ANNEX 1

(Item 2.2)

AUTOMOTIVE TYRES, TUBES AND RIMS SECTIONAL COMMITTEE, TED 7

SCOPE — Standardization of automotive tyres, tubes, rims, and related.
Co-ordination of work with ISO/TC 31and its relevant subcommittees

Meeting No.	Date	Venue
37th Meeting	28th April 2023	Hybrid Meeting
38th Meeting	10th July 2023	Virtual Meeting
39th Meeting	28th August 2023	Virtual Meeting

Sl. No.	NAME OF ORGANIZATION	REPRESENTED BY Principal member (P) Alternate member (A) Young Professional (YP)	Attendance			
			37th	38th	39th	Total
1)	IN INDIVIDUAL CAPACITY	Shri D. P. Saste (Chairman)	Y	Y	Y	3/3
~~2)~~	~~All India Motor Transport Congress, New Delhi~~	~~Shri Naveen Gupta (P)~~ ~~Shri Pramod Bhavsar (A)~~	~~N~~	~~N~~	~~N~~	~~0/3~~
3)	Ashok Leyland Limited, Chennai	Shri N Muthu Kumar (A) Shri Ved Prakash Gautam (A)	N	Y	Y	2/3
4)	Association of State Road Transport Undertakings, New Delhi	Shri R Chandrababu (P) Shri Ulhas Babu (A) Shri RRK Kishore (A)	N	Y	Y	2/3
5)	Automotive Component Manufactures Association of India, New Delhi	Shri Sanjay Tank (P) Ms. Seema Babal (A)	Y	Y	N	2/3
6)	Automotive Research Association of India, Pune	Shri A Akbar Badusha (P) Shri Vyankatesh S Khairatkar (A) Shri Pranab Devrajan (YP)	Y	Y	Y	3/3
7)	Automotive Tyres Manufacturers Association, New Delhi	Shri Rajiv Budhraja (P) Shri T. C. Kamath (A)	Y	Y	Y	3/3
8)	Bajaj Auto Limited, Pune	Shri Arvind V. Kumbhar (A) Shri R. Narasimhan (P)	Y	Y	Y	3/3
9)	Central Institute of Road Transport, Pune	Shri Mangesh M Pathak (P) Shri Sanjay Salunkhe (A)	Y	Y	Y	3/3

Sl. No.	NAME OF ORGANIZATION	REPRESENTED BY Principal member (P) Alternate member (A) Young Professional (YP)	Attendance			
			37th	38th	39th	Total
10)	Directorate General of Quality Assurance, Ministry of Defence, New Delhi	CQAV (P)	N	Y	N	1/3
11)	In personal Capacity	Shri T Chakaravarty (Personal Capacity)	Y	Y	Y	3/3
12)	Hero Motocorp Limited, New Delhi	Shri Piyush Chowdhry (P) Shri Feroz Ali Khan (A) Shri Mohd. Danish Gazali (YP)	Y	Y	Y	3/3
13)	India Yamaha Motor Private Limited, Noida	Shri Mohit Kansal (P) Shri Rahul Singh Rajput (A)	N	Y	Y	3/3
14)	International Centre for Automotive Technology, Manesar	Shri Amit Kumar Karwal (P) Shri Vijayanta Ahuja (A)	Y	Y	N	2/3
15)	~~Indian Foundation of Transport Research and Training, New Delhi~~	~~Shri S. P. Singh (P)~~ ~~Shri J. S. Walia (A)~~	~~N~~	~~N~~	~~N~~	~~0/3~~
16)	Indian Rubber Manufacturers Research Association, Mumbai	Dr. K. Raj Kumar (P) Dr. Bharat Kapgate (A)	Y	Y	N	2/3
17)	Indian Tyre Technical Advisory Committee, New Delhi	Shri V. K. Misra (P) Shri Niteesh Shukla (A) Shri Vinay Vijayvargia (YP)	Y	Y	Y	3/3
18)	Kalyani Maxion Wheels Chakan, Pune	Shri Sunil Bhatambrekar (P)	Y	Y	Y	3/3
19)	Mahindra and Mahindra Limited, Mumbai	Shri Ram Singh (P) Shri Kulkarni Shailesh (A) Ms. Pathak Pushpanajali (YP)	Y	Y	Y	3/3
20)	Maruti Suzuki India Limited, Gurugram	Shri Gururaj Ravi (A) Shri Raj Kumar Dwivedi (YP)	Y	Y	Y	3/3
21)	Minda Kosei Aluminum Wheels Pvt. Ltd, Bawal	Shri Hemant Parkhi (P) Shri Dushyant Chauhan (A)	Y	Y	Y	2/3
22)	Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade, New Delhi	Shri A.P. Singh (P) Shri S S Gupta (P)	N	N	N	0/3
23)	Ministry of Road Transport and Highways, New Delhi	Director (P)	N	N	N	0/3
24)	National Automotive Testing and R and D Infrastructure Project, Indore	DR. P.P. Chattraraj (P) Shri S J Srihari Shri J K Chakrabarty (A)	N	N	Y	1/3
25)	Renault Nissan Technology & Business Centre India Pvt. Ltd., Chennai	Shri Rajendra Khile Shri Vivekraj Selvarathinam (Alternate) Shri C. V. Girish Chandh (YP)	N	Y	Y	2/3

Sl. No.	NAME OF ORGANIZATION	REPRESENTED BY Principal member (P) Alternate member (A) Young Professional (YP)	Attendance			
			37th	38th	39th	Total
26)	Skoda Auto Volkswagen India Pvt. Ltd, Mumbai	Shri Makarand Brahme (P) Shri Milind Jagatp (A) Smt. Aditi Deshpande (YP)	Y	Y	Y	3/3
27)	Society of Indian Automobile Manufacturers (SIAM), Delhi	Shri Prashant Kumar Banerjee (P) Shri Amit Kumar (A)	N	N	N	0/3
28)	Steel Strips Wheel Limited, Chandigarh	Shri Vimal P. Anand (P)	Y	Y	Y	3/3
29)	Suzuki Motorcycle Indian Pvt. Ltd., Gurugram	Shri Avinash Khot (P) Shri Ramkrishna Ahire (A) Shri Gaurav Singh (YP)	N	Y	Y	2/3
30)	TREA-Tyre Retreading Education Association, Mumbai	Shri Rahul Saxena	NA	Y	Y	2/2
31)	Tata Motors Limited, Pune	Shri Gowrishankar P. S. (P) Shri Amit Jain (A)	N	N	Y	1/3
32)	Toyota Kirloskar Motor Private Limited, Bidadi	Shri Raju. M (P) Shri Vijeth Gatty (A) Shri Dinesh G. M. (YP)	Y	Y	Y	3/3
33)	Tractor and Mechanization Association, New Delhi	Shri Philip Koshy (P) Shri Pradeep Shinde (A)	Y	Y	Y	3/3
34)	Triton Valves Limited, Bengaluru	Shri Bharath Chandrashekar (P) Shri Deepak HV (A)	Y	Y	Y	3/3
35)	Vehicle Research and Development Establishment, Ahmednagar	Shri S. Pal (P) Shri P.P. Mahajan (A)	Y	N	N	1/3
36)	~~Volvo Group India Private Limited, Bengaluru~~	~~Shri Karthik Sarma (P)~~ ~~Shri Pramod Kumar Hugar (A)~~	~~N~~	~~N~~	N	0/3
37	Volvo Trucks India, VE	Shri Pramodkumar Hugar Shri Nithin Roy	N	N	N	0/3
38)	Wheels India Limited, Chennai	Shri Padmanabhan V (P) Shri Senthil Kumar (A) Shri Shiv Narayan Giri (YP)	Y	Y	Y	3/3
39)	Enkei Wheels (I) Limited	Nomination awaited	-	-	-	-
40)	MG Motor India Private Limited	Nomination awaited	-	-	-	-
41)	CFMTTI, Budni	Nomination awaited	-	-	-	-
42)	GARC	Nomination awaited	-	-	-	-

Note- In 39th meeting of TED 7, committee recommended to withdraw: AIMTC, IFTRT and Volvo Group (for detail, please refer the minutes of 49th meeting)

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Annexure 2
(Sl No 6 of ITEM 3)

Draft received from Triton Valve

Automotive Tyres, Tubes and Rims Sectional Committee, TED 7

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rims Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1979 and was revised in 1985, 1992, 2001, 2011 and 2017.
In this proposed revision, based on industry feedback:

a) ***Tolerance on rubber Base diameter changed to +1 / -2***

b) ***Truck & Bus valves with base diameter*** *70 added*

c) New Truck & Bus valves with base diameter 95 ***and with 10V2 threads*** & optional core chamber ***No.3 regularized.***

d) ***JS 430, PVR 70,*** *F 35 3 17,* ***TR 416S, TR 416, V3.20 Series, V3.22.1, TR 542 Series, TR 570 Series, TR 618A*** *, V3-18 Series, TR J690 series* ***Valves added***

e) Modifications in figures and tolerances have also been done in order to align them with the present worldwide practices.

f) ***In this revision of standard updated valves with optional Core Chamber No.3 wherever applicable***

g) *Valve accessories added for standardization.*

Valves designation system comprising six character alpha-numeric code derived from their major functional as well as basic dimensional characteristics as per IS 10939 : ***2021*** 'Designation system for tyre tube valves for automotive vehicles *(first revision)*, has been used in this standard.

A list of widely used valves with their valve designation along with ***TR&A***, ETRTO and ***JATMA*** valve codes is given in Annex A.

For the purpose of deciding whether a particular requirements 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 : *2002* 'Rules of rounding off numerical values (*revised*)'. 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 – VALVES AND VALVE ACCESSORIES FOR PNEUMATIC TYRES- **SPECIFICATION**

(*Sixth Revision of IS 9081*)

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1 SCOPE

This standard specifies the dimensions, materials, tests and acceptance standards for valves and valve accessories for tyre tubes as supplied for application with inner tubes, and valves for use with automotive vehicles including two wheeled vehicles, off-the-road vehicles and animal drawn vehicles. This standard gives those dimensions of commonly used valves which are important for fitment and interchangeability. Although the tests for valve cores have been included, the dimensions for valve core chambers have not been included since the same is covered in IS/ISO 20562 'Tyre Valves-ISO Core Chambers No. 1, No. 2 and No. 3'. Valve caps are also not covered in this standard since these are covered by IS 9453 'Specification for valve caps for tyre tube valves for automotive vehicles.'

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of 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 No.	*Title*
319 : 2007	Free cutting leaded brass bars, rods and sections (*fifth revision*)
2500 (Part 1) : 2000	Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptance quality level (AQL) for lot-by-lot inspection (*second revision*)
2704 : 1983	Brass wires for cold-headed and machined parts (*first revision*)
3168 : 1981	Specification for brass strip and foil for deep drawing (*first revision*)
3400(Part 2) : ***2014***	Methods of test for vulcanized rubbers: Part 2 Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD (*third revision*)
4170 : 1967	Brass rods for general engineering purposes

6912 : 2005	Copper and copper alloy forging stock and forgings (*first revision*)
IS/ISO 4570 : 2002	Tyre valve threads
10939 : ***2021***	Designation system for tyre tube valves for automotive vehicles (first revision)
IS/ ISO 14960-P1 : 2014	***Tubeless tyres - valves and components - Test methods.***
IS/ISO 14960-P2 : 2014	***Tubeless tyres - valves and components - Clamp-In tubeless tyre valves - Test methods.***

3. VALVE CLASSIFICATION

3.1 Rubberized Valves

a) Truck valves;

b) Passenger car valves;

c) Motor cycle valves, scooter valves, moped (light duty) valves; and

d) Off-the-road vehicles (OTR) valves, agricultural tractor (including power tiller) valves and animal drawn slow moving vehicle (ADV) valves.

3.2 Supply Condition of Valves

a) Unless otherwise specified, valves as per respective designation indicates straight form;

b) Valve designation with suffix 'SB' indicates 'Single bend' form and

c) Valve designation with suffix 'DB' indicates 'Double bend' form.

4 DIMENSIONS AND DESIGN FEATURES

4. l Dimensional tolerances, in mm (*see* Fig.1) shall be as follows ***(unless specified):***

a) Effective length	:	+ 1.00 − 2.00
b) Rubber base diameter	:	***+ 1.00*** −2.00
c) Rubber base thickness	:	± 0.50
d) Bend height	*:*	***± 1.5***

e) Bend length : ± 4.0

f) Bend angle : ± 2°

4.2 The basic dimensions of the valves classified in 3.1 shall conform to those in Fig. 2 to *Fig. 40*.

4.3 Details of valve threads shall conform to IS/ISO 4570.

5 VALVE DESIGNATION

5.1 Valves shall be designated in accordance with IS 10939.

5.2 Reference may be made to IS 10939 for examples and details for designating widely used valves

6 REQUIREMENTS FOR RUBBERIZED VALVES

6.1 Material

The metal stems of inserts may be made from brass conforming to IS 319 or IS 2704, IS 4170, IS 6912 or any other suitable brass material. The rubber base shall be butyl rubber / Halo butyl rubber / ***butyl EPDM*** and its derivatives and blends. Natural rubber and its derivatives and blends may also be used, if specified by the purchaser.

6.2 Bendability of Valve Stem

6.2.1 Truck valves shall be bendable to 90° and scooter valves to 55° and 90° with the help of the appropriate valve bending tools, without breaking or cracking during bending.

6.3 Hardness

The rubber forming the valve base shall be tested for hardness either by a shore Type A durometer, if practicable or an IRHD Micro-hardness Tester. The hardness shall be between 58 to 73 measured on the shore Type A durometer or on the IRHD Micro-hardness Tester. The testing shall be done in accordance with IS 3400 (Part 2).

6.4 Pull-Out Strength of Rubber Base

Rubber covered valves when tested for stem pull out strength according to 6.4.1, shall meet the minimum breaking load values specified in 6.4.2.

6.4.1 *Procedure*

The rubber base of the valve shall be clamped in a fixture and the cap thread or body thread shall be screwed on the threaded adapter on a suitable tensile testing machine. The hole in the fixture through which the valve comes out shall be 15 mm in diameter for moped valves (*see* Fig. *29*), 22.2 mm in diameter in case of scooter and motor cycle valves (smaller base diameter) (*see* Figs. *26, 27 & 30*) and 31.8 mm diameter for other valves and *38mm for large bore spuds (see fig.34).* A direct pull shall be made at the rate of 15.0 cm/min until the rubber base separates from the stem. The minimum pull out values shall determine conformance of the quality to the acceptable standard.

6.4.2 Minimum breaking (Pull out) load values shall be as follows:

Sl. No.	*Valve Type*	*Designation*	*Minimum Breaking Load (Pull Out Values) N*
(1)	(2)	(3)	(4)
i)	Scooter valves	A 40 2 45	450
		A 47 2 45	450
ii)	Motor cycle valves	A 29 1 45	450
iii)	Moped valves	A 29 1 32	350
iv)	Passenger car valves	B 35 3 57	450
		B 35 4 57	500
		B 35 5 57	700
		B 49 5 57	700
		B 35 1 57	350
		B 46 3 57	450
		B 57 3 57	450
v)	Agricultural vehicle off-the-road (OTR) vehicle and animal drawn vehicle valves	B 20 5 63 / B 20 5 82	900
		B 30 5 63 / B 30 5 82	900
vi)	Truck and bus valves	A 65 5 82 / A 65 5 95	1750
		A 83 5 82 / A 83 5 95	1750
		A 97 5 82 / A 97 5 95	1750
		A A6 5 82 / A A6 5 95	1750
		A B1 5 82 / A B1 5 95	1750
		A B4 5 82 / A B4 5 95	1750
		A C3 5 82 / A C3 5 95	1750
		A D4 5 82 / A D4 5 95	1750
		A E7 5 82 / A E7 5 95	1750
		A G0 5 82 / A G0 5 95	1750
		A 95 5 95	***1750***
vii)	Spud for large bore	L 08 6 B4	2000

6.5 Adhesion Test

Adhesion test is conducted to test the bond between metal and rubber. In all cases, adhesion shall be considered to be unacceptable, if the total area of separation between brass and rubber, or brass and cement, or cement and rubber is in excess of 41 mm^2.

6.5.1 *Method of Checking*

After subjecting the valve to the hot air treatment (*see* 6.5.2) the rubber cover over the stem or metal insert shall be cut down to the metal face. Each side of the cut rubber base or cover shall be gripped suitably and the rubber pulled away from the metal using pliers. As much rubber as possible, shall be removed from the base of the valve and the sides of the insert and the area of separation for rubber to metal bond shall be examined.

6.5.2 *Hot Air Treatment*

The valves for the adhesion test (*see* 6.5) shall be kept in hot air at a temperature of 165 ± 2°C for 10 min and allowed to cool down to room temperature before testing for adhesion.

6.6 Buffing

Valves shall be buffed (if required, by the purchaser) on the rubber base side which is to be vulcanized on to tubes. Buffing shall not be too rough or too smooth and the rubber base edge shall have a light feathery finish.

6.7 Workmanship

Valves shall be free from defects like incomplete rubber base, blisters larger than the size of a pin head, incomplete or damaged threads, foreign matter embedded in rubber base and cracks or cuts on rubber base or on the metal stem. The through hole in the valve stem shall be perfectly clear. Bloom shall be avoided to the extent of impairing of adhesion of valve base with the tube.

6.8 Marking

Containers of valves shall be clearly marked with the following:

a) Valve designation; and
b) Indication of source of manufacturer or code.

If practicable the above markings may also be carried out on the stem of the valve, or on the rubber with or without equivalent TR Code or ETRTO Code.

6.9 REQUIREMENT FOR TUBELESS VALVES

For test methods of rubber covered tubeless snap in valves, *refer* IS/ISO 14960 - Part 1 *(NEW IS standard to be generated – draft submitted by Triton)*

For test methods of tubeless clamp-in valves, *refer* **IS/ISO 14960** - Part **2**

7 VALVE CORE (*see* Fig. 26)

7.1 Materials

Valve core components may be manufactured from brass conforming to IS 319, IS 2704 or IS 3168 or any other suitable materials. The spring may be made from brass, phosphor bronze or stainless steel wire. The sealing washer material may be synthetic rubber or polymer.

7.2 Valve Core Leakage

Valve cores shall not leak (in excess of one bubble per minute) when tested according to 7.2.1.

7.2.1 The core shall be fitted into a tested valve stem with a torque of 0.23 to 0.56 Nm for core chamber No.1 and 3 and 0.34 to 0.56 Nm for core chamber No.2. Any desired pressure up to 900 kPa shall then be applied from the back of the valve while the tip of the valve is kept immersed in water, mouth downwards.

7.3 Valve Core Interchangeability

Valve core shall be interchangeable. Valve cores shall be made to dimensions such that when installed and properly tightened in valves, the core pin shall not extend above the level of the tip end of the valve by more than 0.25 mm or below the tip end of the valve by more than 0.9 mm.

7.4 Acceptable Operating Temperatures

The temperatures range of the valve cores functioning shall be between - 40°C and 100°C.

7.5 Marking

The packing / container of the valve core shall be marked with the valve core designation and indication of source of manufacturer or code. Valve Cores may not be marked, if it is not practicable to do so.

7.6 Workmanship

Valve cores shall be free from foreign matter, broken washer, etc. which lead to leakage.

8 QUALITY ASSURANCE PROVISION

8.1 Criteria of Conformity and Sampling for Inspection and Tests

8.1.1 For the purpose of ascertaining conformity to this standard, the extent of sampling and the criteria of conformity shall be subject to agreement between the purchaser and the manufacturer.

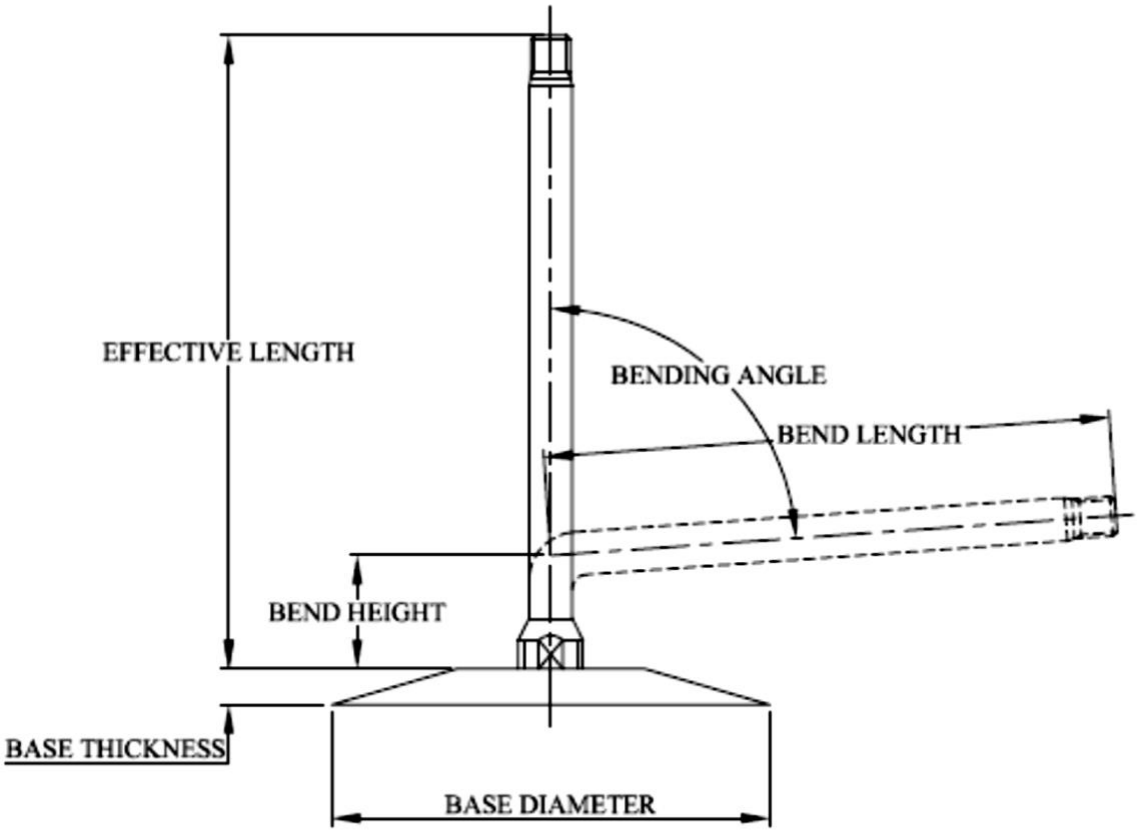
8.1.2 Unless otherwise agreed, the manufacturer is responsible for carrying out all inspection and test requirements as specified herein.

8.2 Sampling shall be according to IS 2500 (Part 1) and the samples shall be selected as per agreement between the manufacturer and the purchaser.

9 BIS CERTIFICATION MARKING

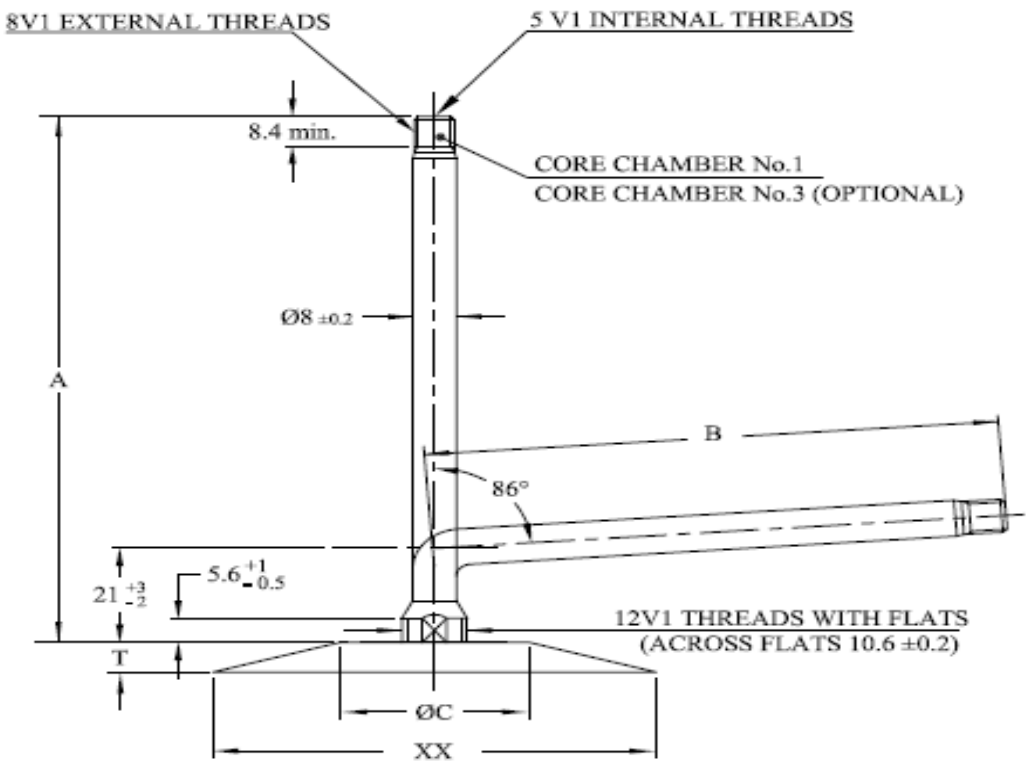
The product may also be marked with the Standard Mark.

9.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards



All dimensions in millimeters.

FIG. 1 DIMENSION TOLERANCES



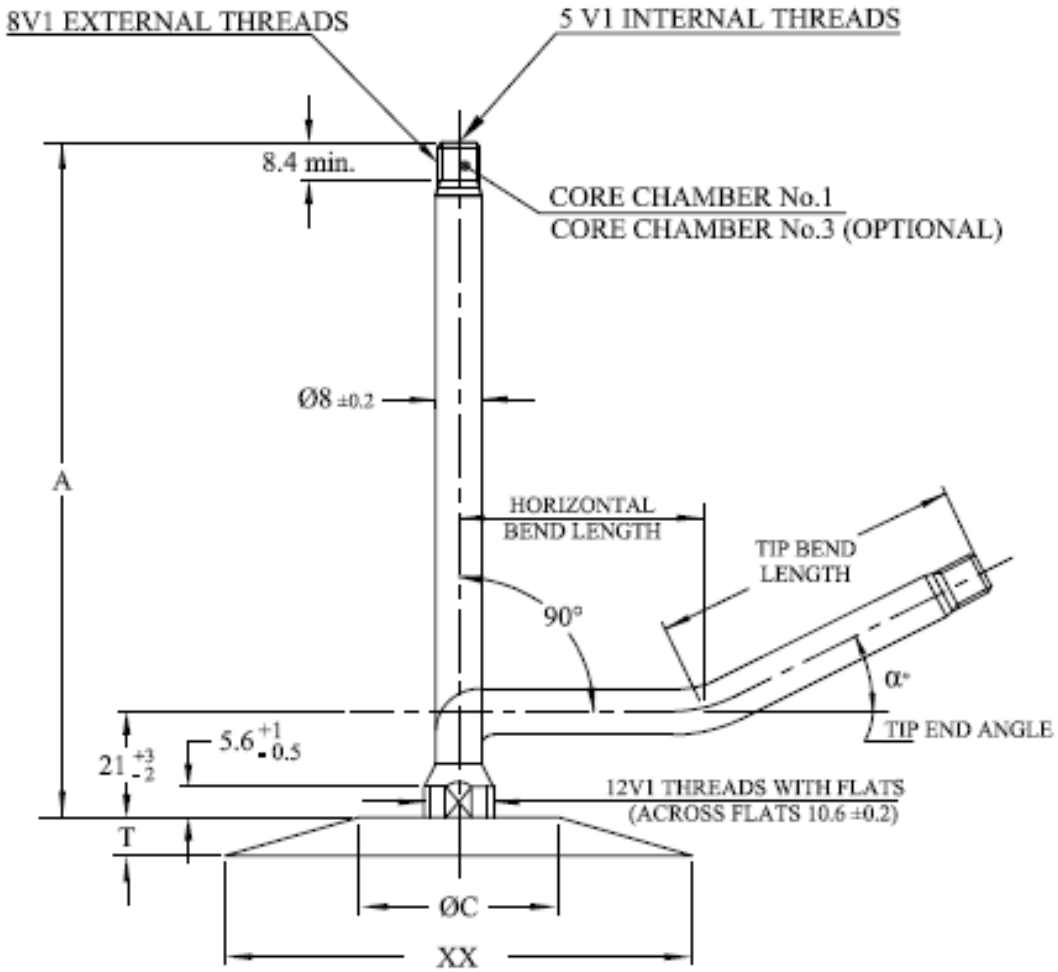
Valve Designation [1]	A	B
A 65 5 XX	65	48
A83 5 XX	83	66
A 97 5 XX	97	80
A A6 5 XX	106	89
A B1 5 XX	111	94
A B4 5 XX	114	97
A C3 5 XX	123	106
A D4 5 XX	134	117
A E7 5 XX	147	130
A G0 5 XX	160	143
[1] Designation with suffix 'SB' indicates Single Bend Valve		

XX: For Valves having base diameter 82, T = 7, ØC = 28 max.
For Valves having base diameter 95, T = 6.7, ØC = 20 max.

XX i.e., 82 or 95 may be marked either on metal insert or on the rubber base of valve

All dimensions in millimeters.

FIG. 2 TRUCK AND BUS VALVES



Valve Designation [1)]	A	Horizontal Bend Length	Tip End Angle (α°)	Tip Bend Length
A 97 5 XX	97	35	31°	48
A A6 5 XX	106	40	31°	51
A B4 5 XX	114	46	26°	54
A E7 5 XX	147	63	21°	70
A G0 5 XX	160	75	21°	70

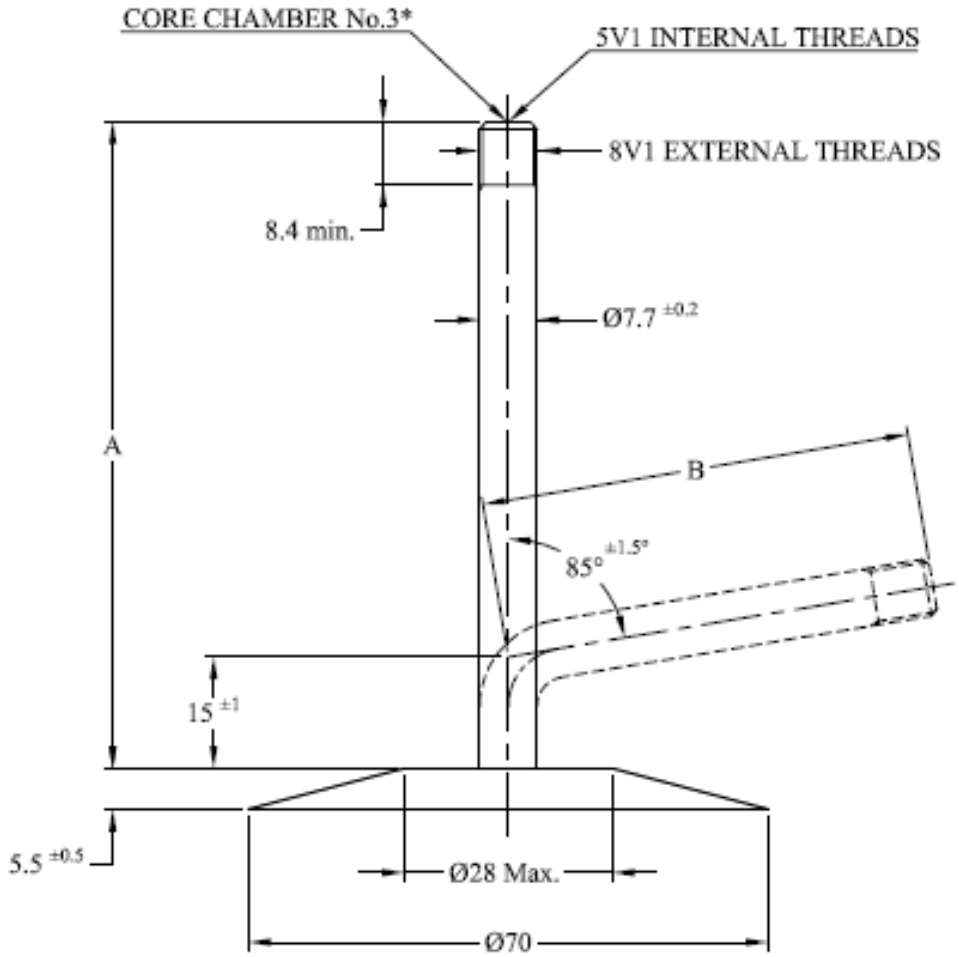
[1)] Designation with suffix 'DB' indicates Double Bend Valve

XX: For Valves having base diameter 82, T = 7, ØC = 28 max.
For Valves having base diameter 95, T – 6.7, ØC – 20 max.

XX i.e., 82 or 95 may be marked either on metal insert or on the rubber base of valve

All dimensions in millimeters.

FIG. 3 TRUCK AND BUS VALVES



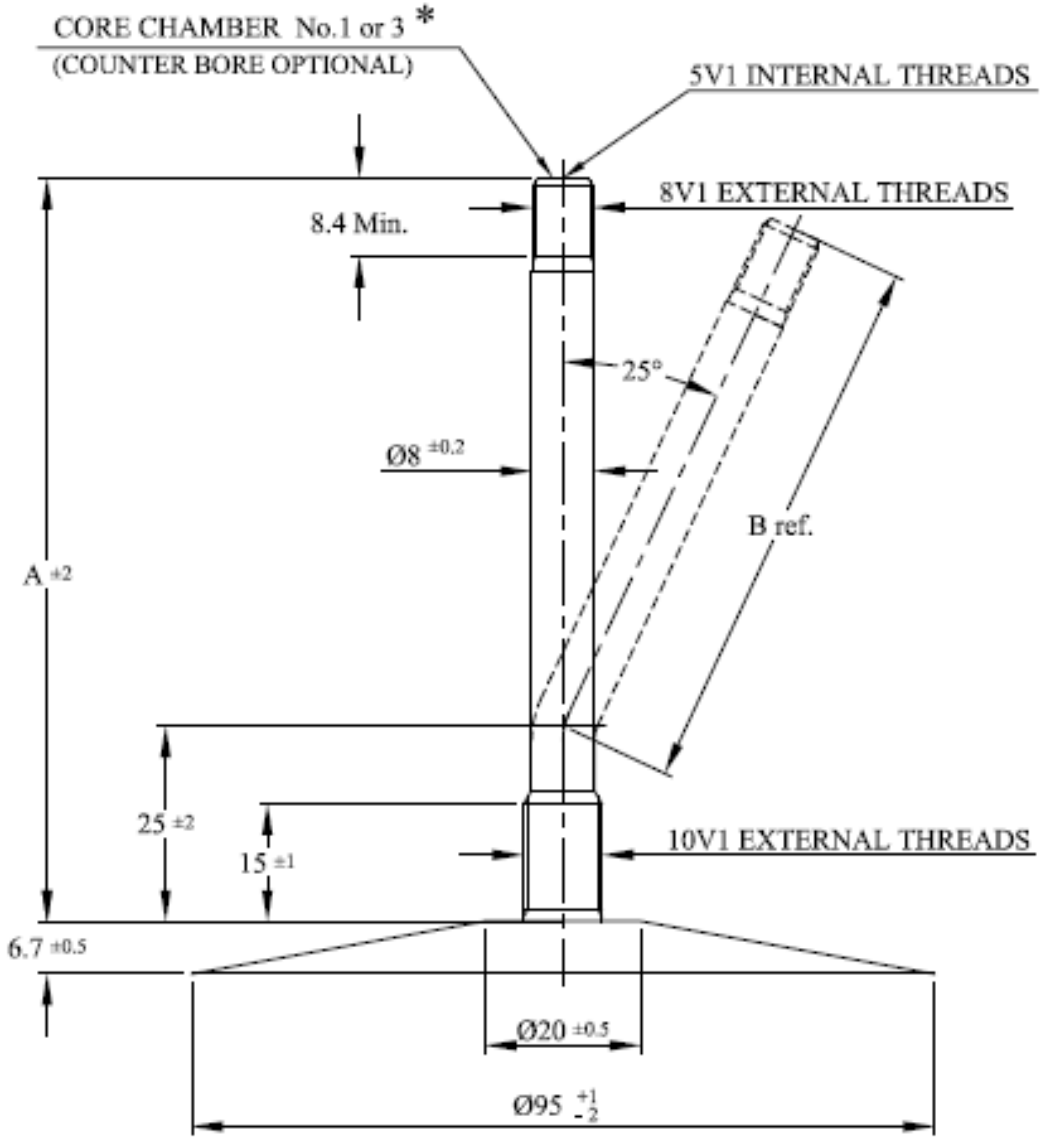
Valve Designation [1)]	A	B
A 85 5 70	85	75
A A5 5 70	105	95
A B5 5 70	115	105
A C5 5 70	125	115
A E5 5 70	140	130
A F5 5 70	155	145

[1)] Designation with suffix 'SB' indicates Single Bend Valve

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 4 TRUCK AND BUS VALVES



Valve Designation [1)]	A	B
A 95 5 95	95	70
[1)] Designation with suffix 'SB' indicates Single Bend Valve		

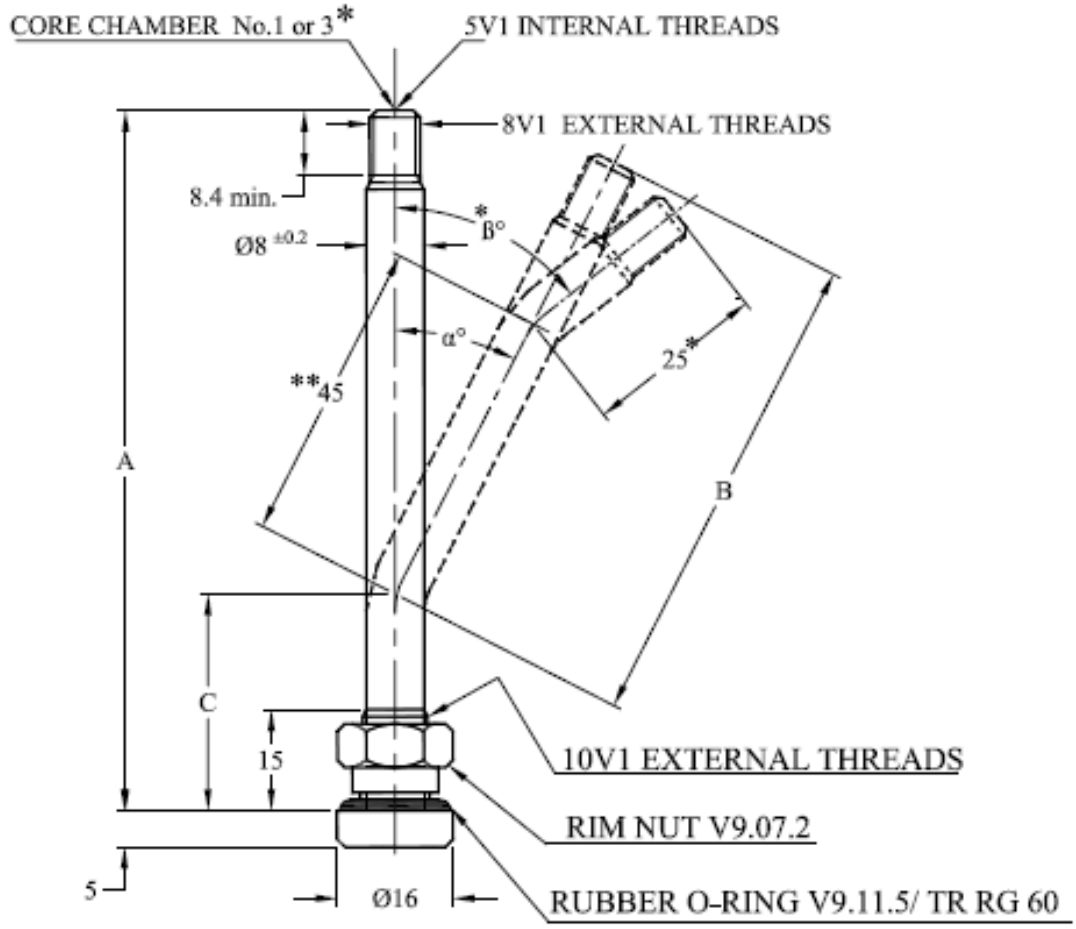
* Accommodates short core only

Accessories to be used : TR RW8 Ring washer & V9-07-2 Nut

Valve designation may be marked either on metal insert or on the rubber base of valve

All dimensions in millimeters.

FIG. 5 TRUCK AND BUS VALVES



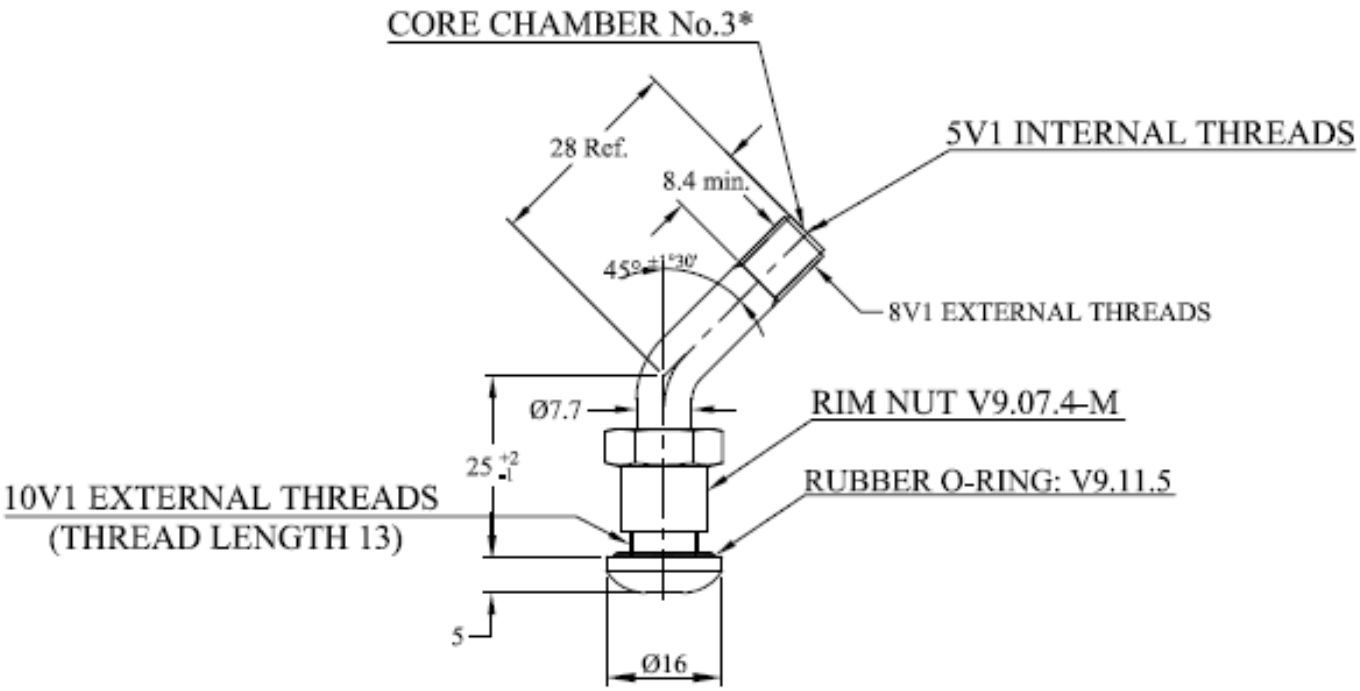
** FOR V3-20-11 ONLY

Valve Designation (ETRTO)	A	B $^{\pm 2}$	C $^{+2}_{-1}$	α°	ß°	Valve Hole Size in Rim	Installation Torque
V3.20.1	36	-	-	-	-	Ø 9.7 $^{+0.3}_{0}$	12 - 15 Nm
V3.20.2	90	60	30	17°30'	-		
V3.20.3	82	-	-	-	-		
V3.20.4	-	60	25	27	-		
V3.20.5	-	40	25	27	-		
V3.20.6	-	85	25	27	-		
V3.20.7	-	50	25	27	-		
V3.20.8	-	85	29	12	-		
V3.20.9	-	52	45	12	-		
V3.20.10	-	25	50	27	-		
V3.20.11	95	-	25	27	42		
V3.20.12	-	70	25	27	-		

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 6 TUBELESS CLAMP-IN TRUCK AND BUS VALVE
(O-RING TYPE - ROUND BASE)

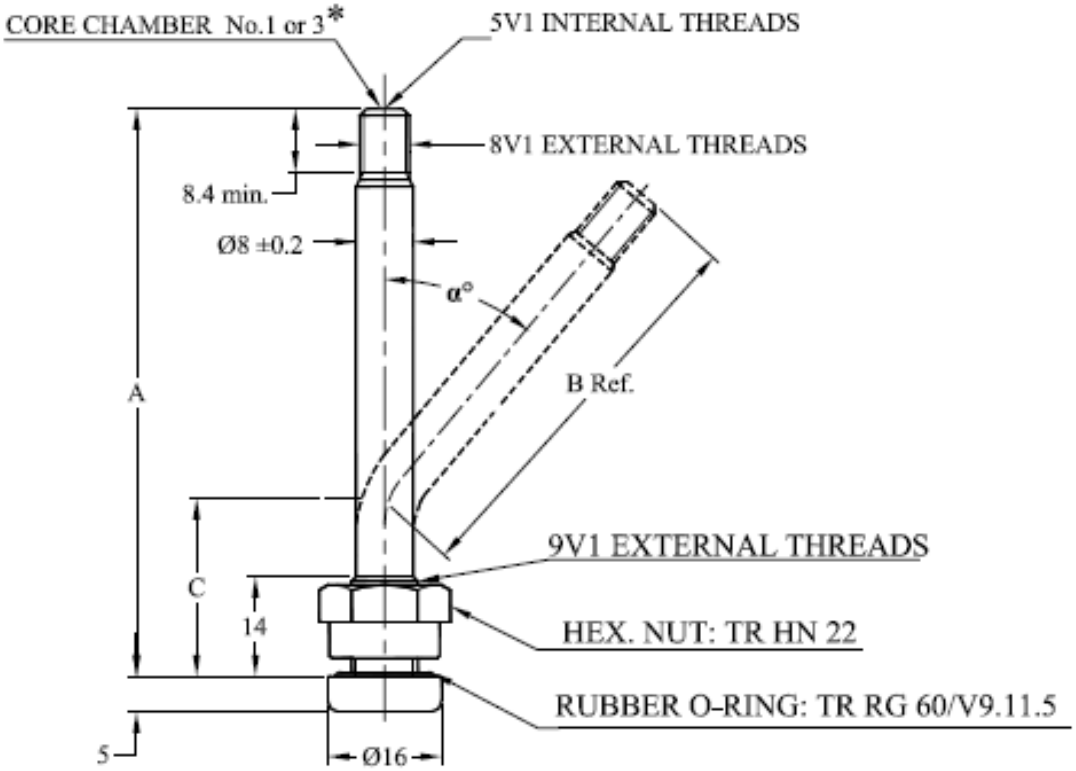


Valve Designation *(ETRTO)*	Valve Hole Size in Rim	Installation Torque
V3.22.1	Ø 9.7 $^{+0.3}_{0}$	12 - 15 Nm

NOTE: * ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 7 TUBELESS CLAMP-IN TRUCK AND BUS VALVE
(O-RING TYPE - ROUND BASE)

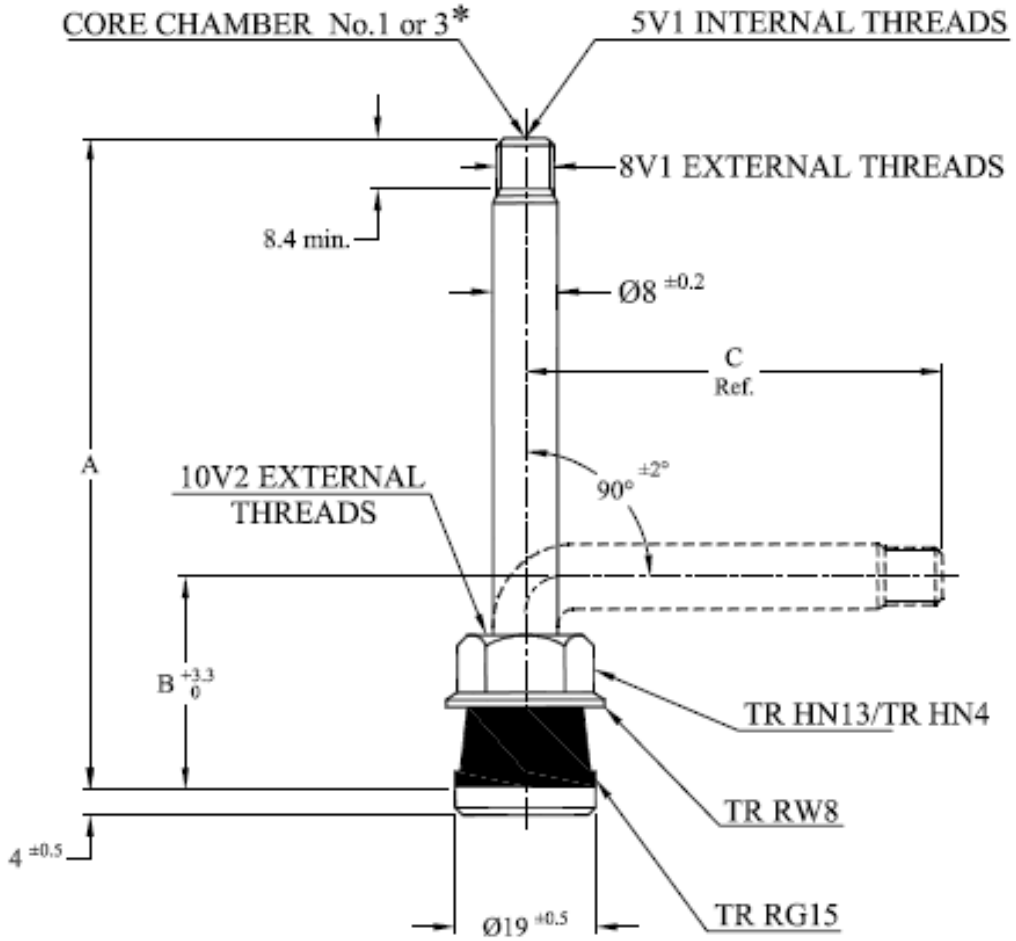


Valve Designation (TR Code)	A	B ±2	C $^{+2}_{-1}$	α° ±2°	Valve Hole Size in Rim	Installation Torque
TR 542	32	-	-	-	Ø 9.7 $^{+0.3}_{0}$	12 – 15 Nm
TR 543	59	-	-	-		
TR 543C	59	36.5	23.5	45		
TR 543D	59	35	25	60		
TR 543E	59	35	25	75		
TR 544	73	-	-	-		
TR 544C	73	49	25	45		
TR 544D	73	49	25	60		
TR 545	89	-	-	-		
TR 545D	89	66	25	60		
TR 545E	89	66	25	75		
TR 546	108	-	-	-		
TR 546-36	108	85	25	36		
TR 546 D	108	85	25	60		
TR 546 E	108	85	25	75		
TR 547 D	119	96	25	60		

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 8 TUBELESS CLAMP-IN TRUCK AND BUS VALVE
(O-RING TYPE - ROUND BASE)

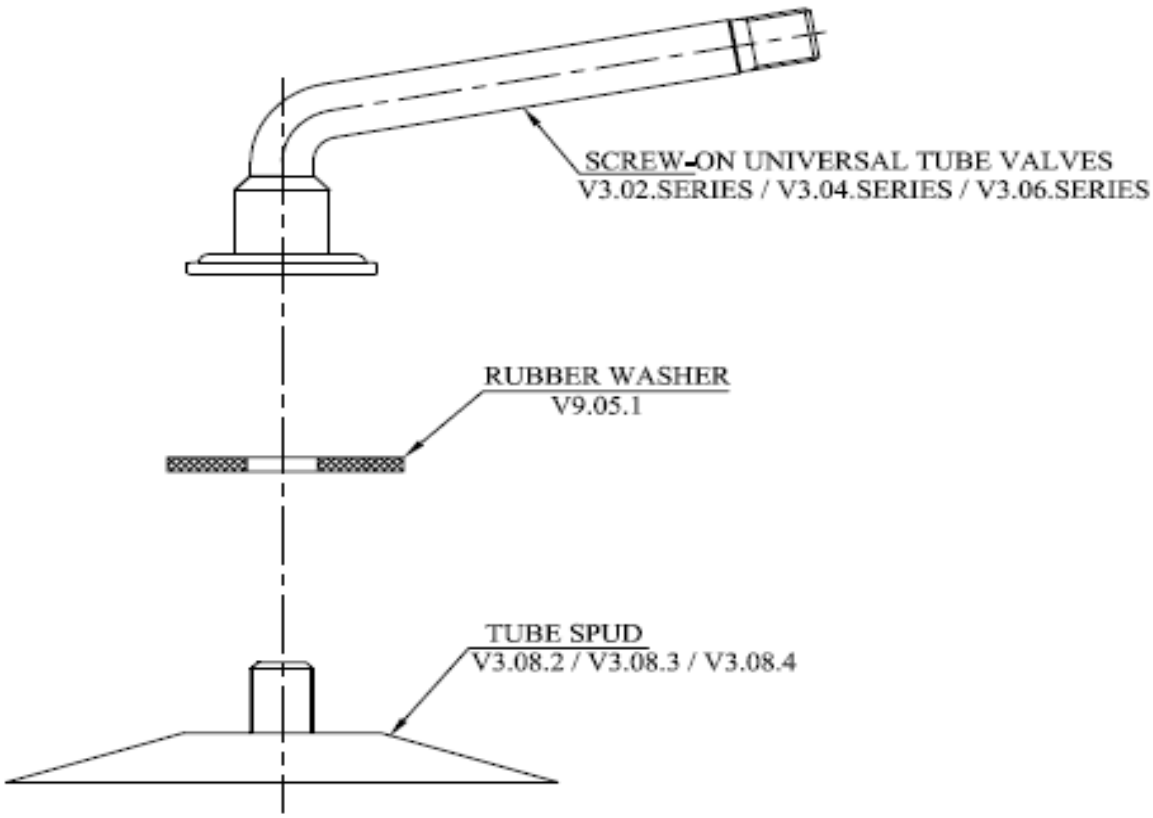


Valve Designation (TR Code)	**A**	**B** $^{+3.3}_{0}$	**C Ref.**	Valve Hole Size in Rim	Installation Torque
TR 575	29	–	–	Ø 15.7 $^{+0.3}_{0}$	4 - 6 Nm
TR 500	51	–	–		
TR 501	38	–	–		
TR 570	80	–	–		
TR 571	86	–	–		
TR 572	95	–	–		
TR 573	111	–	–		
TR 574	127	–	–		
TR 570C	–	33	51		
TR 571C	–	33	58		
TR 572C	–	33	67		
TR 573C	–	33	83		

* ACCOMMODATES SHORT CORE ONLY

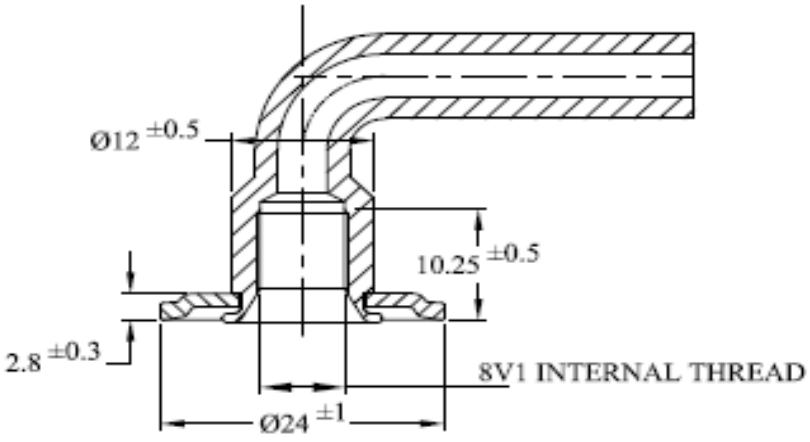
All dimensions in millimeters.

FIG. 9 TUBELESS CLAMP-IN TRUCK AND BUS VALVE
(GROMMET TYPE - ROUND BASE)



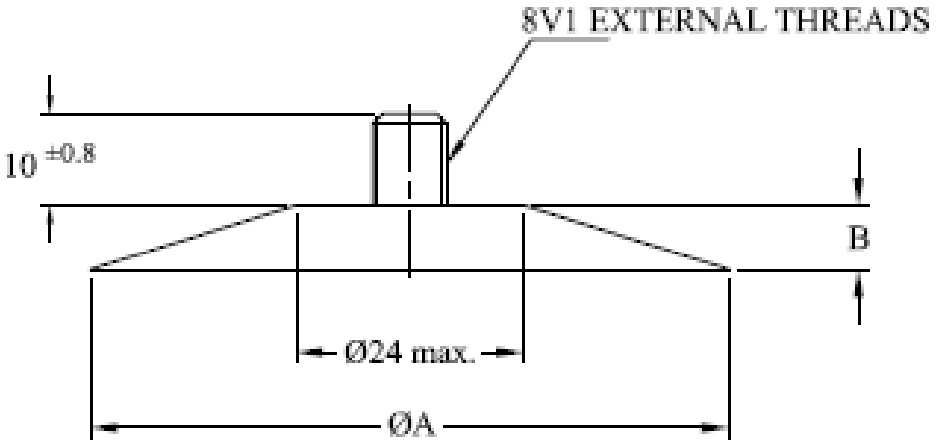
All dimensions in millimeters.

FIG. 10A SCREW-ON UNIVERSAL TUBE VALVES - ASSEMBLY



All dimensions in millimeters.

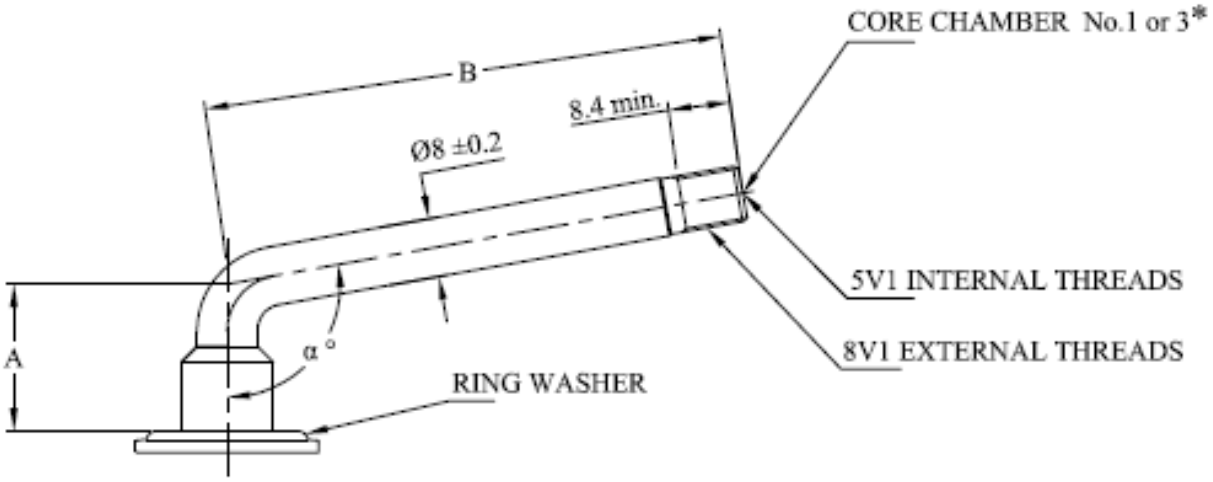
FIG. 10 SCREW-ON UNIVERSAL TUBE VALVE HEAD SHAPE – TRUCK AND BUS VALVES



Valve Designation *(ETRTO)*	A	B
V3.08.2	70	7
V3.08.3	80	8
V3.08.4	57	5

All dimensions in millimeters.

FIG.11 SCREW-ON UNIVERSAL TUBE VALVE SPUDS - TRUCK AND BUS VALVES

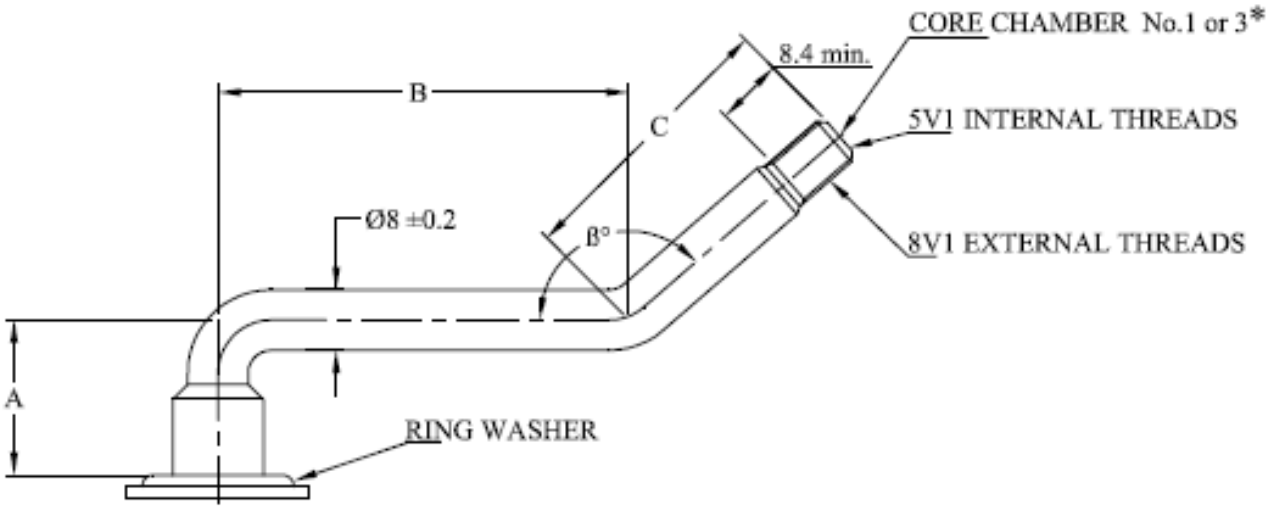


Valve Designation *(ETRTO)*	A	B	α °
V3.02.7	22.5	71.5	100
V3.02.8	20.5	89.5	94
V3.02.9	20.5	99.5	94
V3.02.10	20.5	115	94
V3.02.11	20	126	98
V3.02.12	20.5	132	94
V3.02.14	20.5	138.5	94
V3.02.15	20.5	145.5	94
V3.02.16	20.5	149.5	90
V3.02.18	22.5	74.5	90
V3.02.19	20.5	60	94
V3.02.20	22.5	56.4	95
V3.02.26	20.5	105	94
V3.02.27	20	75	94
V3.02.29	20	127	94

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG.12 SCREW-ON UNIVERSAL TUBE VALVE SINGLE BENT - TRUCK AND BUS VALVES

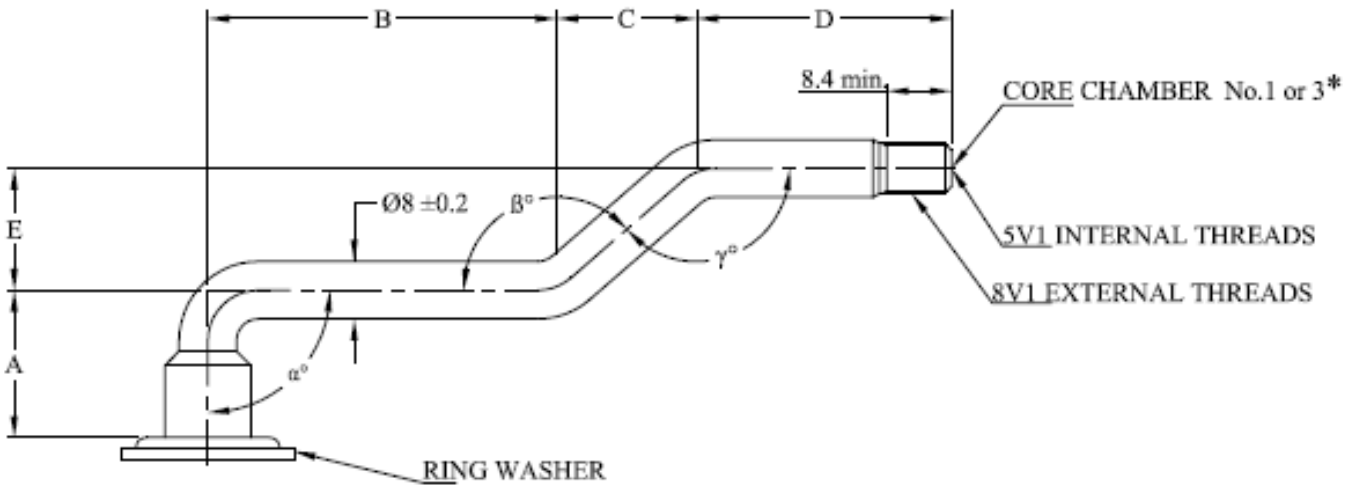


Valve Designation *(ETRTO)*	**A**	**B**	**C**	**α °**	**ß°**
V3.04.4	20	74	40	94	144
V3.04.5	20	76	47.5	90	153
V3.04.6	20	86	47.5	90	153
V3.04.10	20.5	47	53	90	154
V3.04.11	20.5	47	63.5	90	154
V3.04.15	20.5	42	38.5	90	120
V3.04.21	20	83	57	94	154
V3.04.25	20	80	47	94	164

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 13 SCREW-ON UNIVERSAL TUBE VALVE DOUBLE BENT - TRUCK AND BUS VALVES

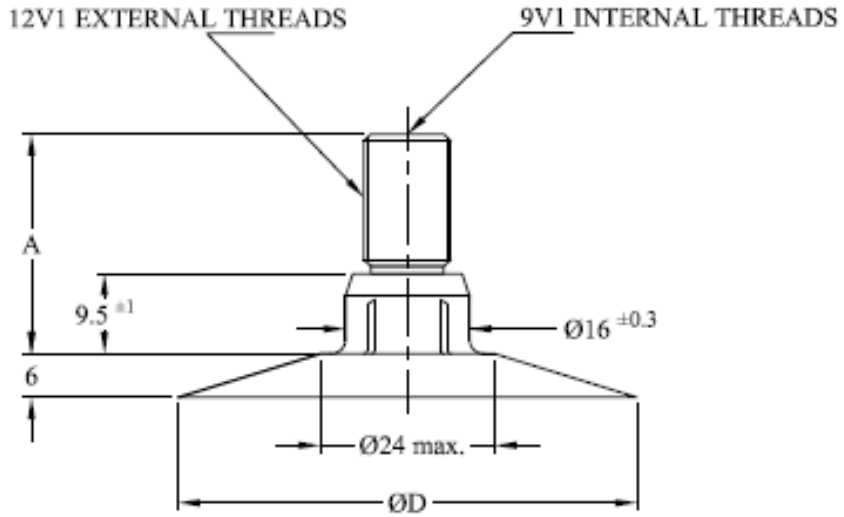


Valve Designation *(ETRTO)*	**A**	**B**	**C**	**D**	**E**	**α °**	**ß°**	**γ°**
V3.06.5	20.5	62.5	19.5	49	17	90	139	139
V3.06.6	20	79.5	19.5	37.5	17	90	139	139
V3.06.7	20.5	45.5	18.5	42.5	17	90	137	137
V3.06.8	24.5	61.5	14.5	50.5	7.5	94	153	153
V3.06.9	20.5	67.5	19.5	54.5	17	90	139	139
V3.06.16	20	62	13	50	7	94	153	153
V3.06.17	20	75	13	50	7	94	153	153

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 14 SCREW-ON UNIVERSAL TUBE VALVE TRIPLE BENT
- TRUCK AND BUS VALVES

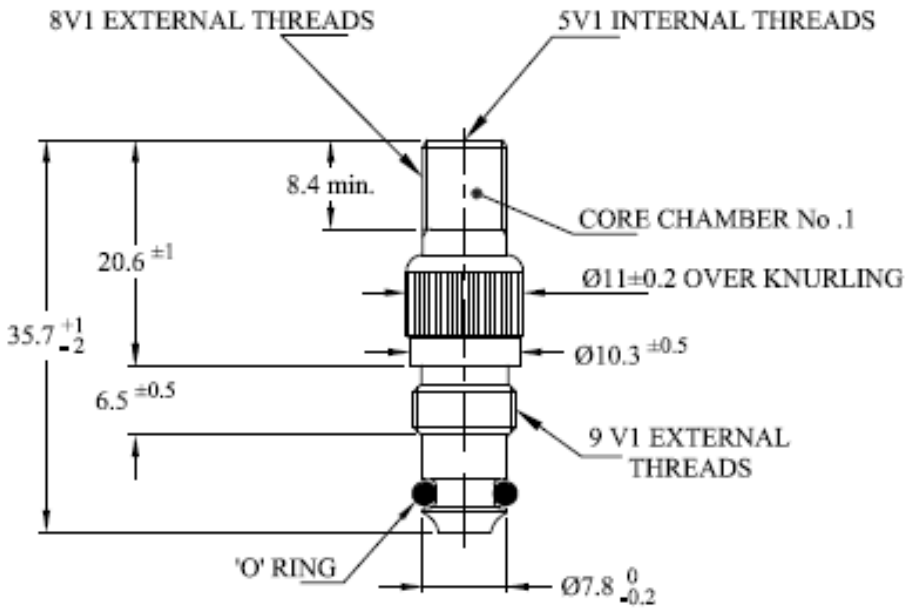


Valve Designation		A
B 20 5 63	B 20 5 82	20
B 30 5 63	B 30 5 82	30

For Valves B 20 5 63 & B 30 5 63 , ØD = 63
For Valves B 20 5 82 & B 30 5 82 , ØD = 82

All dimensions in millimeters.

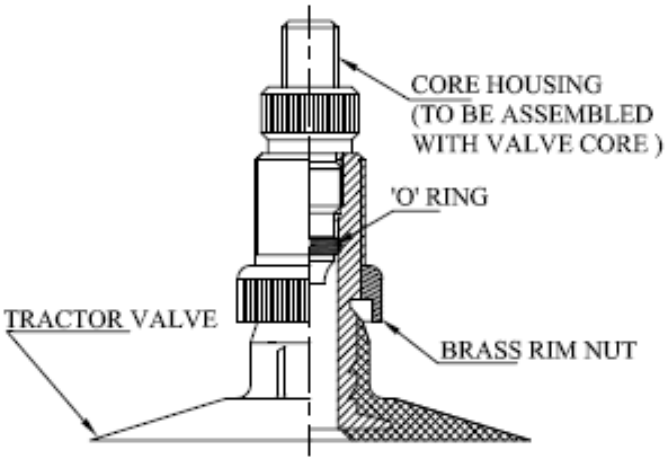
FIG. 15 TRACTOR VALVE AIR WATER FILLING TYPE.
(see FIG. 17 FOR ASSEMBLY)



CORE HOUSING

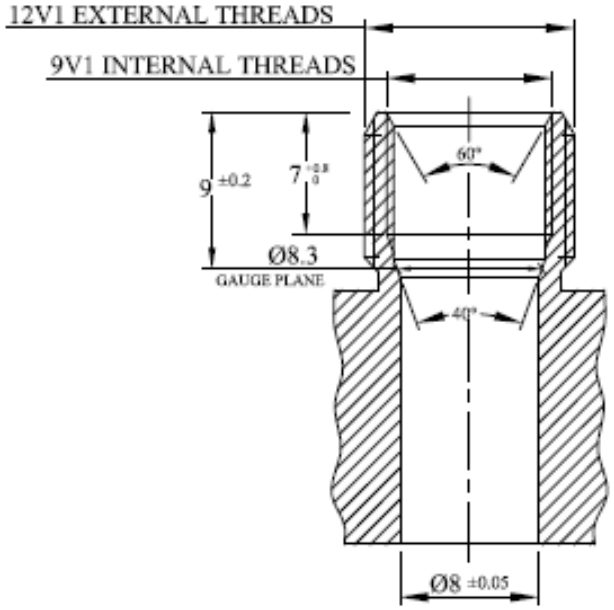
All dimensions in millimeters.

FIG. 16 CORE HOUSING, CH3

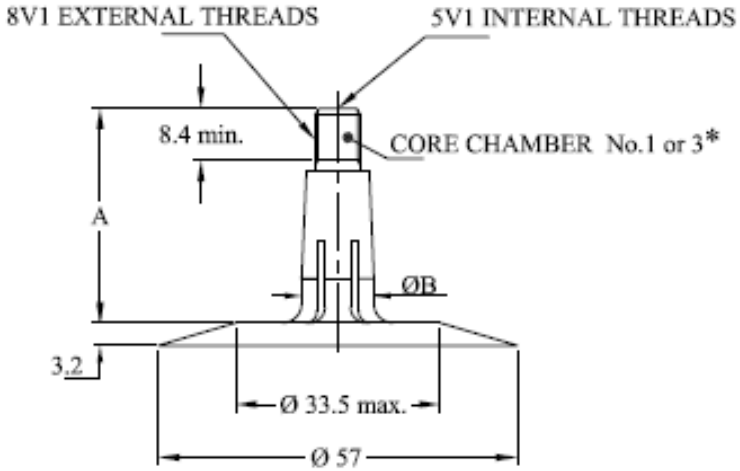


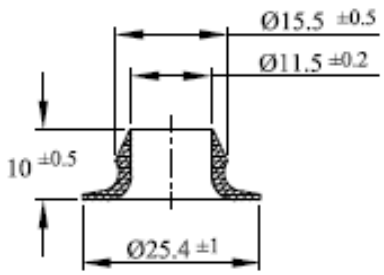
All dimensions in millimeters.

FIG. 17 TRACTOR VALVE ASSEMBLY



INTERNAL DETAILS OF
TRACTOR VALVE





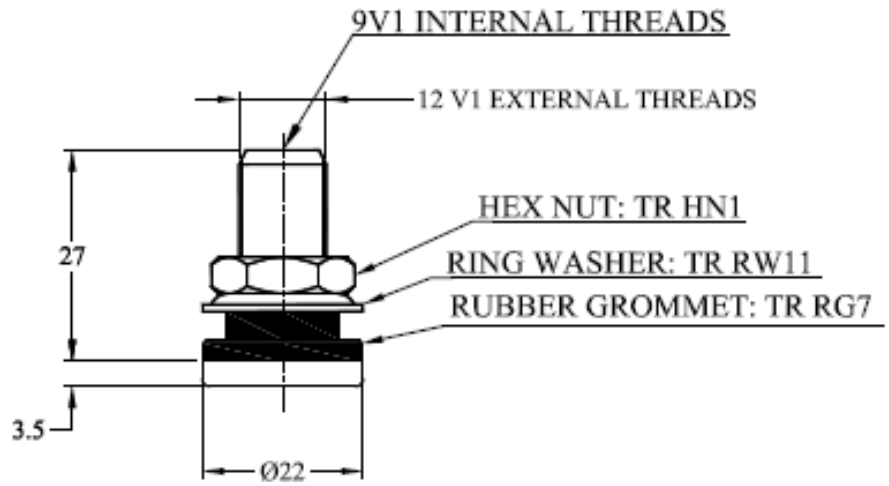
NOTE - Plastic bushing to make up for B dimensions of B 35 5 57 valve where necessay, to suit old design rims of 13 to 15 nominal diameter having a valve hole of 15.9 mm

Valve Designation	A	B (±0.3)
B 35 3 57	35	11.7
B 35 4 57	35	13.1
B 35 5 57	35	16.5
B 49 5 57	49	16.5
B 35 1 57	35	9.1

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

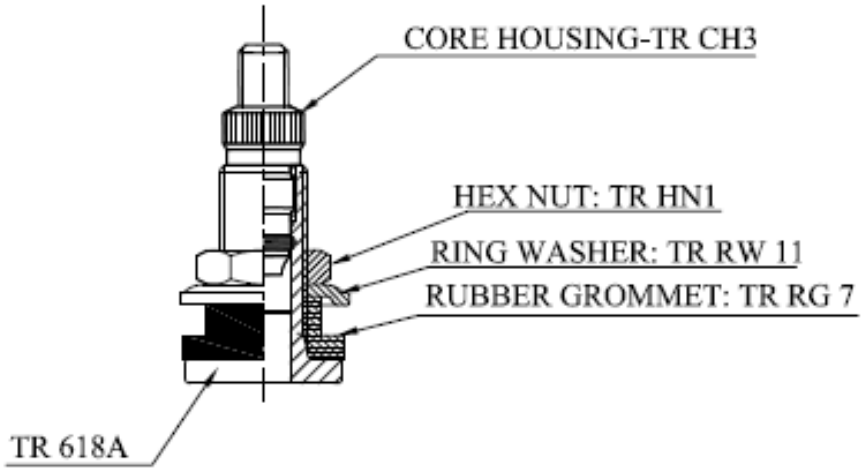
FIG. 18 RUBBER COVERED TUBE VALVE - PASSENGER CAR, JEEP, SCOOTER DERIVATIVES, FRONT TRACTOR LIGHT TRUCK, TRACTOR IMPLEMENT ANIMAL DRAWN AND FORK LIFT



Valve Designation *(TR Code)*	Valve Hole Size in Rim	Installation Torque
TR 618A	Ø 15.7 $^{+0.4}_{0}$	5 - 8 Nm

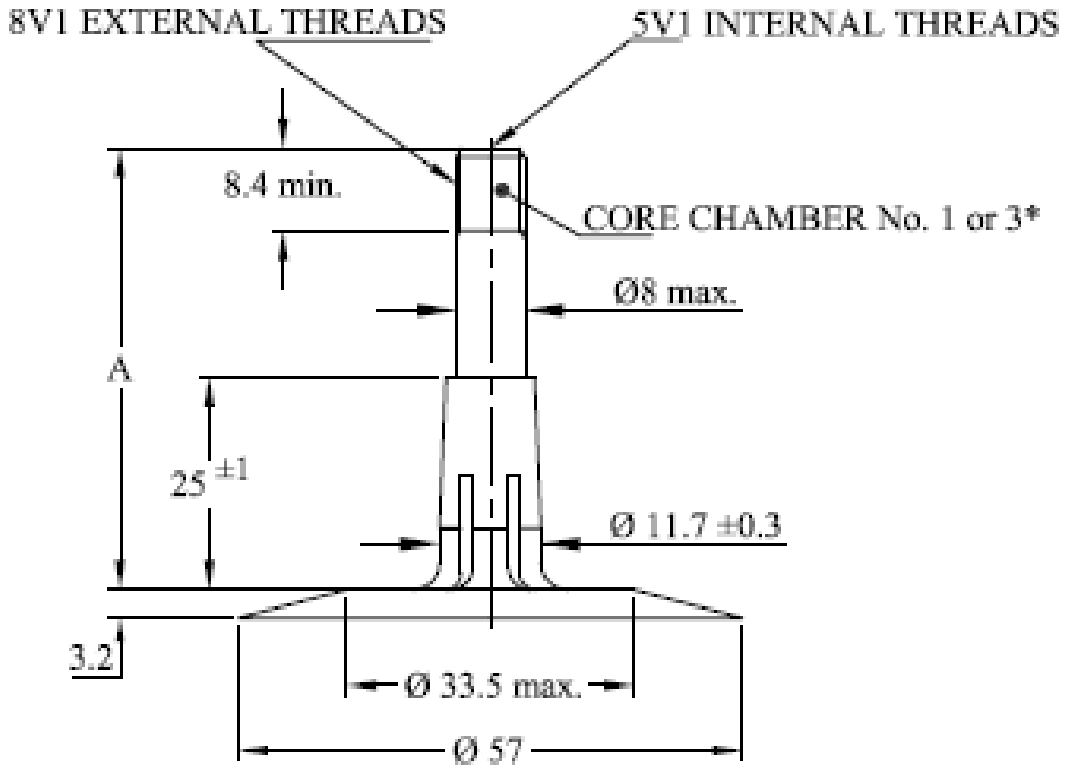
All dimensions in millimeters.

FIG. 19 TUBELESS CLAMP-IN TRACTOR VALVE AIR-WATER FILLING TYPE.
(see FIG. 20 FOR ASSEMBLY)



All dimensions in millimeters.

FIG. 20 TUBELESS CLAMP-IN TRACTOR VALVE ASSEMBLY

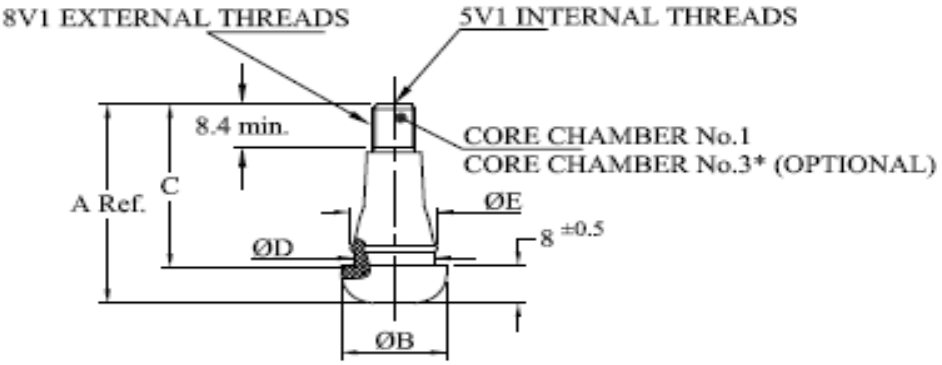


Valve Designation	A
B 57 3 57	57
B 46 3 57	46

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 21 RUBBER COVERED TUBE VALVES - PASSENGER CAR



Valve Designation	A	B $^{\pm 0.5}$	C $^{+1}_{-2}$	D	E $^{+0.5}_{0}$	Valve Hole Size in Rim
F 25 3 19 [1)]	33.0	19.5	25.5	15.0 min.	16.0	Ø11.3 $^{+0.4}_{0}$
F 35 3 19	42.5	19.5	35	15.0 $^{\pm 0.3}$	16.0	Ø11.3 $^{+0.4}_{0}$
F 41 3 19	48.5	19.5	41	15.0 $^{\pm 0.3}$	16.0	Ø11.3 $^{+0.4}_{0}$
F 54 3 19	61.5	19.5	54	15.0 min.	16.0	Ø11.3 $^{+0.4}_{0}$
F 67 3 19	74.0	19.5	66.5	15.0 min.	16.0	Ø11.3 $^{+0.4}_{0}$
F 49 3 19	56.5	19.5	49	15.0 min.	16.0	Ø11.3 $^{+0.4}_{0}$
F 35 5 24	42.5	24.0	35	19.2 min.	20.2	Ø15.7 $^{+0.4}_{0}$
F 54 5 24	61.5	24.0	54	19.2 min.	20.2	Ø15.7 $^{+0.4}_{0}$
F 35 1 16	42.0	16.0	35	12.3 min.	13.2	Ø8.8 $^{-0.3}_{0}$

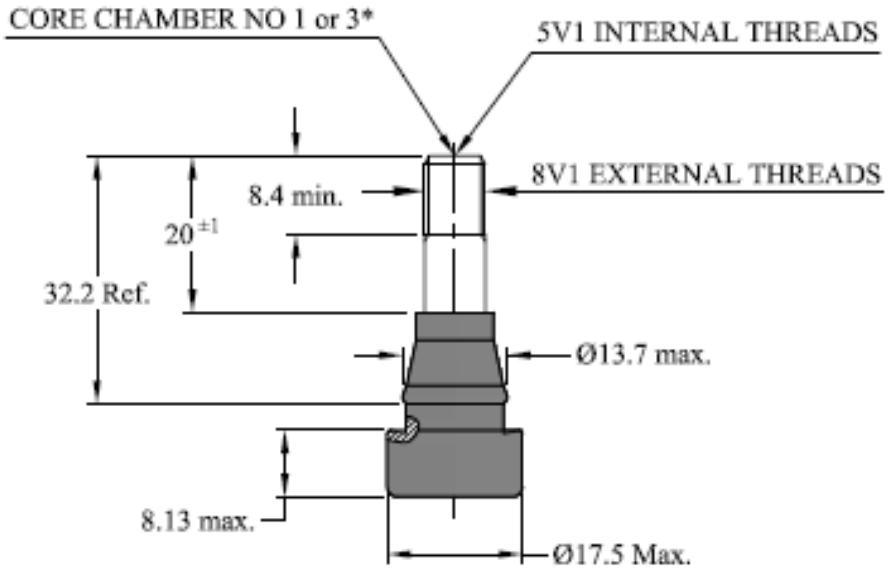
[1)] ONLY CORE CHAMBER No.3 FOR F 25 3 19

* ACCOMMODATES SHORT CORE ONLY

NOTE: PRODUCTS FOR USE UP TO 450 kPa COLD INFLATION PRESSURE MAXIMUM & 210 kmph MAXIMUM.

All dimensions in millimeters.

FIG. 22 RUBBER COVERED TUBELESS SNAP-IN VALVES

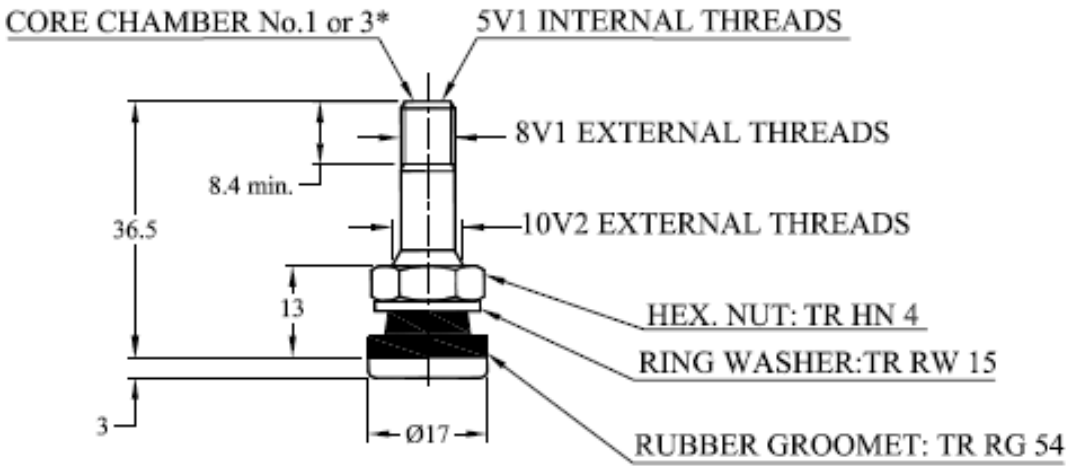


Valve Designation	Valve Hole Size in Rim
F 35 3 17	Ø 11.3 $^{+0.4}_{0}$

All dimensions in millimeters.

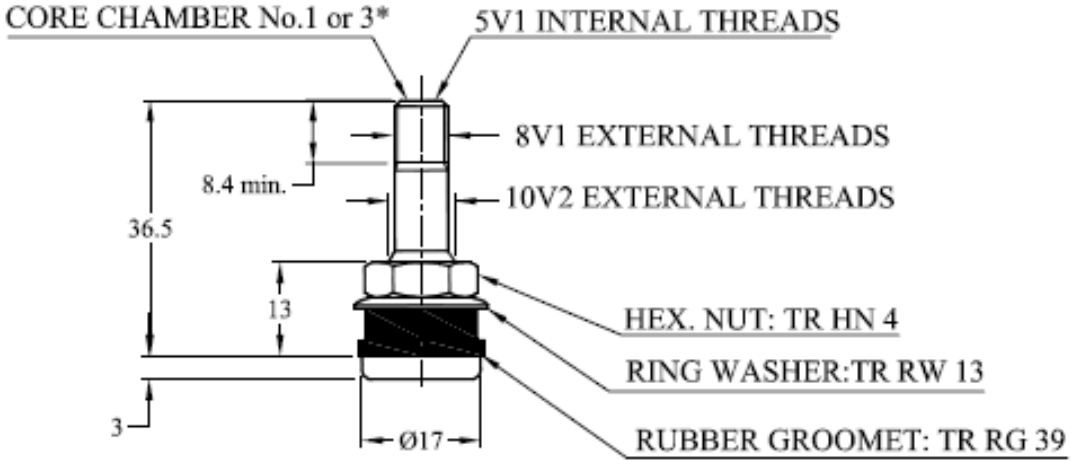
FIG. 23 RUBBER COVERED TUBELESS SNAP-IN SCOOTER VALVE

NOTE: PRODUCTS FOR USE UP TO 550 kPa COLD INFLATION PRESSURE MAXIMUM & 210 kmph MAXIMUM.
* ACCOMMODATES SHORT CORE ONLY



Valve Designation *(TR Code)*	Valve Hole Size in Rim	Installation Torque
TR 416 S	Ø 11.3 $^{+0.4}_{0}$	3 - 5 Nm

FIG. 24 TUBELESS CLAMP-IN PASSENGER CAR VALVE

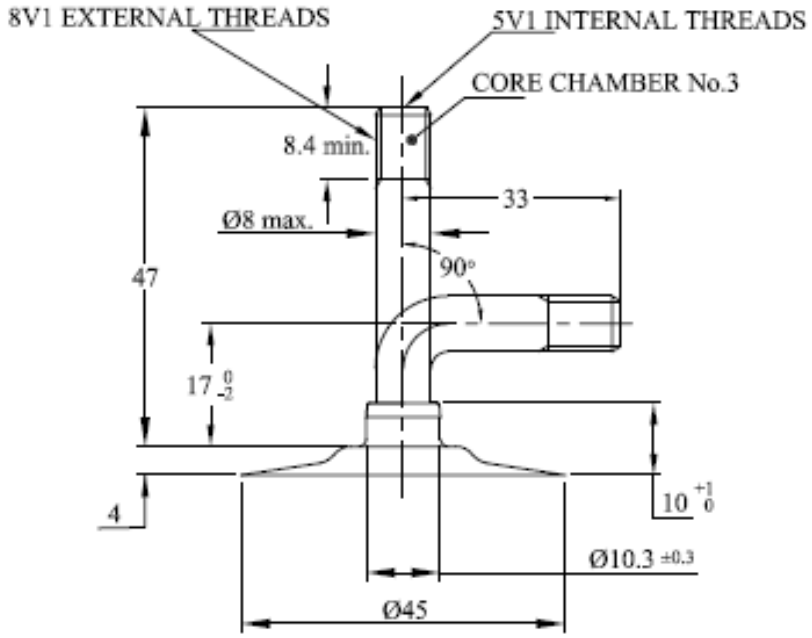


Valve Designation *(TR Code)*	Valve Hole Size in Rim	Installation Torque
TR 416	Ø 15.7 $^{+0.4}_{0}$	3 - 5 Nm

FIG. 25 TUBELESS CLAMP-IN PASSENGER CAR VALVE

* ACCOMMODATES SHORT CORE ONLY

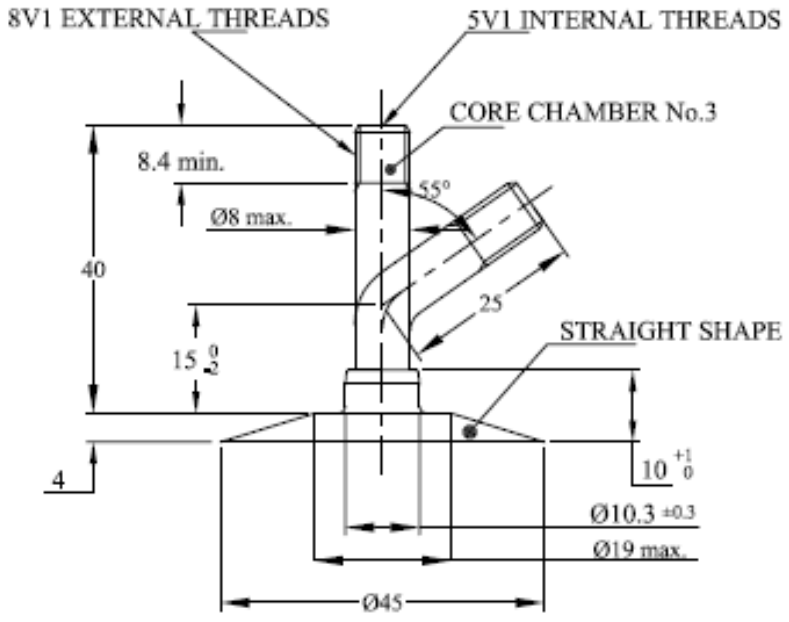
All dimensions in millimeters.



NOTE -
1 These valve accommodate only the appropriate short core.
2 Designation with suffix 'SB' indicates single bent valve.

All dimensions in millimeters.

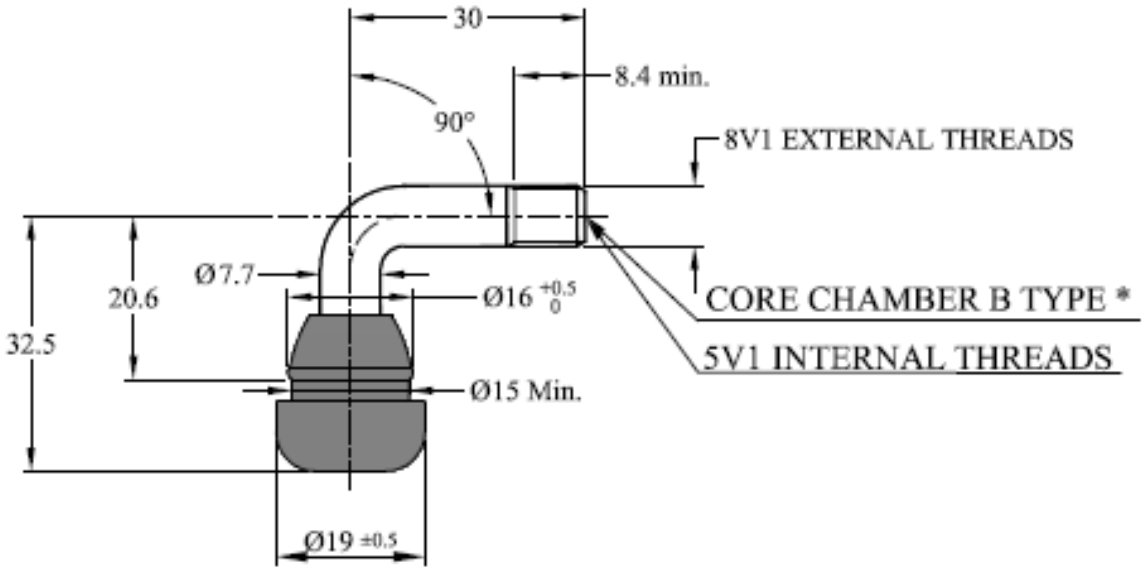
FIG. 26 SCOOTER VALVES A 47 2 45
(BASE-BELL SHAPE/ STRAIGHT SHAPE)



NOTE -
1 These valve accommodate only the appropriate short core.
2 Designation with suffix 'SB' indicates single bent valve.

All dimensions in millimeters.

FIG. 27 SCOOTER VALVES A 40 2 45
(BASE - STRAIGHT SHAPE / BELL SHAPE)

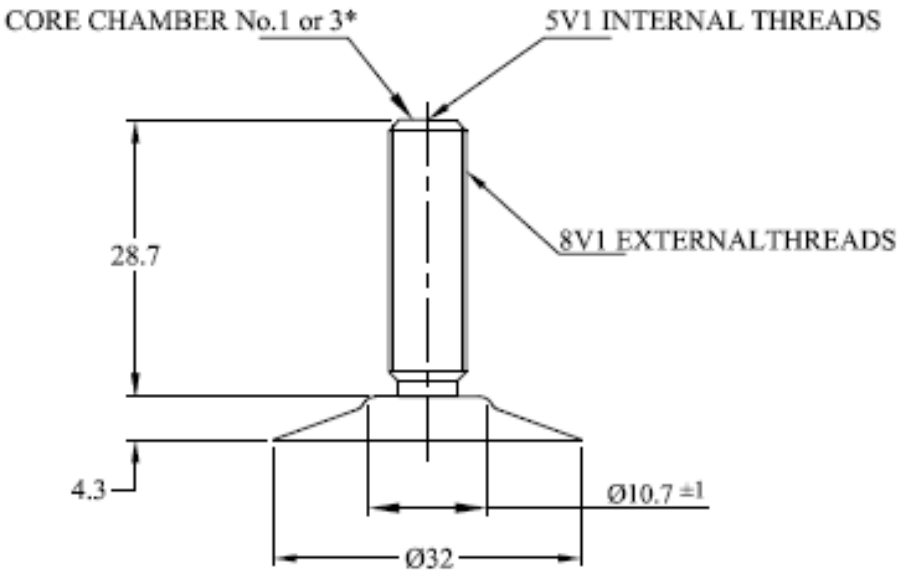


Valve Designation *(JATMA)*	Valve Hole Size in Rim
PVR 70	Ø 11.3 $^{+0.4}_{0}$

All dimensions in millimeters.

FIG. 28 RUBBER COVERED TUBELESS SNAP-IN SCOOTER VALVE

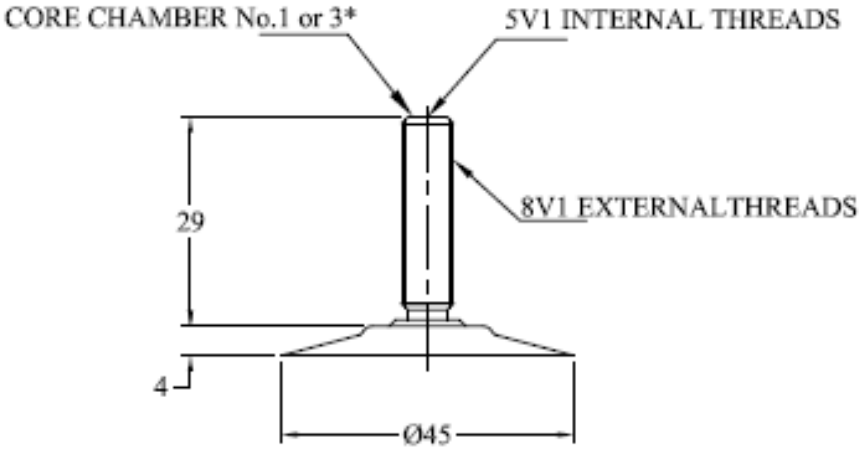
NOTE: PRODUCTS FOR USE UP TO 450 kPa COLD INFLATION PRESSURE MAXIMUM & 210 kmph MAXIMUM.
* ACCOMMODATES SHORT CORE ONLY



* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimetres.

FIG.29 MOPED VALVE A 29 1 32

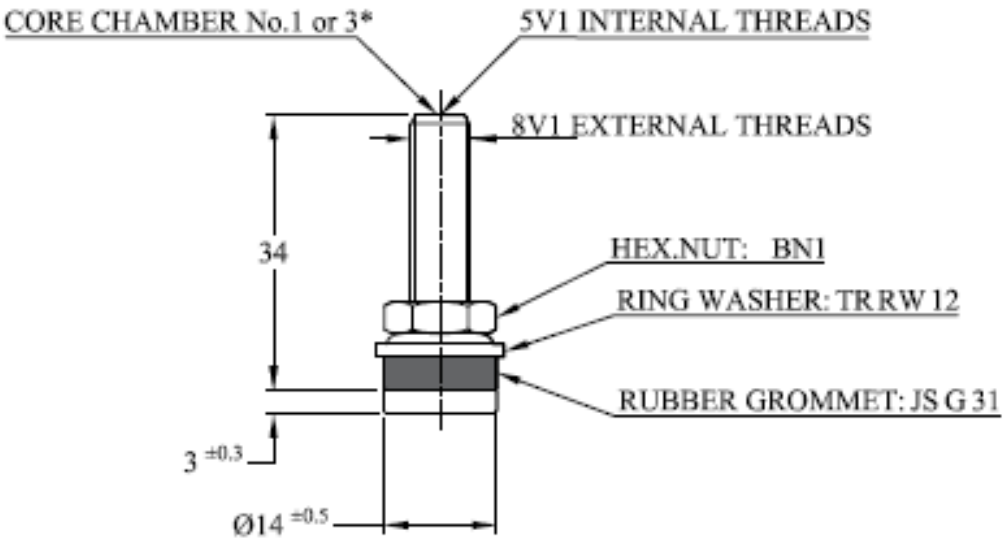


NOTE- The top of rubber base shall have an approximate shape as shown to allow tubes at valve region to seat correctly with certain shallow well rims.

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 30 MOTORCYCLE VALVES A 29 1 45

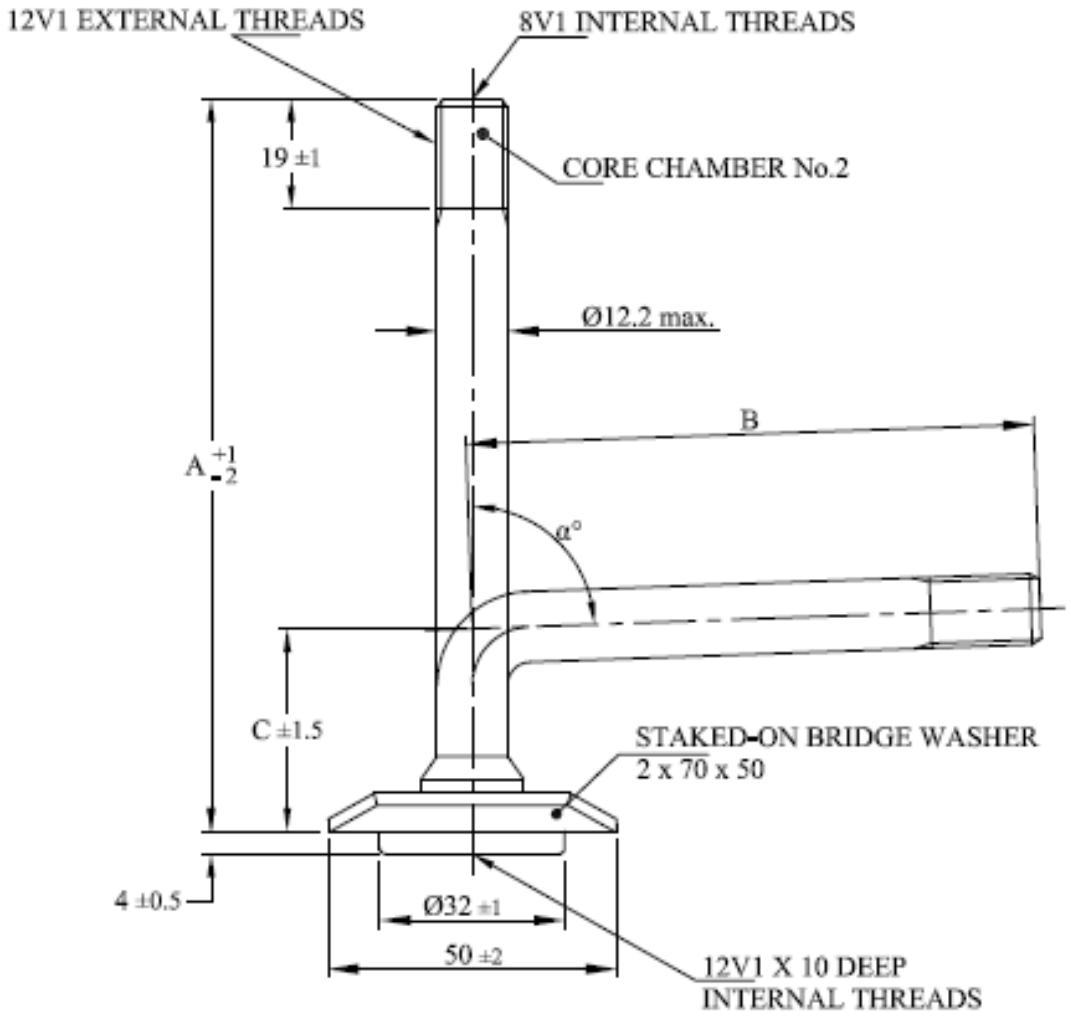


Valve Designation *(JATMA)*	Valve Hole Size in Rim	Installation Torque
JS 430	Ø 8.3 $^{+0.3}_{0}$	3 - 5 Nm

* ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 31 TUBELESS CLAMP-IN MOTOR CYCLE VALVE

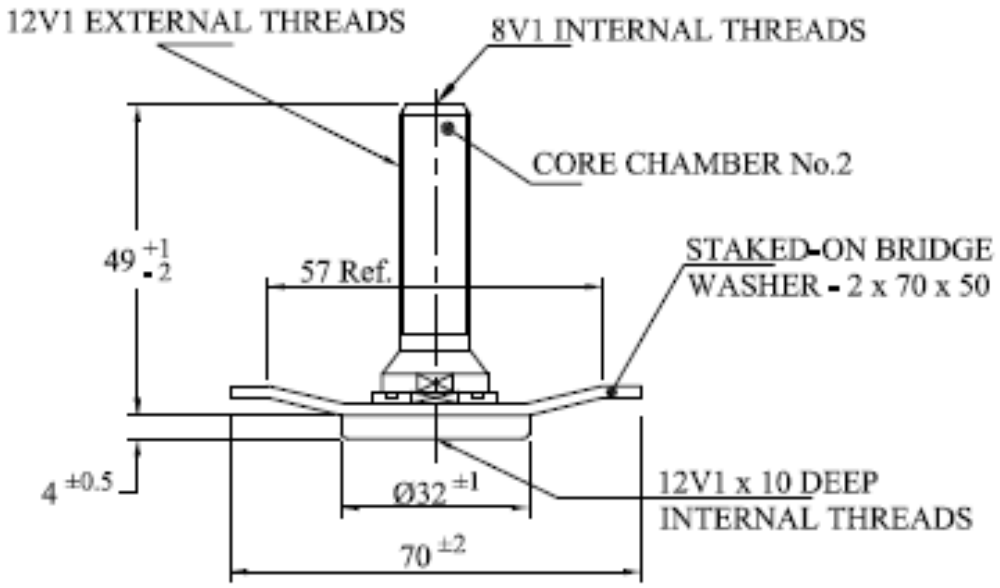


Valve Designation	A	B	C	α °
E D4 6 32	134	–	–	–
E D4 6 32 - SB	–	105	35	88°

NOTE- Available straight or bent form.

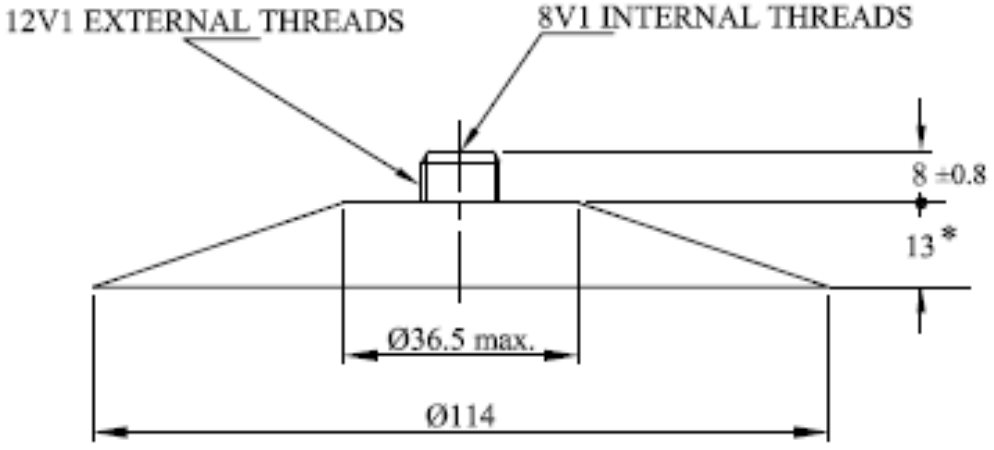
All dimensions in millimeters.

FIG.32 LARGE BORE SCREW-ON TUBE VALVES (OTR) E D4 6 32 AND E D4 6 32 SB
(For Side Elevation of Bridge Washer, see Fig. 22)



All dimensions in millimeters.

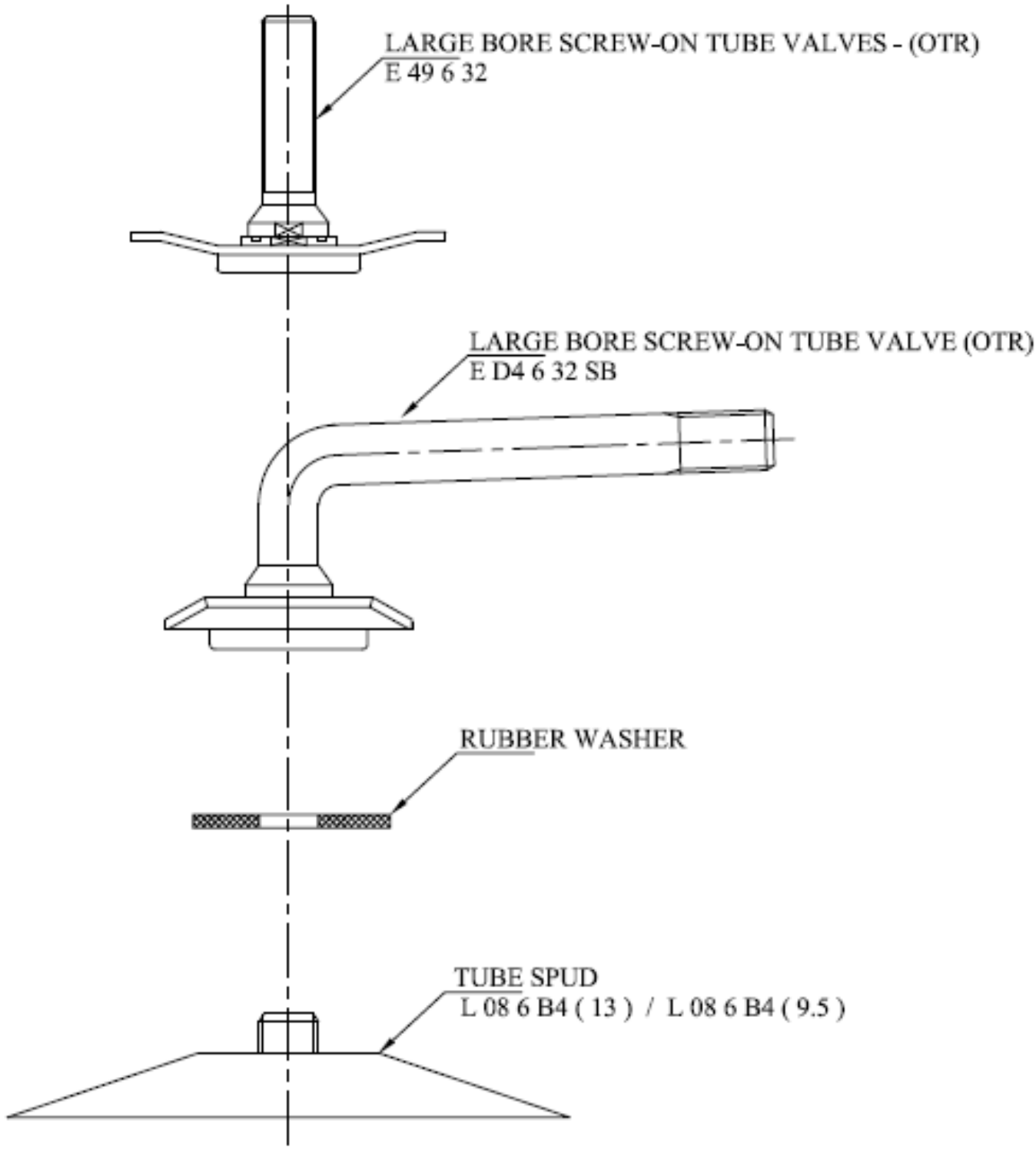
FIG. 33 LARGE BORE SCREW-ON TUBE VALVES - (OTR) E 49 6 32



*Valve available with rubber base thickness of 9.5 mm on special order

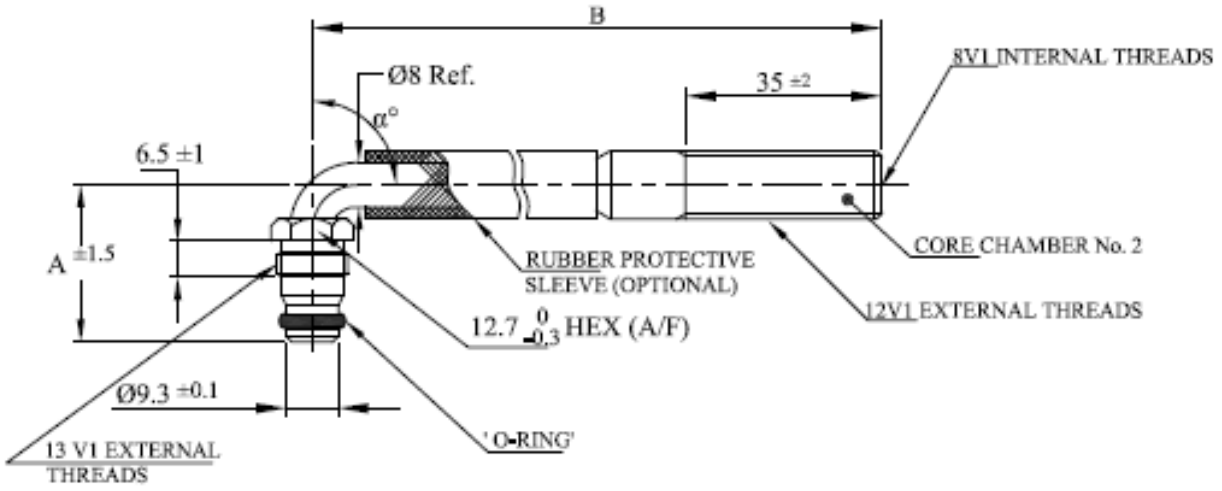
All dimensions in millimeters.

FIG. 34 TUBE SPUD L 08 6 B4



All dimensions in millimeters.

FIG. 35 LARGE BORE SCREW-ON TUBE VALVES - ASSEMBLY

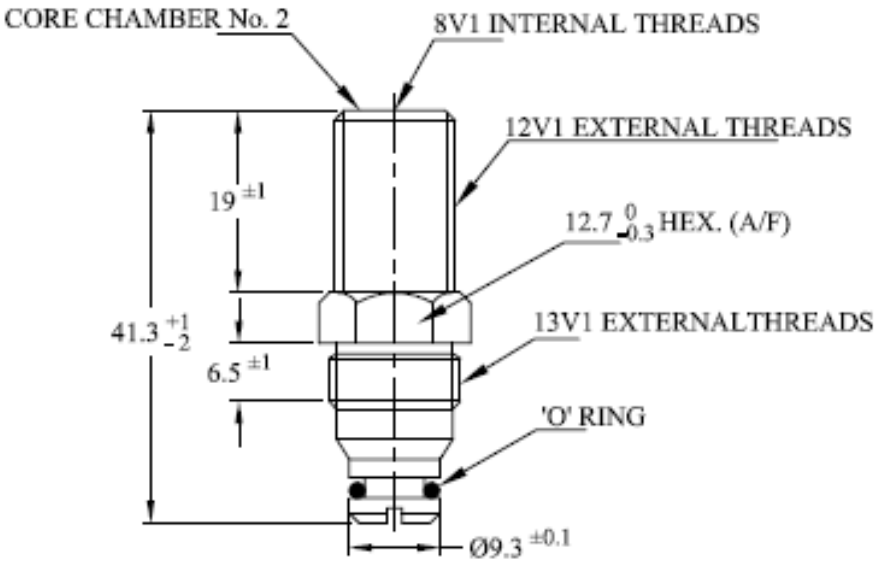


NOTE- These swivel stems to be assembled with tubeless spud S 17 7 27 to be available in several standard lengths and 12.5 mm increment (Dimension B).

Valve Designation	α °	A	B
R 79 6 09 - SB	80	27	79
R B9 6 09 - SB	90	32	119

All dimensions in millimetres.

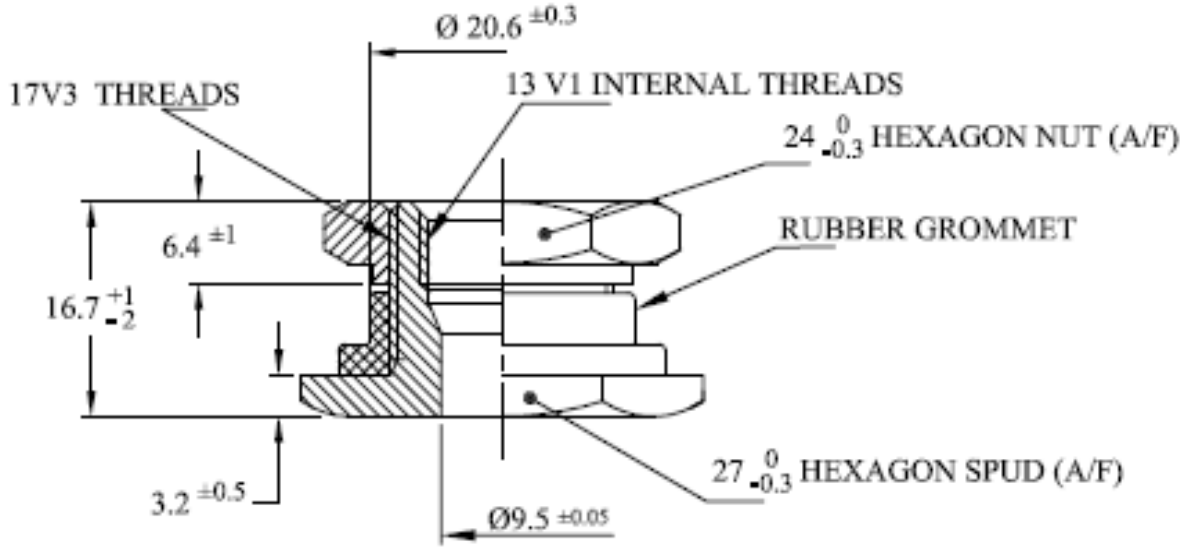
FIG. 36 LARGE BORE (OTR) VALVES R 79 6 09 SB AND R B9 6 SB-SWIVEL TYPE SINGLE BEND



NOTE- This straight stem to be assembled with tubless spud S 17 7 27.

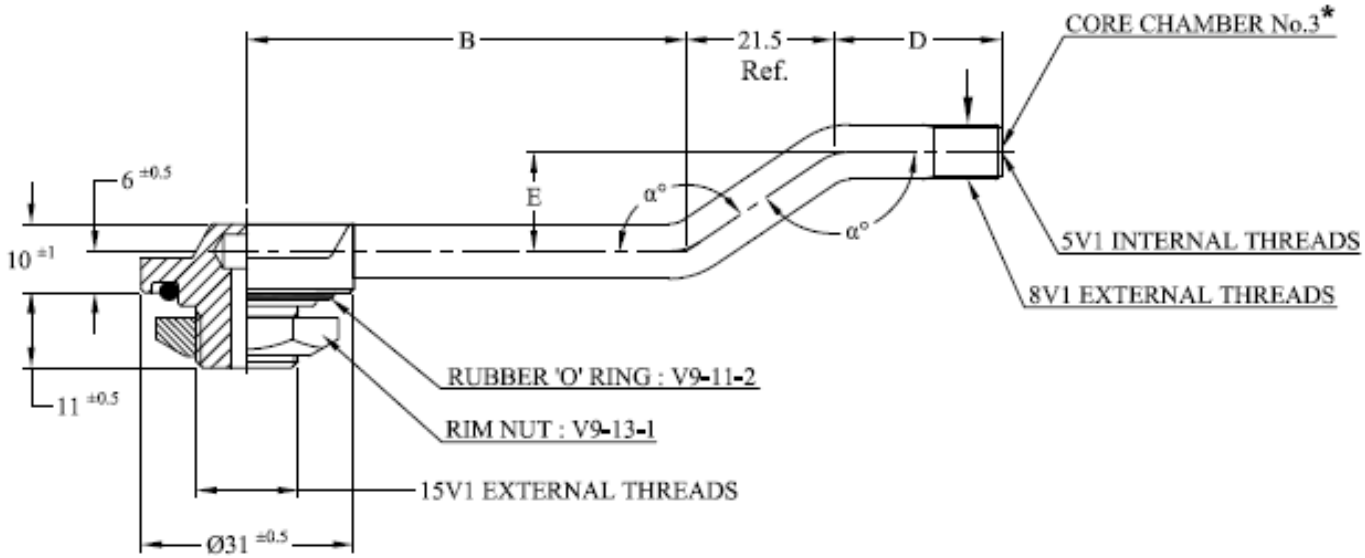
All dimensions in millimeters.

FIG. 37 LARGE BORE (OTR) VALVE R 41 6 09 STRAIGHT TYPE



All dimensions in millimeters.

FIG.38 LARGE BORE (OTR) SPUD (TUBELESS SPUD) S 17 7 27

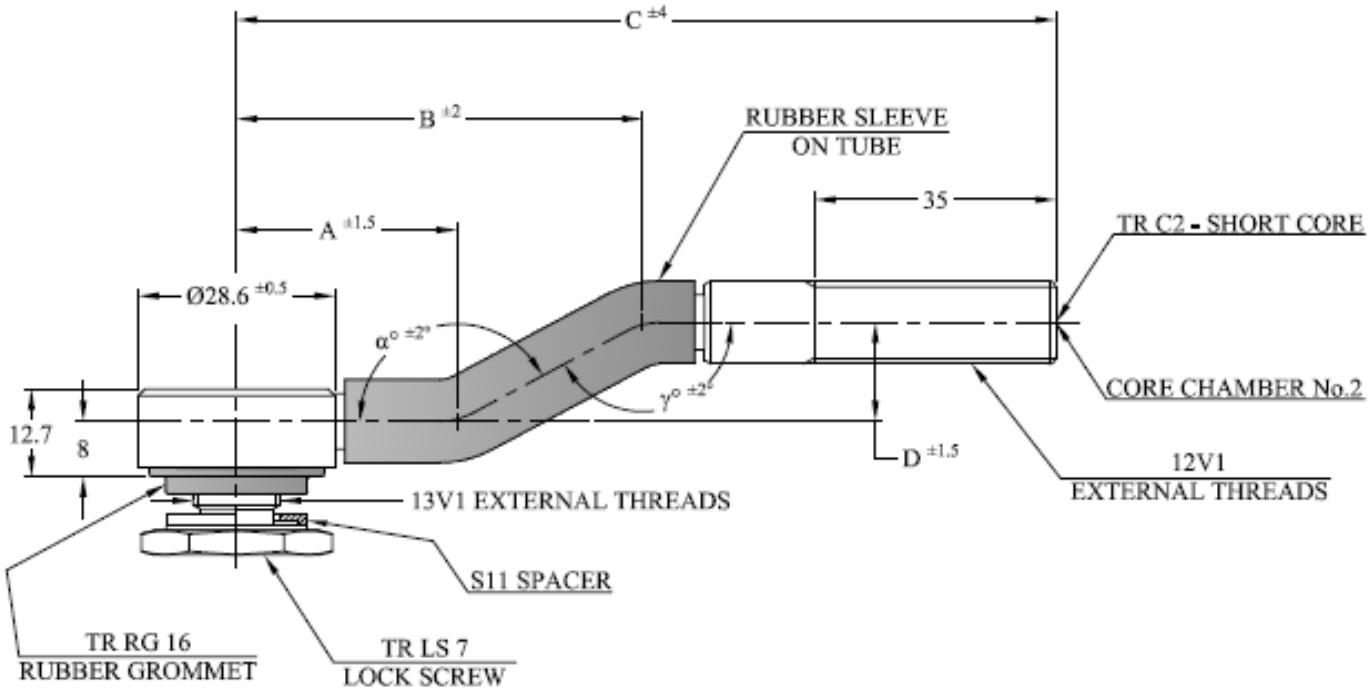


Valve Designation *(ETRTO)*	B ±2	D ±2	E ±1.5	α° ±2	Valve Hole Size in Rim	Installation Torque
V3.18.1	64	24.5	14.5	146	$20.5\ ^{+0.5}_{0}$	25 - 31 Nm
V3.18.2	81	24.5	14.5	146		
V3.18.5	68	37.5	19.5	138		

*ACCOMMODATES SHORT CORE ONLY

All dimensions in millimeters.

FIG. 39 TUBELESS CLAMP-IN TRIPLE BEND - TRUCK AND BUS VALVES



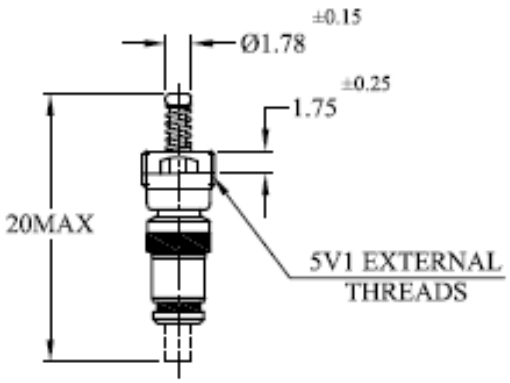
Valve Designation *(TR Code)*	A ±1.5	B ±2	C ±4	D ±1.5	α° ±2	γ° ±2	Valve Hole Size in Rim	Installation Torque
TR J690	31.75	58.6	119	14.2	152	152	$20.5\ ^{+0.5}_{0}$	20 – 23 Nm
TR J692	31.75	58.6	119	14.2	162	152		

All dimensions in millimeters.

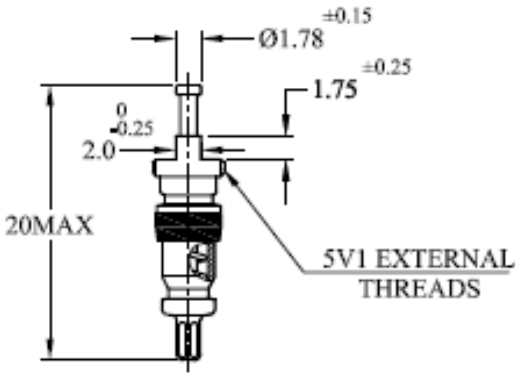
FIG. 40 LARGE BORE TUBELESS CLAMP-IN TURRET TYPE VALVES - OTR

SHORT CORE

OUTSIDE SPRING

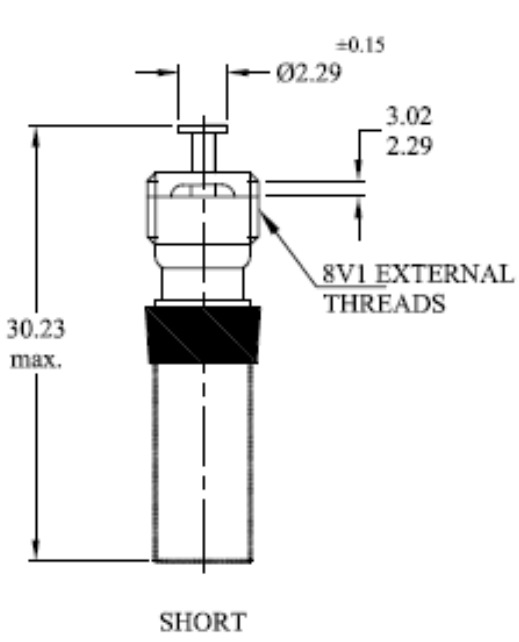


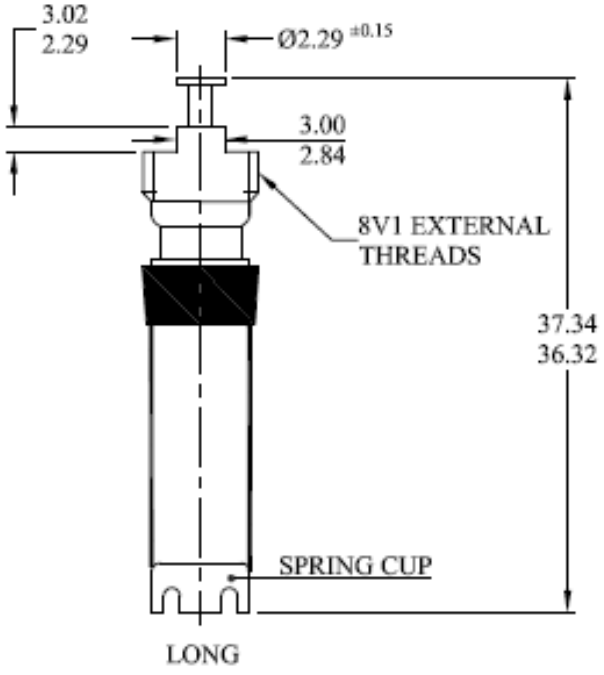
INSIDE SPRING



Note: Recommended torque at installation 0.23 - 0.56 Nm

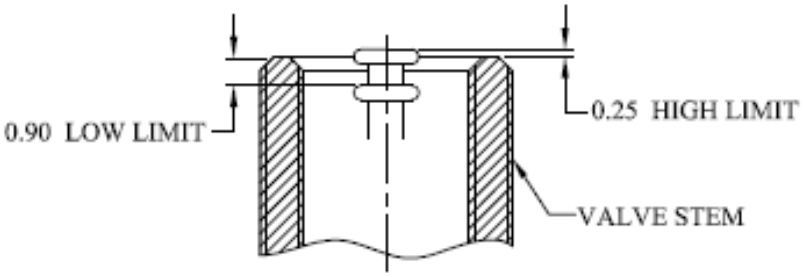
(A) Type 1 Valve Core – Standard Bore





Note: Recommended torque at installation 0.34 - 0.56 Nm

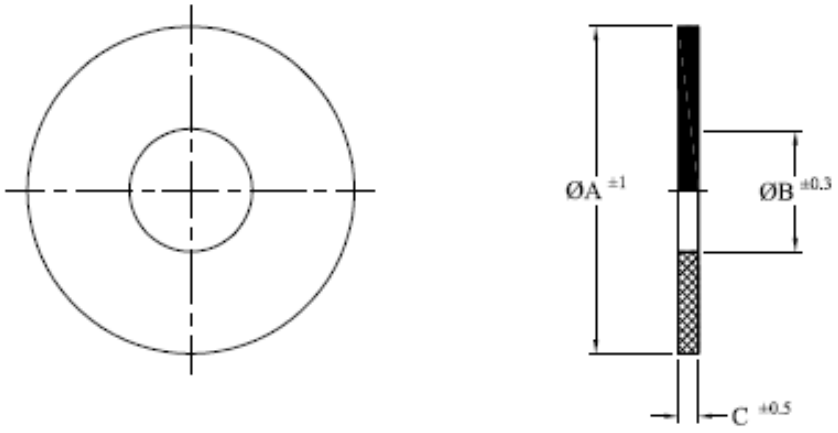
(B) Type 2 Valve Core - Large Bore



(C) Core Pin Head Position – Type 1 & Type 2

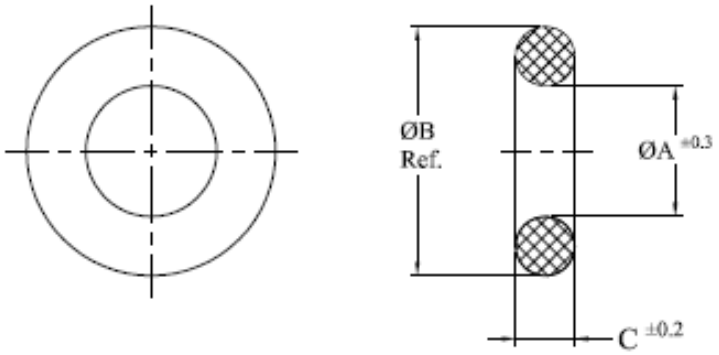
All dimensions in millimeters.

FIG. 41 VALVE CORE



Code	ØA	ØB	C
T-RUW 55	32	12.3	2
V9.05.1	24	8	2.5

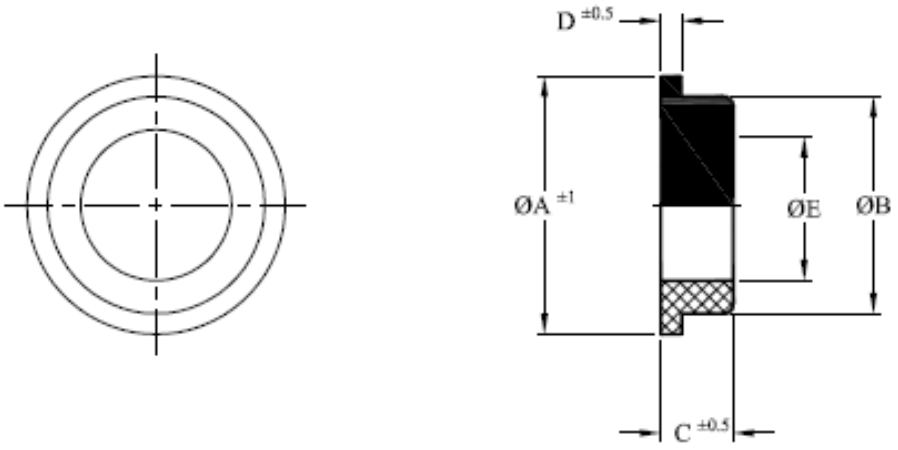
FIG. 42 RUBBER WASHERS



Code	ØA	ØB	C
TR RG 60 / V9.11.5	8.9	12.7	1.9
TR RG 66	6	9.6	1.8
TR RG 67	4.4	8	1.8

FIG. 43 RUBBER O-RINGS

All dimensions in millimeters.



Code	ØA	ØB	C	D	ØE Fits to
TR RG 7	22.4	16	8.65	3.2	12V1
TR RG 22	25.4	20.6	6.4	2.3	17V3
TR RG 39 / V9.10.8	18	16	8	2.3	10V2
JS G31	14	10	5	4	8V1

FIG.44 RUBBER GROMMETS

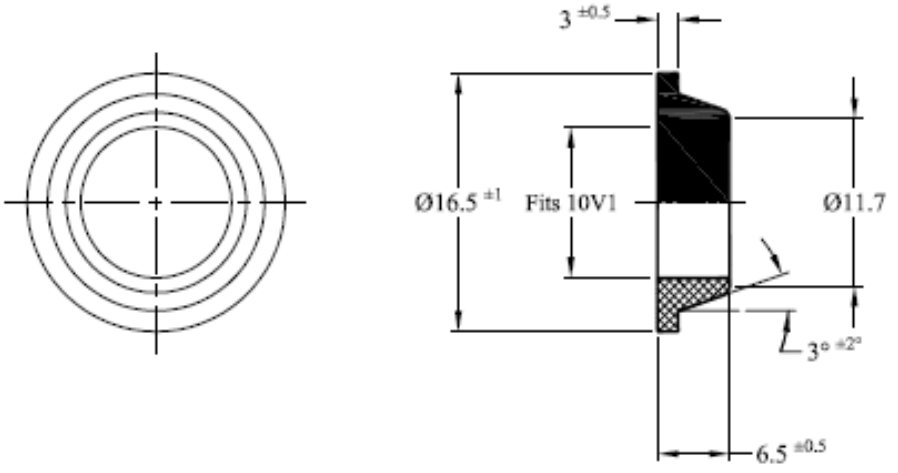
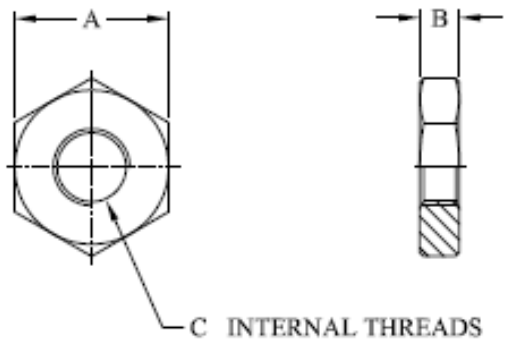


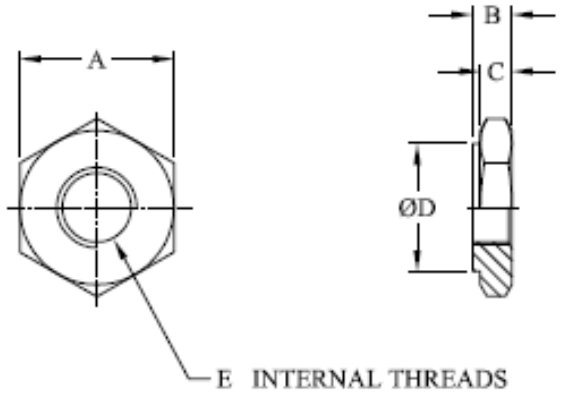
FIG.45 RUBBER GROMMET - TR RG 54

All dimensions in millimeters.



Code	$A\ ^{0}_{-0.3}$	B	C
TR HN 1	16	4.8	12V1
TR HN 4 / V9.08.2	14	5	10V2
BN 1	12	4	8V1

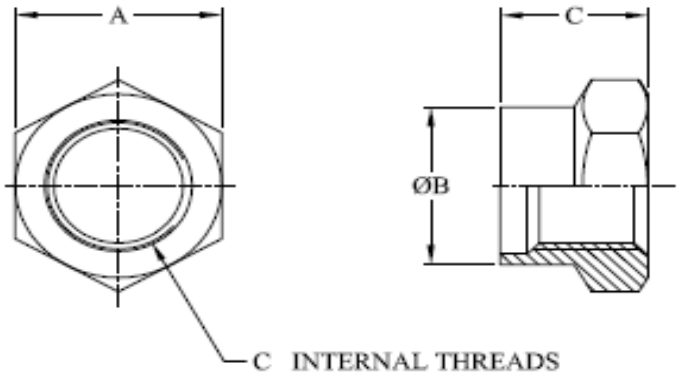
FIG.46 HEX. NUTS



Code	$A\ ^{0}_{-0.3}$	$B\ ^{\pm0.5}$	$C\ ^{\pm0.5}$	$D\ ^{\pm0.5}$	E
TR HN 15 / V9.09.1	24	6.4	4.8	20.3	17V3
TR HN 22	16	10.2	5.2	15.5	9V1

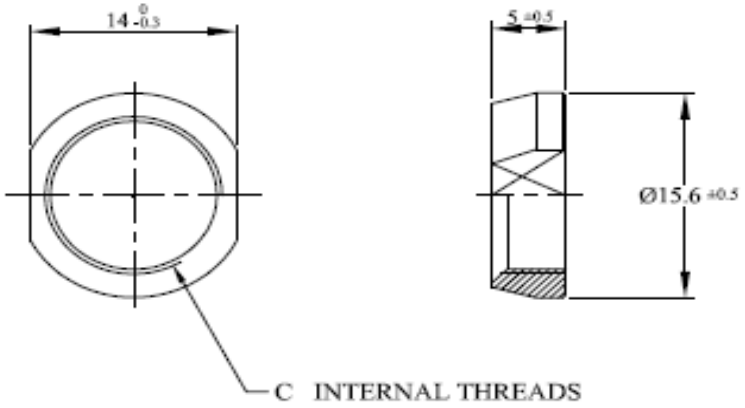
FIG.47 HEX. NUTS

All dimensions in millimeters.



Code	$A\ ^{0}_{-0.3}$	B	$C\ ^{\pm0.5}$
V9.07.2	14	12	10V1
V9.07.4-M	14	12	10V1

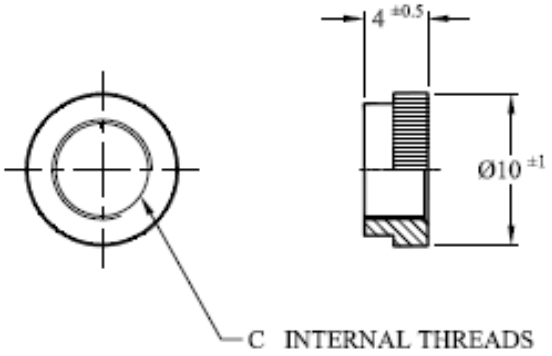
FIG.48 RIM NUTS



Code	$C\ ^{\pm0.5}$
T-LN 53	12V1

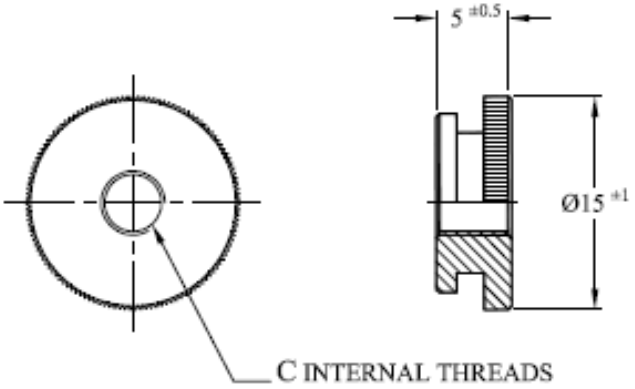
FIG.49 RIM NUT

All dimensions in millimeters.



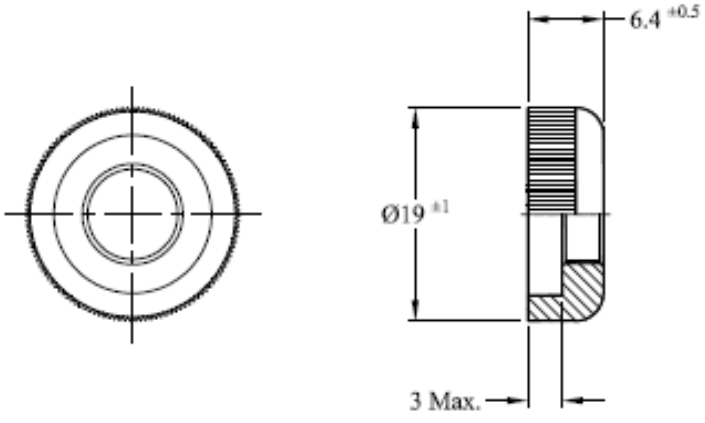
Code	C ±0.5
63	8V1

FIG.50 RIM NUT



Code	C ±0.5
252	8V1

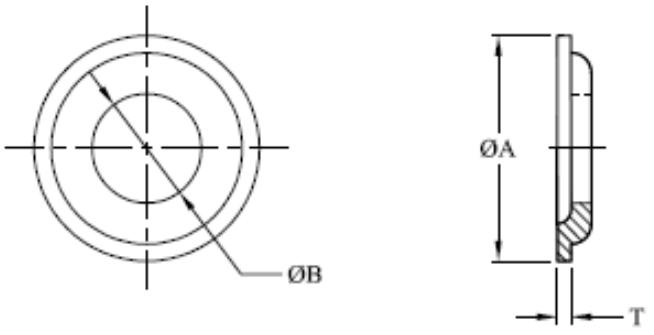
FIG.51 RIM NUT



Code	C ±0.5
TR LN 10	12V1

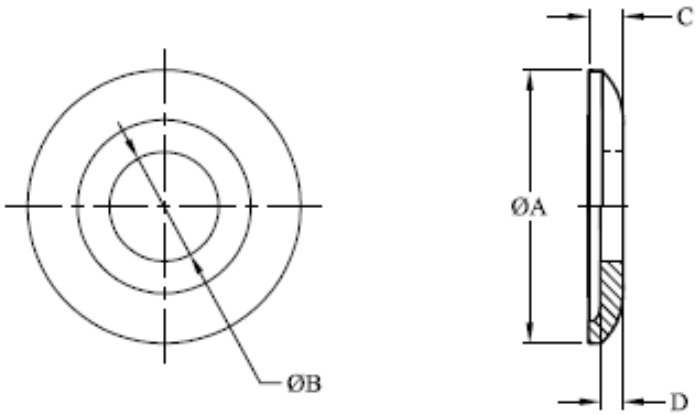
FIG.52 RIM NUT

All dimensions in millimeters.



Code	A ±1	B ±0.2	T ±0.2
TR RW 3	27	12.4	1.4
TR RW 11	23.4	12.4	1.6
TR RW 12	16	8	1.6
T-RW 52	24	10.8	1.6

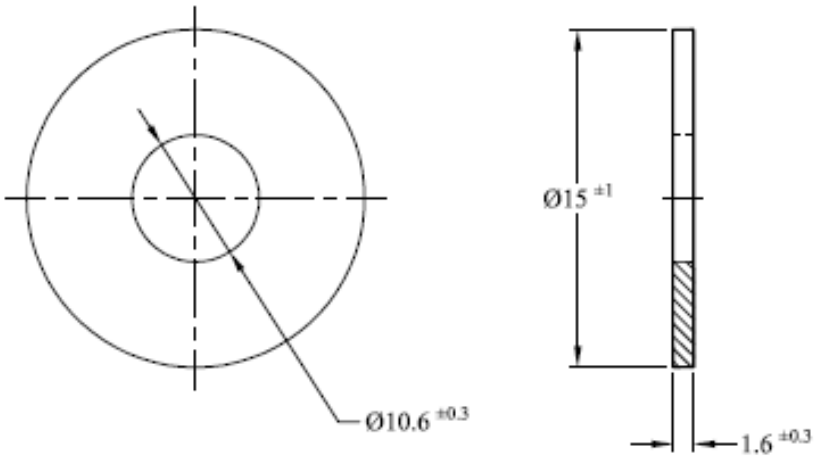
FIG.53 RING WASHERS



Code	A ±1	B ±0.2	C ±0.5	D ±0.2
TR RW 8 / V9.01.4	19	10.5	2.5	1.4
TR RW 13	19	10.5	1.5	0.8

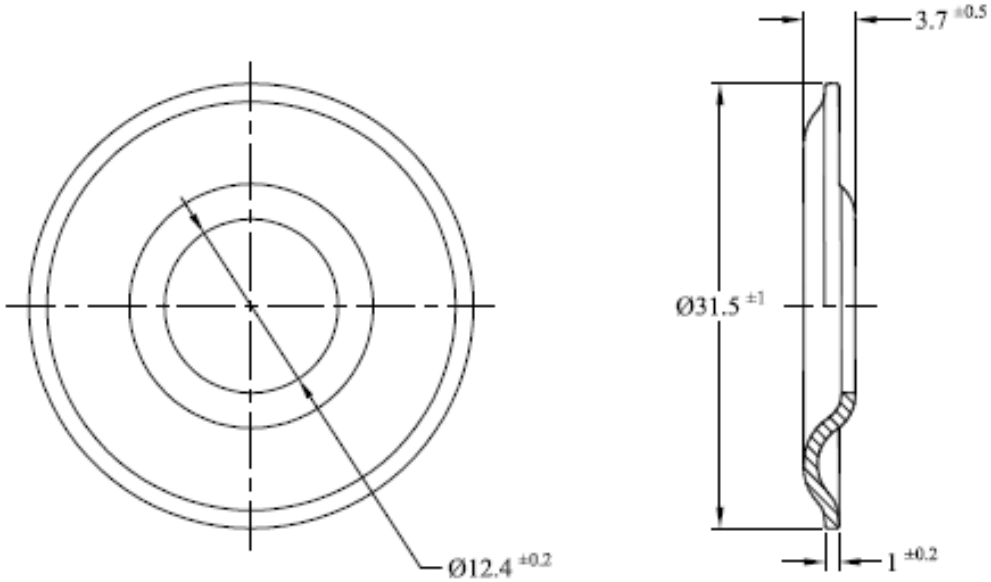
FIG.54 RING WASHERS

All dimensions in millimeters.



Code
TR RW 15

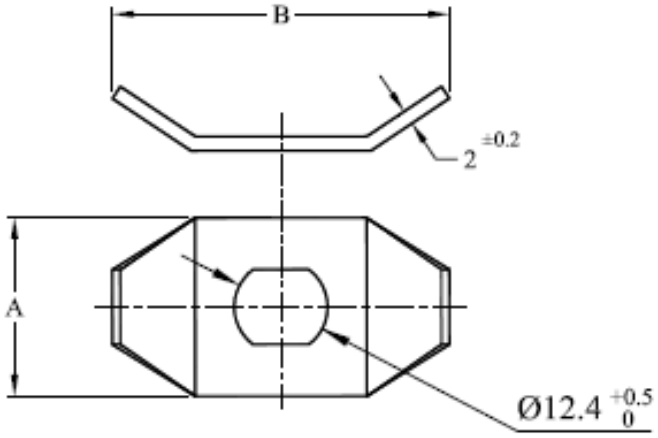
FIG.55 RING WASHERS



Code
T- RW 59

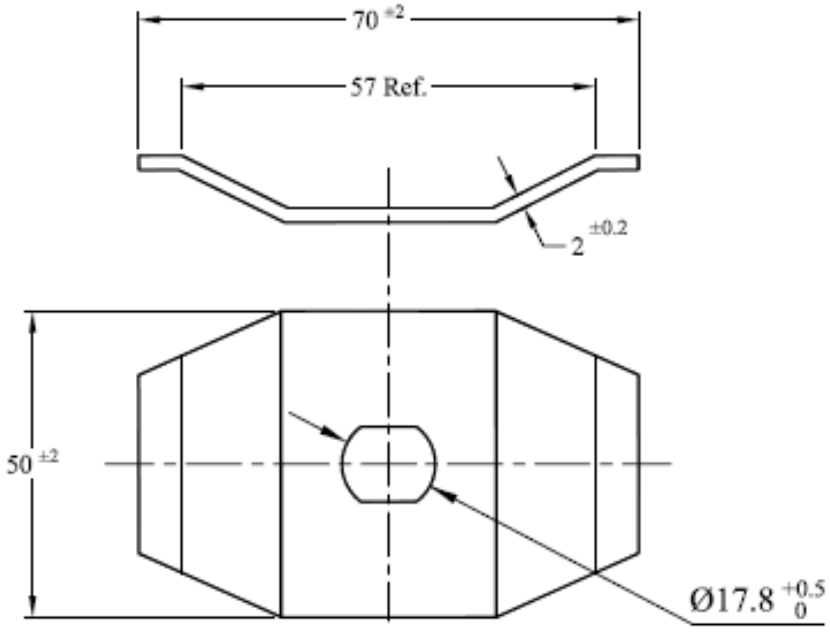
FIG.56 RING WASHERS

All dimensions in millimeters.



Code	A ±1.5	B ±2
TR BW 1	24	47
TR BW 2	28.5	54
TR BW 3	33	57

FIG.57 BRIDGE WASHERS



Code
TR BW 18

FIG.58 BRIDGE WASHER

All dimensions in millimeters.

ANNEX A

(FOREWORD)

VALVE & VALVE CORE DESIGNATION CROSS REFERENCE

SL.NO	BIS CODE	TR CODE CROSS REFERENCE	FIG. NO.
1	A 65 5 82	TR 227	FIG.2
2	A 83 5 82	TR 274A	FIG.2
3	A 97 5 82	TR 75A	FIG.2
4	A A6 5 82	TR 76A	FIG.2
5	A B1 5 82	–	FIG.2
6	A B4 5 82	TR 177A	FIG.2
7	A C3 5 82	TR 77A	FIG.2
8	A D4 5 82	TR 175A	FIG.2
9	A E7 5 82	TR 78A	FIG.2
10	A GO 5 82	TR 179A	FIG.2
11	A 65 5 95	TR 227	FIG.2
12	A 83 5 95	TR 274A	FIG.2
13	A 97 5 95	TR 75A	FIG.2
14	A A6 5 95	TR 76A	FIG.2
15	A B1 5 95	–	FIG.2
16	A B4 5 95	TR 177A	FIG.2
17	A C3 5 95	TR 77A	FIG.2
18	A D4 5 95	TR 175A	FIG.2
19	A E7 5 95	TR 78A	FIG.2
20	A GO 5 95	TR 179A	FIG.2
21	A 95 5 95	–	FIG.4
21	B 20 5 63	TR 218A	FIG.11
22	B 30 5 63	TR 220A	FIG.11
23	B 20 5 82	–	FIG.11
24	B 30 5 82	–	FIG.11
25	CH3	TR CH3	FIG.12
26	B 35 3 57	TR 13	FIG.14
27	B 35 4 57	TR 14	FIG.14
28	B 35 5 57	TR 15	FIG.14
29	B 49 5 57	TR 25	FIG.14

SL.NO	BIS CODE	TR CODE CROSS REFERENCE	FIG. NO.
30	B 35 1 57	–	FIG.14
31	B 57 3 57	–	FIG.15
32	B 46 3 57	–	FIG.15
33	F 25 3 19	TR 412	FIG.16
34	F 35 3 19	TR 413	FIG.16
35	F 41 3 19	TR 414	FIG.16
36	F 54 3 19	TR 418	FIG.16
37	F 67 3 19	TR 423	FIG.16
38	F 49 3 19	TR 414L (V2-03-8)	FIG.16
39	F 35 5 24	TR 415	FIG.16
40	F 54 5 24	TR 425	FIG.16
41	F 35 1 16	TR 438	FIG.16
42	A 29 1 32	–	FIG.19
43	A 29 1 45	–	FIG.20
44	E D4 6 32	TR J 1175A-M	FIG.21
45	E D4 6 32 SB	TR J 1175C-M	FIG.21
46	E 49 6 32	TR J1014-M	FIG.22
47	L 08 6 B4	TR SP 1000	FIG.23
48	R 79 6 09 SB	TR J 650	FIG.25
49	R B9 6 09 SB	TR J 651	FIG.25
50	R 41 6 09	TR J 670	FIG.26
51	S 17 7 27	TR SP2	FIG.27
52	TYPE 1 SHORT	TR C1 SHORT	FIG.28
53	TYPE 2-SHORT	TR C2 SHORT	FIG.28
54	TYPE 2-LONG	TR C2 LONG	FIG.28
	ETRTO CODE		
55	A 47 2 45	V1.08.1	FIG.17
56	A 40 2 45	V1.08.3	FIG.18

ANNEX A

(FOREWORD)

VALVE & VALVE CORE DESIGNATION CROSS REFERENCE

SL. No.	BIS CODE	TR CODE CROSS REFERENCE	FIG. No.
57	–	TR 416 S	FIG.31
58	–	TR 416	FIG.32
59	–	TR 542	FIG.34
60	–	TR 543	FIG.34
61	–	TR 543C	FIG.34
62	–	TR 543D	FIG.34
63	–	TR 543E	FIG.34
64	–	TR 544	FIG.34
65	–	TR 544C	FIG.34
66	–	TR 544D	FIG.34
67	–	TR 545	FIG.34
68	–	TR 545D	FIG.34
69	–	TR 545E	FIG.34
70	–	TR 546	FIG.34
71	–	TR 546-36	FIG.34
72	–	TR 546 D	FIG.34
73	–	TR 546 E	FIG.34
74	–	TR 547 D	FIG.34
75	–	TR 575	FIG.36
76	–	TR 500	FIG.36
77	–	TR 501	FIG.36
78	–	TR 570	FIG.36
79	–	TR 571	FIG.36
80	–	TR 572	FIG.36
81	–	TR 573	FIG.36
82	–	TR 574	FIG.36
83	–	TR 570C	FIG.36
84	–	TR 571C	FIG.36
85	–	TR 572C	FIG.36
86	–	TR 573C	FIG.36
87	–	TR 618 A	FIG.37

SL. No.	BIS CODE	JATMA CODE CROSS REFERENCE	FIG. No.
88	–	JS 430	FIG.29
89	–	PVR 70	FIG.30

SL. No.	BIS CODE	ETRTO CODE CROSS REFERENCE	FIG. No.
90	–	V3.08.2	FIG.7
91	–	V3.08.3	FIG.7
92	–	V3.08.4	FIG.7
93	–	V3.02.7	FIG.8
94	–	V3.02.8	FIG.8
95	–	V3.02.9	FIG.8
96	–	V3.02.10	FIG.8
97	–	V3.02.11	FIG.8
98	–	V3.02.12	FIG.8
99	–	V3.02.14	FIG.8
100	–	V3.02.15	FIG.8
101	–	V3.02.16	FIG.8
102	–	V3.02.18	FIG.8
103	–	V3.02.19	FIG.8
104	–	V3.02.20	FIG.8
105	–	V3.02.26	FIG.8
106	–	V3.02.27	FIG.8
107	–	V3.02.29	FIG.8
108	–	V3.04.4	FIG.9
109	–	V3.04.5	FIG.9
110	–	V3.04.6	FIG.9
111	–	V3.04.10	FIG.9
112	–	V3.04.11	FIG.9
113	–	V3.04.15	FIG.9
114	–	V3.04.21	FIG.9
115	–	V3.04.25	FIG.9

ANNEX A

(FOREWORD)

VALVE & VALVE CORE DESIGNATION CROSS REFERENCE

SL. No.	BIS CODE	ETRTO CODE CROSS REFERENCE	FIG. No.
116	–	V3.06.5	FIG.10
117	–	V3.06.6	FIG.10
118	–	V3.06.7	FIG.10
119	–	V3.06.8	FIG.10
120	–	V3.06.9	FIG.10
121	–	V3.06.16	FIG.10
122	–	V3.06.17	FIG.10
123	–	V3.20.1	FIG.33
124	–	V3.20.2	FIG.33
125	–	V3.20.3	FIG.33
126	–	V3.20.4	FIG.33
127	–	V3.20.5	FIG.33
128	–	V3.20.6	FIG.33
129	–	V3.20.7	FIG.33
130	–	V3.20.8	FIG.33
131	–	V3.20.9	FIG.33
132	–	V3.20.10	FIG.33
133	–	V3.20.11	FIG.33
134	–	V3.20.12	FIG.33
135	–	V3.22.1	FIG.35

Annexure 3
(Sl No 11 of item 3)

TED 07 (19702)F

भारतीय मानक

Indian Standard

IS 13154 : 2023

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

(दूसरा पुनरीक्षण)

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

(Second Revision)

ICS: 83.160.10

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
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July 2023 **Price Group X**

Automotive Tyres, Tubes and Rims Sectional Committee, TED 7

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rims Sectional Committee had been approved by the Transport Engineering Division Council

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.

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 Standard is necessary adjuncts to this standard. At the time of publication, the editionindicated was 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
	(2)	**(3)**	xi)	10	60
i)	0	45	xii)	11	61.5
ii)	1	46.2	xiii)	12	63
iii)	2	47.5	xiv)	13	65
iv)	3	48.7	xv)	14	67
v)	4	50	xvi)	15	69
vi)	5	51.5	xvii)	16	71
vii)	6	53	xviii)	17	73
viii)	7	54.5	xix)	18	75
ix)	8	56	xx)	19	77.5
x)	9	58			

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
xxi)	20	80	lxiii)	62	265
xxii)	21	82.5	lxiv)	63	272
xxiii)	22	85	lxv)	64	280
xxiv)	23	87.5	lxvi)	65	290
xxv)	24	90	lxvii)	66	300
xxvi)	25	92.5	lxviii)	67	307
xxvii)	26	95	lxix)	68	315
xviii)	27	97.5	lxx)	69	325
xxix)	28	100	lxxi)	70	335
xxx)	29	103	lxxii)	71	345
xxxi)	30	106	lxxiii)	72	355
xxii)	31	109	lxxiv)	73	365
xxiii)	32	112	lxxv)	74	375
xxiv)	33	115	lxxvi)	75	387
xxv)	34	118	lxxvii)	76	400
xxvi)	35	121	lxxviii)	77	412
xvii)	36	125	lxxix)	78	425
xviii)	37	128	lxxx)	79	437
xxix)	38	132	lxxxi)	80	450
xl)	39	136	lxxxii)	81	462
xli)	40	140	lxxxiii)	82	475
xlii)	41	145	lxxxiv)	83	487
xliii)	42	150	lxxxv)	84	500
xliv)	43	155	lxxxvi)	85	515
xlv)	44	160	lxxxvii)	86	530
xlvi)	45	165	lxxxviii)	87	545
xlvii)	46	170	lxxxix)	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

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
cv)	104	900	xlvii)	146	3 000
cvi)	105	925	lviii)	147	3 075
cvii)	106	950	xlix)	148	3 150
cviii)	107	975	cl)	149	3 250
cix)	108	1 000	cli)	150	3 350
cx)	109	1 030	clii)	151	3 450
cxi)	110	1 060	cliii)	152	3 550
cxii)	111	1 090	cliv)	153	3 650
cxiii)	112	1 120	clv)	154	3 750
cxiv)	113	1 150	clvi)	155	3 875
cxv)	114	1 180	clvii)	156	4 000
cxvi)	115	1 215	lviii)	157	4 125
xvii)	116	1 250	clix)	158	4 250
xviii)	117	1 285	clx)	159	4 375
cxix)	118	1 320	clxi)	160	4 500
cxx)	119	1 360	clxii)	161	4 625
cxxi)	120	1 400	lxiii)	162	4 750
xxii)	121	1 450	lxiv)	163	4 875
xxiii)	122	1 500	clxv)	164	5 000
xxiv)	123	1 550	lxvi)	165	5 150
xxv)	124	1 600	lxvii)	166	5 300
xxvi)	125	1 650	xviii)	167	5 450
xvii)	126	1 700	lxix)	168	5 600
xviii)	127	1 750	clxx)	169	5 800
xxix)	128	1 800	lxxi)	170	6 000
xxx)	129	1 850	lxxii)	171	6 150
xxxi)	130	1 900	xxiii)	172	6 300
xxii)	131	1 950	xxiv)	173	6 500
xxiii)	132	2 000	lxxv)	174	6 700
xxiv)	133	2 060	xxvi)	175	6 900
xxv)	134	2 120	xvii)	176	7 100
xxvi)	135	2 180	xviii)	177	7 300
xvii)	136	2 240	xxix)	178	7 500
xviii)	137	2 300	lxxx)	179	7 750
xxix)	138	2 360	xxxi)	180	8 000
cxl)	139	2 430	xxii)	181	8 250
cxli)	140	2 500	xxiii)	182	8 500
cxlii)	141	2 575	xxiv)	183	8 750
xliii)	142	2 650	xxv)	184	9 000
xliv)	143	2 725	xxvi)	185	9 250
cxlv)	144	2 800	xvii)	186	9 500
xlvi)	145	2 900	xviii)	187	9 750

Sl No.	LI	Maximum Load	Sl No.	LI	Maximum Load
xxix)	188	10 000	xxxi)	230	33 500
cxc)	189	10 300	cxxii)	231	34 500
cxci)	190	10 600	xxiii)	232	35 500
cxcii)	191	10 900	xxiv)	233	36 500
xciii)	192	11 200	cxxv)	234	37 500
xciv)	193	11 500	xxvi)	235	38 750
cxcv)	194	11 800	cxvii)	236	40 000
xcvi)	195	12 150	xviii)	237	41 250
cvii)	196	12 500	xxix)	238	42 500
cviii)	197	12 850	ccxl)	239	43 750
xcix)	198	13 200	cxli)	240	45 000
cc)	199	13 600	cxlii)	241	46 250
cci)	200	14 000	xliii)	242	47 500
ccii)	201	14 500	cxliv)	243	48 750
cciii)	202	15 000	cxlv)	244	50 000
cciv)	203	15 500	cxlvi)	245	51 500
ccv)	204	16 000	xlvii)	246	53 000
ccvi)	205	16 500	lviii)	247	54 500
ccvii)	206	17 000	cxlix)	248	56 000
cviii)	207	17 500	ccl)	249	58 000
ccix)	208	18 000	ccli)	250	60 000
ccx)	209	18 500	cclii)	251	61 500
ccxi)	210	19 000	cliii)	252	63 000
ccxii)	211	19 500	cliv)	253	65 000
cxiii)	212	20 000	cclv)	254	67 000
cxiv)	213	20 600	clvi)	255	69 000
ccxv)	214	21 200	clvii)	256	71 000
cxvi)	215	21 800	lviii)	257	73 000
ccxvii)	216	22 400	clix)	258	75 000
xviii)	217	23 000	cclx)	259	77 500
cxix)	218	23 600	clxi)	260	80 000
ccxx)	219	24 300	clxii)	261	82 500
cxxi)	220	25 000	lxiii)	262	85 500
ccxxii)	221	25 750	lxiv)	263	87 500
xxiii)	222	26 500	clxv)	264	90 000
xxiv)	223	27 250	lxvi)	265	92 500
ccxxv)	224	28 000	lxvii)	266	95 000
xxvi)	225	29 000	xviii)	267	97 500
cxvii)	226	30 000	lxix)	268	100 000
xviii)	227	30 750	clxx)	269	103 000
xxix)	228	31 500	lxxi)	270	106 000
ccxxx)	229	32 500	lxxii)	271	109 000

Sl No.	LI	Maximum Load
xxiii)	272	112 000
xxiv)	273	115 000
lxxv)	274	118 000
xxvi)	275	121 500
xvii)	276	125 000
xviii)	277	128 500
xxix)	278	132 000
lxxx)	279	136 000

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	1 0
ii)	A4	2 0
iii)	A6	3 0
iv)	A8	4 0
v)	B	5 0
vi)	D	6 5

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	—	

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.

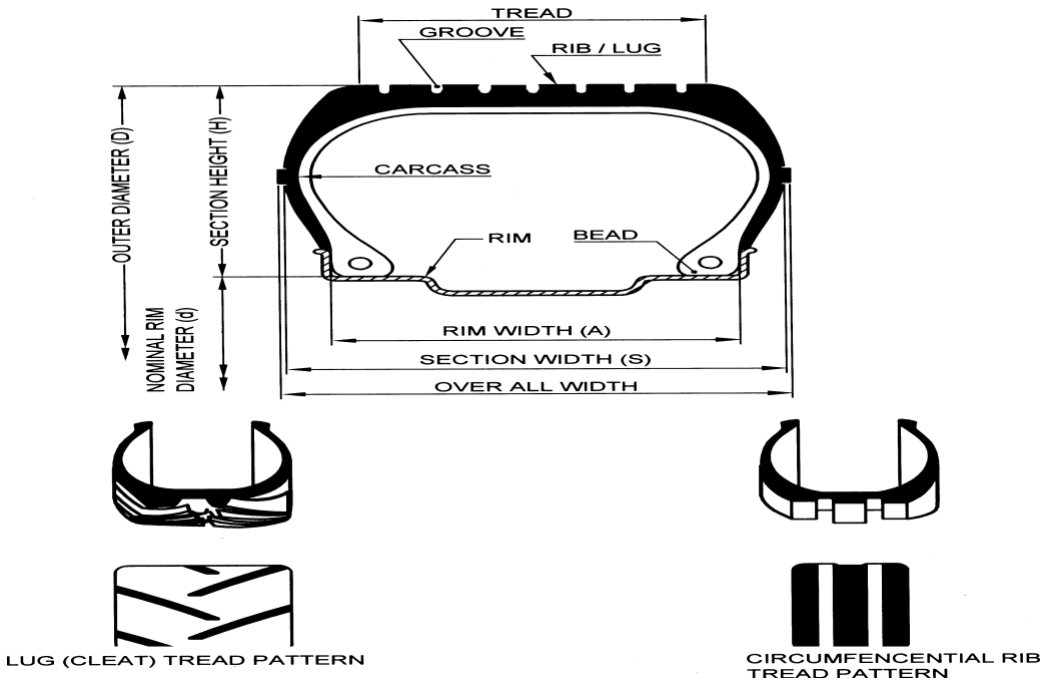


FIG. 1 NOMENCLATURE OF TYRE

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

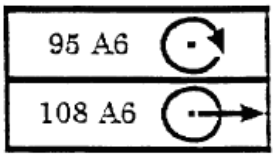
4.3.3 A tyre which, after undergoing the relevant Endurance test (load/speed performance test), exhibits chunking, due to the specific test conditions shall be deemed to have passed the test.

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.

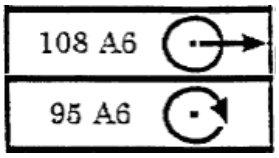
5 MARKINGS

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

8.1 The product may also be marked with the Standard Mark.

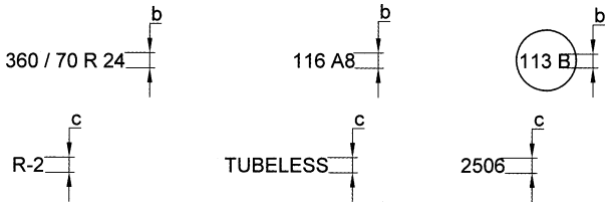
8.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards* Act, 2016 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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;

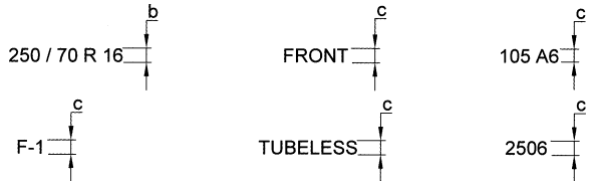
b) The service description (load index and the speed symbol) is placed near the size designation. It may either precede or follow it or be placed above or below it;

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:

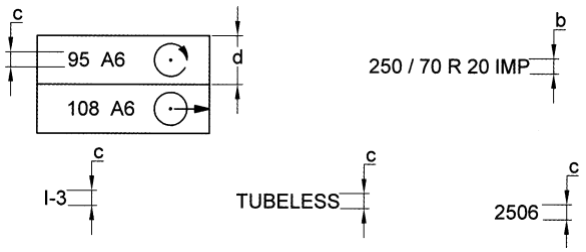
a) Having a nominal section width of 250;
b) Having a nominal aspect ratio of 70;
c) Of radial-ply structure ®;
d) Having a nominal rim diameter of 406 mm, for which the code is 16, designed for the equipment of non-driven steering axles of agricultural tractors (FRONT);
e) Having load capacities of 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 20.

[1] Inflation pressure.

Table 13 Agricultural Tyres — Drive Wheel (Small Tractor) Code Designated Normal Section — Diagonal Ply Speed Symbol A6 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						
								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 21.
[1] Inflation pressure.

Table 14 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 Width	New Tyre — Inflated	Ply Rating	Load Index	Maximum Load	Maximum

	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					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)	(15)
i)	8.3-24	7.00	211	203	228	995	983	1022	1 034	1 041	4 6	92 101	630 825	160 240
ii)	9.5-24	8.00	241	231	260	1 050	1 037	1081	1 094	1 103	4 6 8	97 106 112	730 950 1 120	140 210 280
iii)	8.3-32	7.00	211	203	228	1 195	1 184	1 222	1 233	1 241	4 6	97 105	730 925	160 240
iv)	11.2-28	10.00	284	273	307	1 205	1 190	1 240	1 254	1 264	4 6 8	104 112 118	900 1 120 1 320	130 180 240
v)	12.4-24	11.00	315	302	340	1 160	1 143	1 204	1 215	1 226	4 6 8	106 115 121	950 1 215 1 450	110 170 230
vi)	12.4-28	11.00	315	302	340	1 260	1 244	1 298	1 315	1 364	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
vii)	12.4-36	11.00	315	302	340	1 465	1 448	1 504	1 520	1 531	4 6	113 121	1 150 1 450	110 170
viii)	12.4-38	11.00	315	302	340	1 515	1 499	1 554	1 570	1 581	4 6 8	114 122 127	1 180 1 500 1 750	110 170 230
ix)	13.6-28	12.00	345	331	373	1 310	1 292	1 352	1 370	1 421	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
x)	13.6-38	12.00	345	331	373	1 565	1 547	1 607	1 625	1 637	6 8 10	126 131 136	1 700 1 950 2 240	160 200 250
xi)	14.9-28	13.00	378	363	408	1 365	1 345	1 411	1 430	1 485	6 8 10 12	125 130 132 134	1 650 1 900 2 000 2 120	140 180 210 230
xii)	16.9-28	15.00	429	412	463	1 435	1 413	1 486	1507	1 564	6 8 10 12	129 135 139 143	1 850 2 180 2 430 2 725	130 170 200 240
xiii)	16.9-30	15.00	429	412	463	1 485	1 463	1 536	1557	1 572	6 8 10 12	130 137 140 144	1900 2 300 2 500 2 800	130 170 200 240
xiv)	18.4-30	16.00	467	448	504	1 550	1 526	1 605	1629	1 645	10 12 14	145 149 151	2 900 3 250 3 450	180 230 260

NOTE — For approved rims see Table 21.

[1)] Inflation pressure.

Table 15 Agricultural Tyres — Drive Wheel Code Designated Normal Section — Radial Ply Speed Symbol A6

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 Std. R-1			kPa
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	12.4R28	W11	315	302	331	1 250	1 228	1 272	121	1450	160
ii)	13.6R28	W12	345	331	362	1 295	1 272	1 318	123	1 550	160
iii)	14.9R28	W13	378	363	397	1 350	1 324	1 376	128	1 800	160
iv)	16.9R28	W15	429	412	450	1 420	1 392	1 448	136	2 240	160

NOTE — For approved rims see Table 22.

[1)] Inflation pressure.

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

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	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	1 018	1 002	1 034	1 059	1 067	107	975	160
ii)	320/85R28	11.00	329	316	345	1 255	1 233	1 277	1 309	1 320	124	1 600	160
iii)	340/85R28	12.00	353	339	371	1 289	1 266	1 312	1 347	1 358	127	1 750	160
iv)	380/85R28	12.00	380	365	399	1 357	1 331	1 383	1 422	1 435	133	2 060	160
v)	420/85R28	15.00	438	420	460	1 425	1 396	1 454	1 496	1 511	139	2 430	160
vi)	460/85R30	16.00	475	456	499	1 544	1 513	1 575	1 622	1 638	145	2 900	160

NOTE — For approved rims see Table 22.

[1)] Inflation pressure.

Table 17 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 23.

[1]) Inflation pressure.

Table 18 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.						
	(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 25.

[1] Inflation pressure.

Table 19 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 24.
[1)] Inflation pressure.

Table 20 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 21 Drive Wheel Tyres Diagonal Ply

Sl No.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours
(1)	(2)	(3)	(4)
i)	5	12	**4 JA** 4.00B
ii)	8	18	5.50F W6 **W7**
iii)	8.3	20, 24, 32	W6 **W7**
iv)	9.5	18, 20, 22, 24, 32	W7 **W8**
v)	11.2	20, 24, 28	W9 **W10**
vi)	12.4	20, 24, 28	W10 **W11**
vii)	12.4	36, 38	W10, **W11** DW 11
viii)	13.6	24, 26, 28, 36, 38	W11 **W12** DW 12
ix)	14.9	28, 30	W12 **W13** DW13
x)	16.9	28, 30, 34	W14L **W15L** DW15L
xi)	18.4	30, 34, 38	W15L **W16L** DW16 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 22 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 23 Implement Tyres Power Tiller Tyres

Sl. no.	Tyre Section Code	Rim Diameter Code	Approved Rim Contours

(1)	(2)	(3)	(4)
i)	5.00	1 4	**3.00D** 3.50D 4J
ii)	6.00	1 2	**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 24 Implement Tyres Mixed Application

Sl. No. (1)	**Tyre Section Code (2)**	**Rim Diameter Code (3)**	**Approved Rim Contours (4)**
i)	5.0	1 0	3.50B,**4J**
ii)	6.50	1 6	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 25 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 **6.50HSDC**
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.

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

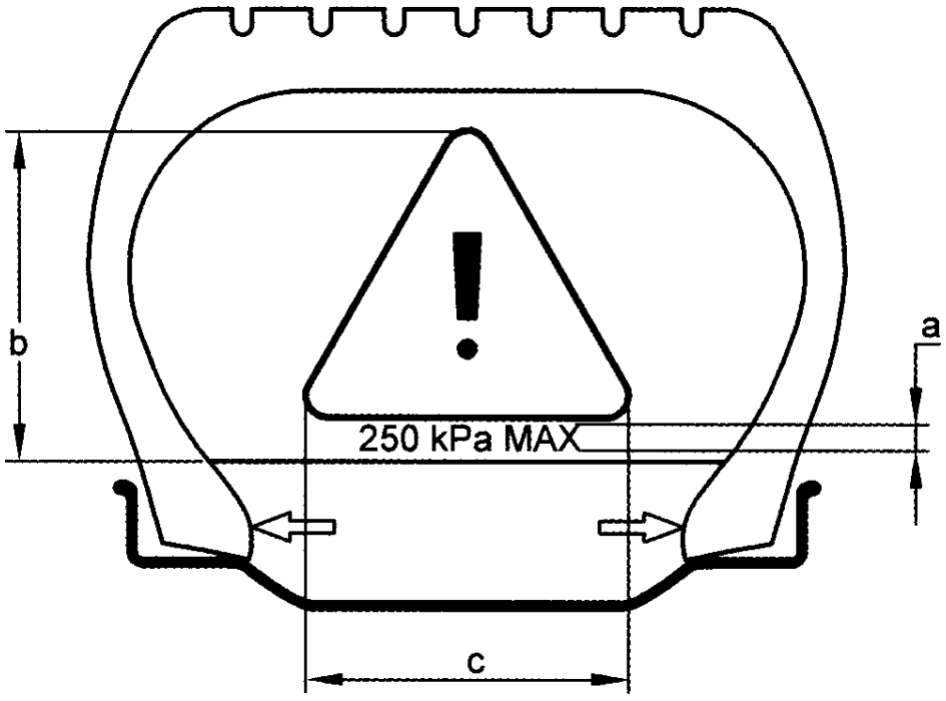
In case a method other than those described above is used, its equivalence shall be demonstrated.

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 26 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

ANNEX J

(*Foreword*)
COMMITTEE COMPOSITION

Automotive Tyres, Tubes and Rims Sectional Committee, TED 07

Organization	*Representative(s)*
In personal Capacity	SHRI D. P. SASTE **(*Chairperson*)**
All India Motor Transport Congress, New Delhi	SHRI NAVEEN GUPTA SHRI PRAMOD BHAVSAR (*Alternate*)
Ashok Leyland Limited, Chennai	SHRI V. P. GAUTAM SHRI MUTHU KUMAR N. (*Alternate*)
Association of State Road Transport Undertaking, New Delhi	SHRI R. CHANDRABABU SHRI ULLAS BABU (*Alternate*) SHRI R.R.K. KISHORE (*Alternate*)
Automotive Components Manufacturers Association, (ACMA)	SHRI SANJAY TANK MS. SEEMA BABAL (*Alternate*)
Automotive Research Association of India, Pune	SHRI A. AKBAR BADUSHA SHRI V. S. KHARIRATKAR (*Alternate*) SHRI PRANAB DEVRAJAN (*Young Professional*)
Automotive Tyre Manufacturers Association, New Delhi	SHRI RAJIV BUDHIRAJA SHRI T. C. KAMATH (*Alternate*)
Bajaj Auto Limited, Pune	SHRI R. NARASIMHAN SHRI ARVIND V. KUMBHAR (*Alternate*)
Central Institute of Road Transport, Pune	SHRI MANGESH M PATHAK SHRI SANJAY SALUNKHE (*Alternate*)
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	CQAV
Enkei Wheels (I) Limited	REPRESENTATIVE
Hero MotoCorp Limited, New Delhi	SHRI PIYUSH CHOWDHRY SHRI FEROZ ALI KHAN (*Alternate*) SHRI MOHD. DANISH GAZALI (*Young Professional*)
Indian Foundation of Transport Research and Training, New Delhi	SHRI S. P. SINGH SHRI J. S. WALIA (*Alternate*)
Indian Rubber Manufacturers Research Association, Thane	DR. K. RAJ KUMAR DR. BHARAT KAPGATE (*Alternate*)
Indian Tyre Technical Advisory Committee, New Delhi	SHRI V. K. MISRA SHRI NITEESH SHUKLA (*Alternate*) SHRI VINAY VIJAYVARGIA (*Young Professional*)
International Centre of Automotive Technology, Manesar	SHRI AMIT KUMAR KARWAL SHRI VIJAYANTA AHUJA (*Alternate*)
Kalyani Maxion Wheels Private Limited	SHRI SUNIL BHATAMBREKAR

Organization	*Representative(s)*
Mahindra & Mahindra Limited, Mumbai	SHRI RAM SINGH SHRI SULKARNI SHAILESH (*Alternate*) Ms. PUSHPANAJALI PATHAK (*Young Professional*)
Maruti Suzuki India Limited, Gurugram	SHRI GURURAJ RAVI SHRI RAJ KUMAR DWIVEDI (*Alternate*)
MG Motor India Private Limited	REPRESENTATIVE
Minda Kosei Aluminum Wheels Private Limited, Bawal	SHRI HEMANT PARKHI SHRI DUSHYANT CHAUHAN (*Alternate*)
Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade, New Delhi	SHRI A. P. SINGH SHRI S. S. GUPTA (*Alternate*)
Ministry of Road Transport & Highways, New Delhi	DIRECTOR
National Automotive Testing and R and D Infrastructure Project, Indore	DR. P. P. CHATTARAJ
Renault India Private Limited, Mumbai	SHRI RAJENDRA KHILE
Skoda Auto Volkswagen India Private Limited, Mumbai	SHRI MAKARAND BRAHME SHRI MILIND JAGATP (*Alternate*) SHRI ADITI DESHPANDE (*Young Professional*)
Society of Indian Automobile Manufactures, New Delhi	SHRI P. K. BANERJEE SHRI AMIT KUMAR (*Alternate*)
Steel Strips Wheels Limited	SHRI VIMAL P. ANAND
Tata Motors Limited, Pune	SHRI P. S. GOWRISHANKAR SHRI AMIT JAIN (*Alternate*)
Toyota Kirloskar Motor Private Limited, Bangalore	SHRI RAJU M. SHRI VIJETH GATTY (*Alternate*) SHRI DINESH G M (*Young Professional*)
Tractor Manufacturer`s Association, New Delhi	SHRI PHILIP KOSHI SHRI PRADEEP SHINDE (*Alternate*)
Triton Valves Limited, Bengaluru	SHRI BHARATH CHANDRASHEKAR SHRI DEEPAK H. V. (*Alternate*)
Vehicles Research & Development Establishment, Ahmednagar	SHRI S. PAL SHRI P. P. MAHAJAN (*Alternate*)
Volvo Group India Private Limited, Bangalore	SHRI KARTHIK SARMA SHRI PRAMOD KUMAR HUGAR (*Alternate*)
Wheels India Limited, Chennai	SHRI Padmanabhan V SHRI SENTHIL KUMAR (*Alternate*) SHRI SHIV NARAYAN GIRI (*Young Professional*)
BIS Directorate General	SHRI P.V. SRIKANTH, SCIENTIST 'D'/JOINT DIRECTOR AND HEAD (TRANSPORT ENGINEERING DEPARTMENT) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
MR. AUGUST DUBEY

Organization	*Representative(s)*
SCIENTIST ‘B’/ASSISTANT DIRECTOR (TRANSPORT ENGINEERING DEPARTMENT)	

Annexure 4
(Sr No 15 of ITEM 3)

Comments received from Yamaha Motor vide mail dated 27 and 29 September 2023 on draft TED 7 (21146)

1. (*Page* 5, *clause* **4.3**, *line* 7) — Substitute 'Table 15' for 'Table 13'.
   - Kindly substitute clause "4.3.1" for "4.3".

2. (*Page* 27, *clause* **J-1**) — Substitute the following for the existing:

   - "M/C" shall be inserted between rim size- "R18" and Load index- "53".

3. As we are adding the acronym ***"DP"*** in the marking requirements.

[*Page* 6, *clause* **5.1 (u)**] — Substitute the following for the existing: u) The inscription M + S or M.S or M & S or DP in the case of a snow tyre.

I suggest we should add the full name for the acronym, aligned with the ***UN R75***.

Paragraph 3.1.9., amend to read:	
"3.1.9.	The inscription "M+S" or "M.S" or "M&S" if the tyre is classified in the category of use "snow tyre" or if the tyre is classified in the category of use "special tyre" when declared by the tyre manufacturer at paragraph 4.1.3. as complying also with the definition given in paragraph 2.33. The inscription "DP" (i.e. Dual Purpose) is accepted as a permitted alternative; "M+S" or "M.S" or "M&S" means "Mud and Snow";"

Reason: For ease of understanding and unambiguity.

Annexure 5
(Item 3)

Minutes for Panel 2 meeting (28.8.2023 and 19.10.2023)

1. **Wire spoke wheel rim –**

Decision – In light of the comment received from CMD-III on draft amendment 2 to IS 16192-1, applicability of wire spoke wheel rims under IS 16192 was discussed again at length. Cross reference and contents of ISO 4210-2 and ISO 8644 was also discussed by members. Wheels India confirmed that on Wired spoke wheel for Vintage Car, they internally perform CFT and RFT both. BAL and Hero informed that they will discuss within SIAM 2/3 wheeler group and inform test standard / test specifications followed by suppliers for dynamic tests.

Further panel took reference from ISO 3911 and recommended to change the definition of 'spoke wheel' given in IS 10694-1, suitably.

Justification – It was noted that ISO 4210-2, for bicycles is not mandatory in India. In principle, it was agreed that dynamic test should be done for wired spoke wheel also. Members also informed that as per ongoing certification process, wire spoke rims are considered under IS 16192 part 3. Panel opined that specific test method, equipment and qualification criterion needs to be derived for inclusion of new scope under any IS standard. BAL and Hero members informed that they would like to come back after internal discussions, panel requested BAL and Hero to submit the input received from Wired spoke wheel manufacturers, to BIS within 14 days for further deliberation in panel/committee.

2. **Inclusion of 12 " wheel rim under scope of IS 9438 –**

Decision -Proposal was agreed. WIL was requested to provide draft proposal for inclusion of wheel under applicable clause/s of IS 9438 standard.
Justification – In Panel meeting held on 28.8.2020, panel had requested WIL team to explore whether equivalent practise to include 12 " rim for LCV / HCV vehicles is observed in any other international standard. WIL team informed that they will come back with details.
In meeting on 19.10.2023, WIL and TML representatives informed requirement of 12 " wheel under IS 9438 standard. Members assessed the accelerated factors and life requirements. Wheel rim factors such as diameter, inset limitations were also discussed. Based on discussions committee agreed to include 12" rims under IS 9438 along with 13 " rim row in table**.**

3. **Helium leak test proposal –**

Decision – Proposal to add new test method was not agreed in proposed form. However, panel further requested Minda to review their proposal again and submit the modified proposal which

does not create non-uniformity, for further deliberation in panel meetingg, it may be taken suitably.

Justification – method and proposal was discussed in detail. It was understood that having two different methods without equal / equivalent criterion could cause non uniformity in test requirement. Members referred to INMETRO (Brazilian) standards. After discussion it was decided to not agree on the proposal in given form.

4. **Inputs from TED 22 regarding vehicle applicability in scope of IS 16192 P1, P2, P3 –**

Decision – Panel opined that it is better to include applicable vehicle categories in each standard. A small subpanel of ARAI, CIRT, ACMA, BIS and Maxion, will include applicable vehicle categories in respective test standards. Group will provide proposal before next TED 7 meeting (tentatively in Nov 23).
Justification – Panel discussed Platform trucks and opined that such industrial trucks are not expected to be covered under IS 16192 standard, as in development of IS 16192 assistance was taken from JASO, which is for Motorcycle and ISO 8644 is also applicable to motorcycle, and practical conditions for platform trucks are different than motorcycles. Therefore, it is required to specify vehicle categories in each standard for clarity. ARAI informed that standard along with applicable CMVR rule provides clarity however for BIS QCO implementation scope should be clarified with vehicle categories.

5. **Unification of terminologies used in IS 16192, 9436 and 38 for wheel rims.**

Decision – subpanels will review standard for uniformity of terms used. (IS 16192 P1, P2, P3 – BAL and Hero), IS 9436 / 38 – Maxion, WIL, TML will provide proposal. Subpanels will share proposal by 10 Nov 23.

Justification – it was discussed that terminology used (e.g. standard title, used for wheel rims / rims / wheels) needs to be unified as and where it is used in test standards. These terms shall be referred from ISO / ETRTO/IS terminologies.

6. **Input from CMD wrt wcc in test standards – Wcc in IS 9436 includes only CFT test for plant change. CMD requested to remove this requirement from standard**.

Decision – Panel recommended to both CFT+RFT for plant change.

Justification – panel discussed WCC mentioned in IS 9436 for change in plant. It was informed that CFT test is severe test as compared to RFT test. Hence for wheel rims with no other change other than plant change, only CFT test would have been considered in past. Members opined that WCC can not be removed from IS standard as this standard is referred for CMVR and other purposes also. However both tests can be included as they are important from safety aspect.

7. **Wheels for vintage cars –**

Decision – Panel requested WIL to provide inputs wrt which tests are mandatory for export of wheels outside India for vintage cars ?

Justification – WIL informed that they export wired spoke wheels for vintage cars and they perform CFT and RFT test as per SAE standard. It was discussed that following options may be deliberated –

1. For vintage car, ACMA may approach to concerned regulator for exemption in QCO (as CMVR not applicable for vintage car)
2. To exclude vintage car wheels from scope of standard after detailed discussion (in line with IS 15633)
3. Examine global requirements for vintage wheels and then share proposal to TED 7.Panel discussed to review inputs from WIL and then take call on this subject.

8. **Revision of ISO 10694 Part 4, 5 and 7**

Inputs received from BIS were discussed. Following was agreed and was recommended to issue the draft documents (after incorporating the following) into WC:

- IS 10694 Part 4 and Part 5: Agreed to update the reference standards, bilingual title and other editorial corrections.
- IS 10694 Part 7: Agreed to update the reference standards, bilingual title,other editorial corrections and addition of new proposed dimensions in-line with ITTAC and ISO as proposed.

Further, members were requested to review the standards and submit their technical comments, addition/deletion of size, etc (if any) by 10.11.2023.

9. **ITTAC comments on 2/3-Wheeler Rim**

Decision: Panel deliberated and agreed to update the existing IS standards and ITTAC manual for dimension and profile. Further it was agreed that once, IS and ITTAC manual are updated, it may be deliberated again for inclusion in standard IS 16192.

Justification: ITTAC briefed their comments and requested for inclusion of dimensional requirement in IS 16192. It was also observed that JASO T 203 has reference of RIM profile as compulsory requirement (please refer 37th meeting minutes-TED7 also).

10. **CMD comments on Rim thickness**

Panel deliberated and requested the guidance of TED 7 committee.

11. **Proposal by Panel convenor**

Changes proposed in IS:9436:2018 by Sub-Panel 2								
Sr. No.	**Page no.**	**Clause**	**Line**	**Current**		**Proposed change**	**Remark**	**Panel Recommendation**
1	Table 2	Sr. 1	Column 1	ii)		* ii)		Panel decided to modify the NOTE as follows: NOTE: For cold formed alumunium 5000 series, magnesium content shall be less than or equal to 3%.
2	Annex B	8.3	2nd from bottom	Maximum Vertical (Front / Rear) axle load capacity (kN)		Maximum (Front/Rear) Wheel load capacity (kN)	Axle load - not applicable	Agreed

Changes proposed in IS:9438:2018 by Sub-Panel 2								
Sr. No.	**Page no.**	**Clause**	**Line**	**Current**		**Proposed change**	**Remark**	**Panel recommendation**
1	Table 1	Sr. iv)	Column 4	16 and above		16		Agreed (as per Industry practice and international reference)
2	Table 1	Sr. iv)	Column 5	Inset below 100 and all outset		All		
3	Table 2	Sr. ii)	Column 4	15, 17, 18, 20, 22, 24, 17.5, 19.5, 22.5, 24.5		15, 16, 17, 18, 20, 22, 24, 17.5, 19.5, 22.5, 24.5		
4	Table 2	Sr. iv)	Column 5	127 or more		All		

Changes proposed in IS:16192 Part 1 by Sub-Panel 2								

Sr. No.	Page no.	Clause	Line	Current		Proposed change	Remark	Panel recommendation
1	1	3.2	--	There are some types of Alloy Wheel Rim under 3.2.2		Separate the current matter under 3.2.2 under title 3.2.2 (a). Add 3.2.2 (b) *Composite Construction of Steel & Light Alloy Wheel* - Wheel rim made of Steel and spoke / disc / hub motor housing are made of Light alloy		Agreed (in line with TED7 Decsion- 37th meeting and current practice for homologation)
2		Annex F		(No mention of material grade)		Add 11.1 Material for Rim 11.2 Material for Spoke / Disc / Hub motor		Agreed

Changes proposed in IS:16192 Part 2 by Sub-Panel 2								
Sr. No.	Page no.	Clause	Line	Current		Proposed change	Remark	**Panel recommendation**
1	1	Fig. 1	--	(Current figure shows Truck wheel)		(To be replaced with Steel wheel figure)	Editorial change	Agreed, Panel requested Mr Sachin Pawar from Endurance to provide the updated figure
2	2	4.2.3.4 b)		*For two wheeled vehicles:* After being subjected to 105 cycles according to the dynamic cornering fatigue test specified		*For two wheeled vehicles:* After being subjected to 100,000 cycles according to the dynamic cornering fatigue test specified	Editorial change	Already covered
3	2	Fig 2	--	(Sketch shows Light alloy wheel figure and text)		(To be replaced with Steel wheel figure & text)	Editorial change	Agreed, Panel requested Mr Sachin Pawar from

								Endurance to provide the updated figure
4	3	4.2.4.3	7	(No mention of whether the RFT is for two / three wheeled vehicle. It is separately mentioned for CFT, but not for RFT)		Add *For both two and three wheeled vehicles*	Editorial change	Panel recommended to modify clause 4.2.4.3 as follows: *The radial load F_r, for both two and three wheeled vehicles in newton, is determined as follows:*
5	3	4.2.4.4	c)	c) The wheel rim shall withstand a minimum of 400 000 test cycles without failure.		c) *For Two wheeled vehicles:* The wheel rim shall withstand a minimum of 500 000 test cycles without failure. d) *For Three wheeled vehicles*: The wheel rim shall withstand a minimum of 400 000 test cycles without failure.	Technical correction	Panel requested justification for the proposed change.
6	4	Annex F		(No mention of material grade)		Add 11.1 Material	Technical correction	Agreed

Changes proposed in IS:16192 Part 3 by Sub-Panel 2								
Sr. No.	Page no.	Clause	Line	Current		Proposed change	Remark	Panel recommendation
1	1	1	SCOPE	This Standard prescribes the general and performance requirements of spoke wheel rims intended for use on two and three wheeled motor vehicles with or		This Standard prescribes the general and performance requirements of spoke wheel rims with or without hub	Technical change to cover all types of Spoke wheel rims	**Panel meeting-28.8.2023:** There was discussion regarding inclusion of wire spoke wheel rims used for 2/3 wheelers / EV in scope of

				without sidecar.		or hub-motor assembly (see fig 2) intended for use on two and three wheeled motor vehicles with or without sidecar.		IS 16192 P3. Panel 2 did not conclude on the subject and needs further discussions and agreement of members. If possible, physical samples of wheels should be made available – as many of the wheels are not manufactured / used by Indian companies. Majority of these vehicles (2 wheelers) with their special wheels are directly imported and sold in India. **Panel meeting 19.10.2023:** No physical sample was brought, further please refer Item 1 above.
2	2	Fig.1	--	(Current figure shows generic sketch)		(To be made clear with spoke type of wheels, hub / hub-motor type of wheels)	Technical change to cover all types of Spoke wheel rims	

Annexure-6
(Sr No 22 of ITEM 3)

Comments received from Mr T Chakravarty on IS 15704

Clause No / Annex No	Sub-Clause No / Table No	Title	As per Standard	Changes requested	Justification
3	3.2 b)	Definitions	b)Radial — Pneumatic-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 in-extensible circumferential belt.	Amend to read b) "Radial" or "radial-ply" describes 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;"	s per Revision 1 mendment 5 to ECE egulation 109
	3.3.2	Category of use	Special Use Tyre — Tyre intended for mixed use, both on and off road and/or at restricted speed.	Amend to read "Special use tyre" is a tyre intended for mixed use, both on and off road and/or at restricted speed. These tyres are primarily designed to initiate and maintain the vehicle in motion in off-road conditions.	
	3.3.4		None	Insert a new sub clause 3.3.4 to read: "Traction tyre" means a tyre in class C2 or C3 bearing the inscription TRACTION and intended to be fitted primarily to the drive axle(s) of a vehicle to maximize force transmission in various circumstances."	
	3.14	Tread Groove	None	Insert new : a)Tread depth" means the depth of the principal grooves." b)Principal grooves" means the wide circumferential grooves positioned in the central zone of the tyre tread, which, in the case of truck (commercial)	

				tyres, have the treadwear indicators located in the base." **c)** Void to fill ratio" means the ratio between the area of voids in a reference surface and the area of this reference surface calculated from the mould drawing."	
	3.20 a) & b)	Tyre Size Designation	A designation showing, a) Nominal section width — This shall be expressed in millimetres, except in cases of tyres for which the size designation is shown in the col 2 of the Tables 6 to 25 of IS 15636 b)Nominal aspect ratio — Except in cases of tyres for which the size designation is shown in the col 2 of the Tables 6 to 25 of IS 15636.	Amend to read "Tyre-size designation" means, except in the case of types of tyre for which the tyre-size designation is shown in the col 2 of the Tables 6 to 28 of IS 15636, a designation showing: a)The nominal section width expressed in millimetres b)The nominal aspect ratio or, depending on the tyre design type, the nominal outer diameter expressed in mm;"	
	3.20 c) & d		None	Insert new paragraphs to read: 3.20 c)An indication of the structure placed in front of the rim diameter marking as follows: 3.20 d)on diagonal (bias-ply) tyres, a dash "-" or the letter "D"; d)n radial-ply tyres, the letter "R";"	
8	8.6	Marking	None	Add 8.6: In the case that the date of manufacture is not moulded, it shall be applied not later than 24 hours after the tyre is removed from the mould."	

Annexure- 7
(Sl No 32 of Item 3)

Comments received from CMD 3 on draft amendment TED 7 (22490)

2. Amendment No. 2 was examined and it was observed that following major changes are being brought in the Standard through this Amendment:

Sl. No.	Page and clause reference	Change
1	Page 1, Cl. 3.2.2- Definition of Composite Construction Light alloy wheel	A Note is being added to clarify that wired spoke wheel rims are not covered under scope of the Standard

3. In addition to the above, following observations have also been made:
a) As per Fig.1, Spoke wheel rims are also covered in IS 16192-1. This fig. may also be required to be amended suitably to exclude wired spoke wheel rims from IS 16192-1. Amendment No. 2 may be reviewed from this aspect and revised.

b)Further, it is also felt that simultaneous amendment in IS 16192-3 may also be required to specify that wired spoke wheel rims are covered under scope of the Standard IS 16192-3 to avoid any confusion. Till that time, Amendment No 2 to IS 16192-1 may be held for publication.

4. **TED may be requested to look into the above observations and give clarifications/take necessary actions.**

Annexure 8

(Sl No 33 of item 3)

Comments received on Minutes of Panel 2 meeting from Yamaha vide mail dated 20.11.2023

ITEM 11 of MoM: "Proposal by Panel Convenor" -

Changes Proposed in IS 16192 (Part 1) by Sub-Panel 2					
S.No.	**Clause**	**Current**	**Proposed Change**	**Yamaha Comment**	**Justification**
1	3.2	**3.2.2** *Composite Construction Light Alloy Wheel* — Wheels of which the rim is made of light alloy and the spokes or disc of light alloy are steel, which are then assembled (*see* Fig.1).	Separate the current matter under 3.2.2 under title 3.2.2 (a). **Add 3.2.2 (b):** *Composite Construction of Steel & Light Alloy Wheel* - Wheel rim made of Steel and spoke / disc / hub motor housing are made of Light alloy	**Add 3.2.2 (b):** *Composite Construction of Steel & Light Alloy Wheel* - Wheel rim made of Steel and spoke / disc ~~/~~ **with** hub motor housing are made of Light alloy.	Clarity must be available in the standard to avoid misinterpretation with "Wire spoke wheel rims" without hub motor. As separate discussion is going-on "Wire spoke wheel rims".
2	Annex F	-NA-	Add - 11.1: Material for Rim 11.2: Material for Spoke / Disc / Hub motor	Add - 11.1: Material for Rim 11.2: Material for Spoke / Disc / Hub motor **casing**	For clarity

Annexure- 9
(Item 5.9)

Comments received from ITTAC on IS 18258

Sr. no	Subject	Existing	Proposed changes	Justification
1	**FOREWORD**	This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rims Sectional Committee and approved by the Transport Engineering Division Council. ''Sound emitted due to contact between road and tyre is known as rolling sound emission. In past few years, there have been considerable demand for reducing this sound. This standard specifies the various test method to evaluate the tyre with respect to rolling sound emission and its performance on wet surface. In the formulation of this standard, considerable assistance has been drawn from AIS 142	This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Tyres, Tubes and Rims Sectional Committee and approved by the Transport Engineering Division Council. ''~~Sound emitted due to contact between road and tyre is known as rolling sound emission. In past few years, there have been considerable demand for reducing this sound.~~ In recent years, environment has become a prime focus and Rolling resistance is directly related to fuel efficiency and hence the CO_2 emissions. This standard specifies the various test methods to evaluate the tyre with respect to rolling resistance, its performance on wet surface and rolling sound emission. In the formulation of this standard, considerable assistance has been drawn from AIS 142	**To align with the requirements of AIS 142.**
2	Wet grip testing of SNO	Test requirements are not covered.	Atmospheric conditions for the wet grip testing of Snow tyres as under:	**To align with the amendment no 01 to AIS 142**

	W tyres		The wind conditions shall not interfere with w (wind-shields are allowed). The wetted surface temperature and the ambient between: **Category of use** / **Wetted surface temperature** Normal tyres: 12 °C – 35 °C Snow tyres: 5 °C – 35 °C Snow tyres for use in severe snow conditions: 5 °C – 20 °C Special use tyres: not applicable Moreover, the wetted surface temperature shall not v more than 10 °C. The ambient temperature shall remain close to temperature; the difference between the ambient a temperatures shall be less than 10 °C."	

Annexure 10
(Sl No 5 of Item 3**)**

Comments on Marking clause from MSIL and Kalyani Maxion

A-10.1 Comment on Marking clause from MSIL (reference 37th meeting of TED 7

Commentator	Clause	Comments/Suggestions along with Justification for the Proposed Change	Proposed changes/modified wording	Panel discussions	Committee Decision
Mr RAJ KUMAR DWIVEDI (MSIL) 13-04-2021		(Page 4, clause 4) ? Substitute the following for the existing clause: ◆4 MARKING Wheels with integral or permanently affixed rims and rims separate or demountable shall be legibly marked with their size designation. As far as possible, the marking shall be visible after the tyre is mounted and inflated. 4.1 Marking of Rims Rims delivered without disc and being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following: a) Size designation b) Indication of the source of manufacture; and c) Rim bead seat contour type, if applicable. 4.1.1 In case the markings are impressed or embossed, the letters shall not be smaller than 3 mm and impressed to a depth or embossed to a height of not less than 0.13 mm. 4.1.2 In case other permanent marking	(Page 4, clause 4) ? Substitute the following for the existing clause: ◆4 MARKING Wheels with integral or permanently affixed rims and rims separate or demountable shall be legibly marked with their size designation. As far as possible, the marking shall be visible after the tyre is mounted and inflated. 4.1 Marking of Rims Rims delivered without disc and being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following: a) Size designation b) Indication of the source of manufacture; and c) Rim bead seat contour type, if applicable. 4.1.1 In case the markings are impressed or embossed, the letters shall not be smaller than 3 mm and impressed to a depth or embossed to a height of not less than 0.13 mm. 4.1.2 In case other permanent marking methods ,for example, laser printing, pad printing, ink jet printing and permanent stickers are used, such marking should be permanent, legible, indelible,	Generally agreeable. Can be included appropriately in the draft for circulation. 10694 par 1 Comment regarding cl no 4.2.3 is agreed. TED 7 may discuss same and confirm.	Committee agreed.

		methods ,for example, laser printing, pad printing, ink jet printing and permanent stickers are used, such marking should be permanent, legible, indelible, non-removable and durable. 4.1.3 The rims shall be marked on the outer-side as shown in Fig. l5 and Fig. 16 so that the marking is visible after the tyre is mounted and inflated. In the case of lack of space on the outside, the rim may be marked inside (see Fig. 17). 4.2 Marking of Disc Wheel Disc wheels being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following: a) Size designation; b) Indication of the source of manufacture; c) Date of manufacturing: year and month or year and quarter of the year (for example 21 03 indicates March 2021; 21 III indicates third quarter of 2021); and d) Half dual spacing or inset may also be marked. 4.2.1 In case the markings are impressed or embossed , the marking shall be recessed and without sharp edges and letters shall not be smaller than 3 mm and impressed to a depth or embossed to a height not less than 0. 13 mm. 4.2.2 In case other permanent marking methods, for example,	non-removable and durable. 4.1.3 The rims shall be marked on the outer-side as shown in Fig. l5 and Fig. 16 so that the marking is visible after the tyre is mounted and inflated. In the case of lack of space on the outside, the rim may be marked inside (see Fig. 17). 4.2 Marking of Disc Wheel Disc wheels being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following: a) Size designation; b) Indication of the source of manufacture; c) Date of manufacturing: year and month or year and quarter of the year (for example 21 03 indicates March 2021; 21 III indicates third quarter of 2021); and d) Half dual spacing or inset may also be marked. 4.2.1 In case the markings are impressed or embossed , the marking shall be recessed and without sharp edges and letters shall not be smaller than 3 mm and impressed to a depth or embossed to a height not less than 0. 13 mm. 4.2.2 In case other permanent marking methods, for example, laser printing, pad printing, ink jet printing and permanent stickers are used, such marking should be permanent, legible, indelible, non-removable and durable. 4.2.3 The rims shall be marked on the outer-side as shown in Fig. 18 & Fig 16 so that marking is visible after tyre is mounted and inflated . In the case of lack of space on the outside, the		

		laser printing, pad printing, ink jet printing and permanent stickers are used, such marking should be permanent, legible, indelible, non-removable and durable. 4.2.3 The rims shall be marked on the outer-side as shown in Fig. 18 & Fig 16 so that marking is visible after tyre is mounted and inflated . In the case of lack of space on the outside, the rim may be marked inside (see Fig. 17). Justification: In-line with current practice and supplier feedback	rim may be marked inside (see Fig. 17).		

A-10.2 Comment on Marking clause from Kalyani Maxion (reference 37th meeting of TED 7)

Clause/Sub-clause/ Para/Table/Fig. No. commented	Type of Comments (General/Editorial/ Technical)	Proposed change	Justification	Sub panel comments	Committee Decision
Cl. 4.2. c Date of manufacturing: year and month or year and quarter of the year. (For example: "8403" indicates March 1984, "84 III" indicates Third quarter of 1984)	Editorial / Technical	"Date of manufacturing: At least year and month or year and quarter of the year. Actual marking may with numbers or alphabets with suitable coding system as decided by wheel manufacturer. (Some examples: "1403" indicates March 2014, "14 III" indicates Third quarter of 2014, "AB" indicates A as a month and B as a Year)		Agreed. BAL suggested to add barcode system as alternate method for Date Of Manufacturing. TED 7 may discuss.	Committee agreed on Date of manufacturing marking. For alternate provision, committee decided to discuss in next committee meeting.

Annexure 11

Partially updated draft TED 7 (21198) (except marking clause)

For BIS Use Only

भारतीय मानक प्रारूप

मोटर वाहन - रिम्स - सामान्य आवश्यकताएँ भाग **1** *नामकरण, पदनाम, अंकन और माप*
(तीसरा संशोधन)

(ALL agreed comments included except MSIL)

Draft Indian Standard

AUTOMOTIVE VEHICLES — RIMS — GENERAL REQUIREMENTS
PART 1 NOMENCLATURE, DESIGNATION, MARKING AND MEASUREMENT
(*Third Revision*)

ICS: 01.040.43; 43.040.50

Last date for receipt of comments is XX/XX/XXXX

Automotive Tyres, Tubes and Rims Sectional Committee, TED 7

FOREWORD
(***Formal clause to be added later on***)

This standard was first published in l984. It was subsequently revised in 1993 and 2009. The second revision was done based on the experience gained after publication of standard and availability of new designs.

This standard aims at uniform rims profiles that will match the tyres in obtaining proper fitment. The sizes, designations and markings have also been standardized to facilitate uniform adoption during manufacture.

This standard is one of the parts pertaining to rims for various types of automotive vehicles. The other parts in this series are:

(Part 2): 2009 Passenger car (*second revision*)
(Part 3): 2009 Commercial vehicles rims (*second revision*)
(Part 4): 2009 Scooter and scooter derivative rims (*first revision*)
(Part 5): 2009 Moped, motorcycle and motorcycle derivative rims (*second revision*)
(Part 6): 2009 Rims for agricultural tractors, tillers and implements (*second revision*)
(Part 7): 2009 Industrial truck rims (*first revision*)
(Part 8): 2009 Earthmoving machine rims (*first revision*)

This part is in general agreement with ISO 3911: 2021 'Wheel/rim nomenclature, designation, marking and units of measurements' published by the International Organization for Standardization (ISO).

These parts do not lay down methods of testing and performance requirements for wheels/rims pertaining to the respective tyres of automotive vehicles but lay down only the profiles and other general requirements. For passenger car wheels and truck and bus wheels/rims reference may be made to the following Indian Standards for methods of testing performance requirements:

IS No.	*Title*
9436: 2018	Performance requirements and methods of test for wheels for passenger cars, quadricycles and mini goods carriers (First Revision)
9438: 2018	Performance requirements and methods of tests for wheels/ rims for trucks and buses (First Revision)

This third revision is taking place to keep pace with the latest technological advancement in the field of wheels/rims for all types of vehicles.

Following are the major changes in this revision:

a) Amendment 1 has been incorporated in this standard;
b) Marking clause **5.2.3** is modified;
c) Tolerances, dimensions and figures are updated.

The composition of the Committee responsible for the formulation of this standard is given at **Annex A (Will be added later).**

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 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 — RIMS — GENERAL REQUIREMENTS PART 1 NOMENCLATURE, DESIGNATION, MARKING AND MEASUREMENT

(Third Revision)

1 SCOPE

1.1 It covers the nomenclature, designation, marking, methods and units of measurement and requirements for wheels/rims.

1.2 The figures given in this standard are intended to define fundamental wheel/rim terms rather than to provide all the wheel design features comprehensively.

2 REFERENCES

This standard contains no cross reference.

3 DEFINITIONS AND NOMENCLATURE

For the purpose of this standard, following definitions and nomenclatures shall apply:

3.1 Wheel — A rotating load carrying member between the tyre and the axle. It usually consists of two major parts:

a) The rim; and
b) The wheel disc.

3.1.1 *Rim* — The part of the wheel on which the tyre is mounted and supported.

3.1 .2 *Wheel Disc* — That part of the wheel which is the supporting member between the axle and the rim.

3.1.3 *Single Wheel* — A wheel which supports one tyre on one end of an axle.

3.1.4 *Inset Wheel* — A wheel so constructed that the centre line of the rim is located inboard of the attachment face of the disc. Inset is the distance from the attachment face of the disc to the centre line of the rim [*see* Fig. 1(a)].

3.1.5 *Zeroset Wheel* — A wheel so constructed that the centre line of the rim is coincident with the attachment face of the disc [*see* Fig. l(b)].

3.1.6 *Outset Wheel* — A wheel so constructed that the centre line of the rim is located outboard of the attachment face of the disc, Outset is the distance from the attachment face of the disc to the centre line of the rim [*see* Fig. 1(c)].

NOTE — Track, the distance between the centre line of the tyres on an axle, increases as the outset of the wheels is increased.

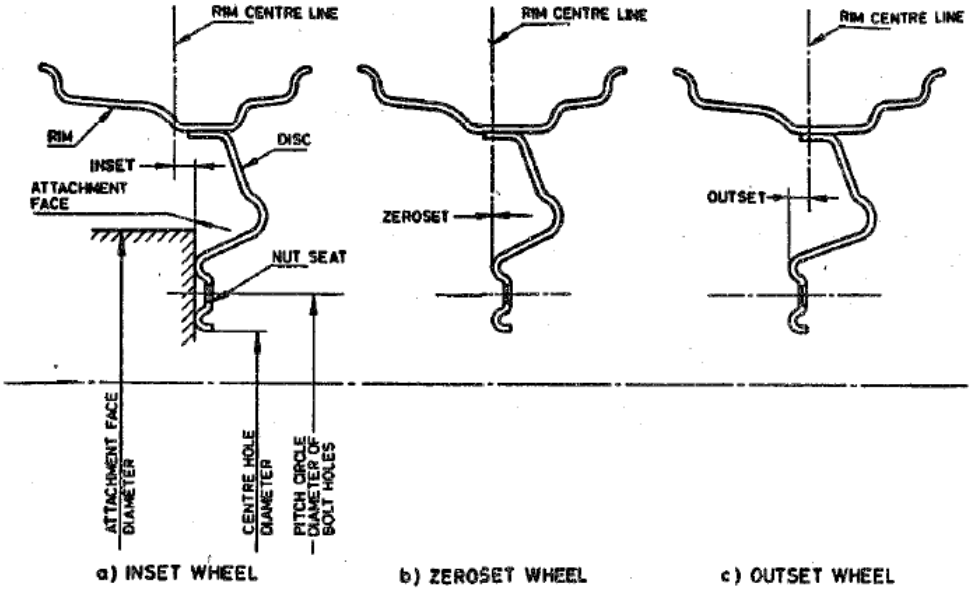


FIG. 1 PASSENGER CAR AND LIGHT COMMERCIAL VEHICLE DISC WHEEL NOMENCLATURE

3.1.7 *Dual Wheel* — A wheel of the type shown in Fig. 2 or a wheel with sufficient inset and configuration so that two such wheels, when assembled with each other, support two tyres on one end of an axle.

3.1.8 *Dual Spacing* — The distance between the centre lines of the rim to provide the required clearance between the tyres (*see* Fig. 2).

3.1.9 *Offset (Half Dual Spacing)* — The distance between the centre line of the rim and the outer face of the disc and is equal to the inset plus the nominal thickness of the disc.

3.2 Types of Wheel

3.2.1 *Wheel* — A permanent combination of a rim and a wheel disc (*see* Fig. 1 and Fig. 2).

3.2.2 *Divided Wheel* — A wheel so constructed that its two main parts, the rim portions of which may or may not be the same in width, when securely fastened together, combine to form a rim having two fixed flanges (*see* Fig. 3).

3.2.3 *Reversible Wheel* — A wheel so constructed that its wheel disc can be mounted on either face to provide inset (narrow track) or outset (wide track) (*see* Fig. 4).

3.2.4 *Adjustable Wheel* — A wheel so constructed that the rim can be repositioned axially relative to the wheel disc. Adjustments can he made: (a) manually, or (b) by power of the vehicle (*see* Fig. 5).

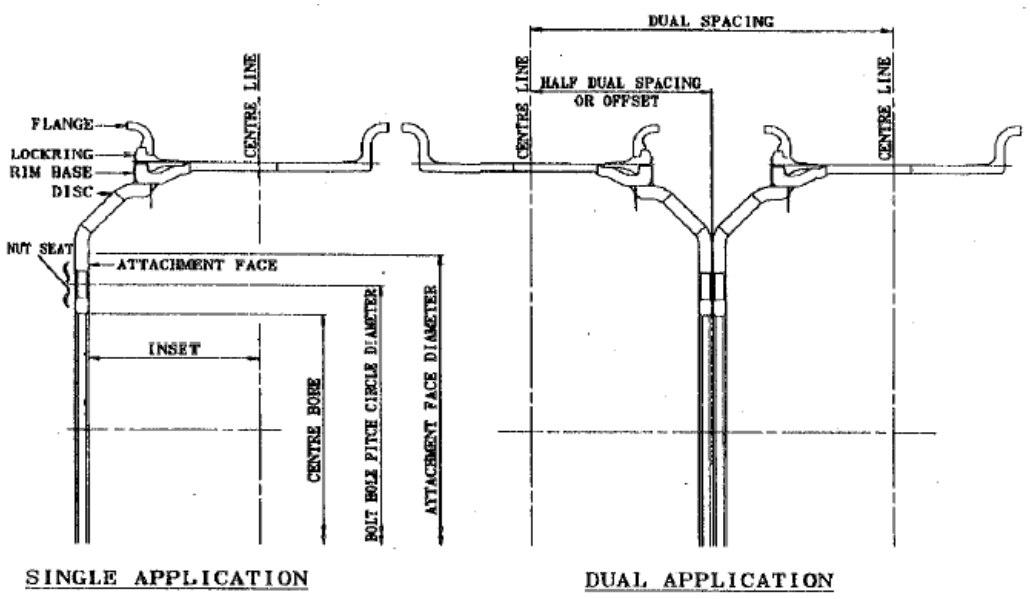


FIG. 2 COMMERCIAL VEHICLE WHEEL NOMENCLATURE

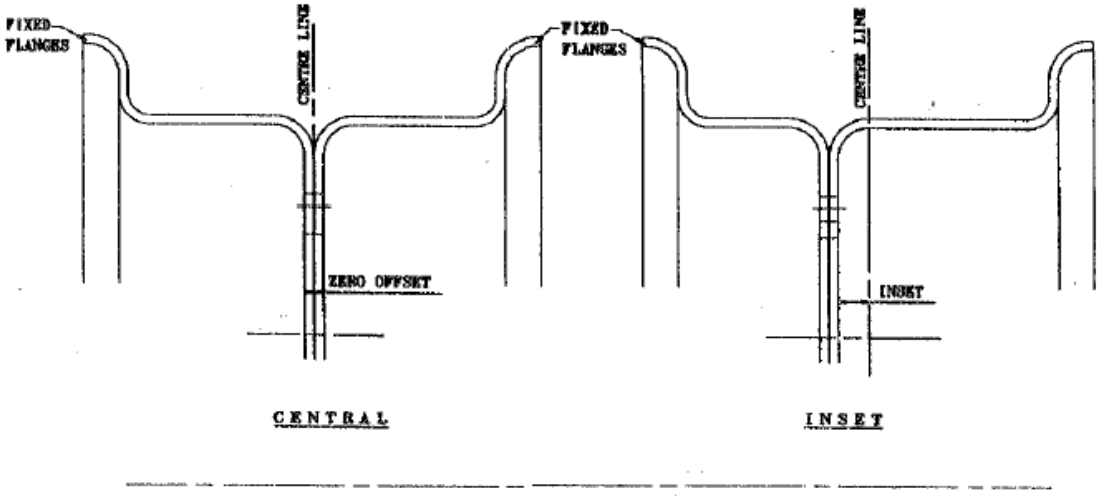


FIG. 3 DIVIDED WHEEL NOMENCLATURE

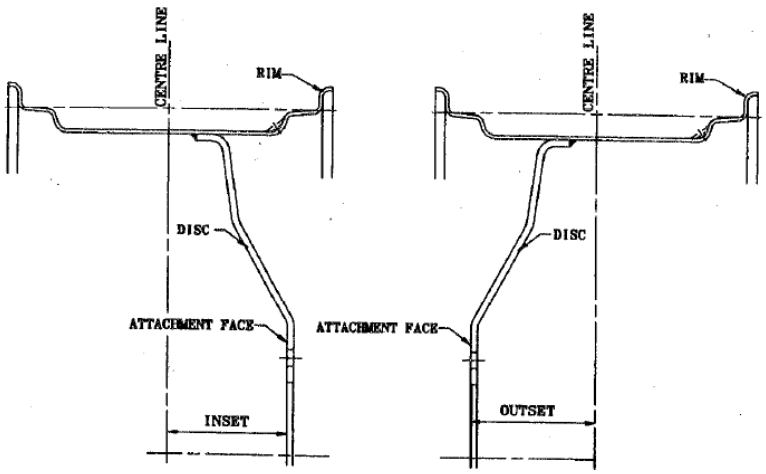


FIG. 4 REVERSIBLE WHEEL NOMENCLATURE

3.2.5 *Spoke Wheel* — A wheel so constructed that its rim is joined to the centre piece by a series of wire spokes (*see* Fig. 6).

3.2.6 *Forklift Wheel* (*see* Fig. 7)

3.3 Rim Nomenclature

3.3.1 *Flange* — That part of the rim which provides lateral support to the tyre (*see A, B, G,* R_2 and R_6 in Fig. 8).

3.3.2 *Bead Seat* - That part of the rim which provides radial support to the tyre *(see D, P,* Band R_3 in Fig. 8).

3.3.3 *Well* — That part of the rim so located with sufficient depth and width to enable the tyre beads to be mounted and demounted over the mounting side rim flange or bead seat taper *(see* R_4, α, *M, H, L* and R_5, in Fig. 8).

3.3.4 *Valve Hole (Valve Aperture)* — The hole or slot in the rim which accommodates the valve for tyre inflation *(see V, Fin* Fig. 8). For detail of valve hole aperture (*see* Fig. 21A, 21B, 21C, 21D, 21E, 21F, 21G and 21H).

3.3.5 *Gutter* — The groove in the rim base in which rim parts, such as a spring lock ring or a detachable spring flange fit and are retained by the gutter tip (*see* S and T in Fig. 8).

3.3.6 Other nomenclature shall be as given in Fig. 8.

3.4 Rim Types

3.4.1 *One-Piece* (*Drop-Centre*) *Rim* — A rim which is of one-piece construction and incorporates a well (*see* Fig. 9).

3.4.2 *Two-Piece Rim* (*see* Fig. l0)

3.4.3 *Three-Piece Rim* (*see* Fig. 11)

3.4.4 *Four-Piece Rim* (*see* Fig. 12)

3.4.5 *Five-Piece Rim* (*see* Fig. 13)

3.4.6 *Cylindrical Bead Seat Rim for Motorcycles* (*see* Fig. 14)

4 SIZE DESIGNATION OF WHEE/RIM

4.1 Present Designation

The wheels/rims shall be designated by the following figures representing:

a) Nominal rim width code;
b) Rim profile;
c) Nominal rim diameter code;
d) A letter or letters signifying the tyre-side profile of the rim (usually the profile designation follows the nominal rim width; it may, however, precede or include the nominal rim width); and
e) *Off the road* — The symbol '/' followed by a figure or figures indicates the flange, height.

Example:

RIM MARKING				RIM CONTOUR		NOMINAL DIAMETER CODE	SPECIAL FEATURES
				WIDTH CODE	PROFILE		
PASSENGER CAR							
4.5J × 15	Or 15 × 4.5J	$4\frac{1}{2}$J × 15	15 × $4\frac{1}{2}$J	$4\frac{1}{2}$J or 4.5	J	15	—
4.5J × 15 H2	Or 15 × 4.5J H2	$4\frac{1}{2}$J J × 15 H2	15 × $4\frac{1}{2}$J J H2	$4\frac{1}{2}$J or 4.5	J	15	H2 Hump Designation
COMMERCIAL VEHICLES							
5.0-20 (5.0 × 20)		Or 20-5.0 (20 × 5.0)		5	—	20	—
22.5 × 7.50		Or 7.50 × 22.5		7.50	—	22.5	—
10.00 V-20		Or 20-10.00 V		10	V	20	—
10.00 V × 20		(20 × 10.00 V)					
AGRICULTURAL TRACTORS							
W 15 L × 28		Or 28 × W 15 L		15	L	28	—
MOTOR CYCLES							
16 × 1.20		Or 1.20 × 16		1.20	—	16	—
18 × 2.15		Or 2.15 × 18		2.15	—	18	—
18 × MT 2.15 H2		Or MT 2.15 × 18 H2		2.15	MT	18	—
SCOOTERS							
8-2.10		Or 2.10-8		2.10	—	8	—
INDUSTRIAL/LIFT TRUCK							
5.00F-10		Or 10-5.00F		5.00	F	10	—
EARTHMOVING EQUIPMENT							
8.00TG-24 SDC		Or 24-8.00TG SDC		8.00	TG	24	SEMI-DROP CENTRE (SDC)

11.25-25/2.0	Or 25-11.25/2.0	11.25	—	25	CODE OF FLANGE HEIGHT (/2.0)
25 × 14.00/1.3	Or 14.00/1.3 × 25	14.00	—	25	CODE OF FLANGE HEIGHT (/1.3)

5 MARKING

Wheels with integral or permanently affixed rims and rims separate or demountable shall be legibly marked with their size designation.

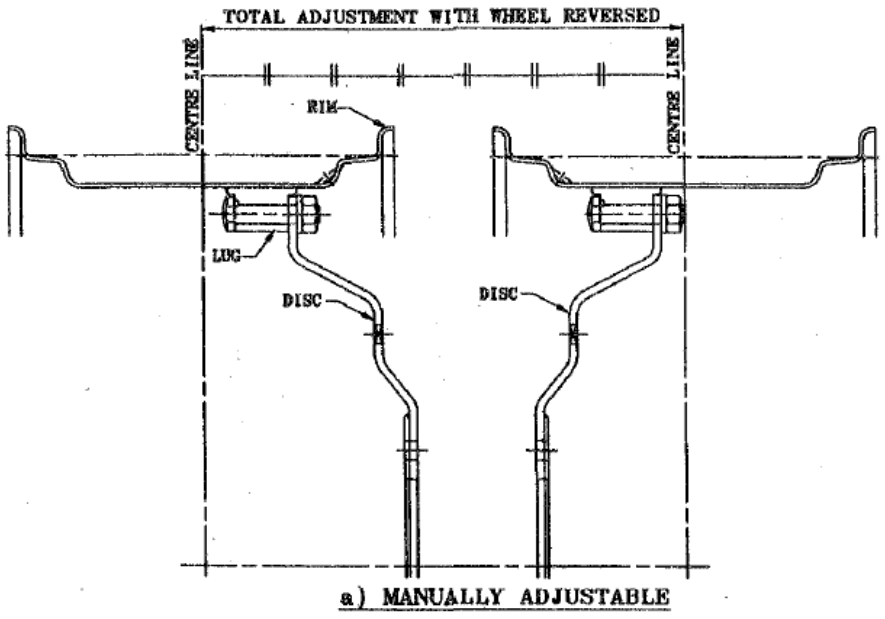
5.1 Marking of Rims

Rims delivered without disc and being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following:

a) Size designation;

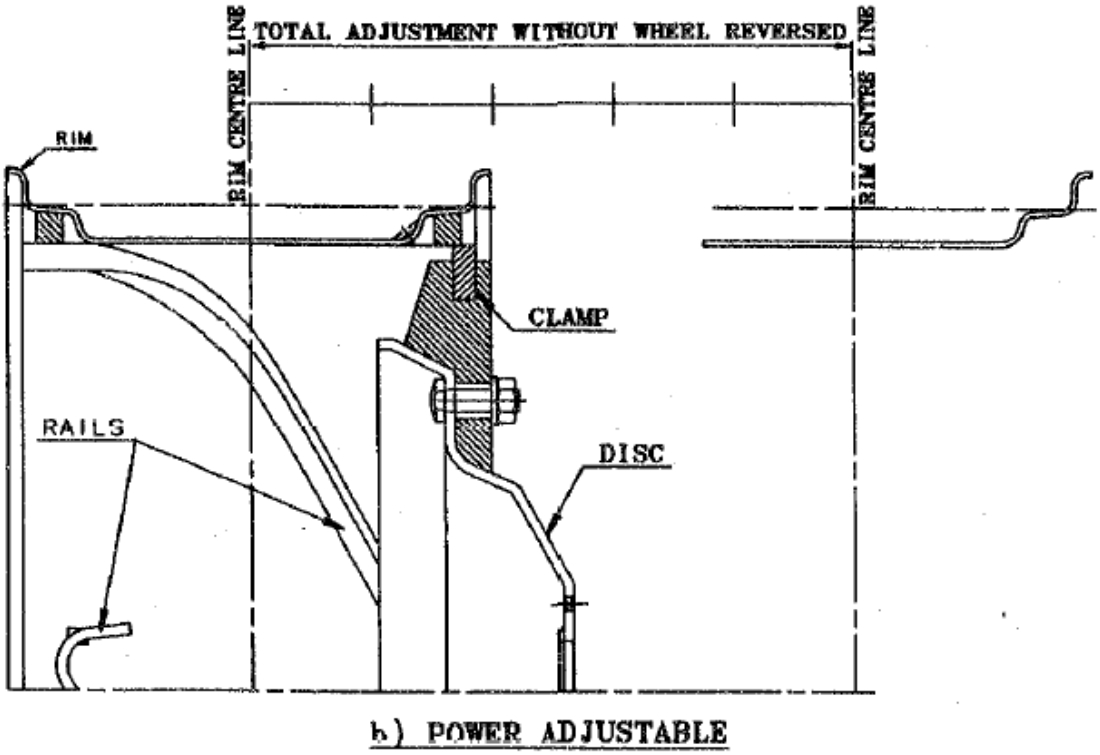
b) Indication of the source of manufacture/manufacturer's logo; and

c) Rim bead seat contour type, if applicable (Rim bead seat contour type may be as given in ITTAC Manual or International standards).



a) MANUALLY ADJUSTABLE

FIG. 5



ADJUSTABLE WHEEL NOMENCLATURE

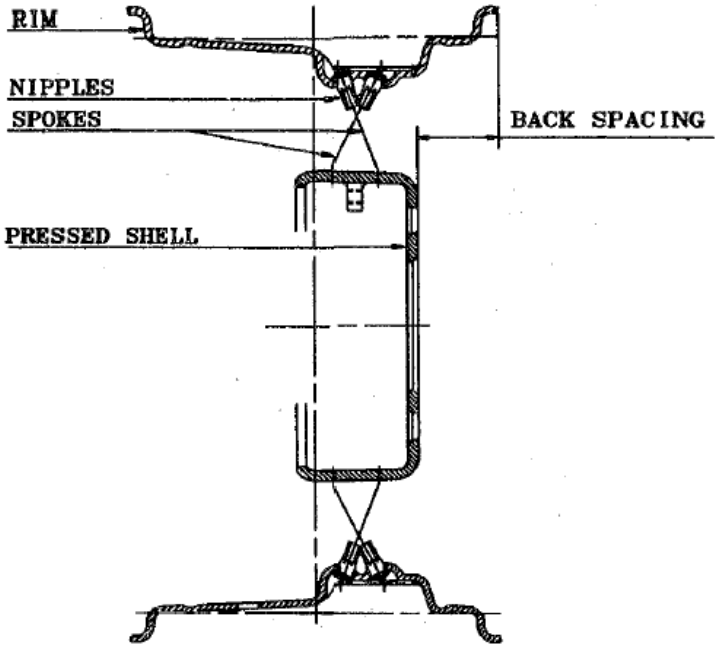


FIG. 6 SPOKE WHEEL NOMENCLATURE

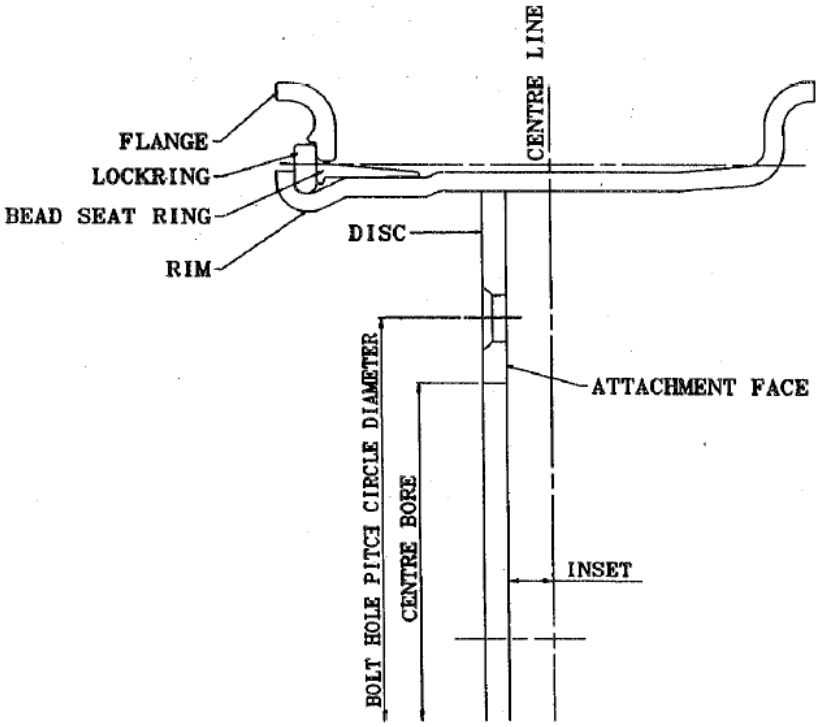
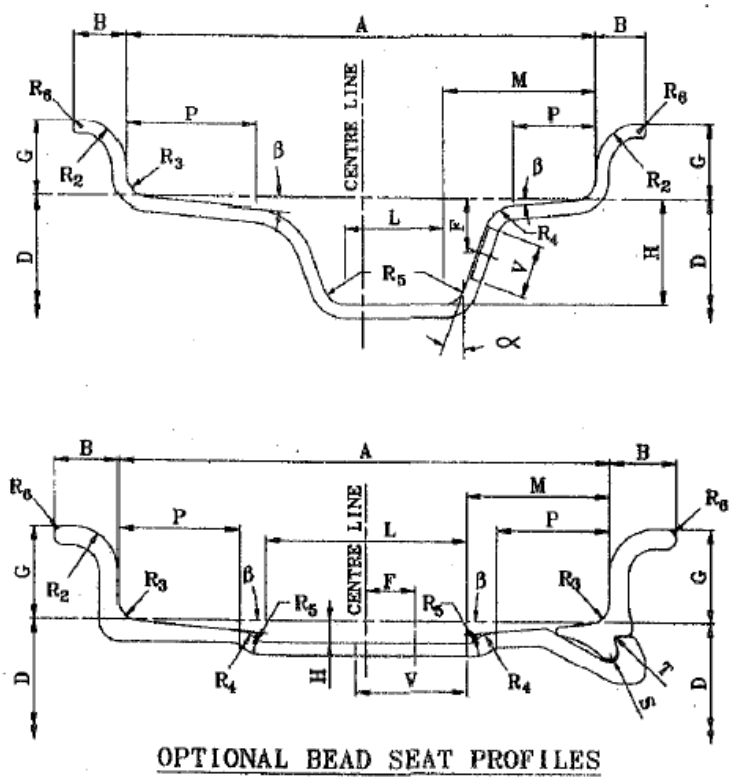
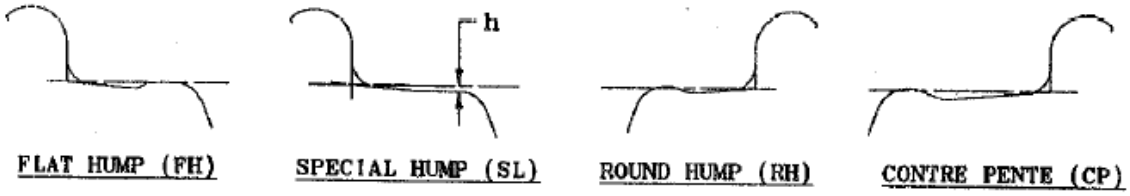


FIG. 7 FORKLIFT WHEEL NOMENCLATURE



OPTIONAL BEAD SEAT PROFILES



OPTIONAL BEAD SEAT PROFILES

Flat Hump (FH)	*Special Ledge (SL)*	*Round Hump (RH)*	*Contre Pente (CP)*
D	Specified rim diameter	α	Well angle
A	Specified rim width	*H*	Well depth
G	Flange height	*L*	Well width
B	Flange width	*M*	Well position
R_2	Flange radius	R_5	Well bottom radius
R_6	Flange edge radius	*V*	Valve hole/ slot
P	Bead seat width	*F*	Valve hole/ slot location
R_3	Bead seat radius	*S*	Gutter groove
β	Bead seat angle	*T*	Gutter tip
R_4	Well top radius	*h*	Ledge dimension

NOTE — Options may be permitted for bead seat contour as agreed between the rim and vehicle manufacturers in which case the rim shall bear identification for the safety hump as below:

Hump Type	*Bead Seat Contour*		*Marking (on Rim)*
	Outboard	Inboard	
Hump	Hump	Normal	H
Double hump	Hump	Hump	H_2
Flat hump	Flat hump	Normal	FH
Combination hump	Flat hump	Hump	CH

FIG. 8 RIM TYRE SIDE PROFILE NOMENCLATURE AND OPTIONAL BEAD SEAT PROFILE

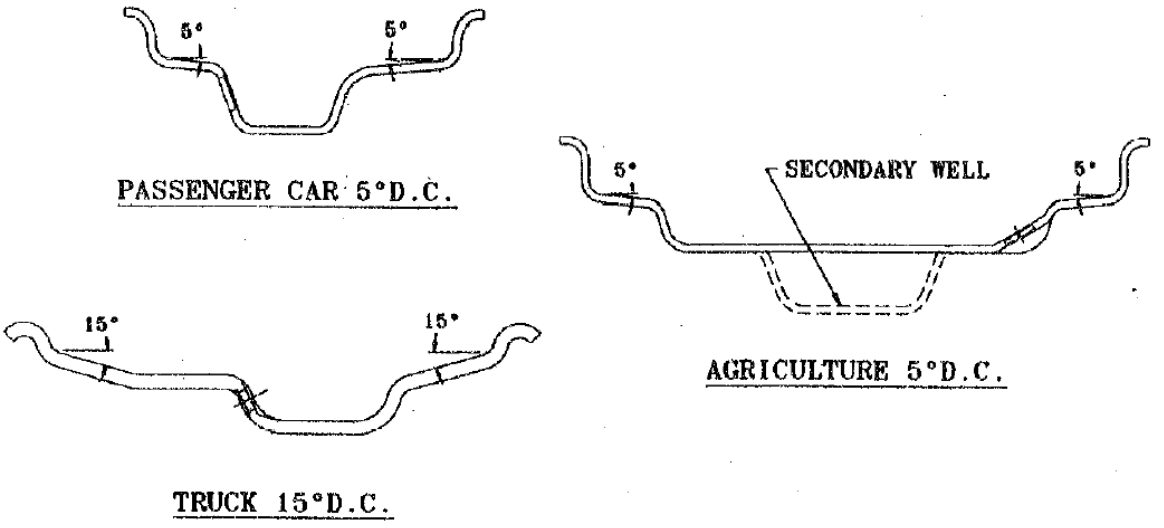


FIG. 9 ONE-PIECE (DROP-CENTER) RIM NOMENCLATURE

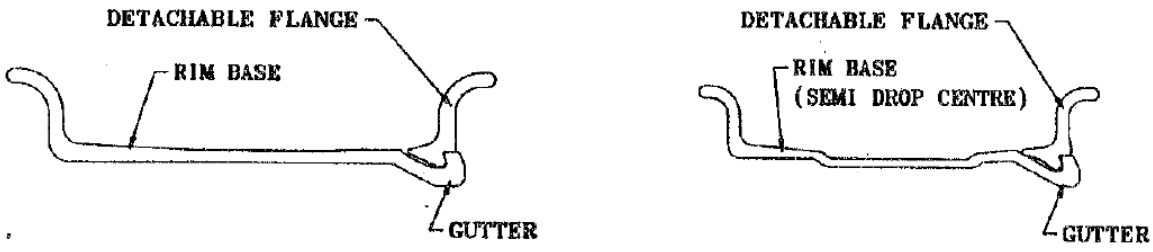


FIG. 10 TWO-PIECE RIM NOMENCLATURE

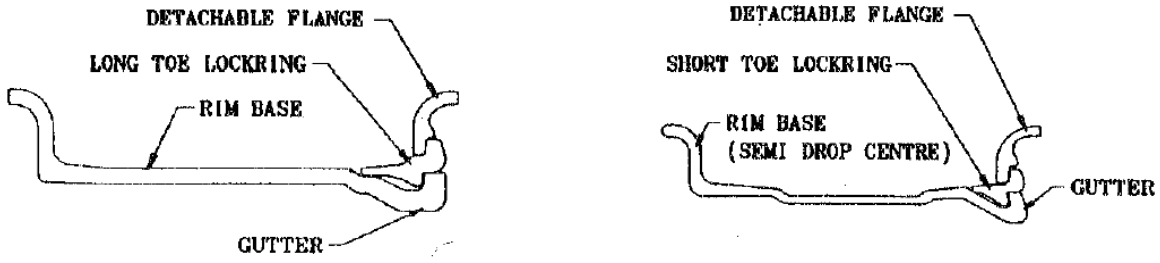


FIG. 11 THREE-PIECE RIM NOMENCLATURE

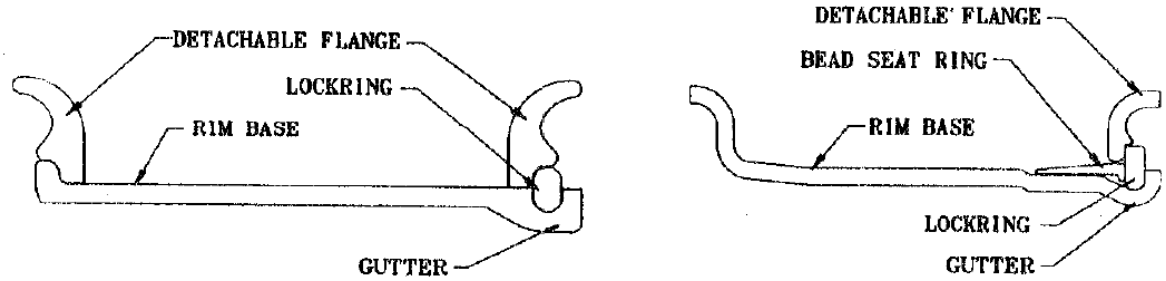


FIG. 12 FOUR-PIECE RIM NOMENCLATURE

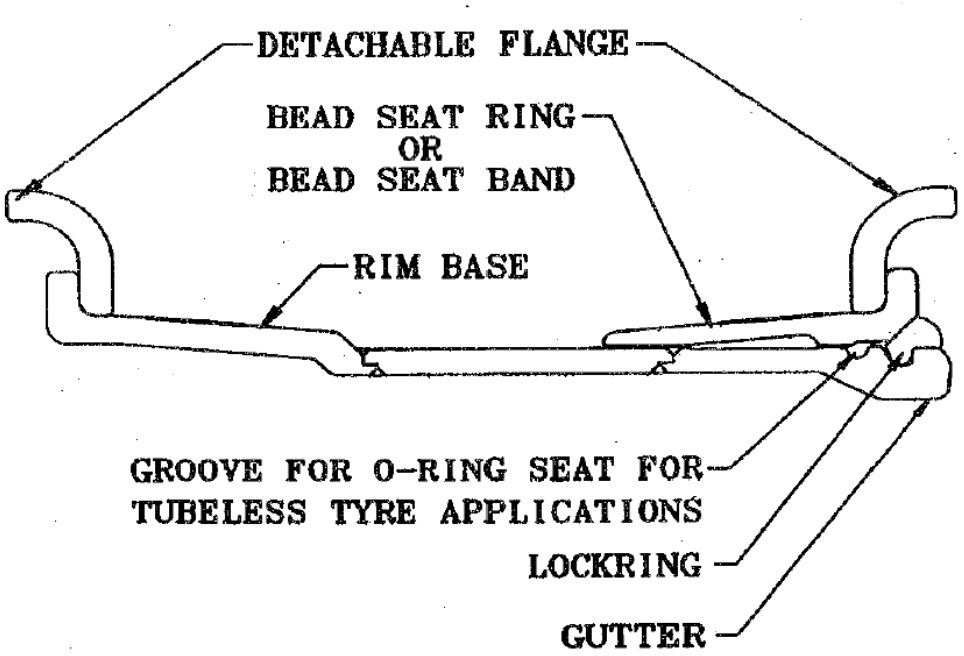


FIG. 13 FIVE-PIECE RIM NOMENCLATURE

5.1.1 In case the markings are impressed or embossed, the letters shall not be smaller than 2 mm and impressed to a depth or embossed to a height of not less than 0.13 mm.

5.1.2 In case other marking methods, for example, laser printing, pad printing, ink jet printing and stickers are used, such marking should be, legible, indelible, non-removable and durable.

5.1.3 The location of the markings shall be as per the discretion of the manufacturer. The rims may be marked on the outer-side (see Fig. l5 and Fig. 16) or inside (see Fig. 17).

5.2 Marking of Disc Wheel

Disc wheels being in compliance with the relevant Indian Standard shall be durably and legibly marked with the following:

a) Size designation;
b) Indication of the source of manufacture/manufacturer's logo;
c) Date of manufacturing: year and month or year and quarter of the year (for example 22 03 indicates March 2022; 22 III indicates third quarter of 2022); and
d) Half dual spacing or inset may also be marked.

ONE PIECE RIM (SHALLOW WELL) - USED WITH SPOKES CYLINDRICAL BEAD SEAT RIM

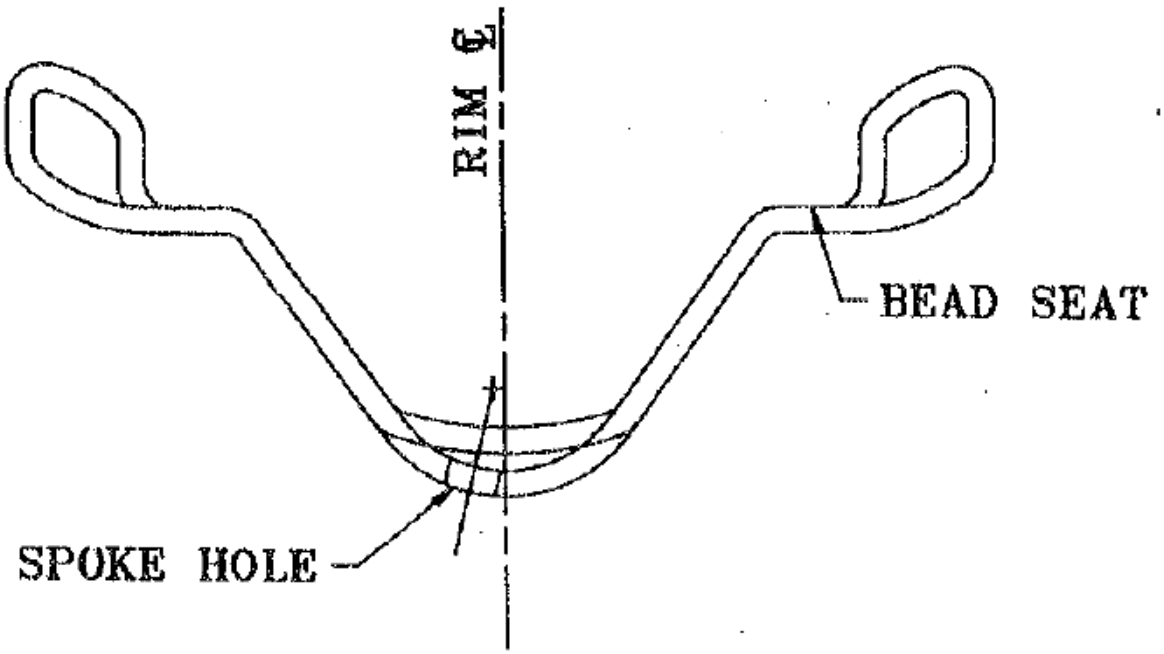


FIG. 14 CYLINDRICAL BEAD SEAT RIM FOR MOTOR CYCLES

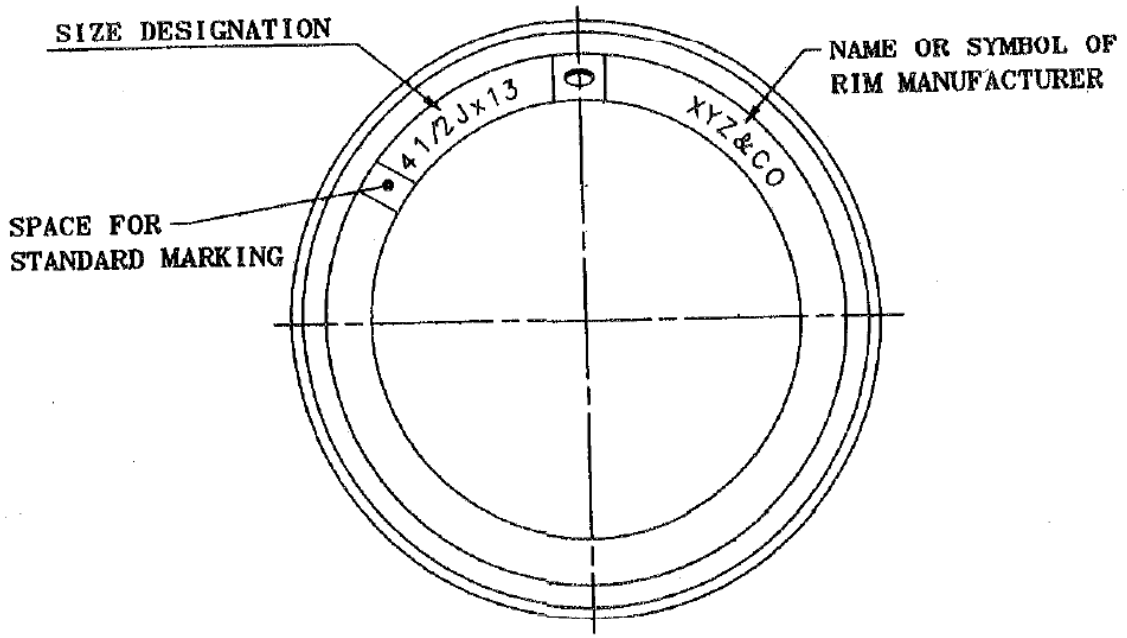
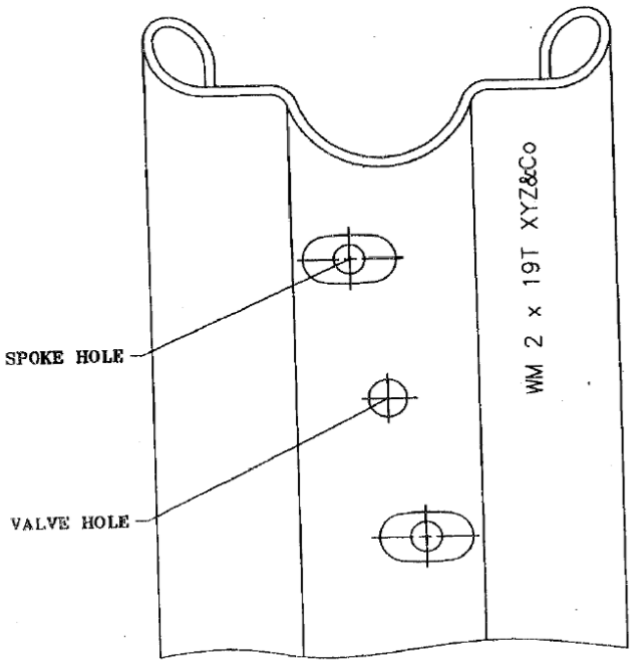


FIG. 15 EXAMPLE OF OUTER SIDE RIM MARK



EXAMPLE OF MARKING OF

FIG. 16 OUTSIDE RIM SPOKED RIMS

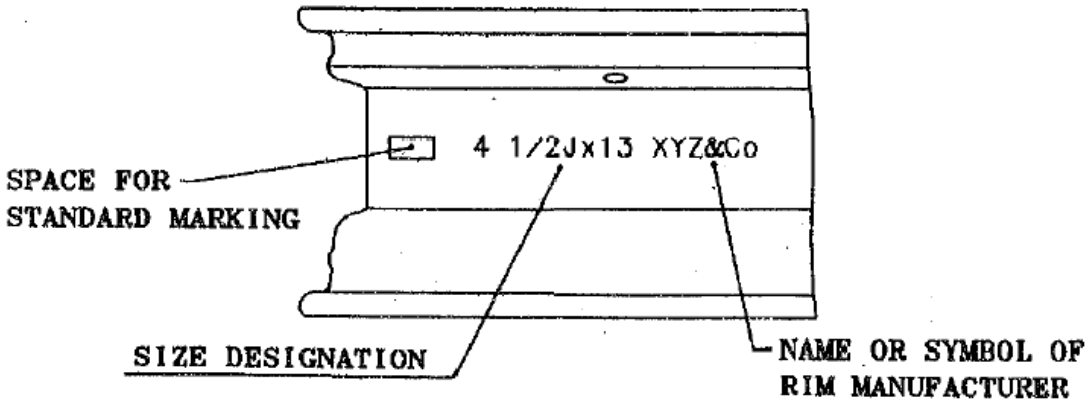


FIG. 17 EXAMPLE OF INSIDE RIM MARKING

5.2.1 In case the markings are impressed or embossed, the marking shall be recessed and without sharp edges and letters shall not be smaller than 2 mm and impressed to a depth or embossed to a height not less than 0.13 mm.

5.2.2 In case other marking methods, for example, laser printing, pad printing, ink jet printing and stickers are used, such marking should be legible, indelible, non-removable and durable

5.2.3 The location of the markings shall be at the discretion of the manufacturer. The disc wheels may be marked on the outer-side (*see* Fig.18) or inside (*see* Fig.17).'

6 METHODS OF RIM MEASUREMENT

Rims with a taper bead seat are measured by ball spring steel tape as located in position in Fig. 19.

6.1 For ball diameter of tape refer to the relevant Indian Standard on rim dimensions. The method is applicable to all 5° or 10.5° mean taper bead seat rim contours.

6.2 Measurement for Motorcycle/Moped Rims

The measurement of the cylindrical bead seat rim circumference shall be made on rims ready for mounting with a tape gauge whose length is related to mandrel diameter, specific for a specified rim diameter (*see* Fig. 20).

The tape shall be marked with details of rim width code and nominal rim diameter.

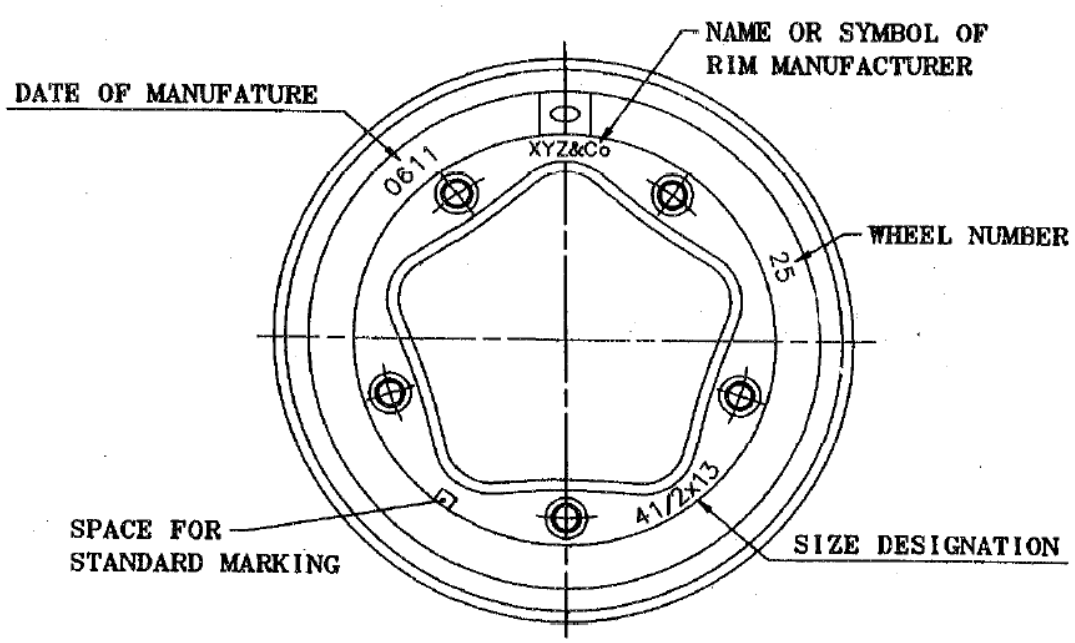
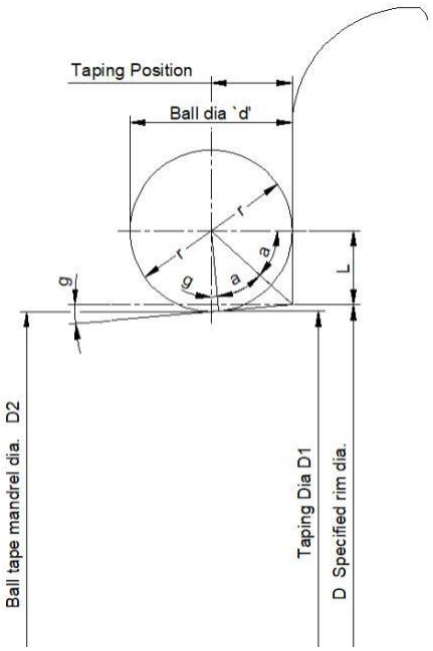


FIG. 18 EXAMPLE OF OUTER RIM MARKING



$$D_1 = D - 2\,(r - l)$$

where $l = r \times \tan(a)$ and $a = \frac{90° - g}{2}$

$$\therefore \quad D = D_1 + 2\,(r - r \times \tan(a))$$

$$\therefore \quad D = D_1 + 2\,(r - r \times \tan(\tfrac{90° - g}{2}))$$

Examples:

1. For Ø 20 ball, and for a = 5°

$$D = D1 + 2\,(10 - 10 \times \tan(\tfrac{90° - 5°}{2}))$$

$$\therefore \quad D = D_1 + 2\,(10 - 10 \times 0.91633)$$

$$\therefore \quad D = D_1 + 1.673377$$

2. For ϕ 16 ball, and for a = 5°

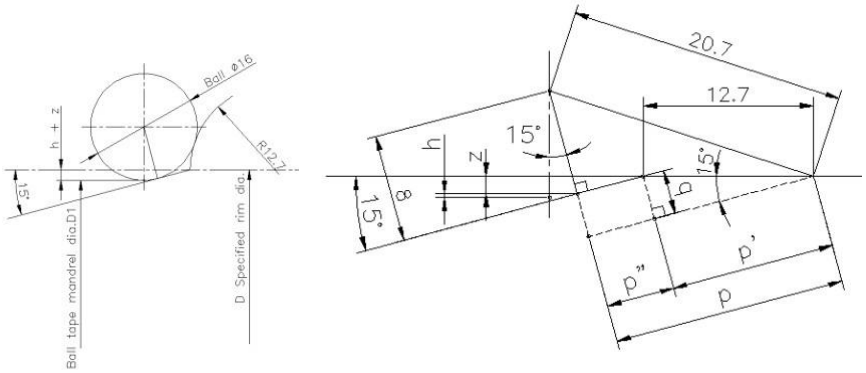
$$D = D_1 + 2\,(8 - 8 \times \tan(90° - 5°))$$

$$\therefore \quad D = D_1 + 2\,(8 - 8 \times 0.91633)$$

$$\therefore \quad D = D_1 + 1.338701$$

Angle of Taper (g)	Ball Tape Diameter (mm)				
	8	10	14	16	20
	Factor ε				
1° 30°	0.206745	0.258431	--	0.413490	0.516863
3°	0.408283	0.510354	--	0.816567	1.020709
5°	0.669351	0.836688	1.171364	1.338701	1.673377
The original inch values of specified rim diameters are used for the calculations of tape mandrels (D)					

FIG. 19 (A) METHOD OF USING TAPE AND CALCULATION OF DIMESIONS FOR THE MEASUREMENT OF TAPERED BEAD SEAT RIMS



$$q = 2.7 \times \sin 15° \times 0.2588190451 = 3.287001873$$

$$p = \sqrt{20.7^2 - (8 + q)^2} = \sqrt{301.0935887} = 17.35204855$$

$$P' = 12.7 \times \cos 15° = 12.7 \times 0.9659258263 = 12.26725799$$

$$P'' = p - p' = 17.35204855 - 12.26725799 = 5.084790552$$

$$Z = p'' \times \sin 15° = 5.084790552 \times 0.2588190451 = 1.316040635$$

$$H = 8 (1 - \cos 15°) = 8 \times 0.0340741737 = 0.2725933897$$

$$H + z = 1.588634025$$

$$D1 = D - 2 (h + z) = D - 3.17726805$$

FIG. 19 (B) METHOD OF USING TAPE AND CALCULATION OF DIMESIONS FOR THE MEASUREMENT OF 15° DROP-CENTRE RIMS

6.2.1 *Accuracy of Measuremen*t

For accurate measurement the individual circumference on each bead sea shall be measured and corrected to 20°C and checked against the data given in the relevant part of this Indian Standard. (In this case the tape width *′ W′* is free.)

6.3 Diameter and circumference and mandrel dimensions shall be as per Fig. 22 and Fig. 23 and Tables 3 to 6.

7 UNIT

The dimensional data for rims shall be expressed in millimeters, and angular measurement in degrees. Load-carrying capacity shall be expressed in kilograms (kg). Tyre inflation pressure shall be expressed in kilopascals (kPa) [lkPa = $10^3 N/m^2$ = 0.01 kgf/cm^2 (within 2 percent error)].

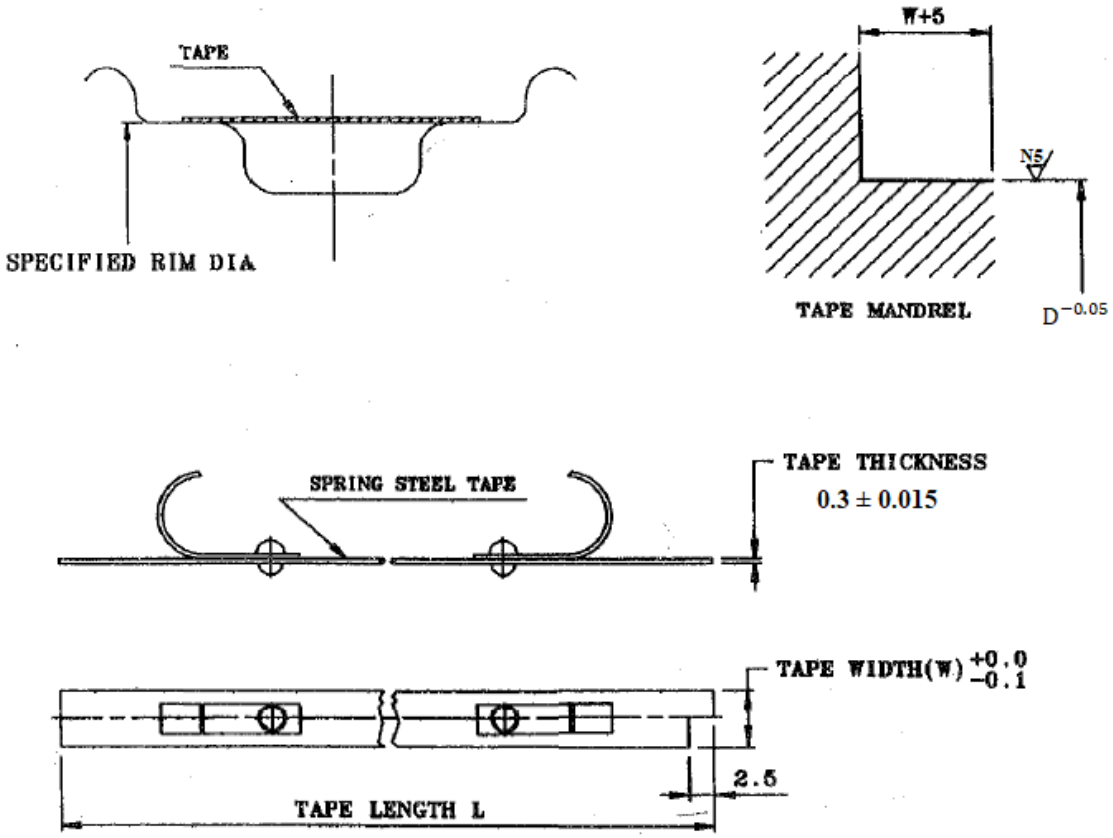


FIG. 20 MEASUREMENT OF CYLINDRICAL BEAD SEAT RIM

NOTES –

1) Reference Temperature 20°C. The tape must be marked with details of rim width code and nominal diameter.
2) Measurement are to be made on rims ready for tyre mounting
3) Rim measurement is to be done with reference to mandrel

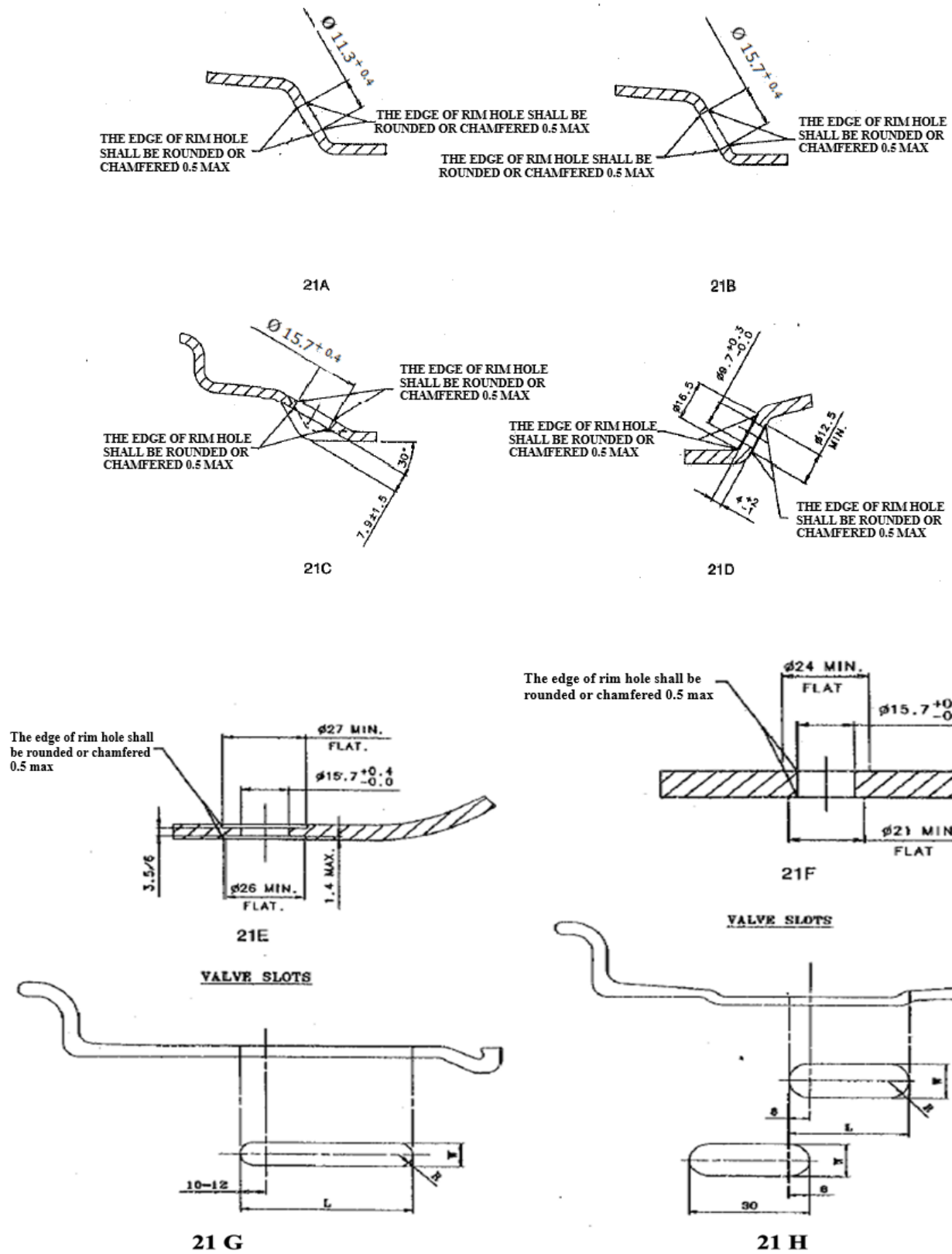


FIG. 21 VALVE HOLE APERTURE
All dimensions in millimetres.

Table 1 Valve slot details
(Fig. 21 G)

Sl No.	Nominal Size Designation	*L*	*W*	*R*
(1)	(2)	(3)	(4)	(5)
i)	B6.0	54	16	8
ii)	B6.5	63.5	16	8
iii)	B7.0	73	16	8
iv)		96	16	8
v)	B7.5	73	16	8
vi)		96	16	8
vii)	B8.0	73	16	8
viii)		96	16	8
ix)	B8.5	73	16	8
x)	7.00T	75	15	7.5
xi)		96	15	7.5
xii)	7.50V	105	15	7.5
xiii)	8.50V5°	100	16	8
xiv)	10.00 V5°	120	16	8
xv)	10.00W	150	16	8

Table 2 Valve slot details
(Fig. 21 H)

Sl No.	Nominal Size Designation	*L*	*W*	*R*
(1)	(2)	(3)	(4)	(5)
i)	5.50 F ×16	45	16 (+0,-2)	8
ii)	5.50 F ×16	35	16 (+0,-2)	8
iii)	6.00 G × 16	45	16 (+0,-2)	8
iv)	6.00 G × 16	30	16 (+0,-2)	8
v)	6.00 G × 16	28.6	12.8	8
vi)	6.00 G × 16	30.0	12	6

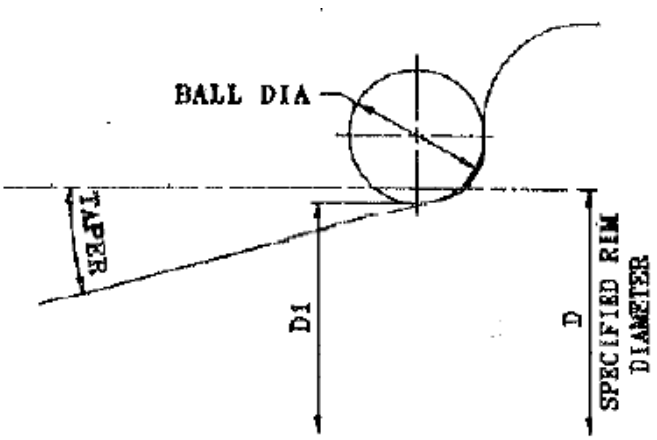


FIG. 22 MANDREL DIMENSIONS

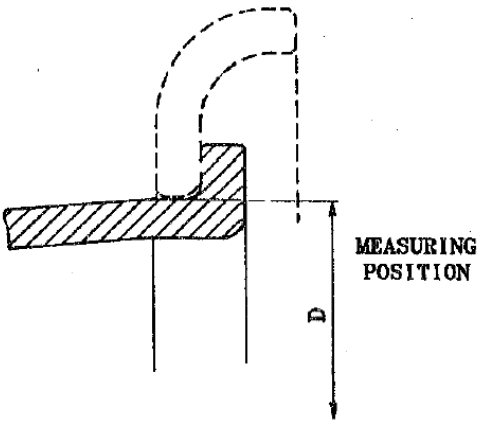


FIG. 23 DIMENSIONS FOR MEASUREMENT OF RIMS WITH TWO DEMOUNTABLE FLANGES

Table 3 Dimensions for Measurement of Tapered Bead Seat Rims
(*Clause* 5.3)

Sl No.	Nominal Diameter, inch	Dimensions		
		Specified Diameter *D*, mm	Nominal Mandrel Diameter *D*1, mm	Nominal Mandrel Circumference, mm
(1)	(2)	(3)	(4)	(5)

	3° Taper		Ball dia 20	
i)	24[1)]	616.0	614.93	1 931.9[1)]
	5° Taper		Ball dia 8	
i)	4	100.8	100.14	314.6
ii)	6	151.6	150.94	474.2
iii)	8	202.4	201.74	633.8
iv)	9	227.8	227.14	713.6
v)	10	253.2	252.54	793.4
vi)	12	304.0	303.34	953.0
vii)	13	329.4	328.73	1 032.7
viii)	13M/C[2)]	332.2	331.53	1 041.5[2)]
ix)	14M/C[2)]	357.6	356.93	1 121.3[2)]
x)	15 M/C[2)]	383.0	382.33	1 201.1[2)]
xi)	16 M/C[3)]	406.0	405.33	1 273.4[2)]
xii)	17 M/C[2)]	433.8	433.13	1 360.7[2)]
xiii)	18M/C[2)]	459.2	458.53	1 440.5[2)]
xiv)	19 M/C[2)]	484.6	483.93	1 520.3[2)]
xv)	19	487.4	486.60	1 529.0
xvi)	21 M/C[2)]	535.4	534.73	1 679.9[2)]
xvii)	30	766.8	766.09	2 406.7
xviii)	36	919.2	918.49	2 885.5
xix)	38	970.0	969.29	3 045.1

1) Only for EM 11.25/2.375 with tolerance on circumference + 1.2, -2.4 mm.

2) Only for Motorcycle MT type rims with tolerance on circumference + 1.5, -0.5 mm.

3) Only for Motorcycle MT type rims with tolerance oi1 circumference ±1.0 mm.

Table 4 Dimensions for Measurement of Tapered Bead Seat Rims

(*Clause* 5.3)

Sl No.	**Nominal Diameter, inch**	**Dimensions**		
		Specified Diameter *D*, mm	Nominal Mandrel Diameter D_1, mm	Nominal Mandrel Circumference, mm
(1)	(2)	(3)	(4)	(5)
	5° Taper		Ball dia 10	
i)	8	202.4	201.57	633.2
ii)	9	227.8	226.97	713
iii)	10	253.2	252.37	792.8
iv)	12	304.0	303.17	952.4
v)	13	329.4	328.57	1 032.2
vi)	14	354.8	353.97	1 112
vii)	15	380.2	379.37	1 191.8
viii)	16	405.6	404.77	1 271.6

	5° Taper		Ball dia 14	
i)	15	380.2	379.03	1190.8
ii)	16	405.6	404.43	1270.6
iii)	17	436.6	435.43	1367.9
iv)	18	462.0	460.83	1447.7
v)	19	487.4	486.23	1527.5
vi)	20	512.8	511.63	1607.3
	5° Taper		Ball dia 16	
i)	8	202.4	201.7	631.7
ii)	9	227.8	226.47	711.5
iii)	10	253.2	251.87	791.3
iv)	12	304.0	302.67	950.9
v)	13	329.4	328.07	1 030.7
vi)	14	354.8	353.47	1 110.5
vii)	15	380.2	378.87	1 190.2
viii)	15[1)]	387.4	386.01	1 212.7
ix)	15.3	388.3	386.98	1 215.7
x)	16	405.6	404.27	1 270
xi)	17	436.6	435.22	1 367.3
xii)	18	462	460.62	1 447.1
xiii)	19	487.4	486.02	1 526.9
xiv)	20[1)]	512.8	511.42	1 606.7
xv)	20[1)]	514.4	513.01	1 611.7
xvi)	21	538.2	536.82	1 686.5
xvii)	22	563.6	562.22	1 766.3
xviii)	24	614.4	613.02	1 925.9
xix)	24[1)]	616	614.61	1 930.9
xx)	26	665.2	663.82	2 085.5
xxi)	28	716	714.62	2 245.1
xxii)	30	766.8	765.42	2 404.6
xxiii)	32	817.6	816.22	2 564.2
xxiv	34	868.4	867.02	2 723.8
xxv)	36	919.2	917.82	2 883.4
xxvi)	38	970	968.62	3 043
xxvii)	40	1 020.8	1 019.42	3 202.6
xxviii)	42	1 071.6	1 070.22	3 362.2
xxix)	44	1 122.4	1 121.02	3 521.8
xxx)	46	1 173.2	1 171.82	3 681.4
xxxi)	48	1 224	1 222.62	3 841
xxxii)	50	1 274.8	1 273.42	4 000.6
xxxiii)	52	1 325.6	1 324.22	4 160.2
xxxiv)	54	1 376.4	1 375.02	4 319.8
	5° Taper		Ball dia 20	
i)	25	635	633.33	1 989.7[2)]

[1)] Only for CV rims.
[2)] Tolerance on circumference ± 2.4mm.

Table 5 Dimensions for Measurement of 15° Drop-Centre Rims

(*Clause* 5.3)

Sl No.	**Nominal Diameter, inch**	**Dimensions**		
		Specified Diameter *D*, mm	Nominal Mandrel Diameter D_1, mm	Nominal Mandrel Circumference, mm

(1)	(2)	(3)	(4)	(5)
	5° Taper		Ball dia 20	
i)	15.5	393.7	390.52	1 226.9
ii)	17.5	444.5	441.32	1 386.5
iii)	19.5	495.3	492.12	1 546
iv)	20.5	520.7	517.52	1 625.8
v)	22.5	571.5	568.32	1 785.4
vi)	24.5	622.3	619.12	1 945
vii)	26.5	673.1	669.92	2 104.6
viii)	30.5	774.7	771.52	2 433.8

Table 6 Dimensions for Measurement of Rims with Tow Demountable Flanges

(*Clause* 5.3)

Sl No.	**Nominal Diameter, inch**	**Dimensions**		
		Specified Diameter *D*, mm	Minimum π (D - 0.8) mm	Maximum π (D + 0.4 mm)
(1)	(2)	(3)	(4)	(5)
i)	25	635	1992.4	1996.2
ii)	29	736.6	231.6	2315.4
iii)	33	838.2	2630.8	2634.5
iv)	35	889	2790.4	2794.1
v)	39	990.6	3109.5	3113.3
vi)	43	1092.2	3428.7	3432.5
vii)	45	1143	3588.3	3592.1
viii)	49[1)]	1244.6	3907.5	3912.5
ix)	51	1295.4	4067.1	4072.1
x)	57	1447.8	4545.9	4550.9

1) Maximum circ *D* (*d* + 0.8) for rims of diameter code 49 and over.

ANNEX A
(Foreword)

COMMITTEE COMPOSITION

AUTOMOTIVE TYRES, TUBES AND RIMS SECTIONAL COMMITTEE, TED 7

Will be added later

Annexure 12

Minutes of Panel 1 meeting held on 21.11.2023

Meeting Title	**Panel 1 Meeting for discussion on review of different IS Standards**
Convener	Mr. Niteesh K. Shukla, Director, ITTAC
Day & Date	Tue, 21st Nov. '23
Time	02:00 PM to 04 :30 PM
Mode	MS Teams

Agenda:

Review of received comments from various stakeholders on following IS Standards:

Sr No	IS Standard	Description
1	**IS 15523:2018**	Automotive Tyres —Precured Patches for Repairing Cross Ply/ Radial Tyres and r Tubes — Specification
2	**IS 15524**	Automotive Vehicles — Retreading of Tyres by the Pre-Cured Process -Spec
3	**IS 15704**	Automotive Vehicles —Re-treaded Pneumatic Tyres for Commercial Vehicles-Spe
4	**IS 15709**	Automotive Vehicles — Re-treaded Pneumatic Tyres for Passenger -Specification
5	**IS 15731**	Automotive Tyres — Selection and Inspection of Re-treadable Tyre Casing
6	**IS 15753**	Automotive Tyres: — Tyre Curing Bladder — Cold Process
7	**IS 15780**	Automotive Tyres — Repair of tyres & tubes used on Motor Vehicles
8	**IS 15725**	Automotive Tyres – Tyre Curing Envelop - Cold Process
9	**IS 11031**	Recommendations for storage and handling of inner tubes, tube valves and flaps for use with pneumatic tyres for automotive vehicles.
10	**IS 11178**	Recommendations for storage and handling of pneumatic tyres for automotive vehicles
11	**Draft amendment no 01 to IS 15627:2022**	Automotive Vehicles — Pneumatic Tyres for Two and Three -Wheeled Motor Vehicles, Quadricycles and E-Rickshaw/E-Carts — Specification

Summary on review of different IS Standards and recommendation of Panel 1 are as under:

1) **Review of ITTAC comments on IS 15523: Automotive Tyres —Precured Patches for Repairing Cross Ply/ Radial Tyres and inner Tubes — Specification**

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation
1		Scope	This standard prescribes the requirement for precured repair patches intended for repairing pneumatic tyres and inner tubes for tyres.	This standard prescribes the requirement for precured repair patches intended for repairing pneumatic tyres both radial and bias ply and also inner tubes for tyres.	Para correction	Panel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
3	3.1.2	Definitions	Hot or Precure Process — When using these patches while retreading, the inside of the tyre can be treated with black vulcanizing cement whereas the patch has to be given a coat of chemical vulcanizing cement. Some repair patches may only require the use, if a chemical vulcanizing fluid without the use of black vulcanizing cement. Some repair patches may only require the use of a chemical vulcanizing fluid without the use of black vulcanizing cement	Hot or Precure Process — When using repair patches while retreading, the inside of the tyre can be treated with black vulcanizing cement whereas the patch has to be given a coat of chemical vulcanizing cement. Some repair patches may only require the use of a chemical vulcanizing fluid without the use of black vulcanizing cement.	Repetition (highlighted in red font) and sentence refined further.	
3	New Clause			3.8 **Repair material** - Specifically designed material (repair units, repair gums, cements, etc.) used during the repair process of a tyre or tube 3.9 **Repair Plug** - Specifically designed material (stems, repair	More information are included to understand the repair and repair materials	

				gums, cements, etc.) used during the repair process of a tyre. 3.10 **Repair Sealant** - Liquid or semi-solid materials used to cover over-buffed areas around repair units. 3.11 **Repair Unit** (PATCH, PLUG, PATCH/PLUG COMBO) - A specially designed unit made of fabric and/or rubber that is applied to a tyre or tube to restore tyre and/or tube integrity.		
6	6.4	Shelf life	Area of storage shall preferably be cool and dry. The surrounding area temperature shall not exceed ambient temperature. The maximum ambient temperature in the storage shall be 35°C.	Storage area shall preferably be cool and dry. The surrounding area temperature shall not exceed ambient temperature The maximum ambient temperature in the storage shall be 25°C for uncured repair material.	In line with international guidelines and retain the material shelf life as specified by the manufacturer	
8	8.2	Packaging And Marking	New clauses to be added after point e	(f) Warning or caution indication (e) Precautions to use (f) Hazardous ingredients	In line with international standards.	
8	8.3 a & b	PACKING AND MARKING	a) For tube patch: 1) Manufacturer's trade-mark, and 2) Size. b) For tyre patch: 1) Manufacturer's trade-mark, 2) Type of patch and its size, and 3) Arrow indicating the direction of fitment	a) For tube patch: 1) Manufacturer's trade-mark, and 2) Size. 3) Month and year of manufacturing, and 4) Expiry date. b) For tyre patch: 1) Manufacturer's trade-mark, 2) Type of patch and its size, and 3) Arrow indicating the direction of fitment	For Quality Repair and better traceability.	

				4) Month and year of manufacturing, and 5) Expiry date.		

2) Review of ITTAC comments on IS 15524: 2018 Automotive Vehicles — Retreading of Tyres by the Pre-Cured Process — Specification

Clause No / Annex No	Sub-Clause No / Table No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation
1		Scope	This standard covers the retreading of tyres, by the precured tread process, for passenger cars, light-trucks, trucks and buses, lays down requirements for the casings, the methods of retreading, and the equipment to be used, as well as for the finished product.	This standard covers the retreading of tyres, by the precured retread process for passenger cars, light-trucks, heavy trucks and buses, lays down requirements for the casings, the methods of retreading, and the equipment's to be used, as well as for the finished product.	Editorial correction	Panel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
3		Definitions	New definitions to be included	3.3 Adhesion - Bond between two cured surfaces 3.4 Backing - A removable protective material used on the application side of retread rubber and repair materials to preserve cleanliness and tackiness 3.5 Base width - A measurement of the width of the tread rubber which joins to the buffed surface of the tyre. 3.6 Bonding - The joining of two materials by use of adhesives or vulcanization **3.7 Buff contour** - The specified profile of a buffed area.	Terminologies related to precure retread process aligning with international guidelines for retreading	

				3.8 Buffing – Complete removal of the previously vulcanized rubber surface. 3.9 Buff line - The dividing line in the cross section of a tyre between the buffed surface of the original tire and the new retread rubber. 3.10 Buffed Radius - A measurement of the buffed surface curvature from shoulder to shoulder. 3.12 Buffed surface - A specifically prepared surface of a tyre casing or repair area to provide proper texture to help promote adhesion to the new rubber. 3.13 Buffed texture - That surface produced by buffing, rasping or cutting. 3.14 Builder - A machine used to apply and stitch tread rubber to a buffed casing. 3.15 Off -Centre-tread - A tread that is not symmetrically distributed from the center line of the casing; or lateral displacement of the tread with respect to the centerline of the casing. 3.16. Optimum cure - That state of cure at which the rubber compound exhibits the most satisfactory physical properties. 3.17 Overcure - Curing in excess of optimum cure. Excessive overcure can result in the deterioration of certain physical properties 3.18 Oxidation - The reaction of oxygen with rubber or steel, usually		

				evidenced by a change in the appearance (discoloration) of the surface, a change in physical properties, corrosion or wire rust. 3.19 Porosity - Small air bubbles created when rubber is cured at insufficient pressure and/or time. 3.20 Precured tread - Tread which is vulcanized with the tread configuration molded into it prior to being placed on the buffed casing. 3.21 Rope rubber - Uncured repair gum supplied in continuous cylindrical form to be used in a hand-held extruder, generally for tyre repairing 3.22 Scorch (Cured rubber) - A soft, tacky surface that occurs during the buffing or skiving processes due to excessive heat. Bonding/adhesion will be adversely affected by scorched rubber. 3.23 Scorch(Green rubber) - Premature vulcanization of rubber caused by excessive heat during processing. Scorched compounds will not mold properly nor develop satisfactory adhesive properties. 3.24 Shelf life - The recommended period of time (stated by the product's manufacturer) for which that product may be applied and/or utilized before it degrades and/or is		

				no longer effective or serviceable. 3.25 Spotter - A small heat vulcanizing unit used in localized repairing tyres and tubes. 3.26 Stitching - A procedure of applying pressure to remove trapped air and improve rubber contact for better adhesion. 3.27 Tack - Stickiness of a rubber surface 3.28 Template (Buffing template) - A pattern used as a guide in repairing and retreading tyres. In repairing, it serves to outline the area to be buffed inside the casing. In retreading, it is used to determine the correct contour of the buffed casing. 3.29 Under cure - A condition which describes less than acceptable vulcanization 3.30 Wicking - An act of air escapement from the tire casing or from under an envelope by means of the wick.		
5.2	a)	REQUIREMENTS FOR THE RETREADING PROCESS	Buffed circumference, buffed width;	Buffed circumference, buffed **Tread** width	To Avoid Confusion b/w Section Width &Tread Width	
5.4	5.4.2.1	Buffing	Buffing shall be carried out by means of a motor-driven buffing machine. The buffed contour shall be that as recommended by the	Tyre to be Inflated to 18 - 22 psi in the recommended rim width and Buffing shall be carried out by means of a motor-driven buffing machine. The buffed contour shall be that as	As per latest international document & Process Improvement	

			original tyre manufacturer and shall be achieved by means of a template, or adjustable radius settings or computerized system.	recommended by the original tyre manufacturer and shall be achieved by means of a template, or adjustable radius settings or computerized system.		
5.6		Building and Trend Application		Building and Tread Application New clauses: (i)Cut the tread to approximately the same length as the center line circumference of the tyre. Tread design should match as closely as possible at the splice (ii) Cut tread ends squarely to ensure a proper match. Then, tread ends should be texturized, cemented, and a layer of cushion gum applied between the ends. (iii) The splice should be made with the tread in a relaxed condition or under slight compression. A blunt tool should be used to force the precured tread ends against the splice gum to ensure good adhesion at the splice. To ensure the splice remains closed, use staples as necessary. Stitch down the complete tread with a stitcher or builder-applicator to avoid trapping air, pulling the tread off centre, and distorting, folding or wrinkling in the shoulders. Also, to ensure stitching is done from crown to shoulder.	Process Improvement to get quality finished product.	
5.6	5.6.5	~~Application~~	The bonding material alongwith the	The application of all retread material shall be carried out by means of a	per Industry practice	

		Bonding / Cushion Gum applicati on	protective film shall be stitched on a mechanical builder with low pressure (about 1.4 kg/cm or 20 psi)	motor driven air inflated machine with 18 psi -22 psi. The bonding material along with the protective film shall be stitched on the building machine at low pressure, The cushion gum application and / or stitching pressure is as recommended by machine manufacturers and / or material supplier		
5.6	5.6.6	~~Building and Trend Applicat ion~~ Building and Tread applicati on	The application of the tread rubber treated as per 5.6.5 shall be carried out by means of a motor driven air inflated machine. Stitching of the bonding material and the tread rubber to the casing shall be done by positive methods like mechanical, pneumatic or hydraulic actuators.	The application of the tread rubber treated as per **5.6**.**5** shall be carried out by means of a motor driven air inflated machine. Stitching of the bonding material and the tread rubber to the casing shall be done by positive methods like mechanical, pneumatic or hydraulic actuators The tread application and /or Stitching pressure is as recommended by machine manufacturers and / or precured tread supplier	ocess Improvement	
5.7	5.7.1	Vulcani zation	The envelopes shall be either of the type which is sealed with a tyre at the shoulder (half skirt) or at the bead (full skirt).	The enveloping systems are of following types: (i) Half skirt - Rim -bag type (Steam bonder) (ii)Full skirt - Rim-bag type (Electric Chamber) (iii)Full skirt - Sealing ring(Electric chamber) – Applicable for all steel radial tyre only (iv) Rimless Double envelope - Inner & Outer(Electric chamber) - Applicable for all steel radial tyre only Full sealing of the envelopes with the tyre	lvancement in curing methods	

				casing is ensured through vacuuming.		
6		Heading	REQUIREMENTS FOR RETREADED TYPRE	REQUIREMENTS FOR RETREADED TYRE	Typographical Error	
6.4	Table-1	Dimensions of Tread	-	Minimum Skid Depth Requirement to be Removed from Standard. New table proposed.	1)NSD Requirement is not a Criteria in any of the Regulation Related to Tyres. 2)NSD Is Directly Related to Mileage and it vary as per customer Requirement and Market Application.	
Ann. A	A-1.2	Pre-cured Tread Rubber	A-1.2 Should have adequate under tread not less than 20 percent of the total tread thickness. The bottom surface of the tread should be well sanded or brushed to RMA-3.	Should have adequate under tread not less than 20 percent of the total tread thickness. The bottom surface of the tread should be well sanded or brushed or impression transferred from warp and weft of moulding liner to RMA#3, similar to the casing buffed texture.	Updated industry practices for better quality	
Ann. A	A 3.1	Filling material	A-3.1 Should have the same characteristics and specifications of the bonding gum material, but in different thickness to suit the filling requirement	A-3.1, Filling material selection should be based on injury location and component compatibility as recommended by tyre manufacturers.	Updated industry practices for better quality	
Ann. A	Table-2	c) Tread wear indicators	Each tread shall have tread wear indicators at least 6 Nos. spaced equally around the circumference as per IS 10914	Each tread shall have tread wear indicators at least 6 Nos spaced equally around the circumference as per IS 15636:2022	Updated Information	

Ann. A	Table-4	Physical Properties for Vulcanising Cement/ Solution	-	Note : The cement shall be thoroughly mixed before taking Sample For Testing	Better Test Results	

Table 1 Dimensions of Tread

(*Clause* 6.4)

All dimensions in millimeters.

Sl No.	**Type of Vehicles**	**Undertread** mm, *Min*	**Tread width** mm
(1)	(2)	(3)	(4)
i)	Passenger car & Light Commercial vehicle	1.6	Precured Tread Bottom width should be equal to tread arc width (± 5mm Tolerance)of buffed casing on which retreading will be done.
ii)	Truck and bus tyres	2.5	

3) Review of ITTAC comments on IS 15704: 2018 Automotive Vehicles —Re-treaded Pneumatic Tyres for Commercial Vehicles — Specification

Clause No / Annex No	**Sub-Clause No / Table No**	**Title**	**As per Standard**	**Changes requested**	**Justification**	**Panel 1 recommendation /Comments /remarks**
1		Scope	This standard prescribes to the production of re-treaded tyres intended to be fitted, but not only, for vehicles in categories M2, M3, N, T3 and T4. It does not, however, apply to the following:	C) Tyres originally produced without type approval and without either an ‘’ISI” or "E" or "e" mark.	align with UN ECE R109 regulation.	nel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
2		REFERE	15636:2012	15636:2022	test Standard Reference	

		NCES	-	**IS 15731:2018** - Automotive Tyres — Selection and Inspection of Re-treadable Tyre Casing **IS 15524:2018** - Automotive vehicles - Retreading of tyres by the pre - Cured process	ldditional Reference for Quality Retreading	nel noted and agreed to the observation made by **Member Secretary, Mr August Dubey, TED-7** on providing reference of **IS 15731** and **IS 15524** either in FOREWORD or at some other appropriate place BUT not under clause 2 as suggested by ITTAC.
3		Definitions	New Definitions to be included	3.41 "Re-treader" means the person or body who is responsible to the Type Approval Authority (TAA) for all aspects of the type-approval under this Regulation and for ensuring the conformity of production. 3.42. "Tyre manufacturer" means the person or body who was responsible to the TAA having granted the original new type approval and for ensuring the conformity of production under the applicable Regulation for	align with UN ECE R 109 regulation	nel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)

				new tyres. "Material manufacturer/material supplier" means the person or body who provides to the retreader the retreading or repair materials. 3.43. "Brand name/trademark" means the identification of the brand or trademark as defined by the retreader and marked on the sidewall(s) of the tyre. The brand name/trademark may be the same as that of the retreader. 3.44. "Trade description/commercial name" means an identification of a range of tyres as given by the retreader. It may coincide with the brand name/trademark.		
3 & 5	3.20 a/3.20 b/ 5.1.1/ 5.1.3/5.14/5.15		Tables 6 to 25 of IS 15636	Tables 6 to 28 of IS 15636	odated table details as per IS 15636:2022	
5	5.1.5 (Note 3)	Tyre Dimension	The actual measured overall width may also exceed the section width determined as detailed in	The actual overall width may be less than the section	align with UN ECE R 109 regulation	

			this clause by value of 4 percent in case of radial ply tyre and by 8 percent in case of diagonal (bias-ply) tyres.	width or width as determined. It may exceed the value by 5.5% in the case of radial-ply tyres and 8% in the case of diagonal (bias-ply) tyres.		

4) Review of ITTAC comments on IS 15709: 2018 Automotive Vehicles — Retreaded Pneumatic Tyres for Passenger Car — Specification

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation /Comments /remarks
1	b)	Scope	Re-treaded tyres with a speed capability below 120 km/h or above 240 km/h (limit of below 120 km/h is not applicable for bias-ply tyres).	Re-treaded tyres with a speed capability below 120 km/h or above 300 km/h (limit of below 120 km/h is not applicable for bias-ply tyres).	align with ECE R108	nel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
2		**REFERENCES**	15633 : 2005	15633: 2022	test Standard Reference	
			-	**15731**:2018 - Automotive Tyres — Selection and Inspection of Retreadable Tyre Casing **15524:2018** - Automotive vehicles - Retreading of tyres by the pre - Cured process	ldditional Reference for Quality Retreading	nel noted and agreed to the observation made by **Member Secretary, Mr August Dubey, TED-7** on providing reference of **IS 15731** and **IS 15524** either in FOREWORD or at some other appropriate place BUT not under clause 2 as suggested by ITTAC.

3	3.21 a) & 3.21 b)		Tables 7 to 12 of IS 15633	Tables 9 to 14 of IS 15633:2022	)dated table details as per IS15633:2022	nel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
4.5	4.5.11 c)	Retreading	The read wear indicators shall provide a means of indicating, with a tolerance of +0.60 and -0.00mm when the tread grooves are no longer more than 1.6 mm deep; and"	The tread wear indicators shall provide a means of indicating, with a tolerance of +0.60 and -0.00mm when the tread grooves are no longer more than 1.6 mm deep; and"	pographical error	

5) Review of ITTAC comments on IS 15731: 2018 Automotive Tyres — Selection and Inspection of Re-treadable Tyre Casing

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation /Comments /remarks
2		Terms and Definitions	New definitions to be included	"2.46 Inspection - The process of checking and assessing the suitability of a tire or casing for further stage of manufacturer or service. 2.47 R.A.R. - Returned As Received. A casing rejected for retreading. 2.48 Edge lifting - A separation of the outer edge of the tread from the casing's shoulder. 2.49 Finger bulge - A localized distortion normally in the sidewall indicating a slight	In line with international guidelines (TRIB and IRSG)	Panel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)

				opening between body cord spacing or can be caused by a penetrating injury. 2.50 Flex area - Circumferential area in a tyre where maximum bending or flexing occurs. 2.51 Flex break - A circumferential break in fabric cords usually parallel to the beads in the mid-sidewall area. 2.52 Flex zone - Reference to the area of a radial tyre from the shoulder apex to mid-sidewall where only the body ply supports the casing profile. 2.53 Inner liner separation - The parting of the inner liner from the body ply material. 2.54 Bluing - The general color that result in rubber that has been subjected to a high heat built up in the tyre . The actual colors can vary from shades of blue to purple to dark green 2.55 Zipper rupture - As a result of being operated significantly underinflated and/or overloaded, multiple ply cords break, thus creating a circumferential rupture in the upper		

				sidewall area of a steel cord radial tyre and is accompanied by instantaneous air loss and explosive force."		
3	3.1.1	Test Method	The recommended lighting is 300 foot-candles.	The recommended lighting is 300 foot-candles or above 3000 lux recommended	As per industry practice 'Lux' is used for lighting. In line with international guidelines (TRIB and IRSG)	The recommended lighting is 300 foot-candles or above **3200** lux recommended
4	4.1	Inspection	A sentence	Thorough inspection should be made by a skilled operator and should include placing the tyre casing on a tyre inspection machine, or other machine capable of spreading the beads under adequate lighting above 3000 lux	Skillset defined for visual inspection	Panel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
4.2	4.2.1 g	Causes for Rejection	bond Ply	body Ply	Typographical Error	
4.2		Causes for Rejection	New causes for rejection to be added	4.2.6 Zipper Damage Indicators Indications of zipper damage include any signs of weakness or non-repairable injury (e.g., ripples, bulges, porosity, softness, etc.) in the sidewall, particularly the upper sidewall. Steel belted radial tyres exhibiting such conditions should be	In line with international guidelines (TRIB and IRSG)	

				rejected and scrapped. 1. Cuts, snags or chips exposing body cords or steel 2. Distortions or undulations (ripples and/or bulges) visible when using an indirect light source which will produce shadows left by any sidewall irregularities 3. Creasing, wrinkling, cracking or discoloration of the inner liner 4. Soft spot(s) in the sidewall flex area 5. Protruding filaments indicating broken cords 6. Any popping sound when feeling for soft spots or when rolling the tyre		

6) Review of ITTAC comments on IS 15753: 2018 AUTOMOTIVE TYRES— TYRE CURING BLADDER— COLD PROCESS

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation
3.2	-	-	The tyre curing bladder shall have uniform thickness and shall be symmetrical in shape and designed to fit properly hi tyres	The tyre curing bladder shall have uniform thickness and shall be symmetrical in shape and designed to fit properly in tyres	pographical Error	nel noted the changes proposed by ITTAC and its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)

7) Review of ITTAC comments on IS 15780: 2018 AUTOMOTIVE TYRES — REPAIR OF TYRES AND TUBES USED ON MOTOR VEHICLES

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendation
1.	-	Scope	This standard specifies the minimum requirements for performance, inspection, marking and material strength of permanent repairs to pneumatic tyres and tubes used for road vehicles. Repairs to steel cord diagonal (cross) ply-commercial vehicle tyres are not included in the standard as this type of tyre is considered obsolete. The recommendations for repairs should be obtained from the manufacturer.	This standard specifies the minimum requirements for performance, inspection, marking and material strength of permanent repairs to pneumatic tyres, tubes and inflation valves used for road/automotive/motor vehicles. However, this Standard is not applicable to: a) T-type temporary use spare tyres b) temporary seals, i.e., externally inserted plugs, intended to allow the vehicle to be driven for a limited period, until a permanent repair can be effected. c) use of liquid sealants introduced into tubed or tubeless tyres to aid the air retention property-clause 10 d) tyres containing sealant gel and e) specialist repairs carried out by the original tyre manufacturer	line with international standards and current market practice.	nel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
2	-	Reference	9081:2001 15627:2005 15633:2005 15636:2005	9081:2017 15627:2022 15633:2022 15636:2022	test Standard Reference	
3	-	Terms and definitions	Some more definitions to be added	**Load Index** numerical code associated with the maximum load a tyre can carry at the speed indicated by its speed symbol. **Speed symbol**	issing definition and repairs terms are included to understand and	

				symbol indicating the speed at which a tyre can carry the load corresponding to its load index or indices **Buffing** mechanical preparation of a tyre surface(s) prior to application of non-vulcanized material **Combination plug-patch** shaped moulded unit combining a patch with a stem protruding from the centre of the bonding face, used for the dual purpose of sealing and filling a penetration in a tyre **Patch** tyre or tube repair unit able to vulcanize to the inside of a tyre or outside of a tube, with the object of sealing a penetration, and, if necessary, providing reinforcement **Reinforced patch** patch containing material, in addition to rubber, often in the form of cords or cables of textile or non-textile material, that impart additional strength while maintaining ability to flex compatibly in normal service when vulcanized onto a tyre carcass/inner liner **Reinforced cross ply patch** type of reinforced patch in which the cords are oriented to align approximately with the ply cords in a diagonal ply tyre **Reinforced radial ply patch** type of reinforced patch in which the cords are oriented to align approximately with the ply cords in a radial ply tyre **Rubber only patch** patch containing no restricting or reinforcing cords, used for tube	differentiate the repair practices. einforced patch definition vised	

				repairs and minor penetration repairs in tyres **Major repair** repair requiring a reinforced patch **Minor repair** repair requiring one of the following: a) rubber only repair b) combination plug patch c) reinforced patch with penetration filler material		
Fig. 2 & 3	-			Fig. 2 & 3 to be interchanged	escription of fig. not matching with the pictures.	
New	-		Table 1 & 2 of Load capacity Index and speed symbol to be added	Table 1 Load-capacity index (LI) LI / Load kg / LI / Load kg / LI / Load kg / LI / Load kg / LI / Load kg / LI 0 45 40 140 80 450 120 1 400 160 4 500 200 32 112 72 355 112 1 120 152 3 550 192 11 200 232 33 115 73 365 113 1 150 153 3 650 193 11 500 233 34 118 74 375 114 1 180 154 3 750 194 11 800 234 35 121 75 387 115 1 215 155 3 875 195 12 150 235 36 125 76 400 116 1 250 156 4 000 196 12 500 236 37 128 77 412 117 1 285 157 4 125 197 12 850 237 38 132 78 425 118 1 320 158 4 250 198 13 200 238 39 136 79 437 119 1 360 159 4 375 199 13 600 239 **Speed symbols** **Speed symbol** / **Speed** km/h (mph) / **Load capacity reduction (V, W and Y tyres)** **Speed** km/h (mph) / **Load capacity** A1 ≤5 (3) A2 ≤10 (6) A3 ≤15 (9) A4 ≤20 (12) A5 ≤25 (16) A6 ≤30 (19) A7 ≤35 (22) A8 ≤40 (25) B ≤50 (31) C ≤60 (37) D ≤65 (40) E ≤70 (44) F ≤80 (50) G ≤90 (56) J ≤100 (62) K ≤110 (69) L ≤120 (75) M ≤130 (81) N ≤140 (87) P ≤150 (93) Q ≤160 (100) R ≤170 (106) S ≤180 (113) T ≤190 (118) U ≤200 (125) H ≤210 (130) V ≤240 (150) 210 (130) 100% of LI load; 220 (137) 97% of LI load; 230 (143) 94% of LI load; 240 (150) 91% of LI load W ≤270 (168) 240 (150) 100% of LI load; 50 (156) 95% of LI load; 2260 (162) 90% of LI load; 270 (168) 85% of LI load Y ≤300 (187) 270 (168) 100% of LI load; 280 (174) 95% of LI load; 290 (180) 90% of LI load; 300 (187) 85% of LI load *NOTE 1 Tyres with ZR within the size marking and no other speed symbol are designed for speeds in excess of 240 km/h (150 mph).* *NOTE 2 Tyres with VR within the size marking are designed for speeds in excess of 210 km/h (130 mph).*		
4.	4.1	Inspection Before	The tyre (and tube if applicable)	Tyres shall be removed from the associated wheel and thoroughly inspected internally and externally,	line with international standards	

		Repairing	shall be removed from its associated wheel and thoroughly inspected for damage.	to determine suitability for repairing , in accordance with the inspection requirements and damage limits in Annex A to Annex H as applicable	and current market practice.	
	4.3		Any existing repair shall be closely inspected. If its condition is found to be unsatisfactory, the repair shall be removed and the damage re-assessed to repair	Any existing repair shall be closely inspected. If its condition is found to be unsatisfactory, the repair shall be removed and the damage re-assessed to repair, in accordance with Annex A to Annex H	nnexure reference is included	
	4.4 (New Clause)			After injury preparation and before application of a patch or new rubber, tyres shall be thoroughly re-examined to determine continued suitability for repair.	r better safety	
5	5.2		All repairs to penetrations through the tyre carcass shall include a suitable patch on the inside of the tyre.	All repairs to penetrations through the tyre carcass shall include a suitable reinforcing patch on the inside of the tyre	per current market practice	
6	b)	Performance	Commercial vehicle tyres diagonal (cross and radial ply) shall be repaired such that they retain their original speed capabilities	Commercial vehicle tyres (cross/diagonal/bias and radial ply) shall be repaired such that they retain their original speed capabilities (Refer IS15636:2022)	rpographical error	
8	8.1	Marking	Reinforced repairs made in accordance with the	Tyres with major repairs shall be marked internally by means (except hot branding) , adjacent to or on each repair , permanently and legibly with	line with international standards	

			requirements of this standard shall have a patch legibly and indelibly marked with the number of this standard and the repairer's name or identification mark.	the number of this IS standard and with repairers's name or identification mark. Note: Min.height of characters shall be 4 mm		
8	8.2	Marking	In the case of a tubeless tyre that can only be repaired so as to be serviceable as a tubed tyre the repairer shall remove the word 'Tubeless' from the sidewalls of the tyre and shall tie a label to the tyre or tyre/wheel assembly bearing the following words:' THE DAMAGE TO THIS TYRE DID NOT PERMIT US TO REPAIR IT TO THE TUBELESS SPECIFICATION. IT IS NOW SERVICEABLE AS A TUBED	In the case of a tubeless tyre, with common rims for both tube and tubeless tyres, that can only be repaired so as to be serviceable as a tubed tyre the repairer shall remove the word 'Tubeless' from the sidewalls of the tyre and shall tie a label to the tyre or tyre/wheel assembly bearing the following words: THE DAMAGE TO THIS TYRE DID NOT PERMIT US TO REPAIR IT TO THE TUBELESS SPECIFICATION. IT IS NOW SERVICEABLE AS A TUBED TYRE ONLY. A TUBE MUST BE FITTED.' Note 1: Marking may be effected by hot branding or a pre-printed label. Note 2: Minor repairs do not require marking.		

			TYRE ONLY. A TUBE MUST BE FITTED.'			
9	9.2 b)	Repair Material	b) Defining limits of damage for which the material are designed;	b) Defining limits of damage for repair patches with reference to injury and tyre types/sizes for which the materials are designed		
	9.2 c)		Ensuring that reinforced patches for tyres, if correctly applied in completed carcass repairs, are capable of withstanding a pressure not less than the following: 1) Car tyres: five times the highest inflation pressure, appropriate to the tyre size. 2) Commercial vehicle tyres: three times the highest inflation pressure, appropriate to the tyre size. 3) Motor cycle and scooter tyres: three times the highest inflation pressure, appropriate	1,2 & 3 and Note to be deleted d) New clause Compatibility of rubber cements and repair compounds to be ensured. Note : It is recommended that repair material application is carried out at an minimum ambient temperature as required (e) Material storage and shelf life recommendation - Temp not beyond 25°C is recommended for uncured rubber compounds	r safety reasons, it is not recommended to inflate the tyres up to five or three times.	

			to the tyre size. NOTE —The capability outlined in 9.2(c) necessitates special test facilities for the patch manufacturer or supplier. The tyre repairer should not attempt to carry out the test unless he is also a patch manufacturer.			
10		Sealants	Note to be included	Note: This excludes any gel that forms part of the original construction.		
Annex A	A-2		New addition after point h Non-repairable conditions applicable to commercial vehicle radial ply tyres to be added	i) Car radial ply tyre carcasses with visible separation in the belt shall be rejected as unsuitable for repair. Non-repairable conditions applicable to commercial vehicle radial ply tyres shall be as follows: a) visible belt ply separation; b) severely permanently deformed or kinked (steel) carcass cords in the sidewall areas outside the injury limits in Annex F c) exposed carcass cords due to sidewall scuffing outside the injury limits in Annex F d) bead damage, other than rubber, or bead chafer ply damage; e) non-repairable sidewall rubber separation from the carcass; and f) severe and non-repairable circumferential cracking above the bead, or looseness in or near the bead.	idialisation in Indian tyre market calls for inclusion of radial specific inspection and acceptance criteria.	

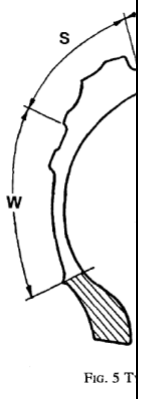
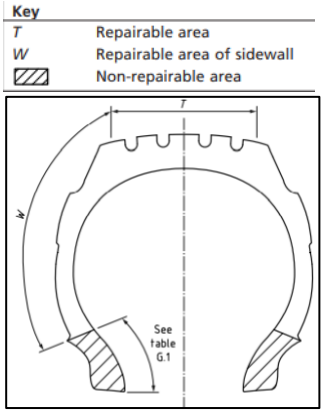
Ann. B	B-2	a)	Surrounding all the damaged area of the injury should be removed by cutting (skiving) and buffing to produce a cavity as shown in Fig. 5, 6 and 7, taking care not to enlarge the damaged area more than necessary. With penetration damage between 3 mm and 6 mm diameter, only minimal straight through preparation (with a 'rat tail') need be carried out.	(i) Remove all of the damaged area of the injury by cutting, skiving and buffing, to produce a cavity, taking care not to enlarge the damaged area more than necessary (for minor penetrations, only minimal straight-through preparation is necessary) (ii) Remove all loose and visibly oxidized material, buffing the rubber in the cavity and surrounding area to a fine matt finish to ensure the best adhesion of filler materials. Take care to avoid contamination. (iii) Examine the tyre to ensure that no injury exceeds the limits given in Table 1,2,3 & 4) (Table 3 & 4 are given separately)		
		Fig.5	 FIG. 5 T		g. to be replaced as per the description	

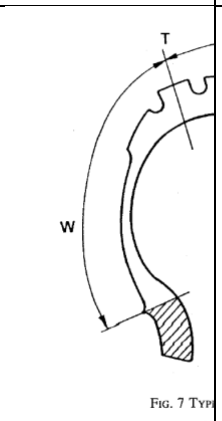
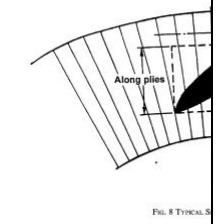
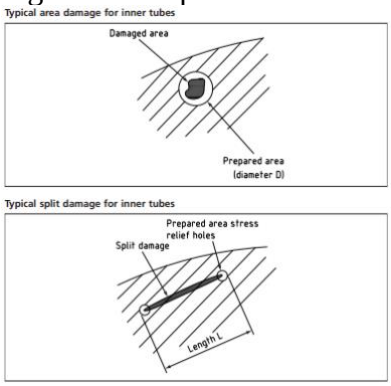
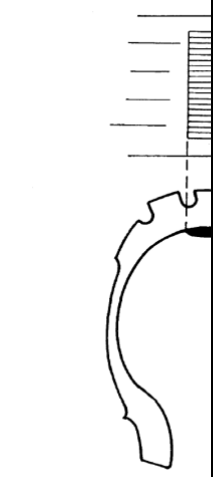
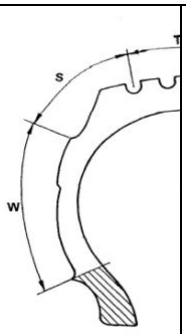
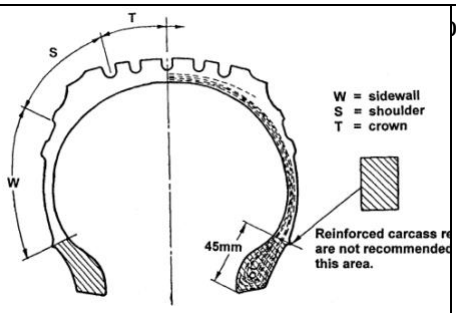
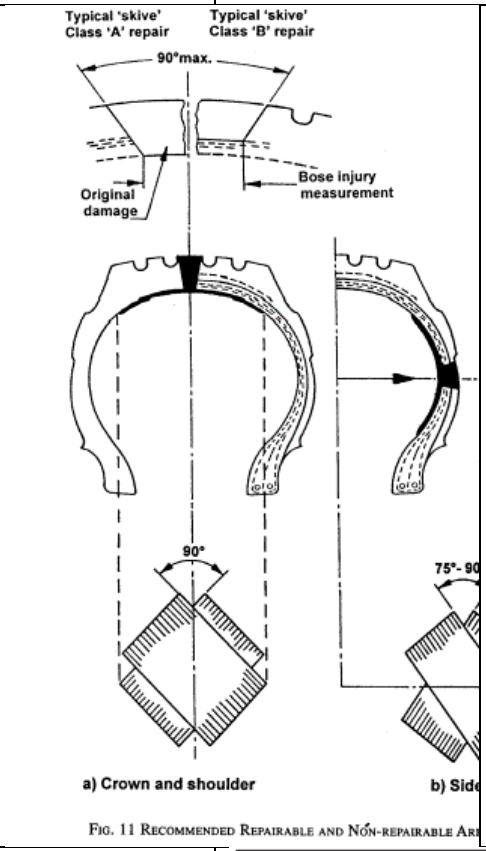
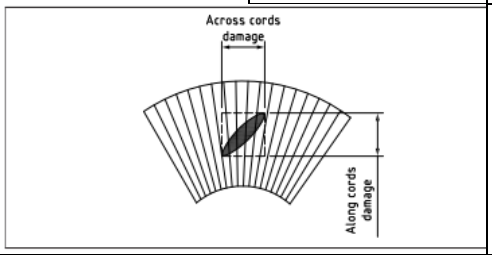
		Fig. 7	 FIG. 7 TYPI	Fig. 7 to be deleted		
		Fig. 8	 FIG. 8 TYPICAL SI	Fig. 8 to be replaced 	)rrect picture of tube section.	
Annex C		Fig. 9	 FIG. 9 RECOMMENDE	Fig. 9 to be deleted as it is not a correct picture of Diagonal (cross) ply car tyre. Acccordinlgy, the reference of Fig. 5 and 9 to be deleted fom C-1.1, C 1.2.		

		Fig. 10			ɔrrect picture of Radial car tyre	
		Fig.11		Fig. 11 to be deleted and acccordinlgy, the reference of Fig. 11 to be deleted fom D-2.3, D 2.4.		
		Fig. 12	Fig. 12 to be replaced			
Annex. E				Two tables to be included Diagonal ply commercial vehicle tyre injury limits (measured at base of injur after preparation) Dimensions in		

Tyre section width	≤210	> 210 ≤ 280	> 280 ≤ 330	>330
Area *T*	35	45	55	65
Area *W*	20	25	30	35
Max. number of repairs	4 (of which only one permitted in area *W*)			

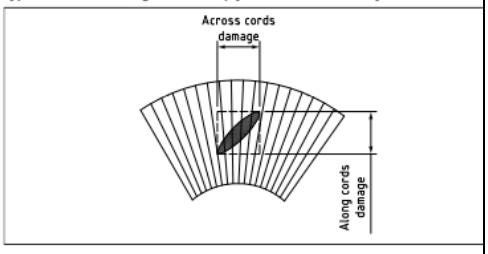
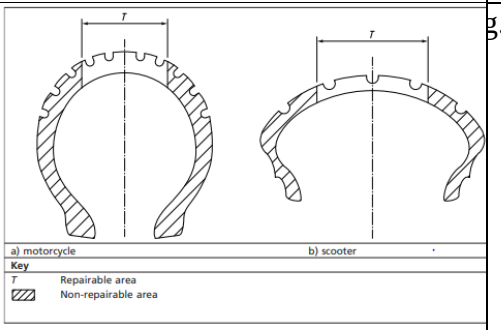
Ann. F				Chart A - Highway Drive or Trailer Tires - to determine maximum size for these tires: **Tire Size** | **Maximum Injury Size in the Crown Area (25% of the tire cross section minus 1")** | **Maximum Injury Size in the Sidewall Area (1/2 the maximum crown injury** 7.50-20/8-22.5 | ⅛ in. (22 mm) | 7/16 in. (11 mm) 8.25-20/9-22.5 | 1 – 1 1/16 in. (27 mm) | 17/32 in. (13 mm) 9.00-20/10-22.5 | 1 – 1 ¼ in. (32 mm) | ⅜ in. (16 mm) 10.00-20/11-22.5 | 1 – 1 ¼ in. (32 mm) | ⅜ in. (16 mm) 10.00-22/11-24.5 | 1 – ½ in. (38 mm) | ¾ in. (19 mm) 11.00-20/12-22.5 | 1 – ½ in. (38 mm) | ¾ in. (19 mm) 11.00-22/12-24.5 | 1 – ½ in. (38 mm) | ¾ in. (19 mm) 11.00-24 | 1 – ¾ in. (44 mm) | ⅞ in. (22 mm) 12.00-20/12.00-24 | 2 in. (51 mm) | 1 in. (25 mm) Note: All measurements are made across the widest point of the skive at the top ply. **Typical Sidewall damage for radial ply commercial vehicle tyres**  **SECTION REPAIR INJURY CHART - RADIAL TRUCK TIRES** **MAXIMUM SECTION REPAIR LIMITS FOR RADIAL TRUCK TIRES** NOTE: DIMENSIONS SHOWN ARE FOR GENERAL GUIDANCE. REPAIR MATERIAL MANUFACTURER'S AND NEW TIRE MANUFACTURER'S RECOMMENDATIONS MAY DIFFER. SPECIFIC LIMITS SHOULD BE BASED ON RECOMMENDATIONS OF THE TI MANUFACTURER, REPAIR MATERIAL MANUFACTURER, AND TYPE OF TIRE SERVICE. **TIRE CROSS SECTION SIZE** | **SIDEWALL MAX. INJURY DIMENSIONS WIDTH** | **LENGTH** | **TREAD MAX. INJURY DIMENSION** 6.50 - 12.50 | 5/16" (10 mm) 3/4" (20 mm) 1" (25 mm) | 3 1/4" (80 mm) 2 1/2" (65 mm) 2" (50 mm) | 1" (25 mm) 1" (25 mm) 1" (25 mm) 215 - 285 | 5/16" (10 mm) 3/4" (20 mm) 1" (25 mm) | 3 1/4" (80 mm) 2 1/2" (65 mm) 2" (50 mm) | 1" (25 mm) 1" (25 mm) 1" (25 mm) 7.50 - 14.00 | 5/16" (10 mm) 3/4" (20 mm) 1 3/4" (40 mm) | 5" (125 mm) 5" (125 mm) 3 1/4" (80 mm) | 1 1/2" (40 mm) 1 1/2" (40 mm) 1 1/2" (40 mm) 8 - 16.5 | 5/16" (10 mm) 3/4" (20 mm) 1 3/4" (40 mm) | 5" (125 mm) 5" (125 mm) 3 1/4" (80 mm) | 1 1/2" (40 mm) 1 1/2" (40 mm) 1 1/2" (40 mm) 235 - 315/80 225 - 305/75 | 5/16" (10 mm) 3/4" (20 mm) 1 3/4" (40 mm) | 5" (125 mm) 5" (125 mm) 3 1/4" (80 mm) | 1 1/2" (40 mm) 1 1/2" (40 mm) 1 1/2" (40 mm) 315 - 445/65 | 5/16" (10 mm) 3/4" (20 mm) 1 5/16" (40 mm) | 5" (125 mm) 5" (125 mm) 3 1/4" (80 mm) | 1 1/2" (40 mm) 1 1/2" (40 mm) 1 1/2" (40 mm)	ble and Fig. to be added.	
Annex. G				 Repairable and Non- Repairable areas for motorcycle and scooter tyres	g. to be added	
Annex H			New clause	Single splits shall not exceed the maximum repairable length L given in Table 6 [Injury Limitations For Tubes after preparation]	ew clause to be added.	

Table 3

Repairable area of *T* as a percentage of the nominal section width of tyre

Nominal section width of tyre	*T* as a percentage of nominal section width %
Car	
Up to and including 155 section width	60
Above 155-200 section width	65
Above 200 section width	70
Commercial vehicle	
Up to and including 225 section width	60
Above 225 to 305 section width	65
Above 305 section width	70
Agricultural vehicle	
All sizes	70

Table 4

Radial tyre injury limits: size of penetration damage (after preparation)

Tyre	Maximum diameter of damage at base of injury in area *T* mm
Car	6
Commercial vehicle	10

NOTE Commercial vehicle tyres exhibiting a 10 mm injury after preparation should be restricted to 50% of the nominal section width in Area T.

8**. Review of ITTAC comments on IS 15725: Automotive Tyres – Tyre Curing Envelop - Cold Process**

Clause No	Sub-Clause No	Title	As per Standard	Changes requested	Justification	Panel 1 recommendations/
		Heading	Envelop	Envelope	Typographical Error, spelling need to be corrected at other places wherever appearing (scope, clause 3.1.1,3.1.2,3.2, 4)	Panel noted & agreed with the changes proposed by ITTAC based on its review and acceptance by concerned stakeholder **TREA** (Tyre Re-treading Education Association)
3.2		Material	Minimum 100 curings	The life cycle of envelope depends on many parameters such as the usage of appropriate envelope type/size for various tyre sizes to be retreaded and several other	Envelope life cycle depends on many parameters such as appropriate envelope type/size and several other retread process parameters. Instead of specifying a minimum number of cures, the right recommendation to achieve optimum life	

				retread process parameters. For achieving optimum envelope life, envelope selection guideline is given in Annexure A & recommended envelope handling procedure is in Annexure B	cycle will result in higher efficiency, multiple times higher than minimum spec	
3.3	Table1	vi)	**Elongation at break,** percent - Min 600	**Min 450**	Lower is better	Panel agreed to consider the proposed limits b**ased on the analyzed data by ITTAC & TREA and Industry practices.**
3.3	Table 1	VIII	**Tension set**	○ Part 17 of IS 3400 to be replaced with part **13 of IS 3400** ○ CIRT pointed out that test method ISO 17464 to be referred for the tension set measurement in one of TED-7 meeting.	Correct test method for tension set.	○ Panel agreed. ○ Member secretary, TED-7 to check & confirm as per TED-7 minutes of meeting.
4	b)	MARKING	Batch No./Lot No.; and	Month and Year of manufacturing; and	Relevant for traceability	

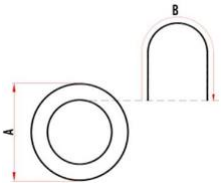
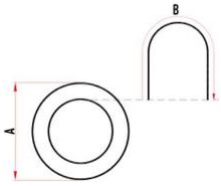
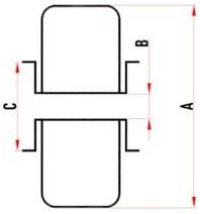
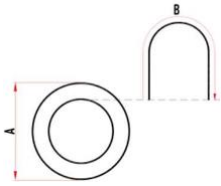
Proposed Addition (as annexure): This is required with the evolving radialisation in Commercial Vehicle tyres, many developments are also taking place in the retreading process as more & more truck & bus radials are getting retreaded.

Annexure(s)

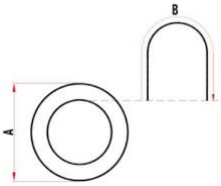
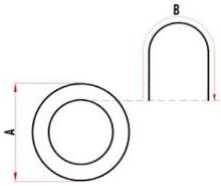
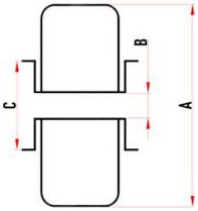
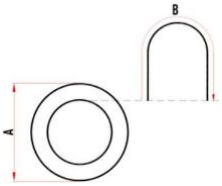
A. Recommended industry practice for selection of envelope type/size
B. Recommended envelope handling procedure

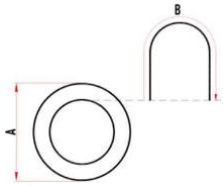
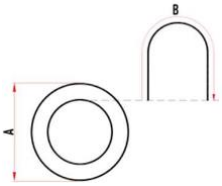
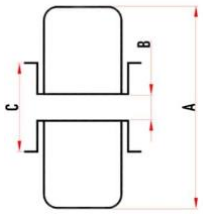
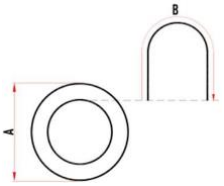
Annexure – A
Recommended industry practice for selection of envelope type/size

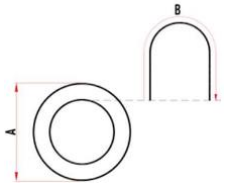
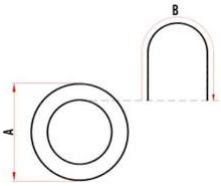
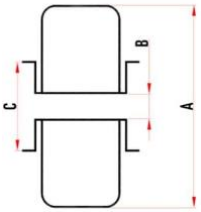
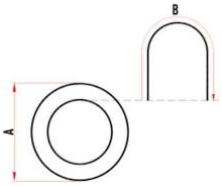
Note: Envelope in the list is only a guide for the use of Proper size of envelopes. Variation in the tyre sizes, tyre dimensions, precure tread designs, and precure rubber thickness may require a smaller or larger envelope size.

TYRE SIZE	ENVELOPE FOR RIM & FLANGE CURE SYSTEM METHOD 1	OUTER ENVELOPE FOR BONDER CURE / INNER & OUTER ENVELOPE SYSTEM METHOD 2 & 3	INNER ENVELOPE FOR PRECURE VULCANISATION PROCESS METHOD 3	ARC SYSTEM METHOD 4
Description	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x [PERIMETER (B) { Measurements are in Inches }	(A x B x C) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }
				
	A x B	A x B	A x B x C	A x B
215R14	29 x 18	29 x 15	27.5 x 12.5 x 22.5	27 x 21
195R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 21
195/75R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 21
205/75R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 22
205R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 22
6.00-14	25 x 16	25 x 15	27.5 x 12.5 x 22.5	27 x 21
5.20-14	25 x 16	25 x 15	27.5 x 12.5 x 22.5	27 x 21
185R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 21
185/75R14	27 x 18	27 x 15	27.5 x 12.5 x 22.5	27 x 21
175R14	25 x 17	25 x 14	27.5 x 12.5 x 22.5	25 x 20

7.50R15	**32 x 22**	**32 x 19**	**30.5 x 16 x 25**	**32 x 27**
7.00R15	**31 x 22**	**31 x 19**	**27.5 x 12.5 x 22.5**	**29 x 25**
10.00R15 LT	**32 x 23**	**38 x 21**	**34.5 x 15 x 26.5**	**32 x 27**
250R15	**31 x 22**	**31 x 19**	**30.5 x 16 x 25**	**32 x 27**
215/70R15	**27 x 18**	**31 x 19**	**30.5 x 16 x 25**	**29 x 22**
235/75R15	**29 x 20**	**31 x 19**	**30.5 x 16 x 25**	**29 x 25**
185R15	**27 x 18**	**27 x 15**	**27.5 x 12.5 x 22.5**	**27 x 22**
8.25R15	**32 x 22**	**32 x 19**	**34.5 x 15 x 26.5**	**35 x 30**

TYRE SIZE	ENVELOPE FOR RIM & FLANGE CURE SYSTEM METHOD 1	OUTER ENVELOPE FOR BONDER CURE /INNER & OUTER ENVELOPE SYSTEM METHOD 2 & 3	INNER ENVELOPE FOR PRECURE VULCANISATIO N PROCESS METHOD 3	ARC SYSTEM METHOD 4
Description	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x [PERIMETER (B) { Measurements are in Inches }	(A x B x C) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }
				
	A x B	A x B	A x B x C	A x B
8.25R16	35 x 24	32 x 19	34.5 x 15 x 26.5	35 x 30
7.50R16	32 x 22	32 x 19	30.5 x 16 x 25	32 x 27
700 R16	31 x 21	32 x 19	30.5 x 16 x 25	31 x 24
6.50R16	29 x 19	31 x 19	27.5 x 12.5 x 22.5	29 x 22
6.00R16	29 x 19	29 x 19	27.5 x 12.5 x 22.5	29 x 22
225/75R16	29 x 19	29 x 19	30.5 x 16 x 25	29 x 25
225/70R16	29 x 18	29 x 15	27.5 x 12.5 x 22.5	29 x 23
215R16	31 x 22	31 x 19	30.5 x 16 x 25	31 x 25
9.5R17.5	37 x 23	37 x 20	34.5 x 15 x 26.5	37 x 27
245/70R17.5	32 x 22	32 x 19	30.5 x 16 x 25	32 x 27
215/75R17.5	31 x 22	31 x 19	30.5 x 16 x 25	32 x 27
235/75R17.5	32 x 22	32 x 19	30.5 x 16 x 25	32 x 27
225/75R17.5	32 x 22	32 x 19	30.5 x 16 x 25	32 x 27
9 R19.5	37 x 23	37 x 20	38 x 17.5 x 27	37 x 28
9.5R19.5	38 x 24	38 x 21	38 x 17.5 x 27	37 x 28
265/70R19.5	32 x 22	35 x 19	38 x 17.5 x 27	35 x 28
245/70R19.5	32 x 22	35 x 19	34.5 x 15 x 26.5	35 x 28

TYRE SIZE	ENVELOPE FOR RIM & FLANGE CURE SYSTEM	OUTER ENVELOPE FOR BONDER CURE /INNER & OUTER ENVELOPE SYSTEM	INNER ENVELOPE FOR PRECURE VULCANISATION PROCESS	ARC SYSTEM
Description	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x [PERIMETER (B) { Measurements are in Inches }	(A x B x C) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }
				
	A x B	A x B	A x B x C	A x B
7.00R20	36 x 20	36 x 20	34.5 x 15 x 26.5	36 x 25
7.50R20	36 x 20	38 x 21	38 x 17.5 x 27	36 x 25
8.25R20	38 x 25	38 x 22	38 x 17.5 x 27	40 x 33
9.00 R20	41 x 28	41 x 25	40 x 19 x 31	40 x 33
10.00R20	43 x 30	43 x 27	40 x 19 x 31	42 x 33
11.00R20	43 x 30	43 x 27	40 x 19 x 31	44 x 37
12.00R20	45 x 32	45 x 29	45.5 x 19 x 34	44 x 40
13/80R20	43 x 30	43 x 27	43.5 x 19 x 34	43 x 38
13.00R20	48 x 32	48 x 29	45.5 x 19 x 34	48 x 37
445/65R22.5	48 x 32	48 x 29	51 x 19.5 x 35.5	48 x 44
445/50R22.5	44 x 30	44 x 28	45.5 x 19 x 34	44 x 38
425/65R22.5	45 x 32	45 x 29	51 x 19.5 x 35.5	45 x 38
385/65 R22.5	45 x 32	45 x 29	47 x 22 x 34.5	45 x 38
315/80R22.5	43 x 30	43 x 27	40 x 19 x 31	44 x 36
295/80R22.5	43 x 30	43 x 27	43.5 x 19 x 34	42 x 35
305/70R22.5	41 x 28	41 x 25	42 x 19 x 22	42 x 35
315/70R22.5	41 x 28	41 x 25	43.5 x 19 x 34	42 x 35
305/75R22.5	43 x 30	43 x 27	43.5 x 19 x 34	43 x 35
275/80R22.5	41 x 28	41 x 25	42 x 19 x 22	42 x 32
275/70R22.5	38 x 25	38 x 22	40 x 19 x 31	38 x 30
255/70R22.5	38 x 24	38 x 21	40 x 19 x 31	38 x 28
12/70R22.5	41 x 28	41 x 25	40 x 19 x 31	44 x 37
12.00 R22.5	43 x 30	43 x 27	43.5 x 19 x 34	43 x 36
11.00 R22.5	42 x 30	42 x 27	42 x 19 x 22	42 x 34
10.00R22.5	41 x 28	41 x 25	40 x 19 x 31	41 x 32

TYRE SIZE	ENVELOPE FOR RIM & FLANGE CURE SYSTEM	OUTER ENVELOPE FOR BONDER CURE /INNER & OUTER ENVELOPE SYSTEM	INNER ENVELOPE FOR PRECURE VULCANISATION PROCESS	ARC SYSTEM
Description	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x [PERIMETER (B) { Measurements are in Inches }	(A x B x C) { Measurements are in Inches }	ENVELOPE OVERALL DIAMETER (A) x PERIMETER (B) { Measurements are in Inches }
				
	A x B	A x B	A x B x C	A x B
12R24.5	45 x 32	45 x 29	47 x 22 x 34.5	45 x 36
11R24.5	45 x 32	45 x 29	47 x 22 x 34.5	44 x 36
12.00R24	46 x 32	46 x 29	51 x 19.5 x 35.5	46 x 41
11.00R24	46 x 32	46 x 29	47 x 22 x 34.5	46 x 38

Annexure – B
Recommended Envelope Handling Procedure

Instructions to improve the envelope life :

- Always select the correct size envelope for the right tyre size.
- Inspect the envelope for holes, tears, and cracks after every use.
- When putting the envelope on the tyre, be sure that it is centred and straight on the tyre and the valve centred over the wicking pad.
- Make sure that the valve stem is located in a position so that it does not bind/kink the chamber exhaust line when the tyre and envelope assembly are placed and hooked-up inside the curing chamber.
- The couplers that is attached to the envelope, should be attached to the chamber hoses with 90°elbows.

- Always check and ensure that exhaust valve is not blocked.

- It is recommended that a vacuum test be performed to check the sealing of the envelope and the sealing ring.

- NEVER insert air under the envelope to check the seal of the envelope and sealing ring.

- Pressurizing the envelope can pull the envelope away from the sealing ring or break the seal of the inner/outer envelope systems and may create a safety hazard.

- Pressurizing the envelope causes distortion and stretching which will shorten envelope life.

IMPORTANT :

- Envelope to be cooled for a minimum of 8 hours before the next usage.

Envelope Storage :

- Store new envelopes and seldom-used envelopes in their original cartons, off the floor and in storage racks.
- Organize and store envelopes according to size.
- Store used envelopes in a cool, dark place away from direct light and heat.
- Do not store in-process envelopes on the floor.
- Store in-process envelopes in bins or on specially designed envelope storage racks.
- Periodically check bins and racks for burrs and sharp edges.
- Avoid rolling or dragging envelopes across the floor.
- Keep them as flat as possible.

Envelope Lubrication :

Lubricant prevents the sticking of envelopes to the tyre throughout the envelope life.

Envelope life will be affected by the following reasons ;

- Repeated usage of envelope without cooling.
- Improper cooling.
- Inefficient storage.
- Sharp edges on equipment.
- No or incorrect lubrication.
- Rolling the enveloped tyre on the floor.
- Storing envelopes in metal containers.
- Folding envelopes.
- Lack of proper training to the Operators on the proper usage/application of the envelopes.

Envelope inspection :

- Inspect envelopes regularly.
- Avoid using them for too long.
- Periodically inspect the envelope for blemishes and cuts and small tears.
- Pay particular attention to the edges of the envelope.
- Move envelopes up in size once it becomes loose.
- Remove envelopes that have stretched too far (thin in shoulder).

Envelope dimension varies based on the Precure Retread systems :

Method 1 – Long skirt envelope - Electric Chamber Operation.

Using Curing bag, flap, curing Rim and sealing flange for curing in Electric chamber system.

Method 2 – Half skirt or short envelope - Steam bonder system.

Using Curing bag, flap and curing Rim for curing in the Steam Bonder system as steam is the heating media for curing.

Method 3 – Inner & Outer envelope system - Electric Chamber Operation.

Retreading tyre using only Inner and Outer envelope without using Curing bag, flap, curing Rim and sealing flanges.

Method 4 – ARC system (Active Seal Rimless Cure System).

Retreading tyre using Bead sealing ring (Snap-on Seal) without using Curing bag, flap, curing Rim and sealing flanges.

9. Review of Comments received from Shri T Chakravarty on IS 11031

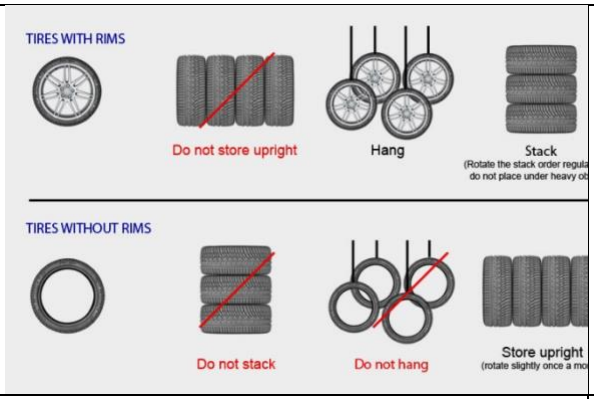
Clause No.	As per Standard	Proposed Changes	Justifications	Panel 1 recommendation
Add to 2.1.2	New inner tubes	This, of course, should only be done as a temporary measure. Before mounting a tyre and tube stored in such a manner, always remove the tube from the tyre and inspect the inside of the tyre for foreign material, which, if not cleaned out, could cause irreparable damage to both tube and tyre.	Damage prevention	Panel advised ITTAC to review the comments on IS 11031 & share it with Mr. August Dubey for its discussion in 40th meeting of TED-7, Sectional Committee.
Add to 2.2.3	Warehouse	Particular care should be taken to store tubes and flaps away from fluorescent/mercury vapour lights, electric motors, battery chargers, electric welding equipment, electric generators and similar electrical devices, since they all create ozone.	To prevent aging of rubber due to ozone.	
Add to 2.2.6	New inner tubes	Storage is recommended at between 0^0C and 35^0C, with relative humidity at less than 70%.	Temperature and humidity specs not included in Standard	
Replace 2.3.3	Stacking and storage	Under no circumstances should tubes ever be hung over nails or pegs, or over any other object which might form a crease in the	To avoid tube failure	

		tube. Such a crease will eventually produce a crack in the rubber and cause tube failure.		
2.3.4(Add)	Stacking guidelines for tubes	If tubes are loose they should be stacked on flat unslotted shelves or pallets so that the valves are not deformed and do not damage neighbouring tubes.	To avoid deformation and damage.	
2.4.2(Add)	Handling	Tubes, which are packed in cartons or bags, should be left in these to provide some protection against contamination, ozone and light.	Protection	
4.1	Receipt	Delete (under preparation)	The other Standard is already published	
4.3 **2.3.2**	Stacking guidelines for flaps	Flaps should be stored on flat, unslotted shelves or pallets.	To avoid permanent fold and cracks. Not explicitly specified in existing stacking guidelines	
4.3.2(Add)	Stacking guidelines for flaps	Under no circumstances should flaps ever be hung over nails or pegs, or over any other object which might form a crease in the tube. Such a crease will eventually produce a crack in the rubber and cause tube failure.	To avoid failure	
Add new section 5	None	Transport: Inner tubes and flaps should be transported in a manner that protects them against deformation, damage or destruction. The means of transport should be dry and clean. They may not be transported with petroleum products, oils, acids, alkalis and other substances that are damaging to rubber. During transport, rubber products should be stacked so that they are secured against movement. If the tubes and flaps are transported at a temperature below -30ºC (minus	New section for transportation of tubes and flaps	

		thirty), at which the rubber begins to lose the characteristics of an elastic material, unloading should be carried out with extreme care so that there is no accidental mechanical damage.		
Add new section 6	None	Storage time: The maximum storage time for new tubes and flaps counted from the date of production, should not be longer than 24 months.	New section for storage time.	
-	Explanatory Note	This standard is one of the standards on the recommendations for storage and handling of tyres, inner tubes, flaps, rims' etc. The other standard in this series being 'Indian Standard Storage and handling of pneumatic tyres for automotive vehicles' ~~(under preparation).~~	The other Standard is already published	

10: Review of comments received from Shri T Chakravarty on IS 11178: Recommendations for storage and handling of pneumatic tyres for automotive vehicles

Clause No.	As per Standard	Proposed Changes	Justifications	Panel 1 Recommendations
Add to 2.5	Storage	Storage temperature should ideally be below 25°C and above 0°C.	To prolong the integrity and safety of tyres	Panel advised ITTAC **to review the comments on IS 11031** & share it with Mr. August Dubey for its discussion in 40th meeting of TED-7, Sectional Committee.
2.8(Add)	Storage	Ensure storage area contains none of these items. The following should also be avoided: Solvents Fuels Lubricants	To avoid damage to tyres	
2.9(Add)	Storage	Protect white rubber Got whitewalls: store them with white areas touching other white areas, and black touching black.	To keep white rubber bright and avoid marks.	

3.1.2.13(Add)	Stacking and Handling		Recommendation for storage of tyres with and without rims	
3.4(Add)	Handling	When handling tyres in warehouse don`t ever drop tyres higher than 1, 5 m. Tyres could be damage on drop from bead area. Typical consequence could be kinked bead. If one finds a tyre with kinked bead it is not recommend to mount such a tyre to a rim.	Proper tyre handling	
10.1: Comments received from Shri Anup Chandra on IS 11031 and IS 11178				
		STORAGE IS RECOMMENDED TO COVER WITH TARPAULIN....PLEASE MAKE IT BLACK TARPAULIN AS PER IS 7903		The panel decided to the discuss the comments in presence of Mr. Anup Chandra
Additional item Participation of TREA members in the TED-7 meeting		Mr Rahul Saxena from TREA requested for the participation of its members in the TED-07 meeting		TREA members can participate in TED-7 meeting and nomination requests to be shared with Member Secretary, TED-07
11: Review of JATMA Comments on draft amendment no 01 to IS 15627:2022				
5	Marking	5.2 Markings given in 5.1 shall be either permanently molded or engraved/etched **into/onto** the tyres.	So as not to restrict tyre molding and engraving/etching technology.	The existing description covers the JATMA suggestions, Therefore, no change is required.
New Clause	New Table	We recognized that ETRTO SM has an	**To align with ETRTO manual**	Panel agreed to

		equivalent table which specifies the wider range of speed capacity of the vehicle up to 300km/h in page M8 of ETRTO SM. Tyres for vehicles that have the speed capacity over 240 km/h is actually distributed in India. Therefore, if this table 12 can switch from ITTAC SM table to ETRTO SM table, it will be appreciated.		consider the ETRTO table given on page M8 (up to speed 300 km/h) for uniformity and to cover the existing tyres, produced by domestic manufacturers.
11.1: Review of ITTAC Comments on draft amendment no 01 to IS 15627:2022				
(Page 5, clause 4.2.1, line 6)		Table 13 to be replaced with table 14	Editorial	Ok/Agreed
Page 7, clause 6.3) Insert the following after 6.3.2		Not required	Table 12 notes covers requirements	Panel recommended to **add new clause 6.4** with following description: If the **cold inflation pressure** declared by the manufacturers varies for tyre sizes listed in Table 05 to 11, Table 12 to be referred for inflation pressure values corresponding to speed capability of vehicle.
New Table 12	Note 1	The inflation pressures mentioned in the load/inflation pressure limit Table 5 (a) to Table 11 are minimum values related to loads. They shall take into account not only the Load but also the tyre construction, road holding, maximum speed, the location of the tyre, the operating conditions and the mechanical characteristics of the vehicle	The inflation pressures mentioned in the load/inflation pressure limit Table 5 (a) to Table 11 are minimum values related to loads **corresponding to speed 150 Km/h**	Ok/Agreed

			(speed symbol P) and below. They shall take into account not only the Load but also the tyre construction, road holding, maximum speed, the location of the tyre, the operating conditions and the mechanical characteristics of the vehicle	
New Table 12	Note 4	In the case of Reinforced tyres, the figures in above table increases by 50 kPa.		**Ok/Agreed**
Comments received from Yamaha Motor vide mail dated 27 and 29 September 2023 on draft amendment no 01 to IS 15627:2022				
Page 5, clause 4.3, line 7		Kindly substitute clause "4.3.1" for "4.3".		**Ok/Agreed**
Page 27, clause J-1)		"**M/C"** shall be inserted between rim size- "R18" and Load index- "53"	To align with the definition given in J, 1.2	**Ok/Agreed**
Page 6, Clause 5.1 (u)		As we are adding the acronym **"DP"** in the marking requirements. [*Page 6, clause* **5.1 (u)**] — Substitute the following for the existir u) The inscription M + S or M.S or M & S or DP in the case of a I suggest we should add the full name for the acronym, aligned with the UN R75. *Paragraph 3.1.9.*, amend to read: "3.1.9. The inscription "M+S" or "M.S" or "M&S" if the tyre is classi category of use "snow tyre" or if the tyre is classified in the categ "special tyre" when declared by the tyre manufacturer at paragrap complying also with the definition given in paragraph 2.33. The "DP" (i.e. Dual Purpose) is accepted as a permitted alternative; "M+S" or "M.S" or "M&S" means "Mud and Snow";"	For ease of understanding and unambiguity and to align with ECE R 75.	**Ok/Agreed.** **Member Secretary advised to incorporate it suitably.**

Prepared by **Checked & Approved by**

Vinay Vijayvargia Niteesh K Shukla

Dy. Dir, ITTAC Director, ITTAC

Annexure 13
(Item 5.2 **)**
Draft document received from WIL

[Page 7, Table 1, Sl No. i), col (4)] — Substitute the following for the existing matter:
’12,13,14,15’

(Clauses 5.2.2 and 5.2.4)’
[Page 8, Table 2, Sl No. i), col (4)] — Substitute the following for the existing matter:
’12,13, 14, 15, 16, 17 (5°drop centre rims and 5° semi drop centre rims)’

Annexure 14
(item 4)
Draft terms of reference

- **Project Title: Formulation of Indian Standard for Construction, Mining or Industrial handling vehicles and machines**

1. Background:

The tire is a critical component in ensuring the safety and performance of vehicles, and India has established separate standards to address safety requirements for specific vehicle types. Standards such as IS 15627, IS 15633, and IS 15636 are in place for Two and Three-Wheeled Motor Vehicles, Quadricycles, E-Rickshaw/E-Carts, passenger cars, and commercial vehicles. Notably, IS 15636 extends its coverage to include mining and logging tires for highway application. Additionally, IS 13154 addresses the safety requirements for agricultural tractors and their trailers. However, there is currently an absence of dedicated Indian Standards specifically covering the tires of Construction, Mining, and Industrial handling vehicles, highlighting a gap in standardization for these specialized applications. Addressing this gap would be essential to ensure comprehensive safety standards for tires in diverse vehicular contexts.

2. Objectives:

The primary objective of this project is to empower the TED 7 committee in formulating dedicated Indian Standards addressing the safety aspects of tires for Construction, Mining, and Industrial handling vehicles. The secondary objectives include:

1) Identify the manufacturers of these specialized tires to establish a comprehensive understanding of the market and industry players.

2) Identify testing agencies responsible for performing safety tests on these tires, ensuring a thorough assessment of testing procedures and standards adherence.

3) Review relevant regulations issued by the in-line ministry to ensure alignment with existing governmental guidelines and compliance with industry standards.

3. Scope:

The project will encompass:

- Conducting a comprehensive study on data regarding manufacturers, testing agencies, and users of tires for Construction, Mining, and Industrial handling vehicles.
- Reviewing existing standards, literature, regulations, and guidelines.
- Collecting and analyzing data from manufacturers and testing agencies to specify tests, test methods and limits in the standard.

- Developing recommendations and preparing drafts for safety standards on tires for Construction, Mining, and Industrial handling vehicles.

4. Expected Research Methodology:

The project will use a mixed-method approach, including literature reviews, data analysis, laboratory testing, consultation with automotive safety experts and etc.

5. Deliverables:

i) Detailed information on manufacturers and testing agencies involved in Tyres of Construction, Mining, and Industrial handling vehicles.

ii) Details analysis report of manufacturers' practices, standards, etc., covering safety aspect of tyres for Construction, Mining, and Industrial handling vehicles.

iii) Compilation of local, national, and international regulations governing the safety safety aspect of tyres for Construction, Mining, and Industrial handling vehicles.

iv) Draft standard for formulation of dedicated Indian Standards on tyres for Construction, Mining, and Industrial handling vehicles, with proper justifications

6. Criteria for Identification of Proposer:

1. Capabilities, experience, and competence in the field of windscreen wiping and washing systems.
2. Membership in the Sectional Committee or an academic institution/university with an MoU with BIS.
3. Other as per doc no. SCMD/R&D Guidelines/20230909

Note 1: Proposal acceptance is subject to Sectional Committee and Screening Committee approval.

Note 2: The proposer should collect and rely on the primary data to the extent possible and may also use peer reviewed publication data to support the finding, wherever necessary.

Considering the above, a comprehensive report shall be submitted by the proposer along with their recommendation and provide drafts for revision/ amendment in aforesaid Indian Standards.

The proposer shall share the **detailed methodology** for research and study on above issues while submitting a proposal to the TED 11

7. Delivery Milestones and Review Process

i) Interim Report covering the review of the literatures and existing stipulations, thereof – within 2 months from the date of assignment received from BIS.
ii) Report of site visits and specific requirement for developments including audit criteria etc. – By end of 4 months from the date of issue of sanction letter by BIS.
iii) Final Working Draft covering all the aspects of the ToR – By end of 5 months from the date of assignment received from BIS.
iv) In case of delay in submission of final draft report, the justification shall be given by the project proposer for consideration by the Sectional Committee.
v) The proposer shall comply to the provisions given in the BIS guidelines for Research & Development Projects for Formulation and Review of Standards, i.e., **doc no. SCMD/R&D Guidelines/20230909.**
vi) The proposer taking up the project shall clear all doubts on provisions of research including ToR and BIS guidelines before acceptance of the project and signing agreement.