



**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

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**Chemicals - Test method for dynamic surface tension -  
Fast-bubble technique**

化学品 动态表面张力的测定 快速气泡法

**(English Translation)**

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### Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard is the same as ASTM D3825-90.2005 "Standard test method for dynamic surface tension by the fast-bubble technique) (English version) in terms of technical content.

The following editorial modifications have been made in this Standard.

- REPLACE "this test method" WITH "this Standard";
- DELETE the foreword, keywords and other informative parts of the original ASTM;
- CONVERT all units and their values INTO China's legal units of measurement;
- ADD heading to the original figures and tables missing heading, and ADJUST the number of the figures, tables and equations in the whole text.

This Standard is proposed by and is under the jurisdiction of National Technical Committee on Hazardous Chemicals of Standardization Administration of China

(SAC/TC 251).

Drafting organizations of this Standard. China Academy of Inspection and Quarantine, China National Chemical Economic and Technical Development Center, Jiangsu Coal Chemical Engineering Design and Research Institute Co., Ltd., Sinochem Chemical Standardization Institute.

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IMPORTANT NOTE. 1.5 This Standard does not purport to address all of the safety concerns (if any) associated with its use. It is the responsibility of the user of this Standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. For specific warning statements, see 7.3, 7.4, and 7.5.

## 1 Scope

This Standard specifies the principle, significance and use, apparatus, reagents and materials, calibration and standardization, test procedure, calculations and report of the determination of dynamic surface tension using chemicals by fast-bubble technique.

This Standard is applicable to the determination of the specific free energy of a liquid-gas surface a short time after formation of the surface.

This Standard is applicable to liquids with vapor pressures up to 30.0 kPa and kinematic viscosities up to 4.0 mm/s at the test temperature.

**NOTE:** Higher viscosities have not yet been investigated.

## 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.

ASTM D1193 Specification for reagent water

ASTM D1331 Test methods for surface and interfacial tension of solutions of surface-active agents

ASTM E1 Specification for ASTM liquid-in-glass thermometers

**7.1 Purity of reagents. Reagent grade chemicals shall be used in all tests. Other grades**

may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

**7.2 Purity of water. Unless otherwise indicated, references to water shall be** understood to mean reagent water conforming to ASTM D1193, Type III.

**7.3 Calibration liquids. reagent grade, covering a wide range of surface tension.**

Acetone, toluene, ethanol, and methanol have been found satisfactory for this purpose.

- a) Acetone. (Warning. Extremely flammable. Vapors may cause flash fire. See A.1 of Annex A).
- b) Toluene. (Warning. Flammable. Vapor harmful. See A.6 of Annex A).
- c) Methanol. (Warning. Flammable. Vapor harmful. See A.5 of Annex A).
- d) Ethanol. (Warning. Flammable. Denatured. See A.4 of Annex A).

**7.4 Cleaning solution. chromic-sulfuric acid (Warning. Causes severe burns. A** recognized carcinogen strong oxidizer, contact with organic material can cause fire. Hygroscopic. See A.2 of Annex A).

**100 mg/L CO<sub>2</sub> with amines (Warning. Compressed gas under high pressure. See**

A.3 of Annex A).

**8.1 Clean the bubbler with cleaning solution, and rinse with water (Warning. Causes**

severe burns. A recognized carcinogen. Strong oxidizer, contact with organic material may cause fire. Hygroscopic. A.2 of Annex A). Condition by soaking in

water for 48 h followed by a final rinse with water.

## **8.2 Set up the apparatus as shown in Figure 2, and bring the thermostat to the desired**

temperature.

**NOTE:** If a test temperature is not specified,  $25\text{ }^{\circ}\text{C} \pm 0.1\text{ }^{\circ}\text{C}$  is recommended.

### Annex A

(normative)

#### Warning statements

##### A.1 Acetone

Extremely flammable. Vapors may cause flash fire.

Keep away from heat, sparks, and open flame.

Keep container dosed.

Use with adequate ventilation.

Vapors may spread long distances and ignite explosively.

Avoid build-up of vapors and eliminate all sources of ignition, especially non-explosion proof electrical apparatus and heaters.

Avoid prolonged breathing of vapor or spray mist.

Avoid contact with eyes and skin.

In case of spillage absorb and flush with large volumes of water.

In case of fire use water, dry chemical, CO<sub>2</sub>, or foam.

##### A.2 Chromic Acid (Cleaning Solution)

Causes severe burns. A recognized carcinogen.

Strong oxidizer - contact with other material can cause fire. Hygroscopic.

Do not get in eyes, on skin, on clothing.

Avoid breathing vapor or mist.

Keep container closed.

Use with adequate ventilation.

Do not take internally.