
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*

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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.

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.

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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

- the designation of the dimensional and constructional characteristics,
- the designation of the service description (load index and speed symbol),
- 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 :

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

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 <i>H/S</i> | Coefficients | |
|-------------------|-------------------|------------------------------------|--------------|----------|
| | | | <i>a</i> | <i>b</i> |
| 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 S_N mm | Measuring rim width code ^a | Design tyre dimensions mm | | | | | | | | |
|--------------------------------------|---------------------------------------|------------------------------|---|-----|-----|-----|-----|-----|-----|-----|
| | | Section width S | Section height, H , at nominal aspect ratios, HIS (%) | | | | | | | |
| | | | 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 S_N mm | Measuring rim width code ^a | Design tyre dimensions mm | | |
|--------------------------------------|---------------------------------------|------------------------------|---|-----|
| | | Section width S | Section height, H , at nominal aspect ratios, HIS (%) | |
| | | | 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 S_N mm | Nominal rim diameter code ^a | | | | | | |
|--------------------------------------|--|---|---|---|----|----|----|
| | 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.