

ICS 71.080.20
CCS G 17

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**CHEMICAL INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

HG/T 2542-2014

**Trichloroethylene for industrial use
(English Translation)**

Issued on: May 12, 2014

Implemented on: October 1, 2014

**Issued by: Ministry of Industry and Information Technology of the
People's Republic of China**

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1 Scope

This Standard specifies the classification, requirements, test methods, inspection rules and marks, packaging, transportation, storage and safety of trichloroethylene for industrial use.

This Standard is applicable to trichloroethylene for industrial use that is made from dehydrochlorination of tetrachloroethane.

Molecular formula: C_2HCl_3 .

Structural formula:

Relative molecular mass: 131.39 (according to the 2007 international relative atomic mass).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 190, Packing symbol of dangerous goods

GB/T 191, Packaging - Pictorial marking for handling of goods

GB/T 601, Chemical reagent - Preparations of reference titration solutions

GB/T 603, Chemical reagent - Preparations of reagent solutions for use in test methods

GB 700, Carbon structural steels

GB/T 3143, Color determination method of liquid chemicals (Hazen unit - Platinum- cobalt

scale)

GB/T 4472-2011, Determination of density and relative density for chemical products

GB/T 6283, Chemical products - Determination of water Karl-Fischer method (general method)

GB/T 6324.2, Test method of organic chemical products - Part 2: Determination of dry residue after evaporation on a water bath for volatile organic liquids

GB/T 6678, General principles for sampling chemical products

GB/T 6680, General rules for sampling liquid chemical products

GB/T 6682, Water for analytical laboratory use - Specification and test methods

GB/T 8170, Rules of rounding off for numerical values and expression and judgement of limiting values

GB/T 9722, Chemical reagent - General rules for the gas chromatography

3 Classification

Trichloroethylene is classified into type I and type II products according to different use. Type I products are mainly used as chemical production raw materials, Type II products are mainly used for industrial cleaning.

4.1 Appearance

Transparent liquid, no visible impurities.

4.2 Trichloroethylene for industrial use shall meet the technical requirements shown in Table 1.

Table 1 - Technical requirements and prepare.

5.7.2.2 Hydrochloric acid standard titration solution: $c(\text{HCl}) = 0.01\text{mol/L}$.

When it is required, use 0.1mol/L hydrochloric acid standard titration solution to dilute and prepare.

5.7.2.3 Bromothymol blue indicator solution: 1g/L .

5.7.2.4 Water.

Use 0.01mol/L sodium hydroxide standard titration solution or 0.01mol/L hydrochloric acid standard titration solution to adjust the pH value as 6.6~7.0.

5.7.3 Instruments

5.7.3.1

Micro-burette

10mL. The division value is 0.01mL.

5.7.3.2

Laboratory routine analytical instruments.

5.7.4 Analysis steps

Use measuring cylinders to respectively measure 50mL of specimen and 100mL of water. Place in a separating funnel. Violently oscillate 3min (about 200 times). After static layering, use a transfer pipette to pipette 50mL of water phase into a triangular flask. Add 5~6 drops of bromothymol blue indicator solution. If the solution is yellow, the solution shall be acidic. If the solution is blue, the solution shall be alkaline. If the solution is green, the solution shall be neutral.

When the solution is acidic: Use sodium hydroxide standard titration solution (5.7.2.1) to titrate till the color turns light blue, which shall be the end point.

When the solution is alkaline: Use hydrochloric acid standard titration solution (5.7.2.2) to titrate till the color turns yellow, which shall be the end point.

When the solution is neutral: Process the solution as acidic.

5.7.5 Result calculation

The mass fraction w_1 of acidity (as HCl) or alkalinity (as NaOH) is calculated according to formula (2):

Where,

V_1 - The volume of sodium hydroxide (5.7.2.1) or hydrochloric acid (5.7.2.2) standard titration solution consumed by test material, in milliliters (mL);

c - The accurate value of sodium hydroxide or hydrochloric acid standard titration solution concentration, in moles per liter (mol/L);

V_2 - The volume of test material, in milliliters (mL);

ρ - The specimen density, in grams per liter (g/mL);

M - The molar mass of sodium hydroxide or hydrochloric acid, in grams per mole (g/mol) [$M(\text{NaOH})=40.00$, $N(\text{HCl})=36.46$].

Take the arithmetic mean of two parallel determinations as the report result. The absolute difference of two parallel determinations is not greater than 0.0005%.

5.8.1.1 Reagents

Coulombic coulometric method Karl Fischer reagent (commercially available).

5.8.1.2 Instruments

5.8.1.2.1

Coulomb coulometric moisture analyzer

The accuracy is 0.1 μ g H₂O. The measuring range is 10 μ g~100mg H₂O.

5.8.1.2.2

Balance

The accuracy is 0.01g.

5.8.1.2.3

Air tightness syringe

1mL.

5.8.1.3 Analysis steps

Use a clean and dry 1mL air tightness syringe to take 1mL of specimen. Weigh it on the balance, to the nearest of 0.01g. Immediately inject the specimen into the Coulometric

Karl Fischer moisture analyzer. Weigh the injector again, to the nearest of 0.01g. Obtain the accurate mass of the injected specimen. Carry out the coulometric titration according to the instrument requirements. Read the water mass from the instrument.

Calculate the moisture content or directly read the moisture content from the instrument.

5.8.2 Karl Fischer Volumetric Method

Carry out according to GB/T 6283.

5.8.3 Tolerance

Take the arithmetic mean of two parallel determinations as the report result. The absolute difference of two parallel determinations is not greater than 0.002%.

5.9.1 Method summery

In the acidic medium, free chlorine reacts with potassium iodide to generate free iodine.

When iodine meets starch, it turns blue. The presence or absence of free chlorine is determined by the presence or absence of blue coloration.