TED 07 (25810) W
JUNE 2024

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भारतीय मानक प्रारूप

स्वचल वाहन- कृषि वाहनों एवं उनके ट्रेलरों के लिए टायर -

विशिष्टि

(दूसरा पुनरीक्षण)

Draft Indian Standard

Automotive Vehicles — Tyres For Agricultural Vehicles And Their Trailers — Specification

(Second Revision)

ICS: 83.160.10

Last date for receipt of comments is 5.7.2024

Automotive Tyres, Tubes and Rims Sectional Committee, TED 7

FOREWORD

(**Formal clause will be added later**)

This standard was first published in 1991. The first revision was done in 2015 to brought out this standard in line with the technological advancements in the field and current practices prevalent in industry and to include the latest sizes of tyres which have been introduced after the publication of the standard.

Tyre is one of the important components of any vehicle. It is the only component which connects the vehicle with ground. Therefore, it becomes imperative to choose proper tyre for agricultural vehicles and their trailer.

This revision is being taken to bring up the relevant changes in line with ECE R106 and ITTAC Standard Manual.

In this standard SI units have been used, the unit of tyre load in kilogram (kg) and of pressure in kilopascal (kPa). Their relationships are given below for information:

1 kPa = 0.01 kgf/cm^2 (within 2 percent error)
1 kgf/cm^2 = 98.066 kPa.

NOTE — Values of kPa shall be rounded to the nearest practical unit.

In the formulation of this standard, considerable assistance has been derived from the following publications:

ECE Regulation No.106	Uniform provisions concerning the approval of pneumatic tyres for agricultural vehicles and their trailers; and
ITTAC	Standards Manual

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (second revision)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

AUTOMOTIVE VEHICLES — TYRES FOR AGRICULTURAL VEHICLES AND THEIR TRAILERS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard specifies the dimensions, performance and general requirements of the new pneumatic tyres designed primarily, but not only, for agricultural and forestry vehicles (power-driven vehicles in Category A as defined in IS 14272, agricultural machines (power-driven and trailed) and agricultural trailers, and identified by speed category symbols corresponding to speeds of 65 km/h (Speed Symbol 'D') and below.

1.2 This standard does not apply to tyre types designated primarily for other purposes, such as:

a) Construction application;
b) Earth-moving equipment; and
c) Industrial and lift trucks.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS/Other Standard No.	*Title*
IS 14272: 2011	Automotive vehicles — Types — Terminology
ISO 4251- 1: 2019	Code designated diagonal tyres (ply rating marked series) for agricultural tractors, trailers and machines: Part 1- Tyre designation and dimensions, and approved rim contours
ISO 4251- 2: 2019	Code designated diagonal tyres (ply rating marked series) for agricultural tractors, trailers and machines: Part 2- Tyre load ratings

3 TERMS, DEFINITIONS AND NOMENCLATURE

For the purpose of this standard, the following terms, definitions and nomenclature shall apply.

3.1 Type of Agriculture Type — A category of tyres which do not differ in such essential respects as:

a) The manufacturer;
b) Tyre size designation;
c) Category of use:
    1) Tractor — Steering wheel;
    2) Tractor — Drive wheel — Regular tread;
    3) Tractor — Drive wheel — Special tread;
    4) Implement — Traction;
    5) Implement — Trailer; and
    6) Implement — Mixed applications.
d) Structure (Diagonal ply, Radial ply);
e) Speed symbol;
f) Load index; and
g) Tyre cross-section

3.2 Structure of a Tyre — The technical characteristics of the tyre carcass. The following structures are distinguished in particular:

a) *Diagonal Ply* — A tyre structure in which the ply cords extend to the bead and are laid at alternate angles of substantially less than 90° to the centreline of the tread.

b) *Radial Ply* — A tyre structure in which the ply cords extend to the beads and are laid substantially at 90° to the centreline of the tread, the carcass being stabilized by an essentially inextensible circumferential belt.

3.3 Bead — The part of a tyre which is of such shape and structure as to fit the rim and hold the tyre on it.

3.4 Cord — The strands forming the fabric of the plies in the tyre.

3.5 Ply — A layer of rubber-coated parallel cords.

3.6 Carcass — That part of a tyre other than the tread and the rubber sidewalls which, when inflated, bears the load.

3.7 Tread — That part of a tyre which comes into contact with the ground.

3.8 Sidewall — The part of the tyre, excluding the tread, which is visible when the tyre, fitted to a rim, is viewed from the side.

3.9 Section Width (S) — The linear distance between the outsides of the sidewalls of an inflated tyre, excluding elevations due to labelling (marking), decoration or protective bands or ribs (*see* Fig. 1).

3.10 Overall Width — The linear distance between the outside of the sidewalls of an inflated tyre, including labelling (marking), decoration and protective bands or ribs (*see* Fig. 1).

3.11 Section Height (h) — A distance equal to half the difference between the outer diameter of the tyre and the nominal rim diameter (*see* Fig. 1).

3.12 Nominal Aspect Ratio (Ra) — One hundred times the number obtained by dividing the number expressing the nominal section height in millimetres by the number expressing the nominal section width in millimetres.

3.13 Outer Diameter (D) — The overall diameter of an inflated new tyre.

3.14 Tyre — Size Designation — A designation showing:

a) The nominal section width (S_1), expressed in mm.
b) The nominal aspect ratio (R_a).
c) An indication of the structure, placed in front of the nominal rim diameter marking, as follows:

1) On diagonal (bias-ply) tyres: The symbol '–' or the letter 'D';
2) On radial-ply tyres: the letter 'R';
3) The conventional number '*d*' denoting the nominal rim diameter;
4) Optionally, the letters 'IMP' after the nominal rim diameter marking in case of implement tyres.
5) Optionally, the letters 'FRONT' after the nominal rim diameter marking in case of Tractor steering wheel tyres.

NOTE — For tyres listed in Annex B, the 'tyre size designation' is that shown in col 2 of Table 12 to Table 19.

3.15 Nominal Rim Diameter (d) — A conventional number denoting the nominal diameter of the rim on which a tyre is designed to be mounted corresponding to the diameter of the rim expressed by size codes (number below 100 — *see* Table 1 for equivalence with millimetres).

3.16 Rim — The support for a tyre and tube assembly, or for a tubeless tyre, on which the tyre beads are seated.

3.17 Theoretical Rim — The notional rim whose width would be equal to X times the nominal section width of a tyre; the value 'X' shall be specified by the tyre manufacturer.

3.18 Measuring Rim — The rim on which a tyre is fitted for the measurement of the dimensions.

3.19 Tractor drive Wheel Tyre — A tyre designed to be fitted to driven axles of agricultural tractors (vehicles in categories A) suitable for sustained high torque service. The tread pattern of the tyre consists of lugs or cleats.

3.20 Tractor Steering Wheel Tyre

a) Tractor Steering Wheel Tyre-Two Wheel Drive — A tyre designed to be fitted to non-driven axles of agricultural and forestry tractors (motor vehicles in category A as defined in IS 14272). The tread pattern of the tyre generally consists of circumferential grooves and ribs.

b) Tractor Steering Wheel Tyre- Four Wheel Drive — A tyre designed to be fitted to driven axles of agricultural tractors (vehicles in categories A) suitable for sustained high torque service. The tread pattern of the tyre consists of lugs or cleats.

3.21 Implement Tyre — A tyre mainly designed for agricultural machines or implements or for agricultural trailers. It may also equip either front steering wheels or drive wheels of agricultural tractors. It is not suitable for sustained high torque applications

3.22 Traction Tyre — A tyre designed primarily for agricultural machines or implements or for agricultural the equipment of driven axles of implements or agricultural machinery, excluding sustained high torque services. The tread pattern of the tyre generally consists of lugs or cleats. The type of application is identified with the symbol:

Table 1 Nominal Rim Diameter Codes
(*Clause* 3.15)

Sl No.	Nominal Rim Code 'd'	'Diameter Value of d' mm	Sl No.	Nominal Rim Code 'd'	Diameter Value of d' mm	Sl No.	Nominal Rim Code 'd'	Diameter Value of d' mm
(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
i)	4	102	xvi)	1 6	406	xxxi)	2 6	660
ii)	5	127	xvii)	16.1	409	xxxii)	26.5	673
iii)	6	152	xviii)	16.5	419	xxxiii)	2 8	711
iv)	7	178	xix)	1 7	432	xxxiv)	28.5	724
v)	8	203	xx)	17.5	445	xxxv)	3 0	762
vi)	9	229	xxi)	1 8	457	xxxvi)	30.5	775
vii)	1 0	254	xxii)	1 9	483	xxxvii)	3 2	813
viii)	1 1	279	xxiii)	19.5	495	xxxviii)	3 4	864

ix)	1 2	305	xxiv)	2 0	508	xxxix)	3 6	914
x)	1 3	330	xxv)	20.5	521	xl)	3 8	965
xi)	1 4	356	xxvi)	2 1	533	xli)	4 0	1 016
xii)	14.5	368	xxvii)	2 2	559	xlii)	4 2	1 067
xiii)	1 5	381	xxviii)	22.5	572	xliii)	4 4	1 118
xiv)	15.3	389	xxix)	2 4	610			
xv)	15.5	394	xxx)	24.5	622			

3.23 Trailer Tyre — A tyre designed for the equipment of non-driven (trailed) axles of implements, agricultural machinery or trailers. The type of application is identified with the symbol:

3.24 Mixed Application Tyre — A tyre designed to be fitted to either driven and non-driven axles of implements, agricultural machinery or trailers.

3.25 Service Description — The association of a load index with a speed symbol.

NOTE — In case of implement tyres the service description is supplemented with the relevant symbol for the type of application concerned (traction or trailer) as defined in **3.23** and **3.24.**

3.26 Supplementary Service Description — An additional service description, marked within a circle, to identify a special type of service (load rating and speed symbol) to which the tyre type is also allowed in addition to the applicable load variation with speed.

3.27 Load Index — A number which indicates the load the tyre can carry in single formation at the speed corresponding to the associated speed symbol and when operated in conformity with the requirements governing utilization specified by the manufacturer. The list of these indices and their corresponding loads is given in Table 2.

Table 2 Load Indices
(*Clause* 3.27)

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
(1)	**(2)**	**(3)**	xii)	11	61.5
i)	0	45	xiii)	12	63
ii)	1	46.2	xiv)	13	65
iii)	2	47.5	xv)	14	67
iv)	3	48.7	xvi)	15	69
v)	4	50	xvii)	16	71
vi)	5	51.5	xviii)	17	73
vii)	6	53	xix)	18	75
viii)	7	54.5	xx)	19	77.5
ix)	8	56	xxi)	20	80
x)	9	58	xxii)	21	82.5
xi)	10	60	xxiii)	22	85

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
xxiv)	23	87.5	lxvi)	65	290
xxv)	24	90	xvii)	66	300
xxvi)	25	92.5	xviii)	67	307
xvii)	26	95	lxix)	68	315
xviii)	27	97.5	lxx)	69	325
xxix)	28	100	lxxi)	70	335
xxx)	29	103	xxii)	71	345
xxxi)	30	106	xxiii)	72	355
xxii)	31	109	xxiv)	73	365
xxiii)	32	112	lxxv)	74	375
xxiv)	33	115	xxvi)	75	387
xxv)	34	118	xvii)	76	400
xxvi)	35	121	xviii)	77	412
xvii)	36	125	xxix)	78	425
xviii)	37	128	lxxx)	79	437
xxix)	38	132	xxxi)	80	450
xl)	39	136	xxii)	81	462
xli)	40	140	xxiii)	82	475
xlii)	41	145	xxiv)	83	487
xliii)	42	150	xxv)	84	500
xliv)	43	155	xxvi)	85	515
xlv)	44	160	xvii)	86	530
xlvi)	45	165	xviii)	87	545
xlvii)	46	170	xxix)	88	560
lviii)	47	175	xc)	89	580
xlix)	48	180	xci)	90	600
l)	49	185	xcii)	91	615
li)	50	190	xciii)	92	630
lii)	51	195	xciv)	93	650
liii)	52	200	xcv)	94	670
liv)	53	206	xcvi)	95	690
lv)	54	212	xcvii)	96	710
lvi)	55	218	xcviii)	97	730
lvii)	56	224	xcix)	98	750
lviii)	57	230	c)	99	775
lix)	58	236	ci)	100	800
lx)	59	243	cii)	101	825
lxi)	60	250	ciii)	102	850
lxii)	61	257	civ)	103	875
lxiii)	62	265	cv)	104	900
lxiv)	63	272	cvi)	105	925
lxv)	64	280	cvii)	106	950

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
cviii)	107	975	cl)	149	3250
cix)	108	1000	cli)	150	3350
cx)	109	1030	clii)	151	3450
cxi)	110	1060	cliii)	152	3550
cxii)	111	1090	cliv)	153	3650
cxiii)	112	1120	clv)	154	3750
cxiv)	113	1150	clvi)	155	3875
cxv)	114	1180	clvii)	156	4000
cxvi)	115	1215	lviii)	157	4125
cxvii)	116	1250	clix)	158	4250
xviii)	117	1285	clx)	159	4375
cxix)	118	1320	clxi)	160	4500
cxx)	119	1360	clxii)	161	4625
cxxi)	120	1400	lxiii)	162	4750
cxxii)	121	1450	clxiv)	163	4875
xxiii)	122	1500	clxv)	164	5000
xxiv)	123	1550	clxvi)	165	5150
cxxv)	124	1600	lxvii)	166	5300
xxvi)	125	1650	xviii)	167	5450
cxvii)	126	1700	clxix)	168	5600
xviii)	127	1750	clxx)	169	5800
xxix)	128	1 800	clxxi)	170	6000
cxxx)	129	1 850	lxxii)	171	6150
xxxi)	130	1 900	xxiii)	172	6300
cxxii)	131	1 950	xxiv)	173	6500
xxiii)	132	2000	lxxv)	174	6700
xxiv)	133	2060	xxvi)	175	6900
cxxv)	134	2120	cxvii)	176	7100
xxvi)	135	2180	xviii)	177	7300
cxvii)	136	2240	xxix)	178	7500
xviii)	137	2300	lxxx)	179	7750
xxix)	138	2360	xxxi)	180	8000
cxl)	139	2430	cxxii)	181	8250
cxli)	140	2500	xxiii)	182	8500
cxlii)	141	2575	xxiv)	183	8750
xliii)	142	2650	xxxv)	184	9000
cxliv)	143	2725	xxvi)	185	9250
cxlv)	144	2800	cxvii)	186	9500
cxlvi)	145	2900	xviii)	187	9750
xlvii)	146	3000	xxix)	188	10000
lviii)	147	3075	cxc)	189	10300
cxlix)	148	3150	cxci)	190	10600

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
cxcii)	191	10900	xxiv)	233	36500
xciii)	192	11200	cxxv)	234	37500
xciv)	193	11500	xxvi)	235	38750
cxcv)	194	11800	cxvii)	236	40000
xcvi)	195	12150	xviii)	237	41250
cvii)	196	12500	xxix)	238	42500
cviii)	197	12850	ccxl)	239	43750
xcix)	198	13200	cxli)	240	45000
cc)	199	13600	cxlii)	241	46250
cci)	200	14000	xliii)	242	47500
ccii)	201	14500	xliv)	243	48750
cciii)	202	15000	cxlv)	244	50000
cciv)	203	15500	xlvi)	245	51500
ccv)	204	16000	xlvii)	246	53000
ccvi)	205	16500	xlviii)	247	54500
cvii)	206	17000	xlix)	248	56000
cviii)	207	17500	ccl)	249	58000
ccix)	208	18000	ccli)	250	60000
ccx)	209	18500	cclii)	251	61500
ccxi)	210	19000	cliii)	252	63000
cxii)	211	19500	cliv)	253	65000
cxiii)	212	20000	cclv)	254	67000
cxiv)	213	20600	clvi)	255	69000
cxv)	214	21200	clvii)	256	71000
cxvi)	215	21800	lviii)	257	73000
cxvii)	216	22400	clix)	258	75000
xviii)	217	23000	cclx)	259	77500
cxix)	218	23600	clxi)	260	80000
cxx)	219	24300	clxii)	261	82500
cxxi)	220	25000	lxiii)	262	85500
cxxii)	221	25750	lxiv)	263	87500
xxiii)	222	26500	clxv)	264	90000
xxiv)	223	27250	lxvi)	265	92500
cxxv)	224	28000	lxvii)	266	95000
xxvi)	225	29000	xviii)	267	97500
cxvii)	226	30000	lxix)	268	100000
xviii)	227	30750	clxx)	269	103000
xxix)	228	31500	lxxi)	270	106000
cxxx)	229	32500	lxxii)	271	109000
xxxi)	230	33500	xxiii)	272	112000
cxxii)	231	34500	xxiv)	273	115000
xxiii)	232	35500	lxxv)	274	118000

Sl No.	LI	Maximum Load
xxvi)	275	121500
xvii)	276	125000
xviii)	277	128500
xxix)	278	132000
lxxx)	279	136000

3.28 Speed Symbol — The reference speed expressed by the speed symbol as shown in Table 3.

Table 3 Speed Symbols
(*Clause* 3.28)

Sl No.	Speed Symbol	Reference Speed km/ h
(1)	**(2)**	**(3)**
i)	A2	10
ii)	A4	20
iii)	A6	30
iv)	A8	40
v)	B	50
vi)	D	65

3.29 Variation of Load Capacity with Speed Tables — Tables 4 to 6 showing as a function of the category of use, the type of application, the load index and the nominal speed symbol, the maximum load rating variations which a tyre can withstand when used at speeds different from that corresponding to its speed
symbol.

NOTE — The table of Variation of load capacity with speed is not applicable to the supplementary service description.

3.30 Maximum Load Rating — Maximum mass the tyre is rated to carry.

NOTE — It shall not exceed the percentage of the value associated with the relevant load index of the tyre as indicated in Table 4 with reference to the category of use, the speed symbol of the tyre and the speed capability of the vehicle to which the tyre is fitted.

Table 4 Variation in Load Capacity (%) with Speed for Tractor Drive Wheel
(*Clauses* 3.29 and 3.30)

Sl No.	Speed Km/h	Speed Symbol			D
		A6		A8	
			Tractor Application	Trailed Application	
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
(i)	0	+130	+130	+130	+130
(ii)	5	+70	+70	+70	+70
(iii)	10	+40	+50	+50	+50
(iv)	10 cyclic	+70	+70	—	+70
(v)	15	+30	+34	+34	+34
(vi)	15 cyclic	+55	+55	—	+55
(vii)	20	+20	+23	+23	+23
(viii)	25	+7	+11	+20	+18.5
(ix)	30	(0)	+7	+20	+15
(x)	35	-5	+3	+20	+12
(xi)	40	-10	(0)	+20	+9.5

(xii)	45	-	-4	+15	+7
(xiii)	50	-	-9	+9	+5
(xiv)	55	-	-	-	+3
(xv)	60	-	-	-	+1.5
(xvi)	65	-	-	-	(0)
(xvii)	70	-	-		-9
(xviii)	Field application with high and sustained torque	0	+7	—	+15

NOTE — The above load/speed variations apply when the tyre is not subjected to sustained high torque service. For field applications with sustained high torque service the values shown in the last line in the table above apply.

Table 5 Variation in Load Capacity (%) with Speed Tractor Steering Wheel and Marked Front or F-1 or F-2
(*Clause* 3.29)

Sl. No.	**Speed km/h**	**Variation in Load Capacity Percent (A6)**	**Variation in Load Capacity Percent (A8)**
(1)	**(2)**	**(3)**	**(4)**
i)	10	+50 (Note 2 and Note 3)	+67 (Note 3 and Note 4)
ii)	15	+43	+50
iii)	20	+35	+39
iv)	25	+15	+28
v)	30	0	+11
vi)	35	-10	+04
vii)	40	-20	0

NOTES —

1) Consult tyre/rim manufacturer for confirmation of the suitability and strength of the tyre/rim for the intended service
2) 6PR and above with a 25% increase in inflation pressure
3) In case where a front end loader is fitted on the tractor, +100% applies
4) The inflation pressure must be increased in accordance with the recommendation of the tyre manufacturer
5) In case of tyre with no service description column 3 of table 5 applies.

3.31 Tread Groove — The space between the adjacent ribs or blocks in the tread pattern (*see* Fig.1).

3.32 Tread Lug (or Cleat) — The solid-block element protruding from the base of the tread pattern (*see* Fig. 1).

3.33 Special Tread — A tyre, the tread pattern and structure of which are primarily designed to ensure in marshy areas a better grip than that of a standard tread tyre. The tread pattern of the tyre generally consists of lugs or cleats deeper than those of a standard tyre.

3.34 Chunking — The breaking away of small pieces of rubber from the tread.

3.35 Cord Separation — The parting of the cords from their rubber coating.

3.36 Ply Separation — The parting of adjacent plies.

3.37 Tread Separation — The pulling away of the tread from the carcass.

3.38 Test Rim — Rim on which a tyre shall be fitted for the performance test.

3.39 Tyre Classification Code — The optional marking detailed in Annex H that identifies the category of use and the particular type of tread pattern and application as specified by ISO 4251 Part 1 and Part 2.

4 TEST REQUIREMENTS

4.1 Tyre dimensions

4.1.1 Tyre dimensions namely section width and outer diameter shall be compatible with the appropriate rims and shall conform to the requirements specified in **4.1.1.1** and **4.1.1.2** method of measurement is given in Annex C.

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: 5 mm increase or reduction (as applicable) for every 0.50-inch difference in nominal rim width.

Table 6 Variation in Load Capacity (%) with Speed for Implement Tyres Marked IMP or IMPLEMENT
(*Clause* 3.29)

Sl No.	Speed km/h	DRIVE WHEELS			FREE ROLLING		
		A4	**A6**	**A8**	**A4**	**A6**	**A8**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	0	+135	+135	+135	+65	+65	+65
ii)	10	+20	+29	+40	+20	+29	+40
iii)	15	+12	+21	+33	+12	+21	+33
iv)	20	0	+14	+26	0	+14	+26
v)	25	-2	+7	+19	-2	+7	+19
vi)	30	-5	0	+12	-5	0	+12
vii)	35	—	-5	+5	—	-5	+5
viii)	40	—	-10	0	—	-10	0
ix)	45			-5			-5
x)	50			-10			-10

NOTE — The above load/speed variations apply when the tyre is not subjected to sustained high torque service.

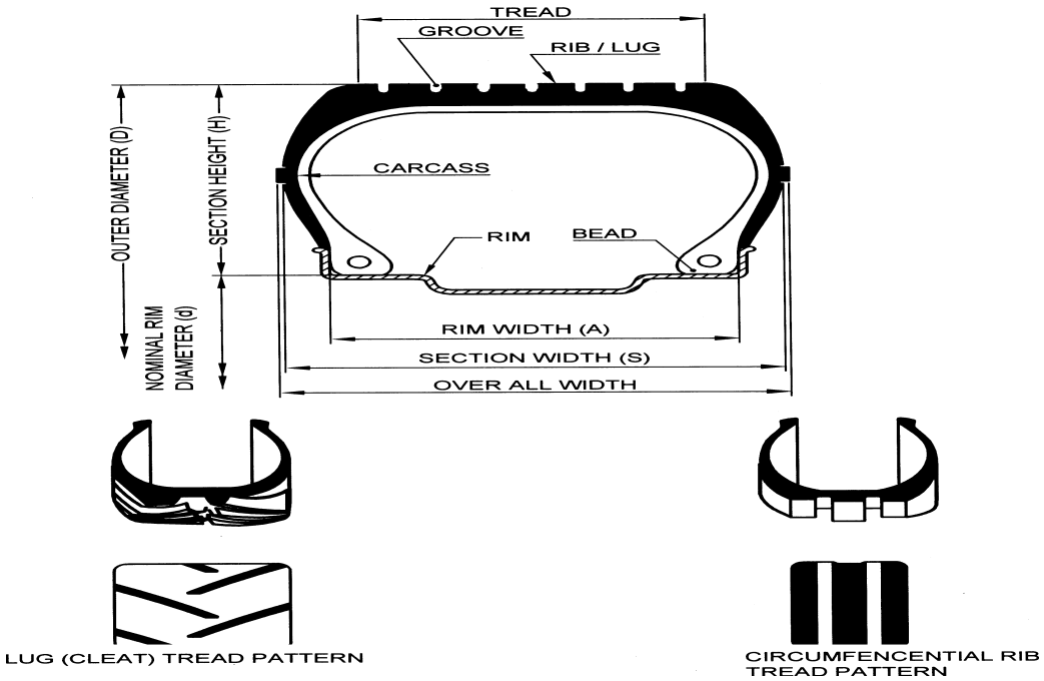


FIG. 1 NOMENCLATURE OF TYRE

4.1.1.1 *Section Width of Tyre*

a) For the existing types of tyres whose designation is given in col 2 of Tables 12 to 19, the actual measured section width shall be within the minimum section width and maximum overall width values specified in Tables 12 to 19.

b) For the tyre sizes listed in Annex B, but ply rating/and or speed symbol and load-inflation details are not listed, the actual measured section width shall be within the minimum section width and maximum overall width values specified in Annex B.

c) For code designated tyres which are not listed in Annex B, the section width shall be verified against the specification declared by the manufacturer.

d) For Metric designated tyres which are not listed in Annex B, the section width shall be calculated using the following formula:

$$S = S_1 + K \times (A - A_1)$$

where,

S = section width measured on measuring rim, in mm;

S_1 = nominal section width, as set out on the tyre sidewall in the tyre size designation, in mm;

A = width of the measuring rim, as shown by the manufacturer in the technical specification, in mm; and

A_1 = theoretical rim width, in mm.

NOTES —

1) A_1 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.

2) The actual measured overall width of the tyre may be less than the section width determined as detailed in **4.1.1.1** (d).

3) The actual measured overall width may also exceed the section width determined as detailed in **4.1.1.1** (d) up to 5 percent for radial ply tyres and up to 8 percent for diagonal (bias ply) tyres.

4.1.1.2 *Tyre outer diameter*

a) For the existing types of tyres whose designation is given in col 2 of Tables 12 to 19, the actual measured outer diameter shall be within the minimum and maximum diameter values specified in Annex B.
b) For the tyre sizes listed in Annex B, but ply rating/and or speed symbol and load inflation details are not listed the actual measured outer diameter shall be within the minimum and maximum diameter values specified in Annex B.
c) For code designated tyres which are not listed in Annex B, the outer diameter shall be verified against the specification declared by the manufacturer.
d) For metric designated tyres which are not listed in Annex B, the outer diameter shall be calculated using the following formulae:

$$D = d + 2H$$

where,

D = the outer diameter expressed, in mm;

d = the conventional number denoting the nominal rim diameter expressed, in mm (*see* 3.16);

H = the nominal section height, in mm:

$= 0.01 \times Ra \times S1$

where,

R_a = nominal aspect ratio;
S_1 = nominal section width, in mm.

NOTE — R_a and S_1 are as shown on the sidewall of the tyre in the tyre-size designation in conformity with the requirements

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

$$D_{Min} = d + (2H \times a)$$
$$D_{Max} = d + (2H \times b)$$

NOTES —

1) H and d are defined in 4.1.1.2 (d).
2) Coefficients a and b are respectively:

Category of Use	**Radial**		**Diagonal (Bias)**	
	a	**b**	**a**	**b**
Tractor steering wheels	0.96	1.04	0.96	1.07
Tractor drive wheels– normal	0.96	1.04	0.96	1.07
Tractor drive wheels– special	1.00	1.12	1.00	1.12
Implement	0.96	1.04	0.96	1.07

4.2 Burst Test

4.2.1 Burst test is carried out to assess the resistance of tyre to burst. The burst test shall be carried out on a tyre in accordance with the method specified in **Annex D**.

4.2.2 A tyre, after undergoing the burst test, shall not exhibit any tread separation, ply separation, cord separation, broken beads

or broken cords. The tyre on which burst test has been performed, shall not be used for any other test.

4.3 Endurance Test (Load/Speed Performance Test)

4.3.1 Endurance test (load/speed performance test) is carried out to assess the suitability of the tyre for the claimed performances. Endurance test (load/speed performance test) shall be carried out on a tyre in accordance with the method specified in Annex E.

4.3.2 A tyre after undergoing the relevant Endurance test (load/speed performance test), shall not exhibit any tread separation, ply separation, cord separation or broken cords. The tyre Endurance test (load/speed performance test) has been performed, shall not be used for any other test

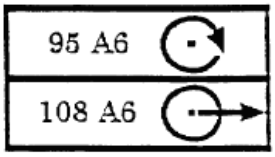
4.3.3 A tyre which, after undergoing the relevant Endurance test (load/speed performance test), exhibits chunking, due to the specific test conditions shall be deemed to have passed the test.

NOTE — Where a tyre manufacturer produces a range of tyres it is not considered necessary to carry out tests on every type of tyre in the range.

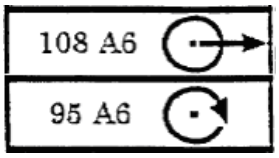
5 MARKINGS

5.1 Tyres shall be permanently and legibly marked on both sidewall with the following:

a) The manufacturer's trade name or mark;
b) The tyre size designation as defined in 3.14;
c) An indication of the structure as follows:
   1) On diagonal (bias ply) tyres, ' – ' or 'D';
   2) On radial-ply tyres, the word 'RADIAL'.
d) The 'service description' as defined in **3.25**
   1) In the case of implement tyre, the service description shall be supplemented with the relevant application symbol;
   2) In the case of implement tyre for mixed applications the tyre shall be marked with two service descriptions one for 'trailer' applications and the other for 'traction' applications, each supplemented with the relevant symbol (*see* 3.23 and 3.24) as follows :



Or



e) The supplementary service description, if applicable;
f) The inscription 'DEEP' (or 'R-2') in the case of a special tread tyre (see Annex H);
g) The inscriptions 'F-1' or 'F-2' in the case of a tractor steering wheel tyre that is not already marked as per **3.14** (v) (see Annex H);
h) The inscription 'IMPLEMENT' in the case of an implement tyre that is not already marked as per **3.15.5.** The inscription 'I-3' for implement tyres with traction tread;
j) The word 'TUBELESS' if the tyre is designed for use without an inner tube;
k) On tractor drive wheel tyres and, if applicable, on implement traction tyres an arrow indicating the preferred direction of rotation of the tyre; and
m) The inscription '… kPa Max' inside the pictogram shown in Annex F (Fig. 2 or Fig. 3) to notify the cold inflation pressure that shall not be exceeded for bead seating during tyre mounting. (At the discretion of the manufacturer.)

5.2 The tyre shall also be marked with the date of manufacture in the form of a group of four digits, the first two showing the

week and the last two the year of manufacture on at least one side wall. However, this marking shall not be mandatory on any tyre submitted for approval until two years after the date of entry into force of this standard.

5.3 All markings shall be clearly and legibly moulded and produced as part of the process during manufacture. The use of branding or other methods of marking after completion of the original manufacturing process shall not be permitted.

5.4 Examples of arrangements of tyre markings are given in Annex A.

6 CRITERIA FOR TYPE APPROVAL/TYPE TEST

6.1 Tyre(s) shall meet the test requirements when tested as per schedule given in Table 7

Table 7 Type Test Schedule
(*Clause* 6.1)

Sl No.	Tests	Tyre 1	Tyre 2
(1)	(2)	(3)	(4)
i)	Tyre marking	✓	
ii)	Tyre dimensions	✓	
iii)	Tyre resistance to bursting	✓	
iv)	Endurance test		✓

6.2 Type Approval Procedure

6.2.1 Application for type approval to be submitted by the manufacturer.

6.2.2 Application for type approval shall contain at least the technical information as specified in Annex G.

NOTE — For type approval of a tyre belonging to one family of tyres, brand of tyre to be selected for type approval shall be left to certifying authority. Worst case selection shall be made at the discretion of the certifying authority based on the family of tyres specified in **6.2.5.2**.

6.2.3 *Changes in the Technical Specification of Already Type Approved Tyres*

6.2.3.1 Every functional modification in technical specification declared in accordance with **6.2.2** shall be intimated to certifying authority.

6.2.3.2 Certifying authority may then consider, whether:

a) Tyre with modification complies with specified requirement or;
b) Any further verification is required.

For considering whether any further verification is required or not (criteria for extension of type approval) specified in **6.2.5** shall be used.

6.2.3.3 In case of **6.2.3.2**(b), checks for those parameters which are affected by the modifications only need to be carried out.

6.2.4 In case of **6.2.3.2**(a) or in the case of **6.2.3.2**(b) after successful compliance to the requirements, a certificate of compliance shall be validated for the modified version, as applicable.

6.2.5 *Criteria for Extension of Tyre Approval*

6.2.5.1 In case the changes cause the tyre to be outside the approved family/range of tyres, the verification shall be carried out for establishing compliance of the changed parameters to the requirements specified in this standard.

6.2.5.2 Family/Range of tyres would mean tyres, which do not differ in the aspects listed below, but having different brand

names/trade name/trade descriptions or trade-marks:

a) Registered name of company;
b) Country of origin;
c) Location of manufacturing facility;
d) Application category (tractor/trailer/ implement);
e) Construction type (standard or reinforced)
f) Structure (diagonal or radial);
g) Tyre size designation;
h) Speed symbol;
j) Tube or tubeless;
k) Load index (or load capacity);
m) Ply rating of diagonal ply tyres; and
n) Fabric material — Nylon/Polyester (one type).

6.2.5.3 A modification of the tread pattern of the tyre shall not be considered to necessitate a repetition of the tests prescribed in **5.2**.

6.3 Type Approval Procedure for Tyres Not Listed in Annex B

6.3.1 Tyre section width and tyre overall diameter shall be verified as per **4.1.1.1** and **4.1.1.2** against the specification declared by the manufacturer.

6.3.2 For carrying out the tests of these tyres, the load and inflation pressures specified by the manufacturer and marked on the tyre shall be used.

7 CONFORMITY OF PRODUCTION TESTS/ ACCEPTANCE TESTS

7.1 Periodic testing of each type of tyre as per the approved family of tyres in **6.2.5.2** shall be carried out. The approval marking shall be made only on the tyres of that approved family and the same shall not get extended to other families of tyres, unless tyres from out of that has undergone the same testing and type approval for that family of tyre.

7.2 The tyres approved under this standard shall be so manufactured as to conform to requirements set forth in Table 8.

Table 8 Acceptance Test Schedule
(*Clause* 7.2)

Sl No. (1)	Tests (2)	Tyre 1 (3)	Tyre 2 (4)
i)	Tyre marking	✓	
ii)	Tyre dimensions	✓	
iii)	Tyre resistance to bursting	✓	
iv)	Endurance test		✓

7.3 The production and quality assurance system shall meet all the requirements laid out by the Certifying Authority.

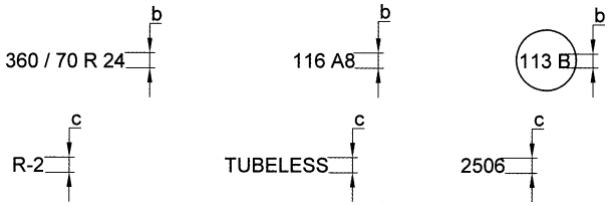
8 BIS CERTIFICATION MARKING

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A
(*Clause* 5.4)

ARRANGEMENT OF TYRE MARKINGS

A-1 DRIVE WHEEL TYRES FOR AGRICULTURAL AND FORESTRY TRACTORS



A-1.1 Minimum Heights of Markings (*see* Table 9)

Table 9 Minimum Heights of Markings
(*Clause* A-1.1)

All dimensions are in millimetres.

Sl No.	Nominal Section Width	Rim Diameter Code		
		Up to 12	13 to 19.5	20 and above
(1)	(2)	(3)	(4)	(5)
(i)	Up to 130	b = 4 c = 4	b = 6 c = 4	b = 9 c = 4
(ii)	135 to 235	b = 6 c = 4	b = 6 c = 4	b = 9 c = 4
(iii)	240 and above	b = 9 c = 4	b = 9 c = 4	b = 9 c = 4

A-2 These markings define a Drive Wheel tyre:

a) Having a nominal section width of 360;
b) Having a nominal aspect ratio of 70;
c) Of radial ply structure (R);
d) Having a nominal rim diameter of 610 for which the code is 24;
e) Having a load capacity of 1250 kg corresponding to load index 116 shown in Table 2;
f) Classified in the speed symbol A8 (reference speed 40 km/h);
g) Allowed to be used additionally at 50 km/h (speed symbol B) with a load capacity of 1 150 kg corresponding to the load index 113 shown in Table 2;
h) For fitting without an inner tube ('tubeless');
j) Having a special tread ('R-2'); and
k) Manufactured during the twenty-fifth week of the year 2006 (*see* **5.2**)

A-3 The positioning and order of the markings constituting the tyre designation are as follows:

a) The size designation, comprising the nominal section width, the nominal aspect ratio, the type of structure symbol (where applicable) and the nominal rim diameter, shall be grouped as shown in the above example: 360/ 70 R 24;

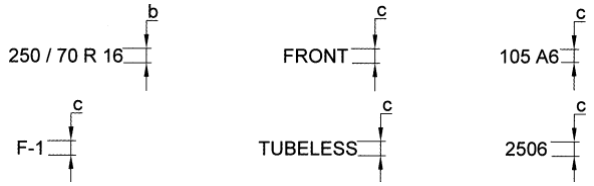
b) The service description (load index and the speed symbol) is placed near the size designation. It may either precede or follow it or be placed above or below it;

c) The symbols 'TUBELESS', 'R-2' or : 'DEEP', the optional word 'RADIAL' and the date of production may be at a distance from the size designation; and

d) The marking of the additional service description inside the circle may show either the speed symbol after or below the load index.

A-4 STEERING WHEEL TYRES FOR AGRICULTURAL TRACTORS

Example of the markings to be borne by types of tyres complying with this standard.



A-4.1 Minimum Heights of Markings (see Table 10)

Table 10 Minimum Heights of Markings
(*Clause* A-4.1)
All dimensions in millimetres

Sl no.	Nominal Section Width	Rim Diameter Code		
		Up to 12	13 to19.5	20 and above
(1)	(2)	(3)	(4)	(5)
i)	Up to 130	b = 4 c = 4	b = 6 c = 4	b = 9 c = 4
ii)	135 to 235	b = 6 c = 4	b = 6 c = 4	b = 9 c = 4
iii)	240 and above	b = 9 c = 4	b = 9 c = 4	b = 9 c = 4

A- 5 These markings define a steering wheel tyre:

a) Having a nominal section width of 250;
b) Having a nominal aspect ratio of 70;
c) Of radial-ply structure ®;
d) Having a nominal rim diameter of 406 mm, for which the code is 16, designed for the equipment of non-driven steering axles of agricultural tractors (FRONT);
e) Having load capacities of 925 kg, corresponding to the load index 105 shown in Table 2;
f) Classified in the nominal speed symbol A6 (reference speed 30 km/h);
g) For fitting without an inner tube 'tubeless'; and
h) Manufactured during the twenty-fifth week of the year 2006 (*see* **5.2**).

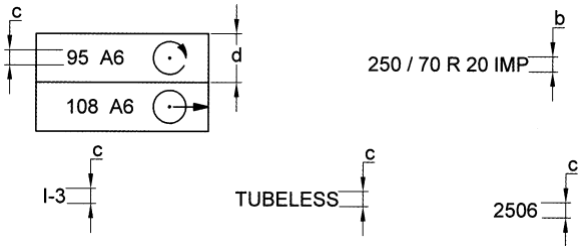
A-6 The positioning and order of the markings constituting the tyre designation are as follows:

a) The size designation, comprising the nominal section width, the nominal aspect ratio, the type of structure symbol (where applicable), the nominal rim diameter and, optionally the letters 'FRONT', shall be grouped as shown in the above example: 250/70 R 16 FRONT;
b) The service description (the load index and the speed symbol) is placed together near the size designation. It may either precede or follow it or be placed above or below it; and
c) The symbol 'TUBELESS', the optional word 'RADIAL', the optional symbol 'F-1', and the date of manufacture may

be at a distance from the size designation

A-7 IMPLEMENT TYRES

Example of the markings to be borne by types of tyres complying with this standard



A-7.1 Minimum Heights of Markings (*see* Table 11)

Table 11 Minimum Heights of Markings
(*Clause* A-7.1)
All dimensions in millimetres

Sl. No.	Nominal Section Width	Rim Diameter Code		
(1)	(2)	(3)	(4)	(5)
		Up to 12	13 to 19.5	20 and above
i)	Up to 130	b = 4 c = 4 d=7	b = 6 c = 4 d=12	b = 9 c = 4 d=12
ii)	135 to 235	b = 6 c = 4 d=12	b = 6 c = 4 d=12	b = 9 c = 4 d=12
iii)	240 and above	b = 9 c = 4 d=12	b = 9 c = 4 d=12	b = 9 c = 4 d=12

A-8 These markings define an implement tyre:

a) Having a nominal section width of 250;
b) Having a nominal aspect ratio of 70;
c) Of radial-ply structure (R);
d) Having a nominal rim diameter of 508 mm, for which the code is 20;
e) Designed primarily for the equipment of implements, agricultural machinery or agricultural trailers (IMP);
f) Having load capacities of 690 kg corresponding to the load index 95 shown in Table 2 when used on driven axles (traction application), as identified by the appropriate symbol;
g) Having load capacities of 1000 kg when used on non-driven axles (trailer application) corresponding to the load index 108 shown in Table 2, as identified by the appropriate symbol;
h) Both applications being classified in the nominal Speed symbol A6 (reference speed 30 km/h);
j) For fitting without an inner tube ‘tubeless’; and
k) Manufactured during the twenty-fifth week of the year 2006 (*see* 5.2).

A- 9 The positioning and order of the markings constituting the tyre designation are as follows:

a) The size designation, comprising the nominal section width, the nominal aspect ratio, the type of structure symbol (where applicable), the nominal rim diameter and optionally the letters ‘IMP’ shall be grouped as shown in the above example: 250/70 R 20 IMP;
b) The service description (the load index and the speed symbol) and the relevant type of application symbol are placed together near the size designation. They may either precede or follow it or be placed above or below it; and
c) The symbol ‘TUBELESS’, I-3 if any, the optional word ‘RADIAL’, the optional word ‘IMPLEMENT’ and the date of

manufacture may be at a distance from the size designation.

ANNEX B
(*Clauses* 4.1.1.1 *and* 4.1.1.2)

Table 12 Agricultural Tyres — Steering Wheel Code Designated Normal Section — Diagonal Ply Speed Symbol A6 General Data and Load, Inflation Pressure Limits

Sl No.	Tyre Size Desig-nation	Meas-uring Rim Width Code	New Tyre — Inflated							Tyre Dimensions In Service		Ply Rating	Load Index	Maxi-mum Load kg	Maxi-mum Cold IP[1] kPa
			Design Section Width mm	Mini-mum Section Width mm	Maxi-mum overall Width mm	Design overall Dia mm	Mini-mum overall Dia mm	Maxi-mum overall Dia mm F-1	Maxi-mum overall Dia mm F-2	Maxi-mum Overall width mm	Mini-mum Overall width mm				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
i)	4.00-9	3.00	112	109	121	460	453	476	488	122	479	4 6	52 60	200 250	340 475
ii)	4.00-19	3 00	112	109	121	712	705	728	739	122	730	4	72	355	340
iii)	4.75-14	3.50	127	123	137	610	602	628	640	138	630	4 6	64 72	280 355	310 450
iv)	5.00-15	4.00	140	136	151	655	647	674	688	153	677	4 6	73 82	365 475	280 370
v)	5.25-14	4.00	145	141	157	646	637	666	681	158	669	4 6	71 79	345 437	310 450
vi)	5.50-16	4 .00	150	145	162	708	699	729	744	164	732	4 6 8	78 86 90	425 530 600	250 370 475
vii)	6.00-16	4.50	165	160	178	732	722	755	771	180	758	4 6 8	80 88 94	450 560 670	230 340 450
viii)	6.50-16	4.50	175	170	189	761	750	786	804	191	789	4 6 8	85 91 98	515 615 750	230 310 420
ix)	6.50-20	5.00	180	175	194	868	857	893	911	196	897	4 6 8	90 97 102	600 730 850	230 310 450
x)	7.50-16	5.50	205	199	221	805	793	833	853	223	837	4 6 8 10	90 98 103 109	600 750 875 1030	200 280 370 475
xi)	9.00-16	6.00	234	227	253	855	842	886	909	255	891	10	116	1250	390

NOTE — For approved rims see Table 23.

[1] Inflation pressure.

Table 13 Agricultural Tyres — Drive Wheel (Small Tractor Type 1) Code Designated Normal Section — Diagonal Ply Speed Symbol A6 General Data and Load/Inflation Pressure Limits

Sl No.	Tyre	Measuring Rim	New Tyre — Inflated	Ply Rating	Load	Maximum	Maximum Cold IP[1]

	Size Designation	Width Code	Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm				Index	Load kg	kPa
								Std. G-1	Prem. G-1	G-2				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
i)	5-12	4JA	128	124	138	551	544	568	576	581	4 6	55 65	218 290	240 360
ii)	6-12	5JA	157	152	170	600	591	621			4 6	63 72	272 355	200 300
iii)	6-14	5JA	157	152	170	650	641	671			4 6	67 76	307 400	200 300
iv)	7-14	5JA	173	168	187	690	680	713			4	74	375	180
v)	5-16	4.00E	127	123	137	652	645	669			4 6	63 71	272 345	220 340
vi)	7-16	W6	183	178	198	740	730	763			4 6	77 85	412 515	180 260
vii)	8-16	W6	201	195	217	790	778	817			4 6	82 90	475 600	160 240
viii)	8-18	W7	206	200	222	835	824	861	873	880	4 6	85 93	515 650	160 240

NOTE — For approved rims see Table 24.

[1)] Inflation pressure.

Table 14 Agricultural Tyres — Drive Wheel (Small Tractor Type 2) Code Designated Normal Section — Diagonal Ply Speed Symbol A6 General Data and Load/Inflation Pressure Limits

Sl No.	Tyre Size Desig-nation	Meas-uring Rim Width Code	New Tyre — Inflated						Tyre Dimensions In Service		Ply Rating	Load Index	Maxi-mum Load kg	Maxi-mum Cold IP[1)] kPa
			Design Section Width mm	Mini-mum Section Width mm	Maxi-mum overall Width mm	Design overall Dia mm	Mini-mum overall Dia mm	Maxi-mum overall Dia mm	Maxi-mum Overall width mm	Mini-mum Overall width mm				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)	(15)	(16)
i)	6.00-12	4.00	164	159	177	633	620	663	179	667	4 6	69 77	325 412	180 270

NOTE — For approved rims see Table 24.

1) Inflation pressure

Table 15 Agricultural Tyres — Drive Wheel Code Designated Normal Section — Diagonal Ply Speed Symbol A6 General Data and Load/Inflation Pressure Limits

Sl No.	Tyre	Measuring Rim	New Tyre — Inflated	Ply Rating	Load Index	Maximum Load	Maximum

	Size Designation	Width Code	Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm		minimum overall Dia mm		maximum overall Dia mm					kg	Cold IP1) kPa
						R-1	R-2	R-1	R-2	Std. R-1	Prem. R-1	R-2				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
i)	8.3-20	7.00	211	203	228	890		879		917	-	-	4 6	88 96	560 710	160 240
ii)	8.3-24	7.00	211	203	228	995		983		1022			4 6	92 101	630 825	160 240
iii)	9.5-20	8.00	241	231	260	945		932		976			4 6 8	93 102 107	650 850 975	140 210 280
iv)	9.5-24	8.00	241	231	260	1050		1037		1081			4 6 8	97 106 112	730 950 1 120	140 210 280
v)	11.2-24	10.00	284	273	307	1105		1090		1140			6 8	110 116	1060 1250	180 240
vi)	8.3-32	7.00	211	203	228	1195		1184		1222			4 6	97 105	730 925	160 240
vii)	11.2-28	10.00	284	273	307	1205		1190		1240	1254		4 6 8	104 112 118	900 1 120 1 320	130 180 240
viii)	12.4-24	11.00	315	302	340	1160		1143		1204			4 6 8	106 115 121	950 1 215 1 450	110 170 230
ix)	12.4-28	11.00	315	302	340	1260	1321	1244	1303	1298	1315	1364	4 6 8 10 12	109 117 123 124 125	1 030 1 285 1 550 1 600 1 650	110 170 230 240 250
x)	12.4-36	11.00	315	302	340	1465		1448		1504			4 6	113 121	1 150 1 450	110 170
xi)	12.4-38	11.00	315	302	340	1515		1499		1 554			4 6 8	114 122 127	1 180 1 500 1 750	110 170 230
xii)	13.6-28	12.00	345	331	373	1310	1375	1292	1355	1 352	1370	1421	4 6 8 10 12	112 121 125 127 128	1 120 1 450 1 650 1 750 1 800	100 160 200 220 230
xiii)	13.6-38	12.00	345	331	373	1565		1547		1607			6 8 10	126 131 136	1 700 1 950 2 240	160 200 250
xiv)	14.9-28	13.00	378	363	408	1365	1434	1345	1412	1411	1430	1485	6 8 10 12	125 130 132 134	1 650 1 900 2 000 2 120	140 180 210 230
xv)	15.9-28	14.00	404	388	436	1397		1376		1445			6 8 10 12	126 132 137 140	1700 2000 2300 2500	130 170 210 2500
xvi)	16.9-28	15.00	429	412	463	1435	1508	1413	1484	1486	1507	1564	6 8 10 12	129 135 139 143	1 850 2 180 2 430 2 725	130 170 200 240
xvii)	16.9-30	15.00	429	412	463	1485		1463		1536	1557		6 8 10 12	130 137 140 144	1900 2 300 2 500 2 800	130 170 200 240
xviii)	18.4-30	16.00	467	448	504	1550		1526		1605	1629		10 12 14	145 149 151	2 900 3 250 3 450	180 230 260

NOTE — For approved rims see Table 24.

[1)] Inflation pressure.

Table 16 Agricultural Tyres — Drive Wheel Metric — Diagonal Ply Speed Symbol A6 General Data and Load/Inflation Pressure Limits

Sl No.	Tyre	Measuring Rim Width	New Tyre — Inflated	Load Index	Maximum Load kg	Maximum Cold IP1)

	Size Designation	Code	Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm			kPa
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	180/85D12	5.00	178	171	192	611	602	632	63 72	272 355	160 240

NOTE — For approved rims see Table 25.

1) Inflation pressure.

Table 17 Agricultural Tyres — Drive Wheel Code Designated Normal Section — Radial Ply Speed Symbol A6

Sl No.	Tyre Size Designation	Measuring Rim Width Code	New Tyre — Inflated						Load Index	Maximum Load kg	Maximum Cold IP1) kPa
			Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm Std. R-1			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	12.4R28	W11	315	302	331	1250	1228	1272	121	1450	160
ii)	13.6R28	W12	345	331	362	1295	1272	1318	123	1550	160
iii)	14.9R28	W13	378	363	397	1350	1324	1376	128	1800	160
iv)	16.9R28	W15	429	412	450	1420	1392	1448	136	2240	160

NOTE — For approved rims see Table 26.

[1)] Inflation pressure.

Table 18 Agricultural Tyres — Drive Wheel Metric — Radial Ply Speed Symbol A6 General Data and Load/Inflation Pressure Limits

Sl No.	Tyre	Measuring Rim	New Tyre — Inflated	Load	Maximum Load	Maximum

	Size Designation	Width Code	Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm			Index	kg	Cold IP1) kPa
								Std. R-1	Prem. R-1	R-2			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
i)	240/85R24	8.00	244	234	256	1018	1002	1034	1059	1067	107	975	160
ii)	320/85R28	11.00	329	316	345	1255	1233	1277	1309	1320	124	1600	160
iii)	340/85R28	12.00	353	339	371	1289	1266	1312	1347	1358	127	1750	160
iv)	380/85R28	12.00	380	365	399	1357	1331	1383	1422	1435	133	2060	160
v)	420/85R28	15.00	438	420	460	1425	1396	1454	1496	1511	139	2430	160
vi)	460/85R30	16.00	475	456	499	1544	1513	1575	1622	1638	145	2900	160

NOTE — For approved rims see Table 26.

[1)] Inflation pressure.

Table 19 Agricultural Tyres — Power Tiller Code Designated Normal Section — Diagonal Ply (Maximum Speed 20 km/h) General Data and Load/Inflation Pressure Limits

Sl No.	Tyre Size Designation	Measuring Rim Width Code	New Tyre — Inflated						Ply Rating	Load Index	Maximum Load kg	Maximum Cold IP[1]) kPa
			Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	5.00-14	3.00	134	129	145	631	620	650	2 4	54 65	212 290	110 200
ii)	6.00-12	4.00	164	157	177	633	620	656	4	69	325	200

NOTE — For approved rims see Table 27.

[1)] Inflation pressure.

Table 20 Agricultural Tyres — Tractor Trailer Code Designated Normal Section — Diagonal Ply (Maximum Speed 30 km/h) General Data and Load/Inflation Pressure Limits

Sl No.	Tyre Size Designation	Measuring Rim Width Code	New Tyre-Inflated						Ply Rating	Load Index	Maximum Load kg	Maximum Cold IP[1]) kPa	Tube Valve	Flap Code
			Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm						

						Std.	Prem.	Std.	Prem.	Std.	Prem.						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
i)	7.50-16	6.00 (**SDC**) 5.50 **(DIV)**	211 206	203 198	228 222	813	824	797	807	841	853	12 14 16	126 129 130	1 700 1 850 1 900	585 690 725	A C3 5 82	16N
ii)	9.00-16/5°	6.50 (**SDC**)	253	243	273	—	912	—	892	—	947	16 18	137 138	2 300 2 360	725 760	A C3 5 82	16N
iii)	9.00-16	6.00 (**SDC**)	248	238	268	—	912	—	897	—	937	16 18	137 138	2 300 2 360	725 760	A C3 5 82	16N

NOTE — For approved rims see Table 28.

[1)] Inflation pressure.

Table 21 Implement Tyres — Mixed Applications -Diagonal Ply (Maximum Speed 20 km/h) General Data and Load/Inflation Pressure Limit

Sl No.	Tyre Size Designation	Measuring Rim Width Code	New Tyre — Inflated						Tyre In Service		Ply Rat-ing	Load Index	Maxi-mum Load kg	Maxi-mum Cold IP1) kPa	Tube Valve
			Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm	Max. Overall width mm	Max. Overall Dia mm					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
i)	5.00-10 (Traction) Free Rolling Wheel	4.00	145	139	157	505	495	523	158	525	2	61	257	100	B 35 5 57
ii)	6.50-16 (Traction) Drive Wheel	4.50	173	166	187	735	722	758	189	761	6	87	545	275	B 35 5 57

NOTE — For approved rims see Table 29.

[1)] Inflation pressure.

Table 22 Implement Tyres — Tyres for Garden Tractors & Motor Cultivators -Diagonal Ply (Maximum Speed 25 km/h) General Data and Load/Inflation Pressure Limit

Sl No.	Tyre Size Designation	Measuring	New Tyre — Inflated	Tyre In Service	Ply Rat-ing	Load Index	Maxi-mum Load	Maxi-	Tube Valve

		Rim Width Code	Design Section Width mm	minimum Section Width mm	maximum overall Width mm	Design overall Dia mm	minimum overall Dia mm	maximum overall Dia mm	Max. Overall width mm	Max. Overall Dia mm			kg	mum Cold IP1) kPa	
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**
i)	18X7.00-8 (180/70-8)	5.50	178	171	190	450	440	460	192	463	2	54	212	90	B 35 5 57

NOTE — For approved rims see Table 30.

[1)] Inflation pressure.

Table 23 Rims for Steering Wheel Tyres

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	**(2)**	**(3)**	**(4)**
i)	4.00	9, 19	**3.00D**
ii)	4.75	14	3.00D **3.50D** 4.00E
iii)	5.00	15	3.00D **4.00E** 4J 4 ½ J
iv)	5.25	14	3.50D **4.00E** 4.50E
v)	5.50	16	3.50D **4.00E** 4.50E
vi)	6.00	16	4.00E **4.50E** 5K 5.00F
vii)	6.50	16	4.00E **4.50E** 5K 5.00F 5.50F
viii)	7.50	16	5 K 5.00F **5.50F** 6.00F
ix)	9.00	16	5.50F **6.00F** 6.50 F
x)	6.50	20	4.00E **5.00F** 5.50F

NOTES —

1) Recommended rim shown in bold.
2) For a ‘Permitted’ size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the ‘Recommended’ rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 24 Drive Wheel Tyres Diagonal Ply (Code Designated)

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	5	12	**4JA,** 4.00B
ii)	5	16	**4.00E,** 4JA
iii)	6	12	4JA, **5JA**, 5J
iv)	6	14	**5JA**, 5J
v)	7	14	**5JA,** 5J
vi)	7	16	5.50F, **W6**, 6.00F
vii)	8	16	5.50F, **W6**, 6.00F, W7
viii)	8	18	W6, **W7**
ix)	6.00	12	**4JA**, 4.00E, 5JA, 5J
x)	8.3	20, 24, 32	W6, **W7**
xi)	9.5	18, 20, 22, 24, 32	W7, **W8**
xii)	11.2	20, 24, 28	W9,**W10**
xiii)	12.4	24, 28, 36, 38	W10, **W11,** DW11
xiv)	13.6	24, 28, 36, 38	W11, **W12,** DW 12
xv)	14.9	28, 30	W12, **W13,** DW13
xvi)	15.9	28	W13, **W14L**
xvii)	16.9	28, 30, 34	W14L, **W15L,** DW15L
viii)	18.4	30, 34, 38	W15L, **W16L,** DW16L, DW15L

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 25 Drive Wheel Tyres Diagonal Ply (Metric Series)

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	180/85	12	**5JA**

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the 'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 26 Drive Wheel Tyres Radial Ply

Sl. no.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	12.4	28	W10, **W11**
ii)	13.6	28	W11,**W12,**DW 12
iii)	14.9	28	W12,**W13,**DW15L
iv)	16.9	28	W14L,**W15L**
v)	240/85	24	W7,**W8**
vi)	320/85	28	W9,W10,**W11**
vii)	340/85	28	W11,**W12**
viii)	380/85	28	W11,**W12,**W13
ix)	420/85	28	W13L,W14L,**W15L**
x)	460/85	30	W14L**,**W15L**,W16L**

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the 'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 27 Implement Tyres Power Tiller Tyres

Sl. no.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	5.00	14	**3.00D,**3.50D 4J
ii)	6.00	12	**4.00E,** 4.50E

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 28 Tractor Trailer Application

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	7.50	1 6	**5.50F Divided** 5.50F SDC **6.00G SDC**
ii)	9.00(5°)	1 6	6.00G **6.50H SDC**
iii)	9.00	1 6	**6.00T**

NOTES —

1) Recommended rim shown in bold.
2) Recommended rim to be used for new design tractor.
3) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the 'Recommended' rim in the respective general data tables.
4) Consult tyre/rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service.

Table 29 Implement Tyres Mixed Application

Sl. No. (1)	Tyre Section Code (2)	Rim Diameter Code (3)	Approved Rim Contours (4)
i)	5.0	10	3.50B,**4J**
ii)	6.50	16	4.00E,**4.50E**, 5.00F, 5.50F

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the 'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

Table 30 Garden Tractor / Motor Cultivator

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	18X7.00	8	5.375I, **5.50A**

NOTES —

1) Recommended rim shown in bold.
2) For a 'Permitted' size of rim, the section width and overall width will increase or reduce by 5 mm for every 0.5 inches wider or narrow (nominal) size code, relative to the data tabulated for the 'Recommended' rim in the respective general data tables.
3) Consult the tyre and rim manufactures for confirmation of the suitability and strength of the tyre/rim for the intended service

ANNEX C
(*Clause* 4.1.1)

TEST METHOD FOR MEASURING TYRE DIMENSIONS

C-1 The tyre shall be mounted on the measuring rim specified by the manufacturer and is inflated to a pressure specified by the manufacturer. To seat the beads, the inflation pressure marked on the tyre sidewalls shall not be exceeded. Having properly seated tyre beads on the rim, the pressure shall be adjusted to the value specified for tyre measurements.

C-2 The tyre fitted on its rim is conditioned to the ambient temperature of the laboratory for at least 24 h.

C-3 The pressure shall be readjusted to the value specified in **C-1**.

C-4 The overall width shall be measured by calliper at six equally-spaced points, accounts being taken of the thickness of the protective ribs or bands. The highest measurement so obtained shall be taken as the overall width.

C-5 The outer diameter shall be determined by measuring the maximum circumference and dividing the figure so obtained by π (3.1416).

ANNEX D
(*Clause* 4.2.1)

BURST TEST PROCEDURE

D-1 PREPARING THE TYRE

D-1.1 Mount a new tyre on the test equipment. Wheels used for the test shall be suitable to withstand, with no deformation, the highest value of pressure achievable during the test.

D-1.2 Carefully centre the tyre beads on the retention device and adjust the outer distance of the tyre beads to a value corresponding to the width of the rim specified by the manufacturer.

D-1.3 Fill the tyre with water taking care that all the air inside the tyre is expelled.

D-2 TEST PROCEDURE

D-2.1 Activate the apparatus and increase the pressure of the water inside the tyre in order to reach progressively the limit given by two and half times the pressure specified by the tyre manufacturer. In no case, however, the limit value shall be lower than 6 bar (600 kPa) or higher than 10 bar (1 000 kPa).

D-2.2 Maintain constant the value of the pressure for at least 10 min.

D-2.3 Decrease, progressively, the pressure of the water to zero and drain the tyre.

D-2.4 Whilst the pressure of the water inside the tyre is higher than the ambient pressure, nobody shall stand inside the test room, which shall be safely locked.

D- 3 EQUIVALENT TEST METHODS

If a method other than that described above is used, its equivalence shall be demonstrated.

ANNEX E
(*Clause* 4.3.1)

TEST PROCEDURE FOR ENDURANCE TEST (LOAD/SPEED TEST)

E-1 SCOPE AND RANGE OF APPLICATION

E-1.1 This test procedure is applicable for new tyres with speed category D corresponding to the characteristics specified in **E-3.4**.

E-1.2 It serves the purpose to assess the suitability of the tyre for the claimed performances

E-2 PREPARING THE TYRE

E-2.1 Mount new tyres on the test rim specified by the manufacturer. To seat the beads the maximum pressure marked on the tyre sidewalls shall not be exceeded.

E-2.2 Use a new inner tube when testing tyres with inner tubes (that is tyres not bearing the marking Tubeless).

E-2.3 With the tyre beads properly seated on the rim, inflate the tyre to the pressure corresponding to the test pressure specified by the tyre manufacturer for the type of test programme.

E-2.4 Condition the tyre and wheel assembly at test room temperature for at least 3h.

E-2.5 Readjust the tyre pressure to that specified in **E-2.3**.

E-2.6 On request of the tyre manufacturer proceed with the test programmes as specified in either of the following:

a) Test procedure in a laboratory on a test drum (**E-3**), or
b) Test procedure on a road using a trailer (**E-4**).

E-3 TEST PROCEDURE ON A TEST DRUM

E-3.1 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 m ±1 percent in diameter having a surface at least as wide as the tyre tread. Drum widths narrower than the tyre tread pattern may be used if the tyre manufacturer so agrees.

E-3.2 Test drum speed: 20km/h.

E-3.3 Apply to test axle a series of masses in accordance with the load/speed test programme shown in **E-3.4,** with reference to the test load which equates the mass corresponding to load index marked on the tyre in case of tyres marked with speed symbol D.

E-3.4 Load/Speed Test Programme

Tyre Speed Category Symbol	Test Step	Percentage of the Test Load	Duration (h)
D	1	66 %	7
	2	84 %	16
	3	101 %	24

E-3.5 The tyre pressure shall not be corrected throughout the test and the test load shall be kept constant throughout each of the three test steps.

E-3.6 During the test the temperature in the test room shall be maintained at between 20°C and 40°C or at another temperature if the manufacturer so agrees.

E-3.7 The load/speed test programme shall be carried out without interruption.

E-4 TEST PROCEDURE ON A TRAILER

E-4.1 Mount two new tyres of the same type on a trailer.

E-4.2 Apply on the trailer a mass in order that each tyre be equally loaded with a test load corresponding to the load carrying capacity allowed for that tyre type at 15 km/h.

E-4.3 Run the trailer at a constant speed of 15 ± 1 km/ h for 48 h. Temporary interruptions are allowed, but they shall be compensated by an additional run-in of 5 min for every 20 min of interruption.

E-4.4 The tyre pressure shall not be corrected and the test load shall be kept constant throughout the test.

E-4.5 During the test the ambient temperature shall be between 5°C and 30°C or at another temperature if the manufacturer so agrees.

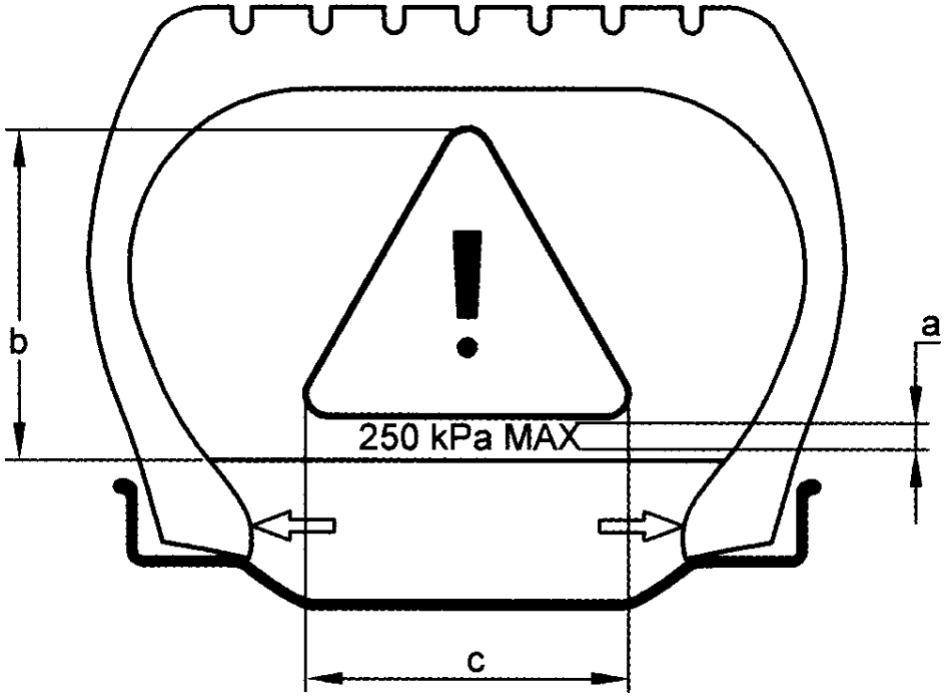
E-5 EQUIVALENT TEST METHODS

In case a method other than those described above is used, its equivalence shall be demonstrated.

ANNEX F

[*Clause* 5.1(l)]

EXAMPLE OF THE PICTOGRAM TO BE MARKED ON BOTH TYRE SIDEWALLS OF THE TYRES TO EXPLICIT THE MAXIMUM INFLATION PRESSURE NOT TO BE EXCEEDED FOR BEAD SEATING DURING TYRE MOUNTING



where,

a = 2 mm min (height of lettering)
b = 12 mm min for tyre section height ≤ 120 mm
18 mm min for tyre section height > 120 mm
c = 14 mm min (width of lettering)

The value of inflation pressure (250 kPa in example) shall be the same as specified by the tyre manufacturer in item 18 of Annex G.

FIG. 2 PICTOGRAM

where,

Minimum height of markings, mm
a = 2 mm, Min

The value of inflation pressure (250 kPa in example) shall be the same as specified by the tyre manufacturer in item 18 of Annex G.

.FIG. 3 SAFETY WARNING

ANNEX G

(*Clause* 6.2.2)

INFORMATION TO BE SUBMITTED FOR TYPE APPROVAL OF TYRES

1) Manufacturer's name and address
2) Contact No. (Telephone/Mobile)
3) FAX No.
4) E-mail address
5) Contact person/Authorised signatory
6) The tyre size designation as defined in **3.14**.
7) Trade-name or mark
8) The category of use as defined in **3.1.3.**
9) The Structure: diagonal ply/radial ply
10) The speed symbol
11) The load index of the tyre/maximum load carrying capacity (kg) specifying in case of implement tyres that for traction (only) and that for trailer application, if applicable
12) Whether the tyre is to be fitted with or without an inner tube
13) Ply-rating number of tyres for (for code designated tyres)
14) Overall section width, mm
15) Overall diameter, mm
16) The rim on which the tyre can be mounted
17) The rim to be used for measurements and the rim to be used for tests
18) The cold inflation pressure (in kPa) that shall not be exceeded for bead seating during tyre mounting, as specified by the tyre manufacturer for the tyre type

    a) Inflation pressure (in kPa) corresponding to maximum load carrying capacity
    b) Inflation pressure (in kPa) for tests
    c) Inflation pressure (in kPa) for measurements

19) Factor 'X' referred to in **3.18** in case of theoretical (imaginary) rim, if applicable
20) Intended for use on (type of vehicle)
21) The supplementary service description, if applicable
22) Sketch, or a representative photograph, which identified the tyre tread pattern. Sketch of the inflated tyre mounted on the measuring rim showing the relevant dimensions. Drawing or photographs in triplicate identifying tyre tread pattern side wall marking and relevant dimensions of inflated tyre mounted on the measuring rim

ANNEX H
(*Clauses* 3.9 and 5.1)

H-1 TYRE CLASSIFICATION CODE (OPTIONAL MARKING)

Tyre classification code given in Table 26 shall be used. This is an optional marking.

Table 31 Tyre Classification Code
(*Clauses* H-1)

Sl. No.	Classification Code	Nomenclature
(1)	(2)	(3)
i)	F-1	Agricultural tractor steering wheel tyres: single rib tread
ii)	F-2	Agricultural tractor steering wheel tyres: multiple rib tread
iii)	G-1	Garden tractor tyres (implement tyres): traction service
iv)	I-3	Agricultural implement tyres: traction tread
v)	R-1	Agricultural tractor drive wheel tyres: regular tread
vi)	R-2	Agricultural tractor drive wheel tyres: cane and rice service (deep tread)
vii)	LS-1	Logging and Forestry service tyre/regular tread