इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 1342 (2002): Oil Pressure Stoves [MED 26: Mechanical Engineering]

"ज्ञान से एक नये भारत का निर्माण"
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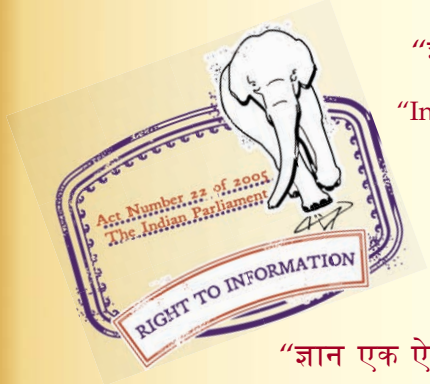


"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

IS 1342 : 2002
(Reaffirmed 2007)

भारतीय मानक

तेल दाब स्टोव — विशिष्टि

(छठा पुनरीक्षण)

Indian Standard

OIL PRESSURE STOVES — SPECIFICATION

(Sixth Revision)

ICS 75.160.20; 97.040.20

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

October 2002 **Price Group 8**

Oil Burning Appliances Sectional Committee, ME 26

FOREWORD

This Indian Standard (Sixth Revision) was adopted by the Bureau of Indian Standards, after the draft fmalized by the Oil Burning Appliances Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first published in 1959 and revised in 1964, 1965, 1978, 1986 and 1988. Since then many suggestions were received for its improvement and Amendments No. 1, 2 and 3 were issued. This standard is being revised again to incorporate the amendments issued. The main change in this revision is the rationalization of stove designations compatible with the fuel capacity. Conformity to the relevant Indian Standard for material has been made optional. The values of safety pressure test and bursting pressure test are revised keeping in view the process capability of the industry and safety factor. The table containing the sizes of aluminium vessels for thermal efficiency test is extended to 1 000 g/h fuel consumption rate. Besides, some of the dimensions have either been revised or made optional.

Burner which is an important component of oil pressure stove has been covered under IS 8808 : 1999 ' Burner for oil pressure stoves and oil pressure heaters — Specification (*second revision*)′ which forms a necessary adjunct.

This standard contains clauses 8 and 12 which call for an agreement between the purchaser and the supplier or permit the purchaser to use his option for selection to suit his requirements.

The composition of the committee responsible for the formulation of this standard is given in Annex G.

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

AMENDMENT NO. 3 SEPTEMBER 2010
TO
IS 1342 : 2002 OIL PRESSURE STOVES — SPECIFICATION

(Sixth Revision)

[*Page* 7, *clause* **9**(j) (*see also Amendment No.* 1)] — Delete.

[*Page* 7, *clause* **10.1.1** (*see also Amendment No.* 1)] — Delete.

(ME 26)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 FEBRUARY 2009
TO
IS 1342 : 2002 OIL PRESSURE STOVES — SPECIFICATION

(Sixth Revision)

(*Page* 6, *clause* **7.6.1**, *line* 2) — Substitute 'Acrylonitrile-Butadiene Rubber (NBR)' *for* 'neoprene'.

(ME 26)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JANUARY 2006
TO
IS 1342 : 2002 OIL PRESSURE STOVES — SPECIFICATION

(Sixth Revision)

(*Page* 6, *clautie* 7.7) — Substitute the following for the existing matter:

'**7.7 Pricker** — The pricker shall have a steel wire of diameter 0.05 mm less than the diameter of the nipple hole and shall be fixed in a steel/tin plate strip.'

(*Page* 6, *clause* **7.8**) — Insert the following new clause at the end:

'**7.9 Strength of Body of Stove** — The top plate of the stove or vessel supports, whichever the case may be, shall be so designed so as to be adequately strong to withstand the minimum load calculated in accordance with the following:

a) *For circular top plate* — Diameter in cm of top plate expressed in kg, and

b) *For square frame* — Side of the square in cm expressed in kg.

Load as mentioned in (a) and (b) may be applied by standard vessel plus water standard vessel shall be selected from Table 2.'

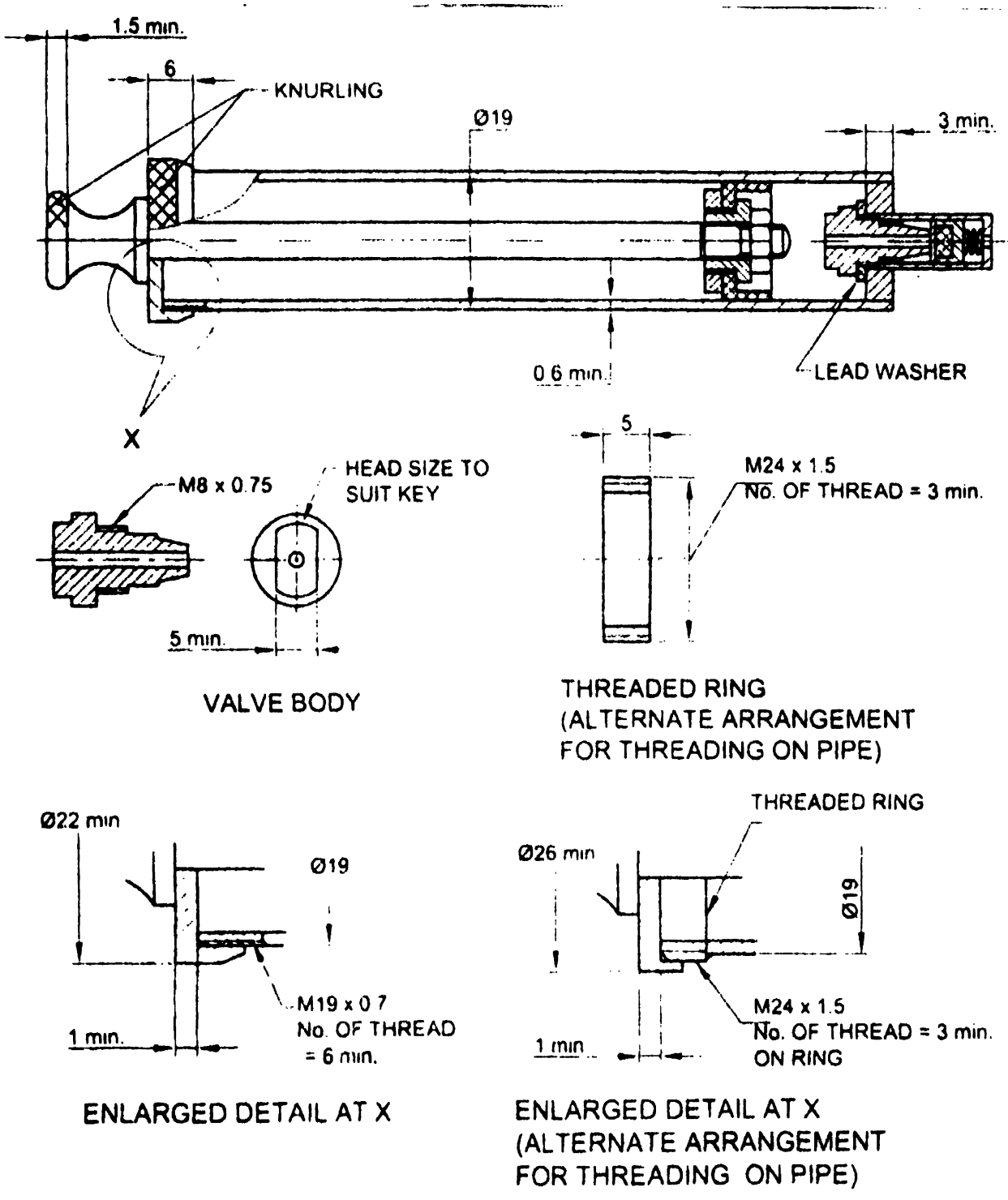
(*Page* 7, *clause* **9**) — Insert the following at the end:

'J) Thermal efficiency when declared in accordance with **13.3.1** may use green label'

(*Page* 7, *clause* **10.1**) — Insert the following new sub-clause at the end:

'**10.1.1** Thermal efficiency when declared in accordance with **13.3.1** may use green label.'

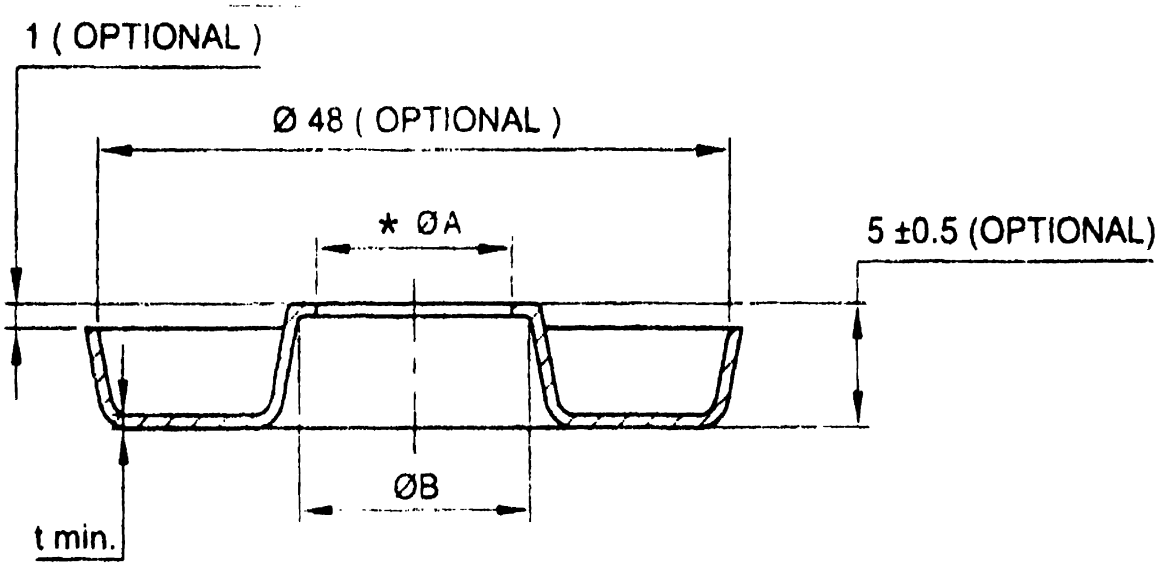
(*Page* 10, *Fig.* 11) — Substitute the following for the existing:



All dimensions in millimetres.

FIG. 11 PUMP ASSEMBLY FOR STOVES

(*Page* 11. *Fig.* 12, *Captions*) — Substitute the words 'PRE-HEATING CUP' *for* 'SPIRIT CUP' wherever appearing in the standard, and substitute the following for the existing figure:



* SUITABLE FIT MAY BE PROVIDED TO SUIT BURNER SOCKET

STOVE DESIGNATION		Ø A	Ø B	t
NEW DESIGNATION	EXISTING DESIGNATION	(OPTIONAL)	(OPTIONAL)	min.
OR. OS, 1R 1S, 2R, 2S	1, 101,2 2S, 5, 105	17.0	19.5	0.5
3R AND 3S	3 AND 3S	21.5	23.0	0.5

All dimensions in millimetres.

FIG. 12 PRE-HEATING CUP FOR STOVES WITH ROARER AND SILENCER TYPE BURNERS

(*Page* 13, *clause* **13.3**) — Insert the following new clause:

'13.3.1 Thermal efficiency may be declared, if it is more than 60 percent and above for stove of roarer type burner and 62 percent and above for stove of silencer type burner.'

(*Page* 13, *clause* **13.6**) — Insert the following new clause at the end:

'13.7 Fuel Creep — When operated under normal conditions with the fuel container filled to its three-fourths capacity, there shall be no spreading of fuel over any part of the appliance so as to cause undesirable odour or any increase in flame size.'

(*Page* 16, *Annex* D, *clause* **D-2.3,** *second para*) — Insert the following at the end:

'(This test may be done in draught free room).'

(ME 26)

Reprography Unit, BIS, New Delhi, India

Indian Standard

OIL PRESSURE STOVES — SPECIFICATION

(Sixth Revision)

1 SCOPE

This standard covers the requirements and tests for oil pressure stoves intended for domestic and commercial use, burning pressurized kerosene oil under a normal working pressure of the 100 to 200 kN/m^2 (1 to 2 kgf/cm^2).

2 REFERENCES

The standards listed at Annex A contain provisions, which through reference in this text, constitute provision 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.

3 TERMINOLOGY

For the purpose of this standard, the nomenclature of different parts of the stove shall be as indicated in Fig. 1 to 15.

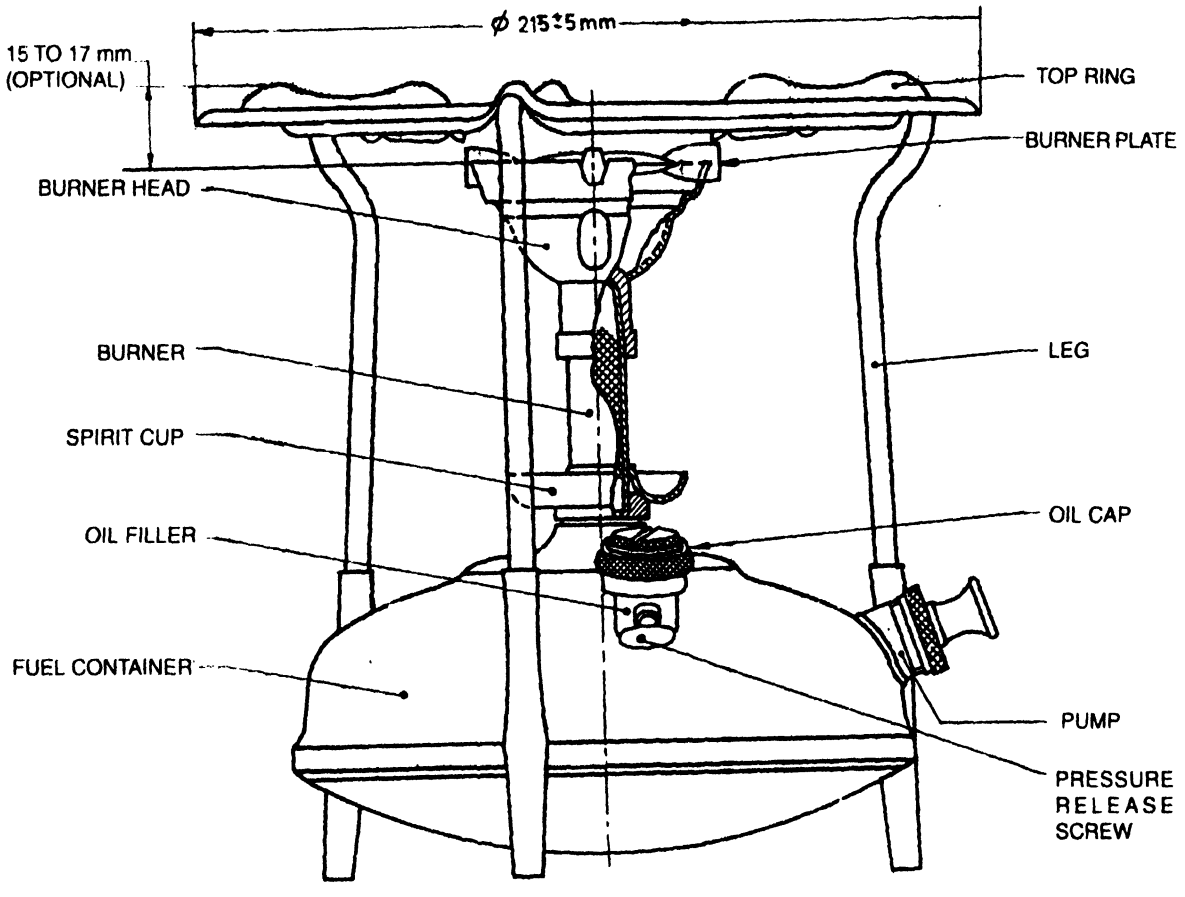


FIG. 1 OIL PRESSURE STOVE NO. 100 (NEW DESIGNATIONS OTR AND OTS)

4 DESIGNATION, TYPES AND FUEL CAPACITY

4.1 The stoves shall be designated according to their capacity and types as given below:

4.1.1 The capacity shall be measured by filling oil to the maximum through oil filler. The volume of the oil that the fuel tank should hold in actual use should not be more than 94 percent of the capacity (*see* also 7.5).

New Designation		*Existing Commercial Designation*	*Description*	*Minimum Fuel Capacity,* ml	*Burner Type as per IS 8808*
Roarer Type	Silencer Type				
(1)	(2)	(3)	(4)	(5)	(6)
OOR	–	–	–	550	O
	OOS	–	–	550	OS
OTR	–	100	Stove portable with tube type burner, with legs detachable (*see* Fig. 1)	900	Tube type with roarer burner
–	OTS	100	Stove portable with tube type bumer, with legs detachable (*see* Fig. 1)	900	Tube type with silencer burner
OR	–	101	Stove portable with roarer type burner, with legs and burner socket detachable (*see* Fig. 3)	900	1
	OS	105	Stove portable with roarer type burner, with legs and burner socket detachable (*see* Fig. 3)	900	IS
IR	–	1	Stove, with roarer type burner, legs and burner socket fixed to fuel container (*see* Fig. 8)	1 200	1
–	IS	5	Stove, with silencer type burner, legs and burner socket fixed to fuel container (*see* Fig. 8)	1 200	IS
ILR	–	–	Stove, large with roarer type burner, legs and burner socket fixed to fuel container (*see* Fig. 8)	1 500	1
–	ILS	–	Stove, large with silencer type burner, legs and burner socket fixed to fuel container (*see* Fig. 8)	1 500	IS
2R	–	2 (Large)	Stove with roarer type burner (*see* Fig. 8)	2 100	2
–	2S	2S (Large)	Stove with silencer type	2 100	2S
3R	–	3 (Very large)	Stove with roarer type burner (*see* Fig. 8)	3 600	3
–	3S	3 (Very large)	Stove with roarer type burner (*see* Fig. 8)	3 600	3S

NOTES

1 Tube type of burners are supposed to have both roarer and silencer arrangements.

2 Common designation shall be given for type of burner instead of separate designation.

3 Letter 'R' stands for roarer type of burners.

4 Letter 'S' stands for silencer type of burners.

5 Letter 'T' stands for tube type of burners.

6 Letter 'L' stands for large size.

5 MATERIALS

5.1 The materials used in the manufacture of the different parts shall be such that they would ensure safe handling and good performance of the stove throughout its reasonable life.

5.2 The following components of the stove shall be made from the materials specified below:

Component	*Ref to Fig.*	*Material*	*Recommended Specification*
(1)	(2)	(3)	(4)
Fuel container	4 and 8	Annealed brass sheet with minimum copper as 60 percent or	CuZn 37 of IS 410
		Brass sheet	IS 422
Top ring	1,3 and 7	Cold rolled mild steel sheet or	IS 513
		Grey cast iron (for 2 and 3 number stoves only)	Grade 15 of IS 210
Inner fuel feed pipe	4 and 8	Seamless brass tube (7.5 mm OD, *Min* and 0.3 mm thick, *Min*)	Alloy No. 2 of IS 407
Pump tube	4, 8 and 11	Seamless brass tube	Alloy No. 2 of IS 407

NOTE — The Indian Standards referred arc for guidance only.

5.3 Typical materials that are commonly used in the manufacture of other components are given in Annex B.

5.4 Materials for all types of burners for oil pressure stoves shall be as given in IS 8808.

6 SHAPE AND DIMENSIONS

6.1 Figure 1 shows the most common shape of Stove No. 100 (new designation OTR for roarer type burner and OTS for silencer type burner) and the dimensions of its important components shall be as given in Fig. 2, 4, 5, 6 and 11.

6.2 Figure 3 shows the most common shape of Stove No. 101 and 105 (new designation OR for roarer type burner and OS for silencer type burner) and the dimensions of its important components shall be as given in Fig. 2, 4, 5, 11, 12, 14 and 16.

6.3 Figure 7 shows the most common shape of Stove No. 1, 2 and 3 (new designation 1R, 1LR, 2R and 3R for roarer type burner) and the dimensions of its important components shall be as given in Fig. 8 to 13 and 15.

6.4 Shapes and dimensions for all types of burners for oil pressure stoves shall be as given in IS 8808.

6.5 The minimum thickness of sheet of the fuel container of oil pressure stoves, when measured at any point, shall be as follows:

Stove Designation		*Minimum Thickness of Fuel Container at Any Point* mm
New Designation	Existing Designation	
(1)	(2)	(3)
OOR, OOS, OTR, OTS, OR, OS 1R, 1S.	100, 101. 105, 1,5	Top = 0.60 Bottom = 0.70
1LR. 1LS	–	Top 0.70 Bottom 0.80
2R, 3R, 2S and 3S	2, 3, 2S and 3S	Top = 0.75 Bottom = 0.85

6.6 The minimum thickness of sheet of the top ring, when measured at any point, shall be as follows:

Stove Designation		*Minimum Thiekness of Top Ring at Any Point*
New Designation	Existing Designation	mm
(1)	(2)	(3)
OTR, OTS, OR, OS, lR and 1S	100, 101, 105, 1 and 5	0.65
2R, 3R, 2S and 3 S	2, 3, 2S and 3S	0.75

7 CONSTRUCTION

7.1 General

7.1.1 Construction of the stove shall be such as to withstand the pressure requirements and other tests laid down in **13.1.1, 13.1.2, 13.1.3** and **13.3.** The fuel container shall be stress relieved after fabrication, but before soldering. This shall be tested by the mercurous nitrate test given in IS 2305.

7.1.2 The top and bottom of the fuel container shall be either pressed or spun. If the top portion is completely spun, then a suitable thicker sheet shall be employed to attain the minimum specified thickness of the sheet after fabrication.

7.1.3 The stove shall be so made as to be firm on its base and the legs shall be so fitted as to have the bottom of the fuel container at least 13 mm clear of the ground on which stove stands. The legs, when soldered to the body of the stove, shall be flattened at the place of contact.

7.1.4 The bottom ends of the legs of stoves shall be so constructed as to touch the ground fully without shoes.

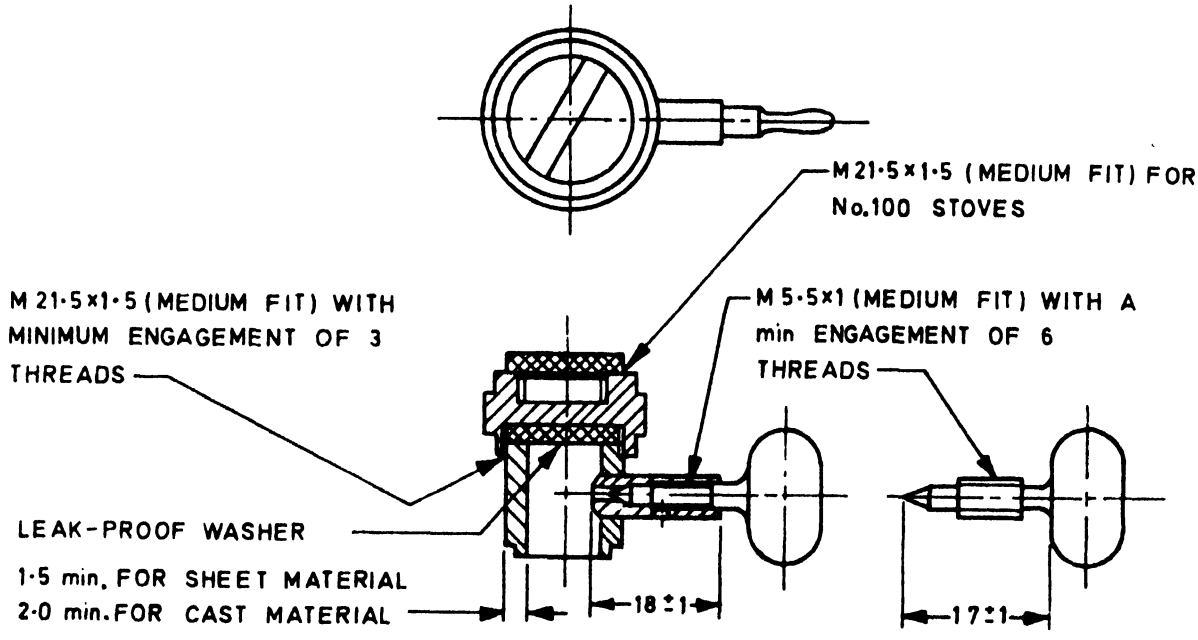
7.1.5 Stoves without shoes, both when full of fuel and when empty, shall be capable of being tilted in any direction to an angle of 15° from the vertical, without overturning at that inclination, or on being released.

7.2 Burner Assembly

Construction of all types of burners for oil pressure stove shall be as given in IS 8808.

7.3 Pump

The pump shall be of sound construction and shall be capable of developing and retaining a pressure of 150 kN/m^2 (or 1.5 kgf/cm^2) (*see* **13.1.1).** The pump washer and the non-return valve shall be removable.



All dimensions in millimetres.

FIG. 2 OIL FILLER ASSEMBLY FOR STOVE NO. 100, 101, AND 105 (NEW DESIGNATIONS OTR, OTS, OR AND OS)

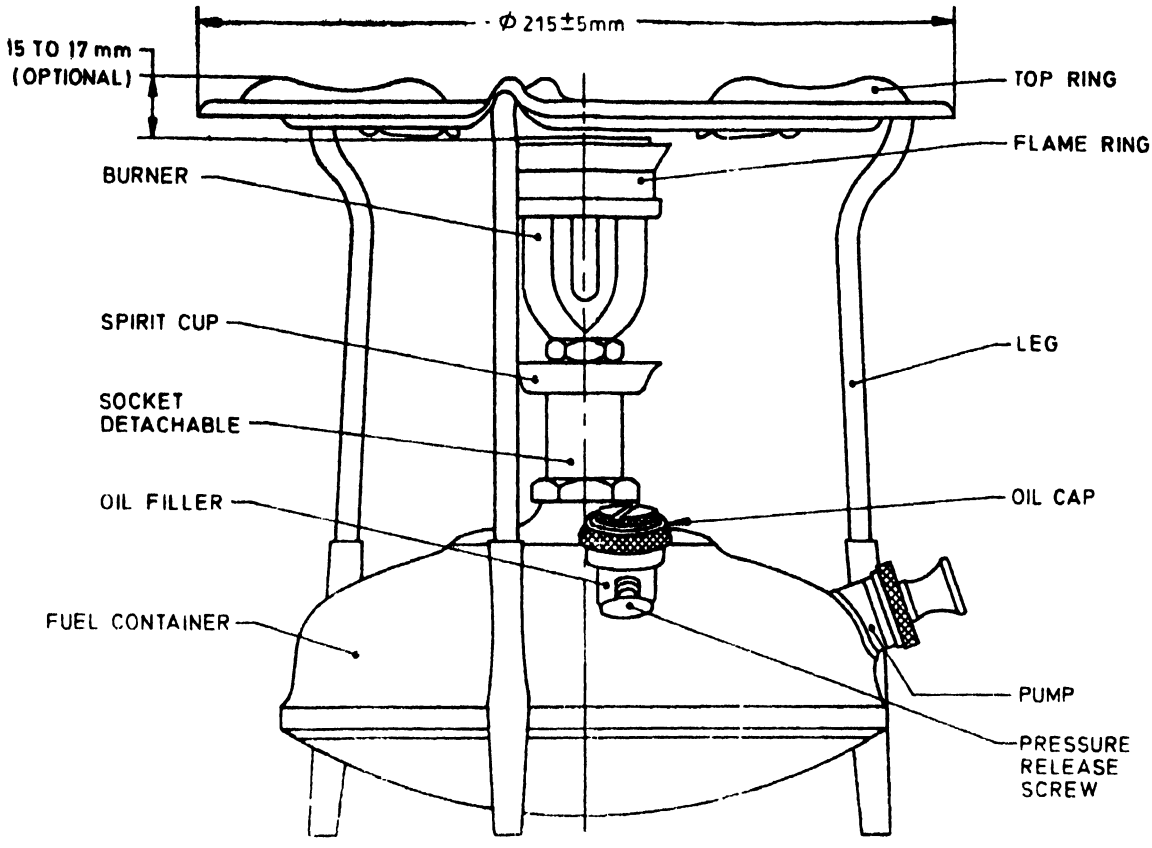


FIG. 3 OIL PRESSURE STOVE No. 101 AND 105 (NEW DESIGNATIONS OR AND OS)

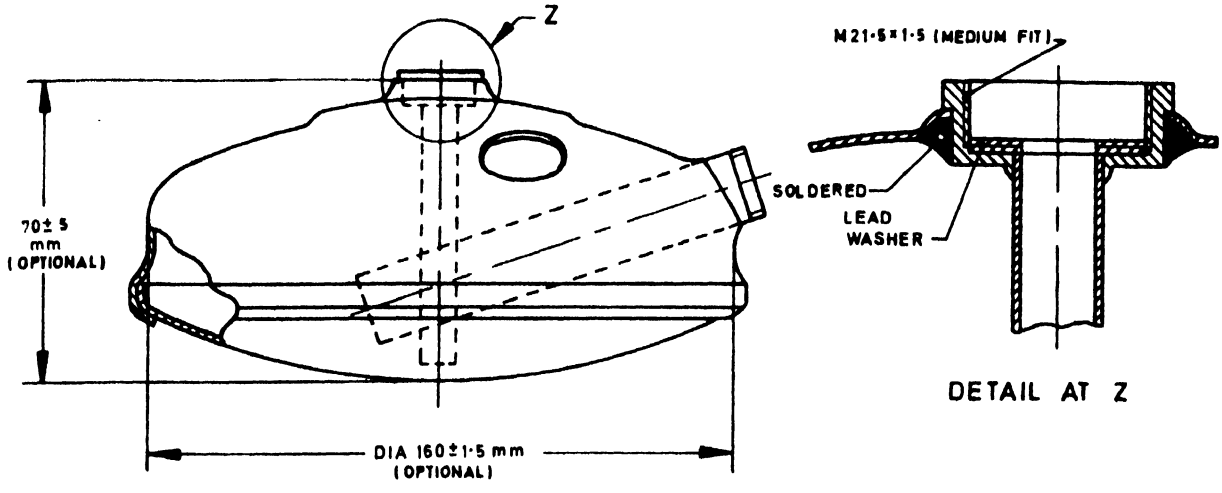


FIG. 4 FULL CONTAINER FOR STOVE NO. 100, 101 AND 105 (NEW DESIGNATIONS OTR, OTS, OR AND OS)

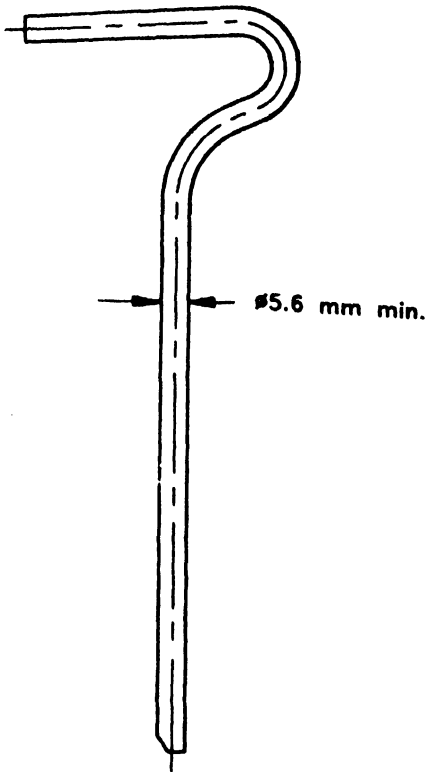
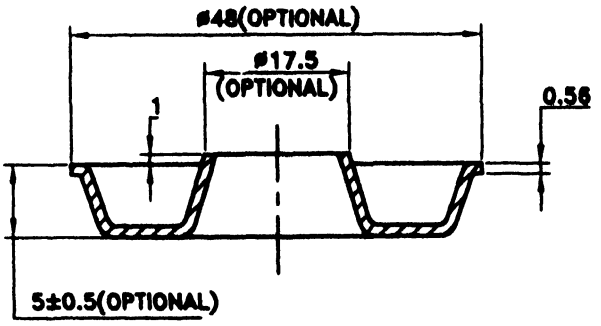


FIG. 5 LEG FOR STOVES, DETACHABLE NO. 100, 101. AND 105 (NEW DESIGNATIONS OTR, OTS, OR AND OS)



All dimensions in millimetres.

FIG. 6 SPIRIT CUP FOR STOVE NO. 100 (NEW DESIGNATIONS OTR AND OTS)

7.4 Pressure-Release Screw

7.4.1 The fuel container shall be fitted with a pressure-release screw for releasing the container pressure quickly and safely.

7.4.2 The outlet hole in the socket of the pressure-release screw shall be directed downwards at an angle of45 ± 5°.

7.5 The filler cap assembly shall be leak-proof at an air pressure of 250 kN/m^2 (or 2.5 kgf/cm^2) (*see* **13.1.1**) and the safety pressure and bursting pressure tested in accordance with **13.1.2** and **13.1.3,** respectively. The filler opening shall be so located that when oil is filled in the fuel container up the level, it should not be more than 94 percent of the total capacity of the fuel container.

7.6 Washers

7.6.1 The washer for oil-filler cap shall be made from neoprene or other equally suitable material which is resistant to heat and kerosene oil. It shall not become tacky or swollen when kept immersed in kerosene oil at 60°C for 24 h (continuously or in three durations of 8 h each) and shall be capable of giving leak-proof seal after the above test.

7.6.2 The pump washer shall be made from curried buffalo leather or other equally suitable material and shall be treated to avoid hardening and cracking.

7.7 Pricker

The pricker shall have a steel wire of diameter 0.05 mm less than the diameter of the nipple hole and shall be fixed in a steel strip.

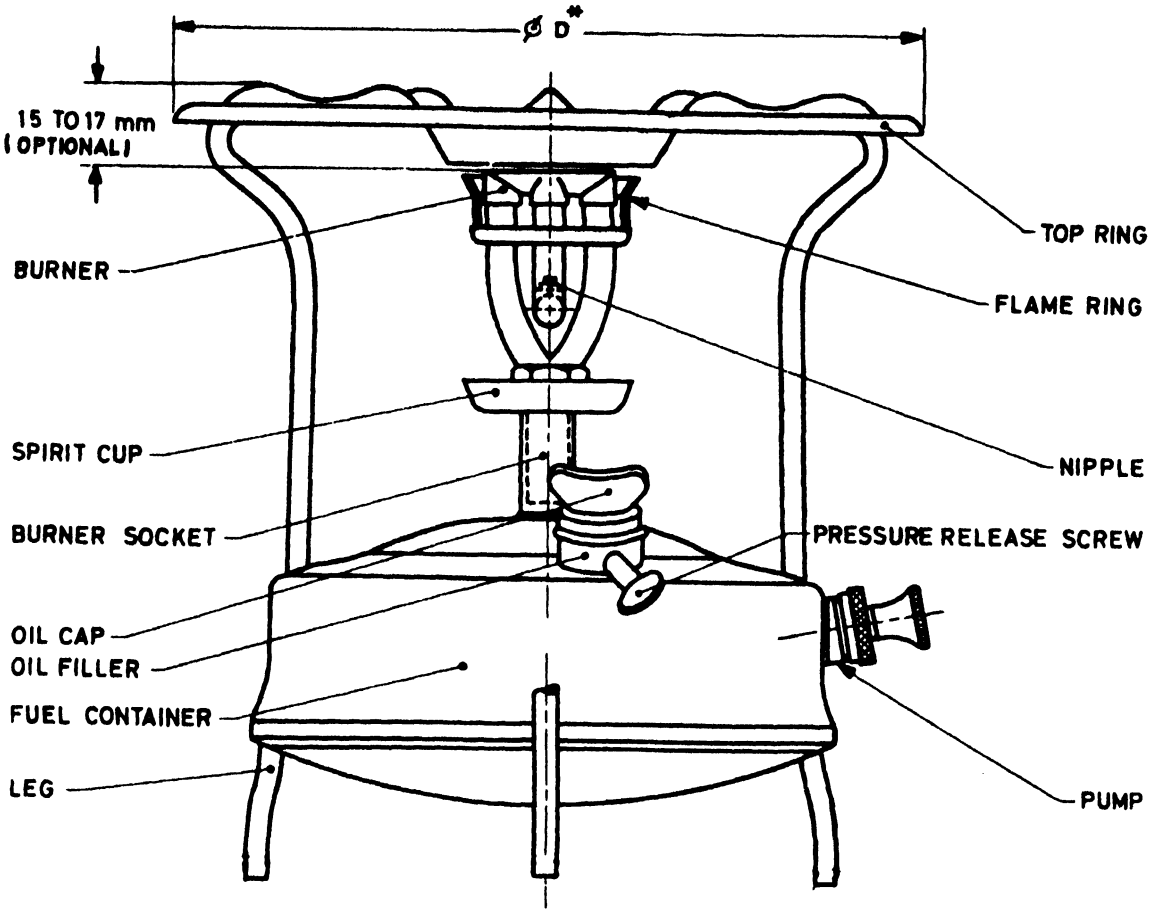
7.8 Interchangeable Parts

The following parts shall be interchangeable in the same type of stove:

a) Burner,
b) Nipple,
c) Flame ring,
d) Spirit cup,
e) Oil filler cap,
f) Pressure-release screw,
g) Oil cap plug,
h) Pump valve,
j) Pump washer, and
k) Pump cap.

8 FINISH

The fuel container and the other brass parts shall be finished bright. Residues of solder flux and similar corrosives shall be removed during manufacture to prevent later corrosion. When legs are soldered to the body of the stove, they shall be tinned before soldering. The top ring shall be gold lacquered or zinc passivated. The detachable legs, pump rod, nut and washer when made of mild steel, may be tin-plated (*see* IS 1359) or cadmium plated (*see* IS 1572) or zinc passivated, as desired by the purchaser.



*See table of Fig. 8

FIG. 7 OIL PRESSURE STOVE NO. 1, 2, 2S, 3, 3S AND 5 (NEW DESIGNATIONS 1R, IS. 2R, 3R AND 3S)

9 INSTRUCTIONS

Instructions for the safe use of stove shall be supplied with the stove in Hindi and English. These shall include the following:

a) Prior to lighting the stove, ensure that all the components are undamaged and properly assembled in accordance with the design.

b) Fill kerosene oil in the container (through a funnel with filter) not exceeding the bottom level of faucet of oil filler assembly. Do not use any fuel other than kerosene oil.

c) Heat the burner adequately by spirit or kerosene soaked external heater and then pump the air moderately to obtain a uniformly spread blue and stable flame.

d) Clean the clogged burner regularly to get the required flame.

e) Reduce the flame, just enough to keep the contents boiling, once the boiling conditions have reached.

f) Maximum oil consumption rate in g/h.

g) Expected thermal efficiency.

h) Total oil filling capacity in mililitre.

10 MARKING

10.1 Each stove shall be marked by stamping with the following information:

a) Designation No.;

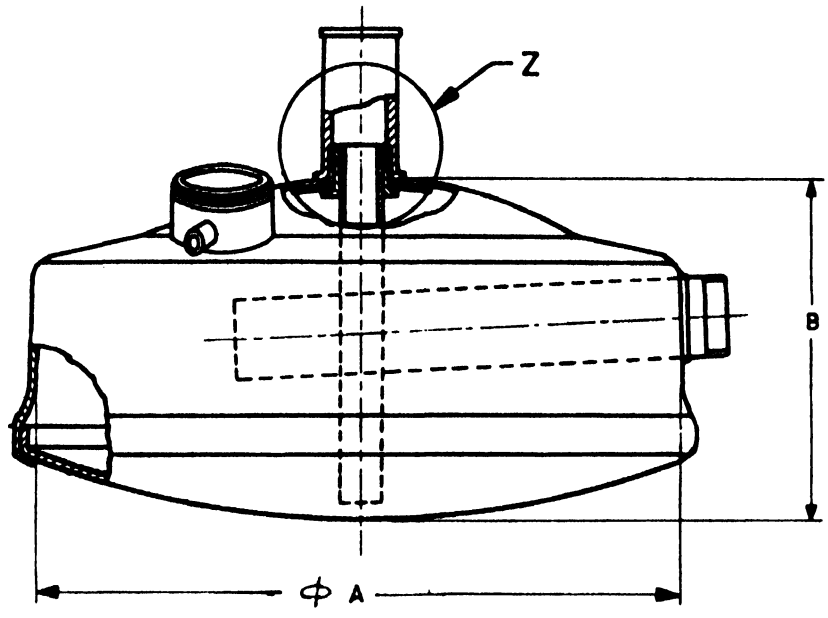
b) Name or registered trade-mark of the manufacturer or supplier; and

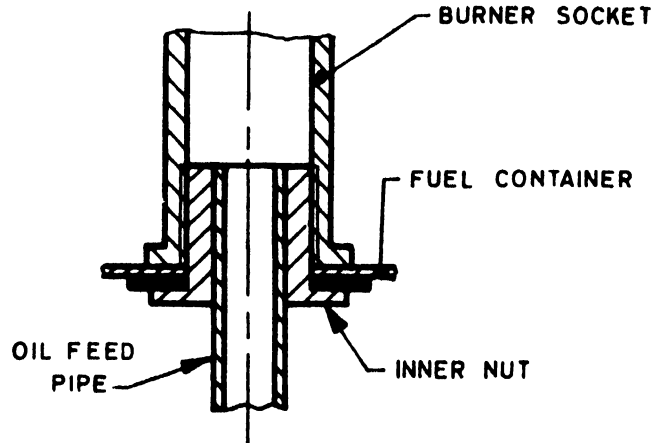
c) Fuel consumption rate in g/h within a tolerance of ± 15 percent (stickers with this information may be used).

10.2 BIS Certincation Marking

10.2.1 The stoves may also be marked with the Standard Mark.

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



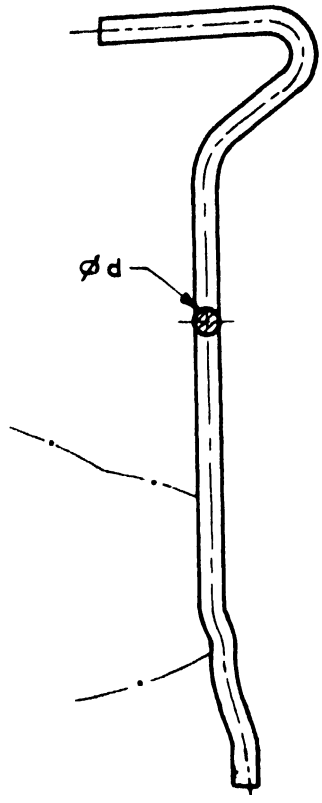


ENLARGED DETAIL AT Z

Stove Designation		Bottom Diameter Ø *A* (Optional) ± 1.5	Height *B* (Optional) ± 1.5	Top Ring Diameter Ø *D* (See Fig. 7) ± 1.5
New Designation	Existing Designation			
1 Rand 1S	1 and 5	160	85	215
1LR and 1LS	–	173	85	215
2R and 2S	2 and 2S	195	120	265
3R and 3S	3 and 3S	235	130	320

All dimensions in millimetres.

FIG. 8 FUEL CONTAINER FOR STOVE NO. 1, 2, 2S, 3, 3S, AND 5
(NEW DESIGNATIONS 1R, 1S, 2R, 2S, 3R AND 3S)



Stove Designation		
New Designation	Existing Designation	Ø *d, Min*
1 R	1	5.6
1 S	5	5.6
2 R	2	8.0
2 S	2 S	8.0
3 R	3	10.0
3 S	3 S	10.0

All dimensions in millimetres.

FIG. 9 LEGS FOR STOVE No. 1, 2, 2S, 3, 3S AND 5 (NEW DESIGNATIONS 1R, IS, 2R, 2S, 3R AND 3S)

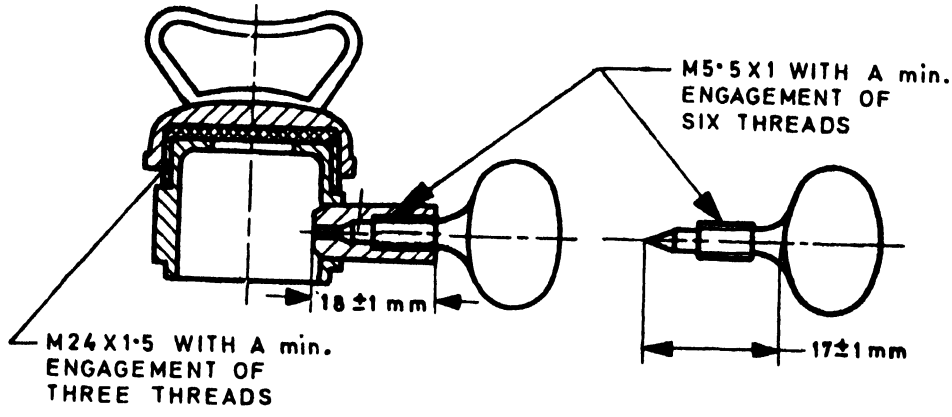
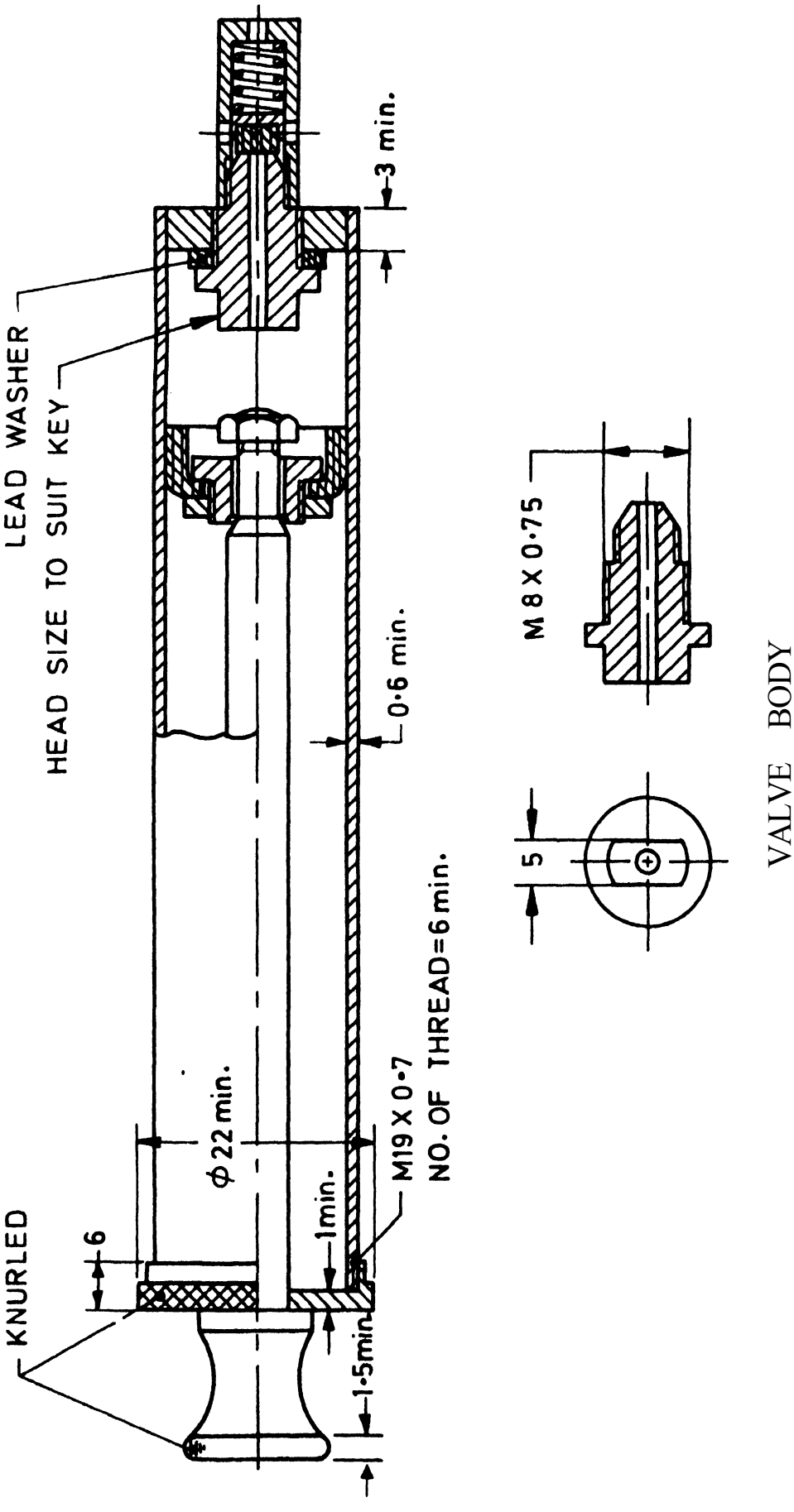
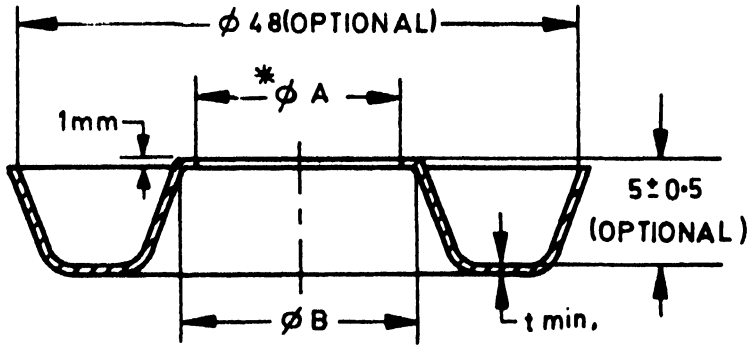


FIG. 10 OIL FILLER ASSEMBLY FOR STOVE NO. 1, 1S, 2, 2S, 3, 38 AND 5
(NEW DESIGNATIONS 1R, 1S. 2R, 3R AND 3S)



All dimensions in millimetres.

FIG. 11 PUMP ASSEMBLY FOR STOVES

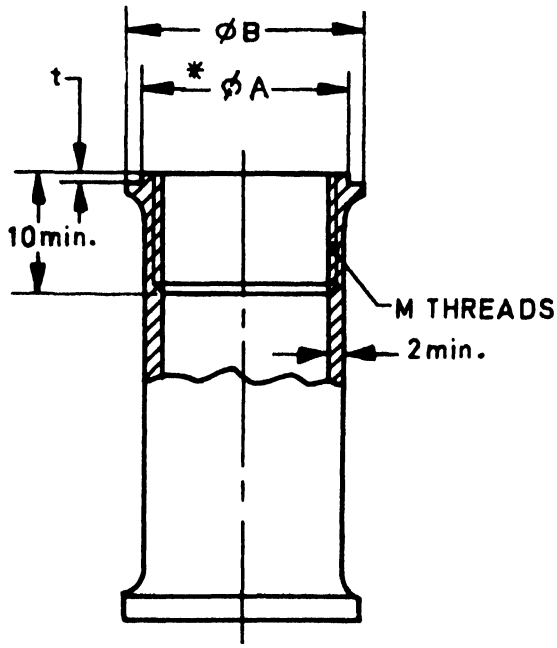


Stove Designation		Ø *A** (Approx)	Ø *B* (Approx)	*t* *Min*
New Designation	Existing Designation			
OR, OS, 1R, 1S.2R.2S	1, 101, 2.2S 5, 105	17.0	19.5	0.5
3R and 3S	3 and 3S	20.5	23.0	0.5

* Suitable fit may be provided to suit bumer socket.

All dimensions in millimetres.

FIG. 12 SPIRIT CUP FOR STOVES WITH ROARER AND SILENCER TYPE BURNERS



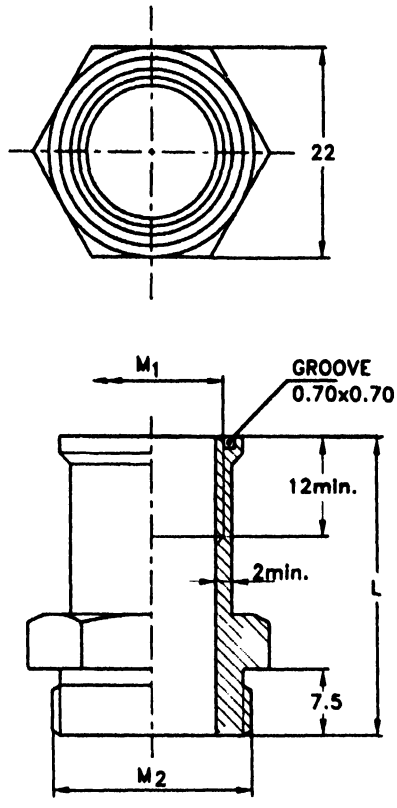
Stove Designation		Ø *A** *Min*	Ø *B* *Min*	Threads (Medium Fit)	*t* Optional
New Designation	Existing Designation				
OR, OS, 1R.and 1S	1, 101, 2 and 105	17.0	19.0	M 14.5 × 0.75	0.5
2R and 28	2 and 23	17.0	19.0	M 14.5 × 0.75	0.5
3R and 3S	3 and 3S	21.5	23.0	M 17 × 1	0.5

NOTE — Hexagonal scoket may be provided with width across flat as 19 mm, *Min.*

*Suitable fit may be provided to suit spirit cup.

All dimensions in millimetres.

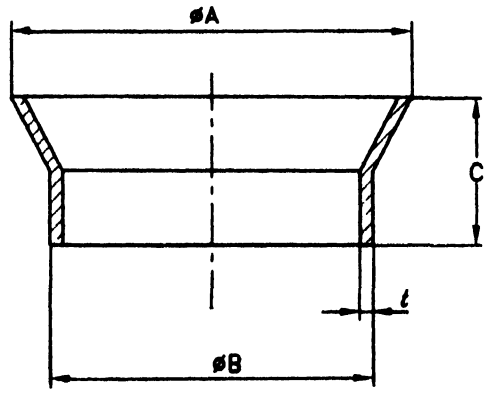
FIG. 13 BURNER SOCKET, FIXED TYPE



Stove Designation		Threads (Medium Fit) on		
New Designation	Existing Designation	Length *L*	Burner Side *M,*	Fuel Container Side *M,*
OR and OS	101 and 105	35 ± 2	M 14.5 × 0.75	M 21.5 × 1.5

All dimensions in millimetres.

FIG. 14 BURNER SOCKET, DETACHABLE TYPE



Stove Designation		*Ø A** (Approx)	*Ø B* (Approx)	*C* ± 0.5	Sheet Thickness at Any Point *t, Min*
New Designation	Existing Designation				
OR and 1R	1 and 101	52 ± 1	41 ± 1	20	0.6
2R	2	67 ± 1.5	50 ± 1	22	0.7
3R	3	86 ± 2	68 ± 2	30	1.0

All dimensions in millimetres.

FIG. 15 FLAME RING

11 PACKING

11.1 Each stove shall be packed in a cardboard or tin box together with the instruction sheet and following accessories:

a) Pricker (three);
b) Pump washer (one);
c) Filler cap washer (one)
d) Burner washer (one for Stove No. 100 the new designation OTR and OTS only);
e) Funnel, made from either tin plate or suitable kerosene resistance plastics (one);
0 Spanner for burner (one for Stove No. 100 new designation OTR and OTS only);
g) Flame ring (one);
h) Nipples (two); and required by the
j) Spanner for nipple (one) Purchaser

11.2 Bach stove, except the portable types, shall be packed in fully assembled condition.

11.3 For the purpose of shipment, a number of such boxes shall be packed in a suitable wooden case or corrugated cardboard boxes, strapped with iron or plastic hoops.

12 SAMPLING

Sampling and acceptance criteria for oil pressure stoves shall be as agreed to between the purchaser and the supplier. A recommended scheme for the same is given in Annex C.

13 TESTS

13.1 Pressure Tests

13.1.1 *Air Pressure Test*

Each fuel container fitted with pump valve, burner and oil cap, shall withstand an internal air pressure of 250 kN/m^2 (2.5 kgf/cm^2) and shall not show any sign of leakage or deformation.

13.1.2 *Safety Pressure Test*

The container, without burner and pump valve shall be subjected to an internal hydraulic pressure of 600 kN/m^2 (6 kgf/cm^2) for a period of 10 min. The container shall not show any sign of leakage or any appreciable deformation.

13.1.3 *Bursting Pressure Test*

When the container selected in **13.1.1** is further subjected to a hydraulic pressure of 1 000 kN/m^2 (10 kgf/cm^2), it shall neither burst nor unduly distort. Slight leakage of the hydraulic fluid shall be permissible, provided the pressure is capable of being maintained for duration of not less than 5 min.

13.2 Fuel Consumption

Each stove shall give within ± 15 percent of the manufacturer's specified fuel consumption in g/h when tested as per Annex D.

13.3 Thermal Efficiency

When tested in accordance with the method described in Annex D, the thermal efficiency of the stove shall be not less than:

a) 55 percent for stove with roarer type burner, and
b) 58 percent for stove with silencer type burner.

13.4 Surface Temperature and Fuel Temperature Test (Type Test)

The surface temperature of any part of the stove that may be necessary to touch during its operation as well as the maximum fuel temperature attained during 3 h continuous operation of the stove shall not exceed 60°C, when measured in accordance with method prescribed in Annex E.

13.5 Combustion Efficiency Test (Type Test)

When tested in accordance with the details laid down in Annex F, the carbon monoxide/carbon dioxide ratio of the exhaust gases of each burner, while burning at the pressure of 140 kN/m^2 (1.4 kgf/cm^2) for Stove No. 100, 101, 105, 1 and 5 (new designations OTR. OTS, OR, OS, 1R, 1S, 1LR and 1LS) and at 200 kN/m^2 (2.0 kgf/cm^2) for Stove No. 2, 2S, 3 and 3S (new designations 2R, 2S, 3R and 3S) shall not exceed 0.02.

13.6 Resistance to Draught (Type Test)

There shall be no extinction of the flame on the burners while operating at a pressure of 140 kN/m^2 (1.4 kgf/cm^2) for Stove No. 100, 101, 105, 1 and 5 (new designations OTR, OTS, OR, OS, 1R, 1S, 1LR and 1LS) and at 200 kWm^2 (2.0 kgf/cm^2) for Stove No. 2, 2S, 3 and 3S (new designations 2R, 2S, 3R and 3S) when the stove is placed in a normal (not localized) current of air with a velocity of 2 m/s, as measured with rotating vane anemometer or any other suitable equipment. The location of the stove relative to neighbouring walls and the direction of the draught shall be varied to correspond to likely conditions of stoves installation.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1993	Grey iron castings — Specification (*fourth revision*)
280 : 1977	Specification for mild steel wire for general engineering purposes (*third revision*)
319 : 1989	Free cutting leaded brass bars, rods and sections — Specification (*fourth revision*)
407 : 1981	Specification for brass tubes for general purposes (*third revision*)
410 : 1977	Cold rolled brass sheet, strip and foil (*third revision*)
422 : 1981	Specification for brass sheet and strip for the manufacture of utensils — Specification (*second revision*)
513 : 1994	Cold rolled low carbon steel sheets and strip — Specification (*fourth revision*)
1359 : 1992	Electroplated coatings of tin — Specification (*third revision*)
1459 : 1974	Specification for kerosene (*second revision*)
1572 : 1986	Specification for electroplated coatings of cadmium on iron and steel (*second revision*)
2062 : 1999	Steel for general structural purposes — Specification (*fifth revision*)
2305 : 1988	Method for mercurous nitrate test for copper and copper alloys (*first revision*)
4170 : 1967	Secification for brass rods for general engineering purposes
4905 : 1968	Methods for random sampling
5522 : 1992	Stainless steel sheets and strips for utensils — Specification (*second revision*)
6912 : 1985	Secification for copper and copper alloy forging stock and forgings (*first revision*)
8808 : 1999	Burner for oil pressure stoves and oil pressure heaters — Specification (*second revision*)

ANNEX B

(*Clause* 5.3)

TYPICAL MATERIALS COMMONLY USED IN THE MANUFACTURE OF COMPONENTS OF OIL PRESSURE STOVES OTHER THAN THOSE SPECIFIED IN S.2

Component	*Material*	*Recommended Specification*
Legs	Mild steel wire	IS 280
Pump valve body	Brass rod	IS 319 or Alloy designation CuZn 40 of IS 4170
Pump rod, nut and washer	Brass rod or Mild steel rod	IS 319 IS 280 or IS 2062
Pump piston and nut, pump valve screw	Brass rod	IS 319 or Alloy designation CuZn 40 of IS 4170
Spirit cup and flame ring	Brass sheet	Alloy designation CuZn 37 of IS 410 or IS 5522 or IS 513
Burner socket — Fixed type, oil filler socket	Wrought brass sheet	IS 410 or IS 4170
Burner socket — Detachable type, oil filler socket	Brass suitable for forging	IS 6912

ANNEX C

(*Clause* 12)

SAMPLING SCHEME AND CRITERIA FOR CONFORMITY FOR OIL PRESSURE STOVES

C-1 LOT

C-1.1 In any consignment, all stoves of the same designation, type, fuel capacity and manufactured from the same materials under essentially similar conditions of production shall be grouped together to constitute a lot.

C-1.2 Each lot shall be inspected separately to ascertain its conformity or otherwise to the requirements of this specification.

C-2 SELECTION OF SAMPLES

C-2.1 The number of samples to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with col I and 2 of Table I.

C-2.2 The stoves to be selected from the lot shall be chosen at random and in order to ensure the randomness of selection, IS 4905 shall be followed.

C-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-3.1 Inspection for Shape, Dimensions, Construction and Finish

All the stoves selected according to **C-2.1** and col 2 of Table I shall be first inspected for shape, dimensions, construction and finish. Any stove failing in one or more of the above characteristics shall be considered as defective. The lot shall be considered as conforming to the requirements of these characteristics, if the number of defective stoves in the sample does not exceed the permissible number of defectives given in col 3 of Table I.

C-3.2 Testing for Internal Air Pressure

The stoves in the sample having passed the requirements of **C-3.1** shall be subjected to internal air pressure test in accordance with **13.1.1.** The lot shall be considered as conforming to the requirements of internal air pressure test if none of the sample stoves fails in the test.

C-3.3 Testing for Safety Pressure and Bursting Pressure

From the stoves inspected/tested under **C-3.1** and **C-3.2** and found conforming to the requirements of above mentioned characteristics, a sub-sample of the size given in col 4 of Table I shall be selected at random and subjected to safety pressure test and subsequently to bursting pressure test in accordance with **13.1.2** and **13.1.3.** A stove failing to satisfy either safety pressure test or bursting pressure test or both, shall be considered as defective. The lot shall be declared as conforming to the requirements of safety pressure and bursting pressure if the number of defective stoves as obtained above does not exceed the permissible number of defectives given in col 5 of Table 1.

C-3.3.1 For lots of sizes less than 1 000 stoves, if one of the stoves in the sub-sample is found failing for bursting pressure test, a further sub-sample of the same size as indicated in col 4 of Table 1 may be selected from the stoves inspected/tested under **C-3.1** and **C-3.2** and found conforming to the relevant requirements. The stoves in this sub-sample may be subjected to bursting pressure test. The lot shall be declared as conforming to the requirements of bursting pressure test, if none of the stoves in the second sub-sample is found failing.

C-3.4 From the sample stoves inspected/tested under **C-3.1** and **C-3.2**, five stoves for lot sizes up to 500, ten stoves for lot sizes 501 to 3 000, and fifteen stoves for lot sizes above 3 000 shall be selected at random and subjected to thermal efficiency, surface temperature and fuel temperature test. The lot shall be considered as conforming to the requirements of these two tests only if all the above tested stoves pass the requirements of these tests.

Table 1 Sample Size and Criteria for Conformity

(*Clauses* C-2.1, C-3.1, C-3.3 *and* C-3.3.1)

No. of Stoves in the Lot	No. of Stoves to be Selected in the Sample	Permissible No. of Defectives Stoves	Sub-sample Size	Permissible No. of Defectives in the Sub-sample
(1)	(2)	(3)	(4)	(5)
Up to 150	20	0	5	0
151 to 300	32	1	8	0
301 to 500	50	2	13	0
501 to 1 000	80	3	20	0
1001 to 3 000	125	5	32	1
3 001 and above	200	7	50	2

ANNEX D

(*Clauses* 13.2 *and* 13.3)

TEST FOR THERMAL EFFICIENCY

D-1 THERMAL EFFICIENCY

Thermal efficiency of a stove may be defined as the ratio of heat actually utilized to the heat theoretically produced by complete combustion of a given quantity of fuel (which is based on the net calorific value of the fuel).

D-2 CONDITIONS FOR CARRYING OUT THERMAL EFFICIENCY TEST

D-2.1 Test Room Conditions

D-2.1.1 The air of the test room shall be free from draught likely to affect the performance of the stove. The temperature of the room shall be between 25 and 30°C.

D-2.1.2 At the start of the test, the stove and the kerosene in its container shall be at room temperature.

D-2.2 Kerosene

The kerosene to be used in conducting the test shall conform to IS 1459.

D-2.3 Setting of the Stove

The stove, whose efficiency is to be determined shall be fitted with a burner of corresponding designation. Prior to the test, the stove shall be checked and examined to ensure that all components are undamaged and properly assembled according to the manufacturer's instruction. The stove shall be lighted and allowed to bum for a period of 10 min at a working pressure of 100 to 200 kN/m^2 (1 to 2 kgf/cm^2) during which a blue flame shall be obtained. Now a vessel containing water shall be placed on the stove and the pressure shall be readjusted to get a maximum blue and stable fiame.

In the manner prescribed above, the stove shall be operated at the maximum blue fiame height for two periods of approximately 2 h each during which it shall be observed for any abnormal performance or leakage.

D-3 METHOD OF TEST

D-3.1 Fuel Consumption Test

The stove, whose efficiency is to be determined shall be filled with kerosene up to three-fourths of its capacity. The stove shall be lighted and brought up to working pressure of 140 kN/m^2 (1.4 kgf/cm^2) for Stove No. 100, 101, 105, 1 and 5 (new designations DTR, OTS, OR, OS, 1R, 1S, 1LR and 1LS) and 200 kN/m^2 (2.0 kgf/cm^2) for Stove No. 2, 2S, 3 and 3S (new designations 2R, 2S, 3R and 3S) within 5 min.

After burning for 5 min, the lighted stove shall be weighted on a sensitive balance with an accuracy of 1 g. The stove is allowed to bum for 1 h with an aluminium pan having sufficient water in it. At the end of 1 h, weight of the burning stove shall be noted after removing the aluminium pan. The difference in the initial and final weight of the buming stoves shall give the kerosene consumption rate in grams per hour. A suitable pan for corresponding fuel consumption rate for the stove under test shall be selected in accordance with Table 2.

D-3.2 A cylindrical flat-bottomed aluminium pan (selected according to fuel consumption rate as given in Table 2) provided with an aluminium lid shall be used for this purpose. The lid shall have two holes, one for inserting the cork for holding a thermometer and the other for the stirrer (made of aluminium wire) required for stirring the water.

D-3.3 The pan along with the lid and the stirrer shall be weighed first and then filled with the required amount of water (as given in Table 2) and initial temperature of water shall be kept within ± 2°C from the actual room temperature. The fuel container of the stove shall be connected to a pressure gauge and the fuel container filled to nearly three-fourths of the capacity. The stove shall be lighted at an average working pressure of 140 kN/cm^2 (1.4 kgf/cm^2) for 100, 101, 105, 1 and 5 (new designations OTR, OTS, OR, OS, 1R, 1S, 1LR and 1LS) stoves, and 200 kN/m^2 (2.0 gf/cm^2) for Stove No. 2, 2S, 3 and 3S (new designations 2R, 2S, 3R and 3S) and shall be maintained. After buming the stove for 5 min, weight of the stove, time and initial temperature of the water in the pan shall be noted. The pan shall be covered with a lid fitted with a test quality mercury thermometer inserted into the cork in such a way that the bulb of the thermometer immersed to half the depth of the water in the vessel. The thermometer shall be mercury-in-glass thermometer of accuracy 0.5°C. The free end of the stirrer shall come out of the lid.

D-3.4 The pan shall be placed on the stove after the initial weighing of the stove and the stop-watch shall be started immediately. As soon as the temperature of the water reaches 90 ± 1°C the stop-watch shall be stopped. The stove shall be weighed again after 1 h of its previous weighing.

NOTE — Care should be taken to see that the same average working pressure is maintained throughout the test and the water stirred gently during heatings.

D-3.5 In case hourly fuel consumption obtained during the test as per **D-3.4** falls above the highest or below the lowest limit of the range of kerosene consumption rate, on the basis of which the pan was selected earlier, then the test should be repeated with a pan based upon fuel consumption obtained during test as specified in **D-3.4.** The average of both calculations would give thermal efficiency of the stove.

D.4 CALCULATION

Thermal efficiency of the stove shall be calculated as follows:

a) Heat gained by vessel $= M \times 0.214 (t_2 - t_1)$ kcal

b) Heat utilized for heating water $= m \times 1 (t_2 - t_1)$ kcal

c) Total heat utilized $= M \times (0.214 + m) (t_2 - t_1)$ kcal

d) Heat produced by fuel $= \frac{W \times T \times 10\ 500}{60}$ kcal

e) Thermal efficiency $= \frac{\text{Heat utilized}}{\text{Heat produced}} \times 100 =$

$$\frac{M \times (0.214 + m)(t_2 - t_1) \times 60 \times 100}{W \times T \times 10\ 500}$$

where

M = mass in kg of the vessel complete with lid and stirrer,

t_1 = initial temperature of water in °C;

t_2 = final temperature of water in °C;

W = mass in kg of fuel consumed in 1 h; and

T = time in minimum taken to heat the water to 90 ± °C, and

m = mass in kg of water in the pan.

NOTE — Specific heat of aluminium is 0.214. Net calorific value of kerosene is 10 500 kcal/kg.

Table 2 Aluminium Vessels for Thermal Efficiency Test

(*Clauses* 0.3.1, D-3.2 *and* D-3.3)

Consumption Rate at Thermal Efficiency Test Pressure	Pan Diameter (External) ±5 percent	Pan Height (External) ±5 percent	Total Pan Mass with Lid ±10 percent	Mass of Water in Pan
g/h	mm	mm	G	Kg
(1)	(2)	(3)	(4)	(5)
151-180	245	130	632	4.8
181-200	260	140	750	6.1
201-240	285	155	853	7.7
241-270	295	165	920	9.4
271-300	320	175	1 100	11.4
301-330	340	185	1 200	12.5
331-360	350	195	1 310	14.0
361-390	370	200	1 420	16.0
391-420	380	210	1 530	18.0
421-450	400	215	1 640	20.0
451-480	410	225	1 750	22.0
481-510	420	230	1 860	24.0
511-540	435	240	2 000	26.5
541-570	450	245	2 130	29.0
571-600	460	250	2 240	31.0
601-630	470	255	2 320	33.0
631-660	480	260	2 440	35.0
661-700	490	265	2 520	38.0
701.750	500	270	2 650	41.0
751-800	510	275	2 720	44.0
801-850	530	280	3 050	47.0
851-900	540	285	3 190	50.0
901-950	550	290	3 330	53.0
951-1 000	560	300	3 480	57.0

NOTE — For fuel consumption rate above 700 g/h, the upper limit of tolerance on the total weight with lid of the pan (col 4) may be increased to 30 percent.

ANNEX E

(*Clause* 13.4)

METHOD OF MEASUREMENT OF SURFACE TEMPERATURE AND FUEL TEMPERATURE

E-1 PREPARATION OF STOVE

The stove shall be tested with the fuel container containing approximately 75 percent of the amount of fuel, which it would hold when full. The stove shall be lit and run at the full output (at a working pressure of 140 to 200 kN/m^2) for 1 h before starting the measurement of temperature, with the vessel containing water placed over it.

E-2 TEST PROCEDURE

E-2.1 The temperature of all parts of the stove which may be necessary to touch during operation shall be measured by using a mercury bulb thermometer. The temperature of each such part shall be measured thrice every 30 min to get three concordant readings. While measuring the temperature, the thermometer shall be covered with a felt pad and kept in contact with that part for sufficient period of time until maximum temperature is reached.

E-2.2 During the operation of the stove under **E-2.1**, the maximum temperature of fuel in the container shall also be recorded. The final reading shall be taken at the end of 3 h running operation.

ANNEX F

(*Clause* 13.5)

TEST FOR COMBUSTION EFFICIENCY

F-1 EQUIPMENT

F-1.1 The stove shall be tested with its fuel container filled with kerosene to nearly three-fourth of its capacity. Before starting the test, a suitable vessel containing water sufficient for the test shall be placed over the burner. In addition, a gas collecting hood (*see* Fig. 16) suitable for stove under examination shall be used.

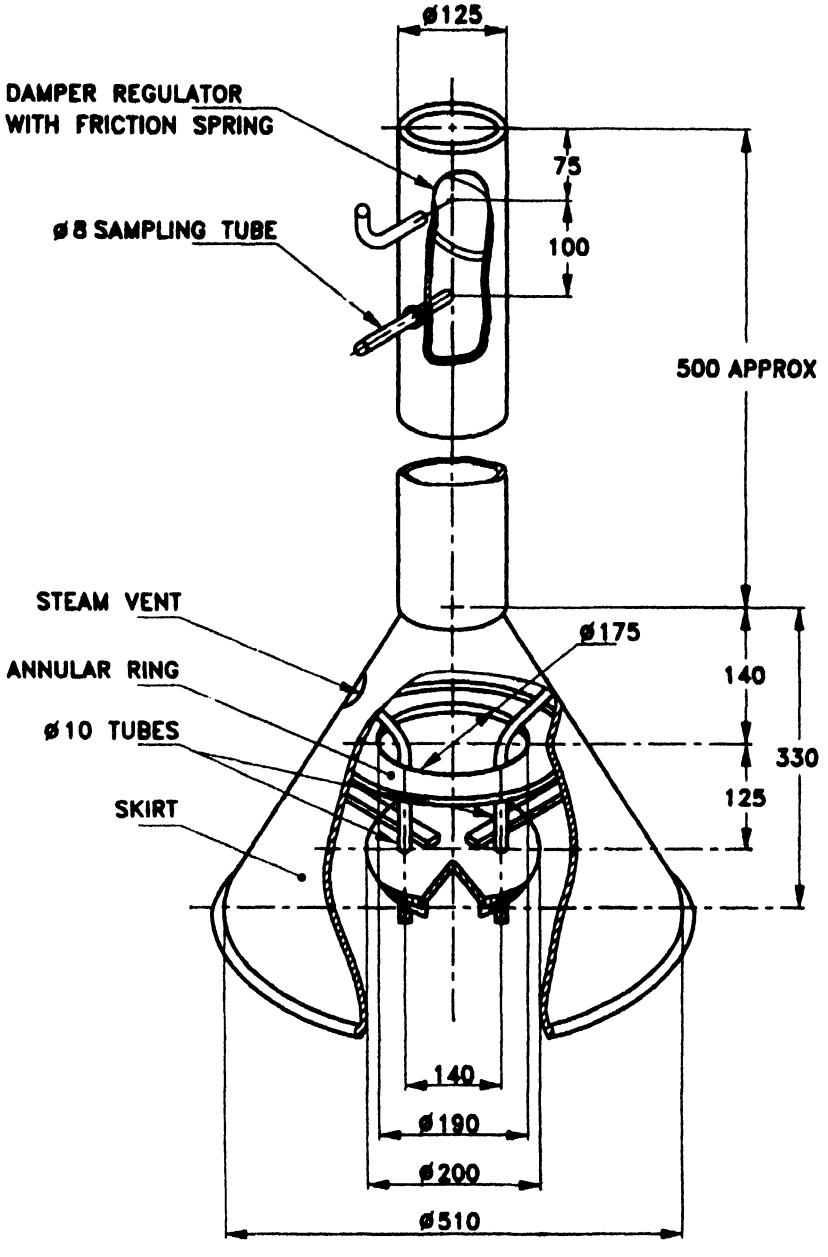
F-1.1.1 The hood shall be so designed that while not interfering in any way with the normal combustion of the burner, it collects a fairly high proportion of the flue gases. Also it shall be such that the sample collected represents the whole of the combustion gases and not those from one particular point only. When using the hood, the damper provided shall be set so that the spillage of the flue gases around the skirt is minimized.

F-2 TEST PROCEDURE

F-2.1 With the hood in position over the stove under investigation, the stove shall be lit and run at full output for a few minutes till a stable flame is achieved. Then a sufficient number of samples shall be collected.

F-2.2 The flue gas shall be analyzed by using any of the recognized methods. For carbon monoxide, it is recommended that co-indicator of prescribed accuracy or iodine pentoxide method or catalytic method, for example, Drager method, the Katz method or infra-red analysis method may be used. Carbon dioxide may be tested by using Orsat apparatus or Haldane apparatus or by the infra-red analysis.

F-2.3 The carbon monoxide and carbon dioxide content of the product of combustion shall be determined by the methods capable of an accuracy of 0.001 percent and 0.5 percent, respectively of the volume of the sample.



NOTE — All the dimensions specified are optional.

All dimensions in millimetres.

FIG. 16 HOOD FOR BURNER

ANNEX G

(Foreword)

COMMITTEE COMPOSITION

Oil Burning Appliances Sectional Committee, ME26

Organization	*Representative(s)*
Petroleum Conservation Research Association, New Delhi	SHRI U. P. SING (*Chairman*) SHRI PARAMJIT SINGH (*Alternate*)
Ashok Iron & Steel fabricators Pvt Ltd, Rajkot	SHRI H. V. BARCHHA SHRI VINODRAI V. VARCHHA (*Alternate*)
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Member Secretary
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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 Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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