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Tyres for agricultural tractors and machines — Code-designated and service-description marked radial drive-wheel tyres

Pneumatiques pour tracteurs et machines agricoles — Pneumatiques radiaux pour roues motrices portant une désignation de dimension par code et une description d'utilisation

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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).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 8664:2005), which has been technically revised. It also incorporates the Amendment ISO 8664:2005/Amd1:2010. The main changes compared to the previous edition are as follows:

— information already contained in other International standards has been removed and replaced with normative references to these standards;

— A6 speed symbol for radial code designated tyres has been deleted;

— the document has been aligned with other standards developed by SC 5 and with existing regulations;

— the values of SRI have been updated to the most recent data as given by ETRTO;

— approved rim contours have been added (Table C.1).

Tyres for agricultural tractors and machines — Code-designated and service-description marked radial drive-wheel tyres

1 Scope

This document specifies the marking, dimensions, load ratings and reference speeds for code-designated agricultural tractor drive-wheel tyres with service description (load index and speed symbol).

It applies to tyres of radial construction in the speed categories 40 km/h (speed symbol A8), and 50 km/h (speed symbol B).

NOTE Code designated series of:

— diagonal (ply rating marked) tyres for agricultural tractors and machines are specified in ISO 4251-1 and ISO 4251-2;

— tyres for logging and forestry machines are specified in ISO 18807[1];

— tyres for construction/industrial tractors are specified in ISO 13442.

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

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 https://www.electropedia.org/

3.1
cyclic loading
gradual increase of payload to maximum allowable load with unloading before off-field transport

3.2
basic tyre load
tyre load-carrying capacity indicated by the tyre's load index at the reference speed indicated by the tyre's speed symbol

Note 1 to entry: When used as dual tyres, the load per tyre shall be reduced to 88 % of the single tyre load.

1) To be published.

3.3
high and sustained torque
condition that occurs when high continuous tractive effort is applied to the drawbar or hitch

Note 1 to entry: Vehicles equipped with injectors or any other ground engaging attachment (e.g. ploughing) or dragging objects are considered to be operating in a high and sustained torque mode. Vehicles pulling carts or trailers are also considered to be operating in a high torque mode when operating on slopes greater than 11° (20 %) lateral slope.

4 Tyre marking

4.1 General

The tyre marking shall consist of the designation of the dimensional and constructional characteristics (tyre size designation), the service description (load index and speed symbol) and any other additional markings (see example in Figure 1).

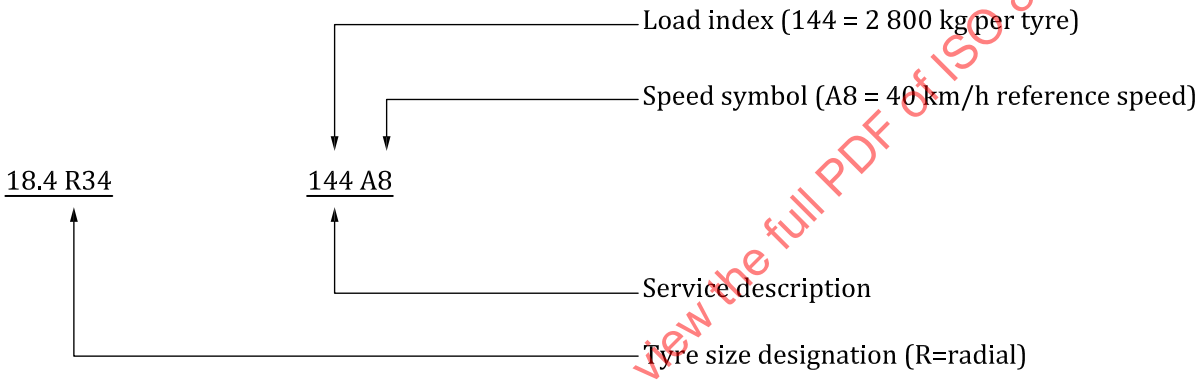

Figure 1 — Example of tyre marking

4.2 Supplementary service description

Tyres may also be marked with an additional service description, indicated within a circle, to identify a special type of service (load rating and speed category) for which the tyre size is also allowed in addition to the applicable load variation with speed (see example in Figure 2).

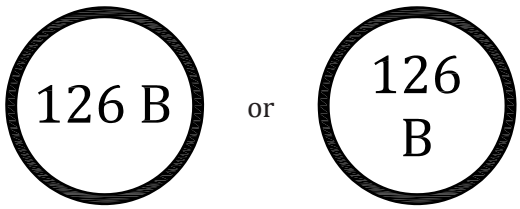

Figure 2 — Example of additional service description

Load variations of Table 1 are not applicable to the supplementary service description. See examples of load ratings in 7.3.

4.3 Additional information

4.3.1 In the case of tubeless tyres, the marking "**TUBELESS**" shall be shown on the tyre.

4.3.2 In the case of a preferred direction of rotation of the tyre, an arrow may be used to indicate that direction.

4.4 Tyre classification and nomenclature

A tyre classification code may be used to describe the primary field of application of the tyre as detailed in ISO 18805.

4.5 Tyre maximum pressure for bead seating pictogram

Conformity to some regional regulations requires the inscription "xxx kPa MAX" or "xxx bar MAX" inside a pictogram (see Figure 3) to indicate the cold inflation pressure that shall not be exceeded for bead seating during tyre mounting.

The level of the seating pressure is determined by the tyre manufacturer.

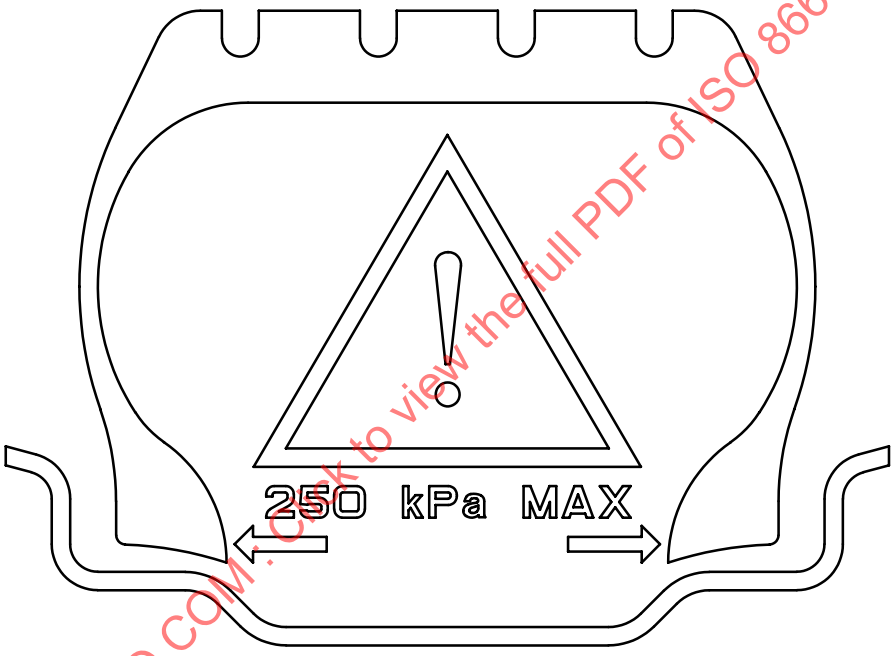

Figure 3 — Pictogram

5 Tyre dimensions

Standard sizes, measurement rims, tyre design dimensions and maximum tyre dimensions in service shall be as given in Annex A (see Table A.1).

New tyre design dimensions are used for tyre design purposes only.

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

Approved rim contours shall be as given in Annex C (see Table C.1).

6 Tyre load ratings

Load indices, basic tyre loads and reference inflation pressures shall be as given in Annex B.

7 Tyre applications other than at reference speed

7.1 General

For applications without high and sustained torques, including road transport, the load/speed relationship is given in Table 1.

The tyre manufacturer concerned shall be consulted for the actual pressure to be used when applying the load/speed relationship given in Table 1.

The rim/wheel manufacturer shall be consulted for confirmation of the strength of the rim/wheel for the intended service.

Table 1 — Load/speed relationship

Service speed km/h	**Maximum tyre load** %[a] Speed symbol	
	A8	**B**
10	150	150
15	134	134
20	123	123
25	111	111
30	107	107
35	103	103
40	100	100
45	96	100
50	91	100

[a] Expressed as a percentage of the basic tyre loads given in Annex B.

7.2 Field applications with high and sustained torque

For applications with high and sustained torque, loads in Annex B can by increased up to 7 %.

7.3 Tyres marked with additional service description

Examples of tyre load carrying capacities at various service speeds for tyres marked with a supplementary service description are given in Table 2.

Table 2 — Load carrying capacity of tyre with supplementary service description — Example of tyre size 16.9R38

Service speed km/h	**Service description**	
	145 A8	**145 A8 (145 B)**
	Tyre load carrying capacities (kg)	
25	3 220	3 220
30	3 105	3 105
35	2 985	2 985
40	2 900	2 900
45	2 785	2 900
50	2 640	2 900

8 Tyre application on combine harvesters

On combine harvesters in cyclic loading application, except hillside combines, a load of up to 170 % of the basic tyre loads given in Annex B is permitted for speeds up to 10 km/h with an inflation pressure increase of approximately 30 % (consult the tyre manufacturer). This load increase shall include all possible field and user modifications that increase the vehicle mass and shall apply only to load increases which occur during the harvesting process.

When not in cyclic application (e.g. grain tanks are empty during transport), the loads in Table 1 apply.

For hillside operations over 11° (20 %) slope (see Figure 4), only the basic tyre loads are permitted.

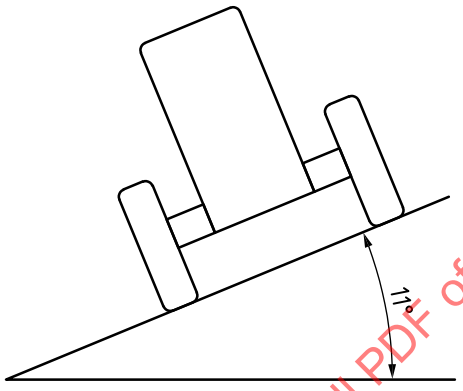

Figure 4 — Hillside operations over 11° (20 %) slope

The rim and wheel manufacturer shall be consulted concerning the strength of the wheels.

9 Tyre 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 (for further information, see ISO 3965 and ISO 11795).

Values shall be as given in Annex D (see Table D.1).

Annex A
(normative)

Tyre size designations, measurement rims and tyre dimensions

Table A.1 — Standard sizes, measurement rims, tyre design dimensions and maximum tyre dimensions in service

Dimensions in millimetres

Tyre size designation	Measurement rim width code	Design tyre		In service	
		Section width	Overall diameter[a]	Maximum overall width	Maximum overall diameter[a]
Normal section height tyres					
8.3R24	7.00	211	985	228	1 000
9.5R24	8.00	241	1 040	260	1 080
9.5R28			1 140		1 155
11.2R20	10.00	284	995	307	1 015
11.2R24			1 095		1 115
11.2R28			1 200		1 220
11.2R36			1 400		1 420
11.2R38			1 455		1 475
12.4R20	11.00	315	1 045	340	1 070
12.4R24			1 145		1 170
12.4R28			1 250		1 275
12.4R32			1 350		1 375
12.4R36			1 450		1 475
12.4R38			1 500		1 525
12.4R54			1 921		1 943
13.6R24	12.00	345	1 190	373	1 215
13.6R28			1 295		1 320
13.6R36			1 500		1 525
13.6R38			1 550		1 575
14.9R24	13.00	378	1 245	408	1 275
14.9R26			1 295		1 325
14.9R28			1 350		1 380
14.9R30			1 400		1 425
14.9R34			1 519		1 545
14.9R38			1 600		1 630
14.9R46			1 824		1 851
15.5R38	14.00	394	1 570	426	1 595

[a] Figures are based on regular service tyres. The tyre manufacturer shall be consulted if tyres with deviating profiles are used.

Table A.1 *(continued)*

Tyre size designation	Measurement rim width code	Design tyre		In service	
		Section width	Overall diameter[a]	Maximum overall width	Maximum overall diameter[a]
16.9R24	15.00	429	1 320	463	1 350
16.9R26			1 370		1 400
16.9R28			1 420		1 450
16.9R30			1 475		1 505
16.9R34			1 575		1 605
16.9R38			1 675		1 705
16.9R42			1 775		1 805
18.4R24	16.00	467	1 395	504	1 425
18.4R26			1 440		1 475
18.4R28			1 490		1 520
18.4R30			1 545		1 575
18.4R34			1 645		1 680
18.4R38			1 750		1 780
18.4R42			1 850		1 880
18.4R46			1 958		1 990
20.8R34	18.00	528	1 735	570	1 770
20.8R38			1 835		1 870
20.8R42			1 935		1 970
23.1R26	20.00	587	1 605	637	1 645
23.1R30			1 700		1 740
23.1R34			1 800		1 840
24.5R32	21.00	622	1 800	672	1 840
Low section height					
28LR26	25.00	719	1 607	777	1 645
30.5LR32	27.00	775	1 820	837	1 860

[a] Figures are based on regular service tyres. The tyre manufacturer shall be consulted if tyres with deviating profiles are used.

Annex B
(normative)

Load index and basic tyre load with reference inflation pressures 120 kPa, 160 kPa, 210 kPa and 250 kPa

Table B.1 presents basic tyre loads for A8 or B speed symbol tyres with reference inflation pressures of 120 kPa, 160 kPa, 210 kPa and 250 kPa. The inflation pressure is the minimum reference value for the loads given in Table B.1.

The tyre manufacturer concerned shall be consulted about the actual pressures to be used in practice.

Table B.1 — Load per tyre at reference speed and inflation pressure

Tyre size designation	Reference inflation pressure							
	120 kPa		160 kPa		210 kPa		250 kPa	
	Load index	Basic tyre load kg	Load index	Basic tyre load kg	Load index	Basic tyre load kg	Load index	Basic tyre load kg
Normal section height tyres								
8.3R24			104	900				
9.5R24			107	975				
9.5R28			109	1 030				
11.2R20			111	1 090				
11.2R24			114	1 180				
11.2R28			116	1 250				
11.2R36			120	1 400				
11.2R38			121	1 450				
12.4R20			116	1 250				
12.4R24			119	1 360				
12.4R28			121	1 450				
12.4R32			122	1 500				
12.4R36			124	1 600				
12.4R38			125	1 650				
12.4R54	123	1 550	128	1 800	133	2 060	137	2 300
13.6R24			121	1 450				
13.6R28	117	1 285	123	1 550	126	1 700		
13.6R36			127	1 750				
13.6R38			128	1 800				
14.9R24			126	1 700				
14.9R26	121	1 450	127	1 750	132	2 000		
14.9R28	122	1 500	128	1 800	133	2 060		
14.9R30	123	1 550	129	1 850	134	2 120		
14.9R34					136	2 240	140	2 500
14.9R38			133	2 060				
14.9R46					142	2 650	145	2 900

Table B.1 *(continued)*

Tyre size designation	Reference inflation pressure							
	120 kPa		160 kPa		210 kPa		250 kPa	
	Load index	Basic tyre load kg	Load index	Basic tyre load kg	Load index	Basic tyre load kg	Load index	Basic tyre load kg
15.5R38	125	1 650	131	1 950	136	2 240		
16.9R24	126	1 700	134	2 120	137	2 300		
16.9R26	128	1 800	135	2 180	139	2 430		
16.9R28	129	1 850	136	2 240	140	2 500		
16.9R30	130	1 900	137	2 300	141	2 575	144	2 800
16.9R34			139	2 430				
16.9R38	134	2 120	141	2 575	145	2 900		
16.9R42			143	2 725				
18.4R24			139	2 430				
18.4R26	134	2 120	140	2 500	145	2 900		
18.4R28			141	2 575				
18.4R30			142	2 650				
18.4R34	139	2 430	144	2 800	149	3 250		
18.4R38	141	2 575	146	3 000	151	3 450		
18.4R42	143	2 725	148	3 150	153	3 650		
18.4R46	144	2 800			155	3 875		
20.8R34	145	2 900	151	3 450	156	4 000		
20.8R38	147	3 075	153	3 650	157	4 125		
20.8R42	149	3 250	155	3 875	159	4 375		
23.1R26			153	3 650				
23.1R30			155	3 875				
23.1R34	151	3 450	157	4 125	161	4 625		
24.5R32	154	3 750	159	4 375	164	5 000		
Low section height								
28LR26	152	3 550	157	4 125	162	4 750	165	5 150
30.5LR32	159	4 375	166	5 300	170	6 000		

Annex C
(normative)

Approved rim contours

Table C.1 — Approved rim contours

Tyre size designation	Approved rim contours[a]
8.3R24	W7, W6
9.5R24	W8, W7, W8H
9.5R28	W7, W8
11.2R20	W10, W9, 9
11.2R24	W10, W9, W10H
11.2R28	W10, W9, W10H, W11
11.2R36	W10, W9, W10H
11.2R38	W10, W9
12.4R20	W11, W10, W9, 9, 11
12.4R24	W11, W10, W10H, W9
12.4R28	W11, W10, W10H, W9
12.4R32	W11, W10
12.4R36	W11, W10
12.4R38	W11, DW11, W10, DW10
12.4R54	W10A
13.6R24	W12, W11
13.6R28	W12, W11
13.6R36	W12, W11
13.6R38	W12, W11, DW12A
14.9R24	W13, W12
14.9R26	W13, W12, DW12A, W11
14.9R28	W13, W12, W11
14.9R30	W13, W12, DW13A
14.9R34	W13, W12, W11, DW12A
14.9R38	W13, W12, W11
14.9R46	W13, DW13A, W13A, W12, W12A
15.5R38	W14L
16.9R24	W15L, W14L
16.9R26	W15L, W14L, DW14A
16.9R28	W15L, W14L
16.9R30	W15L, DW15A, W14L
16.9R34	W15A, W15L, W14L, DW14A
16.9R38	W15L, DW15A, W14L, DW14L
16.9R42	W15L, W14L, DW14A, W15A
18.4R24	W16L, DW16A, W15L

[a] The rim/wheel manufacturer shall be consulted for confirmation of the strength of the rim/wheel for the intended service.

Table C.1 *(continued)*

Tyre size designation	Approved rim contours[a]
18.4R26	DW16A, W16L, W15L
18.4R28	W16A, DW16A, W16L, W15L, W14L
18.4R30	DW16A, W16L, W15L, DW15A
18.4R34	DW16A, W16L, W15L, W15A, W16A
18.4R38	W16L, DD16, W16A, W15A, W15L
18.4R42	DW16A, W16A, W16L, DD16, W15L
18.4R46	DW16A, W16A, W16L, DD16, W15L, DW15A
20.8R34	W18L, W18A, W16A, W16L
20.8R38	W18A, W18L, DW18A, DD18, W16A, W16L
20.8R42	W18A, W18L, DW18A, DD18, W16L
23.1R26	DW20B
23.1R30	DW20B
23.1R34	DW20B, MW20B
24.5R32	DW21B, DH21, DH21H, DH21HB, DW20B
28LR26	DW25B, DW23B
30.5LR32	DH27, DW27B, DH27H

[a] The rim/wheel manufacturer shall be consulted for confirmation of the strength of the rim/wheel for the intended service.

Annex D
(normative)

Rolling circumference (RC), rolling circumference index (RCI) and speed radius index (SRI)

Table D.1 — Rolling circumference (RC), rolling circumference index (RCI) and speed radius index (SRI)

Tyre size designation	Nominal RC		RCI	SRI
	R-1	R-1W		
	mm	mm		
Normal section height				
8.3R24	2 987	2 984	34	475
9.5R24	3 147	3 143	35	500
9.5R32	3 771	3 769	—	600
11.2R20	2 992	2 984	34	475
11.2R24	3 308	3 303	36	525
11.2R28	3 622	3 618	38	575
11.2R36	4 245	4 243	41	675
11.2R38	4 401	4 398	—	700
12.4R20	3 151	3 142	35	500
12.4R24	3 469	3 462	37	550
12.4R28	3 784	3 778	—	600
12.4R32	4 097	4 093	40	650
12.4R36	4 409	4 405	—	700
12.4R38	4 564	4 561	—	725
12.4R54	5 803	5 802	47	975
13.6R24	3 617	3 608	38	575
13.6R28	3 932	3 926	39	625
13.6R36	4 558	4 554	—	725
13.6R38	4 714	4 710	—	750
14.9R24	3 779	3 769	39	600
14.9R26	3 938	3 929	—	625
14.9R28	4 096	4 088	40	650
14.9R30	4 253	4 246	41	675
14.9R34	4 567	4 561	42	725
14.9R38	4 879	4 874	—	775
14.9R46	5 501	5 498	46	875
15.5R38	4 725	4 721	43	750
16.9R24	3 975	3 963	—	625
16.9R26	4 134	4 124	40	650
16.9R28	4 293	4 284	41	675
16.9R30	4 451	4 443	42	700