AMENDMENT NO. 2
TO
AIS – 044 (Part 1)
Automotive Vehicles – Pneumatic Tyres for Commercial Vehicles.

1.0 Page No. 6 and 7, cl. 6.1 Dimension of Tyres:

Substitute following text for the existing text of entire clause 6.1:

"

6.1 Tyre Dimensions

6.1.1 Tyre dimensions and profiles shall be compatible with the appropriate rims. The tyre dimensions namely section width and outer diameter shall meets the requirements given in Annexure A and method of measurement given in Annexure E.

6.1.1.1 **Section Width of Tyre:** Tyre size designation shall be as per tables given in Annexure A, the section width shall be deemed to be that opposite the tyre size designation in those tables.

NOTE - Adjustment to tyre section width/overall width –Within the parameters of specified permissibility of a wider or narrower rim than the recommended rim size, the guidelines for the necessary adjustment are – Sectional width or overall width: 5mm increase or reduction (as applicable) for every 0.50 difference in nominal rim width.

6.1.1.2 **Tyre outer diameter:** Tyre size designation shall be as per tables given in Annexure A. The outer diameter shall not be exceed the minimum and maximum diameter values specified in Annexure A.

6.1.2 For the sizes listed in Annexure A, but tolerance are not given and the tyres sizes which are not listed in Annexure A, the section width and outer diameter shall be calculated by using following formulae:

6.1.2.1 Section width of tyre

6.1.2.1.1 The section width shall be calculated by using following formula

$S = S_1 + K (A - A_1)$,

Where,

S = "Section width" expressed in millimeters measured on measuring rim

S_1 = "Nominal section width" in millimeters, as set out on the tyre sidewall in the tyre size designation

A = Width of the measuring rim in millimeters, as shown by the manufacturer in the technical specification

A_1 = Theoretical rim width expressed in millimeters

A1 shall be taken to equal S_1 multiplied by the factor X as specified by the manufacturer, and K shall be taken to equal 0.4.

6.1.2.1.2 For the existing types of tyres whose designation is given in the first column of the table in Annexure A to this standard, the section width shall be deemed to be that given opposite the tyre designation in those tables.

6.1.2.1.3 The actual measured overall width of the tyre may be less than the section width determined as detailed in para 6.1.2.1.1 and 6.1.2.1.2.

6.1.2.1.4 The measured overall width may exceed by value of 4% in case of radial ply tyre and by 8% in case of diagonal (bias-ply) tyres. However, for tyres for normal section width exceeding 305 mm intended for dual mounting (twinning), the value determined as detailed in para 6.1.2.1.1 and 6.1.2.1.2 shall not exceed by more than 2% for radial ply tyres with nominal aspect ratio higher than 60, or 4% for diagonal (bias-ply) tyres.

6.1.2.2 Outer diameter of the tyre

6.1.2.2.1 The outer diameter of the tyre shall be calculated by using following formula:-

$D = d + 2H,$

Where,

D = outer diameter expressed in mm
d = nominal rim diameter expressed in mm
H = nominal tyre height = $S_1 \times 0.01$ Ra,
S_1 = nominal section width
Ra = nominal aspect ratio as set out in the description on the tyre sidewall.

6.1.2.2.2 For the existing types of tyres whose designation is given in the first column of the table in Annexure A to this standard, the outer diameter shall be deemed to be that given opposite the tyre designation in those tables.

6.1.2.2.3 The outer tyre diameter shall not be outside the minimum and maximum diameter values obtained from the following formulae:

$D_{min} = d + (2H \times a)$

$D_{max} = d + (2H \times b),$

Where,

(a) For the sizes listed in Annexure-A
H = 0.5 (D-d) for references see paragraph 6.1.2.2.1

(b) For other sizes which are not listed in Annexure-A
`H' and `d' are as defined in paragraph 6.1.2.2.1

(c) Coefficients `a' and `b' are respectively

Coefficient `a'	0.97		
Coefficient `b'		Radial	Diagonal
	For normal use tyres	1.04	1.07
	For special use tyres	1.06	1.09

2..0 Page No. 7, cl. 6.3.1

Substitute following text for the existing text:

" 6.3.1 Each type of pneumatic tyre having Load Index (Max load rating)121 or less and a speed category 150km/h and below shall undergo load/speed tests carried out by the procedure in Annexure G to this standard."

3.0 Page No. 9, cl. 6.5.3

Add following text and tables after the existing tables::

" Tyre Strength – Ultra Light Truck, Light Truck and Truck and Bus tyres
(For which the load capability index is not shown)

Sr. No.	PR	Ultra Light truck Tyre , Light truck Tyre			Truck and Bus	
		Nominal rim diameter under 13 Joules (Kgf.cm)	Nominal rim diameter 13 to 14 Joules (Kgf.cm)	Nominal rim diameter 14.5 or more Joules (Kgf.cm)	Tubeless Joules (Kgf.cm)	With Tube Joules (Kgf.cm)
i)	4	136 (1385)	192 (1960)	294 (3000)	--	-
ii)	6	203 (2072)	271 (2765)	362 (3690)	576(5875)	768(7830)
iii)	8	271 (2765)	384 (3915)	514(5240)	734(7485)	893(9105)
iv)	10	-	-	576 (5875)	972(9910)	1412 (14400)
v)	12	-	-	644 (6565)	1412(14400)	1785 (18200)
vi)	14	-	-	712(7260)	1695(17285)	2282 (23270)
vii)	16	-	-	-	2090(21310)	2599 (26500)
viii)	18	-	-	-	2203(22465)	2825 (28805)
ix)	20	-	-	-	-	3051(31100)
x)	22	-	-	-	-	3220(32835)
xi)	24	-	-	-	-	3390(34560)

Diameter of Plunger
(for the tyre of which the load capability index is not shown)

Ultra Light Truck Tyre , Light Truck Tyre	Truck and Bus Tyres	
	12 PR or less	14 PR or more
19 ± 0.2mm	32 ± 0.3mm	38± 0.3mm

4.0 Page No. 10, cl. 6.6, Tyre Uniformity Test

Delete entire clause 6.6 and Annexure K

5.0 Page No. 10, cl. 6.7, Tyre Stiffness Test

Delete entire clause 6.7 and Annexure L

6.0 Page No. 13 to 19 **Annexure : A**

Substitute following text and tables for existing text and tables:

Annexure A

(Refer clause 6.1)

Tyres for Trucks, Buses and Trailers for use in Normal Highway Service (Diagonal Ply)

Dimension

Sr. No	Tyre Size Designation	Rim Rec Alt	NEW TYRE- INFLATED								
			Section Width in mm			Overall Diameter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. (1) (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia. Std./ Prem	Min. Dia. Std./ Prem	Max. Dia. Std./ Prem			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	7.00-20	5.5	199	193	209	904/	892/	924/	10	1430/1250	620/550
		5.0	194	188	204	---	---	---			
ii)	7.50-20	6.0	215	209	226	935/	922/	956/	10	1600/1405	620/550
		5.5	210	204	221	952	939	974	12	1775/1555	725/655
iii)	8.25-20	6.5	236	229	248	974/	960/	997/	12	2040/1790	690/620
		6.0	231	224	243	992	977	1016	14	2230/1960	795/725
iv)	9.00-20	7.0	259	251	272	1019/	1004/	1045/	12	2335/2050	655/585
		6.5	254	246	267	1038	1022	1065	14	2570/2255	760/690
									16	2650/2325	795/725
v)	10.00-20	7.5	278	270	292	1054/	1038/	1081/	14	2740/2405	690/620
		7.0	273	265	287	1073	1056	1101	16	3000/2630	795/725
									18	3080/2700	825/760
vi)	11.00-20	8.0	293	284	308	1085/	1068/	1114/	14	2990/2620	690/620
		7.5	288	279	303	1104	1086	1134	16	3265/2865	795/725
									18	3355/2945	825/760
vii)	11.00-24	8.0	293	284	308	1186/	1169/	1215/	14	3370/2960	690/620
		7.5	288	279	303	---	---	---			
viii)	12.00-20	8.5	315	306	331	1125/	1106/	1156/	14	3175/2785	620/550
		8.0	310	301	326	1146	1127	1178	16	3510/3080	725/655
									18	3725/3265	795/725

Notes

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating tyres.

(1) Inflation pressure

Tyres for Light Truck Commercial Vehicles
(Diagonal Ply)

General Dimension

Sr. No.	Tyre Size Designation	Rim	NEW TYRE- INFLATED								
			Section Width in mm			Overall Diameter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia. Std./ Prem	Min. Dia. Std./ Prem	Max. Dia. Std./ Prem			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	6.00-16	4.50E	166	161	174	737/	727/	754/	6	650/570	310/310
		4.50E				748	738	765	8	765/670	415/415
ii)	6.50-16	4.50E	175	170	184	760/	749/	778/	6	730/645	310/310
		4.50E	180	175	189	771	760	789	8	860/755	415/415
		5K									
iii)	6.40-15	4.50E	168	163	176	698/	688/	714/	6	600/530	310/310
						706	696	722	8	710/625	415/415
iv)	6.70-15	5K	180	175	189	715/	705/	732/	6	695/615	310/310
		5.50F	185	180	194	724	----	----	8	820/725	415/415
v)	7.00-15	5.50F	199	193	209	758/	747/	777/	6	780/690	310/310
		5.50F	194	188	204	769	758	788	8	925/815	415/415
		5K							10	1050/925	515/515
									12	1175/1030	620/620
vi)	7.00-16	5.50F	199	193	209	784/	773/	803/	6	815/715	310/310
		5.50F	204	198	214	795	783	814	8	965/850	415/415
		6.00G							10	1100/965	515/515
									12	1215/1065	620/620
									14	1315/1160	690/690
vii)	9.00-16	8DC	257	249	270	891/	877/	915/	16	2130/1875	725/725
		6.50H				903	888	928			

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating .tyres.

3 Well Base Wheels: Strength- The load and inflation pressure imposed on a rim or wheel must not exceed the rim manufacturer's recommendation. Whenever a high ply rating size is decided for original equipment or replacement of a lower P.R. for O.E., the rim manufacturer must be consulted. To insure that the rim/wheel is of sufficient strength for the load, inflation and service intended. This applies particularly to 6.00-16, 8PR, 6.50-16, 8PR, 7.00-15, 10 PR & 12 PR, 7.00-16, 10 PR, 12PR & 14 PR, 7. 50-16, 10 PR, 12 PR, 14PR & 16 PR tyres on W.B.Rims.

[1] Inflation pressure

Tyres for Light Truck Commercial Vehicles

(Diagonal Ply)

Sr. No.	Tyre Size Designation	Rim	NEW TYRE- INFLATED								
			Section Width in mm			Overall Dimeter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width Std./ Prem	Design Dia. Std./ Prem	Min. Dia. Std./ Prem	Max. Dia. Std./ Prem			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	7.50-16	5.50F	211	205	222	813/	801/	833/	8	1105/970	415/415
		6.00G	206	200	217	824	811	845	10	1260/1105	515/515
		5.50F							12	1405/1240	620/620
									14	1495/1315	690/690
									16	1580/1390	760/760
ii)	8.25-16	6.50	234	227	241	854/	845/	863/	16	1845/1755	655/655
		6.0	229	222	236	863	854	872			

Notes:

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating .tyres.

3 Well Base Wheels: Strength- The load and inflation pressure imposed on a rim or wheel must not exceed the rim manufacturer's recommendation. Whenever a high ply rating size is decided for original equipment or replacement of a lower P.R. for O.E., the rim manufacturer must be consulted. To insure that the rim/wheel is of sufficient strength for the load, inflation and service intended. This applies particularly to 6.00-16, 8PR, 6.50-16, 8PR, 7.00-15, 10 PR & 12 PR, 7.00-16, 10 PR, 12PR & 14 PR, 7. 50-16, 10 PR, 12 PR, 14 PR & 16 PR tyres on W.B.Rims.

[1] Inflation pressure

Ultra Light Truck Tyres (Diagonal Ply)
General Dimension

Sr. No.	Tyre Size Designation	Rim Rec Alt	NEW TYRE- INFLATED								
			Section Width in mm			Overall Dimeter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia.	Min. Dia.	Max. Dia.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	4.50-12	3½J	128	124	136	545	537	553	6	355/340	300/300
	ULT	4J	133	129	141				8	415/395	400/400

Notes:

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating .tyres.

[1] Inflation pressure

Alpha Numeric Light Truck Tyres (Diagonal Ply)
General Dimension

Sr. No.	Tyre Size Designation	Rim Rec Alt	NEW TYRE- INFLATED								
			Section Width in mm			Overall Dimeter in mm			PR	Max. Load (kg) Single	Max Cold I. P. [1] (kpa) Single
			Design Width	Min. Width	Max. Width	Design Dia.	Min. Dia.	Max. Dia.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	F78 – 15 LT	5.50	202	196	212	698	689	714	6	705	310
									8	835	415

[1] Inflation pressure

Tyres for Trucks, Buses and Trailers in Highway Service Numeric Sizes (Radial Ply)

Sr. No.	Tyre Size Desig.	Rim Sec	NEW TYRE-INFLATED								
			Section Width in mm			Overall Diameter in mm			PR	Max load (kg) Single/ Dual	Max. Cold I.P [1] Single/ Dual
			Design width	Min. Width	Max. width	Design Dia. HW/ HT/ TR [2]	Min. Dia. HW/ HT/ TR [2]	Max. Dia HW/ HT/ TR[2]			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	9.00 R20	7.00	259	251	272	1019/ 1024/ 1030	1004/ 1009/ 1014	1034/ 1039/ 1046	8	1850/1750	480/480
									10	2120/2000	590/590
									12	2360/2240	690/690
									14	2575/2430	790/790
ii)	10.00R20	7.5	278	270	292	1054/ 1059/ 1065	1038/ 1042/ 1048	1070/ 1076/ 1082	12	2500/2360	620/620
									14	2800/2650	720/720
									16	3000/2725	830/830
iii)	11.00R20	8.00	293	284	308	1085/ 1090/ 1096	1068/ 1073/ 1078	1102/ 1107/ 1114	12	2725/2575	620/620
									14	3000/2725	720/720
									16	3350/3075	830/830
iv)	12.00R20	8.5	315	306	331	1125/ ------/ 1136	1106/ ------/ 1117	1144/ ------/ 1155	14	3250/3000	660/660
									16	3550/3250	760/760
									18	3750/3450	830/830
v)	11.00R22	8.00	293	284	308	1135/ 1141/ 1147	1118/ 1124/ 1129	1152/ 1158/ 1165	12	2900/2650	620/620
									14	3250/3000	720/720
									16	3550/3250	830/830
vi)	12.00R24	8.5	315	306	331	1226/ ------/ 1238	1208/ ------/ 1219	1244/ ------/ 1257	14	3650/3350	660/660
									16	4000/3650	760/760
									18	4250/3875	830/830
vii)	11.00R22.5	8.25	279	271	293	1054/ 1059/ 1065	1040/ 1044/ 1050	1068/ 1074/ 1080	12	2500/2360	620/620
									14	2800/2650	720/720
									16	3000/2725	830/830

[1] Inflation pressure
[2] HW – Highway, HT- Heavy Tread, TR-Traction

Tyres for Light Truck Numeric Sizes (Radial Ply)
General Dimension Data

Sr. No.	Tyre Size Designation	Rim Rec Alt SDC/WB	NEW TYRE- INFLATED								
			Section Width in mm			Overall Dimeter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia. Sts/ Prem.	Min. Dia. Sts/ Prem.	Max. Dia. Sts/ Prem.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	7.00R15	5.50F 5.50F 5K	202 197	192 187	216 211	752/ 760	741/ 749	763/ 771	6 8 10 12	780/690 925/815 1050/925 1175/1030	345/345 450/450 550/550 655/655
ii)	7.00R16	5.50F 6.00G 5.50F	202 207	192 197	216 221	778/ 785	767/ 774	789/ 796	6 8 10	815/715 965/850 1100/965	345/345 450/450 550/550
iii)	7.50R16	6.00 5.50F 5.50F	211 206	200 195	226 221	808/ 815	796/ 803	820/ 827	6 8 10 12 14	935/825 1105/970 1260/1105 1405/1240 1495/1315	345/345 450/450 550/550 655/655 725/725

Notes:

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating .tyres.

[1] Inflation pressure

Millimetric Light Truck Tyres
(Radial Ply)

Sr. No.	Tyre Size Designation	Rim Rec Alt	NEW TYRE- INFLATED							
			Section Width in mm			Overall Dimeter in mm			Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia.	Min. Dia.	Max. Dia.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)	215/70 R15LT	6½J 7J	221 226	214 219	228 233	683	674	692	975 925	450 450
ii)	205/75 R16LT	5½J 6J	203 208	197 202	209 214	714	705	723	1150 1090	600 600
iii)	215/75 R15 LT	6J 6½J	216 221	210 215	222 227	703	693	713	1215 1150	600 600
iv)	225/75 R15 LT	6J 6½J	223 228	216 221	230 235	719	709	729	1000 900	450 450
v)	195/80 R15 LT	5½J 6J	196 201	190 195	202 207	693	684	702	975 925	450 450
vi)	215/80 R14 LT	6J 6½J	216 221	210 215	222 227	700	690	710	1120 1060	450 450
vii)	185/85 R16 LT	5J 5½J	184 189	178 183	190 195	720	711	729	925 875	450 450

[1] Inflation pressure

Metric Size Designated Light Truck Tyres
(Radial Ply)

Sr. No.	Tyre Size Designation	Rim Rec Alt	NEW TYRE- INFLATED								
			Section Width in mm			Overall Dimeter in mm			PR	Max. Load (kg) Single/ Dual	Max Cold I. P. [1] (kpa) Single/ Dual
			Design Width	Min. Width	Max. Width	Design Dia.	Min. Dia.	Max. Dia.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	145 R12 LT	4J 3½J	145 140	141 136	149 144	543	535	550	6 8	450/425 530/500	515/515 450/450
ii)	155 R13 LT	4½J 5J	157 162	152 157	165 170	582	574	590	6 8	515/487 600/580	350/350 450/450
iii)	175 R14LT	5J 5½J	178 183	173 178	187 192	638	630	646	6 8	710/670 775/750	375/375 450/450
iv)	185 R14 LT	5½J 6J	188 193	182 187	197 202	653	643	662	6 8	775/730 850/800	375/375 450/450
v)	215 R14 LT	6J 6½J	216 221	210 215	227 232	704	694	715	8	1120/1060	450/450

Notes:

1 Recommended shown underlined

2 Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC rims provide ease of tyre mounting/demounting, particularly important for the high Ply Rating .tyres.

[1] Inflation pressure

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THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
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ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

September 2005

AMENDMENT NO. 1
TO
AIS – 044 (Part 1)
Automotive Vehicles – Pneumatic Tyres for Commercial Vehicles.

1. Page no. 6,
Add new cl. 4.3.1 as follows:

4.3.1 **Family of Tyre**

The understanding of " Family / Range of Tyres " would mean tyres which do not differ in the following parameters:

a) Registered name of the company

b) Manufacturing country

c) Manufacturing plant

d) Application category (ordinary or snow)

e) Construction type (Standard or reinforced)

f) Construction cord material (Nylon / Polyester / Polyamide – one type and any other material different family)

g) Structure (Diagonal / Radial / Bias belted)

h) Tyre size designation

i) Speed category

j) Tube / Tubeless (worst case is tubeless)

k) Load index or Load capacity

l) Ply rating of tyres

but having different brand names / trade names and trade descriptions or trade marks.

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ON BEHALF OF :
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
GOVERNMENT OF INDIA

October 2004

AIS-044 (Part 1)

AUTOMOTIVE INDUSTRY STANDARD

Automotive Vehicles – Pneumatic Tyres for Commercial Vehicles

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ON BEHALF OF:
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UNDER
CENTRAL MOTOR VEHICLES RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
GOVERNMENT OF INDIA

March 2004

Status chart of the Standard to be used by the purchaser for updating the record

Sr. No.	Corri-genda	Amend-ment	Revision	Date	Remark	Misc.

General remarks:

Introduction

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the Ministry of Surface Transport (MoST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the secretariat of the AIS Committee, has published this standard. For better dissemination of this information ARAI may publish this document on their Web site.

The pneumatic tyre is an important safety critical item. With the new generation vehicles and development in road infrastructure facilities the vehicle speeds are increasing day by day. To ensure, safety of operation of tyres and vehicles, there was a need for a standard specifying the performance requirements of the pneumatic tyres.

Considerable assistance has been taken from ECE R-54 “Uniform provisions concerning the approval of pneumatic tyres for commercial vehicles and their trailers” and National, International standards of tyres.

The Automotive Industry Standards Committee (AISC) responsible for preparation of this standard is given in Annexure :N.

Automotive Vehicles – Pneumatic Tyres for Commercial Vehicles

1.0 SCOPE

1.1 This standard prescribes the general, dimensional and performance requirements of new pneumatic tyres designed for vehicles in categories M2, M3, N, T3 & T4.

2.0 DEFINITIONS

2.1 **"Type of Pneumatic Tyre"** means a category of pneumatic tyres, which do not differ in such essential respects as:

2.1.1 The manufactures name and brand name.

2.1.2 Tyre-size designation

2.1.3 Category of use

Normal: normal-road-use tyres;
Special: special-use tyre e.g. tyre for mixed use (both on and off the road) and/or at restricted speed:
Snow tyre:

2.1.4 Structure (diagonal (bias-ply), radial);

2.1.5 Speed category

2.1.6 Load-capacity indices or maximum load and ply rating

2.1.7 Cross-section;
Dimension when fitted to a specified rim

2.2 "**Snow tyre**" means a tyre whose tread pattern and whose structure are primarily designed to ensure in mud and fresh or melting snow a performance better than of an ordinary (road-type) tyre. The tread pattern of a snow tyre generally consists of groove (rib) and /or solid block elements more widely spaced than on an ordinary (road type) tyre.

2.3 **"Structure"** of a pneumatic tyre means the technical characteristics of the tyres carcass. A distinction is made between the following structure in particular:

2.3.1 **"Diagonal"** or **"bias-ply"** describes a pneumatic-tyre structure in which the ply cords extend to the beads and are laid at alternate angles substantially less than 90 ° to the centerline of the tread.

2.3.2 **"Radial"** describes a pneumatic-tyre structure in which the ply cords extend to the beads and are laid substantially at 90° to the centerline of the tread, the carcass being stabilized by an essentially inextensible circumferential belt.

2.4 "Bead" means the part of a pneumatic tyre which is of such shape and structure as to fit the rim and to hold the tyre on it; see Figure 1.

2.5 "Cord" means the strands forming the fabric of the plies in the pneumatic tyre; see Figure 1.

2.6 "Ply" means a layer of rubber-coated parallel cords; see Figure 1.

2.7 "Carcass" means that part of a pneumatic tyre other than the tread and the rubber sidewalls which, when inflated, bears the load; see Figure 1.

2.8 "Tread" means that part of a pneumatic tyre which comes into contact with the ground protects the carcass against mechanical damage and contributes to ground adhesion; see Figure 1.

2.9 "Sidewall" means the part of a pneumatic tyre between the tread and the area designed to be covered by the rim flange; see Figure 1.

2.10 "Lower Sidewall" means the area included between the line of maximum section width of the tyre and the area designed to be covered by the rim flange;

2.11 "Tread Groove' means the space between two adjacent ribs and/or blocks in the tread pattern; see Figure 1.

2.12 "Section Width (S)"means the linear distance between the outsides of the sidewalls of an inflated pneumatic tyre, excluding elevations due to labeling (marking), decoration or protective bands or ribs; see Figure 1.

2.13 "Overall Width" means the linear distance between the outsides of the sidewalls of an inflated pneumatic tyre, including labeling (marking), decoration and protective bands or ribs; see Figure 1.

2.14 "Section Height (H)" means a distance equal to half the difference between the outer diameter of the tyre and the nominal rim diameter.

2.15 "Nominal Aspect Ratio (Ra)" means one hundred times the number obtained by dividing the number expressing the section height (H) by the number expressing the nominal section width (S_1), both dimensions expressed in the same units.

2.16 "Outer Diameter (D) means the overall diameter of an inflated new pneumatic tyre. see Figure 1.

2.17 "Tyre-size Designation" means

2.17.1 A designation showing:
2.17.1.1 The nominal tyre section width – means a tyre section width indicated in the tyre size –designation (Refer Annexure - D).
2.17.1.2 The nominal aspect ratio.
2.17.1.3 The nominal rim diameter code.

2.18 "Nominal Rim Diameter (d)" means the diameter of the rim on which a tyre is designed to be mounted; see Figure 1.

2.19 "Rim" means the support for a tyre-and-tube assembly, or for a tubeless tyre, on which support the tyre beads are seated; see Figure 1.

2.20 "Theoretical Rim" means a rim whose width would be equal to 'x' times the nominal section width of a tyre, the value of 'x' shall be specified by the manufacturer of the tyre.

2.21 "Measuring Rim" means the rim on which a tyre must be fitted for dimensional measurements;

2.22 "Test Rim" means the rim on which a tyre must be fitted for endurance testing, load / speed test, plunger test;

2.23 "Chunking" means the breaking away of pieces of rubber from the tread;

2.24 "Cord separation" means the parting of the cords from their coating;

2.25 "Ply separation" means the parting of adjacent plies;

2.26 "Tread separation" means the pulling away of the tread from the carcass;

2.27 "Load-Capacity Index" means one or two numbers which indicate the load the tyre can carry in single or in single and dual operation at the speed corresponding to the associated speed category and when operated in conformity with the requirements governing utilisation specified by the manufacturer.

The list of the Load –capacity indices and their corresponding loads is given in Annexure - B.

2.28 "Speed Category" means:

2.28.1 The speeds, indicated by a symbol, at which the tyre can carry the load indicated by the associated load-capacity index or maximum rated load;

2.28.2 The speed categories are as shown in the table below.

Speed-category symbol	Corresponding speed (km/h)
F	80
G	90
J	100
K	110
L	120
M	130
N	140
P	150
Q	160
R	170
S	180
T	190
U	200
H	210

2.29 "Table Load-Capacity Variation with Speed" means:

The table, in Annexure C, showing as a function of the load-capacity indices and nominal-speed-category symbols the load variations which a pneumatic tyre can withstand when used at speeds different from that conforming to its nominal-speed-category symbol.

2.30 "International Tyre Standard" means any one of the following standard documents:

a) The European Tyre and Rim Technical Organisation (ETRTO): 'Standard Manual'
b) The Tire and Rim Association Inc. (TRA):'Year Book'
c) The Japanese Automobile Tire Manufacturers Association (JATMA): 'Year Book'
d) Economic Commission of Europe Regulation (ECE R-54):

3.0 MARKINGS

3.1 Pneumatic tyres submitted for approval shall display on both sidewall in the case of symmetrical tyres and at least on the outer sidewall in the case of asymmetrical tyres following markings:

3.1.1 The manufacturer's name or trade name (may be placed on one side wall only).

3.1.2 The tyre size designation as defined in para. 2.17.

3.1.3 An indication of the structure as follows:

3.1.3.1 On diagonal (bias-ply) tyres: No marking or the letter "–", or the letter "D" placed in front of the rim-diameter marking

3.1.3.2 On radial-ply tyres: the letter "R" placed in front of the rim-diameter marking and, optionally, the word "RADIAL",

3.1.4 The speed –category symbol;

3.1.4.1 An indication of the tyre's nominal speed category in the form of the symbol prescribed in para. 2.28 above

3.1.5 The load-capacity indices as defined in para 2.27 of this Regulation or maximum permissible load in kg and ply rating.

3.1.6 The inscription M+S or M.S or M&S in the case of a snow tyre.

3.1.7 Tyre inflation pressure in kPa or bar or kg/cm^2 or any combination of this units.

3.1.8 The word "TUBELESS" if the tyre is designed for use without an inner tube;

3.1.9 Manufacturer's code (may be placed on one side wall only).

3.1.10 Week and year code or Month and Year code of Manufacture (may be placed on one side wall only).

3.1.11 In the case of tyres which can be regrooved , symbol "U″ at least 20 mm in diameter, or the word "REGROOVABLE", moulded into or on to each sidewall.

3.1.12 Tread wear indicators mark shall be provided at minimum six/four (as applicable) places along the circumference to give indication to the user for location of tread wear indicator.

3.2 Annexure D provides layout for the tyre markings.

3.3 The markings referred to in para 3.1 and the approval mark prescribed in AIS-037 shall be moulded into or onto the tyres. They shall be clearly legible and shall, except for the marking referred in para 3.1.1 above, be located on at least one lower sidewall.

3.4 Tyre shall exhibit a free space sufficiently large to accommodate an approval mark.

3.5 Examples of tyre size designations are given in Annexure J.

4.0 APPLICATION FOR TYPE APPROVAL

4.1 The manufacturer shall submit the details as specified in Annexure M.

4.2 Number of tyre to be provided shall be minimum " 3 " numbers or at the discretion of test agency.

4.3 For Type Approval of tyre belonging to one family of tyre, brand of the tyre to be selected for type approval shall be left to test agency. Worst-case selection may be made at the discretion of the test agency.

4.4 Type approval procedure shall be as decided by Central Motor Vehicles Rules - Technical Standing Committee (CMVR-TSC) and Ministry of Road Transport and Highways (MoRT&H).

5.0 TYPE APPROVAL

5.1 If the type of pneumatic tyre submitted for approval in pursuance of this standard meets the requirements of para 3.1 above and para 6.0 below, approval of that type of tyre shall be granted. However, uniformity test mentioned at para 6.6 shall be carried out, when test facility is established by test agency

5.2 Approval number shall be as decided by CMVR-TSC and MoRT&H.

6.0 REQUIREMENTS

6.1 Dimensions of Tyres

6.1.1 Section width of a tyre

6.1.1.1 For the existing types of tyre whose size designation shall be as per the tables in Annexure A, the section width shall be deemed to be that given opposite the tyre size designation in those tables.

6.1.2 Tyre section width specifications:

6.1.2.1 The overall width of a tyre shall conform to dimensions mentioned in Annexure A

6.1.3 Tyre outer diameter

6.1.3.1 For the existing types of tyre whose size designation shall be as per the tables in Annexure A, the outer diameter shall be deemed to be that given opposite the tyre size designation in those tables.

6.1.4 Tyre outer diameter specifications:

6.1.4.1 The outer diameter of a tyre shall conform to dimensions mentioned in Annexure A

6.1.5 Tyre Measuring Method

The tyre dimensions shall be measured by the procedure as specified in Annexure E.

6.1.6 Tyre sizes covered in other International tyre standard (ECE, JATMA, ETRTO and T&RA) shall meet the dimensional requirements of respective standards. Further, if same size of tyre with different dimensions appears in more than one standard. It shall meet the dimension requirement of any one standard as per priority ITTAC, T&RA, JATMA, ECE, ETRTO.

6.2 Endurance Test

6.2.1 Each type of pneumatic tyre shall undergo at least one endurance tests carried out by the procedure described in Annexure F to this Standard.

6.2.2 A tyre which, after undergoing the endurance test, does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall be deemed to have passed the test.

6.2.3 The outer diameter of the tyre, measured six hours after the endurance test, must not differ by more than ± 3.5% from the outer diameter as measured before the test.

6.2.4 Where application is made for the approval of a type of pneumatic tyre for the load/speed combination given in the table in Annexure C, the endurance test prescribed in para 6.2.1 above need not be carried out for load and speed values other than the nominal values

6.3 Load / Speed Test

6.3.1 Each type of pneumatic tyre having

a) Load index (Max load rating) 122 or more,

b) Load index (Max load rating) 121 or less and a speed category 150 km/h and below,

shall undergo load / speed tests carried out by the procedure described in Annexure G to this Standard.

6.3.2 A tyre which, after undergoing the load / speed test, does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall be deemed to have passed the test.

6.4 Tread-wear Indicators

6.4.1 The pneumatic tyre shall include not less than six transverse rows of wear indicators, approximately equally spaced and situated in the principal grooves of the tread. The tread-wear indicators shall be such that they cannot be confused with the rubber ridges between the ribs or blocks of the tread.

6.4.2 However, in the case of tyres of dimensions appropriate for mounting on rims of a nominal diameter of 12 or less, minimum 4 no of tread-wear indicators shall be accepted.

6.4.3 The tread-wear indicators must provide a means of indicating with a tolerance of + 0.60/-0.00 mm., when the tread grooves are no longer more than 1.6 mm. deep.

6.4.4 The height of tread-wear indicators is determined by measuring the difference between the depth, from the tread's surface, to the top of the tread-wear indicator and to the bottom of the tread groove close to the slope at the base of the tread-wear indicator.

6.5 Tyre Strength Test

6.5.1 The tyre strength test (Plunger Test) shall be carried out on a tyre in accordance with the method set out in Annexure H.

6.5.2 Tyre should conform to the following requirements as mentioned below (for which load index is not shown) when tested as per Annexure H.

Tyre range and size designations	Ply rating (PR)	Plunger diameter mm.	Test inflation pressure kPa	Breaking energy (min.) J
Ultra Light Trucks				
4.50-12	6	19 ± 0.2	MSP	203
4.50-12	8	19 ± 0.2	MSP	271
Light truck				
All Sizes	6	19 ± 0.2	MSP	362
All Sizes	8	19 ± 0.2	MSP	514
All Sizes	10	19 ± 0.2	MSP	576
All Sizes	12	19 ± 0.2	MSP	644
All Sizes	14	19 ± 0.2	MSP	721
All Sizes	16	19 ± 0.2	MSP	768
Truck/Bus				
All Sizes	10	32 ± 0.3	MSP	1412
All Sizes	12	32 ± 0.3	MSP	1785
All Sizes	14	38 ± 0.3	MSP	2282
All Sizes	16	38 ± 0.3	MSP	2599
All Sizes	18	38 ± 0.3	MSP	2825
All Sizes	20	38 ± 0.3	MSP	3051
All Sizes	22	38 ± 0.3	MSP	3220
All Sizes	24	38 ± 0.3	MSP	3390

NOTES:

1. Inflate to the pressure corresponding to the maximum load, or maximum dual load where there is both single and dual load marked on the tyre.
2. For rayon tyres, the minimum requirement shall be 60 percent of the above values for the corresponding size and ply rating tested under identical conditions.
3. **MSP – Maximum schedule pressure applicable to the tyre size and ply rating.**

6.5.3 Tyre strength of Light Truck and Truck and Bus tyres (for which the load capability index is shown).

Air pressure corresponding to the maximum load capability kPa	Load capability index (single wheel) 121 max.		Load capability index (single wheel) 122 or more kgfcm (Joules)
	Nominal rim diameter under 13 kgfcm (Joules)	Nominal rim diameter 13 or more kgfcm (Joules)	
250 or less	1385 (136)	3000 (294)	-
251 to 350	2072 (203)	3690 (362)	-
351 to 450	2765 (271)	5240 (514)	-
451 to 550	-	5875 (576)	9910 (972)
551 to 650	-	6565 (644)	14400 (1412)
651 to 750	-	7260 (712)	17285 (1695)
751 to 850	-	-	21310 (2090)
851 or more	-	-	22465 (2203)

Diameter of plunger (for the tyre of which the load capability index is shown)

Light Truck, Truck and Bus Tyres		
Load capability index (single wheel)	**Load capability index (single wheel)**	**Load capability index (single wheel)**
121 or less	122 or 134	135 or more
19 mm	32 mm	38 mm

6.6 Tyre Uniformity Test

6.6.1 Each type of pneumatic tyre shall undergo tyre uniformity test carried out by the procedure described in Annexure K to this Standard.

6.6.2 This test shall be for record only.

6.7 Tyre Stiffness Test

6.7.1 Each type of pneumatic tyre shall undergo tyre stiffness test carried out by the procedure described in Annexure L to this Standard.

6.7.2 This test shall be for record only.

7.0 MODIFICATIONS AND EXTENSION OF APPROVAL OF TYRE TYPE

7.1 Every modification of the type of pneumatic tyre shall be notified to testing agency which approved the type of pneumatic tyre. The test agency may then either;

7.1.1 Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case, the pneumatic tyre still compiles with the requirements; or

7.1.2 Require a further test report from the testing agency responsible for conducting the test.

7.2 A modification of the tread pattern of the tyre shall not be considered to necessitate a repetition of the tests prescribed in para 6 of this standard.

For considering whether any further verification is required or not, guide-lines given in para 7.3 (Criteria for Extension of Approval) may be used.

7.3 Criteria for Extension of Approval

7.3.1 In case of following changes, the verification shall be carried out for establishing compliance of the changed parameters to the requirements specified in this standard:

7.3.1.1 Size designation:

7.3.1.2 If the rim diameter is within, and the section is not more than already type approved sizes, test need not be carried out for approval

7.3.1.3 Material-Fabric Style (e.g. Rayon, nylon etc.)

7.3.1.4 Tyre Construction (e.g. diagonal / bias ply, radial, reinforced, etc.)

7.3.1.5 Increase in Speed category.

7.3.1.6 Increase in Load Capacity Index/ Maximum load carrying capacity.

7.3.1.7 Colour of side wall if changed to white.

8.0 CONFORMITY OF PRODUCTION

8.1 Tyres approved under this regulation shall be so manufactured as to conform to the type approved, by meeting the requirements set forth in paras. 6.1 and 3.0, 6.2, 6.3 and 6.5 for the following tests respectively:

8.1.1 Dimensions and marking
8.1.2 Endurance Test
8.1.3 Load / Speed Test
8.1.4 Tyre Strength Test

8.2 The authority, which has granted type approval, may at any time verify the conformity control methods applied in each production facility

.

8.3 Conformity of Production Procedure shall be as decided by CMVR-TSC and MoRT&H.

9.0 PENALTIES FOR NON-CONFORMITY OF PRODUCTION

9.1 As and when decided by CMVR-TSC and MoRT&H.

10.0 PRODUCTION DEFINITELY DISCONTINUED

10.1 As and when decided by CMVR-TSC and MoRT&H.

Explanatory Figure

(Refer Para. 2.0)

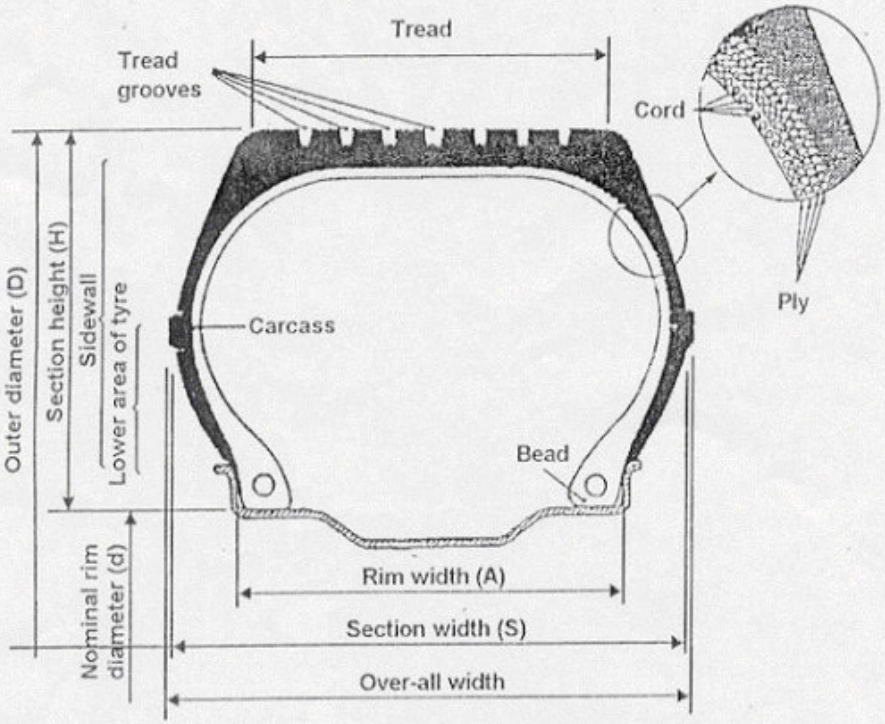


FIG.1

ANNEXURE – A
(Refer Para 6.1)
TYRES FOR TRUCKS, BUSES AND TRAILERS FOR USE IN NORMAL HIGHWAY SERVICE
(Diagonal Ply)
General Dimension Data

Tyre Size Designa-Tion	RIM Rec. Alt.	NEW TYRE- INFLATED								
		Design Section Width mm	Min. Section Width mm	Max. Overall Width Mm	Design Overall Dia. Std. mm	Design Overall Dia. Prem. Mm	Min. Overall Dia Std. mm	Min. Overall Dia Prem. mm	Max. Overall Dia Std. Mm	Max. Overall Dia Prem. mm
7.00-20	5.5	199	193	209	904	-	892	-	924	-
	5.0	194	188	204						
7.50-20	6.0	215	209	226	935	-	922	-	956	-
	5.5	210	204	221						
8.25-20	6.5	236	229	248	974	992	960	977	997	1016
	6.0	231	224	243						
9.00-20	7.0	259	251	272	1019	1038	1004	1022	1045	1065
	6.5	254	246	267						
10.00-20	7.5	278	270	292	1054	1073	1038	1056	1081	1101
	7.0	273	265	287						
11.00-20	8.0	293	284	308	1085	1104	1068	1086	1114	1134
	7.5	288	279	303						
11.00-24	8.0	293	284	308	1186	-	1169	-	1215	-
	7.5	288	279	303						
12.00-20	8.5	315	306	331	1125	1146	1106	1127	1156	1178
	8.0	310	301	326						

TYRES FOR LIGHT TRUCK COMMERCIAL VEHICLES
(Diagonal Ply)
General Dimension Data

Tyre Size Designation	RIMS	NEW TYRE- INFLATED								
	Recommended shown underlined WB SDC See NOTES 1&2	Design Section Width	Min. Section Width	Max. Overall Width	Design Overall Dia.		Min. Overall Dia.		Max. Overall Dia.	
					Std.	Prem.	Std.	Prem.	Std.	Prem.
		mm	Mm	mm	mm	Mm	mm	mm	mm	mm
6.00-16	4.50E 4.50E	166	161	174	737	748	727	738	754	765
6.50-16	4.50E 4.50E 5K	175 180	170 175	184 189	760	771	749	760	778	789
6.70-15	5K 5.50F	180 185	175 180	189 194	715	724	705	-	732	-
7.00-15	5.50F 5.50F 5K	199 194	193 188	209 204	758	769	747	758	777	788
7.00-16	5.50 F 5.50F 6.00G	199 204	193 198	209 214	784	795	773	783	803	814

TYRES FOR LIGHT TRUCK COMMERCIAL VEHICLES
(Diagonal Ply)

Tyre Size Desig-Nation	'RIMS	NEW TYRE- INFLATED								
	Recommended shown underlined WB SDC See NOTES 1&2	Design Section Width	Min. Section Width	Max. Overall Width	Design Overall Dia.		Min. Overall Dia.		Max. Overall Dia.	
					Std.	Prem.	Std.	Prem.	Std.	Prem.
		mm	mm	mm	mm	mm	mm	mm	mm	mm
7.50-16	5.50F <u>6.00G</u>	<u>211</u>	<u>205</u>	<u>222</u>	813	824	801	811	833	845
	5.50F	206	200	217						
8.25-16	<u>6.50</u>	<u>234</u>	<u>227</u>	<u>241</u>	854	863	845	854	863	872
	6.0	229	222	236						

General Dimension Data

NOTE 1:Rims: Sizes not underlined above are permitted, but one and the same tyre may not be suitable for more than two rim widths or flange profiles. Before deciding a rim size/type, the tyre manufacturer should be consulted regarding suitability of the size/type intended to be used with a Permitted Rim. SDC (Semi Drop Center) rims provide case of tyre mounting/demounting, particularly important for the high P.R. tyres.

NOTE 2: Well Base (WB) Wheels Strength: The load and inflation pressure imposed on a Rim or wheel must not exceed the rim manufacturer's recommendation. Whenever a high ply rating size is decided for original equipment or Replacement of a lower P.R. for O.E., the rim manufacturer must be consulted. To insure that the rim/wheel is of sufficient strength for the load, inflation and service intended. This applies particularly to 6.00-16, 8PR, 6.50-16 8PR, 7.00-15, 10 PR & 12 PR 7.00-16. 10 PR, 12PR & 14 PR, 7. 50-16. 10 PR, 12 PR, 14PR & 16 PR tyres on W.B. Rims.

ULTRA LIGHT TRUCK TYRES (Diagonal Ply)
General Dimension Data

Tyre Size Designation	RIM Rec. Alt.	NEW TYRE- INFLATED					
		Design Section Width mm	Min. Section Width mm	Max. Overall Width mm	Design Overall Dia. mm	Min. Overall Dia. mm	Max. Overall Dia. mm
4.50-12	3½ J	128	124	136	545	537	553
ULT	4 J	133	129	141			

ALPHA NUMERIC LIGHT TRUCK TYRES (Diagonal Ply)
General Dimension Data

Tyre Size Designation	RIM Rec.	NEW TYRE- INFLATED					
		Design Section Width mm	Min. Section Width Mm	Max. Overall Width mm	Design Overall Dia. mm	Min. Overall Dia mm	Max. Overall Dia mm
F78 – 15 LT	5.50	202	196	212	698	689	714

TYRES FOR TRUCKS, BUSES AND TRAILERS IN HIGHWAY SERVICE
Numeric sizes (Radial Ply)
General Dimension Data

Tyre Size Designation	RIM Rec.	NEW TYRE- INFLATED											
		Design Section Width Mm	Min. Section Width mm	Max. Overall Width mm	Design Overall Dia. mm			Min. Overall Dia mm			Max. Overall Dia mm		
					HW	HT	TR	HW	HT	TR	HW	HT	TR
9.00 R20	7.00	259	251	272	1019	1024	1030	1004	1009	1014	1034	1039	1046
10.00R20	7.5	278	270	292	1054	1059	1065	1038	1042	1048	1070	1076	1082
11.00R20	8.00	293	284	308	1085	1090	1096	1068	1073	1078	1102	1107	1114
12.00R20	8.5	315	306	331	1125	-	1136	1106	-	1117	1144	-	1155
11.00R22	8.00	293	284	308	1135	1141	1147	1118	1124	1129	1152	1158	1165
12.00R24	8.5	315	306	331	1226	-	1238	1208	-	1219	1244	-	1257

HW – Highway
HT - Heavy Tread
TR - Trac.

TYRES FOR LIGHT TRUCK
Numeric sizes (Radial Ply)
General Dimension Data

Tyre Size Designation	RIMS Rec. Shown underlined		NEW TYRE- INFLATED								
			Design Section Width	Min. Section Width	Max. Overall Width	Design Overall Dia.		Min. Overall Dia		Max. Overall Dia.	
						Std.	Prem.	Std.	Prem.	Std.	Prem.
	WB	SDC	mm	mm	mm	mm	Mm	mm	mm	mm	mm
7.00R15	5.50F	5.50F	202	192	216	752	760	741	749	763	771
	5K		197	187	211						
7.00R16	5.50F	5.50F	202	192	216	778	785	767	774	789	796
		6.00G	207	197	221						
7.50R16	5.50F	6.00	211	200	226	808	815	796	803	820	827
		5.50F	206	195	221						

MILLIMETRIC LIGHT TRUCK TYRES
(Radial Ply)
General Dimension Data

Tyre Size Designation	RIM Rec. Alt.	NEW TYRE- INFLATED					
		Design Section Width mm	Min. Section Width mm	Max. Overall Width mm	Design Overall Dia. mm	Min. Overall Dia. mm	Max. Overall Dia. mm
215/70 R15LT	6½J	221	214	228	683	674	692
	7J	226	219	233			
205/75 R16LT	5½J	203	197	209	714	705	723
	6J	208	202	214			
215/75 R15 LT	6J	216	210	222	703	693	713
	6½J	221	215	227			
225/75 R15 LT	6J	223	216	230	719	709	729
	6½J	228	221	235			
195/80 R15 LT	5½J	196	190	202	693	684	702
	6J	201	195	207			
215/80 R14 LT	6J	216	210	222	700	690	710
	6½J	221	215	227			
185/85 R16 LT	5J	184	178	190	720	711	729
	5½J	189	183	195			

METRIC SIZE DESIGNATED LIGHT TRUCK TYRES
(Radial Ply)
General Dimension Data

Tyre Size Designation	RIM Rec. Alt.	NEW TYRE- INFLATED					
		Design Section Width mm	Min. Section Width mm	Max. Overall Width mm	Design Overall Dia. mm	Min. Overall Dia. Mm	Max. Overall Dia. mm
155 R13 LT	4½J	157	152	165	582	574	590
	5J	162	157	170			
175 R14LT	5J	178	173	187	638	630	646
	5½J	183	178	192			
185 R14 LT	5½J	188	182	197	653	643	662
	6J	193	187	202			
215 R14 LT	6J	216	210	227	704	694	715
	6½J	221	215	232			

ANNEXURE B
(Refer Para 2.27)
LIST OF SYMBOLS OF LOAD-CAPACITY INDICES

Load-capacity index	Corresponding maximum mass to be carried (kg)
60	250
61	257
62	265
63	272
64	280
65	290
66	300
67	307
68	315
69	325
70	335
71	345
72	355
73	365
74	375
75	387
76	400
77	412
78	425
79	437
80	450
81	462
82	475
83	487
84	500
85	515
86	530
87	545
88	560
89	580
90	600
91	615
92	630
93	650
94	670
95	690
96	710
97	730
98	750
99	775

Load-capacity index	Corresponding maximum mass to be carried (kg)
100	800
101	825
102	850
103	875
104	900
105	925
106	950
107	975
108	1000
109	1030
110	1060
111	1090
112	1120
113	1150
114	1180
115	1215
116	1250
117	1285
118	1320
119	1360
120	1400
121	1450
122	1500
123	1550
124	1600
125	1650
126	1700
127	1750
128	1800
129	1850
130	1900
131	1950
132	2000
133	2060
134	2120
135	2180
136	2240
137	2300
138	2360
139	2430

Load-capacity index	Corresponding maximum mass to be carried (kg)
140	2500
141	2575
142	2650
143	2725
144	2800
145	2900
146	3000
147	3075
148	3150
149	3250
150	3350
151	3450
152	3550
153	3650
154	3750
155	3875
156	4000
157	4125
158	4250
159	4375
160	4500
161	4625
162	4750
163	4875
164	5000
165	5150
166	5300
167	5450
168	5600
169	5800
170	6000
171	6150
172	6300
173	6500
174	6700
175	6900
176	7100
177	7300
178	7500
179	7750

Load-capacity index	Corresponding maximum mass to be carried (kg)
180	8000
181	8250
182	8500
183	8750
184	9000
185	9250
186	9500
187	9750
188	10000
189	10300
190	10600
191	10900
192	11200
193	11500
194	11800
195	12150
196	12500
197	12850
198	13200
199	13600
200	14000

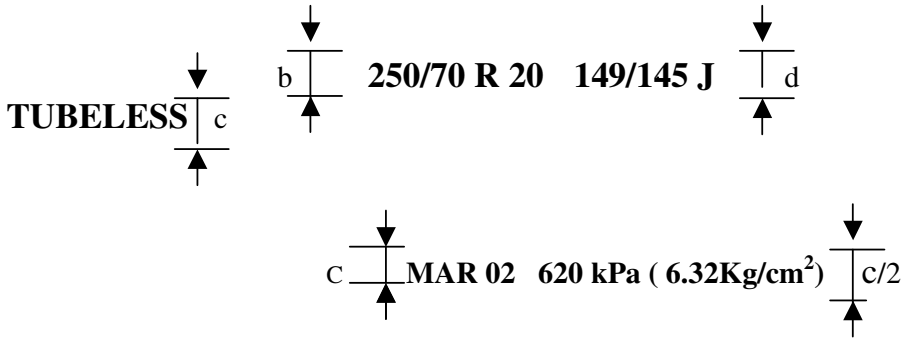
ANNEXURE C
(Refer Paras 2.27, 2.29 & 6.2.4)
VARIATION OF LOAD CAPACITY WITH SPEED
COMMERCIAL VEHICLES TYRES – RADIAL AND DIAGONAL

Speed (km/h)	Variation of load capacity (%)									
	All load indices				Load indices ≥ 122 (1)		Load indices ≤ 121 (1)			
	Speed category symbol				Speed category symbol		Speed category symbol			
	F	G	J	K	L	M	L	M	N	P (2)
0	+150	+150	+150	+150	+150	+150	+110	+110	+110	+110
5	+110	+110	+110	+110	+110	+110	+90	+90	+90	+90
10	+80	+80	+80	+80	+80	+80	+75	+75	+75	+75
15	+65	+65	+65	+65	+65	+65	+60	+60	+60	+60
20	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50
25	+35	+35	+35	+35	+35	+35	+42	+42	+42	+42
30	+25	+25	+25	+25	+25	+25	+35	+35	+35	+35
35	+19	+19	+19	+19	+19	+19	+29	+29	+29	+29
40	+15	+15	+15	+15	+15	+15	+25	+25	+25	+25
45	+13	+13	+13	+13	+13	+13	+22	+22	+22	+22
50	+12	+12	+12	+12	+12	+12	+20	+20	+20	+20
55	+11	+11	+11	+11	+11	+11	+17.5	+17.5	+17.5	+17.5
60	+10	+10	+10	+10	+10	+10	+15.0	+15.0	+15.0	+15.0
65	+7.5	+8.5	+8.5	+8.5	+8.5	+8.5	+13.5	+13.5	+13.5	+13.5
70	+5.0	+7.0	+7.0	+7.0	+7.0	+7.0	+12.5	+12.5	+12.5	+12.5
75	+2.5	+5.5	+5.5	+5.5	+5.5	+5.5	+11.0	+11.0	+11.0	+11.0
80	0	+4.0	+4.0	+4.0	+4.0	+4.0	+10.0	+10.0	+10.0	+10.0
85		+2.0	+3.0	+3.0	+3.0	+3.0	+8.5	+8.5	+8.5	+8.5
90		0	+2.0	+2.0	+2.0	+2.0	+7.5	+7.5	+7.5	+7.5
95			+1.0	+1.0	+1.0	+1.0	+6.5	+6.5	+6.5	+6.5
100			0	0	0	0	+5.0	+5.0	+5.0	+5.0
105				0	0	0	+3.75	+3.75	+3.75	+3.75
110				0	0	0	+2.5	+2.5	+2.5	+2.5
115					0	0	+1.25	+1.25	+1.25	+1.25
120					0	0	0	0	0	0
125						0		0	0	0
130						0		0	0	0
135									0	0
140									0	0
145										0
150										0
155										
160										

(1) The load capacity indices refer to a single operation.

(2) Load variations are not allowed for speeds above 160 km/h. For speed category symbols "Q" and above the speed category corresponding to the speed category symbol (See para 2.28.2) specifies the maximum speed permitted for the tyre.

ANNEXURE D
(Refer Para. 2.17 & 3.2)
ARRANGEMENT OF TYRE MARKINGS



	MINIMUM HEIGHTS OF MARKINGS (mm)	
	Tyres of rim diameter < 20" or <514.4 mm or of section width ≤ 235 mm or ≤ 9"	**Tyres of rim diameter ≥ 20" or ≥ 514.4 mm or of section width >235 mm or >9"**
b	6	9
c	4	
d	6	

- **These markings define a pneumatic tyre:**
- Having a nominal section width of 250;
- Having a nominal aspect ratio of 70;
- Of radial-ply structure (R);
- Having a nominal rim diameter of 514.4mm, for which the symbol is 20;
- Having load capacities of 3250 kg when single and 2900 kg when twinned (dual), corresponding respectively to the load indices 149 and 145 shown in Annexure B to this Standard;
- Classified in the nominal speed Category J (reference speed 100 km/h);
- Capable of being fitted without an inner tube ("TUBELESS");
- Manufactured during the month MARCH of year 2002;
- Max pressure of 620 kPa or 6.2 bar or 6.32 kg/cm^2.

Note: Arrangement of tyre marking relates to the tyre size designation. Other markings location will be left to the discretion of the tyre manufacturer.

ANNEXURE E
(Refer Para. 6.1.5)
METHOD OF MEASURING PNEUMATIC TYRES

E.1.0 The tyre is mounted on the measuring rim specified by the manufacturer pursuant to para.4.1 of this standard. and is inflated to a pressure specified by the manufacturer pursuant to Para.4.1 of this standard.

E.2.0 The tyre fitted on its rim is conditioned to the ambient temperature of the laboratory for at least 24 hours.

E.3.0 The pressure is readjusted to the value specified in Para.1 above.

E.4.0 The overall width is measured by caliper at six equally-spaced points, account being taken of the thickness of the protective ribs or bands. The highest measurement so obtained is taken as the overall width.

E.5.0 The outer diameter is calculated from the maximum circumference.

ANNEXURE F
(Refer Para. 6.2.1)
PROCEDURE FOR ENDURANCE TEST

F.1.0 PREPARING THE TYRE

F.1.1 Mount a new tyre on the test rim specified by the manufacturer pursuant to para.4.1 of this standard.

F.1.2 Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.

F.1.3 Inflate the tyre to the pressure corresponding to the pressure specified by the manufacturer.

F.1.4 Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.

F.1.5 Readjust the tyre pressure to that specified in para.F.1.3

F.2.0 TEST PROCEDURE

F 2.1 Mount the tyre-and wheel assembly on the test axle and press it against the outer face of a smooth power-driven test drum 1.70 ± 1% in diameter having a surface at least as wide as the tyre tread.

F.2.2 Apply to the test axle a series of test loads expressed in percent of the load indicated, in Annexure B to this Regulation, opposite the load index or max load engraved on the sidewall of the tyre, in accordance with the test programme below. Where the tyre has load-capacity indices for both single and twinned utilisation, the reference load for single utilisation shall be taken as the basis for the test loads.

F.2.2.1 In the case of a tyre with a load capacity index 121 or less and a speed category above P, test procedures are as specified in para. F.3.0.

F.2.2.2 For all other tyre types, the endurance test programme is shown in Appendix 1 to this annexure.

F.2.2.3 The tyre pressure must not be corrected throughout the test and the test load must be kept constant throughout each of the three test stages.

F.2.3 During the test the temperature in the test-room must be maintained at between 20 °C and 40 °C or at a higher temperature if the manufacturer so agrees.

F.2.4 The endurance-test programme shall be carried out without interruption.

F.3.0 LOAD/SPEED TEST PROGRAMME FOR TYRE WITH A LOAD CAPACITY INDEX 121 OR LESS AND A SPEED CATEGORY Q AND ABOVE.

F.3.1 Load placed on the wheel as a percentage of the load corresponding to the load index:

F.3.1.1 90% when tested on a test drum 1.70 m ± 1% in diameter;

F.3.1.2 92% when tested on a test drum 2.0 m ± 1%in diameter.

F.3.2 Initial test speed: speed corresponding to the speed category symbol less 20km/h;

F.3.2.1 Time to reach the initial test speed 10 min.

F.3.2.2 Duration of the first step = 10 min

F.3.3 Second test speed: speed corresponding to the speed category symbol less 10 km/h;

F.3.3.1 Duration of the second step = 10 min.

F.3.4 Final test speed: speed corresponding to the speed category symbol:

F.3.4.1 Duration of the final step = 30 min.

F.3.5 Total test duration: 1 H

APPENDIX – 1 TO ANNEXURE F
ENDURANCE TEST PROGRAMME

Load index	Tyre speed category	Test-drum speed		Load placed on the wheel as a percentage of the load corresponding to the load index		
		Radial-ply min $^{-1}$	Diagonal (bias-ply) min $^{-1}$	7 h.	16 h.	24 h.
122 or more	F	100	100	66%	84%	101%
	G	125	100			
	J	150	125			
	K	175	150			
	L	200	-			
	M	225	-			
121 or less	F	100	100			
	G	125	125			
	J	150	150			
	K	175	175			
	L	200	175	70%	88%	106%
				4h.	6 h.	24h
	M	250	200	75%	97%	114%
	N	275	-	75%	97%	114%
	P	300	-	75%	97%	114%

Notes: (1) "Special-use" tyres (see para 2.1.3 of the Standard) should be tested at a speed equal to 85% of the speed prescribed for equivalent normal tyres.

(2) Tyres with a Load Index of 122 or more of speed categories above M are not yet produced. Approval cannot be granted to them under this Standard.

ANNEXURE G
(Refer Para. 6.3.1)
LOAD / SPEED TEST

G.1.0 PREPARING THE TYRE

G.1.1 Mount a new tyre on the test rim specified by the manufacturer pursuant to Para.4.1 of this standard.

G.1.2 Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.

G.1.3 Inflate the tyre to the pressure corresponding to the pressure specified by the manufacturer.

G.1.4 Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.

G.1.5 Read just the tyre pressure to that specified in para.G.1.3 above.

G.2.0 TEST PROCEDURE

G.2.1 Load placed on the wheel as a percentage of the load corresponding to the load index:

G.2.1.1 90% when tested on a test drum 1.70 m ± 1% in diameter;

G.2.1.2 92% when tested on a test drum 2.0 m ± 1%in diameter.

G.2.2 Initial test speed: speed corresponding to the speed category symbol less 20km/h;

G.2.2.1 Time to reach the initial test speed 10 min.

G.2.2.2 Duration of the first step = 10 min

G.2.3 Second test speed: speed corresponding to the speed category symbols less by 10 km/hr;

G.2.3.1 Duration of the second step = 20 min.

G.2.4 Final test speed: speed corresponding to the speed category symbol (Reference speed).

G.2.4.1 Duration of the final step = 20 min.

G.2.5 Total test duration: 1 H

ANNEXURE H
(Refer Para. 6.5)
TYRE STRENGTH TEST (PLUNGER TEST)

H.1.0 APPARATUS

The equipment consists of a cylindrical steel plunger, having a hemispherical end of a diameter specified in the paras. 6.5.2 & 6.5.3 for type of tyre and a device to force the plunger rod into a tyre at the rate of 50 ± 1.5 mm per minute.

H.1.1 PREPARATION OF TYRE FOR THE TEST

The tyre with a tube shall be mounted and inflated on a test rim of the recommended size and shall be conditioned at approximately the temperature of the room in which the test is to be conducted, for at least 3 hours after which the pressure shall be adjusted, if necessary, to the test inflation pressure specified in paras. 6.5.2 & 6.5.3.

H.1.2 TEST PROCEDURE

The plunger rod shall be forced into the tread of the tyre/wheel assembly mounted as described in para. H.1.1. Perpendicularly over a tread element at the centerline of the tread, or as near as possible to avoiding penetration into a tread groove. The rate of travel of the plunger; shall be 50 ± 1.5 mm per minute until the tyre breaks or the plunger is stopped by the rim (bottoming of the plunger against the rim), in which case the tyre shall be deemed to have passed the test regardless of energy value. Measurement of force and penetration at break (or bottoming against the rim) shall be made at 5 points nearly equally spaced around the tyre circumference. The arithmetic mean energy absorbed shall be calculated from the five energy values obtained at the break, using the formula given in Para. H.1.3.

H.1.3 Formula for calculating the breaking energy:

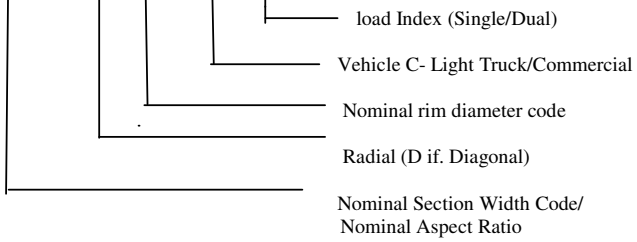
$$W = \frac{F \times P}{2} \times 10^{-3}$$

Where;
W = Energy at break (or bottoming) in J (Joule)
F = Force at break (or bottoming) in N; and
P = Penetration at break (or bottoming) in mm.

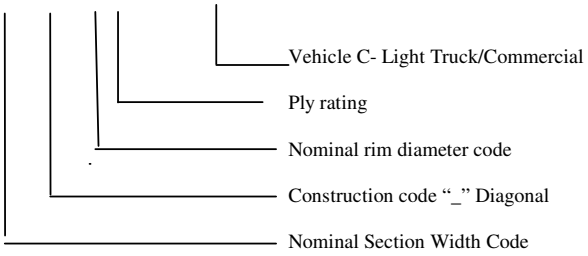
H.1.4 As an option, for purpose of conformity, if the plunger energy measurements meet or exceed the minimum value specified, it is not necessary to continue penetration of the plunger to break the tyre.

ANNEXURE J
(Refer Para. 3.5)
EXAMPLES OF TYRE SIZE DESIGNATIONS

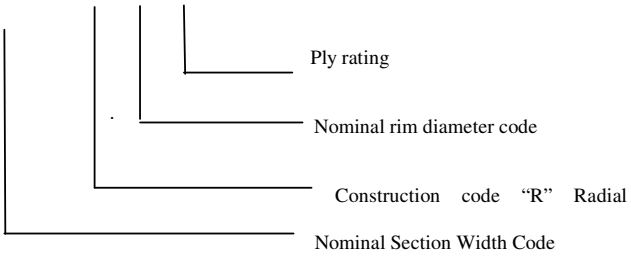
MILLIMETRIC SERIES (RADIAL) — **205 / 80 R 15 LT/C 108/104 J** - Speed symbol



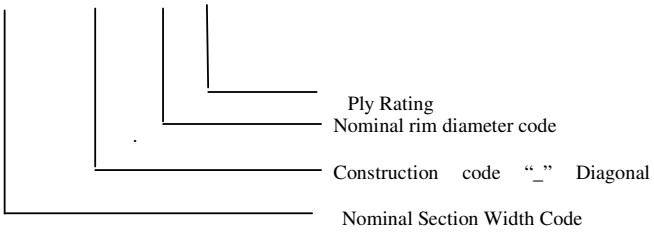
NUMERIC (BIAS) — **7.50 _ 16 14PR LT/C**



NUMERIC (RADIAL) — **10.00 R 20 14PR**



NUMERIC (BIAS) — **14.00 _ 20 16PR**



ANNEXURE K
(Refer Para. 6.6.1)
TYRE UNIFORMITY TEST

K.1.0 PREPARING THE TYRE

K 1.1 Mount a new tyre on the test rim specified by the manufacturer pursuant to para.4.1 of this standard.

K.1.2 Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.

K.1.3 Inflate the tyre to the pressure corresponding to the pressure specified by the manufacturer.

K.1.4 Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.

K.2.0 TEST PROCEDURE

K.2.1 Apply a load of 85% of rated load (for rim up to 14 inch) and 88% of rated Load (for rim above 15 inch) to the tyre and warm up the tyre for two minutes at 300-400 rpm of tyre rotating speed.

K2.2 Outer diameter of test drum shall be 854.1 ± 2.5 mm for rim diameter up to 14 inches and 1600.2 ± 2.5 mm for rim diameter above 15 or more and drum surface shall have High friction coarse textured surface

K.2.2 Adjust the inflation pressure and rotating speed of tyre to 60 rpm.

K.2.3 The distance between the axis of the tyre and the axis of the drum shall be held constant.

K.2.4 Rotate the tyre at 60 rpm and measure the components and variations of the following generated force with indicators and recorders

Radial force variation
Lateral force variation
Tractive force variation
Conicity and Ply steer

If necessary, repeat the measurements after reversing the tyre on the machine, or reversing the direction of the rotation.

ANNEXURE L
(Refer Para. 6.7.1)
TYRE STIFFNESS TEST

L.1.0 PREPARING THE TYRE

L 1.1 Mount a new tyre on the test rim specified by the manufacturer pursuant to para.4.1 of this standard.

L.1.2 Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.

L.1.3 Inflate the tyre to the pressure corresponding to the pressure specified by the manufacturer.

L.1.4 Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.

L.2.0 TEST PROCEDURE

L.2.1 Radial Stiffness:

L2.1.1 Radial load shall be applied equal to its maximum load capacity. Stiffness shall be reported for the load (difference between 80% and 20% of rated load) divided by corresponding deflection in mm.

L 2.2 Lateral Stiffness:

L2.2.1 Radial load shall be applied equal to its maximum load or load Index.

L.2.2.2 Tyre or the surface on which radial load is applied shall be pulled laterally at a speed of 50mm./min. by maintaining constant radial load.

L.2.2.3 Load required to pull tyre/surface shall be monitored and slip is recorded when there is reduction in lateral pull load.

L.2.2.4 Stiffness shall be reported for the load (between 80% & 20% of maximum lateral load) divided by corresponding displacement in mm (Surface finish of surface on which radial load is applied shall be reported in test report).

L2.3 Tangential Stiffness:

L2.3.1 Radial load shall be applied equal to its maximum load or load Index

L.2.3.2 Tyre or the surface on which radial load is applied shall be pulled in the direction of rotation of tyre at a speed of 50mm/min by maintaining constant radial load.

L.2.3.3 Load required to pull tyre/surface shall be monitored and slip is recorded when there is reduction in tangential pull load.

L.2.3.4 Stiffness shall be reported for the load (between 80% & 20% of maximum lateral load) divided by corresponding displacement in mm. (surface finish of surface on which radial load is applied shall be reported in test report).

ANNEXURE M
(Refer Para 4.1)
TECHNICAL SPECIFICATION TO BE SUBMITTED BY MANUFACTURER

M.1 Tyre make (trade name), brand name and type

M.2 Manufacturers name and address

M.3 Tyre-size designation as defined in para 2.17 of this standard

M.4 The category of use (normal or special or snow);

M.5 The Structure: diagonal (bias ply) or radial;

M.6 The speed category;

M.7 The load-capacity index or Max Permissible load;

M.8 Whether the tyre is intended to be used with or without an inner tube;

M.9 Normal or Reinforced

M.10 Ply-Rating

M.11 The overall dimensions: overall section width and outer diameter;

M.12 The rims on which the tyre can be mounted;

M.13 The measuring rim and test rim;

M.14 The measuring pressure and test pressure;

M.15 Number and height of tread wear indicators

M.16 Drawing or photographs of sidewall showing marking.

M.17 Drawing or photographs of tread, which can identify tread pattern

M.18 Dimensional drawing of tyre cross-section.

ANNEXURE N
(See Introduction)
COMMITTEE COMPOSITION
Automotive Industry Standards Committee

Chairman	
Shri B. Bhanot	Director The Automotive Research Association of India, Pune
Members	**Representing**
Shri Alok Rawat	Ministry of Road Transport & Highways, New Delhi
Shri Sushil Kumar	Department of Heavy Industry, Ministry of Heavy Industries & Public Enterprises, New Delhi
Director	Office of the Development Commissioner Small Scale Industries, Ministry of Small Scale Industries, New Delhi
Shri L. R. Singh	Bureau of Indian Standards, New Delhi
Shri A. S. Lakra Shri D. G. Shirke (Alternate)	Central Institute of Road Transport, Pune
Director	Indian Institute of Petroleum, Dehra Dun
Shri R.C. Sethi Shri N. Karuppaiah (Alternate)	Vehicles Research & Development Establishment, Ahmednagar
Shri Rajat Nandi	Society of Indian Automobile Manufacturers
Shri T.C. Gopalan Shri Ramakant Garg (Alternate)	Tractor Manufacturers Association, New Delhi
Shri K.N.D. Nambudiripad	Automotive Components Manufacturers Association, New Delhi
Shri G. P. Banerji	Automotive Components Manufacturers Association, New Delhi

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The Automotive Research Association of India, Pune