



DAMAGE AND WEAR GUIDE

COMMERCIAL TYRES



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INTRODUCTION

The tyre is one of the most important parts of any vehicle. It is what supports the load and makes contact between the vehicle and the ground.

The tyre turns the engine's power into traction and is therefore responsible for the vehicle's movement, steering, stability and braking efficiency.

Tyres often suffer damage and wear that impair their performance, so it is important to know their characteristics, types, applications and, especially, their care and maintenance.

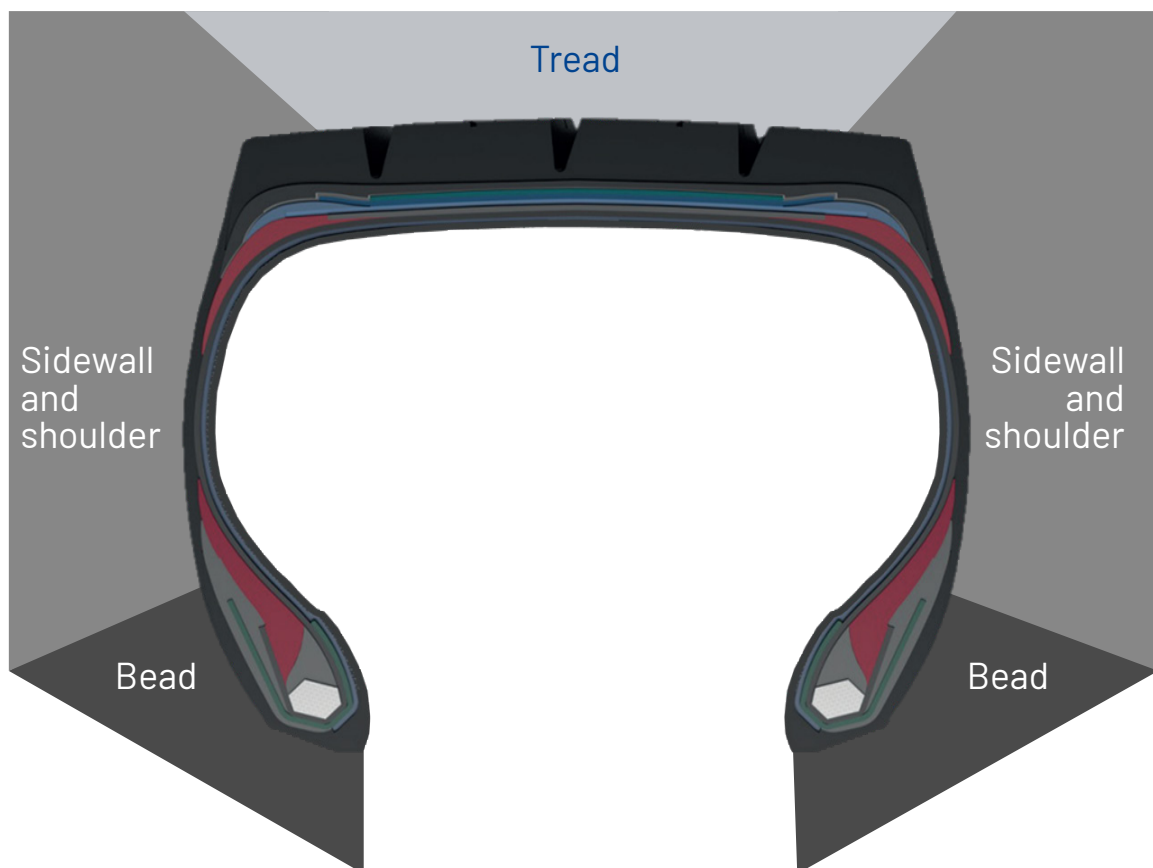
With the aim of guiding the customer and/or user of commercial and light commercial tyres, Vipal has developed this Damage and Wear Guide, which, through illustrative images and information, can help in recognising problems, as well as in the actions that should be taken to correct and minimise losses with tyres.

In addition to a series of guidelines on damage, this guide also provides important information on commercial tyres, such as construction, pressure, load and speed index, as well as tips for improving tyre performance.

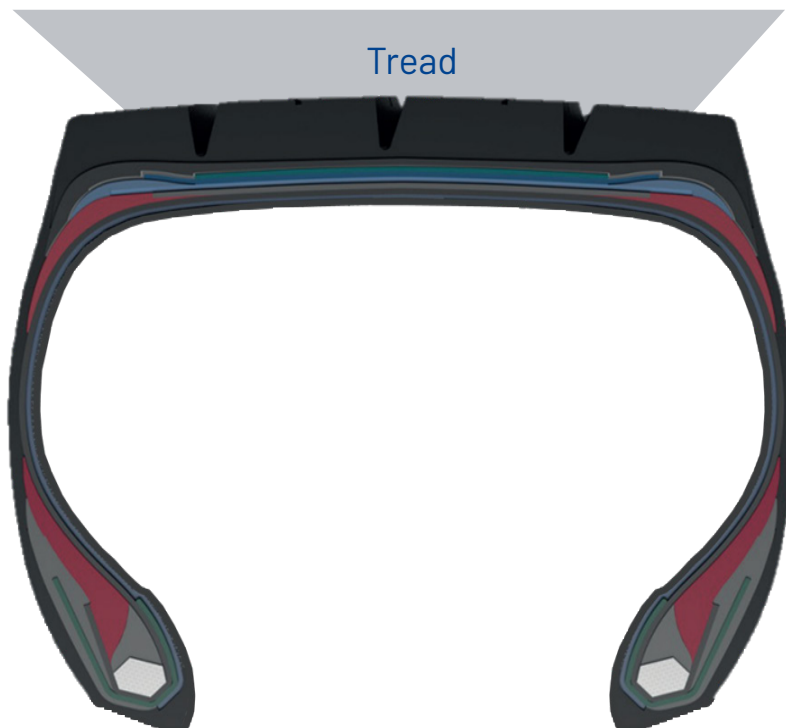
CODED DAMAGES

Damages are coded according to their location on the tyre, that is, divided by parts of the tyre, as follows:

- **Tread damage** – codes will be from numbers 1 to 29;
- **Damage to the casing** – codes will be from numbers 30 to 49;
- **Damage to the sidewall and shoulder** – codes will be from numbers 50 to 69;
- **Damage to the bead** – codes will be from numbers 70 to 79;
- **Special damages** – codes will be from numbers 90 to 99.



TREAD DAMAGE



01 - DETACHMENT/ BELTS SEPARATION



01	DETACHMENT/BELTS SEPARATION
APPEARANCE	Tyre belt ends loose and/or separated.
PROBABLE CAUSE(S)	Low pressure and excessive load that generate overheating at the end of the belts.
ACTION	The tyre must be discarded.
PRECAUTION	Avoid excessive load and always calibrate the tyres at room temperature.

02 - SEVERE IRREGULAR WEAR ON SHOULDER



02	SEVERE IRREGULAR WEAR ON SHOULDER
APPEARANCE	Tyre shoulder showing excessive wear, resulting in exposed cords end.
PROBABLE CAUSE(S)	Damaged steering terminal, mechanical problems and axle misalignment (convergence/divergence).
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Inspect tyres periodically, perform preventive maintenance, and avoid driving when the tyre cords are exposed.

03 - PEELING/ TREAD DETACHMENT



03	PEELING/TREAD DETACHMENT
APPEARANCE	Partial and/or total peeling of the tread.
PROBABLE CAUSE(S)	Driving on stony pavement, which can be worsened by excessive pressure and speed incompatible with road conditions.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Set the ideal pressure according to the weight transported. The vehicle speed must be compatible with the road conditions.

04 - EXCESSIVE CHIPPING ON THE TREAD



04	EXCESSIVE CHIPPING ON THE TREAD
APPEARANCE	Numerous cuts in the tread, which can reach the tyre cords.
PROBABLE CAUSE(S)	Driving on aggressive surfaces, aggravated by excessive pressure and speed incompatible with the road.
ACTION	Remove the tyre and ask a specialised professional to analyse it.
PRECAUTION	Periodically evaluate the tyres. It is recommended that the tyre be removed for retreading before the limit established by law, otherwise the tyre's retreading may be compromised.

05 – CIRCUMFERENTIAL TEARS ON THE TREAD



05	CIRCUMFERENTIAL TEARS ON THE TREAD
APPEARANCE	Excessive cuts in the circumferential direction on the tread.
PROBABLE CAUSE(S)	Vehicle skidding, inappropriate tyre selection/design or inappropriate driving.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Adjust the vehicle's driving and torque, check road conditions and choose the correct tyre/design.

06 – TREAD RUBBING



06	TREAD RUBBING
APPEARANCE	Circumferential damage.
PROBABLE CAUSE(S)	Accidental damage and/or contact with vehicle parts while driving.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Perform preventive maintenance, inspect the tyres and suspension of the vehicle periodically.

07 – RIB/ROW PEELING ON THE TREAD



07	RIB/ROW PEELING ON THE TREAD
APPEARANCE	Loosening/laceration at the bottom of the groove with partial or total peeling of the row/rib.
PROBABLE CAUSE(S)	Impact/contact with a sharp object at the base of the design (bottom of the groove).
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Inspect your tyres regularly to identify potential peeling at an early stage.

08 – DIAGONAL WEAR



08	DIAGONAL WEAR
APPEARANCE	Localised and accentuated wear across the entire circumference in a diagonal direction.
PROBABLE CAUSE(S)	Badly twinned double wheels and/or uneven pressures, vehicle misalignment, aggravated by mechanical problems, unbalanced assembly and/or clearance in the bearings.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Perform periodic maintenance on the vehicle, twin it correctly (tyres of the same brand and model), keep the tyres calibrated.

09 – IRREGULAR ASYMMETRICAL WEAR



09	IRREGULAR ASYMMETRICAL WEAR
APPEARANCE	Areas of tread worn in alternating spots.
PROBABLE CAUSE(S)	Pressure difference between duals, poorly twinned duals. Mechanical problems (suspension failure, assembly imbalance).
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Periodically perform maintenance on vehicle, braking system, tyre assembly and balancing.

10 - CRACK IN THE PATTERN GROOVE ON BIAS TYRES



10	CRACK IN THE PATTERN GROOVE ON BIAS TYRES
APPEARANCE	Crack in the tread groove.
PROBABLE CAUSE(S)	Inadequate pressure, excessive load, fatigued casings and poorly twinned duals.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Keep your tyres properly calibrated. Use tyres with the same dimensions and load capacity.

11 - CHIPPING IN THE TREAD



11	CHIPPING IN THE TREAD
APPEARANCE	Numerous cuts in the tread.
PROBABLE CAUSE(S)	Unpaved roads, poor design choice or excessive pressure.
ACTION	Choose appropriate designs for the segment and adjust the pressures according to the load.
PRECAUTION	Keep tyres properly calibrated, remove stones and objects from tyres. Remove the tyre for retreading within the limit established by the manufacturer.

12 - LOCALISED DAMAGE



12	LOCALISED DAMAGE
APPEARANCE	Localised wear on the tread/tread sides.
PROBABLE CAUSE(S)	Sudden braking or turning of the "S" axis at the time of braking.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Perform preventive maintenance on the vehicle's braking system.

13 - CENTRALISED WEAR



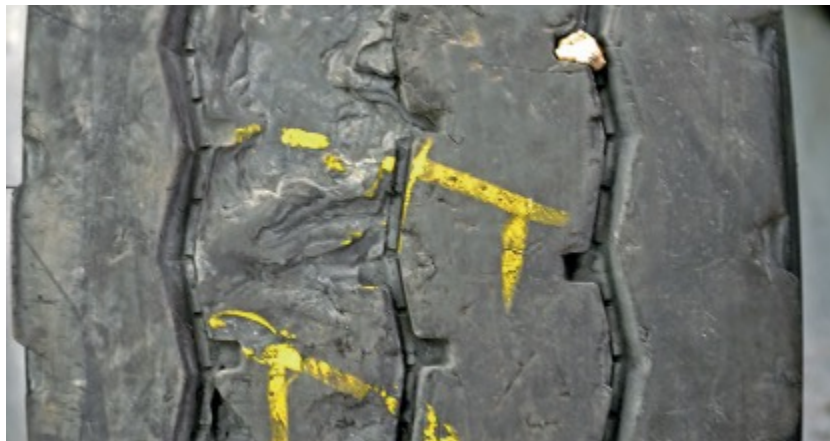
13	CENTRALISED WEAR
APPEARANCE	Severe wear in the central region of the tread.
PROBABLE CAUSE(S)	Excessive pressure in relation to the load being transported.
ACTION	Adjust pressure with reliable equipment according to the load. In cases where the wear has reached the TWI, remove it for retreading.
PRECAUTION	Periodically calibrate the tyres at room temperature and according to the manufacturer's instructions.

14 - BLOCK PEELING



14	BLOCK PEELING
APPEARANCE	Cracks at the base of the pattern, partial or complete ruptures of the block in traction designs.
PROBABLE CAUSE(S)	Excessive torque, tyre/design unsuitable for operation, and aggressive driving by the driver.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Select the tyre/design compatible with the operation and vehicle drivers.

15 – TREAD DAMAGE



15	TREAD DAMAGE
APPEARANCE	Damaged tread area.
PROBABLE CAUSE(S)	Contact with sharp objects during use.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Periodically inspect tyres, identifying damage at an early stage.

16 – IRREGULAR WEAR ON BLOCKS



16	IRREGULAR WEAR ON BLOCKS
APPEARANCE	Blocks worn irregularly around the entire circumference (sawtooth type).
PROBABLE CAUSE(S)	Excessive vehicle torque, pressure difference, incorrect use of the braking system.
ACTION	For superficial damage, keep it in use; if in doubt, ask a specialised professional for analysis.
PRECAUTION	Adjust the vehicle's torque application, correctly use the braking systems, calibrate the tyres according to the manufacturer's instructions.

17 - CONICAL WEAR ON THE TREAD



17	CONICAL WEAR ON THE TREAD
APPEARANCE	The tyre shows greater wear on one side of the tread.
PROBABLE CAUSE(S)	Incorrect vehicle camber and KPI, overload or bent axle.
ACTION	Perform preventive maintenance on the vehicle's suspension. Pull tires for retreading as soon as wear reaches the Tread Wear Indicator (TWI).
PRECAUTION	Continue with preventive maintenance on the vehicle's suspension.

18 – PARTIAL TREAD RELEASE



18	PARTIAL TREAD RELEASE
APPEARANCE	Detachment of part of the tread with visible puncture.
PROBABLE CAUSE(S)	Penetration of an object into the casing, causing infiltration into the structure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Periodically inspect your tyres, avoiding driving with punctured tyres for long periods of time. Calibrate them periodically and always at room temperature.

19 – UNEVEN WEAR ON STEPS



19	UNEVEN WEAR ON STEPS
APPEARANCE	Significant wear on some tread pattern rows.
PROBABLE CAUSE(S)	Incorrect choice of tyre model, pressure differences between duals and clearances in the bearings.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Perform preventive maintenance on the vehicle and tyres, especially periodic calibration.

20 - EARLY STAGE SEPARATION OF THE TREAD



20	EARLY STAGE SEPARATION OF THE TREAD
APPEARANCE	Tread wider than the casing.
PROBABLE CAUSE(S)	Placement of the tread wider than the original casing.
ACTION	If in doubt, request analysis from a specialised professional.
PRECAUTION	When retreading the tyre, use treads compatible with the width of the casing.

21 - DETACHMENT OF TREAD



21	DETACHMENT OF TREAD
APPEARANCE	Detachment between the tread and the tyre structure.
PROBABLE CAUSE(S)	Probable deviation in the retreading process.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Choose companies with qualified labour to retread your tyre.

22 - WEAR ON THE TREAD SHOULDER



22	WEAR ON THE TREAD SHOULDER
APPEARANCE	Shoulders show more pronounced wear in relation to the centre of the tread.
PROBABLE CAUSE(S)	Running with low pressure or excess load.
ACTION	Calibrate the tyres with the indicated pressure according to the manufacturer's instructions. When the wear reaches the TWI at one point, remove the tyres for retreading.
PRECAUTION	Calibrate periodically the tyres at room temperature, perform visual inspections on the tyres, and optimise load distribution.

23 – STONES CAPTURED ON THE TREAD



23	STONES CAPTURED ON THE TREAD
APPEARANCE	Tread with retention of stones in the grooves.
PROBABLE CAUSE(S)	Unpaved roads, incorrect choice of tyre/design suitable for operation.
ACTION	Select the tyre/design compatible with the operation.
PRECAUTION	Regularly inspect tyres to remove stones and/or objects, seeking to preserve the tread.

CASING DAMAGE



30 - FILLING LOOSENESS



30	FILLING LOOSENESS
APPEARANCE	Looseness or wear in the area of filling carried out during the retreading or repair process.
PROBABLE CAUSE(S)	Failure in the tyre retreading process, presence of moisture, oxidised structure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Check your tyres frequently to identify looseness at an early stage.

31 – OBJECT PENETRATION



31	OBJECT PENETRATION
APPEARANCE	Puncture with an object in the tread area.
PROBABLE CAUSE(S)	Sharp object on the track (nail, screw, etc.).
ACTION	Remove the tyre and request an analysis of the extent of the damage by a specialised professional.
PRECAUTION	Inspect tyres daily, remove objects that are partially impregnated, avoiding greater damage to the structure.

32 – CIRCUMFERENTIAL BREAK IN FLEXION ZONE



32	CIRCUMFERENTIAL BREAK IN FLEXION ZONE
APPEARANCE	Circumferential tear on the tyre sidewall in the form of a zipper.
PROBABLE CAUSE(S)	Tyre fatigue, low tyre pressure, casing failure due to a lack of tyre pressure when the vehicle is stopped and overloaded.
ACTION	The tyre must be discarded.
PRECAUTION	Calibrate properly according to the manufacturer's instructions. Perform maintenance on the calibration equipment (tyre inflation system) and carry out periodic inspections.

33 - CIRCUMFERENTIAL BREAK ON THE SIDEWALL



33	CIRCUMFERENTIAL BREAK ON THE SIDEWALL
APPEARANCE	Damage and/or deformation on the tyre side.
PROBABLE CAUSE(S)	Driving with a flat tyre, low pressure or excessive load.
ACTION	The tyre must be discarded.
PRECAUTION	Carry out periodic inspections, calibrate tyres frequently and always at room temperature.

34 - INTERNAL DAMAGE TO LINER



34	INTERNAL DAMAGE TO LINER
APPEARANCE	Tyre structure with damaged liner.
PROBABLE CAUSE(S)	Running with low pressure or excess load.
ACTION	The tyre must be discarded.
PRECAUTION	Periodically calibrate the tyres, always at room temperature, carry out periodic inspections on the tyres, and avoid overloading.

35 - RADIAL TYRE BREAK



35	RADIAL TYRE BREAK
APPEARANCE	Tyre with radial break.
PROBABLE CAUSE(S)	Strong impact with an obstacle or hole in the track, affecting the tyre structure, aggravated by excessive pressure, load and/or speed.
ACTION	The tyre must be discarded.
PRECAUTION	On poorly maintained roads, compatible speeds should be adopted. Keep your tyres at the correct pressure. For double setups, the tyres must be of identical construction, same brand and model, same size, and mounted on rims of equal dimensions.

36 - DETACHMENT BETWEEN LINER AND CASING



36	DETACHMENT BETWEEN LINER AND CASING
APPEARANCE	Bubble or separation between the liner and the tyre structure.
PROBABLE CAUSE(S)	Loss of adhesion of the tyre's inner liner material due to excessive heating. It can also be caused by infiltration in the tyre structure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Perform tyre maintenance, avoiding overheating, select a wheel with the appropriate size for the tyre size.

37 – SEPARATION OF CABLES FROM THE CASING



37	SEPARATION OF CABLES FROM THE CASING
APPEARANCE	Spaced or exposed casing wires.
PROBABLE CAUSE(S)	Impact against an object, bridge head, hole, which may be aggravated by excess pressure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Calibrate tyres always when cold, avoiding impacts during the use.

38 – INFILTRATION DAMAGE



38	INFILTRATION DAMAGE
APPEARANCE	Rubber detachment from the structure in the sidewall region in radial casings.
PROBABLE CAUSE(S)	Driving with unrepaired puncture for a long period.
ACTION	The tyre must be discarded.
PRECAUTION	Inspect the vehicle's tyres daily to detect possible damage.

39 - IMPROPER REPAIR 1



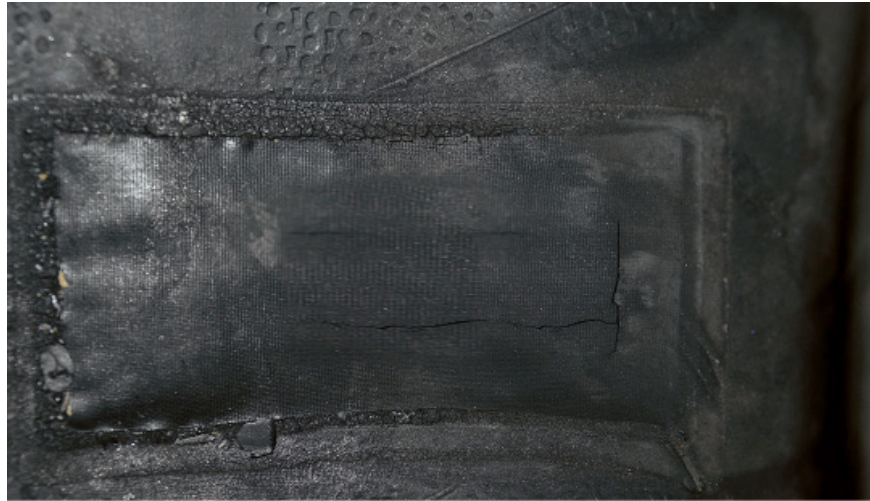
39	IMPROPER REPAIR 1
APPEARANCE	Damage with temporary repair.
PROBABLE CAUSE(S)	Inadequate (emergency) repair.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Use only indicated repairs for each type of damage. See the Vival patch application chart and avoid emergency repairs, as they can reduce the tyre's useful life.

40 - IMPROPER REPAIR 2



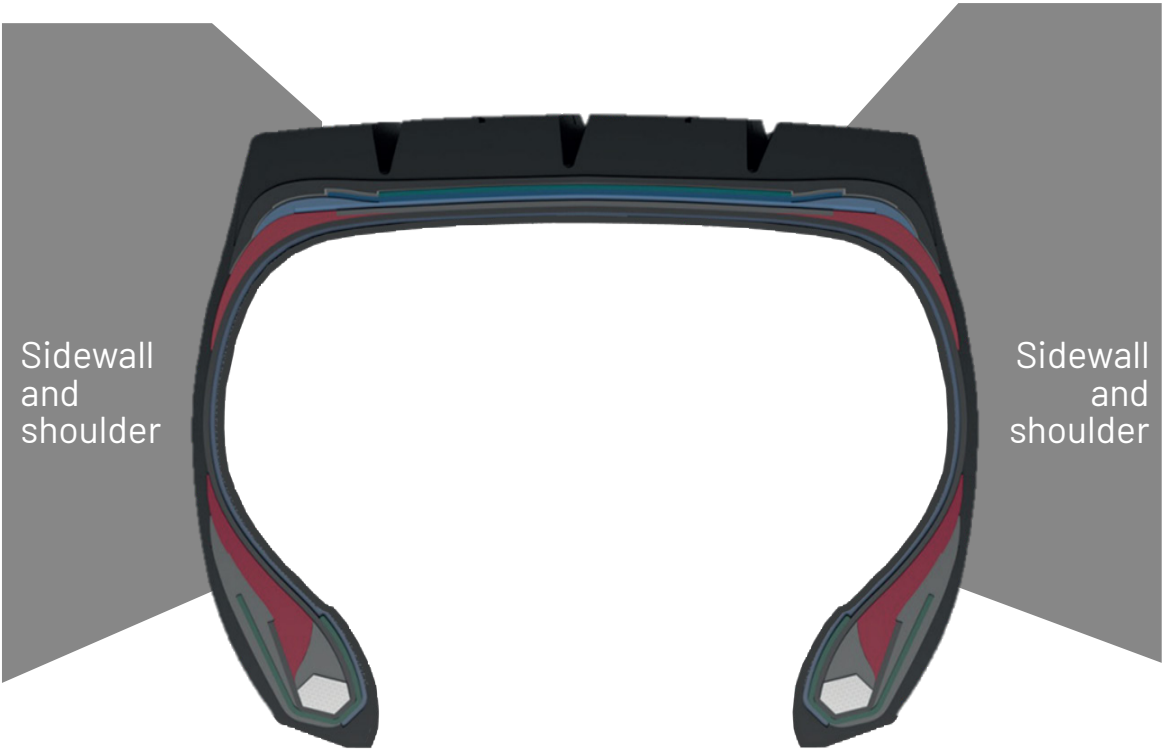
40	IMPROPER REPAIR 2
APPEARANCE	Tyre with repair intended for inner tube or with piece of rubber (handmade repair).
PROBABLE CAUSE(S)	Piece of inner tube or inner tube repair applied to the damaged area of the tyre.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Use indicated repairs according to the Vival patch application chart.

41 – IMPROPER REPAIR 3



41	IMPROPER REPAIR 3
APPEARANCE	Crack or partial or total rupture of the repair (patch).
PROBABLE CAUSE(S)	Misinterpretation and incorrect selection and application of repair material.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Choose qualified professionals and follow the instructions for choosing and applying repair material according to the Vival repair technical manual.

SIDEWALL AND SHOULDER DAMAGE



50 - DETACHMENT BETWEEN SIDEWALL AND CASING



50	DETACHMENT BETWEEN SIDEWALL AND CASING
APPEARANCE	Detachment of rubber between the sidewall and casing in radial tyres.
PROBABLE CAUSE(S)	Air trapped in the casing structure, excessive heat or rolling at low pressure, without any puncture.
ACTION	The tyre must be discarded.
PRECAUTION	Avoid overload and calibrate the tyres according to the load to be transported.

51 – DETACHMENT BETWEEN CASING AND SIDEWALL WITH PUNCTURE



51	DETACHMENT BETWEEN CASING AND SIDEWALL WITH PUNCTURE
APPEARANCE	Puncture in the casing and peeling on the sidewall.
PROBABLE CAUSE(S)	Internal infiltration due to impact, overload or running at low pressure, aggravated by excessive heat.
ACTION	The tyre must be discarded.
PRECAUTION	Avoid overload and calibrate the tyres accordingly, always at room temperature.

52 – DETACHMENT/SEPARATION IN THE SHOULDER REGION



52	DETACHMENT/SEPARATION IN THE SHOULDER REGION
APPEARANCE	Detachment of the tread from the structure in the shoulder region.
PROBABLE CAUSE(S)	Forced manoeuvres, incorrect design for free axle, impact or sharp object.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Perform correct manoeuvres, use appropriate designs/tyres for free axles, and inspect tyres regularly.

53 – SIDEWALL FRICTION



53	SIDEWALL FRICTION
APPEARANCE	Accidental friction in the sidewall area around the entire circumference of the tyre.
PROBABLE CAUSE(S)	Contact with vehicle parts such as broken springs, U-clamps and/or loose suspension parts.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Perform preventive maintenance, inspect the vehicle's tyres and suspension periodically.

54 - SHOULDER DETACHMENT IN BIAS TYRE



54	SHOULDER DETACHMENT IN BIAS TYRE
APPEARANCE	Separation in the shoulder and/or tread area.
PROBABLE CAUSE(S)	Driving with low pressure, tyre structure fatigue, manoeuvres with side drag, impact with obstacles on the road, such as bridge heads, studs, holes and curbs.
ACTION	The tyre must be discarded.
PRECAUTION	Perform correct manoeuvres and periodically calibrate the tyres, always at room temperature.

55 - WAVING (BUMP) ON THE SIDEWALL OF THE RADIAL TYRE



55	WAVING (BUMP) ON THE SIDEWALL OF THE RADIAL TYRE
APPEARANCE	Deformation (vein) on the tyre sidewall.
PROBABLE CAUSE(S)	Separation or break of the structure cables caused by impact.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Avoid impacts against obstacles such as studs, holes, bridge heads and sharp objects.

56 – ACCIDENTAL DAMAGE ON SIDEWALL 1



56	ACCIDENTAL DAMAGE ON SIDEWALL 1
APPEARANCE	Cut or damaged sidewall structure.
PROBABLE CAUSE(S)	Object between doubles.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Carry out periodic inspections.

57 - RADIAL OPENING ON THE SIDEWALL



57	RADIAL OPENING ON THE SIDEWALL
APPEARANCE	Radial crack on the sidewall.
PROBABLE CAUSE(S)	Severe impact, running with low pressure or overload.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Calibrate periodically, according to the weight and manufacturer's instructions, and drive the vehicle properly.

58 – ACCIDENTAL DAMAGE ON SIDEWALL 2



58	ACCIDENTAL DAMAGE ON SIDEWALL 2
APPEARANCE	Damaged or cut sidewall.
PROBABLE CAUSE(S)	Accidental impact/rubbing on the tyre sidewall.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Avoid rubbing against obstacles. Perform correct manoeuvres.

59 – BREAKS/CRACKS ON THE SIDE OF THE TYRE



59	BREAKS/CRACKS ON THE SIDE OF THE TYRE
APPEARANCE	Numerous small breaks/cracks on the side of the tyre.
PROBABLE CAUSE(S)	Out-of-service tyres exposed for long periods to weather conditions (sun, rain, snow, humidity), aggravated by high concentrations of ozone.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Store tyres in a cool and dry place, away from chemical agents, heat sources and direct sunlight. Products must be stored without tension or compression, to prevent cracking and deformation. The rubber properties will be better utilised if the tyre is in use.

60 – CRACK IN THE HEEL



60	CRACK IN THE HEEL
APPEARANCE	Partial opening between the sidewall and the shoulder region.
PROBABLE CAUSE(S)	Incorrect radius for manoeuvring and/or contact with an object during operation.
ACTION	For superficial damages (only rubber) that do not reach the casing structure (steel or textile), keep in use; in case of doubts, please request analysis by a specialized professional.
PRECAUTION	Increase the angle of the manoeuvres or perform them in stages. Use a design/tyre with rounded shoulders and/or a tread with wings.

DAMAGES TO THE BEAD



70 - CIRCUMFERENTIAL CRACK ON THE BEAD



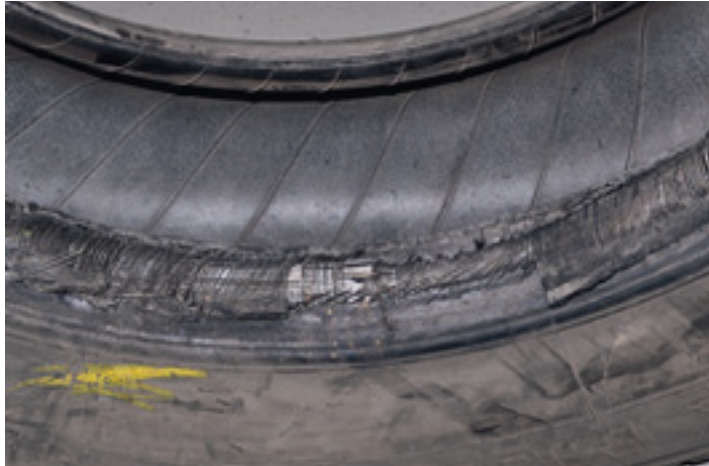
70	CIRCUMFERENTIAL CRACK ON THE BEAD
APPEARANCE	Break in the bead region at the end of the casing.
PROBABLE CAUSE(S)	Overheating, excessive flexion, load excess, low pressure and/or inadequate tyre.
ACTION	The tyre must be discarded.
PRECAUTION	Avoid overheating and overloading, always calibrate tyres at room temperature, use tyres following the manufacturer instructions, and rotate tyres regularly.

71 - RUBBER TEARED OFF THE BEAD



71	RUBBER TEARED OFF THE BEAD
APPEARANCE	Damaged bead by teared rubber.
PROBABLE CAUSE(S)	Overheating, overload and/or low pressure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Avoid overheating, overload and/or low pressure, check the tyre status and size according to the manufacturer's instructions.

72 - BURNT BEAD



72	BURNT BEAD
APPEARANCE	Bead surface burned due to overheating.
PROBABLE CAUSE(S)	Failure or improper use of the brake system.
ACTION	The tyre must be discarded.
PRECAUTION	Perform preventive maintenance on the vehicle's brake system and train drivers.

73 - DAMAGED BEAD



73	DAMAGED BEAD
APPEARANCE	Breaks, cracks and tearing in the bead area.
PROBABLE CAUSE(S)	Lack of lubrication during assembly or disassembly, use of inappropriate equipment.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Review assembly and disassembly procedures, use appropriate paste and tools and qualified labour to perform the service.

75 – BEAD SLIPPAGE ON THE RIM



75	BEAD SLIPPAGE ON THE RIM
APPEARANCE	Bead showing circumferential damage at its base.
PROBABLE CAUSE(S)	Assembly process failure, low pressure.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Periodically calibrate the tyres and carry out the assembly process correctly.

79 - DAMAGE TO THE BEAD HEEL



79	DAMAGE TO THE BEAD HEEL
APPEARANCE	Bead with breaks or deformation in its heel.
PROBABLE CAUSE(S)	Driving with low pressure or excessive load, improper assembly and tyre with damaged flange.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Review assembly and disassembly procedures, evaluate the condition of the tyre flanges, and calibrate the tyres periodically.

SPECIAL DAMAGES



90 - TYRE CONTAMINATION



90	TYRE CONTAMINATION
APPEARANCE	Tyre with oil, grease and water.
PROBABLE CAUSE(S)	Storage in an inadequate location, mechanical problem, air network contaminated with water and oil.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Avoid contact with oil and grease, and keep the air network free of oil and moisture.

91 - INCORRECT ASSEMBLY



91	INCORRECT ASSEMBLY
APPEARANCE	Duals with different construction, brand and design.
PROBABLE CAUSE(S)	Lack of standardisation and control in assembly, in the composition of the ideal set, and tyre management.
ACTION	Remove the tyres and select tyres of the same construction and design for the same axle.
PRECAUTION	Only assemble tyres of the same brand, size, design and depth for the same set.

92 – INCORRECT STORAGE



92	INCORRECT STORAGE
APPEARANCE	Tyres stacked irregularly, crushed and/or deformed.
PROBABLE CAUSE(S)	Incorrect storage/stacking.
ACTION	Stack/store tyres as per manufacturer's instructions.
PRECAUTION	Guide professionals involved in moving tyres on correct storage.

94 – USAGE LIMIT REACHED



94	USAGE LIMIT REACHED
APPEARANCE	Tread wear reaching TWI.
PROBABLE CAUSE(S)	Tyre has reached the wear limit defined by legislation.
ACTION	Remove the tyre and ask a specialised professional to analyse the extent of the damage.
PRECAUTION	Inspect tyres daily and remove them before reaching TWI to increase safety and to avoid violations.

96 - RIM DECENTRALIZATION



96	RIM DECENTRALIZATION
APPEARANCE	Tyre showing decentralization in relation to the rim.
PROBABLE CAUSE(S)	Incorrect assembly, poor centralization of the tyre assembly or damaged tyre.
ACTION	Remove the tyre and request a specialised professional to analyse it.
PRECAUTION	Review the assembly procedure of the set, inspect the condition of the rim.

TYRE PARTS

The main parts of the tyre are described below:

A) Tread (1):

Part of the tyre that comes into contact with the ground.

B) Grooves (2):

Cavities that cut the surface of the tread longitudinally and/or transversely, establishing their design.

C) Shoulders (3):

Parts of the tyre between the tread and the sidewalls.

D) Ply (Plies) or protection belt(s)(4):

Exterior part of the resistant tyre structure, which aims to protect the plies/work belts.

E) Ply (Plies) or belt(s)(5):

External part of the structure of the radial tyre aimed at stabilizing the tyre.

F) Inner liner (6):

The entire inner surface of the tyre, made up of rubber components, responsible for protection.

G) Casing ply (plies)(7):

Inner part of the tyre whose cords extend from bead to bead.

H) Sidewalls or sides (8):

Part of the tyre between the edges of the tread and the beads.

I) Rib (9):

Rib: embossed line close to the beads area that is intended to visually indicate the correct centralization of the tyre on the rim.

TYRE PARTS

J) Beads (10):

Parts of the tyre that come into contact with the rim, ensuring that it is secured.

K) Bead rim (11):

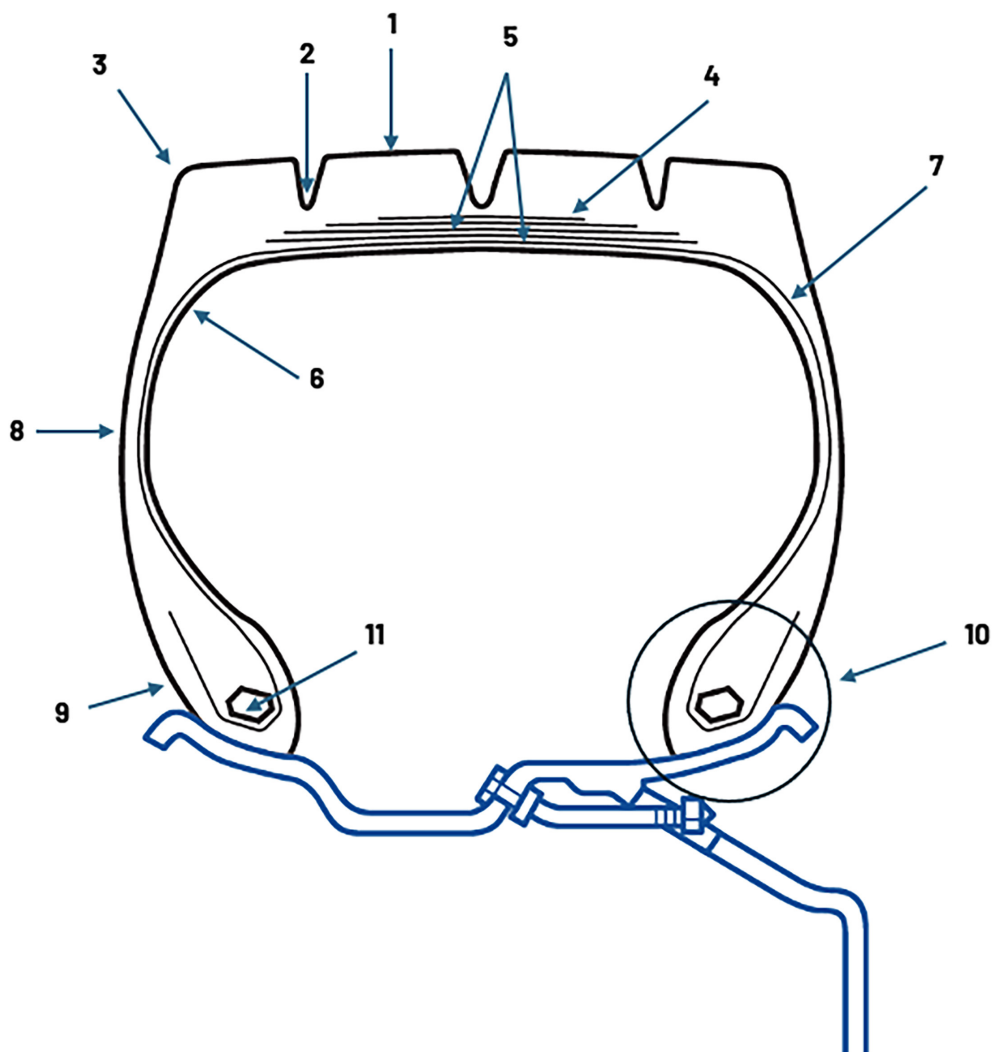
Internal metallic element of the bead.

L) Casing:

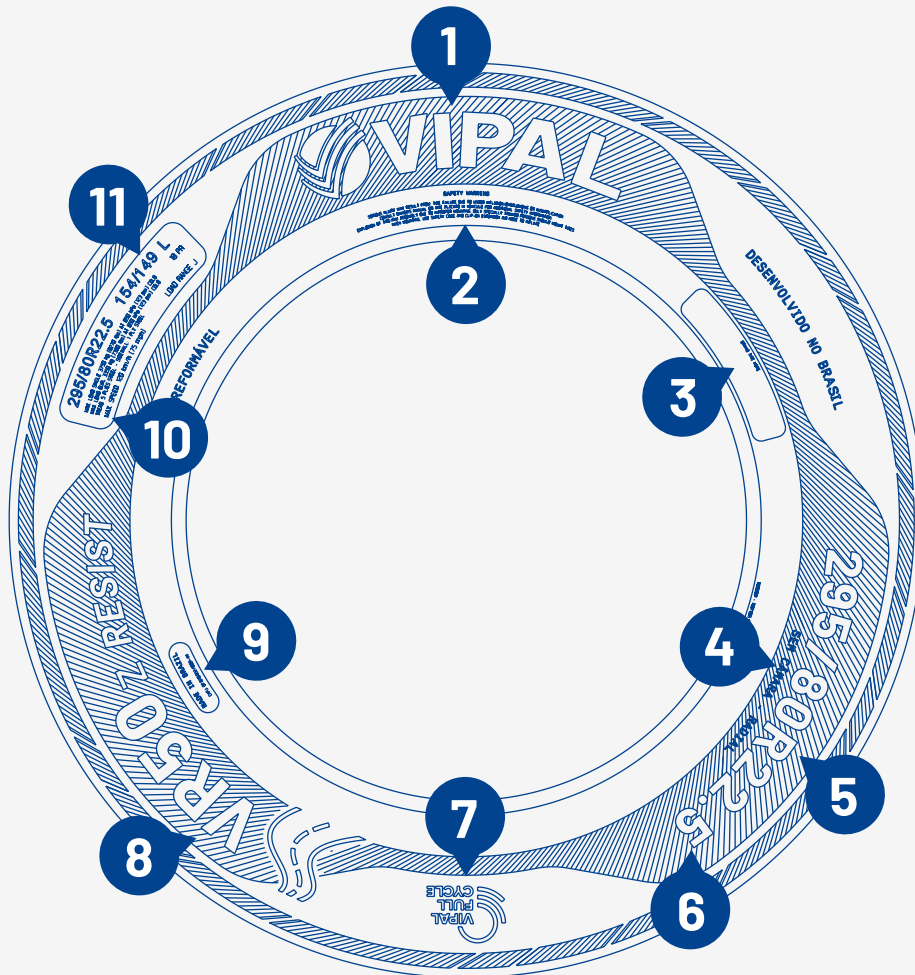
Resistant structure built by plies and a protection belt.

M) Tread wear indicators:

Protrusions or bumps located at the bottom of the grooves that visually indicate the maximum use limit of the tyre tread.



HOW TO READ THE TYRE



- 1** - Manufacturer
- 2** - Safety information
- 3** - Area for tyre marking
- 4** - Tubeless version tyre
- 5** - Construction type
- 6** - Dimension characteristics
- 7** - VIPAL FULL CYCLE Seal
- 8** - Tyre model
- 9** - Country of manufacture
- 10** - Tyre structure, pressure and load speed indexes
- 11** - Dimension, load index for single and double mounting and speed code

DIMENSION CHARACTERISTICS

Example: 295/80R22.5

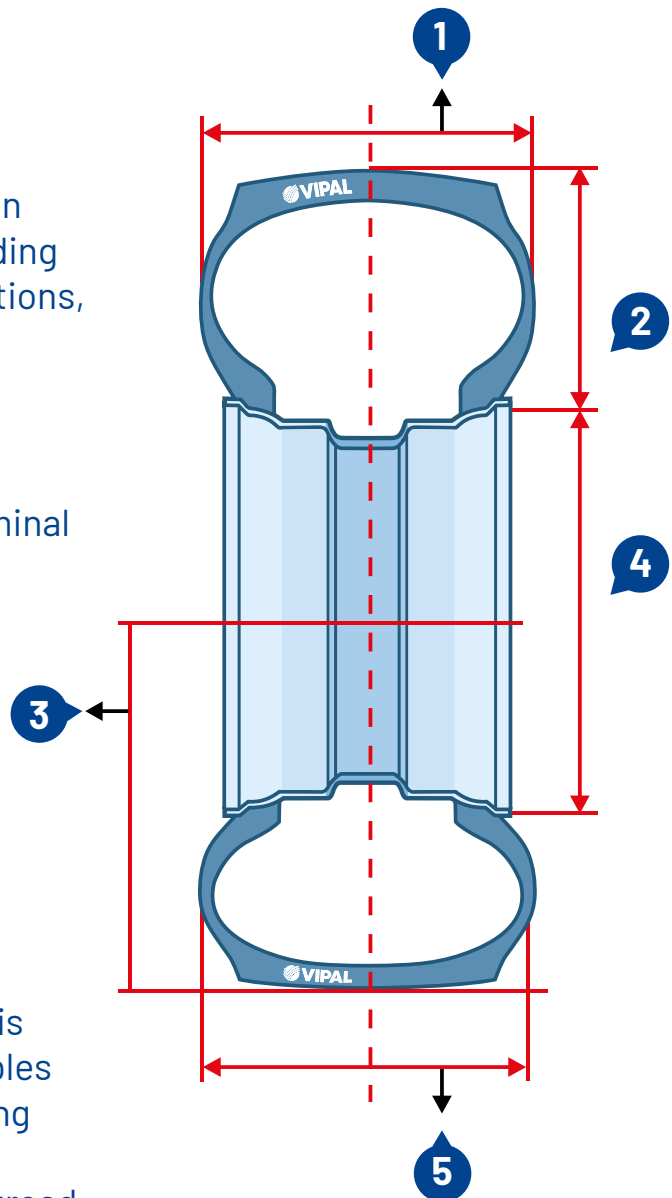
**Nominal Section Width (mm):
(295 mm)** Distance between the outside of the tyre sidewalls when mounted and pressurised, excluding reliefs from inscriptions, decorations, or blocks.

**Section Height (mm):
(236 mm)** Tyre section height corresponding to 80% of the nominal section width.

**Aspect Ratio (%):
80** (section height/section width)*100

**Nominal Rim Diameter:
22.5** Wheel size designation.

Construction Type R (Radial):
Tyres whose resistant structure is made up of steel plies whose cables extend from bead to bead, forming angles of approximately 90° in relation to the centre line of the tread. This structure is stabilised by a set of circumferential metal belts.



- 1 - Section width
- 2 - Section height
- 3 - Static radius with load
- 4 - Rim diameter
- 5 - Section width with load

TYRE CONSTRUCTION

Bias tyre:

Tyres whose resistant structure is made up of a set of superimposed textile plies whose cords extend from bead to bead forming alternating angles in relation to the centre line of the tread.



Radial tyre:

Tyres whose resistant structure is made up of plies whose cables extend from bead to bead forming angles of approximately 90° in relation to the centre line of the tread. This structure is stabilised by a set of circumferential belts.



LOAD AND SPEED INDEX

Load capacity

Represents the maximum load that the tyre can support in its nominal condition of use, identified by a load index or other corresponding method. Abbreviation: "CAP. LOAD".

The load capacity of the tyres can be indicated on one of the sidewalls with the expressions and their respective abbreviations: "CAPACITY OF PLYS" ("CAP. PLYS" or "PLY CAP."); "PLY RATING" ("PR"); "LOAD RANGE" and "LOAD CAPACITY".

Conversion of "ply capacity" to "load capacity"

PLY CAP.	LOAD CAP.	PLY CAP.	LOAD CAP.
A	2	G	14
B	4	H	16
C	6	J	18
D	8	L	20
And	10	M	22
F	12	N	24

Source: Alapa - Latin American Tyre and Rim Association

LOAD AND SPEED INDEX

SPEED INDEX	SPEED (KM/H)	SPEED INDEX	SPEED (KM/H)
A1	5	K	110
A2	10	L	120
A3	15	M	130
A4	20	N	140
A5	25	P	150
A6	30	Q	160
A7	35	R	170
A8	40	S	180
B	50	T	190
C	60	U	200
D	65	H	210
E	70	V	240
F	80	W	270
G	90	Y	300
J	100		

Source: Alapa - Latin American Tyre and Rim Association

Load Index "LI"

The "Load Index" (L.I.) is an assigned number that corresponds to the maximum weight that a tire can support when properly inflated, that precedes the tire speed rating as indicated by a letter at the very end of the code, under the service conditions specified by the tire manufacturer.

IC	kg	IC	kg	IC	kg	IC	kg
0	45	40	140	80	450	120	1400
1	46,2	41	145	81	462	121	1450
2	47,5	42	150	82	475	122	1500
3	48,7	43	155	83	487	123	1550
4	50	44	160	84	500	124	1600
5	51,5	45	165	85	515	125	1650
6	53	46	170	86	530	126	1700
7	54,5	47	175	87	545	127	1750
8	56	48	180	88	560	128	1800
9	58	49	185	89	580	129	1850
10	60	50	190	90	600	130	1900
11	61,5	51	195	91	615	131	1950
12	63	52	200	92	630	132	2000
13	65	53	206	93	650	133	2060
14	67	54	212	94	670	134	2120
15	69	55	218	95	690	135	2180
16	71	56	224	96	710	136	2240
17	73	57	230	97	730	137	2300
18	75	58	236	98	750	138	2360
19	77,5	59	243	99	775	139	2430
20	80	60	250	100	800	140	2500
21	82,5	61	257	101	825	141	2575
22	85	62	265	102	850	142	2650
23	87,5	63	272	103	875	143	2725
24	90	64	280	104	900	144	2800
25	92,5	65	290	105	925	145	2900
26	95	66	300	106	950	146	3000
27	97,5	67	307	107	975	147	3075
28	100	68	315	108	1000	148	3150
29	103	69	325	109	1030	149	3250
30	106	70	335	110	1060	150	3350
31	109	71	345	111	1090	151	3450
32	112	72	355	112	1120	152	3550
33	115	73	365	113	1150	153	3650
34	118	74	375	114	1180	154	3750
35	121	75	387	115	1215	155	3875
36	125	76	400	116	1250	156	4000
37	128	77	412	117	1285	157	4125
38	132	78	425	118	1320	158	4250
39	136	79	437	119	1360	159	4375

Source: Alapa - Latin American Tyre and Rim Association

IC	kg	IC	kg	IC	kg
160	4500	200	14000	240	45000
161	4625	201	14500	241	46250
162	4750	202	15000	242	47500
163	4875	203	15500	243	48750
164	5000	204	16000	244	50000
165	5150	205	16500	245	51500
166	5300	206	17000	246	53000
167	5450	207	17500	247	54500
168	5600	208	18000	248	56000
169	5800	209	18500	249	58000
170	6000	210	19000	250	60000
171	6150	211	19500	251	61500
172	6300	212	20000	252	63000
173	6500	213	20600	253	65000
174	6700	214	21200	254	67000
175	6900	215	21800	255	69000
176	7100	216	22400	256	71000
177	7300	217	23000	257	73000
178	7500	218	23600	258	75000
179	7750	219	24300	259	77500
180	8000	220	25000	260	80000
181	8250	221	25750	261	82500
182	8500	222	26500	262	85000
183	8750	223	27250	263	87500
184	9000	224	28000	264	90000
185	9250	225	29000	265	92500
186	9500	226	30000	266	95000
187	9750	227	30750	267	97500
188	10000	228	31500	268	100000
189	10300	229	32500	269	103000
190	10600	230	33500	270	106000
191	10900	231	34500	271	109000
192	11200	232	35500	272	112000
193	11500	233	36500	273	115000
194	11800	234	37500	274	118000
195	12150	235	38750	275	121000
196	12500	236	40000	276	125000
197	12850	237	41250	277	128500
198	13200	238	42500	278	132000
199	13600	239	43750	279	136000

Source: Alapa - Latin American Tyre and Rim Association

IMPORTANT TIPS

- Inspect the tyres frequently;
- Rotate tyres at regular intervals;
- Perform preventive maintenance on the vehicle (alignment and geometry, balancing, brakes, suspension, etc.);
- Inspect the wheels frequently;
- Determine the frequency of monitoring tyres in use;
- Store and handle tyres correctly;
- Carry out tyre assembly and disassembly with trained professionals;
- After the retreading process, only mount the tyres when they are at room temperature;
- Determine the correct time to remove tyres for retreading, according to the segment of activity;
- Carry out repairs in accordance with the Vipal patch application chart and with skilled labor;
- Standardise designs and tyres – it makes it easier to pair them;
- Demand quality products in retreading.

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