IS 10694-1 (2009): Automotive Vehicles - Rims - General Requirements, Part 1: Nomenclature, Designation, Marking and Measurement [TED 7: Automotive Tyres, Tubes and Rims]

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(Reaffirmed 2003)

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भाग 1 नामपद्धति, पदनाम, मुहरांकन तथा मापन

(पहला पुनरीक्षण)

Indian Standard

AUTOMOTIVE VEHICLES — RIMS — GENERAL REQUIREMENTS

PART 1 NOMENCLATURE, DESIGNATION, MARKING AND MEASUREMENT

(First Revision)

UDC 629·113·012·61:001·4

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1993

Price Group 6

FOREWORD

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

This Standard was first published in 1984 and has now been revised to incorporate modifications required to keep pace with latest technological advancement in the field of wheels/rims for all types of vehicles.

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

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

IS 10694	General requirements for rims for automotive vehicles:
(Part 2) : 1983	Passenger car
(Part 3) : 1983	Commercial vehicles rims
(Part 4) : 1983	Scooter and scooter derivative rims
(Part 5) : 1987	Moped, motorcycle and motorcycle derivative rims (*first revision*)
(Part 6) : 1988	Agricultural tractor rims (*first revision*)
(Part 7) : 1983	Industrial truck rims
(Part 8) : 1983	Earthmoving machine rims

This Part is in general agreement with ISO 3911 - 1977 'Wheel/rim nomenclature, designation, marking and units of measurements', published by the International Organization for Standardization (ISO).

Keeping the exports of vehicles in view and for harmonization of standards, efforts have been made to refer to European Tyre and Rim Technical Organization (ETRTO) Standards.

These standards do not lay down methods of testing and performance requirements for wheels/rim 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 standards for methods of testing performance requirements:

IS 9436 : 1980	Performance requirements and method of tests for wheels for passenger cars
IS 9438 : 1980	Performance requirements and method of tests for wheels/rims for trucks and buses

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, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off valve should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — RIMS — GENERAL REQUIREMENTS

PART 1 NOMENCLATURE, DESIGNATION, MARKING AND MEASUREMENT

(First Revision)

1 SCOPE

1.1 This Standard covers the nomenclature, designation, marking, methods and units of measurement and other 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 DEFINITIONS AND NOMENCLATURE

Following definitions and nomenclatures shall apply.

2.1 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.

2.1.1 *Rim*

The part of the wheel on which the tyre is mounted and supported.

2.1.2 *Wheel Disc*

That part of the wheel which is the supporting member between the axle and the rim.

2.1.3 *Single Wheel*

A wheel which supports one tyre on one end of an axle.

2.1.4 *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 of the rim (*see* Fig. 1a).

2.1.5 *Zeroset Wheel*

A wheel so constructed that the centre line of the rim is coincident with the attachment face of the disc (*see* Fig. 1b).

2.1.6 *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. 1c).

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

2.1.7 *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.

2.1.8 *Dual Spacing*

The distance between the center lines of the rim to provide the required clearance between the tyres (*see* Fig. 2).

2.1.9 *Disc 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.

2.2 Types of Wheel

2.2.1 *Wheel Disc*

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

2.2.2 *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).

2.2.3 *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).

2.2.4 *Adjustable Wheel*

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

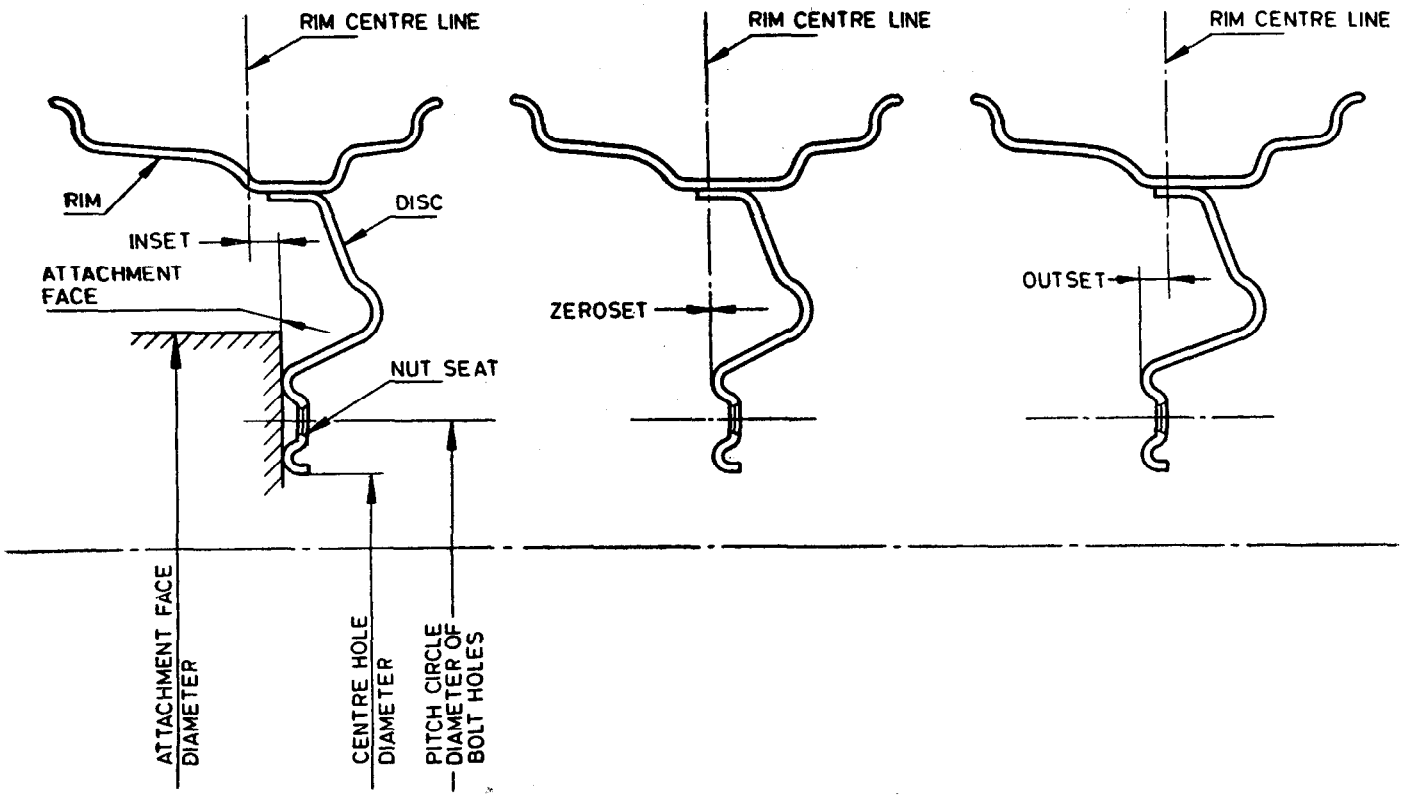


FIG. 1 PASSENGER CAR AND LIGHT COMMERCIAL VEHICLE DISC WHEEL NOMENCLATURE

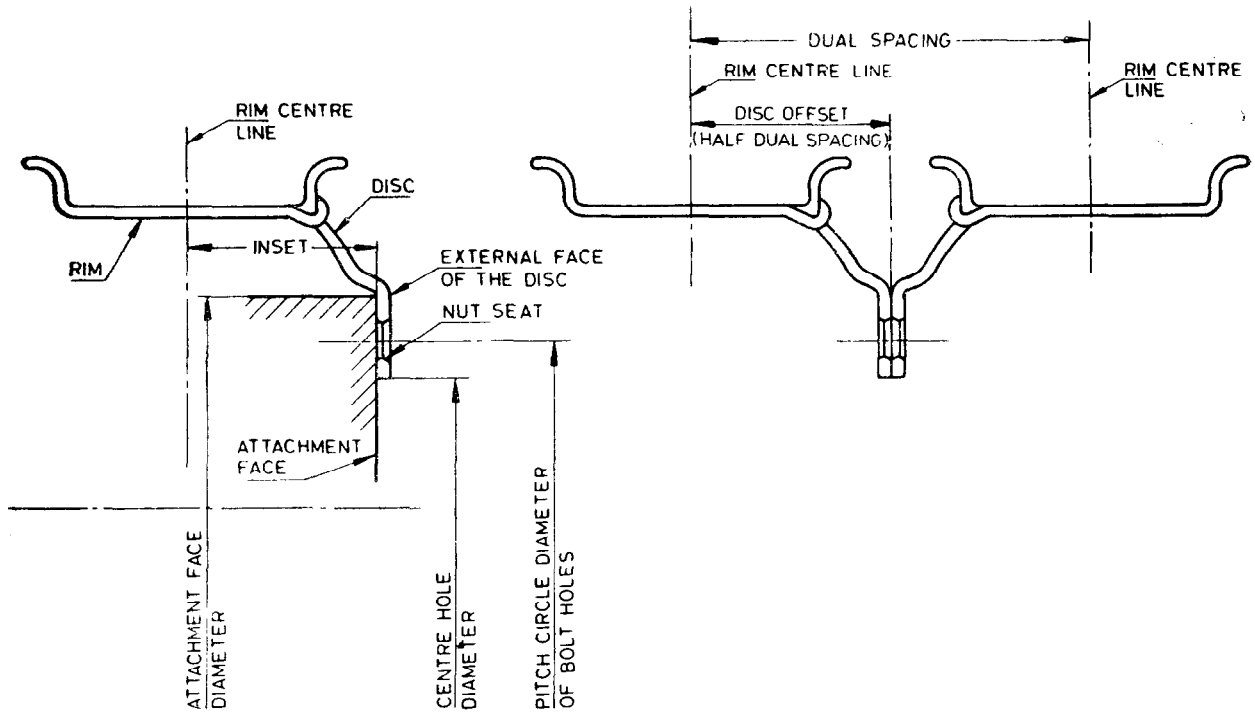


FIG. 2 COMMERCIAL VEHICLE DISC WHEEL NOMENCLATURE

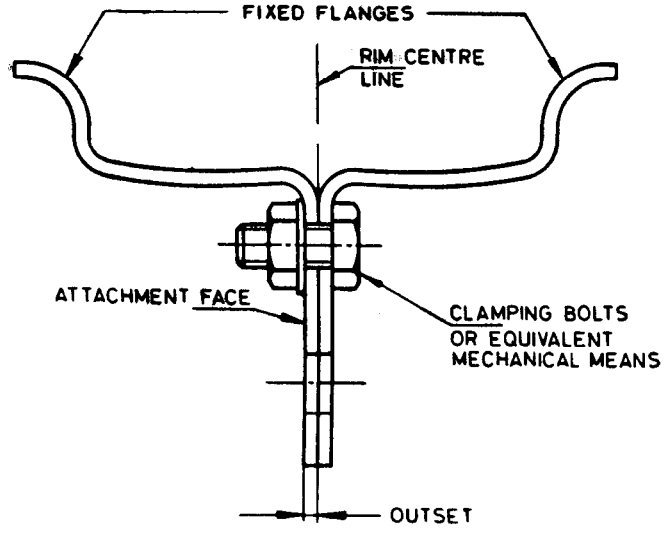


FIG. 3 DIVIDED WHEEL NOMENCLATURE

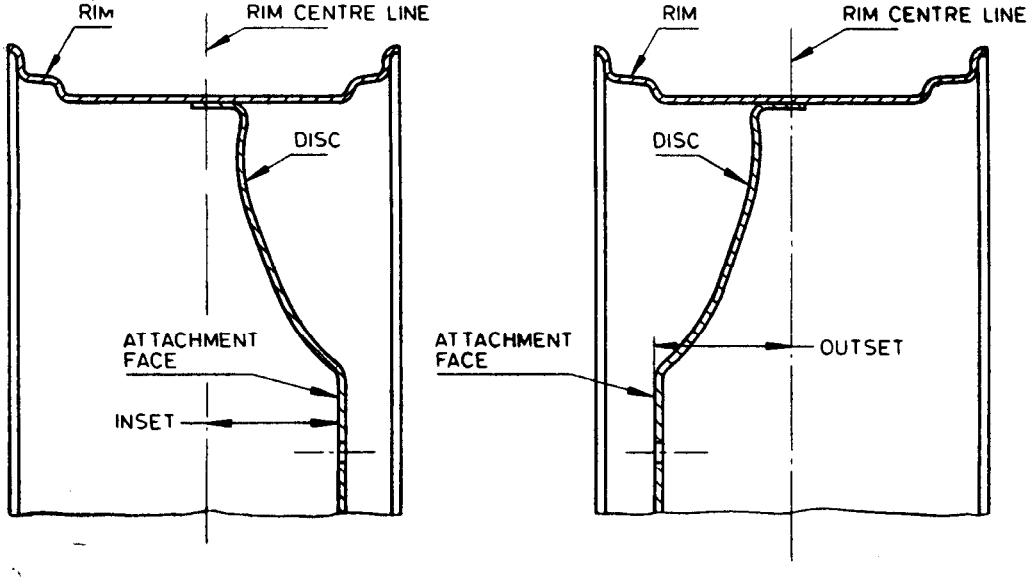
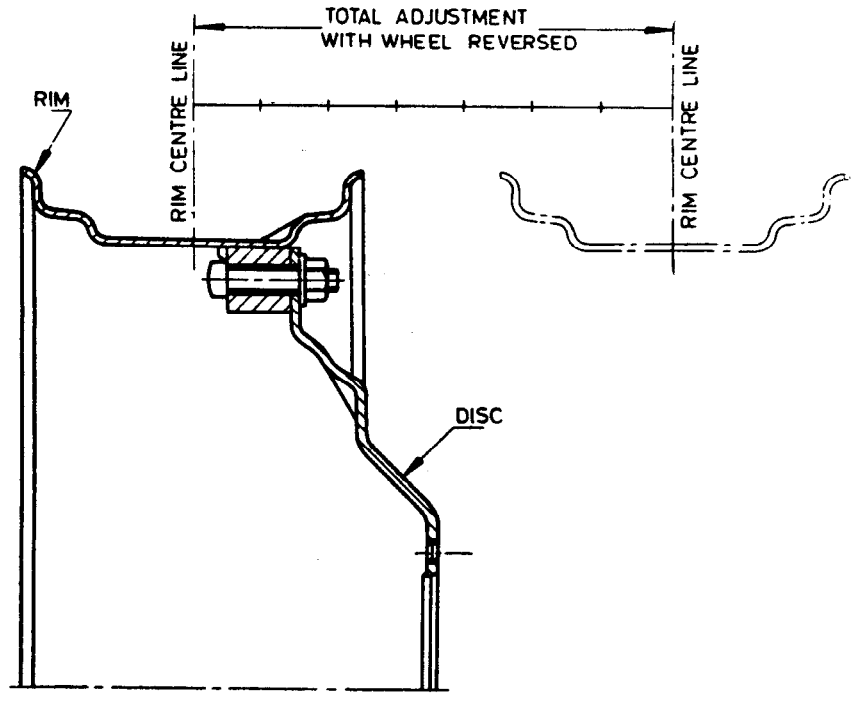
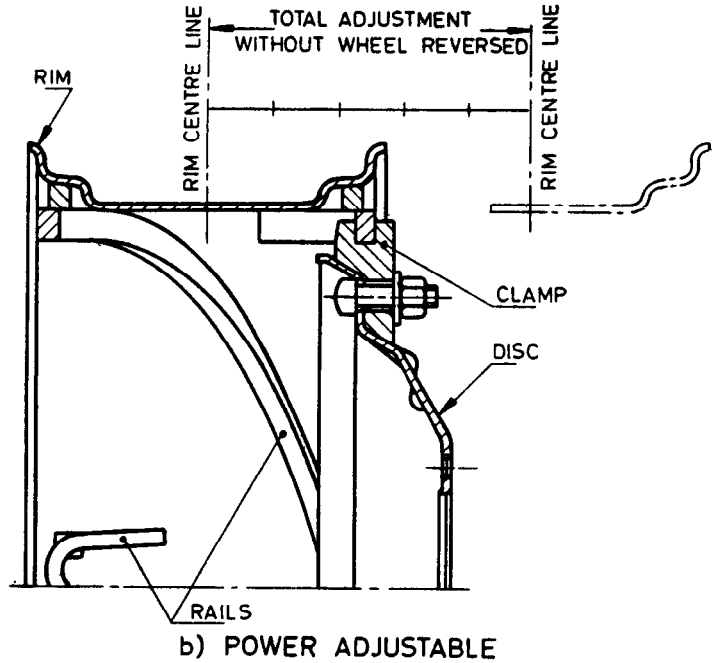


FIG. 4 REVERSIBLE WHEEL NOMENCLATURE



a) MANUALLY ADJUSTABLE



b) POWER ADJUSTABLE

FIG. 5 ADJUSTABLE WHEEL NOMENCLATURE

2.3 Rim Nomenclature

2.3.1 *Flange*

That part of the rim which provides lateral support to the tyre (*see* Fig. 6; references *A*, *B*, *G*, R_2, R_6).

2.3.2 *Bead Seat*

That part of the rim which provides radial support to the tyre (*see* Fig. 6; references *D*, *P*, β, R_3).

2.3.3 *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* Fig. 6; references R_4, α, *M*, *H*, *L*, R_5).

2.3.4 *Valve Hole (Valve Aperture)*

The hole or slot in the rim which accommodates the valve for tyre inflation (*see* Fig. 6; references *V*, *F*).

2.3.5 *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 (references *S*, *T*).

2.3.6 Other nomenclature shall be as given in Fig. 6.

2.4 Rim Types

2.4.1 *One-Piece (Drop-Centre) Rim*

A rim which is of one-piece construction and incorporates a well (*see* Fig. 7).

2.4.2 *Two-Piece Rim* (*see* Fig. 8)

2.4.3 *Three-Piece Rim* (*see* Fig. 9)

2.4.4 *Four-Piece Rim* (*see* Fig. 10)

2.4.5 *Five-Piece Rim* (*see* Fig. 11)

3 SIZE DESIGNATION OF WHEEL/RIM

3.1 Present Designation

The wheels/rims shall be designated by the following order by 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);

e) Off the road — The symbol '/' followed by a figure or figures indicates the flange, height; and

f) Number of the relevant Indian Standard.

Example:

Scooter	: 2·50 C × 10	IS		
Passenger car	: 3·50 D × 13	IS.....	4J × 15	IS .....
Light truck	: 6·50 H × 16	IS.....		
Truck/Bus	: B 7·0 × 20	IS.....	B 6·5 × 20	IS .....
Agricultural	: W 11 × 28	IS.....	W 15L × 28	IS .....
Off the road	: 13·00/2·5 × 25	IS.....		

3.1.1 *Motor Cycle Rim*

Alpha-numeric coding is used to indicate the rim width.

Example:

WM 2 × 19 T IS 10694

NOTE — The present practice may continue till the industry changes over to the proposed form of designating the rim sizes given below:

a) Nominal rim diameter — In millimetres.

b) Rim type:

1) the symbol 'X' indicates a one-piece rim;

2) the symbol '—' indicates a multi-piece rim; and

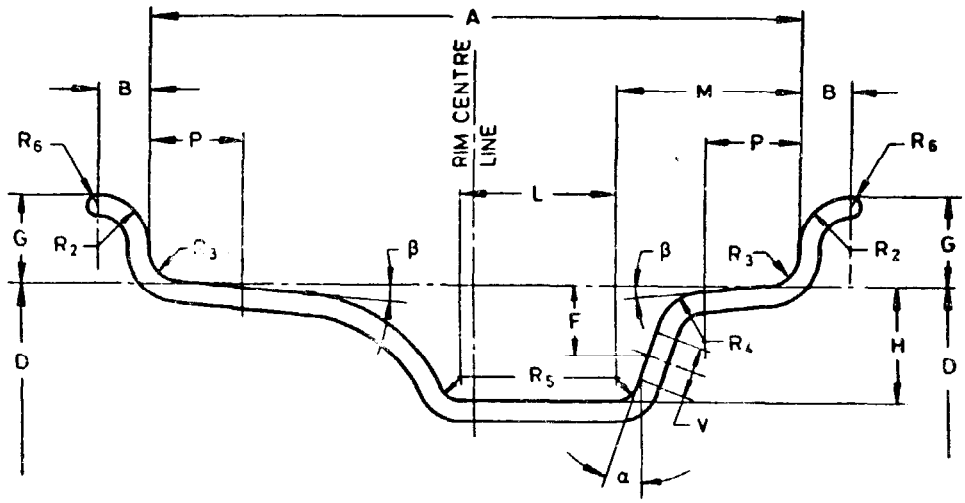
3) the symbol 'HD' indicates heavier design of rim.

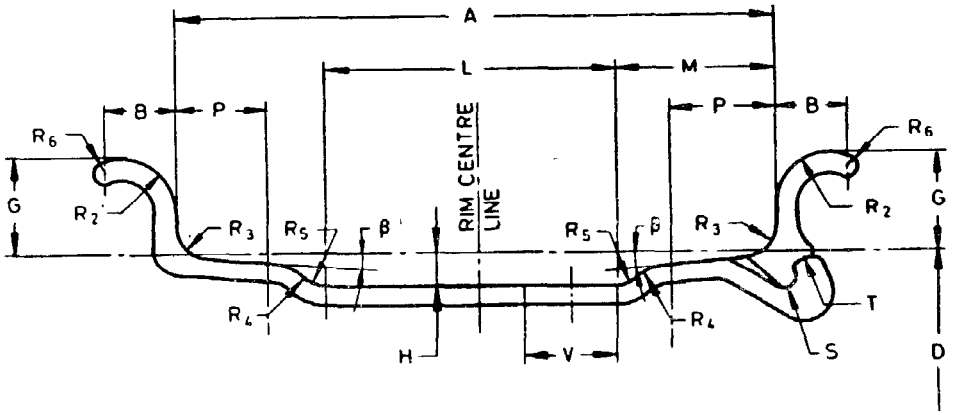
c) Nominal rim width — In millimetres.

d) Rim profile — A letter or letters signifying type side profile of the rim (example: B, C, D, E, F, G, J, JJ, JK and K). Usually the profile designation follows the nominal rim width. It may however, precede or include the nominal rim width as shown for agricultural rims.

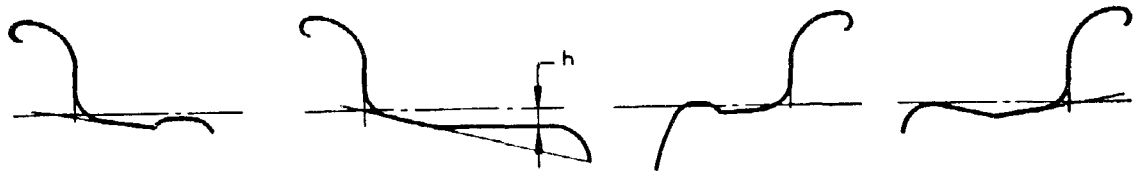
e) Off the road — The symbol '/' followed by a figure or figures indicates the flange height (individual detachable flanges shall be marked with the flange height and the rim designation with which they are to be used).

f) Number of relevant Indian Standard.





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
P	Bead seat width	F	Valve hole 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	*Read Beat Contour*		*Marking (On rim)*
	Outside	*Inside*	
Hump	Hump	Normal	H
Double hump	Hump	Hump	H2
Flat hump	Flat hump	Normal	FH
Combination hump	Flat hump	Hump	CH

FIG. 6 RIM TYPE SIDE PPOFILE NOMENCLATURE AND OPTIONAL BEAD SEAT PROFILE

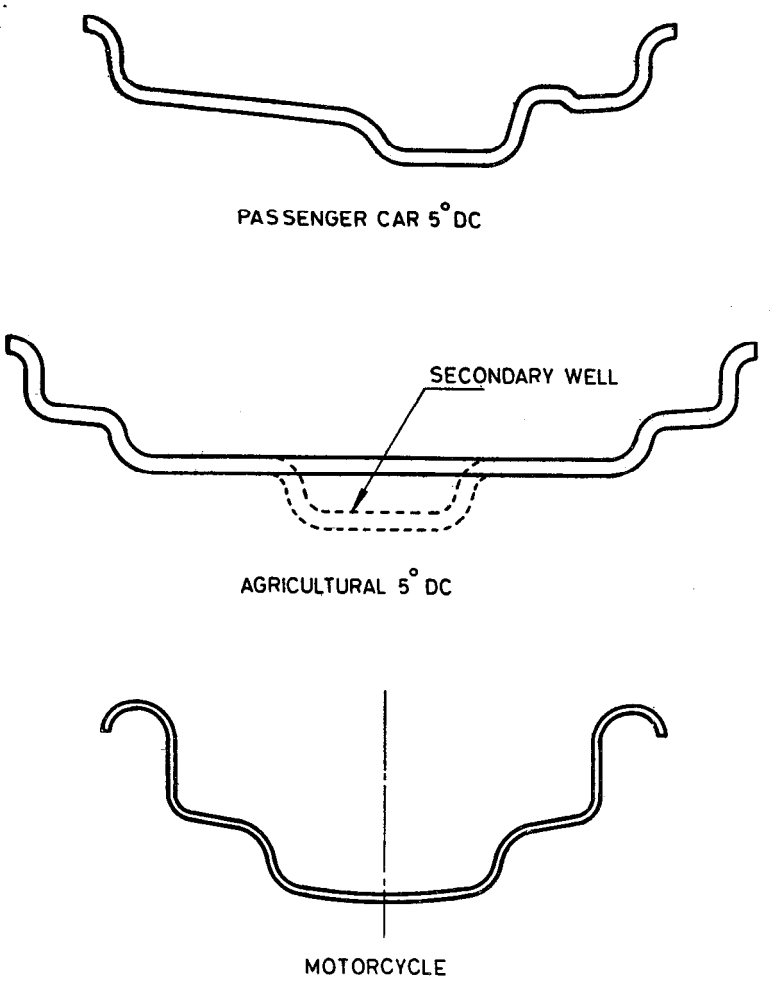


FIG. 7 ONE-PIECE (DROP CENTRE) RIM NOMENCLATURE

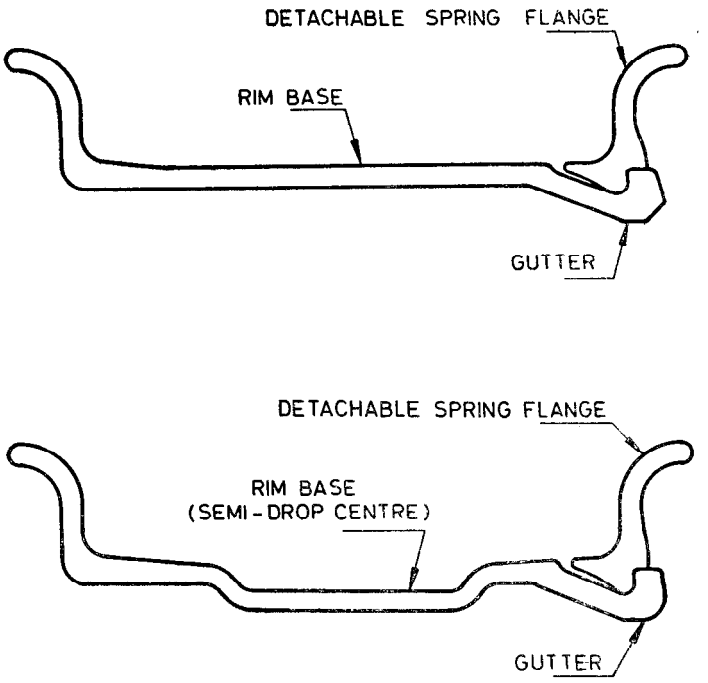


FIG. 8 TWO-PIECE RIM NOMENCLATURE

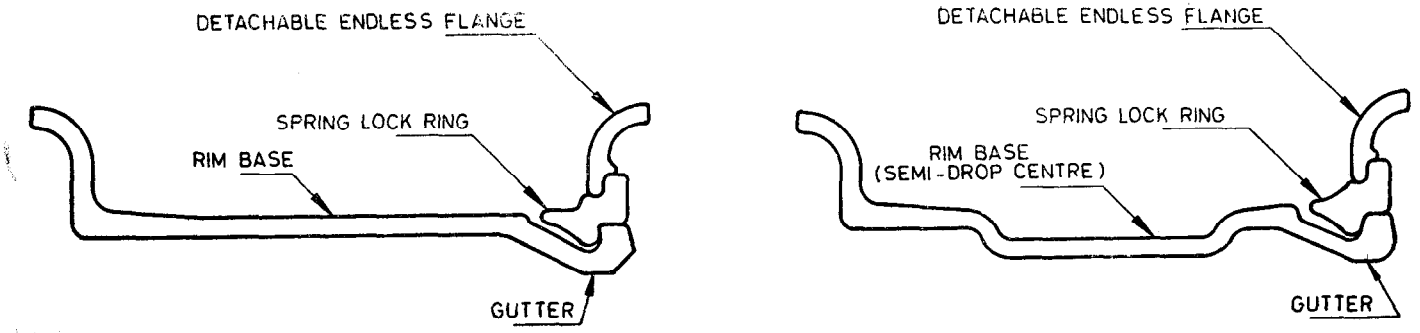


FIG. 9 THPEE-PIECE RIM NOMENCLATURE

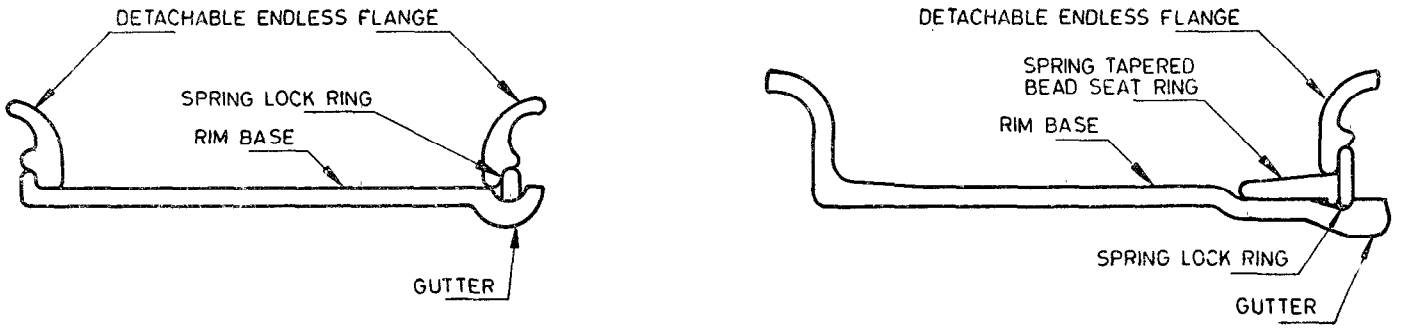


FIG. 10 FOUR-PIECE RIM NOMENCLATURE

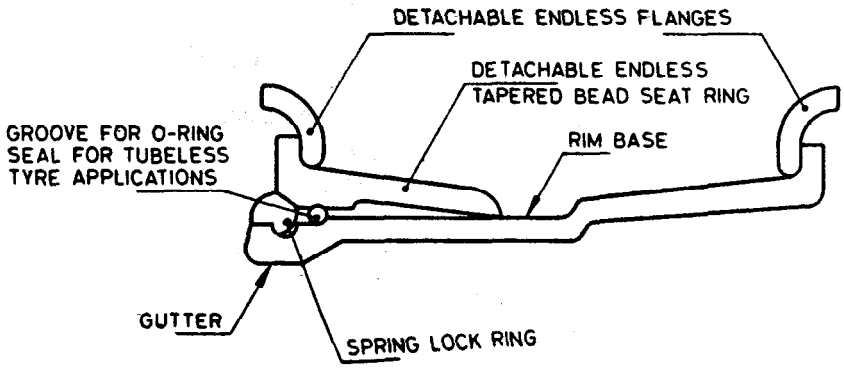


FIG. 11 FIVE-PIECE RIM NOMENCLATURE

4 MARKING

Wheels with integral or permanently affixed rims and rims separate or demountable, shall be legibly marked with their size designation. 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) Indicating the source of manufacturer; and

c) Rim bead seat contour type, if applicable.

4.1.1 In 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 The rims shall be marked on the outerside as shown in Fig. 12 and Fig. 13 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. 14).

4.2 Marking of Disc Wheels

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

a) Size designation,

b) Indicating the source of manufacture,

c) Date of manufacturing: year and month or year and quarter of the year (example 8403 indicates March 1984; 84 III indicates third quarter of 1984); and

d) Half dual spacing or inset may also be marked.

4.2.1 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 The disc wheels shall be marked on the outer side. An example of marking is shown in Fig. 15.

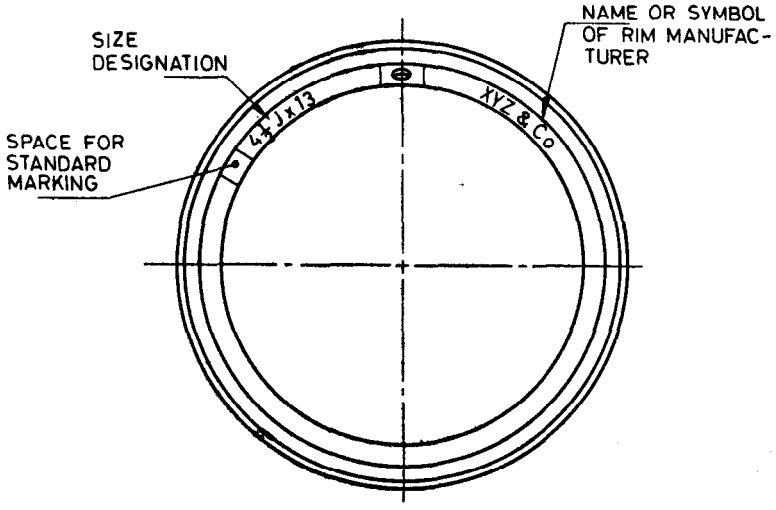


FIG. 12 EXAMPLE OF OUTSIDE RIM MARKING

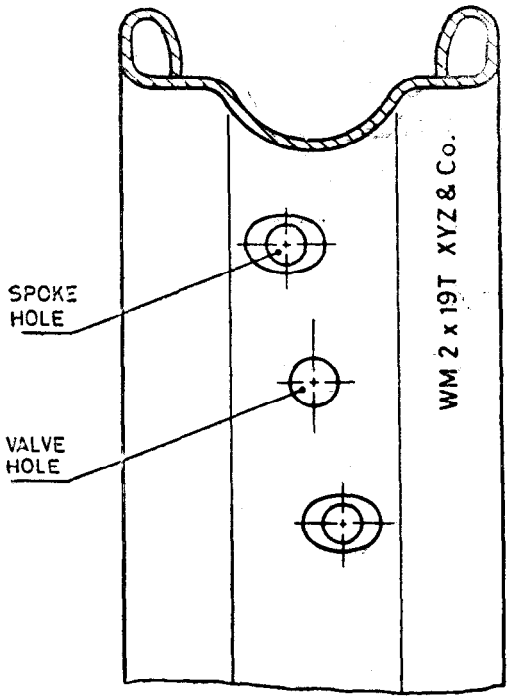


FIG. 13 EXAMPLE OF OUTSIDE MARKETING OF SPOKED RIMS

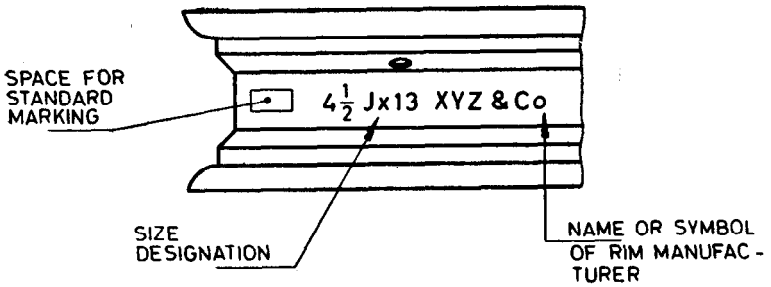


FIG. 14 EXAMPLE OF INSIDE RIM MARKING

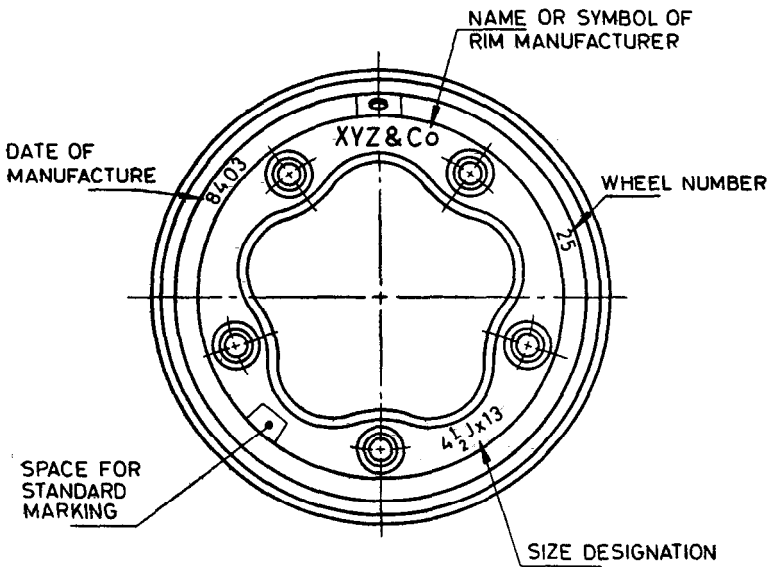


FIG. 15 EXAMPLE OF WHEEL MARKING

5 METHODS OF RIM MEASUREMENT

Rims with a taper bead seat are measured by ball spring steel tape as located in position in Fig. 16.

5.1 For ball diameter of tape refer to the relevant standard on rim dimensions. The method is applicable to all 5° or 10·5° mean taper bead seat rim contours.

5.2 Measurement for Motorcycle/Moped Rims

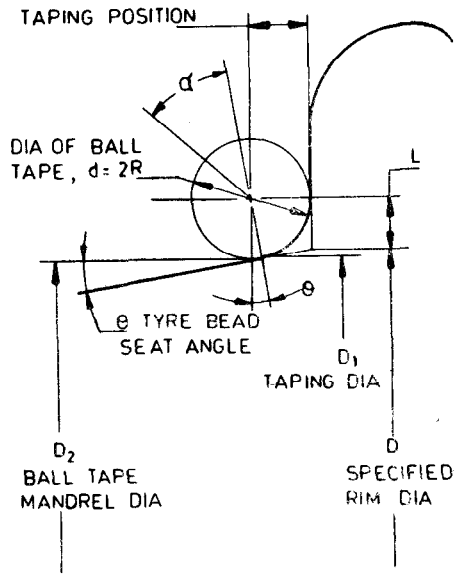
The measurement of the cylindrical bead seat rim circumference shall be made on rims ready for mounting with a tape gauge whose length is related to mandrel diameter, specific for a specified rim diameter (*see* Fig. 17). The tape shall be marked with details of rim width code and nominal rim diameter.

5.2.1 *Accuracy of Measurement*

For accurate measurement the individual circumference on each bead seat 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 UNIT

The dimensional data for rims shall be expressed in millimetres, and angular measurement in degrees. Load-carrying capacity shall be expressed in kilogram (kg). Tyre inflation pressure shall be expressed in kilopascals (kPa) [1kPa — 10^3 N/m² = 0·01 kgf/cm² (within 2 percent error)].



$$D_2 = D + 2(L - R)$$

$$L = R \tan \alpha$$

$$\alpha = \frac{90° - \theta}{2}$$

$$D_2 = D - d\left(1 - \tan \frac{90° - \theta}{2}\right)$$

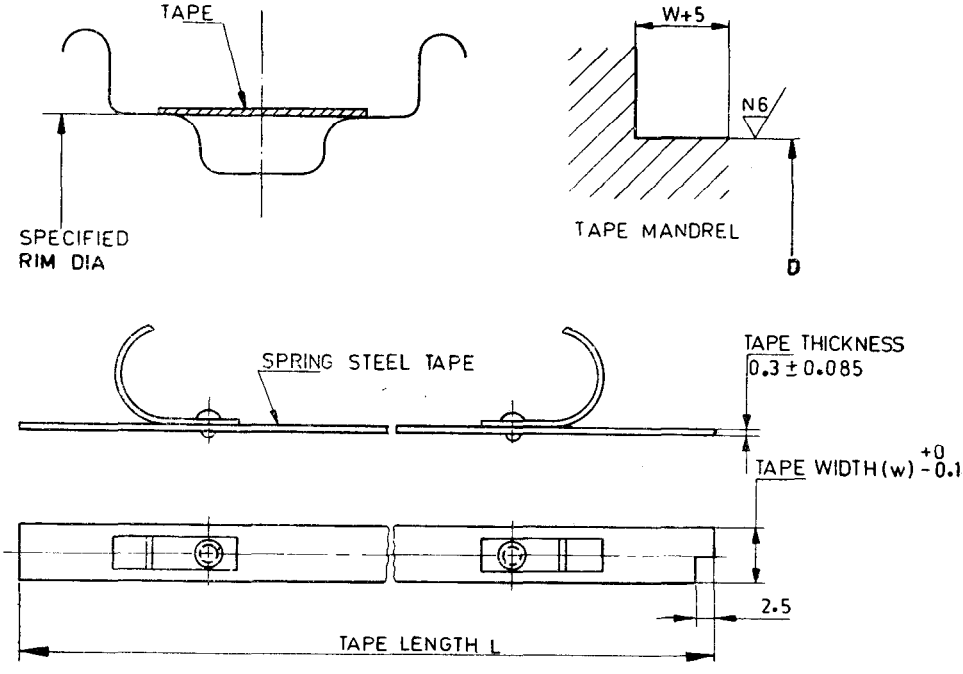
For 5° Taper Bead Seat Rim

$D_2 = D - 0{\cdot}8367\ d$

For 10° — 30° Taper Bead Seat Rim

$D_2 = D - 0{\cdot}16831\ d$

FIG. 16 METHOD OF USING TAPE



NOTES

1 *See* individual rim profile data for tape length, tape mandrel dia and tape width,

2 Measurements are to be made on rims ready for tyre mounting; and

3 Rim measurement is by circumference related to mandrel.

All dimensions are in millimetres.

FIG. 17 MEASUREMENT OF CYLINDRICAL BEAD SEAT RIM

Standard Mark

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 Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference :

Doc : No. TED 07 (5111)

Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{331 01 31 {331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	{37 84 99, 37 85 61 {37 86 26, 37 86 62
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