INTERNATIONAL STANDARD

ISO 3739-1

Second edition
2007-07-01

Industrial tyres and rims —

Part 1: Pneumatic tyres (metric series) on 5° tapered or flat base rims — Designation, dimensions and marking

Pneumatiques et jantes pour matériel de manutention —

Partie 1: Pneumatiques (série millimétrique) montés sur jantes coniques à 5° ou à base plate — Désignation, cotes et marquage

Reference number
ISO 3739-1:2007(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 3739-1 was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*, Subcommittee SC 7, *Industrial tyres and rims*.

This second edition cancels and replaces the first edition (ISO 3739-1:1992), which has been technically revised.

ISO 3739 consists of the following parts, under the general title *Industrial tyres and rims*:

— *Part 1: Pneumatic tyres (metric series) on 5° tapered or flat base rims — Designation, dimensions and marking*

— *Part 2: Pneumatic tyres (metric series) on 5° tapered or flat base rims — Load ratings*

— *Part 3: Rims*

Industrial tyres and rims —

Part 1:
Pneumatic tyres (metric series) on 5° tapered or flat base rims — Designation, dimensions and marking

1 Scope

This part of ISO 3739 specifies the main requirements of the metric series of pneumatic tyres primarily intended for industrial vehicles, including designations, dimensions and markings. The tyres are based on the following parameters:

— speeds not exceeding 50 km/h;

— use on 5° tapered or flat base rims.

The conversion of code-designated industrial tyres into metric-designated tyres is outside the scope of this part of ISO 3739.

2 Normative references

The following referenced documents are indispensable for the application 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 31-0:1992, *Quantities and units — Part 0: General principles*

ISO 3739-2:1992, *Industrial tyres and rims — Part 2: Pneumatic tyres (metric series) on 5° tapered or flat base rims — Load ratings*

ISO 3739-3: *Industrial tyres and rims — Part 3: Rims*

ISO 3877-1: *Tyres, valves and tubes — List of equivalent terms — Part 1: Tyres*

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

3 Terms and definition

For the purposes of this document, the terms and definitions given in ISO 4223-1 and ISO 3877-1 apply.

4 Tyre designations

4.1 Dimensional and constructional characteristics

4.1.1 General

The characteristics shall be indicated as follows:

Nominal section width	/	Nominal aspect ratio	Tyre construction code	Nominal rim diameter code

4.1.2 Nominal section width

The nominal section width of the tyre shall be indicated in millimetres, ending either in 0 or 5.

4.1.3 Nominal aspect ratio

The nominal aspect ratio shall be expressed as a percentage and shall be a multiple of 5.

4.1.4 Tyre construction code

The tyre construction code shall be as follows:

"D" or "—" (dash) indicates diagonal construction;

"R" indicates radial ply construction.

4.1.5 Nominal rim diameter code

For tyres mounted on existing rims, the code shall be as given in Table 1. Nominal rim diameter is for calculation of tyre dimensions only. For specified rim diameter, see ISO 3739-3.

Table 1 — Nominal rim diameter code

Nominal rim diameter code	**Nominal rim diameter**, D_r mm
4	102
6	152
8	203
9	229
10	254
12	305
15	381

4.2 Service description

4.2.1 General

The service description shall be indicated as follows:

Load index Speed symbol

4.2.2 Load index

The load index is a numerical code associated with the maximum load a tyre can carry at the speed indicated by its speed symbol under service conditions specified by the tyre manufacturer.

The correlation between load indices and tyre load-carrying capacities shall be as given in Table 2.

4.2.3 Speed symbol

The speed symbol shall be as given in Table 3. The speed symbol or speed category indicates the reference speed defined as the speed at which the tyre can carry the load corresponding to its load index under the specified service conditions.

The reference speed for tyre load identification of industrial tyres shall be 25 km/h, i.e. speed symbol A5.

Table 2 — Correlation between Load Index (LI) and Tyre Load-Carrying Capacity (TLCC)

LI	TLCC kg	LI	TLCC kg	LI	TLCC kg	LI	TLCC kg	LI	TLCC kg
40	140	80	450	120	1 400	160	4 500	200	14 000
41	145	81	462	121	1 450	161	4 625	201	14 500
42	150	82	475	122	1 500	162	4 750	202	15 000
43	155	83	487	123	1 550	163	4 875	203	15 500
44	160	84	500	124	1 600	164	5 000	204	16 000
45	165	85	515	125	1 650	165	5 150	205	16 500
46	170	86	530	126	1 700	166	5 300	206	17 000
47	175	87	545	127	1 750	167	5 450	207	17 500
48	180	88	560	128	1 800	168	5 600	208	18 000
49	185	89	580	129	1 850	169	5 800	209	18 500
50	190	90	600	130	1 900	170	6 000	210	19 000
51	195	91	615	131	1 950	171	6 150	211	19 500
52	200	92	630	132	2 000	172	6 300	212	20 000
53	206	93	650	133	2 060	173	6 500	213	20 600
54	212	94	670	134	2 120	174	6 700	214	21 200
55	218	95	690	135	2 180	175	6 900	215	21 800
56	224	96	710	136	2 240	176	7 100	216	22 400
57	230	97	730	137	2 300	177	7 300	217	23 000
58	236	98	750	138	2 360	178	7 500	218	23 600
59	243	99	775	139	2 430	179	7 750	219	24 300
60	250	100	800	140	2 500	180	8 000	220	25 000
61	257	101	825	141	2 575	181	8 250	221	25 750
62	265	102	850	142	2 650	182	8 500	222	26 500
63	272	103	875	143	2 725	183	8 750	223	27 250
64	280	104	900	144	2 800	184	9 000	224	28 000
65	290	105	925	145	2 900	185	9 250	225	29 000
66	300	106	950	146	3 000	186	9 500	226	30 000
67	307	107	975	147	3 075	187	9 750	227	30 750
68	315	108	1 000	148	3 150	188	10 000	228	31 500
69	325	109	1 030	149	3 250	189	10 300	229	32 500
70	335	110	1 060	150	3 350	190	10 600	230	33 500
71	345	111	1 090	151	3 450	191	10 900	231	34 500
72	355	112	1 120	152	3 550	192	11 200	232	35 500
73	365	113	1 150	153	3 650	193	11 500	233	36 500
74	375	114	1 180	154	3 750	194	11 800	234	37 500
75	387	115	1 215	155	3 875	195	12 150	235	38 750
76	400	116	1 250	156	4 000	196	12 500	236	40 000
77	412	117	1 285	157	4 125	197	12 850	237	41 250
78	425	118	1 320	158	4 250	198	13 200	238	42 500
79	437	119	1 360	159	4 375	199	13 600	239	43 750

Table 3 — Correlation between speed symbol and speed category

Speed symbol	Speed category km/h
A2	10
A3	15
A4	20
A5[a]	25 [a]
A6	30
A7	35
A8	40
B	50

[a] Reference speed for industrial tyres related to load capacity.

4.3 Other service characteristics

4.3.1 The word “TUBELESS” shall be used to characterize tyres that can be used without a tube.

4.3.2 The prefix letters “IN” to dimensional and construction characteristics (see 4.1.1) are an optional marking for industrial service.

4.3.3 Specific indications (if required) may be added to show, for example, the preferred direction of rotation, indicated by an arrow.

5 Marking

5.1 General marking

The marking shall consist of

a) the designation of the dimensional and constructional characteristics,

b) the designation of the service description (load index and speed symbol),

c) the designation of other service characteristics.

The location of the marking of the service description (load index and speed symbol) shall be distinct but in the vicinity of the marking of the dimensional and constructional characteristics.

No location is specified for the markings related to other service characteristics (see 4.3.1 and 4.3.3).

EXAMPLE

180/65R9 marking of dimensional and constructional characteristics

116 A5 marking of load index and speed symbol (distinct location but in the vicinity of the preceding marking)

TUBELESS location left to the discretion of the tyre manufacturer

The characteristics of a tyre with the above markings are as follows:

180	nominal section width equal to 180 mm;
65	nominal aspect ratio equal to 65;
R	radial ply construction;
9	nominal rim diameter code, corresponding to 229 mm;
116	load index (LI) corresponding to a tyre load of 1 250 kg;
A5	speed symbol corresponding to a speed category of 25 km/h;
TUBELESS	tyre to be used without a tube.

5.2 Maximum speed marking

If the maximum speed of a tyre is less than 50 km/h (see ISO 3739-2:1992, Table 3), its actual maximum speed shall be marked on the tyre, e.g. “40 km/h max.” or “max. 40 km/h”.

6 Tyre dimensions

6.1 General

The formulae-derived values for design tyre dimensions shall be rounded to the nearest millimetre. For rounding of values, see ISO 31-0:1992, Annex B.

6.2 Calculation of design tyre dimensions

6.2.1 Theoretical rim width, R_{th}

The theoretical rim width, R_{th}, is equal to the product of the nominal section width, S_N, and the rim/section ratio, K_1:

$$R_{th} = K_1 \times S_N$$

For industrial tyres mounted on 5° tapered or flat base rims, K_1 = 0,7 applies to tyres with nominal aspect ratios (H/S) from 60 to 95 inclusive, and K_1 = 0,8 applies to tyres with aspect ratios (H/S) from 50 to 55 (where H is the design tyre section height and S is the design tyre section width).

6.2.2 Design tyre section width, S

The design tyre section width, S, is the nominal section width, S_N, transferred from the theoretical rim, R_{th}, to the measuring rim, R_m:

$$S = S_N + 0{,}4\left(R_m - R_{th}\right)$$

where R_m and R_{th} are expressed in millimetres.

6.2.3 Design tyre section height, H

The design tyre section height, H, is equal to the product of the nominal section width, S_N, and the nominal aspect ratio, H/S, divided by 100 (H/S expressed as a percentage):

$$H = S_N \times \frac{H}{S} \times \frac{1}{100}$$

6.2.4 Design tyre overall diameter, D_O

The design tyre overall diameter, D_O, is the sum of the nominal rim diameter, D_r, plus twice the design tyre section height, H:

$$D_O = D_r + 2H$$

For the values of D_r to be used, see Table 1.

6.3 Calculation of maximum overall tyre dimensions in service

6.3.1 General

This calculation is for use by vehicle manufacturers when designing for tyre clearance.

These dimensions shall be calculated with the coefficients appropriate to the design tyre section width and design tyre section height (see Table 4).

6.3.2 Maximum overall width in service, W_{max}

The maximum overall width in service, W_{max}, is equal to the product of the design tyre section width, S, and the appropriate coefficient, a (see Table 4):

$$W_{max} = S \times a$$

6.3.3 Maximum overall diameter in service, $D_{O,max}$

The maximum overall diameter in service, $D_{O,max}$, is equal to the nominal rim diameter, D_r, plus twice the product of the design tyre section height, H, and the appropriate coefficient, b (see Table 4):

$$D_{O,max} = D_r + (2H \times b)$$

Table 4 — Coefficients for calculation of maximum overall tyre dimensions in service

Tyre construction	Construction code	Nominal aspect ratio	Coefficients	
		H/S	a	b
Diagonal	"D" or "—"	50 to 95	1,08	1,08
Radial	"R"			

7 Design tyre dimensions

The relevant dimensions for the recommended metric series of industrial tyre nominal tyre section width, measuring rim width, design tyre section width and design tyre section height for tyres of nominal aspect ratios of 60 to 95 are shown in Table 5, tyres of aspect ratios of 50 to 55 are shown in Table 6.

Table 5 — Tyre dimensional guidelines for tyres 60 to 95 series, inclusive

Nominal section width	Measuring rim width code[a]	Design tyre dimensions mm								
		Section width	Section height, H, at nominal aspect ratios, H/S (%)							
S_N mm		S	95	90	85	80	75	70	65	60
100	2.5	98	95	90	85	80	75	70	65	60
110	3.25	112	105	99	94	88	83	77	72	66
125	3.25	123	119	113	106	100	94	88	81	75
140	4.0	141	133	126	119	112	105	98	91	84
160	4.0	156	152	144	136	128	120	112	104	96
180	5.0	180	171	162	153	144	135	126	117	108
200	5.0	195	190	180	170	160	150	140	130	120
225	6.5	228	214	203	191	180	169	158	146	135
250	6.5	246	238	225	213	200	188	175	163	150
280	8.0	283	266	252	238	224	210	196	182	168
315	8.0	308	299	284	268	252	236	221	205	189
355	10.0	357	337	320	302	284	266	249	231	213

[a] Coefficient K_1 = 0,7.

Table 6 — Tyre dimensional guidelines for tyres 55 series and below

Nominal section width	Measuring rim width code[a]	Design tyre dimensions mm		
		Section width	Section height, H, at nominal aspect ratios, H/S (%)	
S_N mm		S	55	50
100	3.25	97	55	50
110	3.25	108	61	55
125	4.0	126	69	63
140	4.0	136	77	70
160	5.0	160	88	80
180	5.0	173	99	90
200	6.5	202	110	100
225	6.5	219	124	113
250	8.0	251	138	125
280	8.0	272	154	140
315	10.0	316	173	158
355	10.0	343	195	178

[a] Coefficient K_1 = 0,8.

8 Tyre size combinations

The recommended combinations of nominal section widths and rim diameters for metric series of industrial tyres are shown in Table 7.

9 Method of measurement of tyre dimensions

Before being measured, the tyre shall be mounted on its measuring rim, inflated to the recommended pressure and allowed to stand for a minimum of 24 h at normal room temperature, after which the inflation pressure shall be readjusted to the original value.

Table 7 — Recommended combinations of nominal section widths and rim diameters

Nominal section width	Nominal rim diameter code [a]						
S_N mm	4	6	8	9	10	12	15
100	*	*	*				
110	*	*	*				
125	*	*	*	*			
140	*	*	*	*			
160	*	*	*	*	*	*	*
180	*	*	*	*	*	*	*
200	*	*	*	*	*	*	*
225			*	*	*	*	*
250					*	*	*
280					*	*	*
315						*	*
355							*

[a] Combinations marked with an asterix (*) are recommended.

Annex A
(informative)

Tyre size designation

A.1 General

The tyres listed in the tables in this annex exist for industrial applications. Reference should be made to other standards [1)] for specific dimensional data, load capacities and tyre/rim combinations.

A.2 Table for existing metric designed tyres

Table A.1 — Tyres for general industrial use

Tyre size designation					
250 – 15	250 R 15	250 – 15NHS	250 – 16	250 – 18	250 – 20
300 – 15	300 R 15	300 – 15NHS	300 – 18		

A.3 Tables for existing inch-code

Table A.2 — Tyres for general industrial use

Tyre size designation
3,50 — 5; 3,50 — 6
4,00 — 4; 4,00 — 6; 4,00 — 8; 4,00 — 10
4,50 — 6; 4,50 — 8; 4,50 — 12
5,00 — 8
5,00 R 8
5,00 — 10
5,50 — 8; 5,50 — 15
6,00 — 9; 6,00 — 10; 6,00 — 12; 6,00 — 15
6,00 R 9
6,50 — 8; 6,50 — 10; 6,50 — 12; 6,50 — 14
6,50 R 10
7,00 — 10; 7,00 — 12; 7,00 — 14; 7,00 — 15; 7,00 — 16; 7,00 — 20
7,00 R 12
7,50 — 8; 7,50 — 10; 7,50 — 12; 7,50 — 15; 7,50 — 16; 7,50 — 20
8,25 — 12; 8,25 — 14; 8,25 — 15; 8,25 — 16; 8,25 — 18; 8,25 — 20
9,00 — 10; 9,00 — 14; 9,00 — 16; 9,00 — 20
10,00 — 15; 10,00 — 20
11,00 — 20
12,00 — 20; 12,00 — 24
14,00 — 24

1) Examples are ETRTO, JATMA and TRA.

Table A.3 — Tyres for general industrial use

Tyre size designation
15×4½ — 8; 15×4½ — 12
16×6 — 8; 16×6 — 10
18×7 — 8; 18×7 — 16; 18×7 — 10; 18×7 — 14
21×8 — 9; 21×8 — 10; 21×8 — 14; 21×8 — 16
23×9 — 10; 23×9 — 12; 23×9 — 16
27×10 — 12
28×8 — 12; 28×8 — 14; 28×8 — 15; 28×9 — 15; 28×8 — 18

Table A.4 — Tyres for general industrial use

Tyre size designation
2,80 — 4NHS
3,40 — 5NHS
4,00 — 8NHS
4,80 — 8NHS
4,10 — 4NHS
4,10 — 5NHS
4,10 — 6NHS
4,80 — 12NHS
5,00 — 8NHS
5,70 — 8NHS
5,30 — 6NHS
5,30 — 12NHS
6,00 — 9NHS
6,90 — 9NHS
6,00 — 13NHS
6,50 — 10NHS
6,50 — 16NHS
7,00 — 12NHS
7,50 — 10NHS
7,50 — 15NHS
7,50 — 16NHS
8,25 — 15NHS
9,00 — 10NHS
9,00 — 15NHS
10,00 — 15NHS
11,00 — 15NHS
14×8 — 6NHS
18×7 — 8NHS

Tyre size designation
18×9 — 8NHS
21×8 — 9NHS
21×8 — 10NHS
21×9 — 9NHS
23×8 — 10NHS
23×9 — 10NHS
23×10 — 12NHS
23,5×11 — 12NHS
24×12 — 12NHS
27×9 — 10NHS
9,00L — 10NHS
27×10 — 12NHS
27×15 — 10NHS
15L — 10NHS
28×9 — 15NHS
28×12 — 15NHS
28×13 — 15NHS
29×8 — 15NHS
7,00L — 15NHS
30×8 — 15NHS
7,00 — 15NHS
7,50 — 15 30NHS
32×12 — 15NHS
35×15 — 15NHS
14,50L — 15NHS
36×11 — 15NHS
10,00L — 15NHS

Table A.5 — Skid steer/mini loader tyres

Tyre size designation
7,00 — 15SS
8,25 — 15SS
5,70 — 12NHS
5,70 — 15NHS
23×8,50 — 12SS
23×8,50 — 14SS
25×8,50 — 14SS
26×12,00 — 12SS

Table A.6 — Lawn and garden tractor/utility vehicle tyres

Tyre size designation
4,10 — 4NHS
4,10 — 5NHS
4,10 — 6NHS
4,80 — 8NHS
5,30 — 6NHS
5,70 — 8NHS
11×4,00 — 4NHS
11×4,00 — 5NHS
13×5,00 — 6NHS
13×6,00 — 6NHS
13×6,50 — 6NHS
14×4,50 — 6NHS
15×6,00 — 6NHS
16×5,50 — 8NHS
16×6,50 — 8NHS
16×7,50 — 8NHS
18×6,50 — 8NHS
18×7,50 — 8NHS

Tyre size designation
18×8,50 — 8NHS
18×9,50 — 8NHS
19×9,50 — 8NHS
20×8,00 — 8NHS
20×8,00 — 10NHS
20×9,00 — 8NHS
20×10,00 — 8NHS
20×10,00 — 10NHS
21×7,00 — 10NHS
21×11,00 — 8NHS
22×11,00 — 8NHS
23×8,50 — 12NHS
23×9,50 — 12NHS
23×10,50 — 12NHS
24×12,00 — 12NHS
25×8,50 — 14NHS
26×12,00 — 12NHS
IN205/50 D10
IN205/50 R10

This page is intentionally blank.

This page is intentionally blank.

This page is intentionally blank.

ICS 83.160.99

Price based on 12 pages