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STANDARDIZATION ORGANIZATION FOR G.C.C (GSO)



**GSO 51/2007**

إطارات سيارات الركوب

الجزء الأول : المسميات والتمييز والبيانات الإيضاحية

والأبعاد والأحمال وضغوط النفخ

**PASSENGER CAR TYRES**

**PART 1: NOMENCLATURE, DESIGNATION, MARKING,  
DIMENSIONS, LOAD CAPACITY  
AND INFLATION PRESSURE**

**ICS: 38.140**

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**Issuing Status : Technical Regulation**

## **Foreword**

GCC Standardization Organization (GSO) is a regional Organization which consists of the National Standards Bodies of GCC member States. One of GSO main functions is to issue Gulf Standards /Technical regulations through specialized technical committees (TCs).

GSO through the technical program of committee TC No.: (2) " Technical Committee of Mechanical standards" has updated the GSO Standard No. : GSO 51/1986 " Passenger Car Tyres - Part 1: Nomenclature, Designation, Marking, Dimensions, Load Capacity and Inflation Pressure ". The Draft Standard has been prepared by Kingdom of Saudi Arabia.

This standard has been approved as a Gulf Technical Regulation by GSO Board of Directors in its meeting No.(6), held on 19/5/1428 H (5/6/2007G) . The approved standard will replace and supersede the GSO standard No. 51/1986.

**PASSENGER CAR TYRES**  
**PART 1: NOMENCLATURE, DESIGNATION, MARKING,**  
**DIMENSIONS, LOAD CAPACITY**  
**AND INFLATION PRESSURE**

**1- SCOPE AND FIELD OF APPLICATION**

This standard is concerned with the nomenclature, designation, markings, dimensions, load capacity and inflation pressure of the new pneumatic tyres for passenger cars.

**2- COMPLEMENTARY REFERENCES**

2.1 GSO 52/2007 “Passenger Car Tyres - Part 2: General Requirements”.

2.2 GSO 53/2007 “Passenger Car Tyres - Part 3: Methods of Test”.

2.3 GSO 581/1995 “Requirements for Storage of Motor Vehicle Tyres”.

2.4 GSO Standard to be approved by the Organization “Motor Vehicles Tyres – Treadwear, Traction and Temperature Resistance Grading”.

2.5 GSO Standard to be approved by the Organization “Motor Vehicles Tyres – Methods of Testing of Temperature Resistance Grading”.

**3- NOMENCLATURE**

**3.1 Passenger Car**

A motor vehicle with a motive power designed to carry nine persons or less and their luggage including the driver.

**3.2 Pneumatic Tyre**

A pneumatic tyre is a flexible component of the wheel assembly made of rubber and reinforcing materials.

Inflating the tyre with compressed gas enables it to carry the wheel load as a part of an axle load and to transmit longitudinal and lateral forces.

**3.3 New Tyre**

A tyre which has been neither used nor subjected to a retreading operation.

**3.4 Car Tyre**

A tyre of a group primarily designed for use on a passenger carrying vehicle having up to eight seats plus the driver’s seat.

**3.5 Tyre Size Designation**

The combination of numbers, letters, and symbols that uniquely identify the tyre size.

- 3.6 Service Description  
The association of a load index with a speed symbol.
- 3.7 Retreading  
Reconditioning of the used tyre by replacement of the tread rubber or the tread and sidewall rubber in order to reuse the tyre.
- 3.8 Grown Tyre  
A tyre which has undergone expansion due to use in service.
- 3.9 Bead  
That part of the tyre which is shaped to fit the rim. It consists of a core made of inextensible strands, (Fig. 1).
- 3.10 Sidewall  
The part of a pneumatic tyre between the tread and the bead (Fig. 1).
- 3.11 Side Wall Rubber  
The rubber layer on the sidewall of the tyre and over the carcass, which may include ornamental or protective ribs and fitting lines.
- 3.12 Tread  
The part of a pneumatic tyre which normally comes in contact with the ground (Fig. 1) and consists of ribs and grooves.
- 3.13 Tread Rib  
A tread section running circumferentially around a tyre (Fig. 1).
- 3.14 Tread Groove  
The space between two adjacent tread ribs, (Fig. 1).
- 3.14.1 Principal grooves means the wide grooves positioned in the central zone of the tyre tread, which have the tread-wear indicators located inside them.
- 3.14.2 Secondary grooves means the supplementary grooves of the tread pattern which may disappear in the course of the tyre's life.”
- 3.15 Cord  
Textile or non-textile strands thread used in various components of the tyre carcass, plies, belts and breakers.
- 3.16 Ply  
A layer of rubber coated parallel cords.
- 3.17 Innerliner  
The layer(s) of rubber forming the inside surface of a tubeless tyre that contains the inflating medium within the tyre.

3.18 Carcass

The assembly of plies and beads forming the body of a tyre, excluding tread or side wall.

3.19 Breaker (diagonal)

An intermediate ply between carcass and tread.

3.20 Belt or bracing ply (radial)

A layer of material underneath the tread, laid substantially in direction of the tread centre line that restricts the carcass in a circumferential direction.

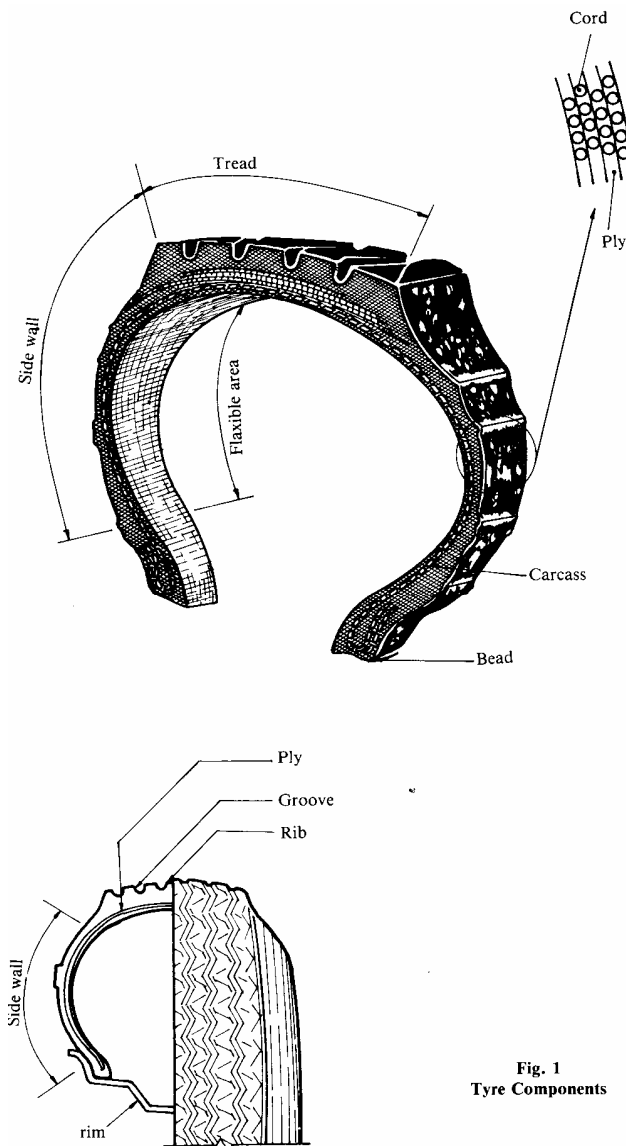


Fig. 1  
Tyre Components

## 3.21 Rim

A metallic support for a tyre, or a tyre and tube assembly, upon which the tyre bead is seated.

## 3.22 Diagonal (Bias Ply) Tyre

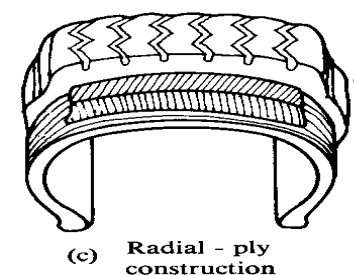
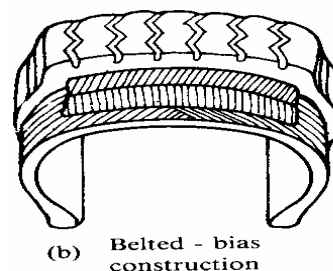
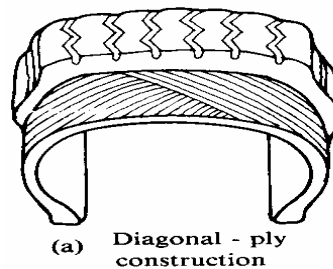
A pneumatic tyre structure in which the ply cords extend to the bead and are laid at alternate angles substantially less than  $90^\circ$  to the centre line of the tread, Fig. (2a).

## 3.23 Bias Belted Tyre

A pneumatic tyre structure of bias ply (diagonal) type in which the carcass is restrained by a belt comprising two or more layers of substantially inextensible cord material laid at alternate angles close to those of the carcass, Fig. (2b).

## 3.24 Radial Tyre

A pneumatic tyre structure in which the ply cord (or cords) extend to the bead and are laid substantially at  $90^\circ$  to the centre line of the tread, the carcass being stabilized by an essentially inextensible circumferential belt, Fig. (2c).



**Fig. 2 - Tyre Construction**

- 3.25 Tread Wear Indicator  
A means which indicates that the wear of tread has reached the maximum permissible limit, Fig. (3).
- 3.26 Ply Rating (PR)  
Index of tyre strength, does not necessarily represent the actual number of plies in the tyre. It is used to relate a given size tyre with its load and inflation pressure.
- 3.27 Rim Width 'r': the linear distance between the Rim flanges
- 3.28 Theoretical rim width 'r<sub>th</sub>': the width of a theoretical rim having a specified ratio to the Nominal Section Width of the tyre.
- 3.29 Section Width (S)  
The linear distance between the outsides of the two side walls of an inflated tyre excluding elevations due to labeling (marking), decorations, or protective ribs, Fig. (4).
- 3.30 Nominal Section Width (SN)  
The Section Width indicated in the Tyre Size Designation, and used for calculation of Tyre Dimensions.
- 3.31 Overall Width (W)  
The maximum linear distance between the outside of the two side walls of an inflated tyre including elevations due to labelling (marking), decoration or protective ribs, Fig. (4).
- 3.32 Maximum overall (grown) Tyre Width in Service  
The overall width (item 3.31) plus manufacturing tolerances and tolerance for service growth.
- 3.33 Design Section Height (H)  
Half the difference between the design overall diameter and the nominal rim diameter.
- 3.34 Overall Diameter (D)  
The diameter of an inflated new tyre at the outermost surface of the tread, Fig. (4).
- 3.35 Nominal Rim Diameter  
A conventional number corresponding to the rim diameter, for reference purpose, only as indicated in the tyre and in the rim size designations.
- 3.36 The 'design overall diameter' of the tyre is equal to:  
 $2 * \text{Nominal Section Width} * \text{Nominal Aspect Ratio} / 100 + \text{Nominal Rim Diameter}$   
(in mm) In case of 'A' metric tyres it is equal to the Nominal Overall Diameter.



## 3.37 Maximum overall (grown) Tyre Diameter in Service

The overall diameter (item 3.34) plus manufacturing tolerances and tolerances for service growth.

## 3.38 Aspect Ratio

One hundred times the ratio of the design section height to the nominal section width (H/SN)

## 3.39 Static Load Radius

The shortest distance of the contact surface from the axle centre of the tyre, mounted on the specified rim, inflated and loaded with the inflation pressure and load specified by the manufacturer and placed vertically on a flat board.

## 3.40 Dynamic Load Radius

The distance divided by  $2\pi$ , covered by one rotation of the tyre inflated at the pressure specified by the manufacturer and mounted with its specified rim on a car loaded with the load specified by the manufacturer and running at a constant speed of 60 km/h on a flat and straight road.

## 3.41 Design Load

Load, specified by the vehicle manufacturer, applied to the tyre mounted on a car loaded with standard equipment, maximum capacity of engine fuel, oil, coolant, spare wheel, and (if so equipped) the air conditioning system in addition to weight of passengers distributed as in Table (1) (taking 75 kg per passenger).

**TABLE (1)**  
**PERSONS DISTRIBUTION**

<b>Car occupant rating</b>	<b>No. of persons</b>	<b>Persons distribution</b>
2 to 4 persons	2	2 persons at front seats
5 to 9 persons	3	2 persons at front seats, 1 person at rear seats

## 3.42 Maximum Load for a Tyre

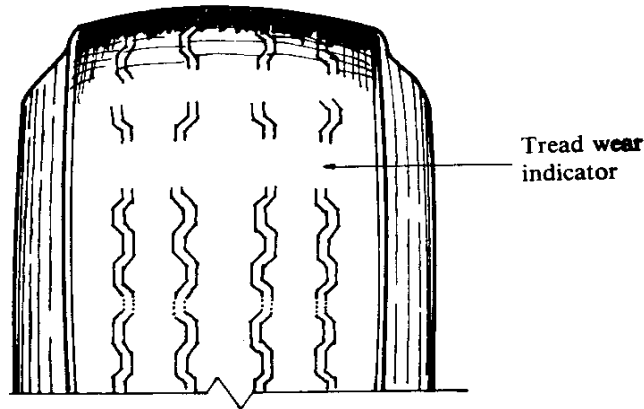
Load for each individual tyre from maximum load applied to the tyre installed on car loaded with the maximum load specified by the manufacturer.

## 3.43 Maximum Speed

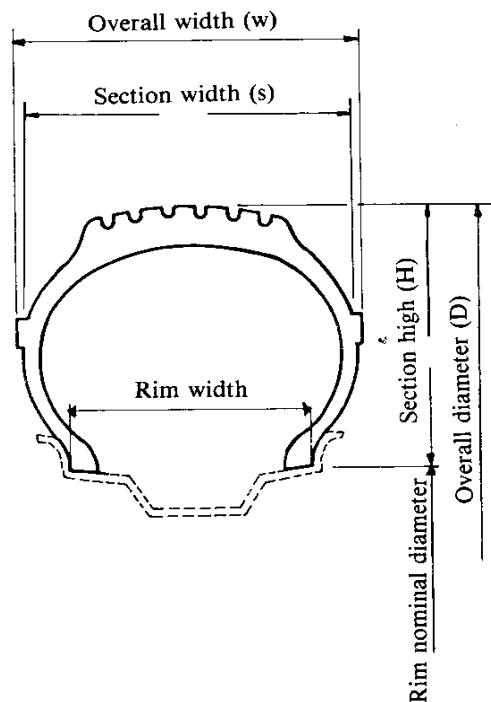
The maximum design speed of the car, including manufacturing tolerances, as specified by the car manufacturer.

3.44 Load Index

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



**Fig. 3**  
**Tread Wear Indicator**



**Fig. 4**  
**Tyre Dimensions Nomenclature**

- 3.45      Chunking  
The breaking away of pieces of the tread or sidewall rubber.
- 3.46      CT (Special Tyre)  
A pneumatic tyre with an inverted flange tyre and rim system in which the rim is designed with rim flanges pointed radially inward and the tyre is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tyre.
- 3.47      Metric A tyres  
A pneumatic tyre with a special rim capable of mounting a support ring and providing by this run flat capability.
- 3.48      Load Capacity  
The maximum load a tyre is rated to carry under specified operating conditions.
- 3.49      Speed Category  
The maximum speed which the tyre can sustain expressed by means of a speed symbol, Table (4).
- 3.50      Tread Separation  
The pulling away of the tread from the tyre carcass.
- 3.51      Inflation Pressure  
The pressure taken with the tyre at ambient temperature and does not include any pressure build-up due to tyre usage.
- 3.52      T-type temporary use spare tyre means a type of temporary use spare tyre designed for use at inflation pressures higher than those established for standard and reinforced tyres
- 3.53      Run flat tyre or Self supporting tyre describes a pneumatic tyre structure provided with any technical solutions (for example reinforced sidewalls, etc.) allowing the pneumatic tyre, mounted on the appropriated wheel and in the absence of any supplementary component, to supply the vehicle with the basic tyre functions at a specified speed and distance when operating in flat tyre running mode.
- 3.54      Flat tyre running mode describes the state of the tyre, essentially maintaining its structural integrity while operating at an inflation pressure between 0 and 70kPa.
- 3.55      Run flat system or Extended mobility system describes an assembly of specified functionally dependant components, including a tyre, which together provide the specified performance granting the vehicle with the basic tyre functions at a specified speed and distance when operating in flat tyre running mode.
- 3.56      Basic tyre functions describe the normal capability of an inflated tyre in supporting a given load up to a given speed and transmitting the driving, the steering and the braking forces to the ground on which it runs.

**4- DESIGNATION**

Tyres shall be designated according to dimensions, construction, nominal tyre rim diameter and service description.

**4.1 Dimensions****4.1.1 Nominal Section Width**

The nominal tyre section width shall be indicated in millimeters, ending either in “0” or “5” so that in any one series of tyres with the same aspect ratio, the values shall all end with “0” or all end with “5”.

**4.1.2 Nominal Aspect Ratio**

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

In case of ‘A’ metric tyres the Nominal Aspect Ratio is replaced by the marking of the ‘Nominal Overall Diameter’ indicated in millimeters and ending in ‘0’.

**4.2 Construction**

The tyre shall be designated according to the construction by one of the following letters:

D or “-“ for diagonal construction.

B for bias belted construction.

R for radial construction.

FR for “run flat” or “self supporting” tyres

**4.3 Nominal Rim Diameter**

Tyres shall be designated by using the relevant numbers of the nominal rim diameter, as mentioned in Table (2).

**TABLE (2)****Nominal Rim Diameter and Figure Used as Tyre Designation**

<b>Nominal Rim Diameter (code)</b>	<b>Value of the rim diameter code expressed in mm</b>
10	254
12	305
13	330
14	356
15	381
16	406
17	432
18	457
19	483
20	508

Nominal Rim Diameter (code)	Value of the rim diameter code expressed in mm
21	533
22	559
23	584
24	610
25	635
26	660

#### 4.4 Service Description

##### 4.4.1 Load Index

Tyre shall be designated according to the maximum load for a tyre (item 3.42) by Load Index mentioned in Table (3).

**TABLE (3)**  
**Max. Load for a Tyre and Load Index Used for Tyre Designation**

Tyre load (kg)	Load index	Tyre load (kg)	Load index	Tyre load (kg)	Load index	Tyre load (kg)	Load index	Tyre load (kg)	Load index
190	50	345	71	630	92	1150	113	2120	134
195	51	355	72	650	93	1180	114	2180	135
200	52	365	73	670	94	1215	115	2240	136
206	53	375	74	690	95	1250	116	2300	137
212	54	387	75	710	96	1285	117	2360	138
218	55	400	76	730	97	1320	118	2430	139
224	56	412	77	750	98	1360	119	2500	140
230	57	425	78	775	99	1400	120	2575	141
236	58	437	79	800	100	1450	121	2650	142
243	59	450	80	825	101	1500	122	2725	143
250	60	462	81	850	102	1550	123	2800	144
257	61	475	82	875	103	1600	124	2900	145
265	62	487	83	900	104	1650	125	3000	146
272	63	500	84	925	105	1700	126	3075	147
280	64	515	85	950	106	1750	127	3150	148
290	65	530	86	975	107	1800	128	3250	149
300	66	545	87	1000	109	1850	129	3350	150
307	67	560	88	1030	110	1900	130	3450	151
315	68	580	89	1060	110	1950	131	3550	152
325	69	600	90	1090	111	2000	132		
335	70	615	91	1120	112	2060	133		

## 4.4.2 Speed Symbol

Tyres shall be designated according to the maximum speed by using the letters mentioned in Table (4).

**TABLE (4)**  
**Maximum Speed and Corrponding Symbol for Tyre Designation**

Speed km/h	Tyre designation
50	B
60	C
65	D
70	E
80	F
90	G
100	J
110	K
120	L
130	M
140	N
150	P
160	Q
170	R
180	S
190	T
200	U
210	H
240	V
270	W
300	Y

4.4.3 Tyres designed for speeds in excess of 300 km/h shall be marked with the service description applicable up to 300km/h within parentheses, e.g. (91Y), and ‘ZR’, or ‘ZRF’, shall replace ‘R’, or ‘RF’ respectively, in the size designation and then the actual maximum tyre performance shall be specified by the tyre manufacturer.

4.4.4 Tyres marked ‘ZR’, but without any marking of the Service Description, are suitable for speeds over 240 km/h. consult the tyre manufacturers with respect to their maximum load and maximum speed capabilities as well as their reference inflation pressure

## 4.4.5 Speed and Load

For speed in excess of 210 km/h, maximum load per tyre shall not exceed the following percentage of the load capacity quoted in the Table (5) depending on the speed symbol of the tyre and on the speed capability of the vehicle.

**TABLE (5)**  
**Percentage of Load Capacity (%) Versus Speed**

Speed Capability of the Vehicle	Speed Symbol			
	H	V	W	Y
	(%)	(%)	(%)	(%)
210	100	100	100	100
220		97	100	100
230		94	100	100
240		91	100	100
250			95	100
260			90	100
270			85	100
280			-	95
290			-	90
300			-	85

4.5 The designation shall be marked on the tyre in the following sequence:

Nominal section width – Nominal aspect ratio - construction - nominal rim diameter - load index - speed Symbol.

Examples: 175/50 R 13 64 H; 215/50 ZR 15 82 Y, 265/30 ZR 18 (88Y); 205/45 RF 17 64W

In case of ‘A’ metric tyres the sequence shall be: Nominal Section Width – Nominal Overall Diameter - Construction - Nominal Rim Diameter - Load Index - Speed Symbol

examples: 195-620 R 420A 90 H; 265- 790 ZR 540A 111 Y

4.6 The word “TUBELESS” shall characterize tyres that can be used without an internal tube

## 5- MARKING

Each tyre shall be legibly, indelibly marked and permanently molded into one or both side walls with the following information in either Arabic or English or both languages, arranged as follows:

5.1 Trade name, trade mark, brand name or manufacturer’s name.

5.2 Designation of dimensions, construction, nominal tyre rim diameter and service description.

5.3 Country of production.

## 5.4 Date of manufacture

A 4-digit date of manufacture code with first two digits identify the week and the second two digits identify the year of production. This marking shall be in characters not less than 4 mm high shall be marked on the tyre.

## 5.5 The word “REINFORCED” or “EXTRA LOAD” if applicable, in characters not less than 4 mm high shall be marked on the tyre.

## 5.6 The words “BIAS-BELTED or RADIAL” if applicable, in characters not less than 4 mm high shall be marked on the tyre.

## 5.7 The words “TUBELESS”, if applicable.

## 5.8 Tread Wear Indicator

The tyre shall incorporate a tread wear indicator that will provide a visual indication that the tyre has worn to a tread depth of  $\left(1.6 \begin{matrix} +0.6 \\ -0.0 \end{matrix}\right)$  mm.

## 5.9 Each tyre shall be graded for temperature resistance grade in accordance with the Gulf Standard mentioned in item 2.4.