भारतीय मानक
Indian Standard

IS 245 : 2020

ट्राईक्लोरोइथाइलीन तकनीकी हेतु विशिष्टि

(चौथा पुनरीक्षण)

Specification for Trichloroethylene, Technical

(Fourth Revision)

ICS 71.080.20

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

February 2020 **Price Group 6**

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Rubber and Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1950 and revised in 1962, 1970 and 1988. The original version of this standard covered technical and pharmaceutical grade of trichloroethylene. In the first revision issued in 1962, the pharmaceutical grade was excluded which was 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 third revision, the requirement of distillation yield was modified and the details of test method including those of thermometer to be used for this purpose were given. Considering its usage as a solvent in degreasing highly polished steel components, a requirement of resistance to corrosion was introduced.

This fourth revision is being carried out mainly to update cross referred standards and to incorporate Amendment no 1 and 2.

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.

The Indian standards listed in Annex C which are referred in this standard are informative in nature. All standards are subject to revision and parties to agreement based on standard are encouraged to apply the most recent editions of the standards.

The composition of the Committee, responsible for the formulation of this standard is given at Annex D.

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 place retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SPECIFICATION FOR TRICHLOROETHYLENE, TECHNICAL

(Fourth Revision)

1 SCOPE

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

2 REFERENCES

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

IS No.	*Title*
2362 : 1993	Determination of water by Karl Fischer method — Test method (*second revision*)
8768 : 2000	Method of measurement of colour in liquid chemical products platinum-cobalt scale (*second revision*)

3 TYPES

The material shall be of the following types.

3.1 Type 1

A stabilized material suitable for metal degreasing, dry cleaning, extraction of oil and fats and similar purposes.

3.2 Type 2

A specially stabilized material suitable for unusually severe duty metal degreasing, particularly for aluminium, magnesium and their alloys.

4 REQUIREMENTS

4.1 Description

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

4.2 The material shall also comply with the requirements given in Table 1 when tested according to the methods prescribed in Annex A. Reference to the relevant clauses of the Annex is given in column **5** of the Table 1.

5 PACKING AND MARKING

5.1 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.

5.2 Marking

5.2.1 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.

5.2.2 *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.'

6 SAMPLING

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

Table 1 Requirements for Trichloroethylene, Technical

(*Clauses* 4.2 and B-6.1)

Sl No.	Characteristic	Requirement		Method of Test (Ref to Cl No. in Annex 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	0.0025 *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**
viii.	Colour, *Max*	25	25	IS 8768
ix.	Moisture, ppm, *Max*	200	200	IS 2362

* The correction factor within the range of 25 to 35°C is + 0.0015 for every degree Celsius fall and −0.0015 for every degree Celsius rise in temperature.

ANNEX A

(*Clause* 4.2 and *Table* 1)

METHODS OF TEST FOR TRICHLOROETHYLENE, TECHNICAL

A-1 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) 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 min. 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 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

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

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 min in an oven at a temperature of 100 ± 2°C.

Cool in a desiccator and weigh.

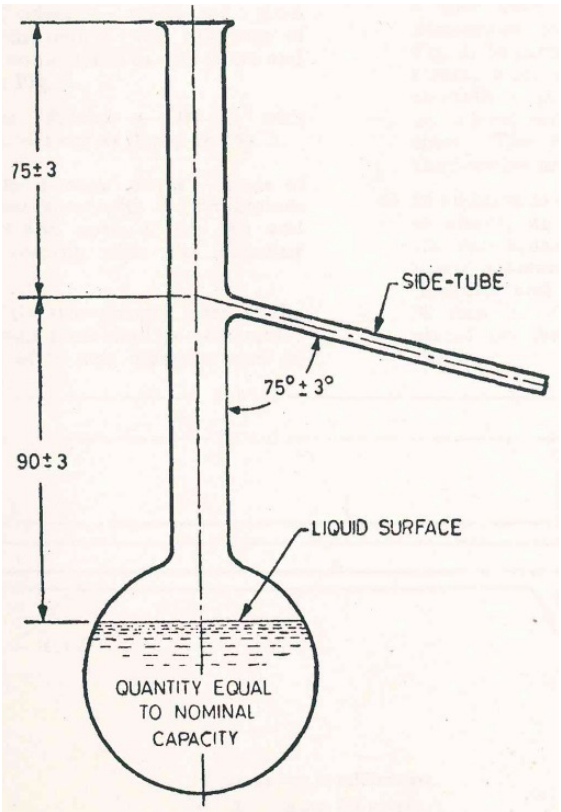
A-3.3 Report

Report the weight (in mg) 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.



All dimensions in millimetres.

FIG. 1 DISTILLATION FLASK

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.

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 m1, with dimensions and graduations as shown in Fig. 3.

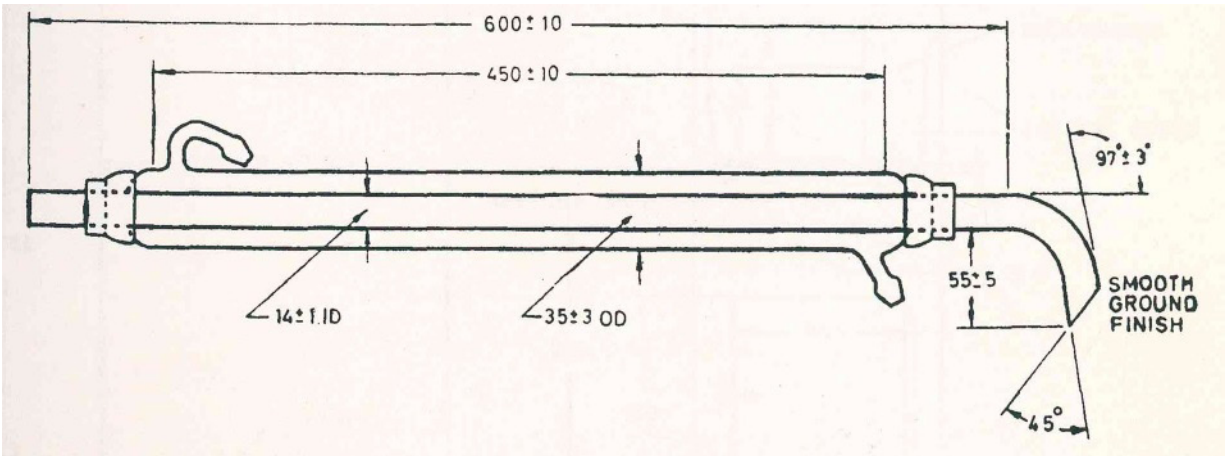
A-4.1.5 *Rectangular Draught Screen* — Made of 0.710 mm thick metal sheet with the dimensions as shown in Fig. 4 and open at the top and bottom. It shall comply with the following requirements:

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.

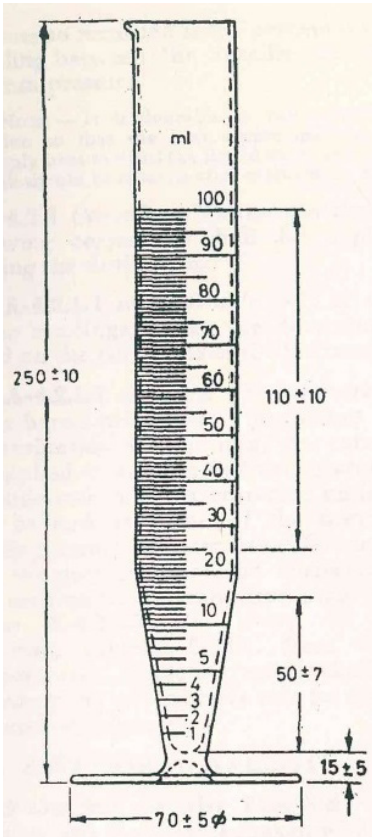
c) In one of the narrow sides of the screen, a door shall be provided having the dimensions and position as shown in Fig. 4. In each of the narrow sides of the screen, a mica window shall be placed centrally, with the bottom of the window on a level with the top of the asbestos sheet. The dimensions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



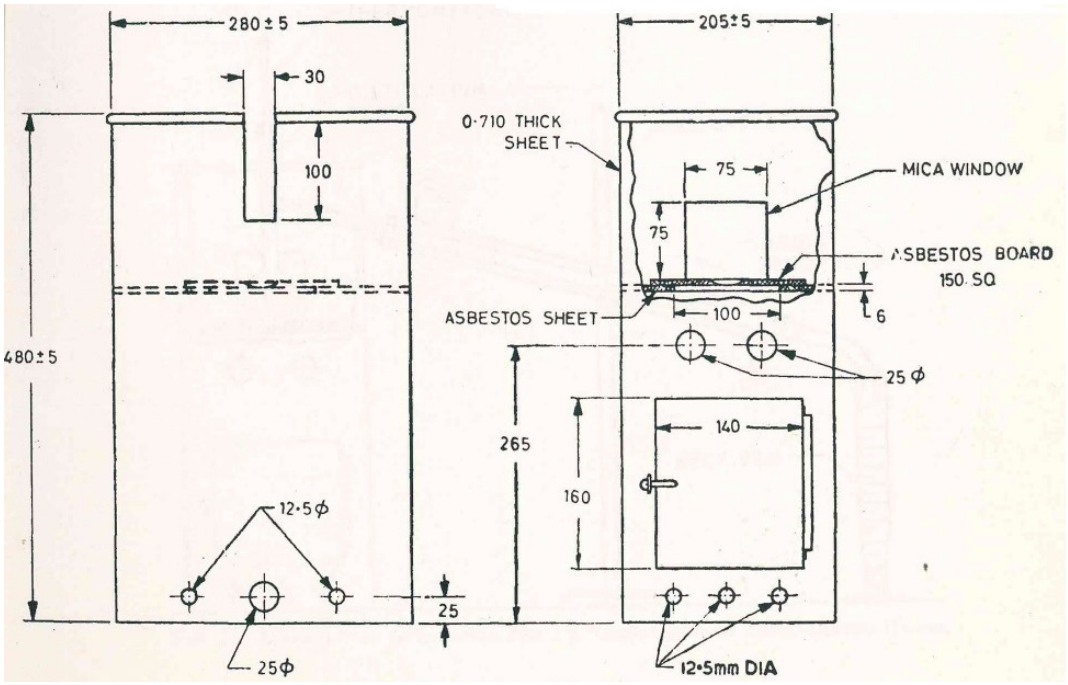
All dimensions in millimetres.

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 s 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 ebullition 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 min nor more than 10 min 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 volumes so recorded is the



All dimensions in millimetres.

FIG. 4 RECTANGULAR DRAUGHT SCREEN

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 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.

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.

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 distilled water into one of the flasks. Add 1.0 ml of the bromophenol blue indicator and,

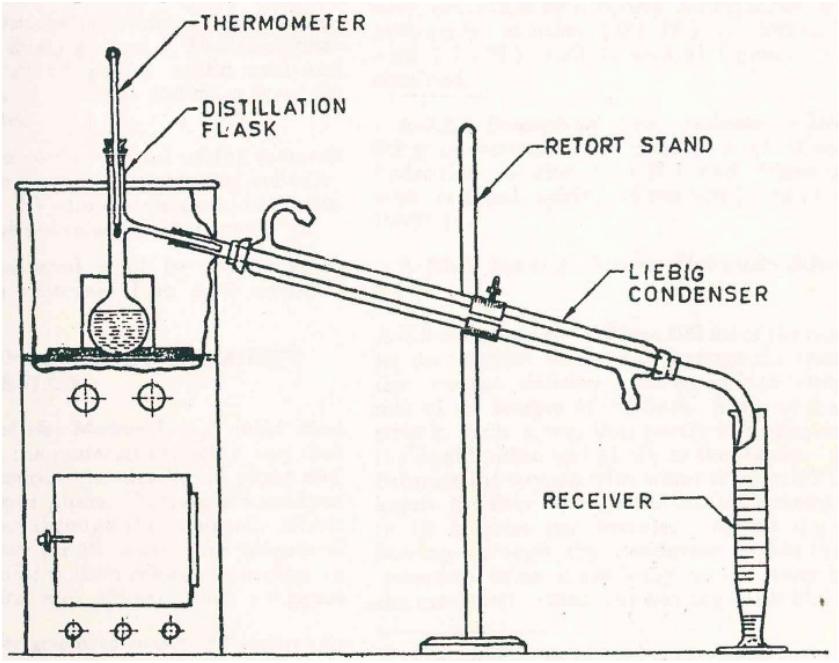


FIG. 5 ASSEMBLY OF APPARATUS FOR DETERMINATION OF DISTILLAION RANGE

if necessary, neutralize by drop-wise 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 about 100 ml 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

$$\text{Alkalinity (as } Na_2CO_3\text{) percent by mass} = \frac{5.3\,VN}{M}$$

Where,

V = Volume in millilitres, of standard hydrochloric acid;

N = Dormality of standard hydrochloric acid; and

M = Mass in g, volume ×relative density.

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).

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 s.

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 h. 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

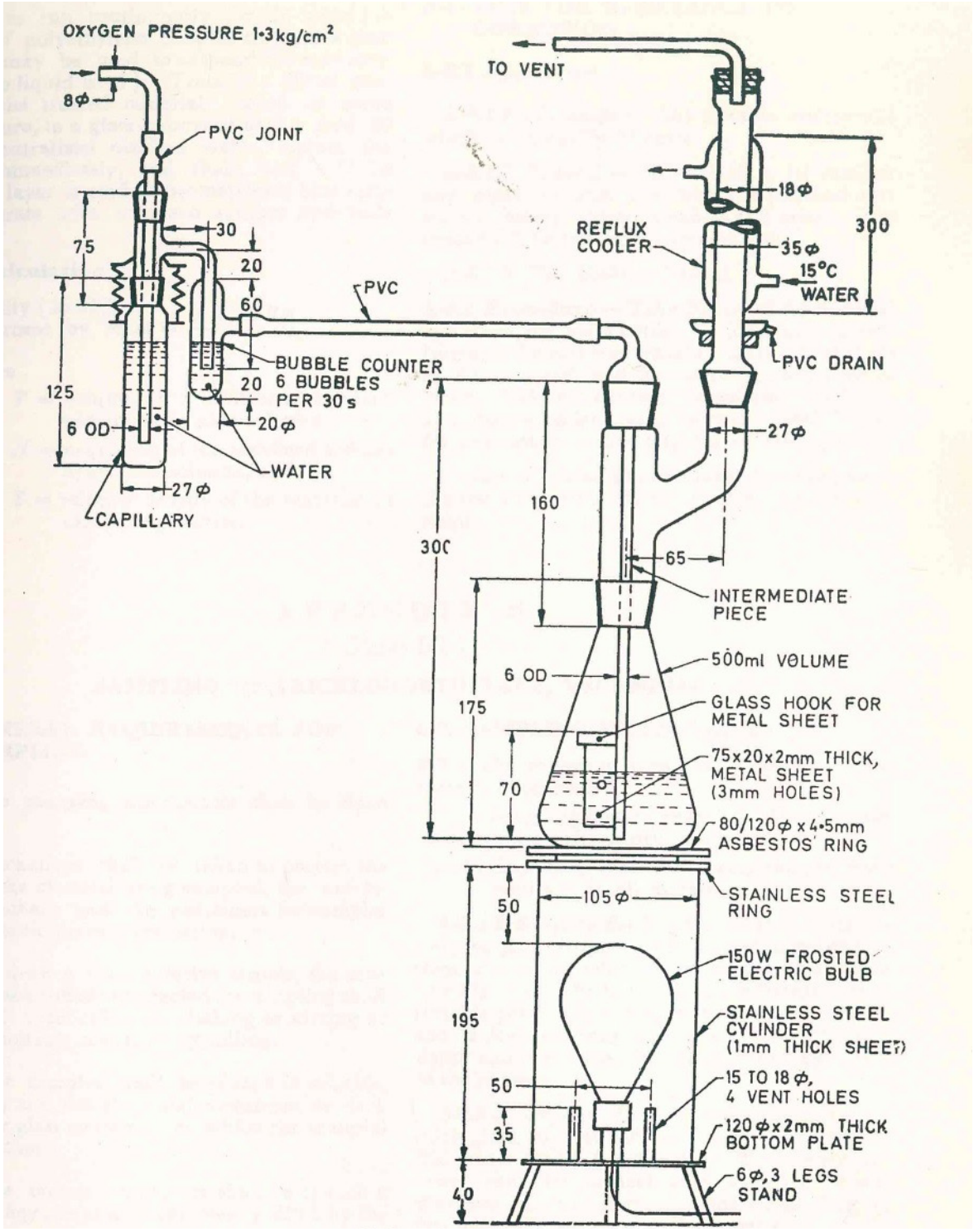
A-7.2.1 *Neutralized Distilled Water* — Measure 100 ml of distilled water into a flask, add 1.0 ml of the bromophenol blue indicator and if necessary, neutralize by dropwise addition of sodium hydroxide solution (0.1 N) or hydrochloric acid (0.1 N) until a neutral (green) tint is obtained.

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).

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 65 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



All dimensions in millimetres.

FIG. 6 APPARATUS FOR DETERMINING STABILITY UNDER REFLUX

bulb and allow the test to run continuously for 48 h (a thread of polyethylene terephthalate or a glass support may be used to suspend the steel strip above the liquid level). Transfer a 20 m1 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

$$\text{Acidity (as HCl) percent by mass} = \frac{0.1823VN}{S}$$

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 m1.

A-8.2 Procedure

Take 200 ml of the material in a clean, dry glass bottle provided with an air tight lid. Immerse the rust free polished carbon steel strips in the material and maintain the same for 24 h. Take out the steel strips after 24 h 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.

ANNEX B

(*Clause* 6.1)

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, material being sampled, 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* **5.2**).

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.

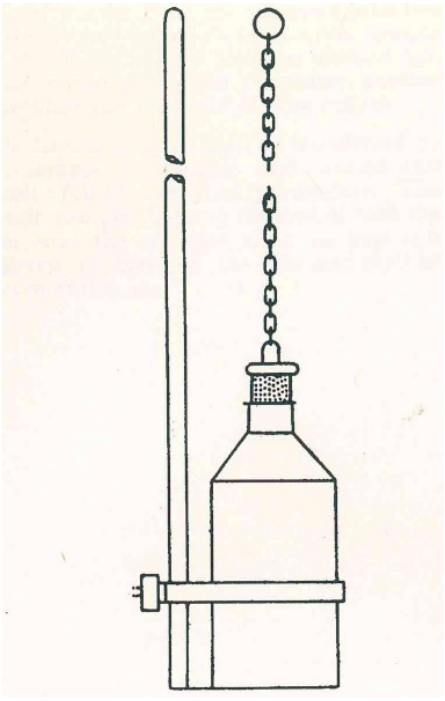
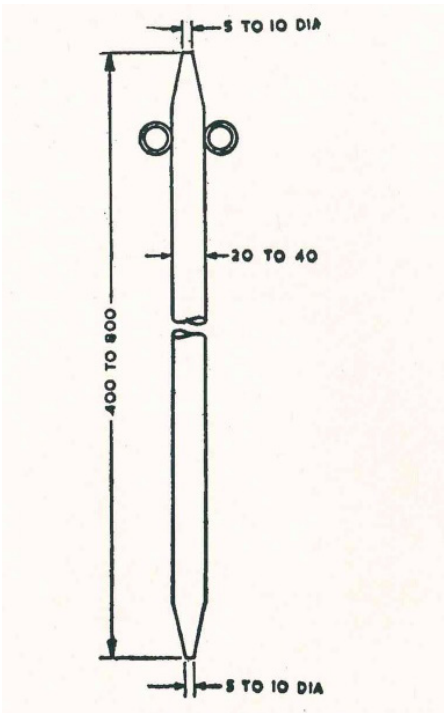


FIG. 7 SAMPLING BOTTLE OR CAN



All dimensions in millimetres.

FIG. 8 SAMPLING TUBE

B-3 SCALE OF SAMPLING

B-3.1 For Tanks and Large Drums

Each tank or drum shall be sampled separately.

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

(*Clause* B-3.2.2)

Sl No.	Lot Size	No. of Containers to be Selected
(1)	(2)	(3)
i)	Up to 15	3
ii)	16 „ 50	4
iii)	51 „ 100	5
iv)	101 „ 150	7
v)	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 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, and 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 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, and 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

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

The lot shall be declared as conforming to this specification if all the test results satisfy the requirements prescribed in **4.1** and Table 1.

ANNEX C

(*Foreword*)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
323 : 2009	Rectified spirit for industrial use — Specification (*second revision*)
878 : 2008/ ISO 4788 : 2005	Laboratory glassware — Graduated measuring cylinders (*second revision*)
1070 : 1992	Reagent grade water — Specification (*third revision*)
4905 : 2015/ ISO 24153 : 2009	Random sampling and randomisation procedures (*first revision*)

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Organic, Chemicals Alcohols and Allied Products Sectional Committee, PCD 09

Organization	*Representative(s)*
Chemical Engineering and Process Development Division, NCL PUNE	Dr C. V. Rode (***Chairman***)
All India Distilleries Association (AIDA), New Delhi	Shri V. N. Raina
Central Drug Research Institute (CDRI), Lucknow	Dr Sanjeev Kanojiya
Central Revenues Control Laboratory, Delhi	Dr T. A. Sreenivasa Rao
Chemical and Petrochemicals Manufacturers Association (CPMA), New Delhi	Shri Kamal Nanavaty
Indian Chemical Council, Mumbai	Dr Mritunjay Chaubey Shri J. I. Sevak (*Alternate*)
Jubilant Life Sciences Ltd, Noida	Shri Hari Mohan Lohani
National Chemical Laboratory, Pune	Dr Udaya Kiran Marelli
UPL Limited Mumbai	Mr M. D. Vachhani, GM (QA)
Alkyl Amines Chemicals Ltd, Mumbai	Shri S. V. Nikumbhe Shri Sameer Katdare (*Alternate*)
All India Alcohol-Based Industries Development Association (AABIDA), Mumbai	Shri K. L. Raphael Shri Kirti Gajjar (*Alternate*)
Godavari Biorefineries Ltd, Mumbai	Shri Shanul Laxmanrao Pagar Wani A. J. (*Alternate*)
Hindustan Organic Chemicals Ltd (HOCL), Mumbai	Dr P. N. Kutty Shri P. Y. Patil (*Alternate*)
India Glycols Limited, Uttarakhand	Shri S. R. Soni Shri Alok Singhal (*Alternate*)
Laxmi Organic Indusrties, Mumbai	Shri J. P. Suryavanshi Dr Vijay S. Mishra (*Alternate*)
Ministry of Chemicals & Fertilizers, New Delhi	Shri Sanjay Bansal Shri Jasbir Singh (*Alternate*)
National Test House, Ghaziabad	Shri Debashis Saha Dr Gopal Krishan (*Alternate*)
BIS Director General, New Delhi	Shri V. K. Diundi, Scientist 'F' and Head (PCD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Chandrakesh Singh
Scientist 'C' (PCD), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

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'.

This Indian Standard has been developed from Doc No.: PCD 09 (14688).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	2323 7617, 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054	2337 8499, 2337 8561, 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, CHANDIGARH 160019	265 0206, 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	2254 1216, 2254 1442, 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East), MUMBAI 400093	2832 9295, 2832 7858, 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE. DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi