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Standard Specification for VM&P Naphthas[1]

This standard is issued under the fixed designation D3735; 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 specification covers four types of moderately volatile hydrocarbon solvents, mainly aliphatic in composition and normally petroleum distillates. These solvents are used primarily by the coatings industry and are commonly referred to as VM&P naphthas.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following applies to all specified limits in this standard; for purposes of determining conformance with this standard, an observed value or a calculated value shall be rounded-off "to the nearest unit" in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E29.

1.4 For specific hazard information and guidance, see the supplier's Material Safety Data Sheet for materials listed in this specification.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D56 Test Method for Flash Point by Tag Closed Cup Tester

D86 Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

D156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

D268 Guide for Sampling and Testing Volatile Solvents and Chemical Intermediates for Use in Paint and Related Coatings and Material

D1133 Test Method for Kauri-Butanol Value of Hydrocarbon Solvents

D1159 Test Method for Bromine Numbers of Petroleum Distillates and Commercial Aliphatic Olefins by Electrometric Titration

D1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)

D1296 Test Method for Odor of Volatile Solvents and Diluents (Withdrawn 2021)[3]

D1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

D3257 Test Methods for Aromatics in Mineral Spirits by Gas Chromatography (Withdrawn 2021)[3]

D3278 Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus

D4052 Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

D5386 Test Method for Color of Liquids Using Tristimulus Colorimetry

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E300 Practice for Sampling Industrial Chemicals

2.2 *U.S. Federal Specification:*[4]

PPP-C-2020 Chemicals, Liquid, Dry, and Paste: Packaging of

3. Classification

3.1 VM&P naphthas shall be of the following types, as specified:

3.1.1 *Type I*—Regular.

3.1.2 *Type II*—High flash.

3.1.3 *Type III*—Odorless.

3.1.4 *Type IV*—Low aromatics.

[1] This specification 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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[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* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.

4. Properties

4.1 The physical and chemical properties of VM&P naphthas shall conform to the requirements specified in Table 1.

NOTE 1—Instrumental Pt-Co color determined by Test Method D5386 has been shown to have no statistically significant difference from Pt-Co color determined by Test Method D1209. However, it is not known whether VM&P naphthas was part of the sample set included in the interlaboratory study.

5. Sampling

5.1 The material shall be sampled in accordance with Practice E300.

6. Test Method

6.1 The properties enumerated in this specification shall be determined in accordance with the following ASTM test methods:

6.1.1 *Aromatics*—Test Method D1319 may be used to measure total aromatics content. Test Methods D3257 should be used to measure accurately total aromatics content and ethyl benzene content.

6.1.2 *Bromine Number*—Test Method D1159.

6.1.3 *Color*—Test Method D156 (Saybolt color) and Test Method D1209 (platinum-cobalt color). In case of dispute, the Saybolt color limit is controlling (see Note 1).

6.1.4 *Corrosion*—Test Method D130.

6.1.5 *Distillation*—Test Method D86.

6.1.6 *Flash Point*—Test Methods D56, D3278 (alternative). In case of dispute, Test Method D56 is controlling.

6.1.7 *Kauri-Butanol Value*—Test Method D1133.

6.1.8 *Odor*—Test Method D1296. Samples of the particular types of products being tested, having odor characteristics as previously agreed to between the purchaser and the supplier, are to be used as reference standards for comparison.

6.1.9 *Olefins*—Test Method D1319 or Test Method D1159.

6.1.10 *Apparent Specific Gravity*—Determine the apparent specific gravity by any convenient method that is accurate to the third decimal place, the temperature of both specimen and water being 15.6°C (60°F) or 25°C (77°F). See Guide D268 or Test Method D4052. In case of dispute, apparent specific gravity at 15.6/15.6°C (60/60°F) is controlling.

7. Packaging and Package Marking

7.1 Package size shall be agreed upon by the purchaser and the supplier.

7.2 Packaging shall conform to applicable carrier rules and regulations or when specified shall conform to Fed. Spec. PPP-C-2020.

8. Keywords

8.1 hydrocarbons; naphthas; solvents; VM&P naphthas

TABLE 1 Physical and Chemical Properties of VM&P Naphthas

	Type I[A]	Type II[A]	Type III[B]	Type IV
Commercial reference	regular	high flash	odorless	low aromatic
Appearance	clear and free of suspended matter and undissolved water.			
Bromine number, max	5	5	5	5
Color Pt-Co max (Note 1)	not darker than + 28 on the Saybolt scale, or 10 on the platinum-cobalt scale.			
Aromatics, volume %, max	20	20	1	2
Copper corrosion, max rating	1	1	1	1
Distillation, °F (°C):				
Initial boiling point, min	235 (113)	280 (138)	235 (113)	235 (113)
50 % recovered, max	275 (135)	320 (160)	275 (135)	275 (135)
Dry point, max	310 (154)	350 (177)	310 (154)	310 (154)
Flash point, min °F (°C)	40 (4)	74 (23)	40 (4)	40 (4)
Kauri-butanol value:				
min	30	30	...	30
max	45	45	30	38
Odor	nonresidual	nonresidual	nonresidual	nonresidual
Apparent specific gravity, 60/60°F (15.6/15.6°C):				
min	0.715	0.715	0.715	0.715
max	0.792	0.792	0.760	0.760
or				
Apparent specific gravity, 77/77°F (25/25°C):				
min	0.709	0.709	0.709	0.709
max	0.786	0.786	0.754	0.754

[A] Type I and Type II may be commercially available to meet certain air pollution regulations that limit C_8 and higher aromatics to not more than 8 volume %, total aromatics to not more than 20 volume %, olefins to not more than 5 volume %, and total aromatic plus olefins to not more than 20 volume %.
[B] Only products that have a very high isoparaffinic hydrocarbon content, that is, approaching 100 %, are considered to fit the "odorless" category.