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Designation: D 4902 – 99 (Reapproved 2004)

### Standard Test Method for Evaporation and Drying of Analytical Solutions<sup>1</sup>

This standard is issued under the fixed designation D 4902; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

#### 1. Scope

1.1 This test method covers a procedure for the evaporating and drying of the 100 mL portions of analytical solution, obtained in the methods for vegetable tannin analysis, so that consistent results may be obtained for the determination of total solids, soluble solids, and non-tannins in the sample. This test method is also intended for use in determining the moisture in the hide powder samples and the moisture in raw and spent materials in the methods for vegetable tannin analysis.

#### 2. Referenced Documents

- 2.1 *ASTM Standards:*<sup>2</sup>  
 D 4903 Test Method for Total Solids and Water in Vegetable Tanning Material Extracts  
 D 6401 Test Method for Determining Non-Tannins and Tannin in Extracts of Vegetable Tanning Materials  
 D 6402 Test Method for Determining Soluble Solids and Insolubles in Extracts of Vegetable Tanning Materials  
 D 6403 Test Method for Determining Moisture in Raw and Spent Materials  
 2.2 *ALCA Methods:*  
 A13 Evaporation and Drying of Analytical Solutions<sup>3</sup>

#### 3. Summary of Test Method

3.1 This test method describes a procedure for evaporation and drying of the 100 mL portions of the analytical solution obtained in Test Methods D 4903, D 6401, and D 6402, so that

consistent results may be obtained for the determination of total solids, soluble solids, and non-tannins in the sample. This test method is also intended for use in determining the moisture in the air-dry and prepared, wet, hide powders used in Test Method D 6401 and the moisture in raw and spent materials in Test Method D 6403.

#### 4. Significance and Use

- 4.1 The test method is useful for determining the solid residue in analytical solutions.  
 4.2 Because of the possibility of unknown errors in this test method, it is essential that the procedure be followed exactly in order to obtain reproducible results both among specimens within a laboratory and for analyses between laboratories.

#### 5. Apparatus

- 5.1 *Drying Oven*—Forced-air convection oven (or mechanical-convection draft oven) capable of maintaining a temperature of  $100^{\circ} \pm 2.0^{\circ}\text{C}$ .  
 5.2 *Thermometer*—Accurate to  $\pm 0.2^{\circ}\text{C}$ , should be used to check and monitor the oven set point.  
 5.3 *Desiccators and Desiccant:*  
 5.3.1 The desiccators used can be of any convenient form or size, but be at least 4 in. in diameter for a single tannin dish.  
 5.3.2 Any normal desiccating agent such as calcium sulfate, calcium chloride, or silica gel may be used.

#### 6. Procedure

- 6.1 The thermometer having been checked and the oven

Designation: D 5515 – 97 (Reapproved 2004)<sup>1</sup>

### Standard Test Method for Determination of the Swelling Properties of Bituminous Coal Using a Dilatometer<sup>1</sup>

This standard is issued under the fixed designation D 5515; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>1</sup> Note—Editorial changes were made throughout in May 2004.

#### INTRODUCTION

The principle of this test method is that the final volume of char obtained at the conclusion of a standard dilatation test is dependent on the mass of coal in the coal pencil and on the radius of the retort tube. This test method incorporates a procedure which: determines the mass of air-dried coal in the coal pencil; provides a means to measure the average retort tube radii; and employs a means to report coal expansion on an air dried coal weight basis.

Other test methods used to determine the swelling properties of bituminous coals include the Ruhr (ISO 8264) and Audibert-Arnu (ISO 349) International Standard Organization (ISO) test methods. However these two ISO test methods provide consistently different values for percent dilatation and percent contraction. Percent contraction and dilatation values obtained using the Audibert-Arnu test method are higher and lower respectively than those obtained using the Ruhr test method. These differences have been attributed to trimming the length of the coal pencil from different ends. The Audibert-Arnu test method specifies that the wider end of the coal pencil be trimmed while the Ruhr test method specifies that the narrower end of the coal pencil be trimmed.

#### 1. Scope

- 1.1 This test method specifies a procedure for the measurement of the swelling of bituminous coal using a dilatometer.  
 1.2 The test method is limited in applicability to those coals which have a free swelling index  $\geq 1$  as determined in accordance with Test Method D 720.  
 1.3 The values stated in SI units (IEEE/ASTM SI-10) are to be regarded as standard.  
 1.4 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 applica-

- D 2013 Method of Preparing Coal Samples for Analysis  
 D 2234/D 2234M Practice for Collection of a Gross Sample of Coal  
 IEEE/ASTM SI-10 Standard for Use of the International System of Units (SI): The Modern Metric System  
 2.2 *International Standardization Organization (ISO) Standards:*<sup>2</sup>  
 ISO 349 Hard Coal-Audibert-Arnu Dilatometer Test  
 ISO 8264 Hard Coal—Determination of the Swelling Properties Using a Dilatometer

#### 3. Terminology

- 3.1 *Abbreviations*—See Table 1.

Designation: D 5359 – 98 (Reapproved 2004)

### Standard Specification for Glass Cullet Recovered from Waste for Use in Manufacture of Glass Fiber<sup>1</sup>

This standard is issued under the fixed designation D 5359; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

#### 1. Scope

1.1 This specification describes glass cullet recovered from municipal waste destined for disposal. The recovered cullet is intended for use in the manufacture of glass fiber used for insulation-type products.

#### 2. Referenced Documents

- 2.1 *ASTM Standards:*<sup>2</sup>  
 C 162 Terminology of Glass and Glass Products  
 D 4129 Test Method for Total and Organic Carbon in Water by High-Temperature Oxidation and Coulometric Detection  
 E 688 Test Methods for Waste Glass as a Raw Material for Glass Manufacturing

#### 3. Terminology

3.1 For definitions of terms used in this specification, refer to Terminology C 162.

#### 4. General Requirements

4.1 Glass cullet from municipal waste is primarily soda-lime bottle glass and shall be one of three grades depending upon the total usage rate requirement of the user. The three grades shall satisfy the following chemical composition, color mix, contamination, and particle size requirements as listed in Section 4.  
 4.2 *Chemical Composition*—See Table 1.

4.3 *Color Mix*—Color is an indicator of the oxidation state of container cullet.  $\text{SO}_2$  gas solubility in the glass melt is a function of the glass oxidation state. Changes in the oxidation

TABLE 1 Chemical Composition

Oxide	Grade 1		Grade 2		Grade 3	
	Weight %	± Range %	Weight %	± Range %	Weight %	± Range %
$\text{SiO}_2$	68–77	NA	68–77	1.00	68–77	1.00
$\text{Al}_2\text{O}_3$	0–7	NA	0–7	0.50	0–7	0.50
$\text{CaO}$	5–15	NA	5–15	0.50	5–15	0.50
$\text{MgO}$	0–5	NA	0–5	0.50	0–5	0.50
$\text{Na}_2\text{O}$	8–18	NA	8–18	0.50	8–18	0.50
$\text{K}_2\text{O}$	0–4	NA	0–4	0.50	0–4	0.50
$\text{Fe}_2\text{O}_3$	<0.5	NA	<0.5	0.05	<0.5	0.05
$\text{Cr}_2\text{O}_3$	<0.2	NA	<0.15	0.03	<0.1	0.02
$\text{SO}_2$	<0.4	NA	<0.3	0.03	<0.2	0.02
All other oxides	<0.5	NA	<0.3	0.05	<0.1	0.02
$\text{C}^*$	<0.15	NA	<0.10	0.02	<0.05	0.01
$\text{H}_2\text{O}$	<0.5	NA	<0.5	0.05	<0.5	0.05
$\text{LOI}$	<0.45	NA	<0.30	0.05	<0.15	0.03

\* Carbon is determined directly by instrumental method such as Coulometric, Inc. Model 5010 Coulometer. Test Method D 4129 uses this instrumentation for total and organic carbon in water. The instrument can be readily adapted to solid materials such as cullet.

means a change in the glass FeO content. This affects the heat transfer in the melt and can affect furnace efficiency and glass quality. See Table 2.

4.4 *Contaminants*—Free metals, magnetic or nonmagnetic, are not oxidized in the glass melting process and, therefore, are insoluble. Metals will pool on the furnace floor and leak through joints causing premature wear of refractories and electrical shorts, which can lead to glass leaks. Some metals will attack and destroy precious metal skimmers and thermo-



## Standard Test Method for 1,2-Dibromoethane and 1,2-Dibromo-3-Chloropropane in Water by Microextraction and Gas Chromatography<sup>1</sup>

This standard is issued under the fixed designation D 5316; 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 approval. A superscripted epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or approval.

### 1. Scope

1.1 This test method covers the determination of 1,2-dibromoethane (commonly referred to as ethylene dibromide or EDB) and 1,2-dibromo-3-chloropropane (commonly referred to as DBCP) in water at a minimum detection level of 0.010  $\mu\text{g/L}$  by liquid-liquid extraction combined with gas-liquid chromatography. This test method is applicable to the analysis of drinking waters and groundwaters. It is not recommended for wastewaters, due to the potential for interferences from high concentrations of other extractable organics. Similar information can be found in EPA Method 504.

1.2 This test method was used successfully with reagent water and groundwater. It is the user's responsibility to ensure the validity of this test method for waters of untested matrices.

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. For specific hazard statements, see Sections 6 and 9.*

### 2. Referenced Documents

- 2.1 *ASTM Standards:*<sup>2</sup>
- D 1066 Practice for Sampling Steam
  - D 1129 Terminology Relating to Water
  - D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits<sup>3</sup>
  - D 1193 Specification for Reagent Water
  - D 3370 Practices for Sampling Water from Closed Conduits
  - D 3856 Guide for Good Laboratory Practices in Laboratory

D 5789 Practice for Writing Quality Control Specifications for Standard Test Methods for Organic Constituents<sup>3</sup>

2.2 *U.S. Environmental Protection Agency Standards:*  
Winfield, T. W., "U.S. EPA Method 504, Revision 2.0," *Methods for the Determination of Organic Compounds in Drinking Water*, 1989<sup>4</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1129.

### 4. Summary of Test Method

4.1 This test method consists of microextraction of the sample followed by gas chromatographic analysis of the extract.

4.2 An aliquot of the sample is extracted with hexane. Two  $\mu\text{L}$  of the extract are then injected into a gas chromatograph equipped with a linearized electron capture detector for separation and analysis. Aqueous calibration standards are extracted and analyzed in an identical manner as the samples in order to compensate for possible extraction losses.

4.3 The extraction and analysis time is 30 to 50 min per sample, depending upon the analytical conditions chosen.

4.4 Confirmatory evidence can be obtained using a dissimilar column. When component concentrations are sufficiently high, Gas Chromatography/Mass Spectrometric (GC/MS) methods may be used for confirmation analysis. (See EPA Method 524.2.)

### 5. Significance and Use

The standards of the American Society for Testing Materials (ASTM) have been around since 1898, and are one of the largest standard development organizations in the world, according to TSI Energy Solutions. In addition, there are several industries that are supervised and charged with the following ASTM standards. What is an ASTM standard? An ASTM standard is a document that was created to establish formal procedures and guidelines for different industries to follow, according to ASTM. An ASTM standard PDF is prepared and published using the ASTM International consensus standards. Consent ensures that the document meets the requirements that generate the procedural and regulatory constraints of ASTM, thus satisfying the standards of ASTM International. Improving people's lives is the goal of the American Society for Testing Materials, according to ASTM. Advanced and unique business services, improved performance processes and a deeper understanding of business and consumer needs and priorities they are used in the creation of standards that work for millions of people on a daily basis, according to TSI Energy Solutions. ASTM Members Worldwide, there are approximately 30,000 ASTM members located in 140 different countries, according to TSI Energy Solutions. Engineering, science and the best judgment of professionals from different industries all contribute to the creation of ASTM standards. Over 12,500 global standards have been developed during the 120 years of ASTM's existence. The broad collaboration and depth of the members' industrial knowledge adds to the recognition and acceptance of ASTM standards by various organizations. The five ASTM objectives are a set of five strategic objectives (or objectives) used to drive ASTM, as noted by TSI Energy. The first two of these goals are leadership and vitality organization. The development of technical content and services are the next two goals of ASTM. The experience and expertise of ASTM members is used by ASTM to establish the rules. When companies and organizations attribute these five ASTM objectives, it helps guide them in observing best business practices. ASTM International Standards formats of formats available to access the 12,000 standards published by ASTM International are available for purchase and you can purchase electronic or printed copies of specific standards on the Internet from ASTM. ASTM standards are documents developed and published by ASTM International. ASTM in full form is American Society for Testing and Materials, the old name of the organization. Although the rules are voluntary, they are often quoted and incorporated into codes, regulations and laws around the world. The standards are drawn up and drafted by the members of the ASTM Technical Committees, which include manufacturers, users, consumers and stakeholders, many of whom are scientists. ASTM develops six types of standards. ASTM is an acronym for American Society for Testing and Materials and has created six types of regulations that concern production processes such as testing, classification of materials and operation. The six types are test methods, specifications, classification, practice, guidance and terminology standards. A standard on test methods contains a brief and informative description of a procedure for determining a property or a component of a material, a collection of materials or a product. In order to obtain satisfactory accuracy, the test method must include details of test, the sample to be analyzed, the test procedure and Calculation of data obtained from the test. An example could consist of standard test methods for pressure awareness Tapes used for electrical and electronic applications. This standard describes the tests to assess the safety of electrical tapes. If all electric tapes are evaluated with the same test, it is easier to determine which tape is most suitable for a particular use. A specification standard contains a detailed set of conditions and provisions that a material, product, system or service must meet. It shall also identify appropriate test methods to determine whether it meets the criteria of the standard. The standard file folder specification for permanent record storage outlines what quality file folders used for record storage and documents should have in order to reach a maximum life span. A classification standard defines the requirements for the systematic classification of materials, products, systems or services into groups. Examples of requirements are origin, composition, physical properties and chemical properties. The standard copper classification shall include the types of copper available in refinery forms and in processed products. When companies use this standard to classify copper they sell, it allows buyers to more easily compare the prices of the same product from different companies before making a purchase. A standard of practice provides specific instructions for carrying out a specific task or operation. For example, the Practice Standard for Functional Control and Control of Alpine/Attach/Shoe Ski Systems describes the procedures for the control and regulation of Alpine/Attach/Shoe Ski Systems. A standard guide has different choices or instructions, but does not recommend a particular action. Depending on the individual situation, the user chooses the most appropriate choice or instructions for the situation. The Standard Guide for the Examination of Articles Written helps examiners Forensics to decide which procedure to use to examine a typescript document, perhaps for a criminal investigation. A terminological provision outlines and defines terms, symbols, symbols, and acronyms used in a sector or industry. Because most chemicals can have more than one name, The standard terminology of aromatic hydrocarbons and related chemicals allows scientists and other chemical users to read a document or article written by others and to easily understand and identify which chemicals are under discussion without the author having to provide extensive definitions within the document. document.

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