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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Motorcycle tyres and rims (metric series)

Part 1 :
Tyres, all series

Pneumatiques et jantes pour motocycles (séries millimétriques) —

Partie 1 : Pneumatiques toutes séries

Reference number
ISO 5751-1 : 1988 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 5751-1 was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*.

This third edition cancels and replaces the second edition (ISO 5751-1 : 1983), of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Motorcycle tyres and rims (metric series) —

Part 1 :
Tyres, all series

0 Introduction

ISO 5751 gives the requirements for motorcycle tyres and rims of the metric series. It consists of the following parts :

Part 1 : Tyres, all series.

Part 2 : Tyre series 100, 90, 80, 70 and 60.

Part 3 : Rims for tyre series 100, 90, 80, 70 and 60.

NOTE — ISO 4249 deals with the requirements for motorcycle tyres and rims (code-designated series) for rim diameters code 13 and above. ISO 6054 deals with the requirements for motorcycle tyres and rims (code-designated series) for rim diameters code 12 and below.

1 Scope and field of application

This part of ISO 5751 specifies the designation, dimensions and load ratings of the metric series of motorcycle tyres.

It applies to motorcycle tyres with reduced height/width ratio (100 and lower), that can be fitted on cylindrical bead seat rims or 5° tapered bead/seat rims.

It is also applicable to different concepts of tyres and rims; in this case, however, appropriate rim/section ratios K_1 and coefficients K_2, a and b (see clause 5) will be established.

2 Reference

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

3 Definitions

For definitions of terms relating to tyres, see ISO 4223-1.

Section one : Tyre designation and dimensions

4 Tyre designation

The designation of the tyre shall be shown on the sidewall of the tyre and shall include the following markings to be shown close to each other:

— size and construction (see 4.1);

— service condition characteristics (see 4.2).

4.1 *Size and construction*

The characteristics shall be indicated as follows :

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

4.1.1 *Nominal section width*

The nominal section width shall be expressed in millimetres.

4.1.2 *Nominal aspect ratio*

The nominal aspect ratio shall be expressed as a percentage and shall be a multiple of 10.

4.1.3 Tyre construction code

The tyre construction code shall be as follows :

— "-" for diagonal ply tyres;

— "R" for radial ply tyres.

NOTE — See also 4.3.3. Other codes will be established for new concepts (constructions) of tyres.

4.1.4 Nominal rim diameter code

The nominal rim diameter shall be expressed by a code. See table 1 for code correlations.

However, it shall be expressed in millimetres for new and future concepts where the application either of existing tyres on new concept rims or of new concept tyres on existing rims would be incompatible.

4.2 Service condition characteristics

The characteristics shall be indicated as follows :

Load Index **Speed symbol**

4.2.1 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 the specified conditions. See table 3.

4.2.2 Speed symbol

The speed symbol indicates the speed category at which the tyre can carry the load corresponding to its Load Index under specified service conditions. See table 4.

Table 1 — Nominal rim diameter code and rim width code

a) Nominal rim diameter code

Code	Nominal rim diameter, D_r mm
8	203
10	254
12	305
13 M/C	330
14 M/C	356
15 M/C	381
16	406
17	432
18	457
19	483
20	508
21	533
23	584

b) Rim width code

Code	Measuring rim width, R_m mm
1.50	38
1.60	40,5
1.85	47
2.15	55
2.50	63,5
2.75	70
3.00	76
3.50	89
4.00	101,5
4.50	114,5
5.00	127
5.50	139,5

4.3 Other service characteristics

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 shall be used to indicate that direction.

4.3.3 Tyres designed for vehicles having a maximum speed capacity in excess of 210 km/h shall be identified by means of code letters:

"V" for diagonal construction;

"VB" for bias-belted construction;

"VR" for radial construction;

"ZR" for radial construction.

This identification shall be placed inside the tyre designation (see 4.1) instead of in the tyre construction code, and precludes the marking of the service condition characteristics (see 4.2).

4.4 Examples

A tyre having a nominal section width of 120 mm, nominal aspect ratio 80, of diagonal construction, nominal rim diameter code 18, load-carrying capacity 290 kg, maximum speed 180 km/h, shall be marked :

120/80 - 18	65 S

A tyre having a nominal section width of 140 mm, nominal aspect ratio 70, of diagonal construction, nominal rim diameter code 17, and intended for speeds in excess of 210 km/h, shall be marked :

140/70 V 17

5 Tyre dimensions

5.1 Calculation of "design new tyre" dimensions

5.1.1 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 :

$$R_{th} = K_1 S_N$$

NOTE — For tyres of existing concepts, $K_1 = 0{,}6$ for aspect ratios 100, 90, 80, and $K_1 = 0{,}7$ for aspect ratios 70, 60. For aspect ratios 50 and lower, K_1 will be defined later.

5.1.2 Measuring rim width, R_m

The measuring rim width, R_m, is the width of the existing rim nearest to the theoretical rim width, R_{th}. See table 1 for rim widths of existing rims.

5.1.3 Design new tyre section width, S

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

$$S = S_N + K_2 (R_m - R_{th})$$

rounded to the nearest whole number.

NOTE — For tyres of existing concepts, $K_2 = 0{,}4$.

5.1.4 Design new tyre section height, H

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

$$H = S_N \frac{H/S}{100}$$

rounded to the nearest whole number.

5.1.5 Design new tyre overall diameter, D_o

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

$$D_o = D_r + 2H$$

For those tyres using a nominal rim diameter code, see table 1 for the value of D_r to be used.

5.1.6 Values

Guidelines for the "new tyre design dimensions" for metric series of motorcycles are given in the annex.

5.2 Calculation of "maximum overall tyre dimensions in service"

These calculations are for use by vehicle manufacturers in designing for tyre clearances.

5.2.1 Maximum overall width in service, W_{max}

The maximum overall width in service, W_{max}, is equal to the product of the design new tyre section width, S, and the appropriate coefficient a (see table 2) :

$$W_{max} = Sa$$

It includes protective ribs, lettering, embellishment, tread overhang, manufacturing tolerances and growth due to service.

5.2.2 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 new tyre section height, H, and the appropriate coefficient b (see table 2) :

$$D_{o,\,max} = D_r + 2Hb$$

It includes manufacturing tolerances, growth due to service, and deformation due to centrifugal force.

The coefficient b (see table 2) shall be 1,10 and 1,13 instead of 1,07 in the case of tyres operating at maximum speeds of 180 km/h and 210 km/h respectively.

5.3 Minimum dimensions : Minimum section width, S_{min}

The minimum tyre section width, S_{min}, is equal to the product of the design new tyre section width, S, and the appropriate coefficient :

$$S_{min} = 0{,}96S$$

$S - S_{min}$ shall be at least 4 mm.

6 Method of measurement of tyre dimensions

Before measuring, a tyre shall be mounted on the measuring rim ready for tyre fitment, 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.

7 Tread configurations

The figure shows various tread configurations.

NOTES

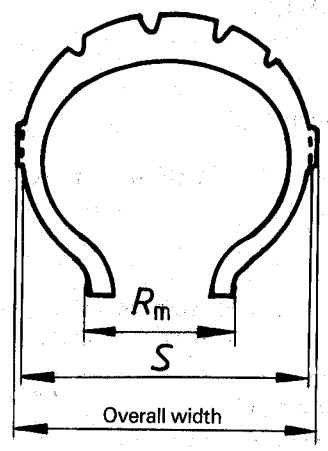
1 Tread type A corresponds to highway service tyres manufactured in speed symbols P, S and higher.

2 Tread type B corresponds to highway service tyres (for high performance vehicles) manufactured in speed symbols S and higher.

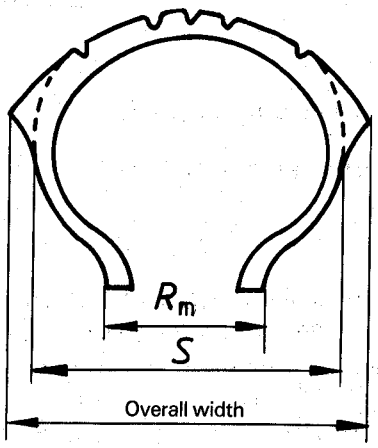
3 Tread type C corresponds to tyres for on-and-off-road service manufactured in speed symbols M and P.

4 Tread type D corresponds to tyres for exclusive off-road service manufactured in speed symbol M.

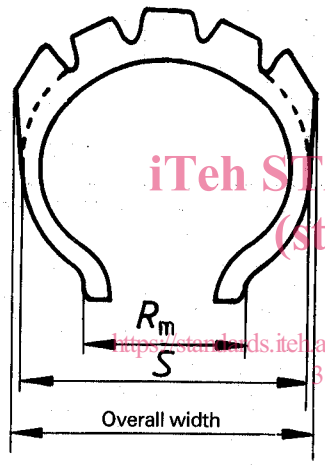
5 The above attributions of tread type configurations to the service are to be considered as examples only. The choice of a given tread type configuration for a given tyre depends on the tyre manufacturer alone.



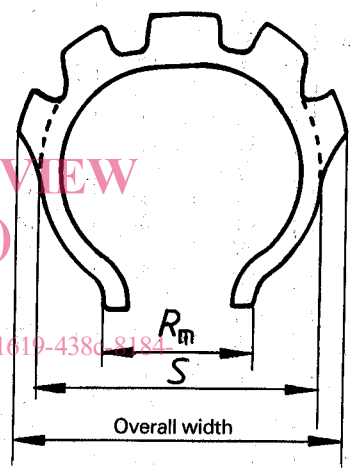
Type A



Type B



Type C



Type D

Figure — Tread configurations

Table 2 — Coefficients for calculation of maximum overall tyre dimensions in service for diagonal and radial ply tyres

Tread configuration	Coefficient	
	a	b [1]
Type A	1,1[2]	1,07[3]
Type B	1,1	1,07[3]
Type C	1,1	1,12[4]
Type D	1,25	1,12[4]

1) For service up to 150 km/h.

2) 1,08 for diameter codes 12 and below.

3) Subject to the condition that $D_{o,\,max} - D_o$ is at least 6 mm.

4) Subject to the condition that $D_{o,\,max} - D_o$ is at least 8 mm.

Section two : Load ratings

8 Tyre load-carrying capacity

Load Indices shall be as shown in table 3.

9 Speed symbol

Speed symbols shall be as shown in table 4.

Table 3 — Correlation between Load Index (LI) and tyre load-carrying capacity (TLCC)

LI	TLCC kg	LI	TLCC kg	LI	TLCC kg
0	45	30	106	60	250
1	46,2	31	109	61	257
2	47,5	32	112	62	265
3	48,7	33	115	63	272
4	50	34	118	64	280
5	51,5	35	121	65	290
6	53	36	125	66	300
7	54,5	37	128	67	307
8	56	38	132	68	315
9	58	39	136	69	325
10	60	40	140	70	335
11	61,5	41	145	71	345
12	63	42	150	72	355
13	65	43	155	73	365
14	67	44	160	74	375
15	69	45	165	75	387
16	71	46	170	76	400
17	73	47	175	77	412
18	75	48	180	78	425
19	77,5	49	185	79	437
20	80	50	190	80	450
21	82,5	51	195	81	462
22	85	52	200	82	475
23	87,5	53	206	83	487
24	90	54	212	84	500
25	92,5	55	218	85	515
26	95	56	224	86	530
27	97,5	57	230	87	545
28	100	58	236	88	560
29	103	59	243	89	580

Table 4 — Correlation between speed symbol and speed category

Speed symbol	Speed category km/h
J	100
K	110
L	120
M	130
N	140
P	150
Q	160
R	170
S	180
T	190
H	210
V	1)

1) For speed categories above 210 km/h, see 4.3.3.

Annex

Guideline values for metric series

NOTE — These guideline values of the metric series of new tyre design dimensions for motorcycles are provided for information.

Nominal section width S_N mm	Aspect ratios 100, 90, 80: Rim/section ratio, K_1 = 0,6			Aspect ratios 70, 60: Rim/section ratio, K_1 = 0,7		
	Theoretical rim width R_{th}	Measuring rim width code R_m	Design section width S	Theoretical rim width R_{th}	Measuring rim width code R_m	Design section width S
60	36	1,5	61	42	1,6	59
70	42	1,6	69	49	1,85	69
80	48	1,85	80	56	2,15	80
90	54	2,15	90	63	2,50	90
100	60	2,50	101	70	2,75	100
110	66	2,50	109	77	3,00	110
120	72	2,75	119	84	3,50	122
130	78	3,00	129	91	3,50	129
140	84	3,50	142	98	4,00	141
150	90	3,50	150	105	4,00	149
160	96	4,00	162	112	4,50	161
170	102	4,00	170	119	4,50	168
180	108	4,50	183	126	5,00	180

Nominal section width S_N mm	Design section height, H, at various nominal aspect ratios, H/S						
	100	90	80	70	60	50	40
60	60	54	—	—	—	—	—
70	70	63	56	—	—	—	—
80	80	72	64	56	—	—	—
90	90	81	72	63	54	—	—
100	100	90	80	70	60	50	—
110	110	99	88	77	66	55	—
120	120	108	96	84	72	60	—
130	130	117	104	91	78	65	52
140	140	126	112	98	84	70	56
150	150	135	120	105	90	75	60
160	160	144	128	112	96	80	64
170	170	153	136	119	102	85	68
180	180	162	144	126	108	90	72