep rib)

"F": Tires for agricultural tractors - steering wheels.

"R": Tires for agricultural tractors - traction wheels.

"I": Tires for agricultural implements.

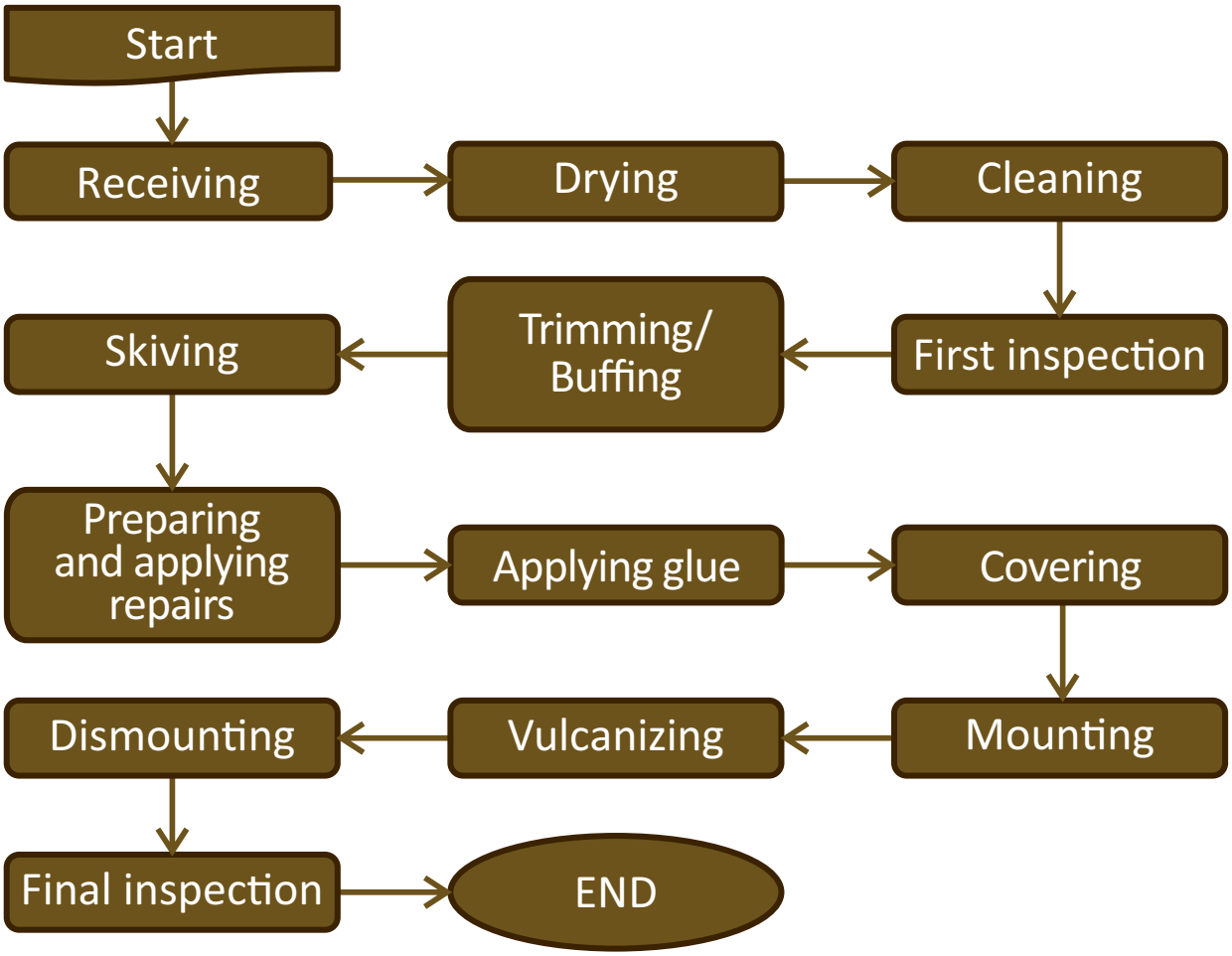
"G": Tires for mini-tractors and agricultural cultivators.

"LS": Agricultural tires for lumber removal.

* R1W - Extra traction tires with greater lug depth than an R1 classification tire. This is a classification adopted by the tire market.

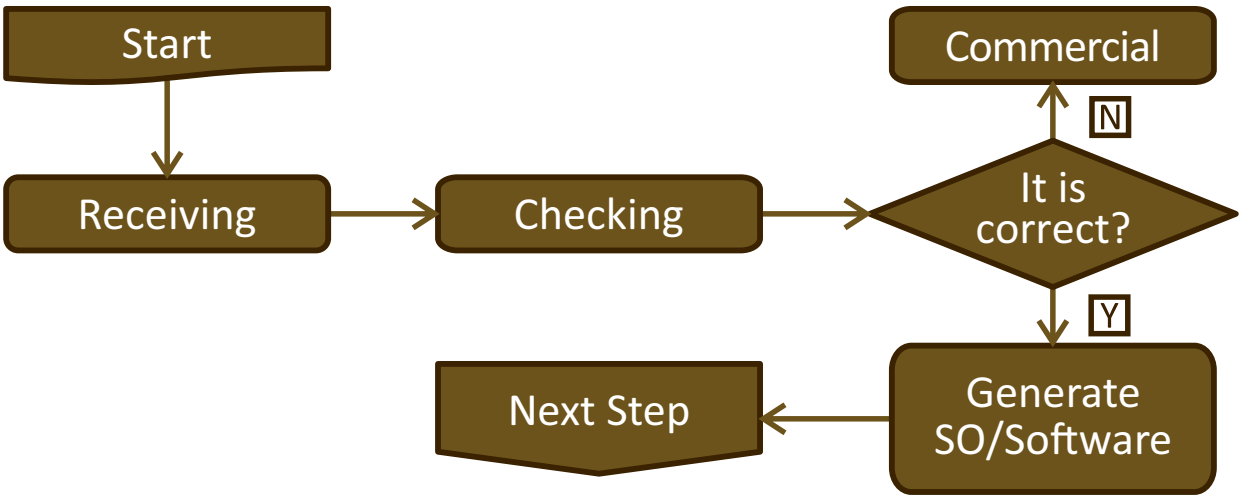
RETREADING PROCESS

TYRE/TIRE RETREADING GENERAL FLOWCHART



Receiving and checking tyres/tires

RECEIVING AND CHECKING TYRES/TIRES FLOWCHART



OBJECTIVE:

Receiving, checking, and storing tyres/tires in covered space, organized and formally recorded.

SECTOR:

The receiving department should be spacious and well-lit to facilitate viewing and identification.

PROCEDURE:

Perform preliminary tyre/tires analysis and check if the information in the incoming invoice is the same as the ones in the sidewall. See the information that must appear on the tyre/tire:

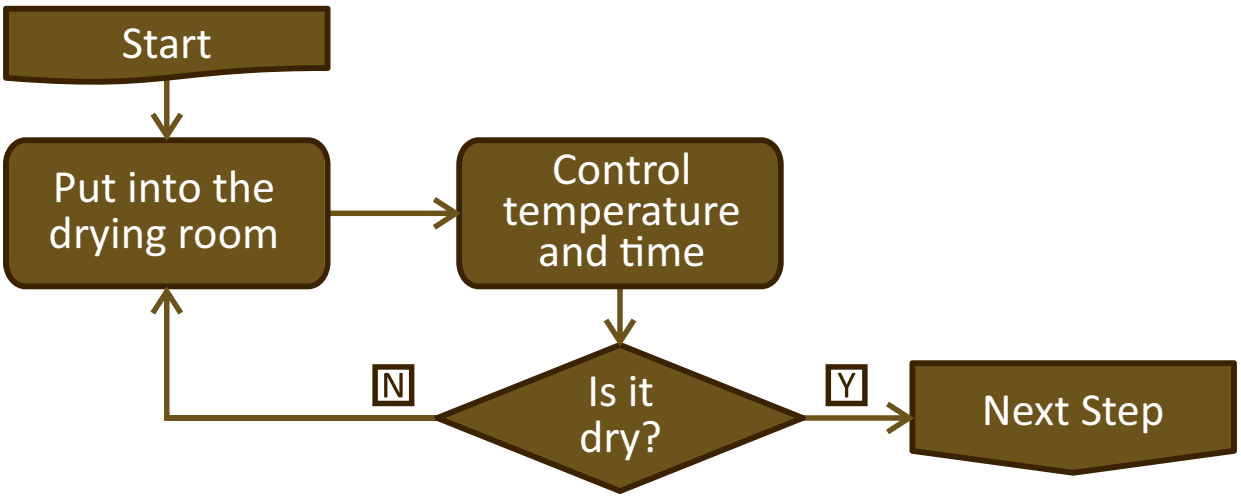
- identification of manufacturer;
- tyre/tire dimensions;
- tyre's/tire's type of construction;
- registration and/or etched number.

If the requirements are met in the first item, generate an internal service order for the tyre/tire.

Store the tyres/tires in covered space, organizing them to facilitate handling. If one or more requirements in the preceding section are not met, the tire may not undergo the retreading process and should be returned to the customer.

Drying

DRYING FLOWCHART



OBJECTIVE:
Drying or eliminating humidity from tyres/tires.

SECTOR:
The drying room must be wide and have controlled temperature and time.

PROCEDURE:

Heat the drying chamber to 60°C ± 10°C.

Leave the tires in the drying process for at least 4 hours.

EQUIPMENT:

- Drying chamber, with moisture exhaust.

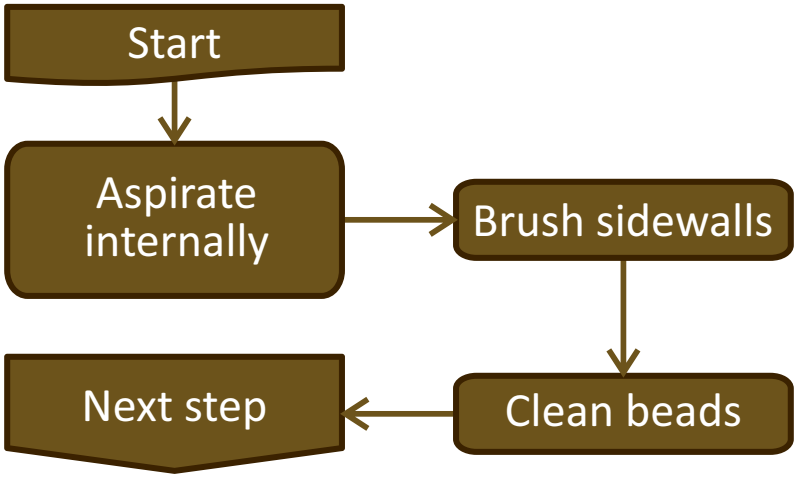
Observation:

In hotter regions with low air humidity, the chamber is not necessary, but the drying process should be followed.

This stage is not mandatory in the process.

Cleaning

CLEANING FLOWCHART



Observation:

If the tire needs to be washed, this should be done in the receiving stage, followed by drying and then it should go directly to the initial inspection sector.

OBJECTIVE:

Perform cleaning to facilitate initial tyre/tires inspection and avoid the contamination of other sectors during the process.

SECTOR:

This area should ideally be isolated from other sectors to prevent spreading of dirt.

PROCEDURE:

All dirt must be removed from the internal area, as well as the external area and the bead, as follows:

- Internal dirt should be cleaned via vacuum;
- The sidewalls, beads and tread should be cleaned by brushing or washing.

EQUIPMENT:

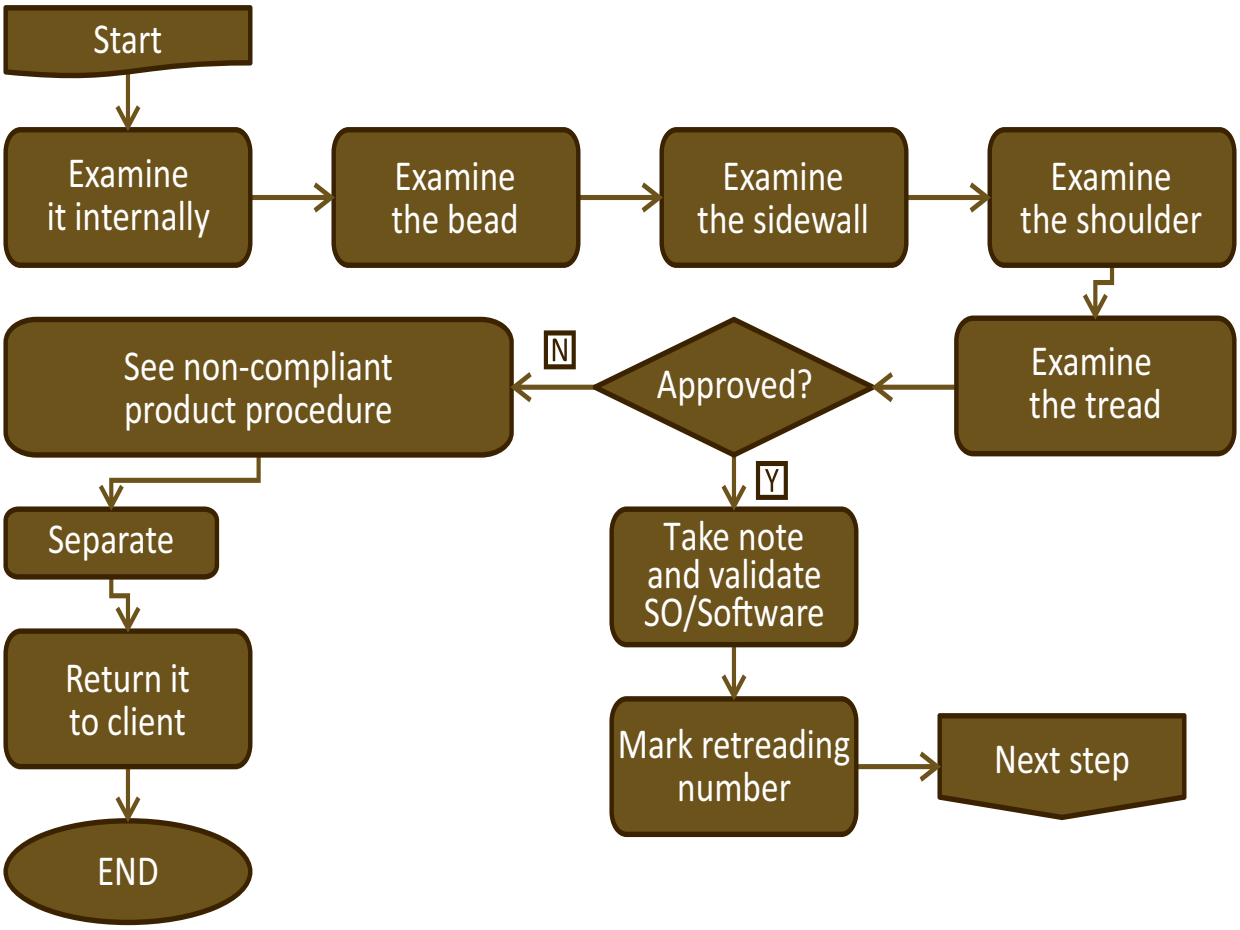
- Industrial vacuum cleaner or exhaust system;
- Manual brush with nylon or steel bristles;
- High pressure washer.

Observation:

In case of contamination by oil derivatives, reject the tyre/tire.

Initial inspection and classification

FIRST INSPECTION FLOWCHART



OBJETIVE:

Selecting or classifying tyres/tires that are able or not to be retreaded or repaired.

SECTOR:

The inspection sector must be well lit to facilitate visualization of all damages.

PROCEDURE:

The operator must be certain that the previous operations were performed.

In this stage, besides the operator's technical knowledge, a visual evaluation and the use of his hands (tact) are necessary in order to establish contact with the casing's surface. Using the tools (eyes/hands), it is possible to identify blisters or small bubbles, which would not be found with visual or mechanical evaluation only.

Due to its critical characteristic, it is important to keep a routine and to perform the inspection in five steps:

1 - Internalinspection:

n the tyre's/tire's internal area, the operator must check:

- Existence of perforation, tyre/tire casing displacement, radial cracks;
- Damages that exceed the limits established in the patch application table;
- Evidence of tread with low pressure, showing folds on the carcass ply or noticeable undulations such streaks or warps;
- Variations of circumferential color or roughness in the bending area, indicating overheating;
- Tubeless tyres/tires presenting inner liner displacement or openings in the splice;
- Previous repair conditions;
- Inner liner conditions.

2- Bead:

- Check deformations due to incorrect mounting, folds, and broken wire;
- Tire showing burnt rubber (degradation) and/or circumferential cracks;
- Tire presenting damage in the bead area that affect elements of its structure, such as the casing ply(ies) or the bead rim(s).

3- Shoulder:

- Check, through characteristic color, the existence of possible displacement caused by excessive concentration of heat or impact.

4- Sidewall:

- Check if there are broken plies, displacemnet, blisters, marks (folds) that indicaterun flat;
- Contaminations by hydrocarbons (oils and greases);
- Tyre/tire stress (rubber degraded by several micro cracks).

5- Tread:

- Remove any strange object impregnated in the tread area;
- Check for excessive chipping or irregular wear that may have reached the belt closer to the surface, causing its oxidation or deterioration;
- When examining the tread, possible displacement should be observed.

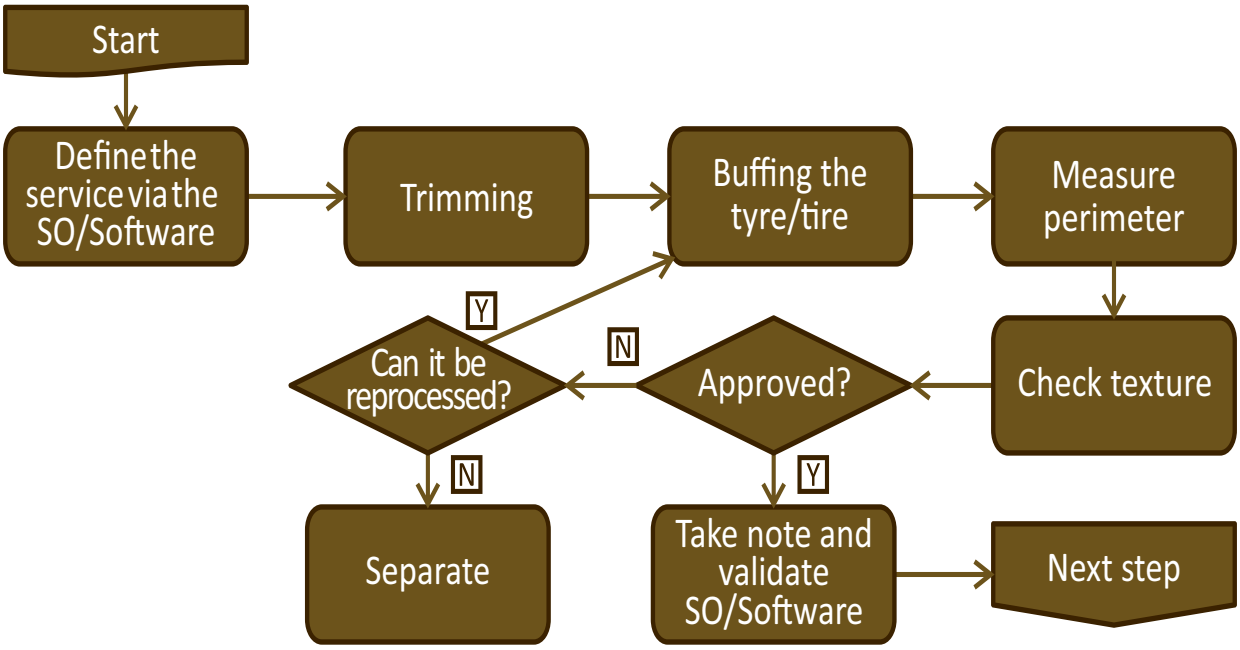
EQUIPMENT:

- nspection machine with good lighting, allowing opening and turning of the tyre/tire.

TOOLS:

- Perforation;
- Plier;
- Knife;
- Rubber hammer;
- Chalk;
- Low speed turbine (2000 rpm to 5000 rpm);
- Ruler;
- Conical punch.

BUFFING FLOWCHART



OBJETIVE:

Remove the remaining part of the tread, leaving the tire with the proper dimensions (according to the size of matrices) and textures for applying the new tread.

SECTOR:

Ideally wide, with adequate lighting and exhaust system for dust and smoke.

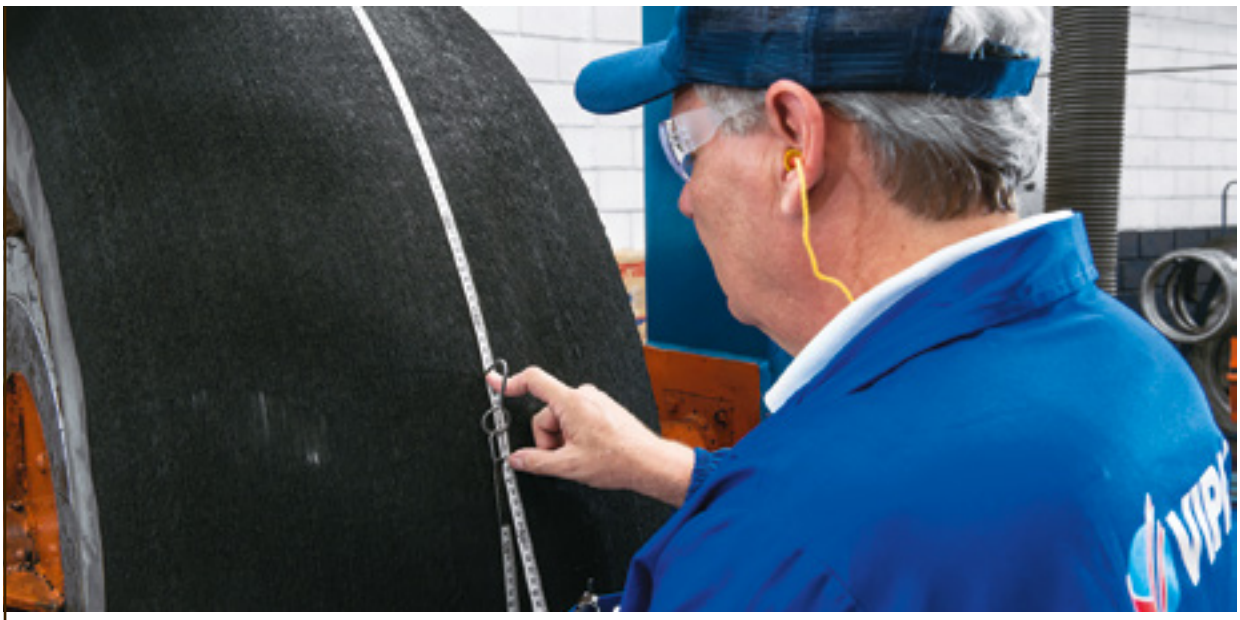
PROCEDURE:

- Inflate the tyre/tire to reach uniformity when buffing (15 to 20 lbs);
- Check whether the beads are properly laid;
- If necessary, trim the tire, preparing the casing for buffing.

Buff the tire always from the hump toward the sides, ensuring that at the end the sub-tread offers a sufficient rubber base for adhesion and protection of the nylon plies and/or steel belts.

Advance carefully with each advancing so that the rubber is not burned.

Excessive heating caused by great advances or older buffing blades cause superficial degradation of the rubber, which makes the adhesion of the cushion gum difficult.



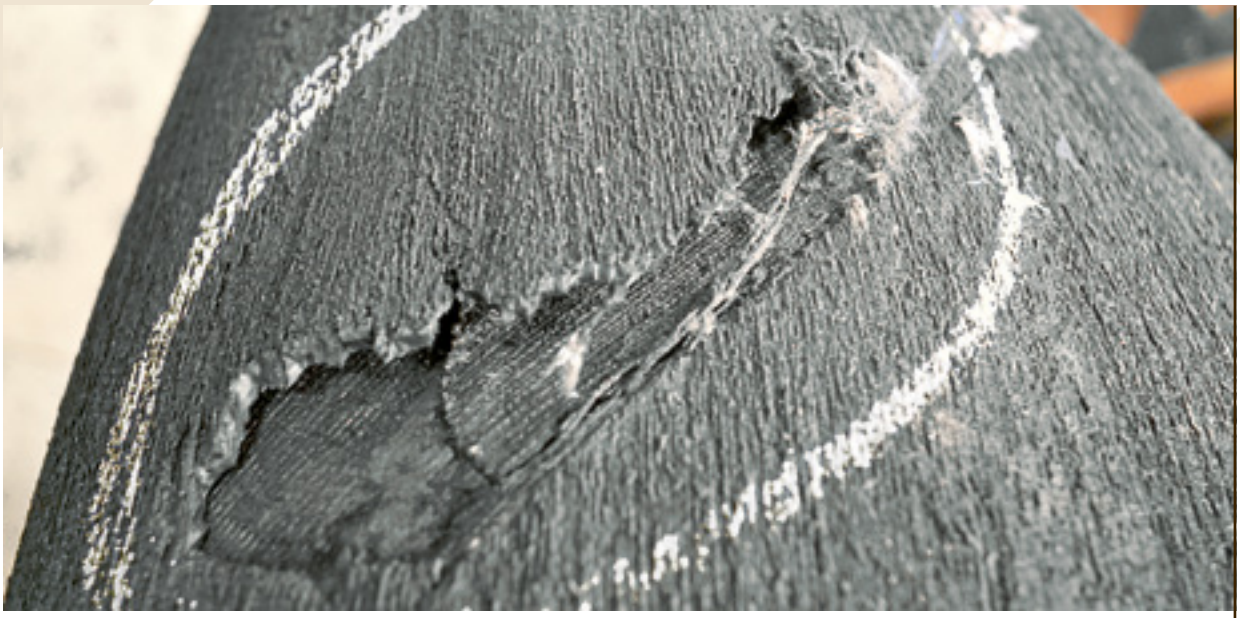
Measure the perimeter with a measuring tape, a mechanical measurer, or laser.

This will ensure that the tire meets the matrix size, according to the reference tables.

Note the perimeter of the buffed tire on the service order or register it in the software.

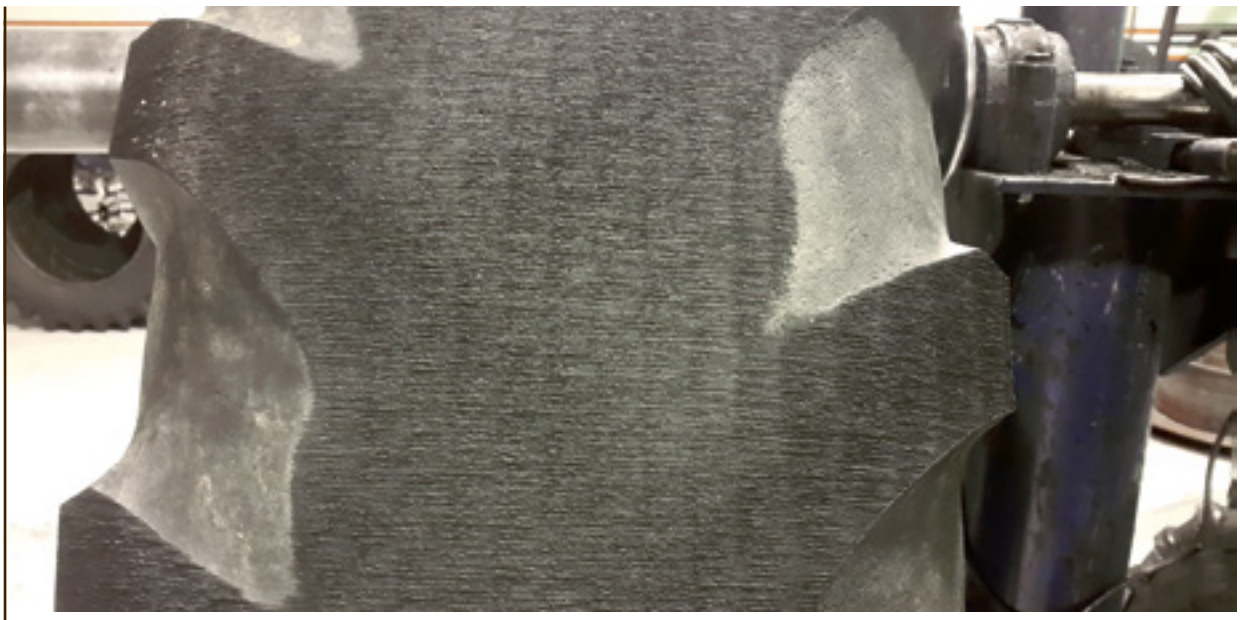
Observation 1:

It is essential that the buffed surface be clean and with the correct texture to allow great adherence of the new tread. The ideal texture is the RMA5 and RMA6.



Observation 2:

During buffing, damages not previously detected in the initial inspectioncan appear, such as excessive chipping, tyre/tire displecement, some times, the tyre/tire needs to be rejected.



PROCEDURE FOR APPLICATION WITH BLOCKS:

Inflate the tyre/tire to reach uniformity when buffing (15 to 20 lbs).

Make sure the beads are properly laid on the wheel.

If necessary, use the trimmer to reduce the lugs so that they are visible to serve as base for applying the new lug (blocks).

Buff the tire, always going from the hump out to the sides.

Proceed in a manner that doesn't burn the rubber.

Excessive heat caused by proceeding too aggressively or using a dull saw can cause surface breakdown of the rubber, hindering adhesion of the cushion.

Note whether the saw's rotation direction is the same direction as the tire's rotation.

Then use appropriate material to clean between the lugs so as to enable adherence of the cover material.

Observation 3:
Because the block has the same height, it's important for the buffing radius to accompany the casing radius, leaving the original lug visible. In agricultural tires, a radius between 52 and 58 is recommended.

EQUIPMENT:

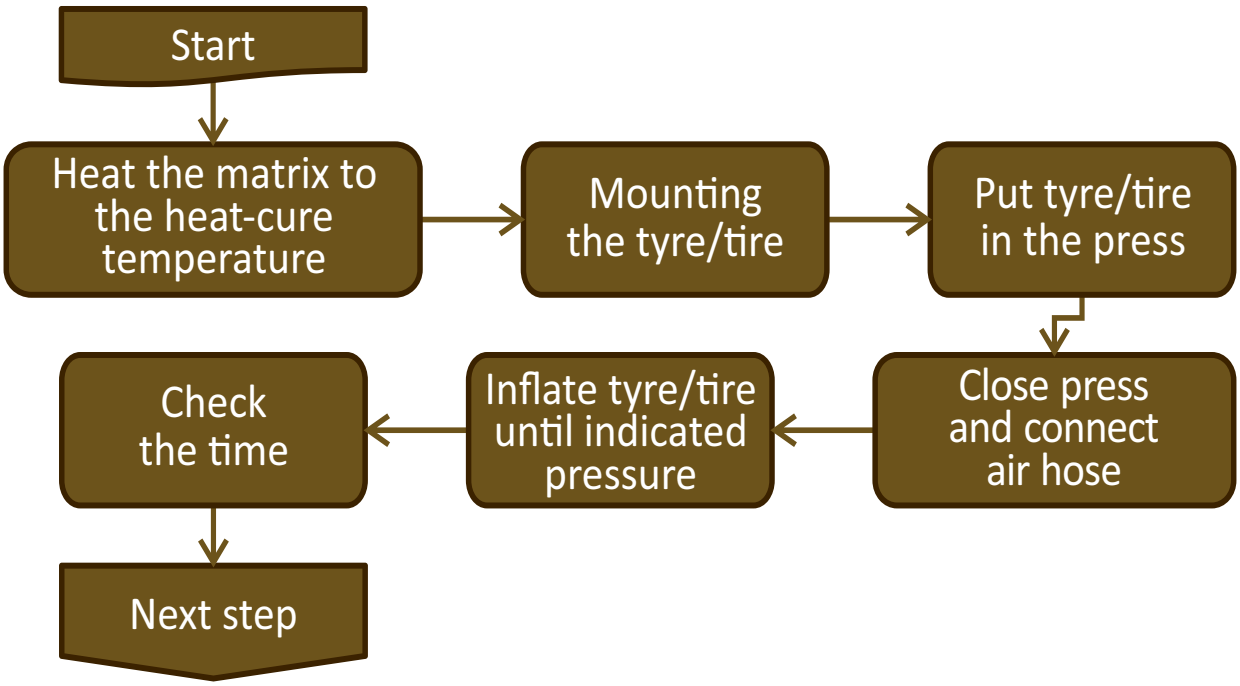
- Machine for trimming and buffing tires;
- Circumferential measurer;
- Low speed electric or pneumatic grinder (whip), from 2500 rpm to 3500 rpm.

TOOLS:

- Tungsten discs;
- Buffing blades;
- RMA table;
- Measuring tape;
- Rubber hammer;
- Awl;
- Front cutting pliers;
- Chalk;
- Knife.

Skiving

SKIVING FLOWCHART



OBJETIVE:

Clean and prepare the damages that affected the tire, whether on the sidewall, shoulder or tread.

SECTOR:

This should be done in equipment that allows for spinning the tire for preparing the skives, with good lighting and a dust and smoke exhaust system.

PROCEDURE:

Turn the tyre/tire and identify damages to be skived.

Skive the damage in a concave way, removing the loose rubber, preparing the damage so to avoid straight or too open angles that hamper the filling's anchorage.

Remove the rubber and the loose plies/belts with a whip or a low rotation turbine with the help of a rubberized brush or tungsten disk or a circular saw. Tools with 2.500 rpm and 3.500 rpm are recommended.

Remove the burnt rubber from the skived area with the aid of a steel brush (for tires with steel belts) or tungsten ball pin.

Evaluate the need for application of repairs (patches).

If necessary, the tyre/tire must be sent to the sector of repair application or to the sector of glue application.

Observation 1:

Be careful to remove only what is loose or oxidized. The adhesion of rubber with rubber will always be better than rubber and nylon, or rubber and steel. However, the choice of tools must consider the damage. Limit the skiving area and extension to a minimum.

Observation 2:

Compressed air contains impurities such as oil, water, and metal detritus from the pipe line. Thus, using it for cleaning the tyres/tires is not recommended. Prefer the nylon brush.

EQUIPMENT:

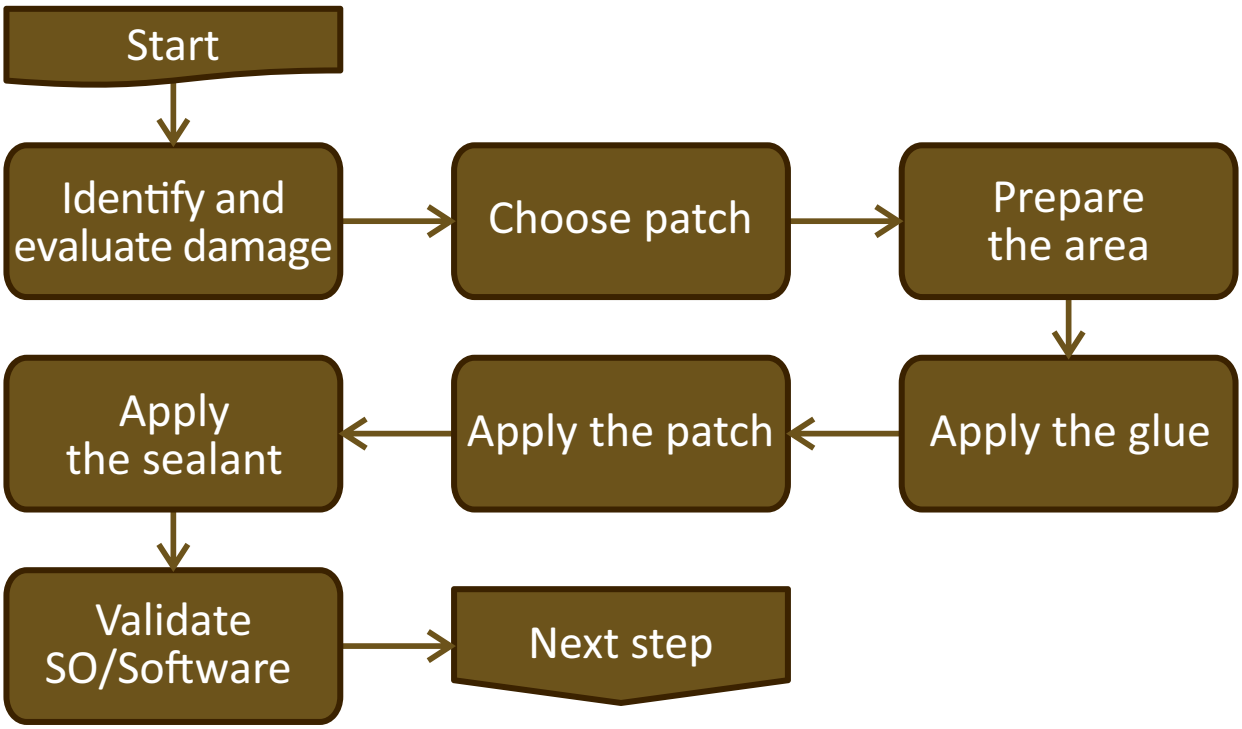
- Low rotation electrical grinder (2500 to 3500 rpm);
- High speed pneumatic turbine (18000 rpm to 22000 rpm);
- Support for skiving.

TOOLS:

- Awl;
- Cutting pliers;
- Assembled ends;
- Rubberized steel brush;
- Tungsten disk;
- Tungsten pencil;
- Conical punch;
- Tungsten gauge;
- Tungsten ball pin;
- Nylon brush for cleaning;
- Saws.

Preparing and applying repairs

PREPARATION AND APPLICATION OF REPAIRS FLOWCHART



OBJETIVE:

Return the tyre's/tire's damaged area the same resistance.

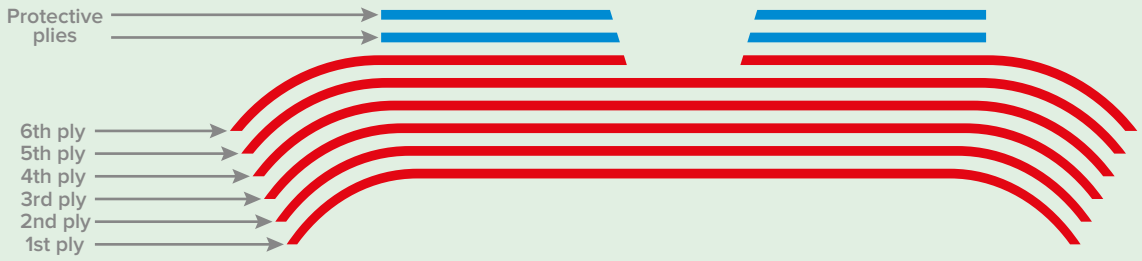
SECTOR:

Well lit, with support for opening the patches, dust aspiration system, and cabinets for storing patches, glues, and accessories.

To select a patch, you have to know the tire's ply capacity.

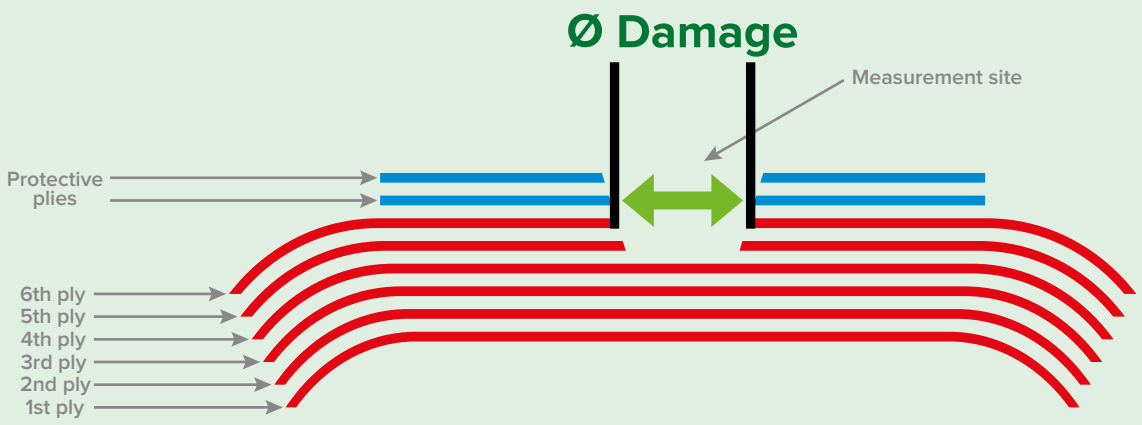
Damages should be measured on the first outer ply, disregarding the protective plies.

Non-structural damage



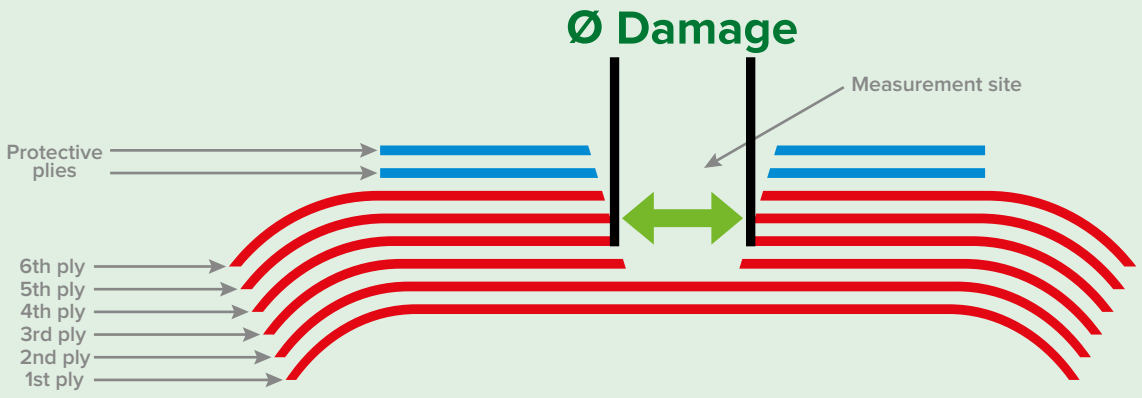
Non-structural damages occur when they affect 25% or less of the main structure. (Except protective plies)

Non-piercing damage



Non-piercing damages occur when 25% to 50% of the main structure is affected. (Except protective plies)

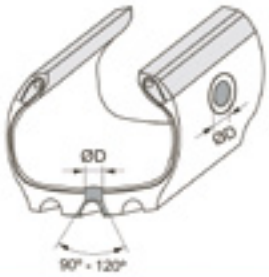
Damage considered piercing



Piercing damages occur when 50% or more of the main structure is affected. (Except protective plies)

Choice of MA patches

Bias-ply agricultural tires



Plies Capacity	D (max.) mm							
	25	50	75	100	125	150	175	200
_8	99	100	100	101	102	103	104	105
10_12	99	100	101	102	103	104	105	106
14_16	100	101	102	103	104	105	106	107
18_20	101	102	103	104	105	106	107	-

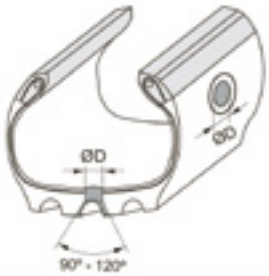
1

Tyre/tire measures:

Tire 18.4-30

10-ply capacity

Bias-ply agricultural tires



Plies Capacity	D (max.) mm							
	25	50	75	100	125	150	175	200
_8	99	100	100	101	102	103	104	105
10_12	99	100	101	102	103	104	105	106
14_16	100	101	102	103	104	105	106	107
18_20	101	102	103	104	105	106	107	-

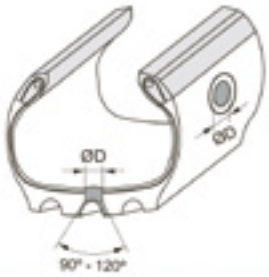
2

Damage size:

Ø - 125mm

Measure the damage dimension and identify it in the table.

Bias-ply agricultural tires



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Plies Capacity	D (max.) mm							
	25	50	75	100	125	150	175	200
_8	99	100	100	101	102	103	104	105
10_12	99	100	101	102	103	104	105	106
14_16	100	101	102	103	104	105	106	107
18_20	101	102	103	104	105	106	107	-

Then, identify the patches' options indicated for the damage.

Indicated patches:
MA 103

Procedure for applying the patch

Clean the area with Bufpal surface activator.

Keep the tire in normal position, without opening the beads. Position the template or patch at the center of the damage and mark the outline with chalk.

To prevent contamination and preserve the inner plies, only the demarcated area should be carefully trimmed using a fine grain carbide grinder at 2500 to 3500 rpm. The texture of the buffed area should be RMA1 or RMA2.

Remove the rubber dust from the buffed area with a fine brush and/or vacuum cleaner in order to obtain a clean and dry surface.

Se the Bufpal surface activator to clean the area. Don't use compressed air.

Apply vulcanizing cement to the area to be repaired, waiting for the cement to dry properly. Don't use devices for drying and avoid direct contact with the previously prepared area.

Attention: DON'T USE flammable cement near flame, spark or other ignition source.

Observation:

For hot repairs, use Vulk cement and hot patch, following the same procedure.

Remove the protective film from the patch from the hump to the edges, leaving room to ensure the repair and preventing contamination of the base.

The patch should be applied with the beads in original position, not opened. Align the patch according to the demarcated area, keeping the indication arrows toward the beads.

Roll the patch from the hump to the edges, ensuring better adhesion and preventing air occlusion.

Apply sealant at the edges of the patch, covering the buffed area and protecting the patch from possible infiltration.

Finally, allow the sealant to dry according to the instructions of the packaging.

Patch selection - radial tires

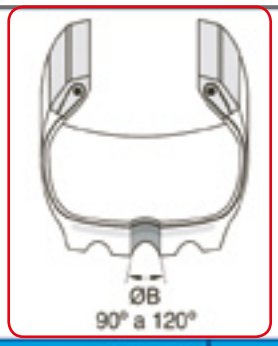
1

13.6 - 30.5

345/ - 1050/

Ø B (mm)	RAC
20	25
30	80
70	82
90	84
130	86

Tyre/tire measures:
800/65R32



2

13.6 - 30.5

345/ - 1050/

Ø B (mm)	RAC
20	25
30	80
70	82
90	84
130	86

Damage position:
Tread

	Ø B (mm)	RAC
13.6 - 30.5	20	25
	30	80
	70	82
345/ - 1050/	90	84
	130	86

3

Damage size:
Ø - 30mm

Measure the damage dimension and identify it in the table.

	Ø B (mm)	RAC
13.6 - 30.5	20	25
	30	80
	70	82
345/ - 1050/	90	84
	130	86

4

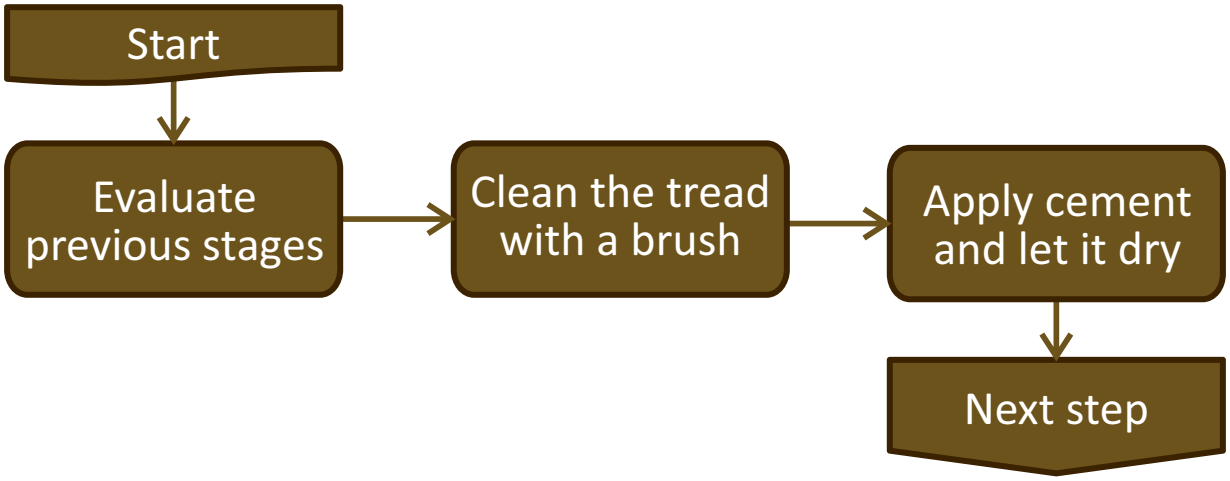
Then identify the options of patches indicated for the damage.

Indicated patches:
RAC 80

Procedure for applying the patch

For applying the RAC patch, follow the same instruction for applying MA patches.

APPLYING THE GLUE FLOWCHART



OBJETIVE:

To reexamine the previous steps.

Ensure the necessary adhesion between the tire and the Camelback to allow its fixation until the assembly is heat-cured.

Protect the buffed area of the tire from oxidation.

SECTOR:

Environment with exhaust and good ventilation without contamination by dust and presence of humidity.

PROCEDURE:

Evaluate whether the preceding steps were completed properly.

Clean the tire with a soft brush (nylon) and clean the inside with a vacuum cleaner if necessary.

Apply a thin and even layer of cement.

After applying the cement, check for the existence of product build-up.

If found, spread it over the area with a paint brush.

Check the complete drying of the glue before continuing the retreading process. Drying time varies according to the temperature and relative air humidity. Thus, each retreader must established standards according to local climate conditions.

To ensure that the cement is dry, test its tackiness with a piece of rubber Cushion MB/AC or Vipal shoulder stripping gum of about 4cm wide by 10 cm of length, observing the following procedure:

- Roll 50% of the Cushion sample length over the buffed surface with cement;
- Remove the plastic protector. At a 90° angle, pull the Cushion. If it offers resistance and the cement stretches, it is ready to proceed to the next step;
- If the Cushion detaches from the area easily when pulled, the drying time should be extended.

Observation 1:

After this stage, it is necessary to be careful so that the surface onto which cement was applied is not contaminated by the touch of hand or any object and neither rolls over the floor.

Observation 2:

After cementing, the tyre/tire must receive the coverage in a maximum period of 2 hours. After this period, the cement must be reapplied.

Observation 3:

In regions where the temperature goes lower than 12°C and humidity above 90%, we recommend the controlled use of a tunnel for drying cement, observing the following parameters:

- Tunnel temperature: 35°C (± 5°C);
- Permanence time of the tyre/tire in the tunnel: 20 minutes.

EQUIPMENT:

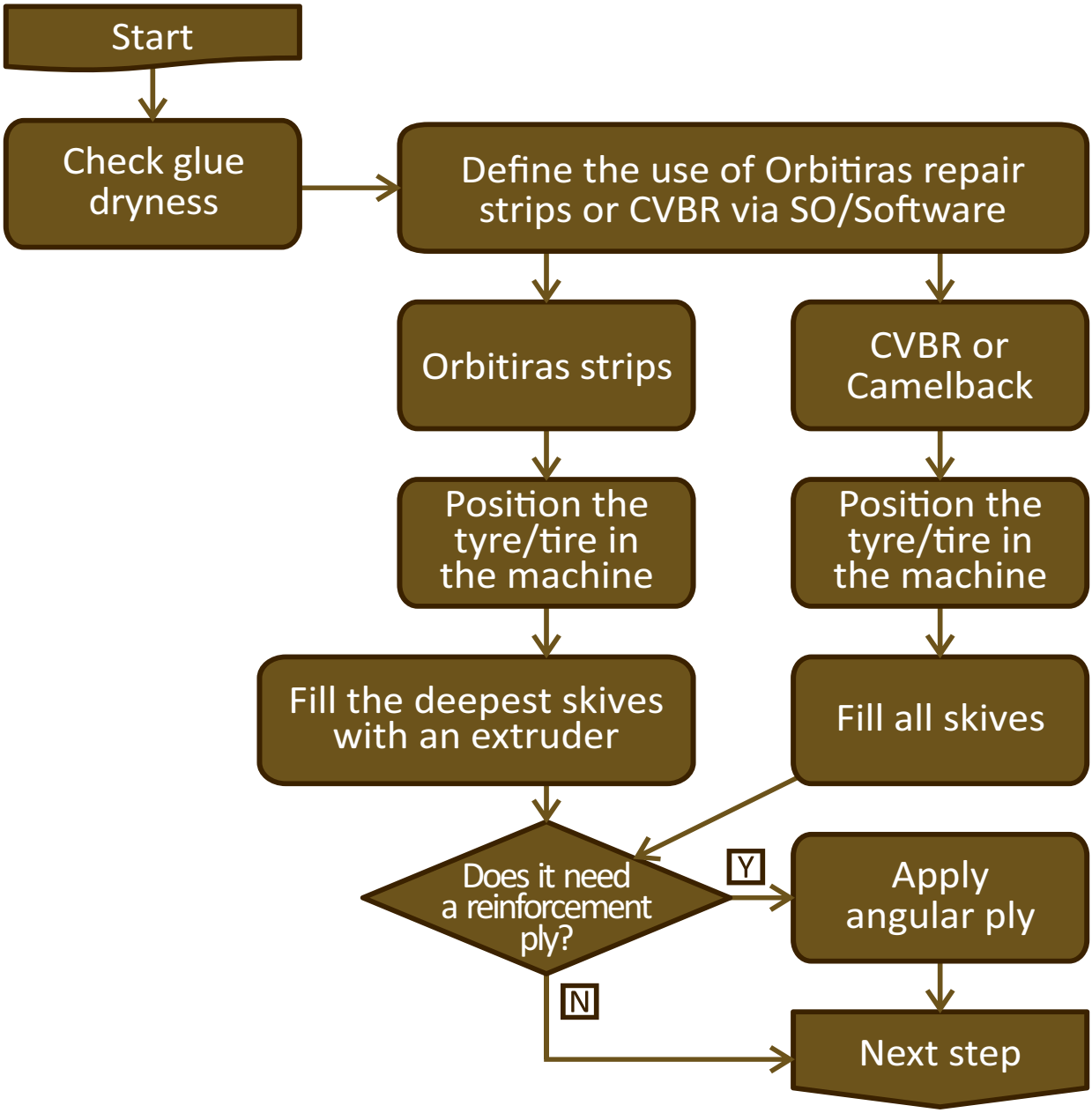
- Trestle with automatic swivel;
- Glue pulverizing pump;
- Drying tunnel;
- Cabin for glue application with exhaust system;
- Vacuum cleaner or exhaust system.

TOOLS:

- Paintbrush;
- Spray nozzle.

Filler with gum

FILLING FLOWCHART



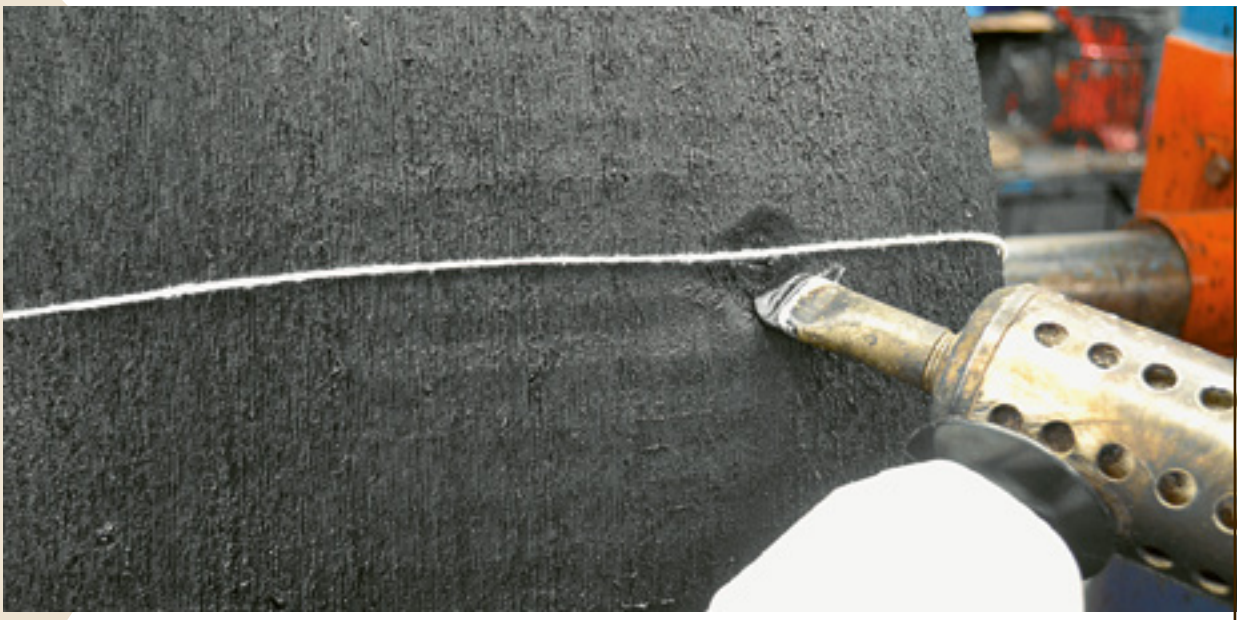
OBJETIVE:

To fill in skived damages, leveling them with the tyre's/tire's surface.

SECTOR:

Well-lit and free of impurities.

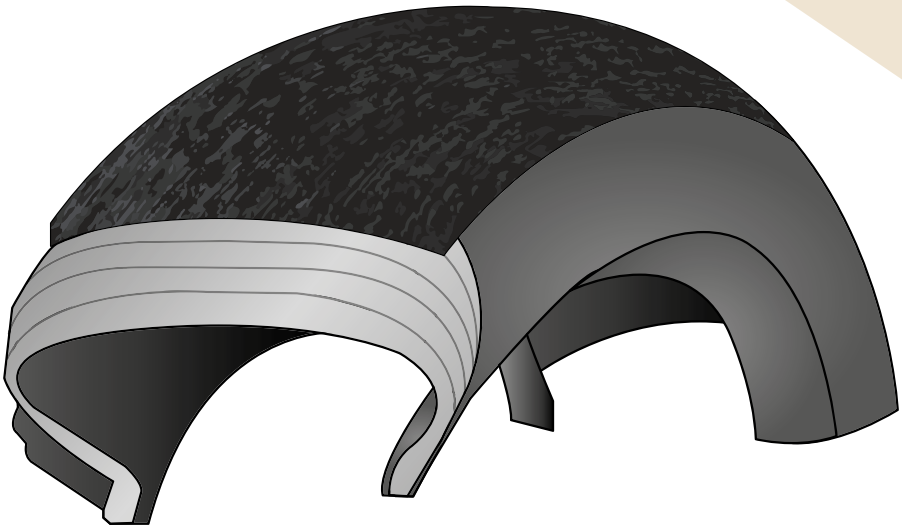
Position the tire on the roller inflated to a pressure of 15 to 20 psi, keeping it centered on all planes (vertical and horizontal).



If there are large fills, we recommend using cotton yarn that will perform the wicking function.

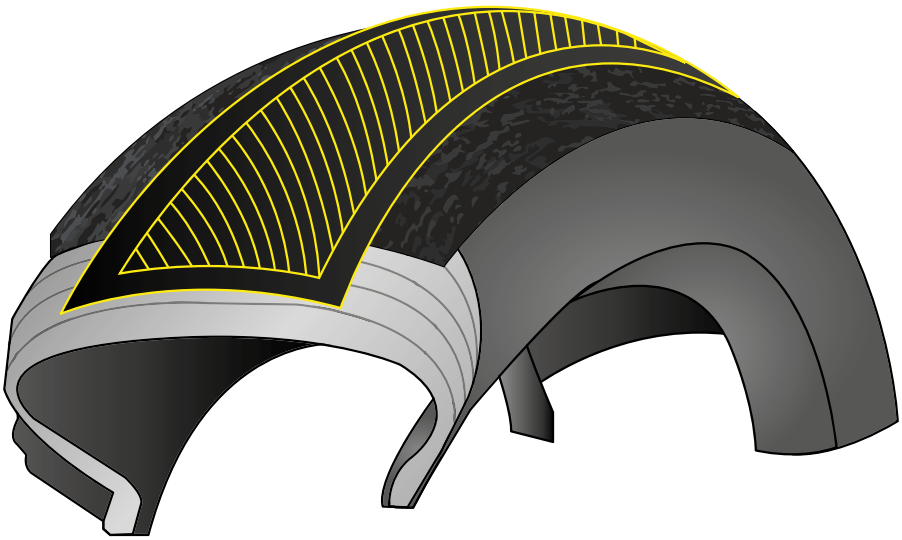
With an extruder heated to 75°C ± 5°C, fill the skives with Cushion gum, leaving no more than 1 to 2 mm excess above the tire level. The same is true for the sidewall.

In large skives or when choosing not to use the extruder, they can be filled manually using ordinary cushion.

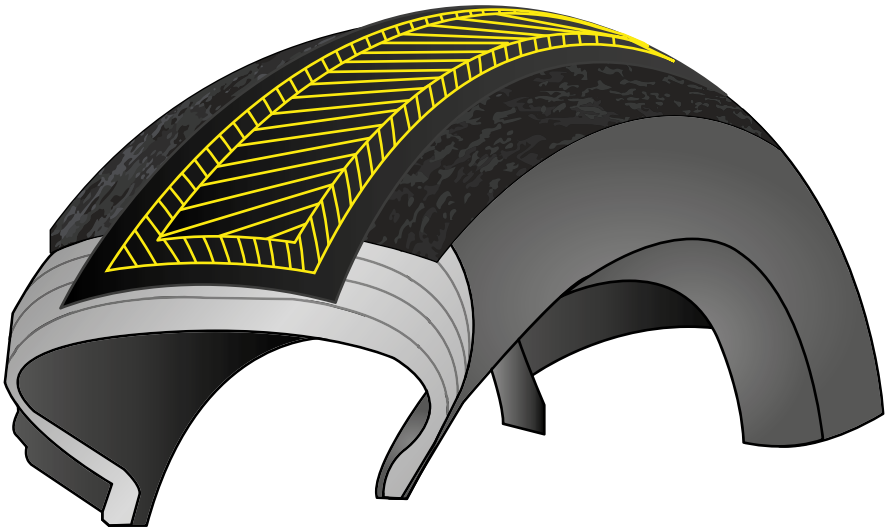


If the casing is damaged, with excessive pricks, exposed or worn plies, the application of rubberized nylon ply is recommended.

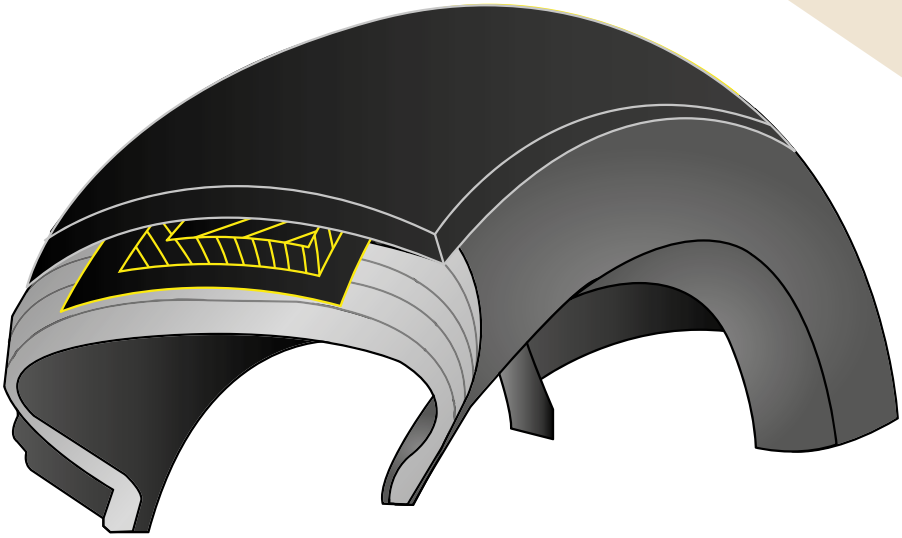
After completing the process of filling the skives, a layer of MB/AC cushion gum should be applied, at a size larger than the rubberized nylon ply (at least 10 mm on each side).



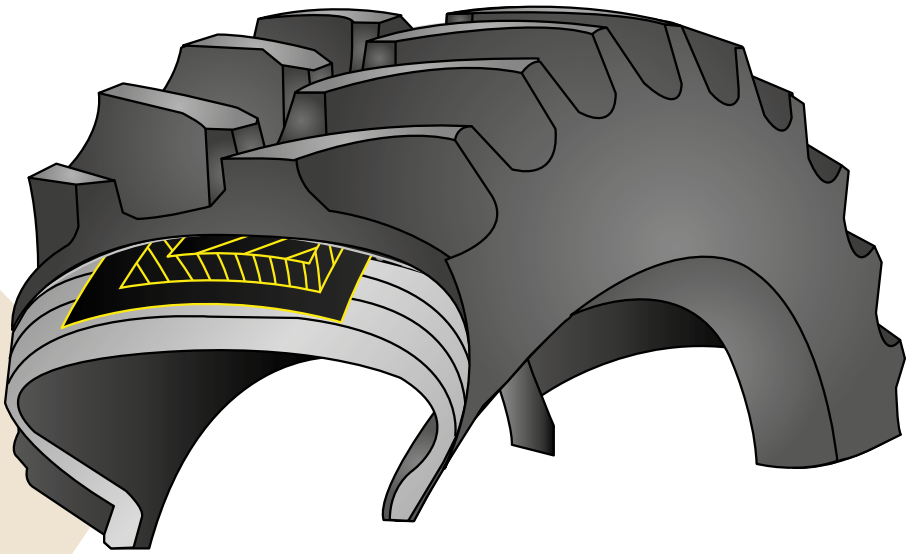
Apply the first ply layer around the full tire circumference.



Apply the second ply layer at a smaller size than the first (50 mm), and apply in the opposite direction from the first, to follow the casing build type.



Roll the tire from the hump toward the sides, eliminating all occluded air.



EQUIPMENT:

- Extruder.

TOOLS:

- Hot knife set;
- Rollers.

Coverage with camelback

OBJETIVE:

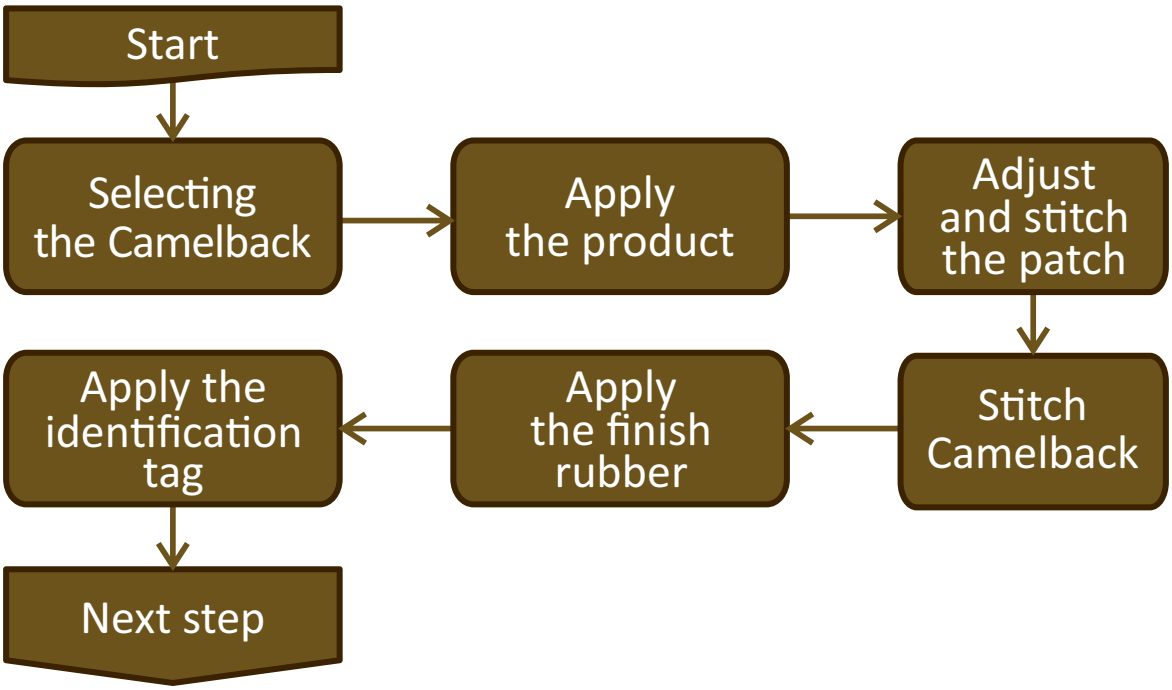
Cover the tire with the new tread.

SECTOR:

Well-lit and free of impurities.

CVBR Camelback application

CVBR CAMELBACK APPLICATION FLOWCHART



PROCEDURE:

Identify the Camelback according to the service order.

A piece may need to be cut or just cleaned with Vipal solvent/bufpal and steel brush.

Position the tire in the machine and inflate it to 15 to 20 psi. Remove the piece of plastic from the Camelback, avoiding contact with the cushion. Center it and fix one of the tips on the tire.

Carefully continue applying the Camelback, partially removing the plastic and ensuring that it is well centered on the tire.

For perfect adhesion of the Camelback patch, its length should be 10 to 15 mm longer than the tire's perimeter. With the aid of a metal ruler, position the ends, hit it with a rubber hammer to increase the patch pressure, and fix it with a proper instrument.

Activate the pneumatic tread pans on the rolling machine so that they work from the hump to the edges, eliminating air from beneath the Camelback.

If lateral finishing is required, spread a thin layer of cement and apply laminade gum or passenger rubber on the sides.

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Apply identification tag. (optional)

Measure the perimeter to check the measurements.

Observation:

Vipal Rubber doesn't recommend the use of rubber shims. The retreader is solely responsible for this practice.

EQUIPMENT:

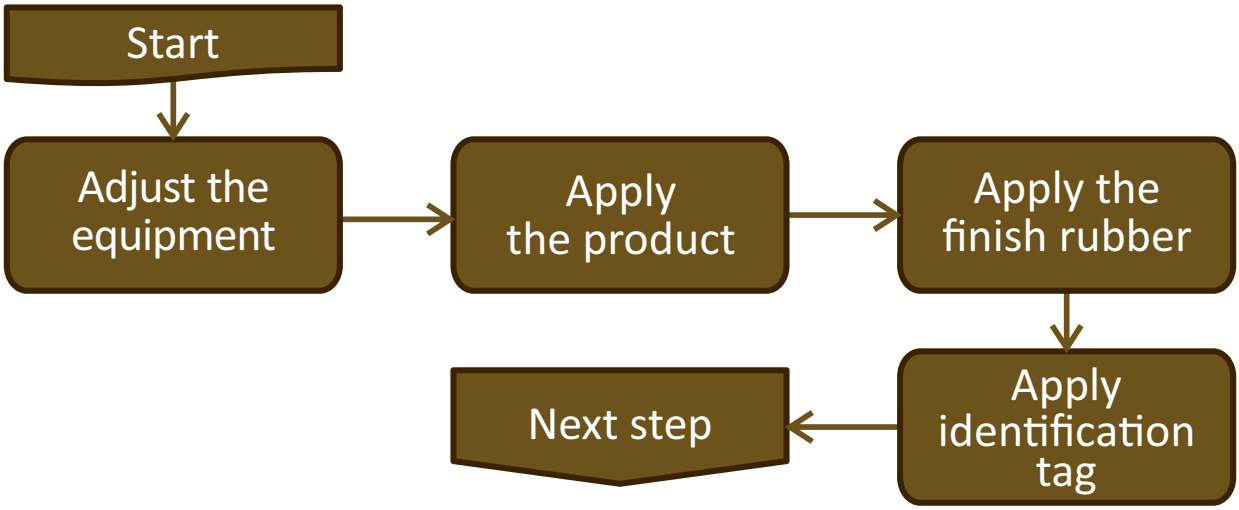
- Builder;
- Mat or support for the product.

TOOLS:

- Rubber hammer;
- Measuring tape;
- Metallic ruler;
- Identification tag;
- Measuring tape;
- Steel brush.

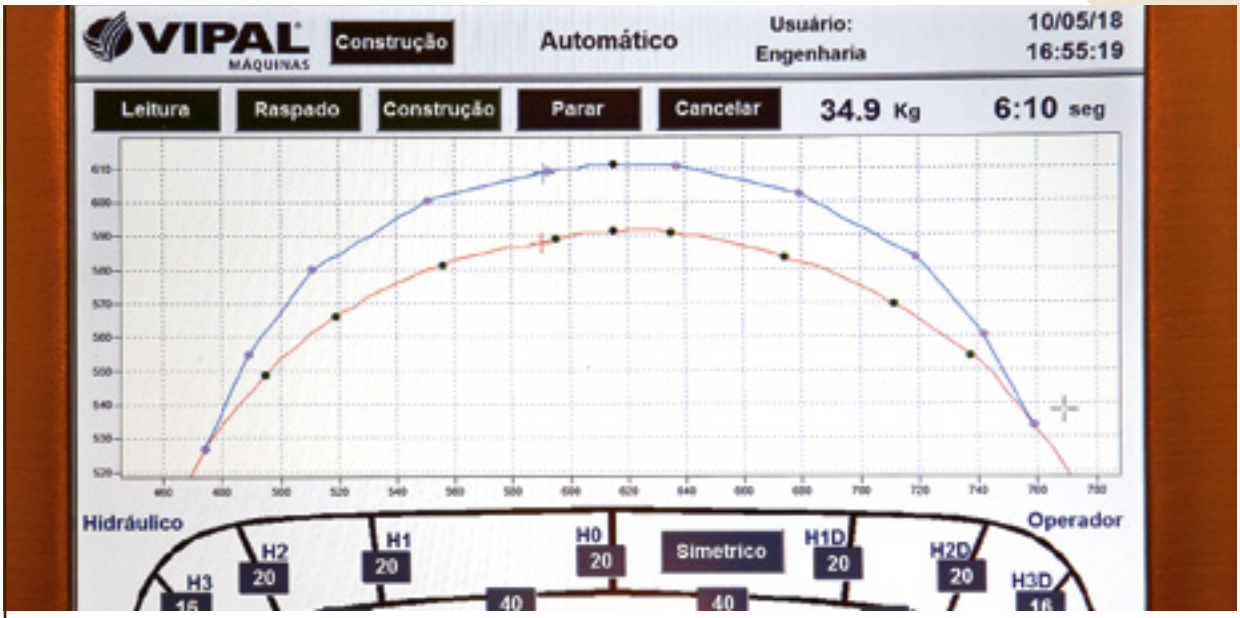
Camelback application in Orbitira rubber compound strips

APPLICATION FLOWCHART FOR CAMELBACK IN ORBITIRA STRIPS



PROCEDURE:

Position the tire on the equipment and inflate it to a pressure of 15 to 20 psi.



Adjust the equipment according to the tire's measurement and begin application.

Keep the product's temperature between 75°C and 110°C.

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Apply identification tag.

Observation 1:

It is important to weigh the casing before and after covering so that the amount of material used can be identified.

Observation 2:

In the event of interruptions longer than 20 minutes*, remove the product from the extruder, thus avoiding the pre-cured material application.

*It is necessary to keep the refrigeration system in operation.

Observation 3:

For a better curing process (reduction of defects by molding, reduction of pre-curing risks, etc.) it is recommended to cure the tire soon after applying the strip. In a case of use different from the described conditions, consult Vipal Rubber's Technical Team for guidance.

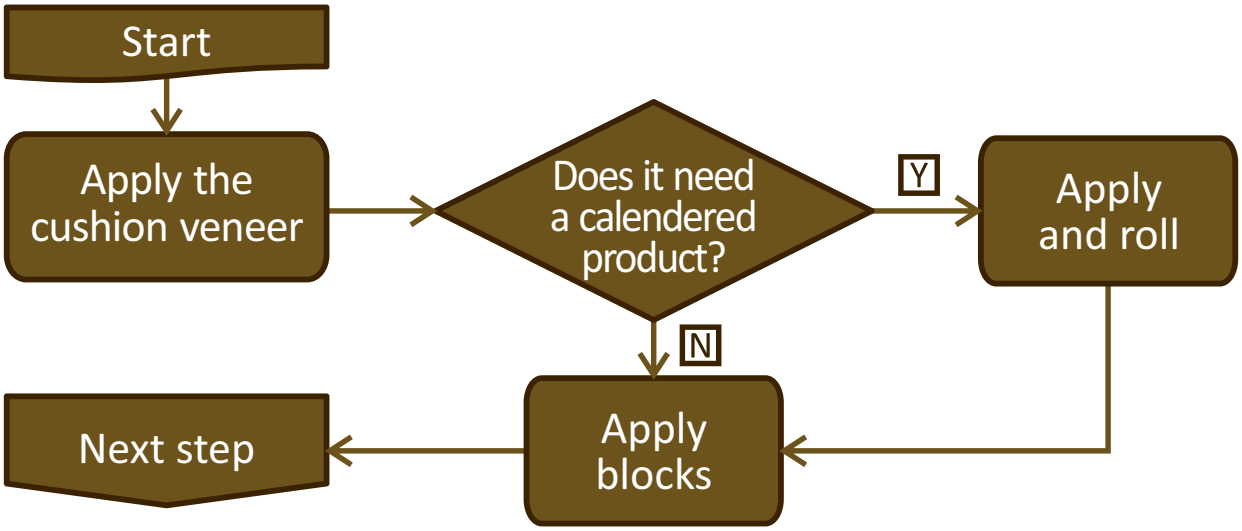
EQUIPMENT:

- Orbitread.

TOOLS:

- Measuring tape;
- Identification tag;
- Knife;
- Pyrometer.

BLOCK APPLICATION FLOWCHART



PROCEDURE:

Position the tire in the equipment.

Start the veneer application and roll from the hump to the edges.

Observation 1:

When the tire shows excessive piercing or needs reinforcement, calendered material should be applied over the full area over the veneer, and then it should be rolled.

Apply the previously prepared blocks, abiding by the positioning of the original lugs.

Observation 2:

On new tires, calendered material may be used as reinforcement, applied between the lugs.

EQUIPMENT:

- Mat or support for the product.

TOOLS:

- Rubber hammer;
- Rollers;
- Flat fiber measuring tape;
- Metallic ruler;
- Retreader's identification tag;
- Measuring tape.

Hot curing

OBJETIVE:

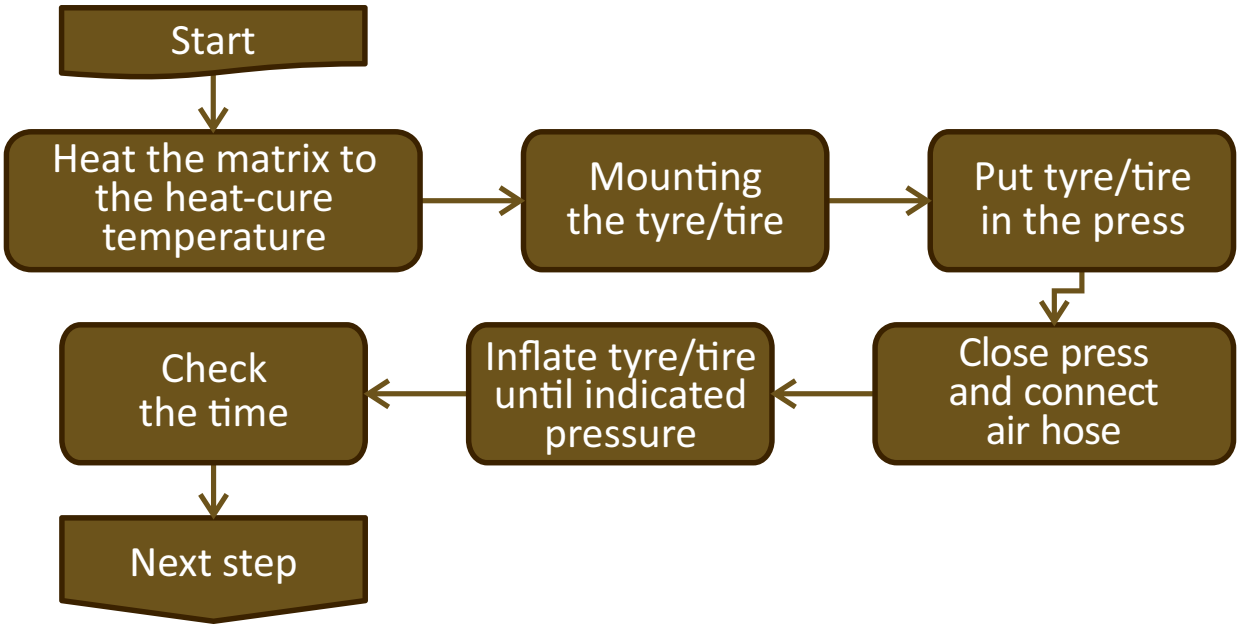
This stage has the function of changing the physical properties of the rubber from a plastic state to an elastic state, by means of time, temperature and pressure, so that the Camelback properly adheres to the tire.

SECTOR:

Ideally wide to allow handling of the mounted tyres/tires.

Press curing

VULCANIZATION IN PRESS FLOWCHART



PROCEDURE:

The press must be correctly assembled with the mould corresponding to the tyre/tire (no space between sectors) and prepared (heated) using a temperature of 150°C +/- 2°C. During this process it is important for the equipment to remain fully closed, preventing loss of heat.

Assemble the tire with air bag, protector and wheel.

Before placing the tire in the matrix, spread a demolding agent if necessary.

Place the tire centered in the machine, without leaving gaps between sectors, in order to prevent staggered formation.

Connect the air hose and inflate it to 130 to 150 psi.

Observation 1:

For 6-8 ply casings, worn or with excessive prickings, inflation pressure between 90 and 110 psi is recommended.

Keep it in machine for the indicated time.

Observation 2:

In order to determine the vulcanization period, it is necessary to know the real evolution in temperature, at the most critical point of heating through a calibrated pyrometer and calculate the vulcanization percentage.

Vipal has a specific software for this calculation - contact a Vipal technician. Vulcanization time must be determined according to the type of camelback and its thickness.

EQUIPMENT:

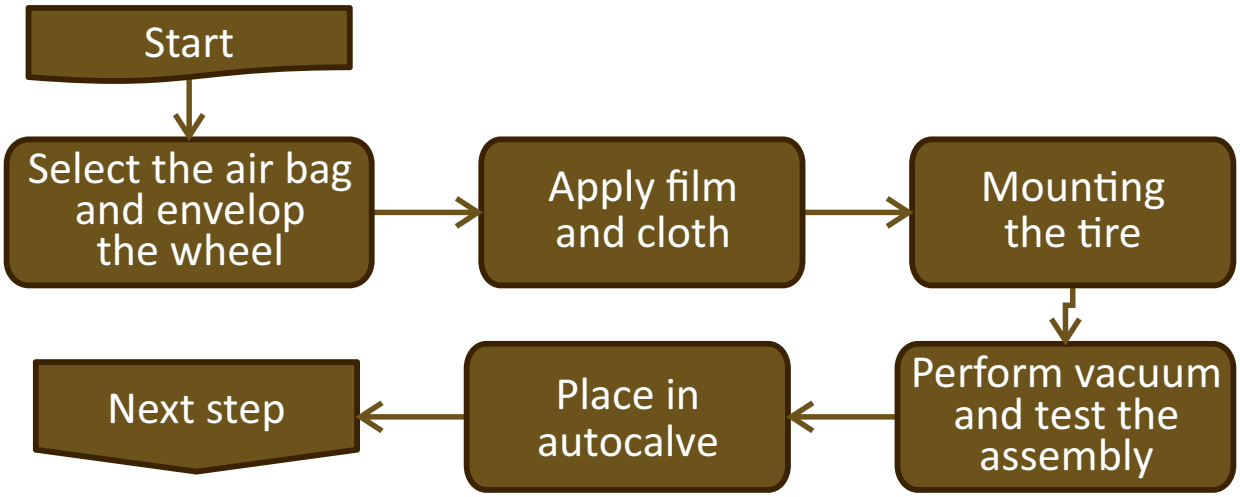
- Presses.

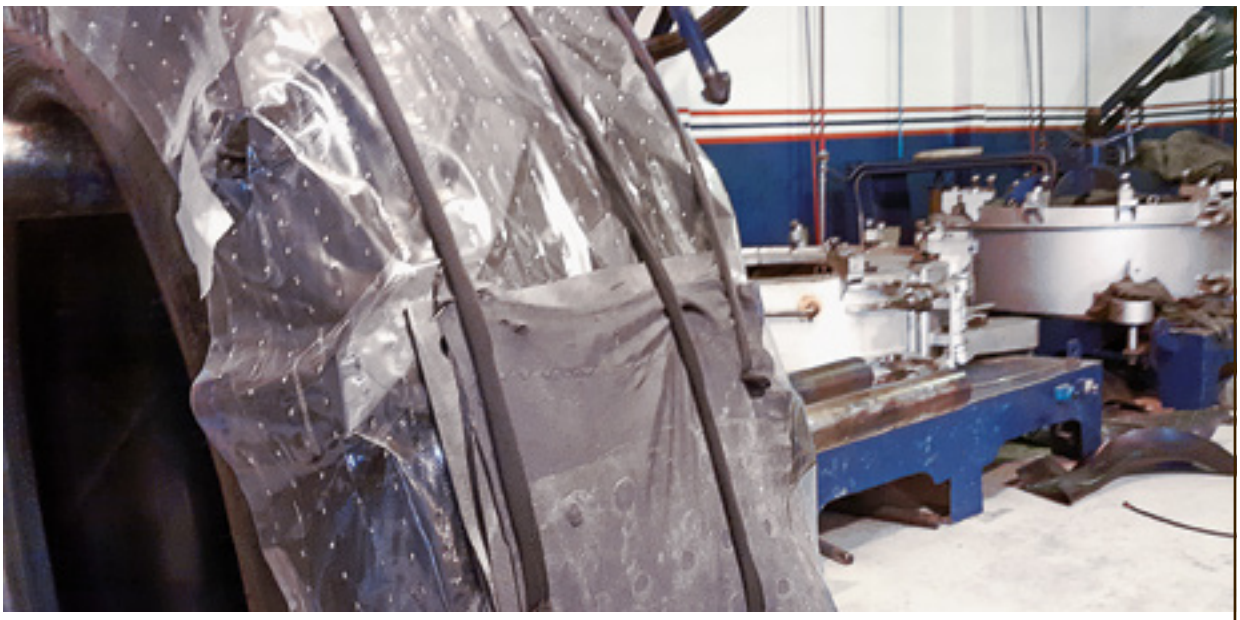
TOOLS:

- Pneumatic jack.

Block Curing in Autoclave

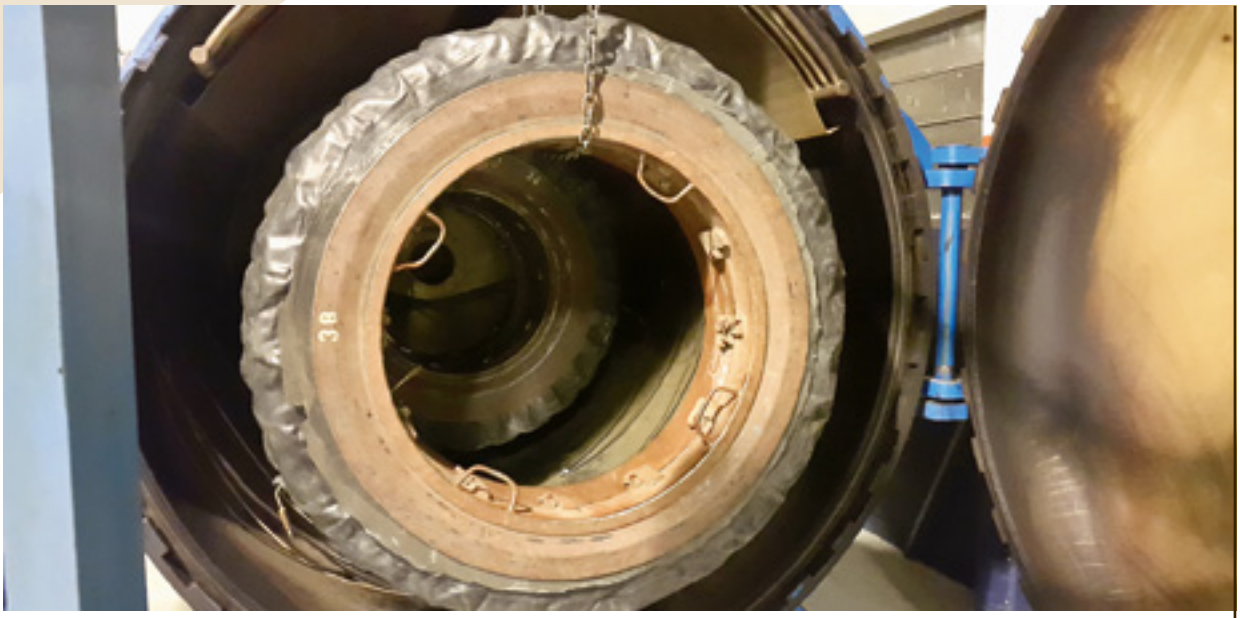
CURING FLOWCHART FOR BLOCKS IN AUTOCLAVE





PROCEDURE:

Apply polypropylene film and cloths, in two opposite positions.



Mount with the envelop, wheel and air bag.

Perform vacuum and test for possible leaks.

Close the hoses' registers that will not be used, that will not have tyres/tires connected to them.

Place the tires in the autoclave from the biggest to the smallest, quickly connecting the inflation hose to the air bag and the wicking hose to the envelop.

Close the autoclave door.

Select operating pressure for the air bag and the autoclave, which may be 8/6 kgf/cm^2 or 7/5 kgf/cm^2.

Start the cycle using a temperature of 120°C ± 5°C.

IMPORTANT:

Retreaded tires should undergo vacuum during the whole process. The use of third pressure is not recommended.

EQUIPMENT:

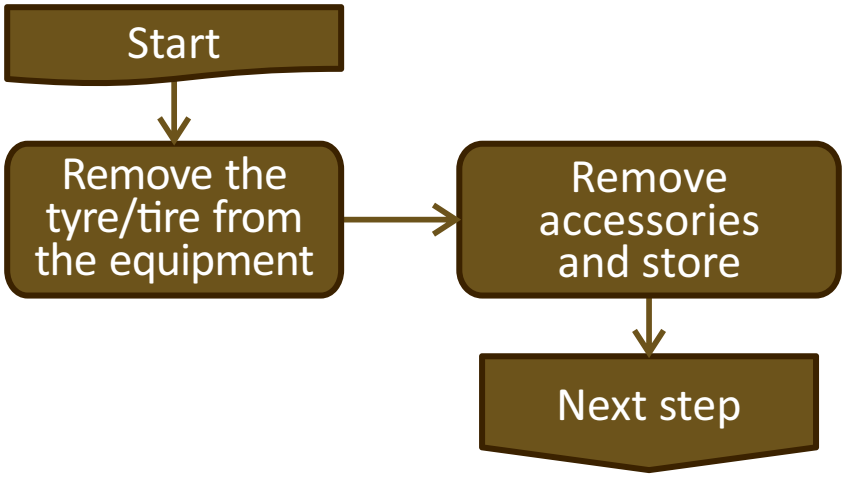
- Autoclave;
- Vacuum pump.

TOOLS:

- Vertical envelope spreader;
- Mounting table;
- Hooks;
- Vacuum's surge tank;
- Vacuum gauge;
- Vacuum sensor;
- Rubber plug for valves;
- Rubber wicking pad;
- External Envelope.

Dismantling the tire

TIRE DISMANTLING FLOWCHART



OBJETIVE:

Dismounting the tyre/tire after vulcanization.

SECTOR:

This should ideally be extensive to allow for classifying and storing accessories such as wheels, protectors, air bags and envelopes.

PROCEDURE:

Remove the tire from the equipment with the aid of the proper tools.

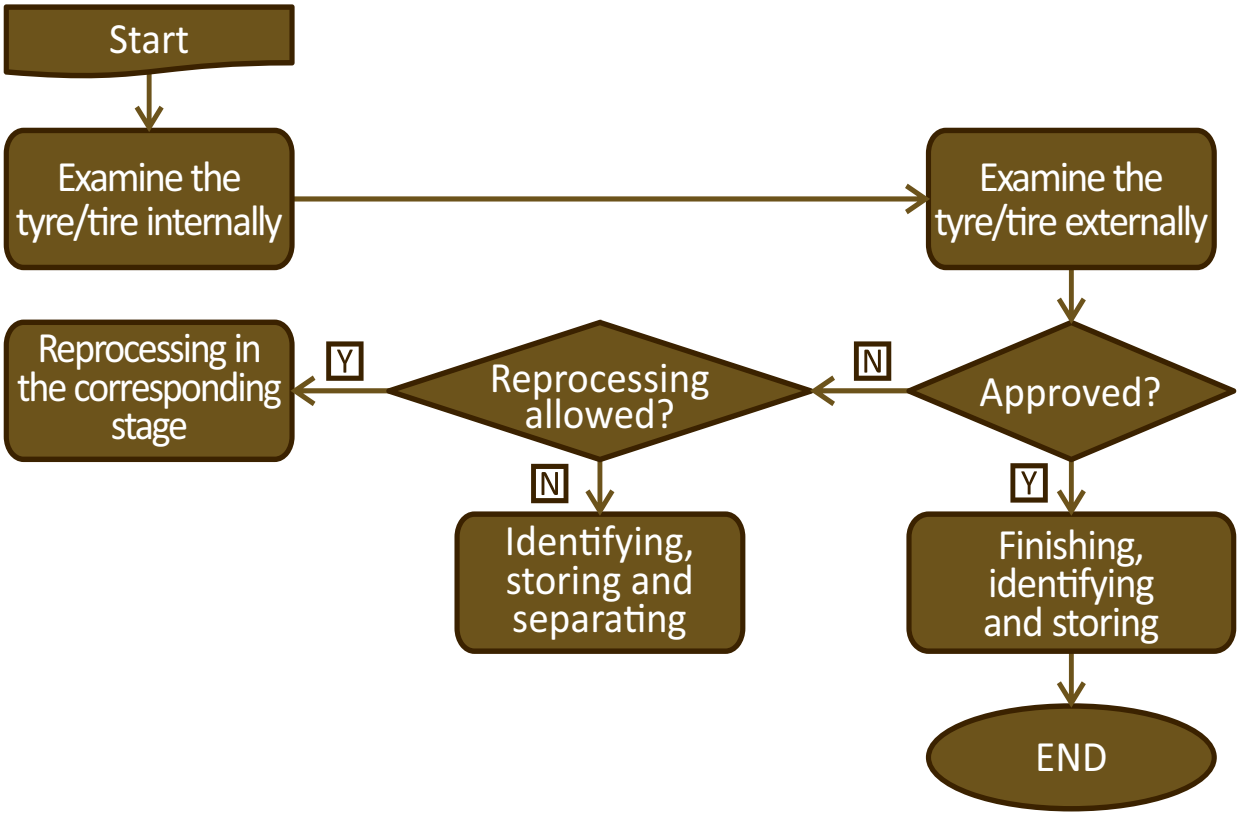
In an appropriate location, remove both parts of the wheel and store them.

Remove and store the accessories (air bag, envelope and protector).

Observation:

We recommend leaving the air bag, envelope and protector to rest between one cycle and another.

FINAL INSPECTION FLOWCHART



OBJETIVE:

To ensure that retreaded tyre/tire is in accordance with the critical analysis of the order and of the quality and finishing standards.

SECTOR:

Ideally wide, well-lit and allowing classifying the finished tyres/tires by seller, client, or date.

PROCEDURE:

Examine the inside of the tire, ensuring that there are no internal separations, patches with bubbles or loose liner.

Externally, check for dislocations, failures in vulcanization and finishing.

Observation:

In the event of a defect in the service performed, reprocess the tire if possible. If not, buff it, put it in the non-compliant area, identify the problem and inform the customer via technical report.

Eliminate burs and paint the tire.

Identify the tire and store it in stacks of regular quantities. The most appropriate way to store them is vertically on shelves.

EQUIPMENT:

- Examining machine with lighting;
- Painting cabin.

Disposing of non-compliant materials

OBJETIVE:

To establish the means to make sure the product that does not comply with specified requirements is prevented from inadvertent use.

SECTOR:

Appropriate place, identified, organized, and with easy dispatch.

PROCEDURE:

Raw materials and inputs, as well as tyres/tires in several stages of the manufacturing process that do not meet the specified requirements, must be identified as non-compliant products and separated in appropriate place.

Block preparation

OBJETIVE:

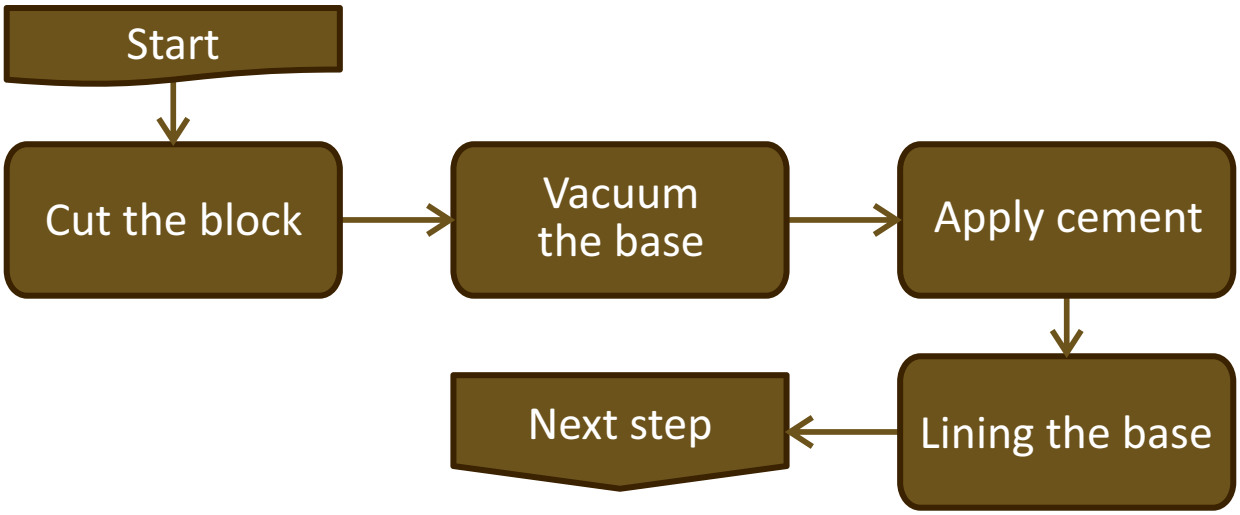
Cut and prepare the blocks for application on tires.

SECTOR:

It should ideally be spacious and well-lit.

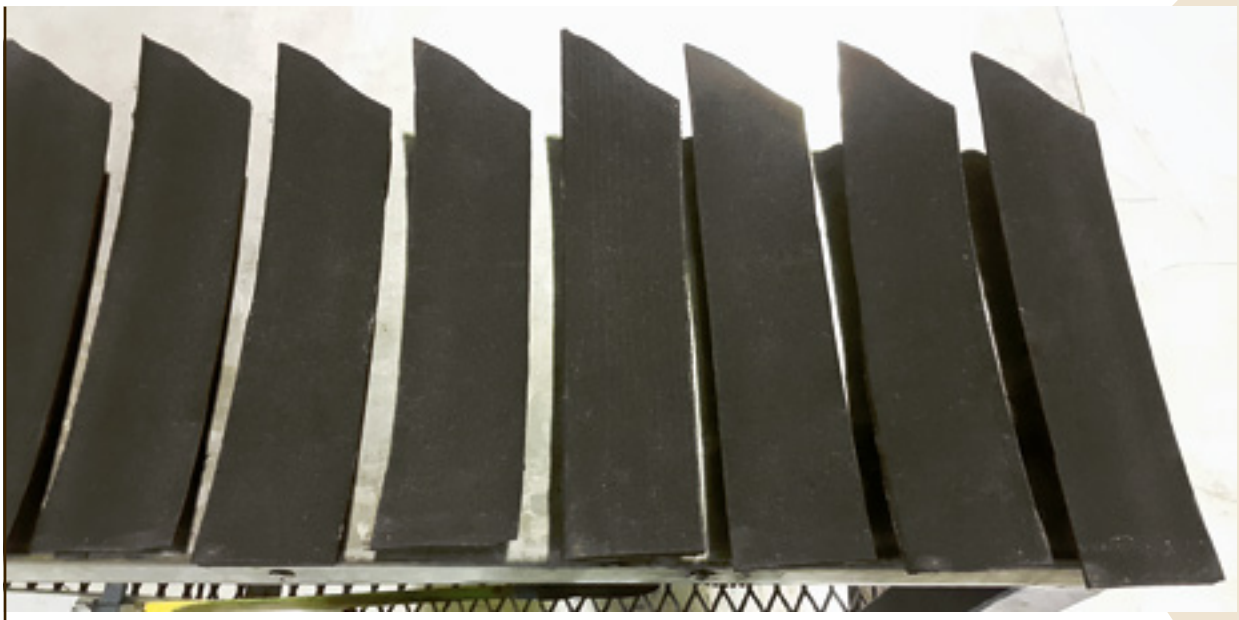
Heat-cured blocks

FLOWCHART FOR HEAT-CURED BLOCKS

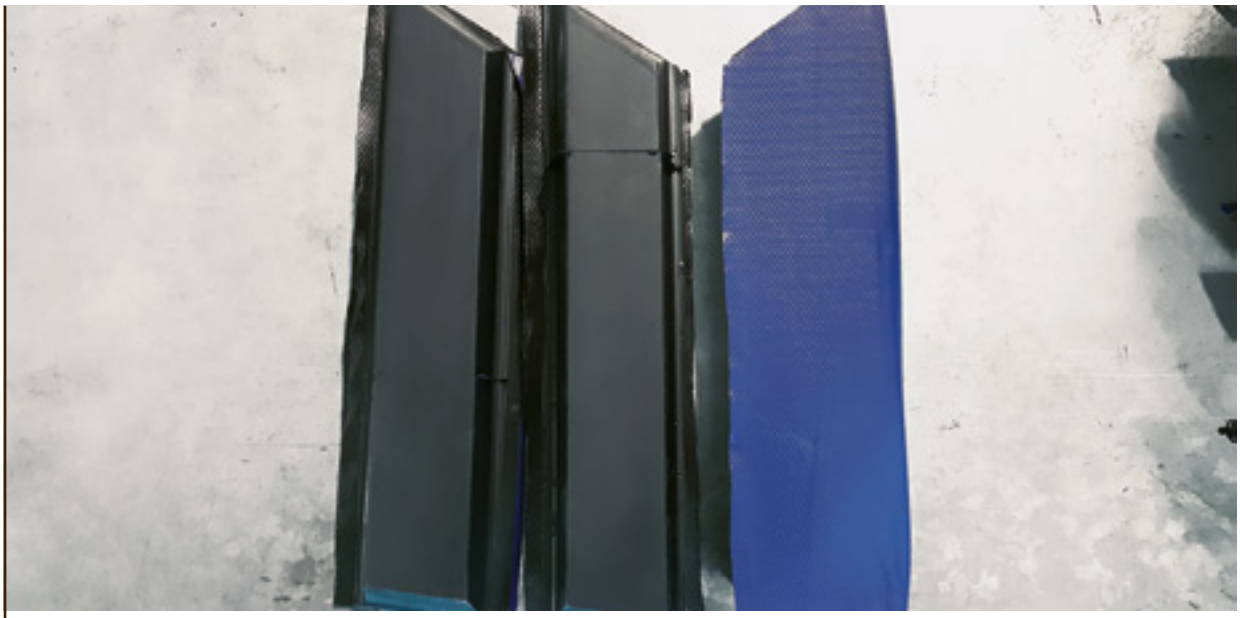


PROCEDURE:

Cut the block with the guillotine according to the size of the original lugs.



Apply cement at the base and let it dry.



Apply MB/AC cushion gum at the base.

EQUIPMENT:

- Guillotine.

TOOLS:

- Rollers;
- Knife;
- Paintbrush;
- Cement recipient.

NOTES

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