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IS 3133 (1989): Manhole and inspection openings for chemical equipment - General requirements [MED 17: Chemical Engineering Plants and Related Equipment]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

**MANHOLE AND INSPECTION
OPENINGS FOR CHEMICAL EQUIPMENT—
GENERAL REQUIREMENTS**

(First Revision)

भारतीय मानक

रसायनिक उपस्करों के मेनहोल और निरीक्षण छेद — सामान्य अपेक्षाएं

(पहला पुनरीक्षण)

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 18 August 1989, after the draft finalized by the Chemical Engineering Sectional Committee had been approved by the Heavy Mechanical Division Council.

This standard was first published in 1965. It has been revised to incorporate the latest industrial practice. In this revision design considerations have been included with illustrations.

All chemical equipments subject to internal corrosion or heavy parts subject to erosion are generally provided with suitable inspection and access opening for complete visual inspection of interior of the vessel.

Indian Factories Act, 1948 requires manhole of adequate dimensions to be provided in case of equipment in which vapour and fumes are likely to be present in such concentration as to be dangerous to persons entering the vessel for inspection and maintenance.

This standard is based on BS : 470-1984 'Specification for inspection access and entry openings for pressure vessels' issued by the British Standards Institution, U.K.

Indian Standard
**MANHOLE AND INSPECTION
 OPENINGS FOR CHEMICAL EQUIPMENT—
 GENERAL REQUIREMENTS**
(First Revision)

1 SCOPE

1.1 This standard covers manhole, handhole and inspection hole openings in chemical equipment and in mobile tanks for chemicals. It does not apply to openings in steam generating plant.

2 CLASSIFICATION

2.1 Manholes, handholes and inspection holes are classified as follows :

a) *Manholes*

- 1) Circular holes
- 2) Elliptical holes; and
- 3) Rectangular holes

b) *Hand and Inspection Holes*

- 1) Circular holes; and
- 2) Elliptical holes.

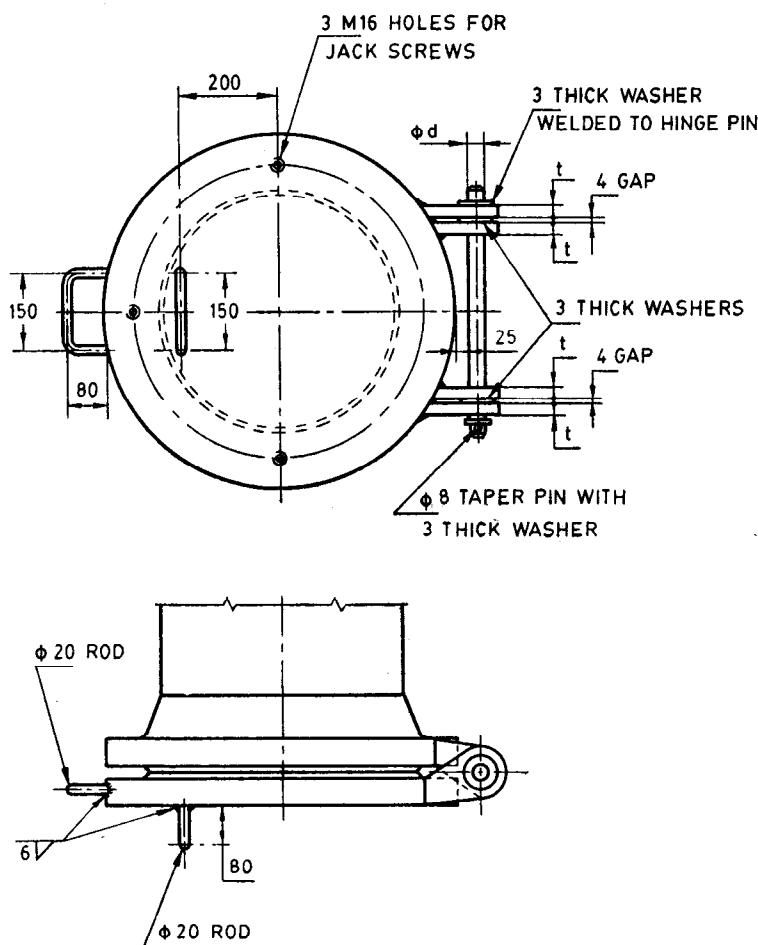
2.1.1 The openings shall preferably be circular in shape, but if not circular they shall be elliptical or rectangular in that order of preference.

3 GENERAL

3.1 Manholes shall be large enough to permit entry and the rescue of persons. In no case shall the size of clear opening be less than 450 mm across inside edges.

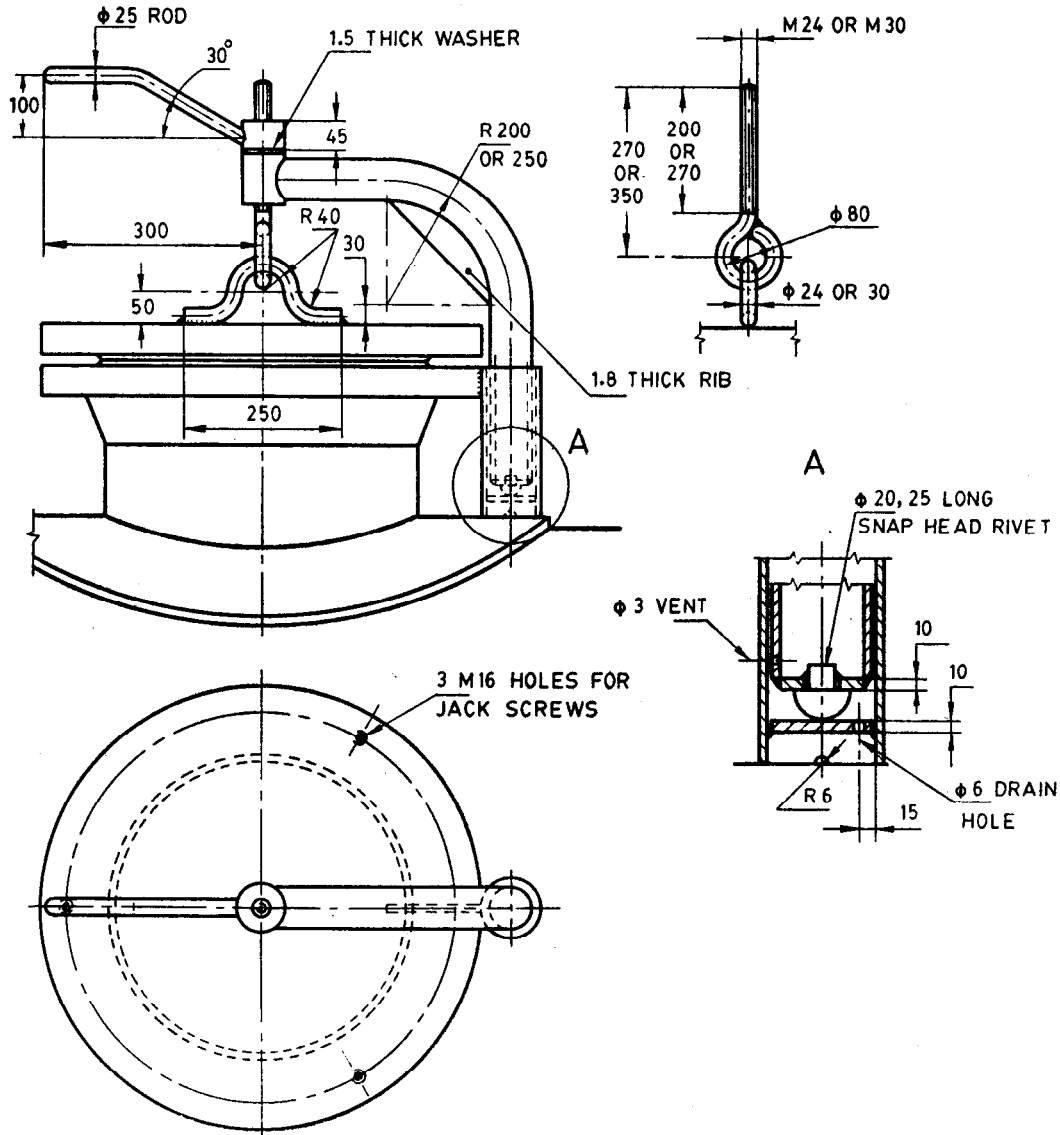
3.2 For large vessels, consideration shall be given to the provision of foot-holds and/or hand holds on the vessel surface. Hand holds be preferably made from 20 mm diameter rods 150 mm long and with 80 mm projection. Foot-holds shall also be made from 20 mm diameter rods with a projection of 200 mm and width of 350 mm.

3.3 For heavy blind flanges weighing more than 10 kg consideration shall be given to the provision of suitable hinge/davit arrangement as shown in Fig. 1, 2 and 3. Suitable number of tapped holes shall



All dimensions in millimetres.

FIG. 1 HANDLE WITH HINGED COVER



All dimensions in millimetres.

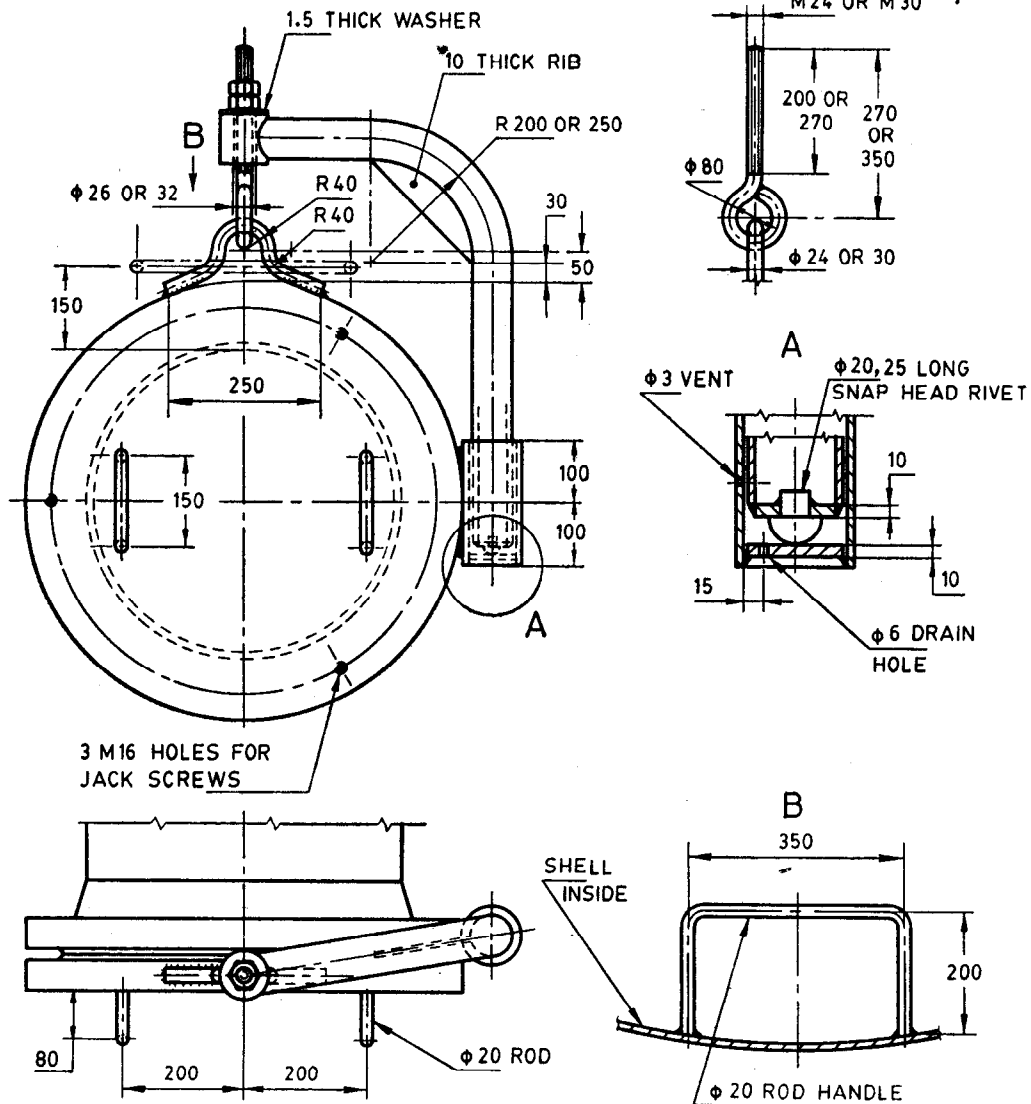
FIG. 2 MANHOLE WITH DAVIT (TOP OPENING)

be provided for M16 stainless steel Jack screws on the blind flange/cover.

3.4 The maximum length of manhole shall be kept to practical minimum. Where design considerations make it impossible to satisfy the maximum length requirement the design of manhole shall be of special consideration and mutually agreed between the manufacturer and the purchaser.

4 NUMBER AND POSITION OF MANHOLES AND INSPECTION HOLES

4.1 The number and position of the various openings and inspection holes are not laid down in this specification. It shall be in accordance with the appropriate Indian Standard dealing with the specific type of equipment or as may be agreed to



All dimensions in millimetres.

FIG. 3 MANHOLE WITH DAVIT (SIDE OPENING)

between the manufacturer and the purchaser.

5 SIZES AND SHAPES OF OPENINGS

5.1 The preferred size and shape of the opening shall be in accordance with the following. In no case shall the size of opening be less than 450 mm across inside edges. The sizes mentioned here are clear openings before any lining is applied, for elliptical and rectangular holes and nominal sizes for circular holes.

a) Manholes

Circular Holes	Elliptical Holes	Rectangular Holes	Maximum Length
mm	mm × mm	mm × mm	mm
600	600 × 450	600 × 450	450
500	500 × 450	500 × 400	450
450	450 × 400	450 × 400	250

b) Hand and Inspection Holes

Circular Holes	Elliptical Holes
mm	mm × mm
300	300 × 225
250	200 × 125
200	125 × 75
100	90 × 65
75*	
50*	
40*	
25*	

For circular hand and inspection holes, equivalent nominal pipe sizes may be used.

5.2 For vessels above 1 000 mm diameter, the minimum manhole size shall be 500 mm.

*Only for inspection holes.

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