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Standard Test Method for Determining Atmospheric Chloride Deposition Rate by Wet Candle Method[1]

This standard is issued under the fixed designation G 140; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method ~~describes~~covers a wet candle device and its use in measuring atmospheric chloride deposition (amount of chloride salts deposited from the atmosphere on a given area per unit time).

1.2 Data on atmospheric chloride deposition can be useful in classifying the corrosivity of a specific area, such as an atmospheric test site. Caution must be exercised, however, to take into consideration the season because airborne chlorides vary widely between seasons.

1.3 *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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

~~D1129Terminology Relating to Water~~[2]

~~D1193Specification for Reagent Water~~[2]

~~D2777Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D-19 on Water~~[2]

D 1193 Specification for Reagent Water

D 4458 Test Method for Chloride Ions in Brackish Water, Seawater, and Brines

G 92 Practice for Characterization of Atmospheric Test Sites

2.2 ~~*ISO Standard:*~~ *ISO Standard:*

ISO 9225 Corrosion of Metals and Alloys. Aggressivity of Atmospheres—Methods of Measurement of Pollution Data[3]

3. Significance and Use

3.1 This test method is capable of generating quantitative values of atmospheric chloride deposition specifying milligrams of chloride ions per square metre per day (or other units derived from such values).

NOTE 1—Chlorides in the atmosphere exist as a suspension of liquid droplets or solid particles. They are transported to solid surfaces by gravity, wind, or brownian motions. These transport mechanisms are direction-sensitive so that a vertical cylinder will not necessarily receive the same flux as a horizontal plate, or objects with different sizes and orientations. Therefore, the use of this approach to provide an indication of the deposition of chlorides on objects in atmospheric exposures may not be quantitatively accurate; however, this technique has been successful in classifying the severity of exposure in a variety of marine locations.

3.2 ~~The sites where samples are to be taken and the sampling time periods should be established. A program of six 30-day exposures per year for a period of three years is recommended. More extensive testing may be desirable if large variability is encountered in the results.~~ The sites where samples are to be taken and the sampling time periods should be established. A continuous program of monthly or 30-day exposures is recommended for site characterization. Seasonal monitoring may be performed if there are specific periods of interest.

~~[1] This test method is under the jurisdiction of ASTM Committee G-1 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.04 on Atmospheric Corrosion.~~

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[1] This test method is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.04 on Atmospheric Corrosion.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* ~~, Vol 11.01.~~volume information, refer to the standard's Document Summary page on the ASTM website.

~~[3] Annual Book of ASTM Standards, Vol 03.02.~~

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

4. Apparatus

4.1 *Components*—The components needed to construct one wet candle device are as follows:

4.1.1 *Erlenmeyer Flask*, narrow mouth, 500 mL, (glass or polypropylene). Other size flasks may be used, but dimensions in Fig. 1 will have to be adjusted accordingly.

NOTE 2—Polypropylene flasks are recommended during threat of freezing weather.

4.1.2 *Glass Test Tube*, general purpose, 16 by 150-mm length.

4.1.3 *Solid Rubber or Neoprene Stopper* , No. 7, diameter top 38 mm, bottom 30 mm.

4.1.4 *Cotton Bandage Gauze*, strip, 50 mm wide and approximately 1500 mm long.

NOTE 3—The overall length of the gauze may vary with installation.

4.1.5 *Type IV Reagent Water*, 1 L, 200 mL CHOH (CH_2OH_2) (glycerin) and 20 drops $CH_3(CH_2)_6$~~COOH (octanoic acid) should be added to prevent freezing, if necessary.~~ COOH (octanoic acid) should be added to prevent freezing, if necessary (See Specification D 1193).

4.1.6 *Gloves*, vinyl, one pair.

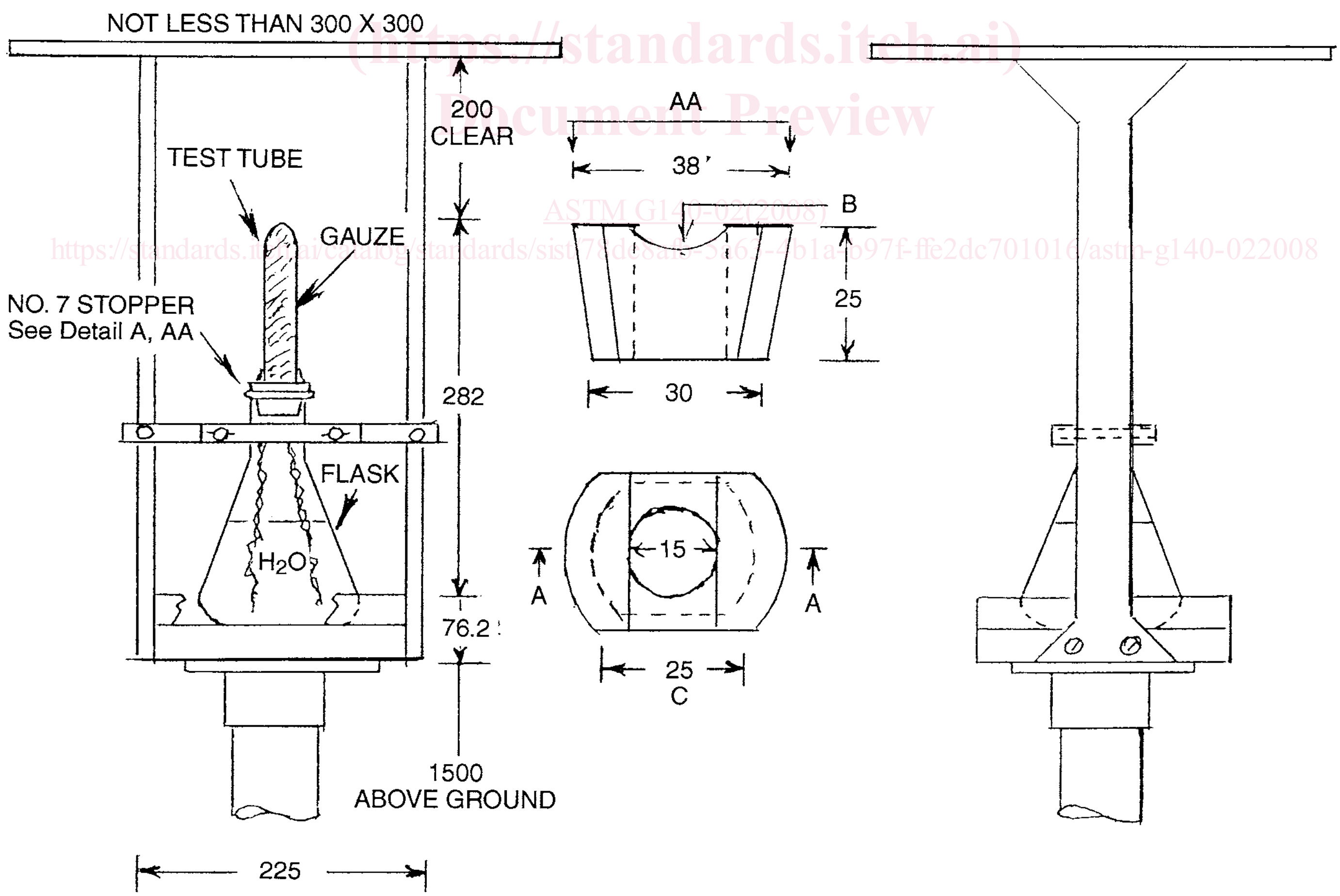
NOTE 4—Poly(vinyl chloride) (PVC) is recommended. Latex gloves are not acceptable, as their chloride content is reported to be comparable to that of human hands.

4.2 *Support Stand*—A suitable support stand shall be erected at the site where the atmosphere is to be sampled. A treated wood post (100 by 100 by 2250 mm) or galvanized pipe (42-mm diameter by 2250-mm length) with an attached plate on top ~~are~~is suitable, with 750 mm in the ground and 1500 mm above the ground on which the apparatus to hold the candle can be mounted (see Fig. 1). The apparatus shall be mounted so that the arms supporting the rain cover do not shield the gauze from a known source of chloride.

4.3 *Assembly of the Wet Candle Apparatus* (see Fig. 1):

4.3.1 The rubber stopper must be modified.

4.3.1.1 In the center, bore a hole 15 mm in diameter through the stopper.



NOTE 1—Dimensions are in millimetres (mm).

FIG. 1 Wet Candle Chloride Apparatus