



# Standard Guide for Sampling and Testing Volatile Solvents and Chemical Intermediates for Use in Paint and Related Coatings and Material<sup>1</sup>

This standard is issued under the fixed designation D 268; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope \*

1.1 This guide covers procedures for the sampling and testing of volatile solvents used in the manufacture of paint, lacquer, varnish, and related products. The test methods are listed in Table 1.

1.2 For specific hazard information and guidance, see Suppliers' Material Safety Data Sheet for materials listed in this guide.

1.3 *This standard does not purport to address 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.*

## 2. Referenced Documents

### 2.1 ASTM Standards:

- D 13 Specification for Spirits of Turpentine<sup>2</sup>
- D 56 Test Method for Flash Point by Tag Closed Tester<sup>3</sup>
- D 86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure<sup>3</sup>
- D 93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester<sup>3</sup>
- D 130 Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test<sup>4</sup>
- D 156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)<sup>3</sup>
- D 233 Methods of Sampling and Testing Turpentine<sup>2</sup>
- D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)<sup>4</sup>
- D 329 Specification for Acetone<sup>4</sup>
- D 611 Test Method for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents<sup>3</sup>
- D 847 Test Method for Acidity of Benzene, Toluene, Xy-

TABLE 1 List of Test Methods

Test Method	Section	ASTM Method
Acidity in:		
Aromatic hydrocarbons	11	D 847
Volatile solvents	11	D 1613
Acid wash color of aromatics	23	D 848
Alcohols in ketones	18	D 2804, D 3329
Alkalinity in acetone	12	D 1614
Aromatics in mineral spirits	25	D 3257
Color, platinum cobalt scale	6	D 1209
Copper corrosion test:		
Aromatic hydrocarbons	14	D 849
Mineral spirits	14	D 130
Distillation range:		
Aromatic hydrocarbons	7	D 850
Mineral spirits, turpentine	7	D 86
Volatile organic liquids	7	D 1078
Ester value	13	D 1617
Esters, purity	13	D 3545
Flash point:		
Pensky-Martens closed cup	17	D 93
Tag closed cup	17	D 56
Tag open cup	17	D 1310
Setaflash tester	17	D 3278
Method surveys:		
Ethylene and propylene glycols	22	E 202
Methanol	21	E 346
Nonaromatics in aromatics	24	D 2360
Nonvolatile matter	8	D 1353
Odor	9	D 1296
Paraffins in aromatics	24	D 2360
Permanganate time for acetone and methanol	16	D 1363
Purity of ketones	18	D 2192, D 2804, D 3329, D 3893
Sampling	4	E 300
Solvent power evaluation:		
Aniline point and mixed aniline point of petroleum products and hydrocarbon solvents	19	D 611
Kauri-butanol value of hydrocarbon solvents	19	D 1133
Dilution ratio in cellulose nitrate solution for active solvents, hydrocarbon diluents, and cellulose nitrates	19	D 1720
Specific gravity	5	D 891, D 2935, D 3505, D 1555
Sulfur as hydrogen sulfide and sulfur dioxide	15	D 853
Water:		
Fischer reagent titration method	10	D 1364, E 203
Turbidity method	10	D 1476
Water miscibility of water-soluble solvents	20	D 1722

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.03.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 06.04.

\*A Summary of Changes section appears at the end of this standard.

lenes, Solvent Naphthas, and Similar Industrial Aromatic Hydrocarbons<sup>4</sup>

D 848 Test Method for Acid Wash Color of Industrial Aromatic Hydrocarbons<sup>4</sup>

D 849 Test Method for Copper Strip Corrosion of Industrial Aromatic Hydrocarbons<sup>4</sup>

D 850 Test Method for Distillation of Industrial Aromatic Hydrocarbons and Related Materials<sup>4</sup>

D 853 Test Method for Hydrogen Sulfide and Sulfur Dioxide Content (Qualitative) of Industrial Aromatic Hydrocarbons<sup>4</sup>

D 891 Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals<sup>5</sup>

D 1078 Test Method for Distillation Range of Volatile Organic Liquids<sup>4</sup>

D 1133 Test Method for Kauri-Butanol Value of Hydrocarbon Solvents<sup>4</sup>

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>4</sup>

D 1296 Test Method for Odor of Volatile Solvents and Diluents<sup>4</sup>

D 1310 Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus<sup>6</sup>

D 1353 Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products<sup>4</sup>

D 1363 Test Method for Permanganate Time of Acetone and Methanol<sup>4</sup>

D 1364 Test Method for Water in Volatile Solvents (Karl Fischer Reagent Titration Method)<sup>4</sup>

D 1476 Test Method for Heptane Miscibility of Lacquer Solvents<sup>4</sup>

D 1555 Test Method for Calculation of Volume and Weight of Industrial Aromatic Hydrocarbons<sup>4</sup>

D 1613 Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products<sup>4</sup>

D 1614 Test Method for Alkalinity in Acetone<sup>4</sup>

D 1617 Test Method for Ester Value of Solvents and Thinners<sup>4</sup>

D 1720 Test Method for Dilution Ratio of Active Solvents in Cellulose Nitrate Solutions<sup>4</sup>

D 1722 Test Method for Water Miscibility of Water-Soluble Solvents<sup>4</sup>

D 2192 Test Method for Purity of Aldehydes and Ketones<sup>4</sup>

D 2360 Test Method for Trace Impurities in Monocyclic Aromatic Hydrocarbons by Gas Chromatography<sup>4</sup>

D 2804 Test Method for Purity of Methyl Ethyl Ketone by Gas Chromatography<sup>4</sup>

D 2935 Test Method for Apparent Density of Industrial Aromatic Hydrocarbons<sup>4</sup>

D 3257 Test Methods for Aromatics in Mineral Spirits by Gas Chromatography<sup>4</sup>

D 3278 Test Method for Flash Point of Liquids by Small Scale Closed-Cup Apparatus<sup>6</sup>

D 3329 Test Method for Purity of Methyl Isobutyl Ketone by Gas Chromatography<sup>4</sup>

D 3505 Test Method for Density or Relative Density of Pure Liquid Chemicals<sup>4</sup>

D 3545 Test Method for Alcohol Content and Purity of Acetate Esters by Gas Chromatography<sup>4</sup>

D 3893 Test Method for Purity of Methyl Amyl Ketone and Methyl Isoamyl Ketone by Gas Chromatography<sup>4</sup>

E 12 Terminology Relating to Density and Specific Gravity of Solids, Liquids, and Gases<sup>5</sup>

E 201 Test Method for Calculation of Volume and Weight of Industrial Chemical Liquids<sup>5</sup>

E 202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols<sup>5</sup>

E 203 Test Method for Water Using Karl Fischer Reagent<sup>5</sup>

E 300 Practice for Sampling Industrial Chemicals<sup>5</sup>

E 346 Method for Analysis of Methanol<sup>5</sup>

### 3. Significance and Use

3.1 A brief discussion of each test method is given with the intent of helping the user in the selection of the most applicable procedure where more than one is available.

### 4. Sampling

4.1 Representative samples are a prerequisite for the evaluation of any product. The directions for obtaining representative samples cannot be made explicit to cover all cases and must be supplemented by judgment, skill, and sampling experience. It is recommended that Practice E 300 be employed in sampling liquid solvents.

### 5. Specific Gravity

5.1 Specific gravity of liquids is defined in Terminology E 12 as “the ratio of the mass of a unit volume of a material to the mass of the same volume of gas-free distilled water at a stated temperature.” When the stated temperature of the water is 4.0°C, specific gravity and density are numerically equal.

5.2 The apparent specific gravity of liquid is defined in Terminology E 12 as “the ratio of the weight in air of a unit volume of material at a stated temperature to the weight in air of equal density of an equal volume of gas-free, distilled water at a stated temperature.”

NOTE 1—Specific gravity or density is an intrinsic property of all substances and can to a degree be used to identify them. When such substances are of high purity, specific gravity may be used in support of other properties to define their degree of purity. The use of specific gravity for such purposes, however, is valid only when all components and their relative effects upon the specific gravity of the system are known.

5.3 The choice of test method for determining specific gravity is largely dependent on the degree of accuracy required. In general, when the product specification requires an accuracy to the third decimal place, the hydrometer or specific gravity balance method may be employed. When the product specification requires an accuracy to the fourth decimal place, a pycnometer method should be employed. Test Methods D 891 give procedures using all three techniques.

5.4 With specific reference to the determination of density or specific gravity of a number of aromatic and cyclic hydrocarbon solvents, Test Method D 3505 describes a simplified procedure for this measurement.

<sup>5</sup> Annual Book of ASTM Standards, Vol 15.05.

<sup>6</sup> Annual Book of ASTM Standards, Vol 06.01.

5.5 Methods for converting specific gravity data to weight and volume data at various temperatures are given in Method E 201 for oxygenated and chlorinated compounds, and for aromatic hydrocarbons in Test Method D 1555.

5.6 The measurement of density of aromatic hydrocarbons at any convenient temperature, and the conversion of the data to an applicable specification or storage temperature are described in Test Method D 2935.

## 6. Color

6.1 The property of color of a solvent will vary in importance with the application for which it is intended, the amount of color that can be tolerated being dependent on the color characteristics of the material in which it is used. The paint, varnish, and lacquer solvents, or diluents commercially available on today's market normally have little or no color. The presence or absence of color in such material is an indication of the degree of refinement to which the solvent has been subjected or of the cleanliness of the shipping or storage container in which it is handled, or both (see Test Method D 1209).

NOTE 2—For a number of years the term “water-white” was considered sufficient as a measurement of solvent color. Several expressions for defining “water-white” gradually appeared and it became evident that a more precise color standard was needed. This was accomplished in 1952 with the adoption of Test Method D 1209 using the platinum cobalt scale. This method is similar to the description given in the *Standard Methods for the Examination of Water and Waste Water* of the American Public Health Assn., 14th Ed., p. 65 and is referred to by many as “APHA Color.” The preparation of these platinum-cobalt color standards was originally described by Hazen, A., *American Chemical Journal*, Vol. XIV, 1892, p. 300, in which he assigned the number 5 (parts per ten thousand) to his platinum-cobalt stock solution. Subsequently, in their first edition (1905) of *Standard Methods for the Examination of Water*, the American Public Health Assn., using exactly the same concentration of reagents, assigned to color designation 500 (parts per million) which is the same ratio. The parts per million nomenclature is not used since color is not referred directly to a weight relationship. It is therefore recommended that the incorrect term “Hazen Color” should not be used. Also, because it refers primarily to water, the term “APHA Color” is undesirable. The recommended nomenclature for referring to the color of organic liquids is “Platinum-Cobalt Color, Test Method D 1209.”

NOTE 3—The petroleum industry uses the Saybolt colorimeter Test Method D 156 for measuring and defining the color of hydrocarbon solvents; however, this system of color measurement is not commonly employed outside of the petroleum industry. It has been reported by various sources that a Saybolt color of +25 is equivalent to 25 in the platinum-cobalt system or to colors produced by masses of potassium dichromate ranging between 4.8 and 5.6 mg. dissolved in 1 L of distilled water. Because of the differences in the spectral characteristics of the several color systems being compared and the subjective manner in which the measurements are made, exact equivalencies are difficult to obtain.

## 7. Distillation Range

7.1 The distillation range of an organic solvent is an empirical set of data peculiar to the solvent under study and the apparatus used giving the purchaser an indication of the product quality available to him.

NOTE 4—The distillation range provides information on the initial boiling point, percent distilled at certain temperatures, and the dry point. These parameters may be affected by improper refining techniques, impurities inherent in the sample, or contamination. It is absolutely necessary that the purchaser and seller employ the same type of apparatus,

including thermometers, and follow an identical procedure as agreed upon. If these factors are not followed precisely, it is quite possible disagreement will result between the parties.

7.2 Three test methods are available for determining the distillation range of solvents. The major differences among the three methods are the size of distillation flasks and type of thermometers (partial or total immersion) employed. Flask size has little to no effect on the results obtained between laboratories beyond the limits of error noted for each test method. The advantage of the larger size flask is to prevent “boil over” when high-boiling products, processing relatively high coefficients of expansion are being tested. On the other hand, differences between laboratories will be large when one laboratory employs a partial immersion thermometer and another a total immersion instrument. The spread between results will increase as the boiling range rises above 100°C. Partial immersion thermometers are preferred for narrow boiling products since they require no emergent stem temperature correction. The type of heat source may affect the distillation range of products boiling within 1 or 2°C. This is especially true for low-boiling solvents such as methyl alcohol or acetone. A large electric heater tends to distort the dry point due to the heating effect of infrared radiation on the bulb of the thermometer, while a properly adjusted gas burner minimizes this effect. The following test methods are commonly used in determining distillation ranges:

7.2.1 *Test Method D 1078*, using a 200-mL flask, high-precision partial immersion thermometers, and gas or electric heat. The latter may be used only after it has proven to give results comparable to those obtained when using gas heat. The method was designed specifically for determining the distillation range of volatile solvents used in coating compositions, but is applicable to any volatile organic liquid that boils between 30 and 300°C, and is chemically stable during the distillation process.

7.2.2 *Test Method D 850*, using a 200-mL flask, partial immersion thermometer, and electric or gas heat. This method is applicable to industrial aromatic hydrocarbons and related products. It is particularly suited to narrow boiling hydrocarbons or mixtures of hydrocarbons.

7.2.3 *Test Method D 86*, using a 100-mL flask for products showing an end point below 250°C, a 125-mL flask for products showing an end point above 250°C, total immersion thermometers, and electric or gas heat. This method is applicable to mineral spirits conforming to Specification D 235, and to spirits of turpentine conforming to Specification D 13, using partial immersion thermometers in accordance with Test Methods D 233, and to other hydrocarbon mixtures that have wide boiling ranges.

## 8. Nonvolatile Matter

8.1 The nonvolatile matter test is run usually on volatile solvents capable of evaporating in a reasonable period of time at 105°C. The finding of a residue significantly higher than 5 mg/100 mL indicates the presence of either contamination or impurities inherent in the solvent. In certain cases this may adversely affect a product or coating system into which the solvent is introduced. See Test Method D 1353.

## 9. Odor

9.1 The evaluation of the characteristic odor of a solvent is a quick and simple means of identifying a material as well as determining its suitability from an odor point of view for use in a solvent system. Note, however, that inhaling certain solvent fumes may be hazardous (see 1.2). Several ASTM standard specifications for solvents list the odor test as an option to be agreed upon between the buyer and the seller. Residual odor may be due to improper refining techniques, impurities inherent in the solvent, or contamination. Whatever the source, a pronounced residual odor may find its way into a finished product and thus adversely affect the coating system. See Test Method D 1296.

## 10. Water

10.1 Two test methods are available for determining the moisture or water content of a solvent:

10.1.1 *Test Method D 1364*, covers the determination of moisture concentration in absolute terms. It is not only sensitive and accurate for the level of water found in commercially available solvents, but is applicable to a wide range of materials including hydrocarbon and oxygenated hydrocarbon solvents. The principles of the procedure are based on the use of the Karl Fischer reagent, Test Method E 203.

10.1.2 *Test Method D 1476* may be used to determine whether there is sufficient moisture in a solvent to cause turbidity when the solvent is mixed with *n*-heptane. This method is limited in its usefulness in that it does not cover measurement of water in absolute terms and is subject to a wide range of sensitivity. For example, when applied to esters and higher molecular weight ketones (methyl ethyl ketone and higher) its lower limit for detecting water ranges from 0.1 to 0.3 %, depending on the particular solvent being tested. When applied to acetone and most alcohols, its lower limit of sensitivity ranges from 0.5 to 2 %, again depending on the particular material. Its main advantage is to detect the gross contamination of a solvent by water.

## 11. Acidity

11.1 Acidity in a solvent may be due to improper refining techniques, instability in storage, or contamination. Some processes are highly sensitive to acidity while others are not. Despite the fact that various acids might be involved, two calculations are commonly given for determining acidity, that is, weight percent as acetic acid, and acid number (milligrams of potassium hydroxide consumed per gram of sample). The purchaser and seller must agree as to which calculation should be used for purchase specifications. See Test Methods D 847 and D 1613.

## 12. Alkalinity

NOTE 5—Alkalinity is so rarely encountered in commercially available solvents that among the solvents under the jurisdiction of Committee D-1, only Specification D 329 for acetone contains a requirement for alkalinity.

12.1 If alkalinity is suspected as a contaminant in a solvent, determine the alkalinity in accordance with Test Method D 1614. This method may be adapted to water-immiscible solvents by substituting isopropyl, or ethyl alcohol conforming

to Formula No. 3A of the U. S. Bureau of Internal Revenue, for water in the test procedure.

## 13. Ester Value

13.1 Test Method D 1617 may be used to estimate the purity of an ester, the remaining portion of the material usually being the alcohol associated with the original reaction to produce the ester. The method also may be employed to obtain the total ester content of a lacquer thinner.

13.2 Essentially pure and urethane grade acetate esters may also be analyzed by the gas chromatographic procedure, Test Method D 3545, which provides not only the ester content but also the concentration of the remaining parent alcohol. The alcohol content is of special interest with urethane grade solvents.

## 14. Copper Corrosion Test

14.1 The copper corrosion test normally is applied to hydrocarbon solvents (aliphatic and aromatic). However, the test also may be used in connection with oxygenated solvents. The test is a visual estimate of the presence of free and combined sulfur and is not a measure of the corrosiveness of solvent to other metals. See Test Methods D 849 and D 130.

## 15. Sulfur

15.1 Test Method D 853 indicates the presence of sulfur dioxide or hydrogen sulfide in aromatic hydrocarbons. No absolute analysis of the sulfur content is obtained. The method is not sensitive to organic sulfur compounds. The presence in a solvent of detectable sulfur compounds using this method indicates the possibility of odor-forming bodies, as well as color-forming agents (color degradation in the final product).

## 16. Permanganate Time Test for Acetone and Methanol

16.1 The measurement of permanganate time is a sensitive means for detecting trace quantities of reducing substances such as aldehydes and unsaturates that might be present in acetone and methanol. Determine the permanganate time of acetone and methanol in accordance with Test Method D 1363.

NOTE 6—The significance of the impurities detected using this test is open to some question; however, the presence of trace quantities of reducing substances may have harmful effects in some chemical reactions, either alone or in combination with other reactants.

## 17. Flash Point

17.1 The flash point is the lowest temperature, corrected to 101.3 kPa (760 mm Hg) of pressure, of a solvent at which application of an ignition source causes the vapor of the specimen to ignite under specified conditions of test.

17.2 There are four methods currently used to determine the flash points of volatile solvents. One uses an open cup that allows the solvent vapors to disperse into ambient air during the determination while three use a closed cup that confines the solvent vapors. Flash point values obtained with the open cup are higher than those measured in closed cups. Current United States Department of Transportation regulations require the measurement of flash points by the applicable closed cup procedure to define the characteristics of a product for labelling and transport purposes. Flash points may be determined by the following methods:

17.2.1 *Test Method D 1310, Tag Open Cup*—A temperature range from  $-18$  to  $168^{\circ}\text{C}$  ( $0$  to  $325^{\circ}\text{F}$ ) is covered by this instrument.

17.2.2 *Test Method D 56, Tag Closed Cup*—This apparatus is applicable to solvents with a viscosity at  $38^{\circ}\text{C}$  ( $100^{\circ}\text{F}$ ) below 45 SUS ( $9.5$  cSt or  $\text{mm}^2/\text{s}$  at  $25^{\circ}\text{C}$ ) and which flash below  $93^{\circ}\text{C}$  ( $200^{\circ}\text{F}$ ).

17.2.3 *Test Methods D 93, Pensky-Martens Closed Cup*—With a range from  $20$  to  $700^{\circ}\text{F}$  ( $-7$  to  $370^{\circ}\text{C}$ ), this unit is applicable to products with flash points higher than those obtainable with either the Tag Closed Tester or the Setaflash Tester. In addition, with its stirrer it is applicable to liquids having a viscosity greater than  $9.5$  cSt ( $\text{mm}^2/\text{s}$ ) at  $25^{\circ}\text{C}$ , having a tendency to skin over, or containing suspended solids.

17.2.4 *Test Methods D 3278, Setaflash Closed Tester*—The construction of this instrument permits the use of a small, 2-mL, specimen and is applicable in the range from  $0$  to  $110^{\circ}\text{C}$  ( $32$  to  $230^{\circ}\text{F}$ ) to liquids with viscosities below 150 St ( $1.50$   $\text{mm}^2/\text{s}$ ) at  $25^{\circ}\text{C}$  ( $77^{\circ}\text{F}$ ). One may determine the finite flash point of a liquid or whether the liquid will or will not flash at a certain temperature.

## 18. Purity of Ketones

18.1 Methyl ethyl ketone and methyl isobutyl ketone may contain small quantities of alcohols and other impurities, depending upon the process by which they were manufactured. Test Method D 2804 may be used to determine the impurities in methyl ethyl ketone by gas chromatography and Method D 3329 is applicable to methyl isobutyl ketone. An equivalent procedure for the analysis of methyl amyl ketone and methyl isoamyl ketone Test Method D 3893.

18.2 Hydroxylamine will react quantitatively with ketones to provide a wet chemical test for assay. This procedure may be found in Test Method D 2192.

## 19. Solvent Power Evaluation

19.1 The following three methods may be used singly, or in combination with each other, to characterize the solvency power of hydrocarbon solvents. The test method described in 18.4 also gives a procedure for evaluating the solvency of oxygenated hydrocarbons.

19.2 *Aniline Point and Mixed Aniline Point of Hydrocarbon Solvents*—Determine the aniline point and mixed aniline point in accordance with Test Method D 611. This method covers the determination of solvent power in terms of miscibility temperatures in the presence of aniline. High aniline points indicate the presence of saturated hydrocarbons in major proportions. Aromatics produce low aniline points and, when present in major quantities, low mixed aniline points.

19.3 *Kauri-Butanol Value of Hydrocarbon Solvents*—Determine the kauri-butanol value in accordance with Test Method D 1133. Numbers obtained by means of the kauri-butanol value determination represent relative solvent power of hydrocarbon solvents used in coating formulations. Results, however, cannot necessarily be translated into terms derived by other test methods, since hydrocarbon solvents vary in composition (ratio of aromatics to paraffins to naphthenes). Solvents from different suppliers may show identical kauri-butanol values but quite different resin solution viscosities. The

method, therefore, is suitable for routine testing of solvents from a particular source. It also may be used as a guide in determining whether a solvent from a new source should be considered.

19.4 *Dilution Ratio in Cellulose Nitrate Solutions for Active Solvents, Hydrocarbon Diluents, and Cellulose Nitrate*—Determine the dilution ratio in accordance with Test Method D 1720. This method covers (a) the amount of standard toluene that can be added to a standard solution of nitrocellulose in a given oxygenated solvent, (b) the amount of a given diluent that can be added to a standard solution of nitrocellulose in standard *n*-butyl acetate, and (c) the amount of standard toluene that can be added to standard *n*-butyl acetate in a prescribed solution of nitrocellulose of varying solubility characteristics.

19.4.1 Item (a) supplies information dealing with the ability of the oxygenated solvent to withstand dilution by a standard diluent. Superior solvent power is characterized by a high dilution ratio.

19.4.2 Item (b) refers to the ability of the diluent (or nonsolvent) to dilute a standard oxygenated solvent in a standard nitrocellulose solution. Superior solvent power is characterized by a high dilution ratio.

19.4.3 Item (c) deals with the nitrocellulose itself and its ability to withstand dilution by a standard diluent in a standard solvent.

## 20. Water Miscibility of Water-Soluble Solvents

20.1 Determine water miscibility of these materials in accordance with Test Method D 1722. This method is designed to detect the presence of trace amounts of a hydrocarbon impurity, or other water-insoluble contaminants.

NOTE 7—Because of modern refining techniques, there is little likelihood of any commercially available acetone, isopropyl alcohol or other water-soluble solvents containing even a trace of a water-insoluble impurity. However, this method is of value in detecting such contamination that might occur as a result of an improperly cleaned shipping or storage container, or both.

## 21. Analysis of Methanol

21.1 A compilation of analytical methods, both general and specific to methanol is presented in Method E 346.

## 22. Analysis of Ethylene and Propylene Glycols

22.1 A survey of analytical methods for the specification testing of mono-, di-, and triethylene glycol, and mono- and dipropylene glycol is presented in Test Method E 202.

## 23. Acid Wash Color of Aromatic Hydrocarbons

23.1 Chemically reactive impurities in aromatic hydrocarbons may impart color to a final product. An estimate of the quantity of these compounds in aromatic hydrocarbons may be obtained by Test Method D 848.

## 24. Paraffins and Other Nonaromatic Hydrocarbons in Aromatics

24.1 For the determination of less than 1 % nonaromatic hydrocarbons in monocyclic aromatics, the applicable procedure is Test Method D 2360.

**25. Aromatics in Mineral Spirits**

25.1 Determine the aromatics in mineral spirits in accordance with Test Method D 3257. Part A of this gas chromatographic procedure permits the identification and calculation of concentrations of aromatic components in accordance with the

scope of the method. Part B measures only the ethyl benzene content by a rapid procedure.

**26. Keywords**

26.1 solvents; volatile solvents

**SUMMARY OF CHANGES**

Committee D01 has identified the location of selected changes to this standard since the last date of issue that may impact the use of this standard.

(1) New paragraph 1.2 added to reference MSDS.

(2) Reference to Test Method D 1616 was removed and replaced by reference to Test Method D 130.

(3) Addition of reference to new 1.2 was added to paragraph

9.1.

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