International Standard ISO 5751/1

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Motorcycle tyres and rims (metric series) — Part 1: Tyres — All series

Pneumatiques et jantes pour motocycles (séries millimétriques) — Partie 1: Pneumatiques toutes séries

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Foreword

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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.

International Standard ISO 5751/1 was developed by Technical Committee ISO/TC 31, *Tyres, rims and valves,* and was circulated to the member bodies in December 1981.

It has been approved by the member bodies of the following countries:

Austria	Israel	Romania
Belgium	Italy	South Africa, Rep. of
Bulgaria	Japan	Spain
China	Korea, Dem. P. Rep. of	USA
Czechoslovakia	Korea, Rep. of	USSR
Egypt, Arab Rep. of	Netherlands	
France	Poland	

The member body of the following country expressed disapproval of the document on technical grounds:

United Kingdom

This second edition cancels and replaces the first edition (ISO 5751/1-1978).

Printed in Switzerland

Motorcycle tyres and rims (metric series) — Part 1: Tyres — All series

1 Scope and field of application

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

ISO 5751/2 deals with the 80, 90 and 100 series tyres whilst ISO 5751/3 deals with requirements for rims.

NOTE — ISO 4249 deals with requirements for existing series.

This part of ISO 5751 applies to motorcycle tyres with reduced height/width ratio (100 and lower). It is applicable to tyres 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: 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) and "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 "—" for diagonal ply tyres.

NOTE — 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 of existing tyres on new concept rims would be incompatible or where the use 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.

Table 1 — Nominal rim diameter code and rim width code

a) Nominal rim diameter code

Code	Nominal rim diameter (D_r) mm
14	356
15	381
16	406
17	432
18	457
19	483
20	508
21	533

b) Rim width code

Code	Measuring rim width (R_M) mm
1.50	38,0
1.60	40,5
1.85	47,0
2.15	55,0
2.50	63,5
2.75	70,0
3.00	76,0
3.50	89,0

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.

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.

4.4 Example

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

120/80 — 18	65 S

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) by 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. For aspect ratios 70 and lower, K_1 will be defined later.

5.1.2 Measuring rim width (R_M)

The measuring rim width 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 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 is equal to the product of the nominal section width (S_N) and the nominal aspect ratio, divided by 100:

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

rounded to the nearest whole number.

5.1.5 Design new tyre overall diameter (D_o)

The design new tyre overall diameter 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 (grown) tyre dimensions in service"

(for use by vehicle manufacturers in designing for tyre clearances)

5.2.1 Maximum overall (grown) width in service (W_{max})

The maximum overall (grown) width in service is equal to the product of the design new tyre section width (S) and the appropriate coefficient "a" (see table 2):

$$W_{max} = S a$$

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

5.2.2 Maximum overall (grown) diameter in service ($D_{o\,max}$)

The maximum overall (grown) diameter in service 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):

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

It includes: manufacturing tolerances and growth due to service.

The coefficient b (see table 2) shall be respectively 1,10 and 1,13 instead of 1,07 in the case of tyres having a speed symbol of S and H.

6 Method of measurement of tyre dimensions

Before measuring, a 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.

7 Tread configurations

The figure shows various tread configurations.

NOTES

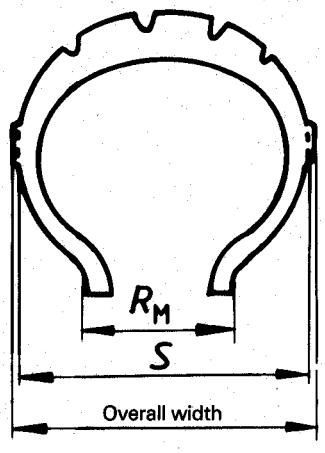
1 Type A is commonly adopted for normal highway service tyres.

2 Type B is commonly adopted for special tyres of speed symbols S and H.

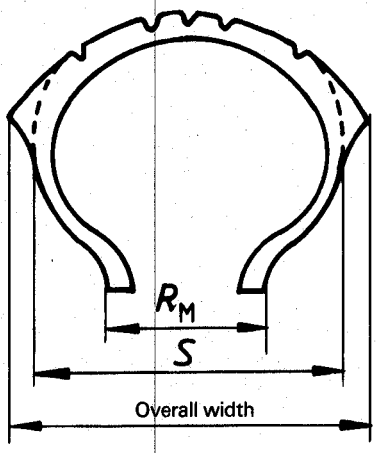
3 Type C is commonly adopted for tyres used in on-and-off-the-road service.

4 Type D is commonly adopted for tyres used specifically in off-the-road service.

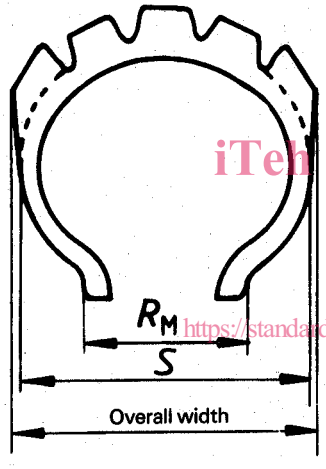
5 The above attributions of tread type configurations to the service are to be considered as examples only. The choice of a given tread type configuration for a given tyre depends on the tyre manufacturer only.



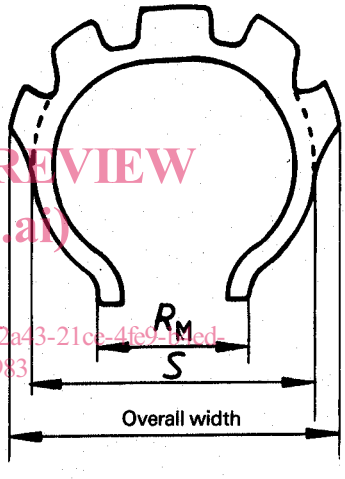
Type A



Type B



Type C



Type D

Figure — Tread configurations

Table 2 — Coefficients for the calculation of the maximum overall (grown) tyre dimensions in service

Tread configuration	Coefficient	
	a	b
Type A	1,08	1,07*
Type B	1,15	1,07*
Type C	1,15	1,12**
Type D	1,30	1,12**

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

** 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 are shown in table 3.

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

9 Speed symbol

Speed symbols are shown in table 4.

Table 4 — Correlation between speed symbol and speed category

Speed symbol	Speed category km/h
J	100
M	130
P	150
S	180
H	210

Annex

Guideline values for metric series

NOTE — These guideline values are provided for information (see 5.1.6).

Nominal section width (S_N)	Rim/section ratio, K_1 = 0,6			Rim/section ratio, K_1 = ...		
	Theoretical rim width (R_{Th})	Measuring rim width (R_M)	Design section width (S)	Theoretical rim width (R_{Th})	Measuring rim width (R_M)	Design section width (S)
60	36	1,5	61			
70	42	1,6	69			
80	48	1,85	80			
90	54	2,15	90			
100	60	2,50	101			
110	66	2,50	109			
120	72	2,75	119			
130	78	3,00	129			
140	84	3,50	142			
150	90	3,50	150			

Nominal section width (S_N)	Design section height (H) at various nominal aspect ratios $\left(\frac{H}{S}\right)$						
	100	90	80	70	60	50	40
60	60	54	48	42	36	30	24
70	70	63	56	49	42	35	28
80	80	72	64	56	48	40	32
90	90	81	72	63	54	45	36
100	100	90	80	70	60	50	40
110	110	99	88	77	66	55	44
120	120	108	96	84	72	60	48
130	130	117	104	91	78	65	52
140	140	126	112	98	84	70	56
150	150	135	120	105	90	75	60