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Definitions of some terms used in the tyre industry —

Part 1: Pneumatic tyres

Définitions de certains termes utilisés dans l'industrie du pneumatique —
Partie 1: Pneumatiques

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*.

This fifth edition cancels and replaces the fourth edition (ISO 4223-1:2002), which has been technically revised. It also incorporates the Amendment ISO 4223-1:2002/Amd 1:2011.

A list of all parts in the ISO 4223 series can be found on the ISO website.

Definitions of some terms used in the tyre industry —

Part 1:
Pneumatic tyres

1 Scope

This document defines a number of significant terms related to pneumatic tyres used in the tyre industry, together with corresponding codes, symbols and values.

NOTE 1 For other terms used in this field and their equivalents in other languages, see ISO 3877 (all parts). For terms and definitions relating to wheels/rims, see ISO 3911.

NOTE 2 Annex A forms a normative part of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4251-4, *Tyres (ply rating marked series) and rims for agricultural tractors and machines — Part 4: Tyre classification and nomenclature*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in ISO 4251-4 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms relating to category of use

3.1.1
normal tyre
tyre intended for highway (or public highway) use which does not require “M+S” (or other variations) or severe snow or *special use* (3.1.2) tyre designations

Note 1 to entry: Examples of special use tyre designations are MPT, *ML* (3.7.1.1.16), POR.

3.1.2
special use
tyre intended for mixed use both on- and off-road or for other special duty and primarily designed to initiate and maintain the vehicle in motion in off-road conditions

3.1.3
snow tyre
tyre whose *tread* (3.5.4) pattern, tread compound or *structure* (3.4.1) is primarily designed to achieve in winter conditions, e.g. snow, a performance better than that of a *normal tyre* (3.1.1) with regard to its ability to initiate or maintain vehicle motion

Note 1 to entry: It is dentified by a combination of the letters "M" and "S", e.g. M+S, M&S.

3.1.4
temporary-use spare tyre
tyre different from a tyre intended to be fitted to any vehicle for normal driving conditions but intended only for temporary use under restricted driving conditions

3.1.5
severe snow use tyre
tyre whose *tread* (3.5.4) pattern, tread compound or *structure* (3.4.1) is specifically designed based on performance testing using ISO 18106 and which is identified by an "Alpine" or "3 Peak Mountain Snow Flake (3PMSF)" symbol

Note 1 to entry: Refer to regional standards and regulatory requirements for dimensions and performance criteria, placement adjacent to "M+S" and characterized by the 3 Peak Mountain Snow Flake (3PMSF) symbol (see Figure 1).

Figure 1 — 3 Peak Mountain Snow Flake (3PMSF) symbol

3.1.6
professional off-road
POR
special use (3.1.2) tyre primarily used for service in severe off-road conditions

3.1.7
not for highway service
NHS
tyre primarily designed for use outside of public roads, but suitable for temporary/incidental use on public roads and identified with the letters "*NHS*" (3.7.1.1.8)

3.1.8
traction tyre
tyre that may have the inscription "TRACTION" and intended to be fitted primarily to the drive axle(s) of a vehicle to maximize force transmission in various circumstances

3.2 Terms relating to service description

3.2.1
service description
tyre identification, in addition to the *tyre size designation* (3.7.1), which consists of a *load index (LI)* (3.2.1.1) (or two load indices in the case of single/dual fitments) and a *speed symbol (SS)* (3.2.1.2)

EXAMPLE 91H or 121/119S.

3.2.1.1
load index
LI
numerical code which indicates a reference load used to define the load carrying capacity of the tyre, which can depend on operating conditions and tyre type

Note 1 to entry: See Table A.1.

3.2.1.2
speed symbol
alpha or alpha-numeric code which indicates the *speed category* (3.2.1.3) of the tyre, which can depend on operating conditions and tyre type

Note 1 to entry: See Table A.2.

3.2.1.3
speed category
maximum speed which the tyre can sustain, expressed by the speed symbol, and which is part of the *service description* (3.2.1)

Note 1 to entry: See Table A.2 for speed symbols.

3.3 Other general terms and definitions

3.3.1
cold inflation pressure
internal pressure of the tyre at ambient temperature and not including any pressure build-up due to tyre usage

Note 1 to entry: It is expressed in kilopascals (kPa).

3.3.2
grown tyre
tyre that has undergone expansion due to use in service

3.3.3
new tyre
tyre that has not been used and is not a *retread tyre* (3.3.11)

3.3.4
rolling circumference
C_r
distance the centre of the tyre (axle) moves in one revolution of the tyre under specified conditions

3.3.5
rolling resistance
F_r
loss of energy (or energy consumed) per unit of distance

Note 1 to entry: The SI unit conventionally used for the rolling resistance is the newton metre per metre (N·m/m). This is equivalent to the drag force in newtons (N).

3.3.6
tyre contact area
A_c
area of the flat surface contained within the *virtual perimeter* (3.3.8) of the tyre footprint

Note 1 to entry: It is expressed in square metres (m^2).

3.3.7
tyre ground pressure
F/A_c
average unit load transmitted by the tyre through its contact area to the road surface, expressed, in kilonewtons per square metre (kN/m^2), as the ratio between the vertical force, *F*, in static conditions on the axis of the *wheel* (3.8.14) and the *tyre contact area* (3.3.6), A_c, and measured with the tyre inflated at the *cold inflation pressure* (3.3.1) recommended for the intended type of service

3.3.8
virtual perimeter
<tyre footprint> convex polygonal curve circumscribing the smallest area containing all points of contact between the tyre and ground

3.3.9
capped inflation
process of inflating the tyre to the required cold pressure and allowing the inflation pressure to build up, as the tyre is warmed up while running

3.3.10
regulated inflation
process of inflating the tyre to the required cold pressure and allowing the inflation pressure to change to the required level as the tyre runs under load

Note 1 to entry: This is most commonly done by using a regulated pressure source attached to the tyre through a rotating union.

3.3.11
retread tyre
used tyre that has been reconditioned to extend the useful life of the tyre with the replacement of the tread rubber only or replacement of *tread* (3.5.4) and *sidewall rubbers* (3.5.3)

Note 1 to entry: It covers the following process methods:

— "Top capping" – replacement of the tread.

— "Re-capping" – replacement of the tread and with the new material extending over part of the *sidewall* (3.5.2).

— "Bead to bead" – replacement of the tread and sidewall rubber including all or part of the lower area of the tyre.

3.3.12
rolling resistance coefficient
ratio of the *rolling resistance* (3.3.5), in newtons, to the load on the tyre, in kilonewtons

Note 1 to entry: This quantity is dimensionless.

3.3.13
tyre strength indicator
star marking (one, two, three, etc.), *ply* (3.5.6) rating (number), or load range (letter) used as an indication of tyre strength

3.3.14
test pressure
pressure to which the mounted pneumatic tyre is measured subject to a specific test

3.3.15
mud and snow tyre
type of tyre designed to achieve snow traction and mud and sand performance better than that of a *normal tyre* (3.1.1) with regard to its ability to initiate or maintain vehicle motion

Note 1 to entry: It is identified by a combination of the letters "M" and "S", e.g. M+S, M&S.

3.3.16
T-type temporary-use spare tyre
temporary-use spare tyre (3.1.4) designed for use at an inflation pressure higher than those established for standard and *reinforced tyres* (3.3.17)

Note 1 to entry: It is designated with the "T" prefix.

3.3.17
reinforced tyre
extra load tyre
description of passenger car and motorcycle tyres designed for loads and minimum reference inflation pressures higher than those of the standard version

3.3.18
run flat tyre
tyre designed to operate in an inflated mode and capable of running at least a specified distance under prescribed conditions in the event that the tyre does not hold air

3.4 Terms relating to structure

3.4.1
structure
technical characteristics of the tyre's *carcass* (3.5.8)

EXAMPLE *Diagonal* (3.4.1.1) (bias-ply), *bias-belted* (3.4.1.2), *radial* (3.4.1.3).

3.4.1.1
diagonal
bias-ply
cross-ply
structure (3.4.1) in which the ply *cords* (3.5.5) extend to the *bead* (3.5.1) and are laid at alternate angles of substantially less than 90° to the centreline of the *tread* (3.5.4)

3.4.1.2
bias-belted
structure (3.4.1) of *diagonal* (3.4.1.1) (bias-ply) type in which the *carcass* (3.5.8) is restricted by a *belt* (3.5.10) comprising one or more layers of substantially inextensible *cord* (3.5.5) material

3.4.1.3
radial
structure (3.4.1) in which the ply *cords* (3.5.5) that extend to the *beads* (3.5.1) are laid at substantially 90° to the centreline of the *tread* (3.5.4), the *carcass* (3.5.8) being restrained by circumferential *belts* (3.5.10) of two or more layers of substantially inextensible cord material

3.5 Terms relating to main components

3.5.1
bead
part of the tyre shaped to fit the *rim* (3.8.12) and having a core made of one or several essentially inextensible strands with the plies wrapped around the core

3.5.2
sidewall
portion of the tyre between the *tread* (3.5.4) and the *bead* (3.5.1)

3.5.3
sidewall rubber
rubber layer on the *sidewall* (3.5.2) of the tyre and over the *carcass* (3.5.8), which may include ornamental or protective ribs, tire labelling and markings, and moulded fitting lines

3.5.3.1
rim protector
feature incorporated into the *lower sidewall* (3.5.11) area of the tyre which is intended to protect the *rim* (3.8.12) flange from damage

3.5.4
tread
part of a tyre which comes into contact with the ground

3.5.5
cord
textile or non-textile strands (threads) used in various components of the tyre *carcass* (3.5.8)

EXAMPLE Plies, *belts* (3.5.10), *breakers* (3.5.9), etc.

3.5.6
ply
layer of rubber-coated parallel *cords* (3.5.5)

3.5.7
inner liner
layer of rubber on the inside of the *carcass* (3.5.8) used especially in tubeless tyres to minimize air loss

3.5.8
carcass
part of a tyre other than the *tread* (3.5.4) and the *sidewall rubber* (3.5.3) which, when inflated, bears the load

3.5.9
breaker (diagonal)
intermediate *ply* (3.5.6) not extending to the *bead* (3.5.1)

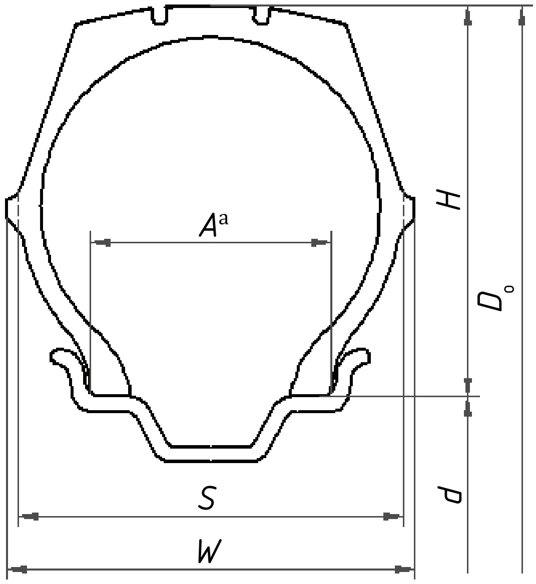
3.5.10
belt
bracing ply
layer of material underneath the *tread* (3.5.4), laid substantially in the direction of the tread centreline, that restricts the *carcass* (3.5.8) circumferentially

3.5.11
lower sidewall
area below the line of maximum *section width* (3.6.1) of the tyre, visible when the tyre, fitted to a *rim* (3.8.12), is viewed from the side

3.5.12
tread groove
space between the adjacent ribs or blocks in the *tread* (3.5.4) pattern

3.5.13
tread wear indicator
projection within the *tread grooves* (3.5.12) designed to give a visual indication of the degree of wear of the *tread* (3.5.4)

3.6 Terms relating to dimensions (see Figure 2)



a Specified rim width.

Figure 2 — Dimensions

3.6.1
section width
S
linear distance between the outside of the *sidewalls* (3.5.2) of an inflated pneumatic tyre, when fitted on a *measuring rim* (3.8.10), excluding elevations due to labelling (markings), decorations, protective bands or ribs, or *rim protector* (3.5.3.1)

3.6.2
overall width
W
linear distance between the outsides of the side walls of an inflated pneumatic tyre, when fitted on a *measuring rim* (3.8.10), including labelling (marking), decoration, protective bands or ribs, and *rim protector* (3.5.3.1), and in the case of tyres where the *tread* (3.5.4) is wider than the *section width* (3.6.1), the overall width corresponds to the tread width

3.6.3
maximum overall tyre width in service
overall width (3.6.2) plus

a) manufacturing tolerances, and

b) tolerance for service growth

3.6.4
section height
H
half the difference between the *overall diameter* (3.6.5) and the *nominal rim diameter* (3.6.9)

3.6.5
overall diameter
D_o
diameter of an inflated pneumatic tyre, when fitted on a *measuring rim* (3.8.10), at the outermost surface of the *tread* (3.5.4), applying to new tires or newly retreaded tyres

