

ENQUIRY DRAFT

Requirements for Pneumatic passenger car tyres



Guyana National Bureau of Standards

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Foreword

This Standard is a revision of the **GYS 67: 2001, “Specification for pneumatic passenger car tyres”** which was revised by the Guyana National Bureau of Standards in 2017, after the draft was finalised by the **Technical Committee – Mechanical Engineering**.

In revision of this standard, assistance was derived from the following publication **ISO 4000: 2013 Passenger Car Tyres and Rims: Part 1 – Tyres standard**.

This standard was revised as a result of a need to keep a pace with new requirements for tyres. For many years there has been an influx of used tyres into the country which are being used by most vehicle owners in Guyana.

In addition to safety, there were concerns that used tyres are being dumped in Guyana from the more developed countries. The shorter the lifespan of the tyres, the more being dumped. This is not in harmony with the government’s policy of a green economy.

To reduce the adverse environmental effects, there was need to curtail the importation of tyres that may have a short lifespan.

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Requirements for pneumatic passenger car tyres

1 Scope

This standard specifies the requirements for new and used pneumatic passenger car tyres, along with their storage conditions. It does not apply to tyres for highway commercial vehicles.

2 Definitions

For the purpose of this standard, the definitions of the latest version of GYS 66 “Definitions of terms used in the pneumatic tyre industry” shall apply.

3 Designation

3.1 Size and construction

3.1.1 Characteristics

The tyre characteristics shall be designated as follows:

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

3.1.2 Nominal section Width

The nominal section width of the tyre shall be indicated in millimetres, and this part of the designation shall end in either the numeral zero or five, so that in any single series of tyres with the same nominal aspect ratio, the values shall all end in 0 or they shall all end in 5.

For sizes mounted on 5° tapered (code-designated) rims, the nominal section width designation shall end in 5.

3.1.3 Nominal aspect ratio

3.1.4 Tyre construction code

The tyre construction code shall be as follows:

- B for bias-belted construction;
- D for diagonal construction;
- R for radial-ply construction.

In the case of tyres designed for vehicles having a maximum speed capability exceeding 240 km/h, the code-letters ZR may be indicated with the dimensional and constructional characteristics for radial-ply tyres instead of the tyre construction code R (see 4.2).

The code-letters ZR shall be used in the dimensional and constructional characteristics associated with the speed symbol Y and the load index, both placed within parentheses, to identify performance up to 300 km/h for tyres suitable for speeds exceeding 300 km/h.

EXAMPLE 235/45 ZR 17 (97Y).

For maximum speed capability and load capacity of the tyre over 300 km/h, consult the manufacturer. Use of any other code-letter (for example in the case of a new construction type) should first be submitted to ISO for acceptance.

3.1.4 Nominal rim diameter code

For tyres mounted on 5° tapered (code-designated) rims, the code shall be as given in Table 1.

Table 1 — Nominal rim diameter code

Nominal rim diameter code	Nominal rim diameter (D_r)
	mm
10	254
12	305
13	330
14	356
15	381
16	406
17	432
18	457
19	483
20	508
21	533
22	559
23	584
24	610
25	635
26	660
28	711
30	762

In the case of tyres requiring new-concept rims, for safety reasons, especially concerning mounting, the code-number shall be equal to the nominal rim diameter (D_r) expressed as a whole number in millimetres.

3.2 Service description

3.2.1 General

The service description shall be as follows:

Load index Speed symbol

In the special case of tyres designed for vehicles having a maximum speed capability exceeding 300 km/h, the service description need not be indicated. However, the tyre manufacturer shall be consulted as to the maximum speed capability and load capacity of such tyres.

3.2.2 Load index

3.2.3 Speed categories

A speed category is assigned to a tyre according to the maximum speed for which its use is rated. The speed for each category shall be indicated by a letter-symbol, in accordance with [Table 2](#).

Table 2 — Speed symbols

Symbol	Category km/h
J	100
K	110
L	120
M	130
N	140
P	150
Q	160
R	170
S	180
T	190
U	200
H	210
V	240
W	270
ya	300
NOTE This list is not exhaustive, and other categories and symbols might be added later. ^aRadial-ply tyres designed for speeds exceeding 300 km/h shall be identified by the code-letters ZR with the dimensional and constructional characteristics in place of the tyre construction code. Consult the tyre manufacturer for the maximum speed capability.	

3.3 Other service characteristics

3.3.1 The word “TUBELESS” shall appear on the tyre designed for use without tubes.

3.3.2 The words “REINFORCED” or “EXTRA LOAD” shall appear on tyres designed for loads and inflation pressures higher than the standard version.

3.3.3 The letters “LL”, close to the tyre size designation, or the words “LIGHT LOAD” shall appear on the sidewalls of tyres designed for loads lower than the standard version.

3.3.4 The letter “T”, immediately preceding the tyre size designation, shall be used to characterize high-pressure, special, temporary-use spare tyres.

3.3.5 Specific indications, if required, may be added to indicate:

- the type of vehicle for which the tyre is primarily designed, using the symbol “P” for passenger cars (see 3.3.6);
- temporary use of certain spare tyres, using indications such as “TEMPORARY USE ONLY”;
- bias-belted construction, with the words “BIAS-BELTED”;
- radial-ply construction, with the word “RADIAL”;
- the direction of mounting;
- the direction of rotation;
- the type of tread pattern;
- other characteristics.

3.3.6 The optional marking “P” may be used where there could be ambiguity regarding the tyre type.

It should be positioned such that confusion cannot result from its proximity to any other service condition marking.

3.3.7 The optional marking “F” shall be added after the construction code to identify self-supporting-type run-flat tyres that meet the requirements of ISO 16992.

EXAMPLE **235/45 RF 17**

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

LI	TLCC kg	LI	TLCC kg	LI	TLCC kg	LI	TLCC kg
50	190	70	335	90	600	110	1 060
51	195	71	345	91	615	111	1 090
52	200	72	355	92	630	112	1 120
53	206	73	365	93	650	113	1 150
54	212	74	375	94	670	114	1 180
55	218	75	387	95	690	115	1 215
56	224	76	400	96	710	116	1 250
57	230	77	412	97	730	117a	1 285
58	236	78	425	98	750	118a	1 320
59	243	79	437	99	775	119a	1 360
60	250	80	450	100	800	120a	1 400
61	257	81	462	101	825	—	—
62	265	82	475	102	850	—	—
63	272	83	487	103	875	—	—
64	280	84	500	104	900	—	—
65	290	85	515	105	925	—	—
66	300	86	530	106	950	—	—
67	307	87	545	107	975	—	—
68	315	88	560	108	1 000	—	—
69	325	89	580	109	1 030	—	—

^a ISO tyre loads have a 116 load index maximum; some existing tyres may have a higher load index number. The maximum tyre load capacity corresponding to the load index shall apply for speeds up to and including 210 km/h.

For tyres in the speed category V (between 210 km/h and 240 km/h), the maximum load capacity per tyre shall be reduced to 100 % at 210 km/h, 97 % at 220 km/h, 94 % at 230 km/h and 91 % at 240 km/h; linear interpolation is permitted.

In the case of speed categories W and Y, the maximum load capacity per tyre corresponding to the load index shall apply for speeds up to and including 240 km/h for W and 270 km/h for Y.

For tyres in the speed category W (between 240 km/h and 270 km/h), the maximum load capacity per tyre shall be reduced to 100 % at 240 km/h, 95 % at 250 km/h, 90 % at 260 km/h and 85 % at 270 km/h; linear interpolation is permitted.

For tyres in the speed category Y (between 270 km/h and 300 km/h), the maximum load capacity per tyre shall be reduced to 100 % at 270 km/h, 95 % at 280 km/h, 90 % at 290 km/h and 85 % at 300 km/h; linear interpolation is permitted.

See 3.2.3 and Table 2 for speed categories and their symbols.

For speeds of over 300 km/h or ZR-marked tyre or both, consult the tyre manufacturer for the maximum tyre load capacity permitted in relation to the maximum speed allowed for the tyre.

For vehicles with a design maximum speed capability of up to 60 km/h, the maximum load capacity corresponding to the load index may be exceeded, as shown below. However, an increase in the reference inflation pressure is necessary and should be determined in consultation with the tyre manufacturer. In the absence of such agreement, the following pressure increases are recommended:

- for 60 km/h, a 10 % load increase with a 10 kPa inflation pressure increase;
- for 50 km/h, a 15 % load increase with a 20 kPa inflation pressure increase;
- for 40 km/h, a 25 % load increase with a 30 kPa inflation pressure increase;
- for 30 km/h, a 35 % load increase with a 40 kPa inflation pressure increase;
- for 25 km/h, a 42 % load increase with a 50 kPa inflation pressure increase.

4 Marking

4.1 Each tyre shall have permanently moulded on it at the time of original manufacture:

The Department of Transportation (DOT) symbol or other markings indicating that the tyre was originally manufactured to comply with **the latest version of the Federal Motor Vehicle Safety Standards, (FMVSS) of the United States of America**, or by other international bodies or standards recognized by the Guyana National Bureau of Standards.

4.2 The marking shall include designations of:

- a) size and construction;
- b) service condition characteristics (see 3.1.4 and 3.2 for special cases);
- c) permissible inflatable pressure; and
- d) the date of manufacture – [in week-year (wwyy)]
- e) any other service characteristics (see 3.3).

4.3 The location of the marking of the load and speed characteristics shall be distinct, but near the marking of the size and construction.

4.4 No location is specified for the markings related to other service characteristics.

EXAMPLE: A tubeless tyre having a nominal section width of 165 mm, a nominal aspect ratio of 80, a radial-ply construction and a nominal rim diameter code of 15, whose service description consists of a load index (LI) of 87 corresponding to a tyre load-carrying capacity of 545 kg, and which falls into the speed symbol H (210 km/h), is marked:

165/80 R 15 87 H
TUBELESS

5 Tyre dimension measurement procedure

The tyre dimension measurement procedure shall be as described below.

- a) Prior to measurement, mount the tyre on an approved rim, inflated to the recommended pressure given in Table 4, and allow it to stand for a minimum of 24 h at normal room temperature.
- b) Readjust the inflation pressure to the original value.
- c) Caliper the section width and the overall width of the tyre at six points approximately equally spaced around the tyre circumference. Record the average of these measurements as section width and overall width.
- d) Determine the tyre overall diameter by measuring its maximum circumference and dividing this by π (where $\pi = 3.141\ 6$).

Table 4 — Recommended pressures for measurement of tyre dimensions

Tyre	Pressure kPa
Standard load and P-type light load (LL) version	180
Extra load/reinforced version	220
T-type temporary-use spare tyre	420

6 Choice of tyre sizes

6.1 In selecting tyres for a vehicle, the vehicle maximum load on the tyre shall not be greater than the applicable maximum load-carrying capacity of the tyre. Vehicle maximum load on the tyre is the load on an individual tyre that is determined by distributing to each axle its share of the maximum loaded vehicle mass and dividing by the number of tyres on the axle.

6.2 The vehicle normal load on the tyre shall not be greater than 88 % of the maximum load-carrying capacity of the tyre. Vehicle normal load on the tyre is the load on an individual tyre that is determined by distributing (in accordance with Table 5) to each axle its share of the curb mass, accessory mass and normal occupant mass and dividing by the number of tyres on the axle. These and other relevant masses are defined below.

6.3 In specific local regulations, the vehicle normal load on the tyre shall not be greater than 94 % of the load rating at the vehicle manufacturer's recommended cold inflation pressure for the tyre.

6.4 The vehicle manufacturer may specify an inflation pressure less than that corresponding to the maximum tyre load. In this case, the load on the tyre (at the corresponding vehicle loading condition) shall not exceed the tyre load capacity at the specified inflation pressure.

6.5 Maximum loaded vehicle mass is the sum of:

- a) curb mass;
- b) accessory mass;
- c) vehicle capacity mass; and
- d) production option mass.

6.6 Curb mass is the mass of a motor vehicle with standard equipment, including the maximum capacity of fuel, oil and coolant, and, if so equipped, of air conditioning and the additional mass of an optional engine.

6.7 Accessory mass is the combined mass (in excess of those standard items that may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

6.8 Normal occupant mass is equivalent to 68 kg multiplied by the number of occupants, as specified in Table 5. When local regulation includes a luggage mass, a mass of 7 kg per occupant, located in the luggage compartment, shall be used. Occupant distribution is the distribution of occupants in a vehicle as specified in Table 5.

7 Storage

Tyres shall be stored inside of a building to protect them from humidity, light, temperature (heat), ozone, and chemicals. Tyres shall not be stored in a manner which could cause permanent deformation (**see 7.7**).

7.1 Humidity

The store room shall be dry and partially ventilated. Tyres shall not be stored in moist conditions as moisture can be absorbed causing degradation of the structure with a risk of subsequent failure in service.

7.2 Light

Tyre shall not be stored in direct sunlight and shall be protected from artificial light having a high ultraviolet content. Lighting with filament type lamps shall be used in preference to fluorescent tubes and daylight shall be reduced by tinting glass windows (if used) with a red or orange coating or screen to absorb ultraviolet light.

7.3 Temperature

Tyres shall not be stored at temperatures higher than 30°C.

7.4 Ozone

As ozone is particularly deleterious to rubber, storage rooms shall not contain any equipment that is capable of generating ozone, such as mercury vapour lamps and high-voltage electrical equipment giving rise to electric sparks or silent electrical discharges. Combustion gases and organic vapour shall be excluded from storage rooms, as they may give rise to ozone via photochemical processes.

7.5 Chemicals and lubricants

Solvents such as petrol, paraffin, oil, grease, acids and disinfectants are harmful to rubber and shall be stored separately. Storage areas shall be free from all forms of dirt and grease which, even if not damaging, will mar the appearance of the tyres.

7.6 Stock rotation

A first-in, first-out policy shall be adopted to minimize the storage period and hence any deterioration of tyres before use. Tyres that have been in storage for more than six (6) years from the date of manufacture shall not be sold, offer for sale or put into service.

7.7 Storage position

Vertical, horizontal or plaited (laced) method shall be used to store tyres.

7.7.1 Vertical storage of tyres shall be in pallets, particularly for long term storage (See **Appendix B**). Tyres stored by this method shall be turned through at least 10° at intervals of not more than 6 months.

7.7.2 Horizontal storage shall be stacked with the maximum number of ten (10) tyres. (See **Appendix B**). The stacking order shall be rotated at least every 2 months.

7.7.3 Plaited (or laced) storage can be used for large amounts of tyres. Tyres shall not be stacked more than 2.4m (8 feet) high and shall be rotated at least every three (3) months. (See **Appendix B**)

8 Inspection and selection of tyres

8.1 Inspection

8.1.1 Inspection of new and used tyres for sale shall be done by a trained Inspector.

8.1.2 Each used tyre shall be cleaned and inspected on both the outside and inside in order to detect all evident damages or injuries. The inspection shall include placing the used tyre on a mechanical spreader under suitable lighting (3200 lux), and distortion of the natural contour sufficient for visual inspection.

8.1.3 Each inspected tyre shall be deemed acceptable or not acceptable for sale and use on motor vehicles.

NOTE The use of electronic, ultrasonic or holographic casing inspection equipment can aid in determining the integrity of the used tyre.

8.2 Sampling size

At the time of inspection of new tyres, the size of the sample for testing shall be representative of the lot under consideration and will be based on the latest version of the GYS 183 'Sampling Procedure for Inspection by Attributes'. For used tyres, one hundred percent sampling and inspection shall be conducted.

8.3 Selection criteria for new tyres

The following criteria shall be met for new passenger car tyres:

- 1) New tyres shall not be more than two years old from the date of manufacture at the time of importation into Guyana.
- 2) Tyres that are six years or older shall not be sold or offered for sale in Guyana.
- 3) Snow tyres shall not be imported into Guyana, sold, or offered for sale for use on passenger car.

8.4 Selection criteria for used tyres

8.4.1 A used tyre shall be acceptable for motor vehicle if it has a minimum tread depth of 4.0 mm and meet the requirements set out in this standard.

8.4.2 Used tyres exceeding six (6) years from the date of manufacture shall not sold, or offered for sale for use on passenger car.

8.4.3 Snow tyres shall not be imported into Guyana, sold or offered for sale for use on passenger car.

8.4.4 A used tyre consisting of any of the following weaknesses or injuries shall not be sold, or offered for sale for use on passenger car:

- (1) Exposed cords due to tread wear or sidewall scuffing;
- (2) Radial or groove cracks extending to the cords;
- (3) Tread separation;

- (4) Weather cracking extending to cords;
- (5) Broken, damaged, kinked or exposed bead wires;
- (6) Any visual evidence of belt damage;
- (7) Ply separation;
- (8) Porous liners or defective or open splices in liners extending to the cords;
- (9) Loose cords on the inner ply;
- (10) Damage to the inner or bead sealing areas on tyres identified as tubeless;
- (11) Evidence of having been run under-inflated or overloaded;
- (12) Casing break-up (flex break);
- (13) Generally weakened condition due to age, moisture, or exposure to oil or other chemical substances causing disintegration;
- (14) Injuries to the plies in the bead area;
- (15) Sidewall separation;
- (16) Irregular wear;
- (17) Blemished;
- (18) Tyres that shows evidence that studs were used; and
- (19) Tyres with nail holes or other injuries greater than 6mm in diameter and/or number more than 2 per tyre.

8.5 Test certificate

8.5.1 When requested by the Guyana National Bureau of Standards, the importer shall supply a certificate of compliance showing the results of tests conducted to determine compliance of the new tyres (with Clauses 3-6) of this standard.

8.5.2 Strength test, bead unseating test, high speed test and endurance test shall be carried out (as necessary) in accordance with the latest version of the ISO 10191 standard, 'Passenger Car Tyres – Verifying Tyre Capabilities – Laboratory Test Methods'.

8.6 Absence of testing facilities

Where the importer or supplier does not have the facilities for testing, he shall be responsible for arranging that test be done elsewhere.

8.7 Compliance

Where the samples taken in accordance with **8.2** and satisfy all requirements of this standard, the lot shall be deemed to comply with this standard.

8.8 Nonconforming tyres

8.8.1 New pneumatic tyres primarily intended for use on passenger cars, but which do not conform to all the requirements of this standard, shall not be sold, offered for sale, or imported into Guyana, for any purpose whatsoever.

8.8.2 Used pneumatic tyres primarily intended for use on passenger cars, but which do not conform to all the requirements of this standard, shall not be sold or offered for sale for any purpose whatsoever.

8.8.3 Passenger car tyres that do not meet the requirements of this standard shall not be used on motor vehicles as prescribed in this standard and shall be destroyed by a means specified by the Guyana National Bureau of Standards.

Appendix A

Other existing size markings

A series of tyres for radial-ply construction, whose identification is not in accordance with the tyre size designation defined in this standard, is currently marketed in various countries.

In particular, this tyre size designation does not include the nominal aspect ratio. These radial tyres were in existence long before publication of the first edition of this standard and traditionally, they pertain to the metric series. Although sometimes quoted as 82-series tyres, they have sizes similar to those of tyres identified by a nominal aspect ratio of 80.

Their size designation and relevant dimensions are shown in Table A.1.

Table A.1 — Metric-series radial tyres with other markings

Dimensions in millimetres

Designation of size and construction	Measuring rim width code	Design tyre dimensions		Maximum tyre dimensions in service	
		Section width S	Overall diameter D_o	Overall width W_{max}	Overall diameter $D_{o\ max}$
125 R 12	3½	127	510	132	518
125 R 15			588		596
135 R 12	4	137	522	142	531
135 R 13			548		557
135 R 14			574		583
135 R 15			600		609
145 R 10	4	147	492	153	501
145 R 12			542		551
145 R 13			566		575
145 R 14			590		599
145 R 15			616		625
155 R 12	4½	157	550	163	560
155 R 13			578		588
155 R 14			604		614
155 R 15			630		640
165 R 13	4½	167	596	174	607
165 R 14			622		633
165 R 15			646		657
175 R 13	5	178	608	185	619
175 R 14			634		645
175 R 15			660		671
175 R 16			686		696
185 R 13	5½	188	624	196	636
185 R 14			650		662
185 R 15			674		686
195 R 14	5½	198	666	206	678
195 R 15			690		702
205 R 14	6	208	686	216	699
205 R 15			710		723
205 R 16			736		749

Appendix B

Storage positions



Figure 1 - Horizontal



Figure 2 - Vertical



Figure 3 – Plait or laced

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