

**BUREAU OF INDIAN STANDARDS**

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*Draft Indian Standard*

**GLASS ENCLOSURES FOR INTERNAL LIGHTING OF PASSENGER  
COACHES - SPECIFICATION**

( *First Revision* )

*भारतीय मानक मसौदा*

**यात्री डिब्बों की आंतरिक रोशनी के लिए कांच के घेरे - विशिष्टि**

( *पहला पुनरीक्षण* )

ICS 81.040.30

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Glass, Glassware & Laboratoryware Sectional Committee, CHD 10

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FOREWORD

(Formal clauses shall be added later)

A variety of glass enclosures are used for internal lighting purposes in passenger coaches, such as buses and railways, and in ship cabins. For the convenience of securing to the light assembly, glass enclosures are made both with or without a flange. Enclosures with screw-in type fitting parts are also sometimes used, particularly in ship cabins. *However, this standard does not deal with globes used with screw-in type fitting part.*

In this standard, stress has been laid on the rigidness of their design and interchangeably in any particular size to ensure an effective fitting with a view to safeguarding against damage due to vibrations and jerks which are common in the course of their usage.

This standard was originally published in 1970. In this revision, enclosures for tubular fluorescent lamps, compact fluorescent lamps (CFL) and light emitting diodes (LED) have been included.

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

**Draft Indian Standard**

**GLASS ENCLOSURES FOR INTERNAL LIGHTING OF PASSENGER COACHES –  
SPECIFICATION  
(First Revision)**

**1 SCOPE**

**1.1** This standard prescribes dimensional requirements and the methods of sampling and test for glass globes used for internal lighting of passenger coaches.

**1.2** This standard does not deal with accessories used for the fitting of glass enclosures.

**2 REFERENCES**

The standards listed below contain provisions which through reference in this text, constitute provisions of and necessary adjuncts to this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated.

<i>IS No.</i>	<i>Title</i>
1382 : 1981	Glossary of terms relating to glass and glassware ( <i>first revision</i> )
2418 (Part 2) : 2018	Tubular fluorescent lamps for general lighting service: Part 2 performance requirements ( <i>second revision</i> )

**3 TERMINOLOGY**

For the purpose of this standard, the terms and definitions given in IS 1382 and IS 2418 (part 2) shall apply.

**4 TYPES AND SIZES**

**4.1** There shall be three types of enclosures, namely:

Type A — made of clear glass;

Type B — made of clear glass but frosted by etching or sand blasting on the inner surface in order to produce a light-diffusing texture; and

Type C — made of opal glass with high transmittance, offering good brightness of light without showing the glare of the bulb/tube within the enclosure.

**4.1.1** Enclosures of types A and B may also be made of coloured glass if desired by the purchaser.

**4.2** Glass enclosures may be of the following shapes depending on the type of light source used –

**4.2.1** Globe shaped, in case of incandescent lamps, LEDs, CFLs etc.

Note - The sizes of glass globes shall be determined by the outside diameter of the globe.

**4.2.2** Long cuboidal shaped, in case of tubular fluorescent lamps (TLs).

**4.3** Illustrations of shapes of glass globes are given in Annex A. Types and sizes of glass globes shall be as prescribed in table 1.

**Table 1**  
 (Clause 4.3)  
**Types and sizes of glass globes**

Types	Size, in mm	Refer to figure
A, B and C	90	1
	120	
	135	
	120	2
	170	3
	175	
	130	4
B and C	250	5, 6 and 7
	300	
	350	
	900	8
	206	9

4.4 Cuboidal shaped glass enclosures shall be of the sizes prescribed in table 2.

**Table 2**  
 (Clause 4.4)  
**Types and sizes of cuboidal glass enclosures**

SI No.	Description	Length (mm)	Width (mm)	Height (mm)	Figure
1.	Single TL	305	26	26	-
2.	Two TLs	610	52	52	-

*\*18W TLs are typically 2 ft in length and 1 inch in diameter.*

## 5 MATERIAL AND WORKMANSHIP

5.1 Enclosures shall be as free as possible from internal strain. They shall be symmetrical about their axes, uniform in thickness and smooth in finish on the outer side and at the edges.

5.2 Enclosures shall be free from cracks and as free as possible from stones, blisters, air bubbles, cords, mould marks, chill marks and other visual defects.

5.3 The flange of the enclosures shall be plane finished with an inclination not exceeding 1 mm.

## 6 REQUIREMENTS

### 6.1 Shapes and Dimensions

Each enclosure shall comply with the shape and dimensions as prescribed for it in the respective figure.

## 6.2 Light Transmission

Enclosures shall be tested for light transmission as per the method prescribed in 7.1.

**6.2.1** Enclosures made of clear glass, conforming to Type A shall show no apparent colour and shall have a transmission of at least 90 percent for visible light.

**6.2.2** Enclosures conforming to Types B and C shall have a transmission of not less than 75 and 38 percent respectively for visible light.

**6.2.3** Enclosures tinted blue shall have a transmission of not less than 7.5 and not more than 12.5 percent for visible light.

## 6.3 Resistance to Thermal Shock

Enclosures of Types A and B conforming to Fig. 1 to 4 only shall be capable of withstanding sudden change of temperature without rupture when tested in accordance with 7.2.

## 7 METHODS OF TEST

### 7.1 Test for Light Transmission

Two sub-standard lamps of approximately the same luminous intensity shall be mounted on the standard photometer. One of the two sub-standard lamps shall be covered completely with the enclosure and its luminous intensity shall be measured against the other lamp. The luminous intensity of the covered lamp when expressed as percentage of the luminous intensity of the uncovered lamp shall be taken as light transmission of globes.

### 7.2 Test for Resistance to Thermal Shock

Enclosures shall be heated in an air-oven (fitted with an air-stirrer) to  $87 \pm 2^\circ\text{C}$  for 20 minutes. They shall then be taken out by means of *asbestos tipped* tongs and immediately subjected to a spray of water of  $27 \pm 2^\circ\text{C}$  at a pressure of  $1 \text{ kgf/cm}^2$ .

Enclosures shall be taken as having satisfied the requirements of the test if they do not develop cracks or break.

NOTE — Items used for the purpose of this test shall not be subjected to other tests or put into service.

## 8 DESIGNATION

Enclosures shall be designated by name, type, size and figure number.

Example: Glass Globe A 90-1; to refer to a globe or Type A, Size 90 conforming to Fig. 1 in shape.

## 9 MARKING AND PACKING

### 9.1 Marking

Each enclosure shall be marked legibly and indelibly with the following at such a location as not to effect the dispersion of light:

- a) Manufacturer's name or recognized trade-mark, if any;
- b) Designation; and
- c) Any other mark of identification desired by the purchaser.

### 9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*,

2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

### 9.3 Packing

Globes shall be packed as agreed to between the purchaser and the supplier.

## 10 SAMPLING OF GLASS GLOBES

### 10.1 Scale of sampling

**10.1.1 Lot** — All glass enclosures in a consignment of the same type and dimensions shall be grouped to constitute a lot.

**10.1.2** Each lot shall be separately examined for various requirements given in this specification. The number of glass enclosures to be selected in the sample from a lot shall be as given in Table 3.

**Table 3**  
(Clause 10.1.2)

**Number of glass globes to be selected and permissible number of defectives**

Lot size	For workmanship and dimensional requirements		For light transmission test	
	Sample size	Permissible number of defectives	Sample size	Permissible number of defectives
(1)	(2)	(3)	(4)	(5)
Up to 50	8	1	3	0
51 to 100	13	1	5	0
101 to 300	20	2	8	0
301 to 500	32	3	13	1
501 and above	50	5	20	1

**10.1.3** Glass enclosures to be included in the sample shall be selected at random from at least 20 percent of the packages or cartons in the lot.

### 10.2 Number of tests and criteria for conformity

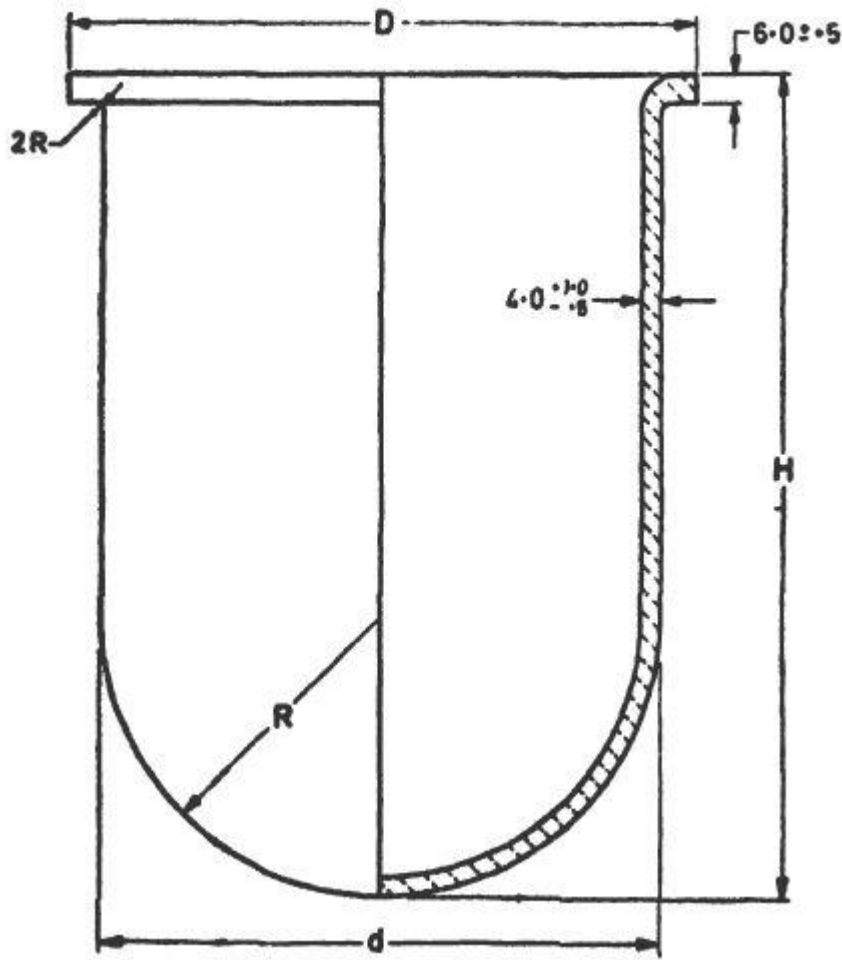
**10.2.1** All the glass enclosures selected under **10.1.2** shall be examined for workmanship, finish and dimensional requirements. Any glass enclosure failing to satisfy one or more of the above requirements shall be called defective. The number of defective glass globes shall not exceed the permissible number given in col 3 of Table 3 if the lot is to be accepted in respect of these characteristics.

**10.2.2** The number of glass enclosures to be tested for the light transmission requirement is given in col 4 of Table 3 and these enclosures shall be selected from among those selected and found satisfactory under **10.2.1**. If the lot is to be accepted for this characteristic, the number of glass enclosures failing under this test shall not exceed the corresponding permissible number given in col 5 of Table 2.

**10.2.3** The lot shall be finally tested for thermal shock resistance and for this purpose, 3 enclosures in the case of lot size being 100 or less and 5 enclosures in the case of lot size above 100, shall be subjected to the prescribed test. No failures shall occur if the lot is to be accepted in respect of thermal shock resistance.

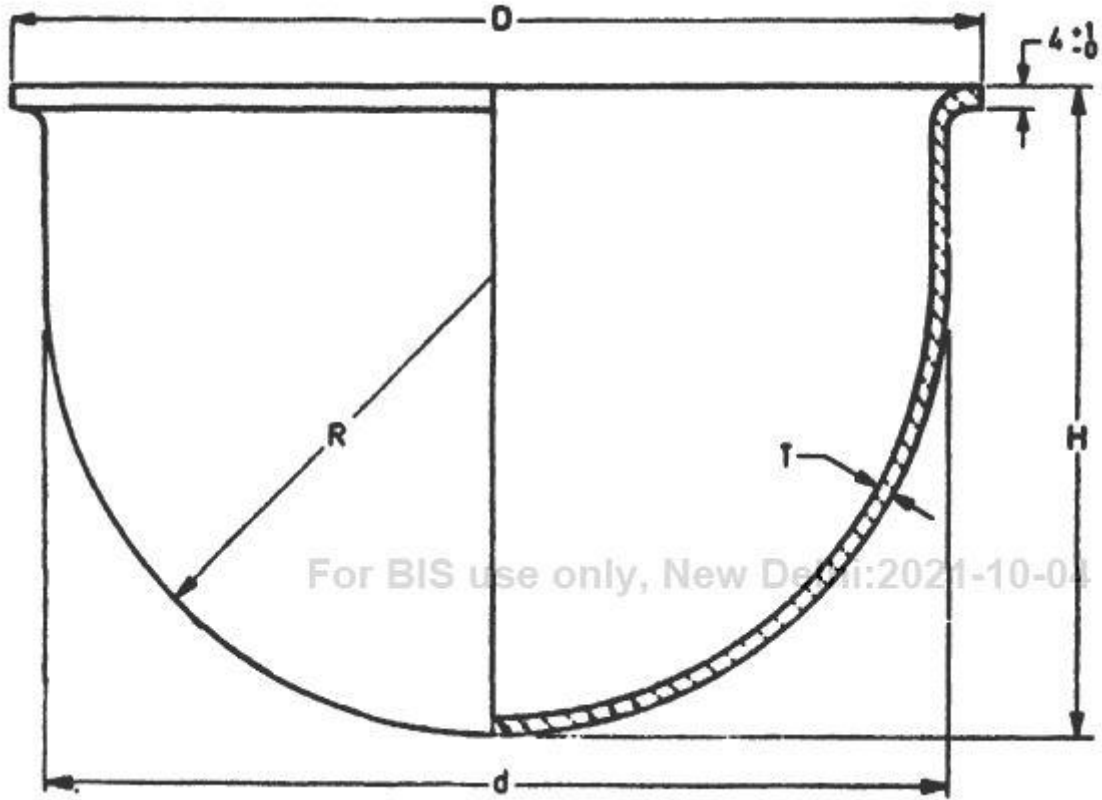
ANNEX A  
 (Clause 4.3)

SHAPES OF GLASS GLOBE ENCLOSURES



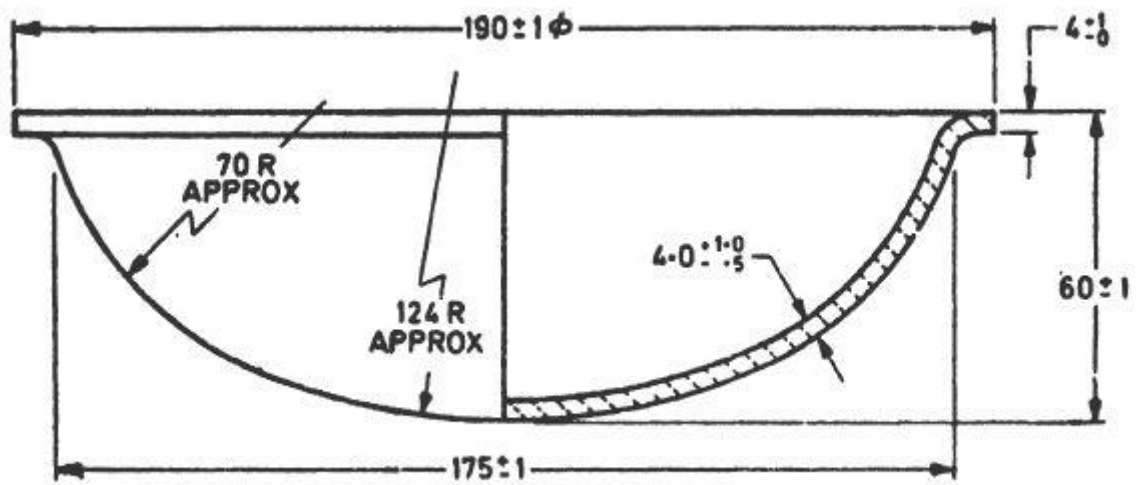
SIZES	$D$	$d$	$H$	$R$
90	$105^{+0}_{-2}$	$90^{+0}_{-9}$ (?)	$150 \pm 1$	$44^{+0}_{-1}$
120	$135^{+0}_{-2}$	$120^{+0}_{-9}$	$175 \pm 1$	$59^{+0}_{-1}$
135	$155^{+0}$	$135^{+0}_{-9}$	$220 \pm 1$	$66^{+0}_{-1}$

Fig.1 Shape 1



SIZES	$D$	$d$	$H$	$R$	$T$
120	$132^{+1}_{-0.5}$	$120^{+0}_{-1}$	$99 \pm 1$	60	$2.5^{+1}_{-0.5}$
170	$182^{+1}_{-0.5}$	$170^{+0}_{-1}$	$120 \pm 1$	85	$3.04^{+1}_{-0.5}$

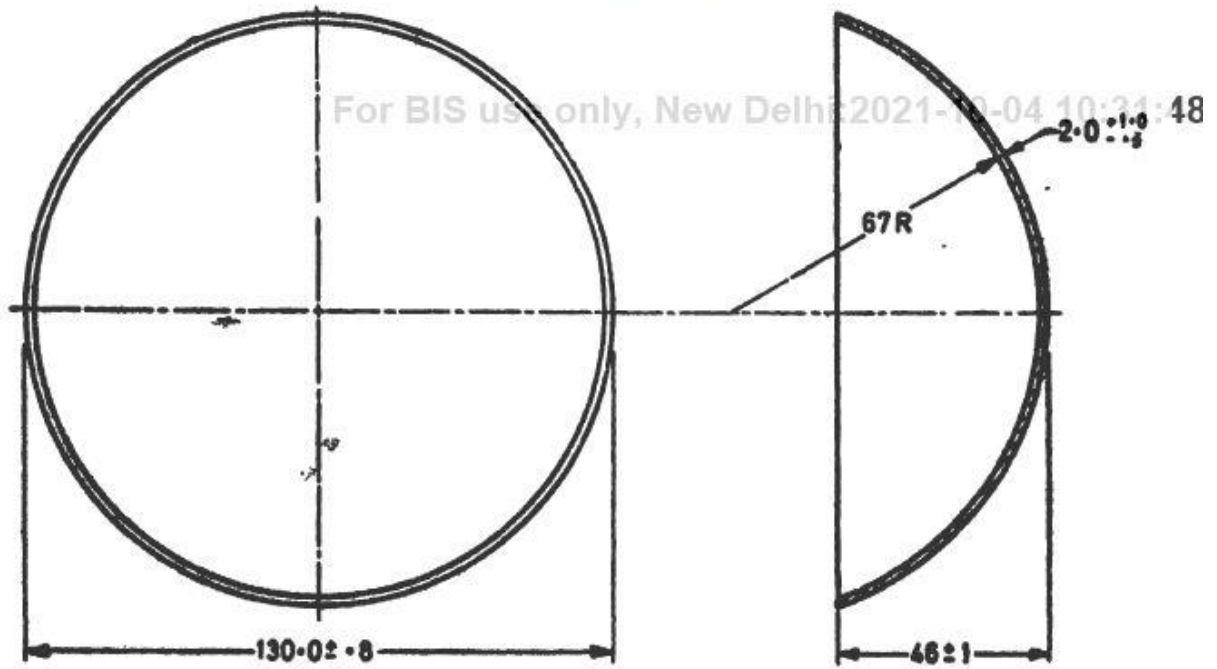
Fig.2 Shape 2



All dimensions in millimetres.

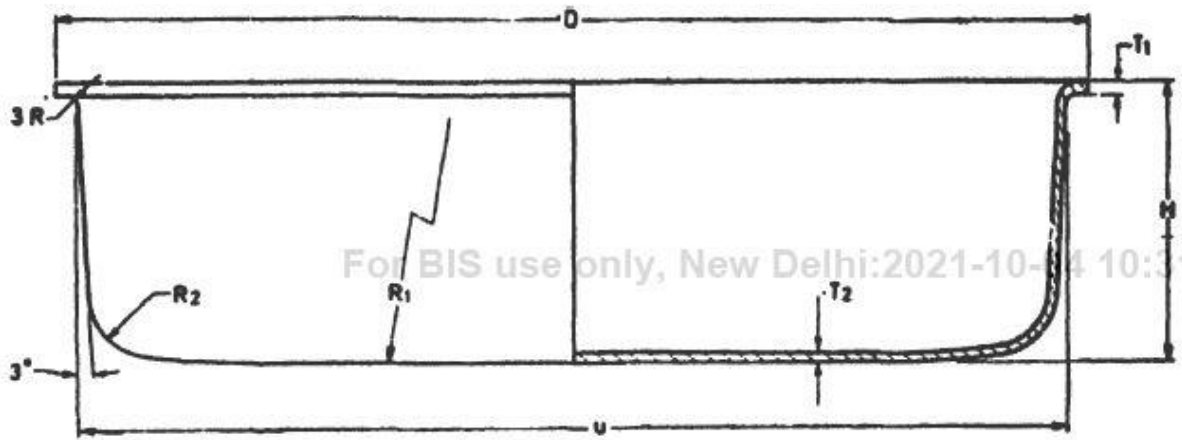
Fig.3 Shape 3





All dimensions in millimetres.

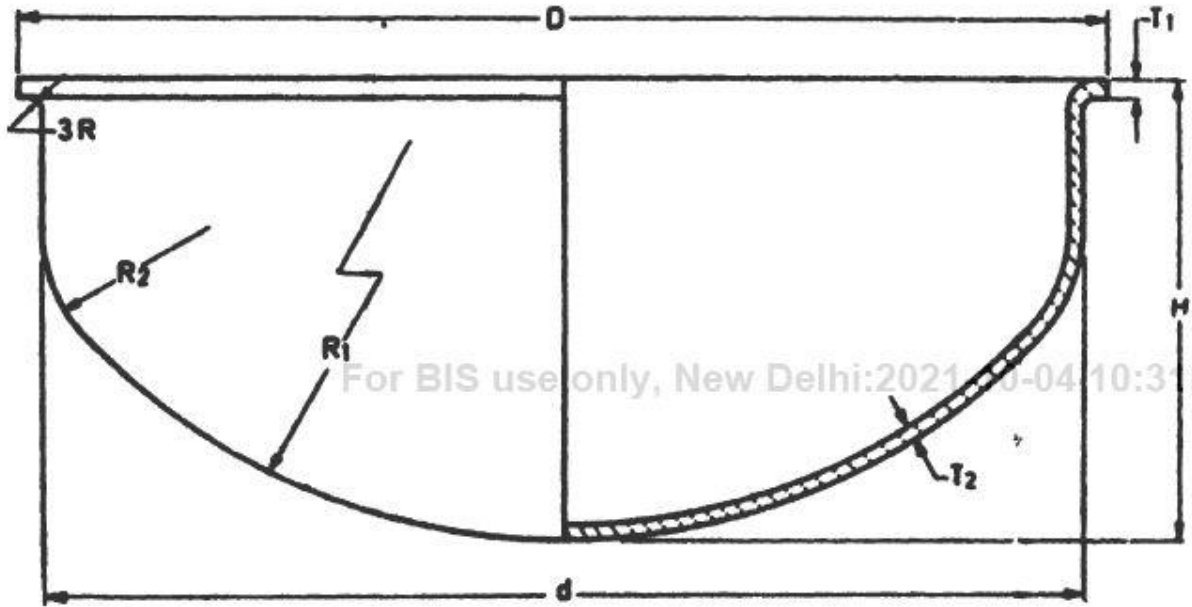
Fig.4 Shape 4



All dimensions in millimetres.

SIZES	$D$	$d$	$H$	$R_1$ (approx.)	$R_2$ (approx.)	$T_1$	$T_2$
250	$262 \pm 1$	$250 \pm 1$	$80 \pm 1$	800			
300	$312 \pm 1$	$300 \pm 1$	$85 \pm 1$	850	20	$4^{+1}_{-0.5}$	$3^{+1}_{-0.5}$
350	$362 \pm 1$	$350 \pm 1$	$90 \pm 1$	900			

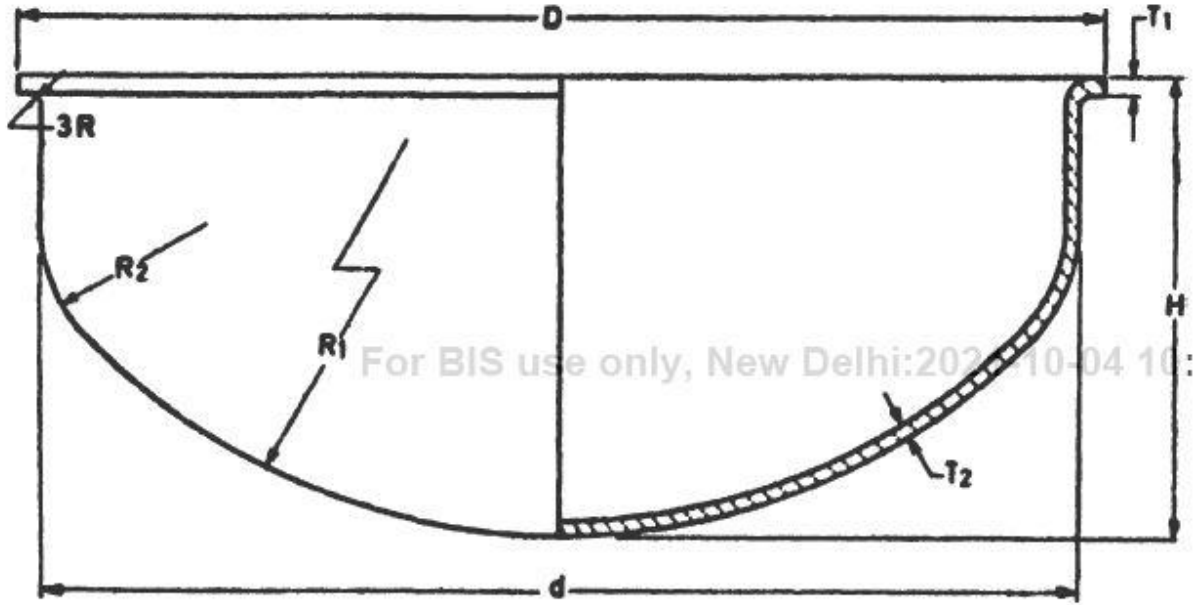
Fig.5 Shape 5



All dimensions in millimetres.

SIZES	$D$	$d$	$H$	$R_1$ (approx.)	$R_2$ (approx.)	$T_1$	$T_2$
250	$262 \pm 1$	$250 \pm 1$	$85 \pm 1$	230	20		
300	$312 \pm 1$	$300 \pm 1$	$90 \pm 1$	280	25	$4^{+1}_{-0.5}$	$3^{+1}_{-0.5}$
350	$362 \pm 1$	$350 \pm 1$	$95 \pm 1$	330	30		

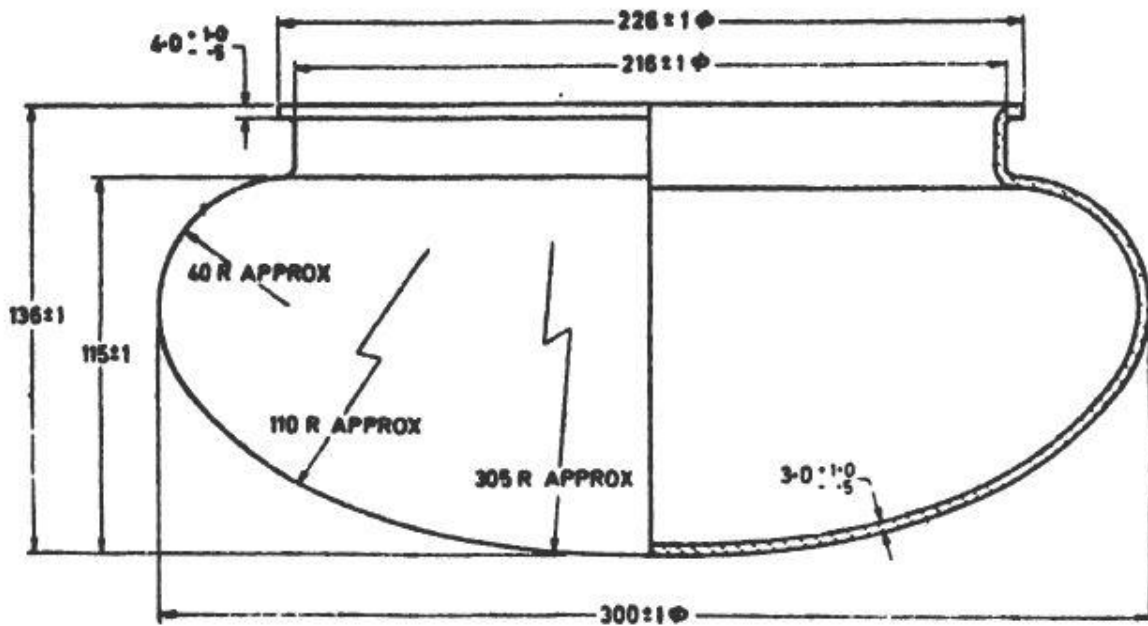
Fig. 6 Shape 6



All dimensions in millimetres.

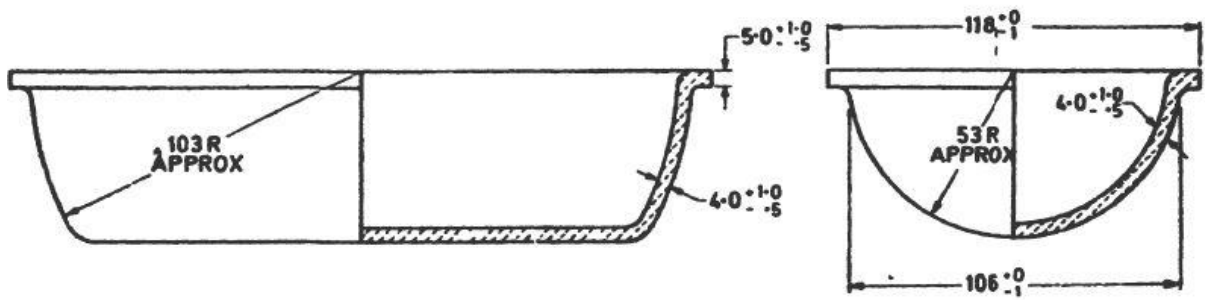
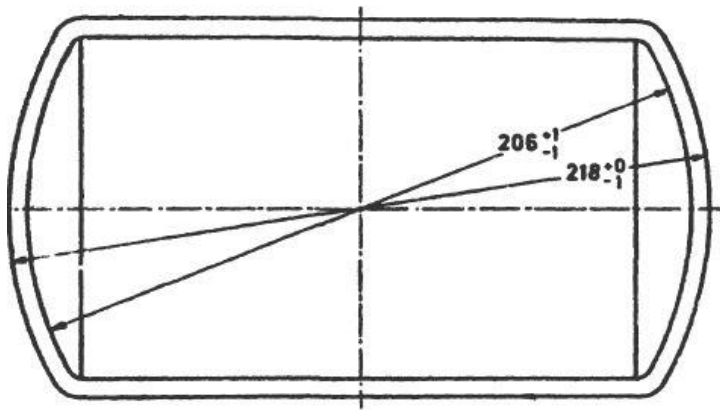
SIZES	$D$	$d$	$H$	$R_1$ (approx.)	$R_2$ (approx.)	$T_1$	$T_2$
250	$262 \pm 1$	$250 \pm 1$	$110 \pm 1$	160	40		
300	$312 \pm 1$	$300 \pm 1$	$120 \pm 1$	200	60	$4^{+1}_{-0.5}$	$3^{+1}_{-0.5}$
350	$362 \pm 1$	$350 \pm 1$	$130 \pm 1$	240	80		

Fig.7 Shape 7



All dimensions in millimetres.

Fig.8 Shape 8



All dimensions in millimetres.

Fig.9 Shape 9