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**Code designated diagonal tyres (ply rating marked series) for agricultural tractors, trailers and machines —**

**Part 1:  
Tyre designation and dimensions, and approved rim contours**

*Pneumatiques diagonaux à désignation dimensionnelle par code (séries à marquage équivalent nappes "ply rating") pour tracteurs, remorques et machines agricoles —*

*Partie 1: Désignations et cotes des pneumatiques, et profils de jantes approuvés*

ISO 4251-1:2019

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 31, *Tyres, rim and valves*, Subcommittee SC 5, *Agricultural tyres and rims*.

This eighth edition cancels and replaces the seventh edition (ISO 4251-1:2017), which has been technically revised. The main changes compared to the previous edition are as follows:

- information already contained in other International Standards was removed and replaced with normative references to those standards;
- radial tyres marked with ply rating and with a reference speed of 10 km/h were deleted since obsolete and this document was restricted to code designated diagonal tyres (marked with PR) for agricultural tractors, trailers and machines;
- the title of this document was revised accordingly;
- the document was aligned with other International Standards developed by SC 5 and with existing regulations;
- additional definitions useful for the comprehension of this document were added;
- specific markings for tractor steering wheel and implement tyres and the pictogram to identify the maximum pressure for tyre bead seating, as specified by UN/ECE Regulation 106, were introduced;
- dimensional data and the list of approved rim contours were revised.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Code designated diagonal tyres (ply rating marked series) for agricultural tractors, trailers and machines —

## Part 1: Tyre designation and dimensions, and approved rim contours

### 1 Scope

This document establishes the designation in use and the dimensions of code designated tyres in diagonal construction (ply rating marked series) for agricultural tractors, trailers and machines.

Tyre load ratings are given in ISO 4251-2.

**NOTE** Code designated diagonal tyres (ply rating marked series) for construction applications (industrial tractors), identified by the classification code R-4, as specified in ISO 18805, or by suffix "IND" are covered by ISO 13442.

Code designated tyres in radial construction for drive wheels of agricultural tractors are covered by ISO 8664.

Code designated diagonal tyres (ply rating marked series) for forestry machines, identified by the classification code LS, as specified in ISO 18805, are covered by ISO 18807.

### 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 4223-1:2017, *Definitions of some terms used in the tyre industry — Part 1: Pneumatic tyres*

ISO 18804, *Rims for agricultural, forestry and construction machines*

ISO 18805, *Tyre classification — Agricultural, forestry and construction machines*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4223-1 and the following apply.

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

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

#### 3.1

##### **tractor drive wheel tyre**

tyre designed to be fitted to driven axles of agricultural tractors (vehicles in categories T) suitable for sustained high torque service

Note 1 to entry: The tread pattern of the tyre consists of lugs or cleats.

### 3.2 tractor steering wheel tyre

tyre designed to be fitted to non-driven axles of agricultural tractors (motor vehicles in category T)

Note 1 to entry: The tread pattern of the tyre generally consists of circumferential grooves and ribs.

### 3.3 implement tyre

tyre designed primarily for agricultural machines, interchangeable towed equipment (vehicles in category S) or agricultural trailers (vehicles in category R)

Note 1 to entry: Such tyre may also equip either front steering wheels and drive wheels of agricultural tractors (vehicles in category T), but it is not suitable for sustained high torque service.

### 3.4 design section height

$H$   
half the difference between the overall diameter and the rim diameter, as defined by

$$H = (D_o - d)/2$$

where

$H$  is the design section height of the tyre;

$D_o$  is the overall diameter of the tyre;

$d$  is the nominal rim diameter expressed in mm (see ISO 4223-1:2017, Table A.3).

## 4 Marking

### 4.1 General

The marking of code designated tyres in diagonal construction consists of the tyre size designation, the load rating, and any additional information. See 4.2 to 4.5 for details.

### 4.2 Tyre size designation

The size marking for the identification of tyres consists of:

**4.2.1** For normal section height tyres: the nominal tyre width code, the construction code ("-") and the nominal rim diameter code.

EXAMPLES

13.6 - 28

6.50 - 16

**4.2.2** For low section height tyres: either the letter L is added to the nominal tyre width code

EXAMPLE 1 9.5L - 15

or the nominal tyre width code is used, followed by "/" and the nominal aspect ratio, the construction code ("-") and the nominal rim diameter code

EXAMPLE 2 9.5/85 - 15

### 4.3 Categories of use

#### 4.3.1 Agricultural tractor drive wheel tyres

The classification code R-2, as specified in ISO 18805, shall be marked on the tyre sidewall to identify tyres with deep tread.

#### 4.3.2 Agricultural tractor steering wheel tyres

The classification code F, as specified in ISO 18805, shall be marked on the tyre sidewall. It may, optionally, be replaced by the inscription "FRONT". The suffix "SL" may be marked after the nominal rim diameter code on the tyre.

#### 4.3.3 Agricultural implement tyres

The inscription "IMPLEMENT" or the suffix "IMP" shall be marked on the tyre sidewall. The suffix "SL" may be marked after the nominal rim diameter code on the tyre.

#### EXAMPLES

4.00-12 IMP

4.00-12 IMPLEMENT

4.00-12SL IMPLEMENT

The classification code I-3, as specified in ISO 18805, shall be marked on the tyre sidewall in case of "Traction pattern" tyres.

### 4.4 Load rating

The marking of the load rating comprises the ply rating (PR) and the service description. For details on load rating markings on the tyre sidewalls, see ISO 4251-2.

### 4.5 Additional information

**4.5.1** Tubeless tyres shall be marked with the word "TUBELESS".

**4.5.2** Except when specifically required in point 4.3 above, the classification code marking, as described in ISO 18805, may additionally be marked, but it is not part of the size designation of the tyre.

**4.5.3** In the case of a preferred direction of rotation of the tyre, an arrow shall be used to indicate that direction.

**4.5.4** Maximum pressure for tyre bead seating shall be marked with the following inscription: "XXX kPa MAX" or "XXX bar MAX" inside the pictogram (Figure 1) indicating the maximum inflation pressure that shall not be exceeded for bead seating during tyre mounting. The value of the tyre bead seating pressure is determined by the tyre manufacturer.

The marking of the pictogram on the tyre sidewall is optional, but can be required for conformity to some regional regulations.

An example of the pictogram to be marked on both sidewalls of the tyre is given in Figure 1.

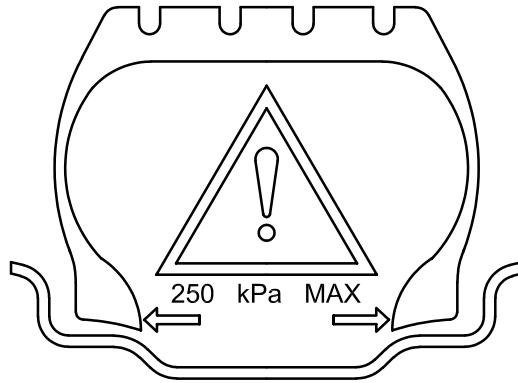


Figure 1 — Pictogram for the maximum bead seating inflation pressure

## 5 Tyre dimensions

### 5.1 Design new tyre dimensions

Design new tyre dimensions are used for tyre design purposes only.

### 5.2 Maximum tyre dimensions in service

Maximum dimensions in service are for use by vehicle manufacturers in designing for tyre clearance.

### 5.3 Minimum new tyre overall diameter

The minimum new tyre overall diameter ( $D_{o,min}$ ) shall be calculated on the basis of a tolerance of  $-3\%$  on design section height.

$$D_{o,min} = d + 2 \cdot 0,97 \cdot H$$

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where

$D_{o,min}$  is to be rounded to the nearest integer;

$H$  is the design section height of the tyre;

$d$  is the nominal rim diameter expressed in mm (see ISO 4223-1:2017, Table A.3).

$0,97 H$  shall be first rounded to the nearest integer before calculating the minimum new tyre overall diameter.

Tyre size designations, measurement rims, design dimensions of new tyres, and maximum tyre dimensions in service shall be as given in [Annex A](#).

The technical data and the approved rim contour of formerly standardized tyres with nominal rim diameter codes 15.3 or 16.1 and tyres for small tractors shall be as given in [Annex C](#).

## 6 Tyre dimension parameters for vehicle speed reference

Rolling circumference (RC), rolling circumference index (RCI) and speed radius index (SRI) are parameters which are used exclusively for the calculation of forward ground speed during homologation procedures (see for further information ISO 3965 and ISO 11795).

Values for tractor drive wheel tyres are given in [Annex D](#).



## 7 Tyre and rim coordination

Approved rim contours shall be as given in [Annex B](#). Dimensional details of rim contours shall be as specified in ISO 18804.

In case the tyre is mounted on a rim whose width code differs from the measuring rim width code, the actual tyre section widths shall be modified as follows:

$$W_a = W_{mr} + 10 \times (R_a - R_{mr})$$

where

$W_a$  is the actual tyre width;

$W_{mr}$  is the tyre width on the measuring rim;

$R_a$  is the actual rim width code;

$R_{mr}$  is the measuring rim width code.

## 8 Tubes

Whenever a tube is required, it should be identified by the same designation as the tyre size in which it is to be mounted.

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## Annex A (normative)

### Tyre size designations, measurement rims and dimensions

**Table A.1 — Agricultural tractor drive wheels tyres with normal section height**

Dimensions in millimetres

Tyre size designation	Measurement rim width code	Design dimensions of new tyres		Dimensions in service	
		Section width	Overall diameter <sup>a</sup>	Maximum overall width	Maximum overall diameter <sup>a</sup>
8.3 - 16	7.00	211	790	228	813
8.3 - 24			995		1 019
8.3 - 36			1 300		1 323
8.3 - 38			1 351		1 374
8.3 - 42			1 452		1 475
8.3 - 44			1 503		1 526
9.5 - 16	8.00	241	845	260	871
9.5 - 22			997		1 024
9.5 - 24			1 050		1 076
9.5 - 32			1 250		1 276
9.5 - 36			1 355		1 381
9.5 - 38			1 404		1 430
9.5 - 42			1 505		1 532
9.5 - 44			1 556		1 582
9.5 - 48			1 658		1 684
11.2 - 20	10.00	284	1 002	307	1 032
11.2 - 24			1 105		1 135
11.2 - 28			1 205		1 235
11.2 - 36			1 410		1 438
11.2 - 38			1 460		1 488
11.2 - 42			1 561		1 591
12.4 - 16	11.00	315	955	340	988
12.4 - 24			1 160		1 192
12.4 - 28			1 260		1 292
12.4 - 32			1 360		1 392
12.4 - 36			1 465		1 497
12.4 - 38	11.00	315	1 515	340	1 547
12.4 - 42			1 616		1 649
12.4 - 46			1 718		1 751

<sup>a</sup> Figures are based on tyres with classification code R-1. Tyres with deep tread (classification code R-2) and related increased overall diameter may be used.