	CORPORATE STANDARD	**AA 567 06**
		Rev. No. 02
		PAGE : 1 OF 2

TRICHLORO ETHYLENE, TECHNICAL

1.0 GENERAL:

This specification governs the quality of Trichloro Ethylne, Technical.

2.0 APPLICATION:

Suitable for severe duty metal degreasing particularly aluminium, magnesium and their alloys.

3.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following material standard and shall also meet the requirements of this specification.

IS:245-1988 : Trichloro Ethylene, Technical.

Type 2

4.0 FREEDOM FROM DEFECTS :

"The material shall be clear almost colourless free from suspended matter & sulphur compounds".

5.0 COMPOSITION :

The material shall be a specially established one and consist essentially of trichloro ethylene.

6.0 TEST SAMPLES :

As per Appendix B of IS : 245.

7.0 PROPERTIES :

When tested in accordance with relevant clauses of Appendix A of IS : 245, the test samples shall show the following properties :

7.1 Relative Density at 27/27°C :

1.447 to 1.458.

7.2 Residue On Evaporation :

15 mg/100 ml Max.

7.3 Distillation Range At 760 mm Hg Pressure And Between 86 And 88°C :

94% Min. by volume.

Revisions : **Refer clause 27.2.2 MOM of MRC (C).**	**APPROVED :** **INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (C)**

Rev. No. 02	**Amd.No.**	**Reaffirmed**	**Prepared**	**Issued**	**Dt. Of 1 st Issue**
Dt. : 15-08-99	**Dt :**	**Year :**	**BHOPAL**	**Corp. R&D**	**Jan. '81**

7.4 Alkalinity (As Na_2 Co_3) :

0.0025% Max. by Mass.

7.5 Free Chlorine :

Nil

7.6 Stability Under Reflux (as HCl acid):

0.02% Max. by Mass.

7.7 Resistance To Corrosion :

Shall pass the test .

8.0 TEST CERTIFICATES

Unless otherwise specified, Three copies of test certificates shall be supplied along with each consignment.

In addition the supplier shall ensure to send one copy of test certificates along with the despatch documents to facilitate quick chance of the material.

The ten certificates shall bear the followings information

AA 567 06 (Rev.No.02) : Trichloroethylene, Technical
BHEL Order No.
Manufacturer's/Supplier's Name.
Trade Mark, if any.
Batch No.
Date of Manufacture
Test Results of clauses 7

9.0 SAFETY PRECAUTION :

Smoking is prohibited in the areas of the solvent owing to the risk of the formation of phosgene gas which is likely to cause explosion.

10.0 PACKING AND MARKING

The material shall be packed securely in closed mild steel or galvanised steel drums, protected from light and stored in cool and well ventilated place.

Each container shall bear the following information:

AA 567 06 : Trichloroethylene, Technical
BHEL Order No.
Manufacturer's/Supplier's Name.
Trade Mark, if any.
Batch/Lot No.
Date of Manufacture
Quantity supplied.

11.0 REFERRED STANDARDS (Latest Publications Including Amendments)

1. IS : 245

IS : 245 - 1988
(Reaffirmed 2005)

Indian Standard

SPECIFICATION FOR TRICHLOROETHYLENE, TECHNICAL

(*Third Revision*)

Second Reprint NOVEMBER 1998

UDC 661·723·63

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

Gr 6

January 1989

Indian Standard
SPECIFICATION FOR TRICHLOROETHYLENE, TECHNICAL
(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards on 18 January, 1988, after the draft finalized by the Organic Chemicals (Miscellaneous) Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was first issued in 1950 which covered technical and pharmaceutical grade of trichloroethylene. In the first revision issued in 1962, the pharmaceutical grade was excluded which is now covered by the Indian Pharmacopoeia. In the second revision of the standard issued in 1970, two different types, namely, Type 1 covering trichloroethylene for general purposes and Type 2 for special purposes were introduced besides incorporating an additional test for stability in respect of Type 2. In the present version, the requirement of distillation yield has been modified and the details of test method including those of thermometer to be used for this purpose have been given. Considering its usage as a solvent in degreasing highly polished steel components, a requirement of resistance to corrosion has been introduced.

0.3 Trichloroethylene is a solvent for oils, fats, waxes, greases, tar, gums and resins. This solvent finds wide application in both liquid and vapour phase degreasing of metal objects, from watch parts to automobile bodies. The excellent solvent power and non-flammability of trichloroethylene has led to its extensive use in dry cleaning apparatus.

0.4 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*. The number of significant place retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*).

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1. SCOPE

1.1 This standard prescribed the requirements and the methods of sampling and test for trichloroethylene, technical.

2. TYPES

2.1 The material shall be of the following types.

2.1.1 *Type 1* — A stabilized material suitable for metal degreasing, dry cleaning, extraction of oil and fats and similar purposes.

2.1.2 *Type 2* — A specially stabilized material suitable for unusually severe duty metal degreasing, particularly for aluminium, magnesium and their alloys.

3. REQUIREMENTS

3.1 Description — The material shall be clear, almost colourless and free from matter in suspension and shall consist essentially of trichloroethylene.

3.2 The material shall also comply with the requirements given in Table 1 when tested according to the methods prescribed in Appendix A. Reference to the relevant clauses of the appendix is given in col 5 of the table.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed securely in closed mild steel or galvanized steel drums or as agreed to between the purchaser and the supplier. They shall be protected from light and stored in a cool and well ventilated place.

4.2 Marking — Each container shall be marked with the following information:

a) Name of the material;

b) Name of the manufacturer and his recognized trade-mark, if any;

c) Type of the material;

d) Net mass of the material in the container; and

e) Lot or batch number, in code or otherwise.

TABLE 1 REQUIREMENTS FOR TRICHLOROETHYLENE, TECHNICAL

(*Clauses* 3.2 and B-6.1)

SL No.	CHARACTERISTIC	REQUIREMENT		METHOD OF TEST (REF TO CL NO. IN APPENDIX A)
		Type 1	Type 2	
(1)	(2)	(3)	(4)	(5)
i)	Relative density at 27/27°C	1·452 to 1·458*	1·447 to 1·458*	A-2
ii)	Residue on evaporation, mg/100 ml, *Max*	15	15	A-3
iii)	Distillation yield between 86 and 88°C, the temperature being corrected for 760 mm Hg pressure, percent by volume, *Min*	94	94	A-4
iv)	Alkalinity (as Na_2CO_3), percent by mass	0·005 to 0·020	0·002 5, *Max*	A-5
v)	Free chlorine	Shall not show any free chlorine	Shall not show any free chlorine	A-6
vi)	Stability under reflux	—	Shall not show any acidity exceeding the equivalent of 0·020 percent by mass of hydrochloric acid	A-7
vii)	Resistance to corrosion	Shall pass the test	Shall pass the test	A-8

*The correction factor within the range of 25 to 35°C is + 0·001 5 for every degree Celsius fall and −0·001 5 for every degree Celsius rise in temperature.

4.2.1 The containers may also be marked with the Standard Mark.

NOTE — 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.

5. SAMPLING

5.1 Representative samples of the material shall be drawn and their conformity to the standard shall be determined as prescribed in Appendix B.

APPENDIX A

(*Clause* 3.2 and *Table* 1)

METHODS OF TEST FOR TRICHLOROETHYLENE, TECHNICAL

A-1. QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. DETERMINATION OF RELATIVE DENSITY

A-2.0 Outline of the Method — In this method, mass of equal volumes of the material and water at the same temperature are compared using relative density bottle.

A-2.1 Apparatus

A-2.1.1 *Relative Density Bottle* — 25-ml capacity.

A-2.1.2 *Water-Bath* — maintained at 27·0 ± 0·2°C.

A-2.1.3 *Thermometer* — Any convenient thermometer of a suitable range with 0·1 or 0·2 deg sub-divisions.

A-2.2 Procedure — Clean and dry the relative density bottle, weigh and then fill with recently boiled and cooled water at 27°C. Fill to overflowing by holding the relative density bottle on its side in such a manner as to prevent entrapment of air bubbles. Insert the stopper and immerse in water-bath. Keep the entire bulb completely covered with water and hold at that temperature for 30 minutes. Carefully remove any water which has exuded from the capillary opening. Remove the bottle from the bath, wipe completely, dry, cool and weigh. Calculate the mass of water. Again clean and dry the

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*Specification for water for general laboratory use (*second revision*).

relative density bottle. Using the material under test, proceed exactly as in the case of water and weigh the bottle with the material.

A-2.3 Calculation

$$\text{Relative density at } 27/27^\circ\text{C} = \frac{M_1 - M_2}{M_3 - M_2}$$

where

M_1 = mass in g of the relative density bottle filled with the material,

M_2 = mass in g of the clean and dry relative density bottle, and

M_3 = mass in g of the relative density bottle filled with water.

A-3. DETERMINATION OF RESIDUE ON EVAPORATION

A-3.1 Apparatus

A-3.1.1 *Basin* — Flat-bottomed, made of platinum, silica or glass and of about 75 mm diameter.

A-3.1.2 *Oven* — With thermostatic control capable of maintaining temperature within ± 2°C.

A-3.2 Procedure — Evaporate 100 ml of the material to dryness in the weighed basin on a water-bath in a fume cupboard. Dry the residue for 30 minutes in an oven at a temperature of 100 ± 2°C. Cool in a desiccator and weigh.

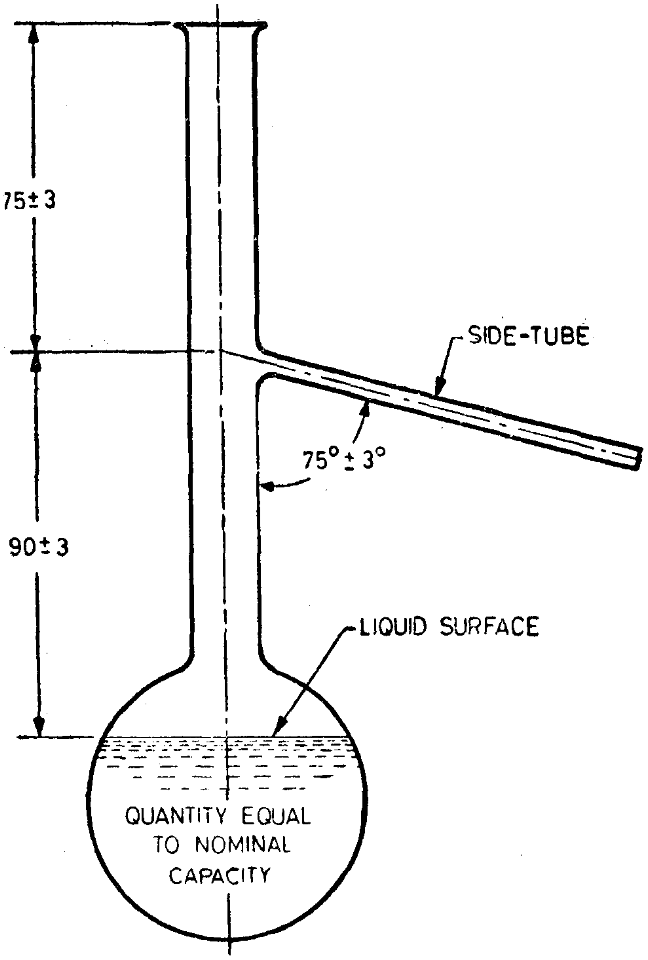
A-3.3 Report — Report the weight of the residue obtained as residue on evaporation.

A-4. DETERMINATION OF DISTILLATION YIELD

A-4.1 Apparatus

A-4.1.1 *Distillation Flask* — The shape and dimensions shall be as shown in Fig. 1.

A-4.1.2 *Thermometer* — It shall be so fitted in the flask that the bottom of the capillary is level with the lower edge of the side-tube joint and the immersion mark is level with the top of the cork.



All dimensions in millimetres.

FIG. 1 DISTILLATION FLASK

A-4.1.2.1 The recommended dimensions, tolerances and graduations of the thermometer are as follows:

Range	40 to 110°C
Graduation	0·2°C
Longer lines at each	1°C
Fully figured at each	10°C
Fractional figuring at each	5°C
Overall length	350 to 360 mm
Length of main scale, *Min*	210 mm
Bulb length, *Max*	15 mm
Stem diameter	5 to 6·5 mm
Distance from the bottom of bulb to the bottom of main scale, *Min*	100 mm
Distance from the bottom of bulb to the top of contraction chamber, *Max*	25 mm
Maximum error	0·6°C
Maximum error in an interval	0·6°/10°C

A-4.1.3 *Liebig Condenser* — made of good quality resistant glass with a wall thickness of 1·0 to 1·5 mm and conforming to the shape and dimensions given in Fig. 2.

A-4.1.4 *Distillation Receiver* — 100-ml, with dimensions and graduations as shown in Fig. 3.

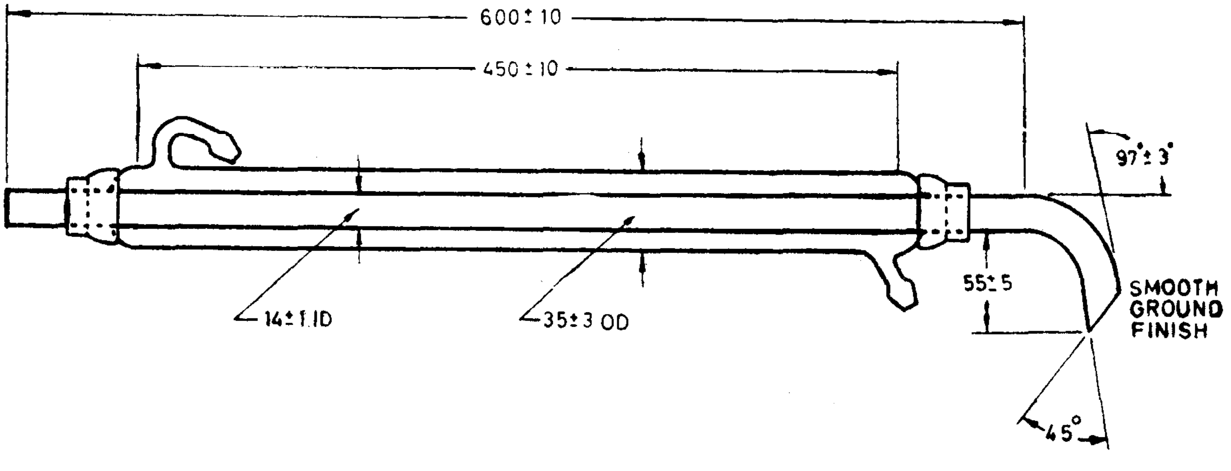
A-4.1.5 *Rectangular Draught Screen* — made of 0·710 mm thick metal sheet with the dimensions as shown in Fig. 4 and open at the top and bottom. It shall comply with the following requirements:

a) In each of the two narrow sides of the draught screen, there shall be two circular holes, each of 25 mm diameter and in each of the four sides of the draught screen, there shall be three holes with their centres 25 mm above the base of the draught screen. These holes shall occupy the position shown in Fig. 4. The diameter of each of the holes centrally situated on the longer sides, shall be 25 mm and of the remaining ten holes shall be 12·5 mm. At the middle of each of the wider sides, a vertical slot with the dimensions shown in Fig. 4 shall be cut downward from the top of the screen.

b) A sheet of hard asbestos, 6 mm in thickness, having a central circular hole 100 mm in diameter shall be supported horizontally in the screen and shall fit closely to the sides of the screen to ensure that hot gases from the sources of heat do not come in contact with the sides or neck of the flask. The supports for this asbestos sheet may conveniently consist of triangular pieces of metal sheet firmly fixed to the screen at its four corners.

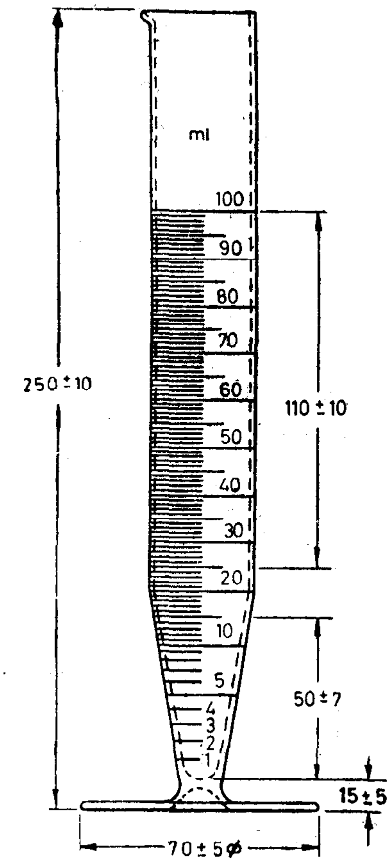
c) In one of the narrow sides of the screen, a door shall be provided having the dimensions and position as shown in Fig. 4. In each of the narrow sides of the screen, a mica window shall be placed centrally, with the bottom of the window on a level with the top of the asbestos sheet. The dimensions and position of the window are shown in Fig. 4.

d) In addition to the asbestos sheet referred to above, an additional asbestos board 150 mm square is required. The additional asbestos board shall be 6 mm in thickness and shall have a central hole 30 mm in diameter. This shall be placed on the asbestos sheet described above.



All dimensions in millimetres.

FIG. 2 LIEBIG CONDENSER

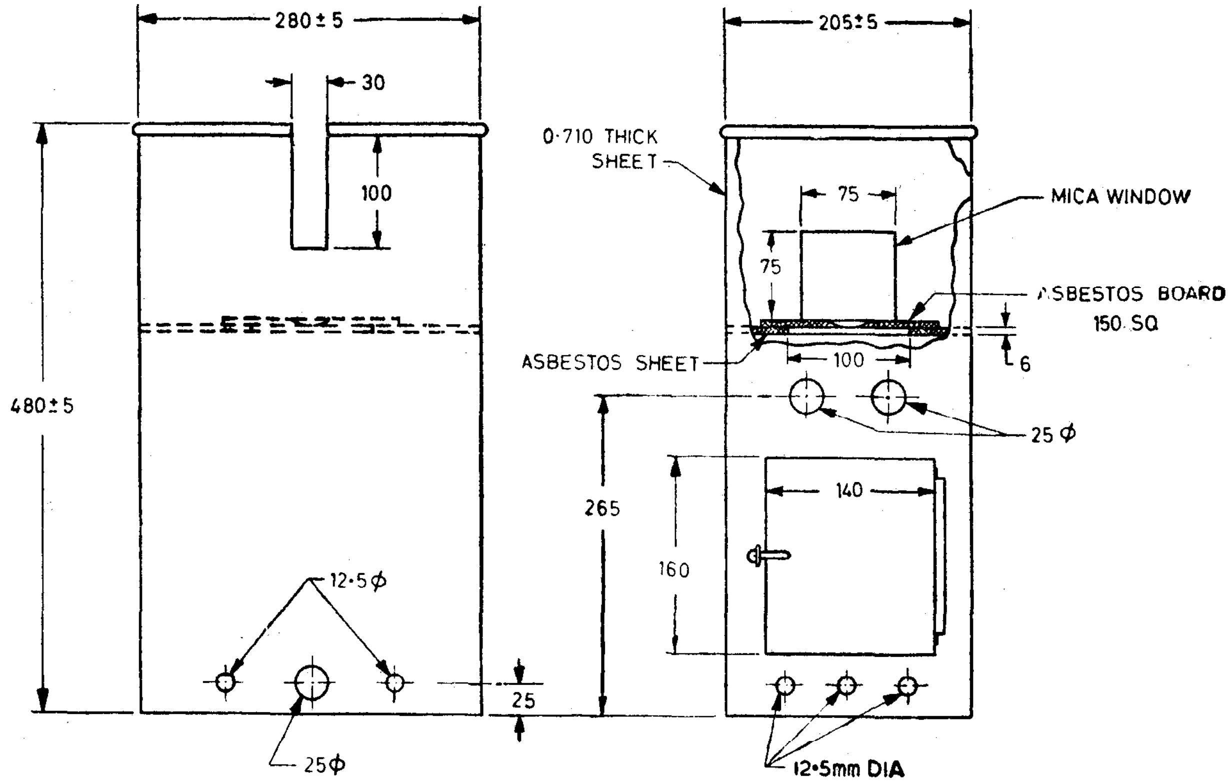


All dimensions in millimetres.

FIG. 3 DISTILLATION RECEIVER

A-4.1.6 *Bunsen Burner* — giving an entirely non-smoky flame and provided with an adjustable screw clip with the help of which the flame may be lowered or raised according to the requirements.

A-4.2 Procedure — Assemble the apparatus as shown in Fig. 5. Measure 100 ml of the material at laboratory temperature into the distillation receiver and transfer it to the distillation flask, the contents of the receiver being allowed to drain for 15 seconds into the flask. Add a fragment of pumice stone or other suitable inert material to prevent bumping. Connect the flask to the condenser so that the distance from the upper end of the jacket to the neck of the flask is 100 to 250 mm, and insert the thermometer. Pass an adequate supply of cooling water through the condenser. To receive the distillate, use the distillation receiver in which the sample was measured, without rinsing or drying. Heat the flask slowly, specially after ebulition has begun, in such a way that between the start of heating and the emergence of the first drop of distillate, an interval of time not less than 5 minutes nor more than 10 minutes is taken. Place the distillation receiver so that the condensate flows down its sides. Adjust the heating to give a rate of distillation of 4 to 5 ml per minute (about 2 drops per second). Read the volume of distillate in the distillation receiver when the thermometer indicates each of the specified distillation temperatures, the temperatures on the thermometer scale being corrected as specified under **A-4.2.1**. The difference between the



All dimensions in millimetres.

FIG. 4 RECTANGULAR DRAUGHT SCREEN

volumes so recorded is the percentage by volume distilling between the specified temperatures at 760 mm pressure.

NOTE — It is desirable to run a preliminary distillation so that the heat source may be regulated to supply heat to distil the liquid at the specified rate. The flask should be cleaned after preliminary distillation.

A-4.2.1 *Correction of Thermometer Reading* — The following corrections shall be applied before starting the distillation.

A-4.2.1.1 *Error of scale* — In all the thermometer readings, make the corrections as indicated on the certificate of the instrument.

A-4.2.1.2 *Correction for barometric pressure* — If the barometric pressure prevailing during the determination is 760 mm, no correction need be applied to the specified temperature, and the thermometer scale is corrected under **A-4.2.1.1** may be used as such. If the prevailing barometric pressure deviates from 760 mm, the specified temperature shall be corrected as follows and used on the thermometer scale as corrected under **A-4.2.1.1.** For every 10 mm above 760 mm, subtract 0·43°C from the specified temperature. These corrections shall be applied in proportion at the above rate for the prevailing barometric pressure.

A-5. TEST FOR ALKALINITY

A-5.0 Outline of the Method — A known mass of the material is shaken with neutralized water and then titrated with standard hydrochloric acid using bromophenol blue as indicator. The end point is noted when the colour of the aqueous layer matches that of the neutralized water. From the amount of standard hydrochloric acid used up, the alkalinity is calculated as sodium carbonate.

A-5.1 Apparatus

A-5.1.1 *Glass Stoppered Flasks* — of 250-ml capacity, two.

A-5.2 Reagents

A-5.2.1 *Sodium Hydroxide Solution* — approximately 0·1 N.

A-5.2.2 *Rectified Spirit* — *See* IS : 323-1959*.

A-5.2.3 *Standard Hydrochloric Acid* — 0·1 N.

A-5.2.4 *Bromophenol Blue Indicator* — Dissolve 0·2 g of bromophenol blue in 3 ml of sodium hydroxide solution and dilute to 100 ml with rectified spirit (95 percent).

A-5.2.5 *Neutralized Distilled Water* — Measure 100 ml of the disttlled water into one of the flasks. Add 1·0 ml of the bromophenol blue indicator and, if necessary, neutralize by dropwise addition of the sodium hydroxide solution or standard hydrochloric acid until a neutral (green) tint is obtained.

A-5.3 Procedure — Transfer 50 ml of the neutralized distilled water to the other flask, add

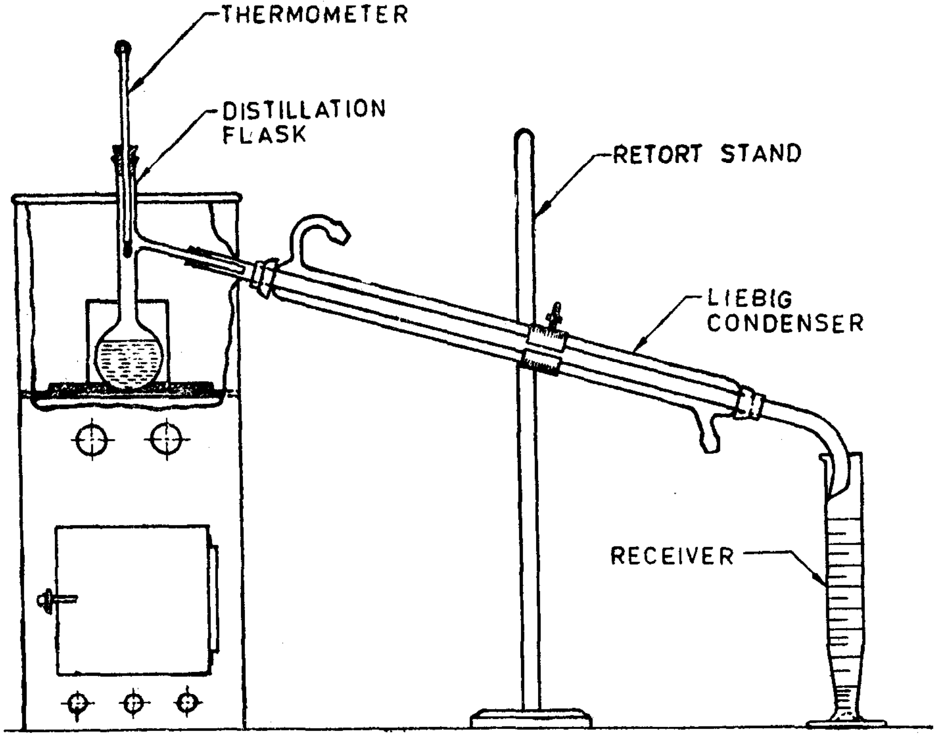


FIG. 5 ASSEMBLY OF APPARATUS FOR DETERMINATION OF DISTILLATION RANGE

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*Specification for rectified spirit (*revised*).

about 100 g of the material, accurately weighed and shake well. Titrate the mixed liquids with standard hydrochloric acid, gently swirling the flask and adding the acid a few drops at a time. When the end point is almost reached, add standard hydrochloric acid one drop at a time and shake the liquid after each addition. Note the end point when the colour of the aqueous layer, after allowing the liquid to separate, matches that of the neutralized distilled water.

A-5.4 Calculation

$$\text{Alkalinity (as } Na_2CO_3\text{), percent by mass} = \frac{5{\cdot}3\,VN}{M}$$

where

V = volume in millilitres of standard hydrochloric acid,

N = normality of standard hydrochloric acid, and

M = mass in g of the material taken for the test.

A-6. TEST FOR FREE CHLORINE

A-6.0 Outline of the Method — The material is shaken with 3, 3'-dimethylnaphthidine solution and the colour developed, if any, is noted.

A-6.1 Apparatus

A-6.1.1 *Graduated Measuring Cylinder* — 50 ml, glass stoppered (*see* IS : 878-1975*).

A-6.2 Reagent

A-6.2.1 *3, 3'-Dimethylnaphthidine Solution* — Dissolve 0·01 g of finely ground 3, 3'-dimethylnaphthidine in 5 ml of glacial acetic acid and dilute rapidly with water to 200 ml. Store the solution in the dark.

A-6.3 Procedure — To 50 ml of the material contained in the graduated measuring cylinder, add 5 ml of the 3,3'-dimethylnaphthidine solution and shake the cylinder for 30 seconds.

A-6.3.1 The material shall be considered as showing no free chlorine if no pink colour is developed.

A-7. DETERMINATION OF STABILITY UNDER REFLUX

A-7.0 Outline of the Method — A mild steel strip is placed in the material in such a way that partly it is immersed in the liquid phase and partly in the vapour phase. Oxygen, at a uniform rate, is then passed through the material, which is kept under reflux for 48 hours. An aliquot of this treated material is then taken out, cooled to room temperature and shaken with an equal quantity of neutralized distilled water. If the aqueous layer is acid to bromophenol blue indicator, it is titrated with standard sodium hydroxide solution and acidity calculated as hydrochloric acid.

A-7.1 Apparatus — A suitable form of apparatus is illustrated in Fig. 6 and comprises of the following.

A-7.1.1 *Heating Arrangement* — The heating arrangement may be as shown in Fig. 6 or may be another similar arrangement provided that a standard 150 Watt frosted light bulb/lamp is used.

A-7.1.2 *Steel Strip* — of mild steel, 75 × 20 × 2 mm, prepared by cleaning with a suitable organic solvent (acetone) polishing with emery cloth to give a bright metallic surface and again cleaning with the organic solvent.

A-7.1.3 *Conical Flask* — 500 ml capacity of heat resistant glass with a joint size 24/29 (also known as B 24).

A-7.1.4 *Oxygen Delivery Apparatus*

A-7.1.5 *Condenser* — fitted with a joint of size 24/29 (also known as B 24).

A-7.2 Reagents

A-7.2.1 *Neutralized Distilled Water* — Measure 100 ml of distilled water into a flask, add 1·0 ml of the bromophenol blue indicator and if necessary, neutralize by dropwise addition of sodium hydroxide solution (0·1 N) or hydrochloric acid (0·1 N) until a neutral (green) tint is obtained.

A-7.2.2 *Bromophenol Blue Indicator* — Dissolve 0·2 g of bromophenol blue in 3 ml of sodium hydroxide solution (0·1 N) and dilute 100 ml with rectified spirit (95 percent) (*see* IS : 323-1959*).

A-7.2.3 *Standard Sodium Hydroxide Solution* — 0·1 N.

A-7.3 Procedure — Place 200 ml of the material in the conical flask and arrange the system so that oxygen delivery tube extends to within 6·5 mm of the bottom of the flask. Suspend the steel strip in such a way that partly it is immersed in the liquid phase and partly in the vapour phase. Saturate the oxygen with water at 20 to 30°C and adjust the flow through the bubble counter to 10 to 12 bubbles per minute. Adjust the water flowing through the condenser so that the condensation takes place only on the lower half of the condenser. Start the heating bulb and allow

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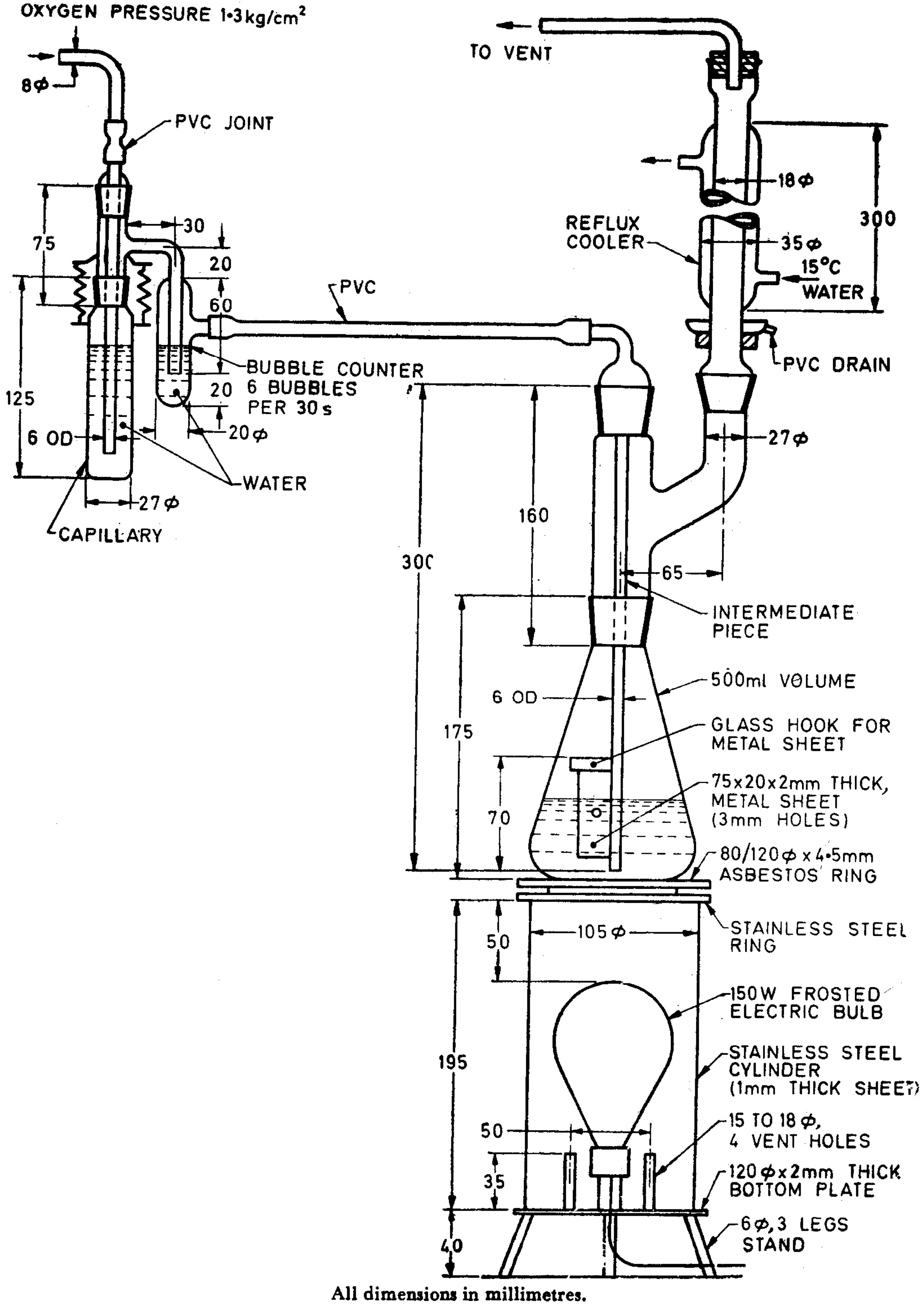
*Specification for graduated measuring cylinders (*first revision*).

*Specification for rectified spirit (*revised*).



All dimensions in millimetres.

FIG. 6 APPARATUS FOR DETERMINING STABILITY UNDER REFLUX the test to run continuously for 48 hours (A thread of polyethylene terephthalate or a glass support may be used to suspend the steel strip above the liquid level). Transfer a 20-ml portion of the treated material, cooled to room temperature, to a glass-stoppered flask. Add 20 ml of neutralized distilled water, replace the stopper immediately, and shake well. If the aqueous layer is acid to bromophenol blue indicator, titrate with standard sodium hydroxide solution.

A-7.4 Calculation

$$\text{Acidity (as HCl), percent by mass} = \frac{0{\cdot}182\,3\,VN}{S}$$

where

V = volume in millilitres of standard sodium hydroxide solution,

N = normality of the standard sodium hydroxide solution, and

S = relative density of the material at room temperature.

A-8. TEST FOR RESISTANCE TO CORROSION

A-8.1 Apparatus

A-8.1.1 *Microscope* — Any suitable microscope which can magnify 20 times.

A-8.1.2 *Carbon Steel Strips* — 50 × 10 mm, or any other suitable size which is polished over smooth emery paper, cleaned and dried. The strips shall be free from any rust spots.

A-8.1.3 *Glass Bottle* — 500-ml.

A-8.2 Procedure — Take 200 ml of the material in a clean, dry glass bottle provided with a lid. Immerse the rust free polished carbon steel strips in the material and maintain the same for 24 hours. Take out the steel strips after 24 hours and observe under a suitable microscope (X 20) for any rust spots that might have developed.

The material shall be taken to have passed the test if no rust spots are observed on the steel strips.

APPENDIX B

(*Clause* 5.1)

SAMPLING OF TRICHLOROETHYLENE, TECHNICAL

B-1. GENERAL REQUIREMENTS FOR SAMPLING

B-1.1 The sampling instruments shall be clean and dry.

B-1.2 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.3 To draw a representative sample, the contents of each container selected for sampling shall be mixed thoroughly by shaking or stirring or both, by suitable means or by rolling.

B-1.4 The samples shall be placed in suitable, clean, dry and airtight metal containers, or dark or amber glass containers on which the material has no action.

B-1.5 The sample containers shall be of such a size that they are almost completely filled by the sample.

B-1.6 Each sample container shall be sealed airtight after filling and marked with full details of sampling, the date of sampling, and lot or batch number (*see* **4.2**).

B-1.7 Samples shall be stored in the dark.

B-2. SAMPLING INSTRUMENTS

B-2.1 The following forms of sampling instrument may be used:

a) Sampling bottle or can for taking samples from tanks or drums, and
b) Sampling tube for taking samples from bottles or small containers.

B-2.1.1 *Sampling Bottle or Can* — It consists of a weighed glass or metal container with removable stopper or top to which is attached a light chain (*see* Fig. 7). The bottle or can is fastened to a suitable pole. For taking a sample, the bottle or can is lowered into the tank to the required depth and the stopper is then removed by means of the chain.

B-2.1.2 *Sampling Tube* — made of metal or thick glass, 20 to 40 mm in diameter and 400 to 800 mm in length (*see* Fig. 8). The upper and lower ends are conical and reach 5 to 10 mm diameter at the narrow ends. Handling is facilitated by two rings at the upper end.

B-2.1.2.1 For small containers, the size of the sampling tube may be altered suitably.

B-3. SCALE OF SAMPLING

B-3.1 For Tanks and Large Drums — Each tank or drum shall be sampled separately.

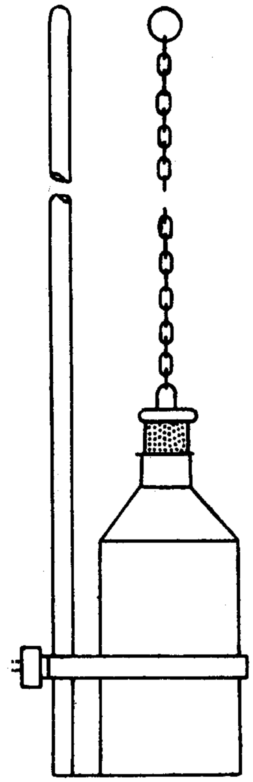
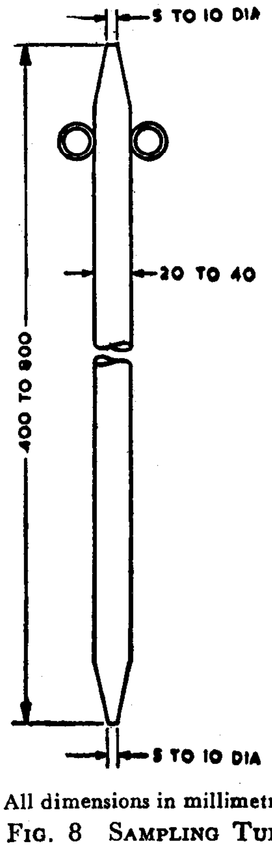


Fig. 7 Sampling Bottle or Can



All dimensions in millimetres.

Fig. 8 Sampling Tube

B-3.2 For Bottles and Small Containers Each lot (*see* **B-3.2.1**) shall be sampled separately.

B-3-2.1 *Lot* — In any consignment of one type of the material, all the containers of the same size and drawn from a single batch of manufacture shall constitute a lot. If a consignment of one type of the material is known to consist of different batches of manufacture or different sizes of containers, the containers belonging to the same batch and size shall be grouped together and each such group shall constitute a separate lot.

B-3.2.2 The number of containers (*n*) to be selected from a lot shall depend upon the size of the lot and shall be in accordance with Table 2.

TABLE 2 NUMBER OF CONTAINERS TO BE SELECTED FROM LOTS OF DIFFERENT SIZES

Lot Size (1)	No. of Containers to be Selected (2)
Up to 15	3
16 ,, 50	4
51 ,, 100	5
101 ,, 150	7
151 and above	10

B-3.2.3 The containers shall be selected at random from the lot. In order to ensure randomness of selection, procedure given in IS : 4905-1968* may be followed.

B-4. TEST SAMPLES AND REFEREE SAMPLES

B-4.1 From Tanks and Drums — As far as possible, samples from a tank or drum should be drawn during the operation of filling. In that case, equal amounts of the material shall be collected at regular intervals so as to get a total amount of about 1 500 ml. Where it is not possible to take a sample during filling, the material shall be drawn from different positions and depths with the sampling bottle or can, after thoroughly agitating the material so as to ensure a fair amount of homogeneity. The total amount of the material collected shall be thoroughly mixed and divided into three equal portions, one for the purchaser, another for the supplier and the third for the referee.

B-4.2 From Bottles and Small Containers — From each of the bottle or containers selected according to **B-3.2.3**, a small representative portion of the material shall be drawn with the help of the sampling tube. Equal quantities of the

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*Methods for random sampling.

material so drawn from the various containers shall be thoroughly mixed to form a test sample of about 1 500 ml. This shall be divided into three equal parts, one for the purchaser, another for the supplier and the third for the referee.

B-4.3 All the test samples shall be transferred to separate sample containers and sealed and labelled with full identification particulars. The referee test sample, bearing the seal of both the purchaser and the supplier shall be kept at a place agreed to between the two and shall be used in case of dispute.

B-5. NUMBER OF TESTS

B-5.1 Tests for determination of all the requirements given in this specification shall be performed on the test sample as obtained in **B-4.1** or **B-4.2**, as the case may be.

B-6. CRITERIA FOR CONFORMITY

B-6.1 The lot shall be declared as conforming to this specification if all the test results satisfy the requirements prescribed in **3.1** and Table 1.

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AMENDMENT NO. 1 DECEMBER 1995
TO
IS 245 : 1988 SPECIFICATION FOR TRICHLOROETHYLENE, TECHNICAL

(Third Revision)

(*Page* 1, *clause* 1.1) — Substitute 'This standard prescribes' *for* 'This standard prescribed'.

(*Page* 3, *clause* A-3.3) — Substitute 'Report the weight in mg' *for* 'Report the weight'.

(*Page* 6, *clause* A-4.2.1.2 'Correction for barometric pressure') — Substitute the following for the existing:

'If the barometric pressure prevailing during the determination is normal (760 mm Hg), no correction need be applied to the observed temperature in Table 1 and the thermometer scale as corrected under A-4.2.1.1 shall also be corrected as follows:

For every 10 mm above 760 mm Hg pressure, substract 0.43°C from the observed temperature of the boiling range to get the specified temperature range as specified in Table 1.

For every 10 mm below 760 mm Hg pressure add 0.43°C to the observed temperature of the boiling range to get the specified temperature range as specified in the Table 1.'

(*Page* 6, *clause* A-5.3) — Substitute 'Add about 100 ml of the material' *for* 'add about 100 g of the material'.

(*Page* 7, *clause* A-5.4, *lines* 8 *and* 9) — Substitute M (mass in g) = volume × relative density for existing 'M'.

(*Page* 9, *clause* A-8.2, *line* 2) — Substitute 'Provided with an air tight lid' *for* 'provided with a lid'.

(PCD 9)

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AMENDMENT NO. 2 MAY 2002
TO
IS 245 : 1988 SPECIFICATION FOR TRICHLOROETHYLENE, TECHNICAL

(*Third Revision*)

[*Page 2, Table 1, Sl No.* (vii)] — Insert the following after Sl No. (vii):

(1)	(2)	(3)	(4)	(5)
viii)	Colour, *Max*	25	25	IS 8768 : 1988
ix)	Moisture, ppm, *Max*	200	200	IS 2362 : 1993

[*Page 6, clause* **A-4.2.1.2** (*see also Amendment No.* 1] — Substitute the following for the existing:

A-4.2.1.2 *Correction for barometric pressure*

If the barometric pressure prevailing during the determination is 760 mm, no correction needs to be applied to the specified temperature, and the thermometer scale is corrected under **A-4.2.1.1** may be used as such. If the prevailing barometric pressure deviates from 760 mm, the specified temperature shall be corrected as follows and used on the thermometer scale as corrected under **A-4.2.1.2**.

a) For every 10 mm above 760 mm, subtract 0.43°C from the observed temperature of the boiling range to get the specified temperature at 760 mm Hg.

b) For every 10 mm below 760 mm of observed atmospheric pressure, add 0.43°C to the observed temperature of the boiling range to get the specified temperature range at 760 mm Hg.

These corrections shall be applied in proportion at the above rate for the prevailing barometric pressure.

(PCD 9)

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