Modern Automotive Technology
Chapter 65

Tire, Wheel and Wheel Bearing Fundamentals
Learning Objectives

- Identify the parts of a tire and wheel.
- Describe different methods of tire construction.
- Explain tire and wheel sizes.
- Describe tire ratings.
- Identify the parts of driving and non-driving hub and wheel bearing assemblies.
Tubeless Tire

Tubeless tire and wheel form leakproof unit

Metal wheel

Air pressure pushes outward to inflate tire

Rubber tire
Wheel Assembly

- Lug nut
- Lug stud
- Dust or hub cap
- Wheel cover
- Hub
- Wheel
- Tire
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1. Sometimes BELTS are used to strengthen plies and stiffen tread; they lie between tread and inner plies.

2. Two rings, called TIRE BEADS, made of steel wires encased in rubber that hold tire sidewalls snugly against wheel rim.
Bias Ply Tire

Bias ply tire

Body ply cords run on bias
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3. The tire **TREAD** is the outer surface of tire that contacts road.

4. The tire **LINER** provides a leakproof membrane for modern tubeless tire.
Parts of a Tire

- Tread
- Belts
- Body plies
- Liner
- Sidewall
- Bead
- Wheel
5. On wheel bearings, BALLS or ROLLERS are the antifriction elements that fit between inner and outer races.

6. An INNER RACE is a cup or cone shaped portion of a wheel bearing that rests on spindle or drive axle shaft.
Tapered Roller Bearing

Lubricated with high-temperature grease
Balls allow parts to rotate with a minimum amount of friction and wear.
Hub and Wheel Bearing
(Non-Driving Wheels)
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7. The P-Metric identification system for tires uses metric values and international standards.

8. The BODY PLIES are rubberized fabric and cords wrapped around the beads of a tire.
P-Metric—Uses metric values and international standards
Belted Bias Tire

Belted bias

Stabilizer belts

Body ply cords run on bias
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9. The SIDEWALL is the outer part of tire extending from bead to tread.

10. Tire size designation using letters and numbers to denote tire sizes in inches and load-carrying capacity in pounds is called an ALPHA-NUMERIC measurement system.
Tire Sidewall Markings

- Brand name
- DOT serial number
- Mud and snow tire
- Size
- Load index
- Speed rating
- Tread plies
- Sidewall plies
- Tire model
- Tread wear index
- Maximum load
- Traction index
- Maximum inflation pressure
- Temperature index
Tire Size

P - metric tire size:

Type tire (P=passenger car) (T=temporary) (C=commercial)
Section width in millimeters (155, 185, 195)
Height to width ratio (70, 75, 80)
Tire construction (R=radial) (B=bias belted) (D=diag. bias)
Rim or wheel diameter in inches (13, 14, 15, 16)

Alpha-Numeric – Uses letters and numbers to denote tire size in inches and its load-carrying capacity in pounds
Aspect Ratio

Height-to-width ratio of a tire. Comparison of a tire’s height and width.
Lug Nut and Stud

Stud is pressed into the hub or axle flange

If metric or left-hand threads are used, markings will normally be given
Hub and Wheel Bearing
(Non-Driving Wheels)

11. Cotter pin
12. Inner race
13. Roller
14. Outer race
15. Spindle
16. Grease seal
17. Hub cavity
18. Grease
19. Nut lock
20. Dust cap
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