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**Designation: D 3735 – 96 (Reapproved 2001)<sup>€1</sup>**


**Designation: D 3735 – 02**

## Standard Specification for VM&P- Naphthas<sup>1</sup>

This standard is issued under the fixed designation D 3735; 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.

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~~ε<sup>1</sup> Note – Paragraph 1.1 corrected editorially to “four types” in May 2001.~~

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<sup>1</sup> 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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### 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 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 E 29.

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

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 56 Test Method for Flash Point by Tag Closed Cup Tester<sup>2</sup>

D 86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure<sup>2</sup>

D 130 Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test<sup>2</sup>

D 156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)<sup>2</sup>

D 268 Guide for Sampling and Testing Volatile Solvents and Chemical Intermediates for Use in Paint and Related Coatings and Materials<sup>3</sup>

D 1133 Test Method for Kauri-Butanol Value of Hydrocarbon Solvents<sup>3</sup>

D 1159 Test Method for Bromine Number of Petroleum Distillates and Commercial Aliphatic Olefins by Electrometric Titration<sup>2</sup>

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>3</sup>

D 1296 Test Method for Odor of Volatile Solvents and Diluents<sup>3</sup>

D 1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption<sup>2</sup>

D 3257 Test Methods for Aromatics in Mineral Spirits by Gas Chromatography<sup>3</sup>

D 3278 Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus<sup>4</sup>

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter<sup>5</sup>

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>6</sup>

E 300 Practice for Sampling Industrial Chemicals<sup>7</sup>

#### 2.2 U.S. Federal Specification:

PPP-C-2020 Chemicals, Liquid, Dry, and Paste: Packaging of<sup>8</sup>

<sup>2</sup> Annual Book of ASTM Standards, Vol 05.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 06.04.

<sup>4</sup> Annual Book of ASTM Standards, Vol 06.01.

<sup>5</sup> Annual Book of ASTM Standards, Vol 05.02.

<sup>6</sup> Annual Book of ASTM Standards, Vol ~~15-05~~; 14.02.

<sup>7</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

<sup>8</sup> Discontinued; see 2001 Annual Book of ASTM Standards, Vol 15.05.

<sup>8</sup> Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098

### 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.

### 4. Properties

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

### 5. Sampling

5.1 The material shall be sampled in accordance with Practice E 300.

### 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 D 1319 may be used to measure total aromatics content. Test Methods D 3257 should be used to measure accurately total aromatics content and ethyl benzene content.

6.1.2 *Bromine Number*—Test Method D 1159.

6.1.3 *Color*—Test Method D 156 (Saybolt color) and Test Method D 1209 (platinum-cobalt color). In case of dispute, the Saybolt color limit is controlling.

6.1.4 *Corrosion*—Test Method D 130.

6.1.5 *Distillation*—Test Method D 86.

6.1.6 *Flash Point*—Test Methods D 56, D 3278 (alternative). In case of dispute, Test Method D 56 is controlling.

6.1.7 *Kauri-Butanol Value*—Test Method D 1133.

6.1.8 *Odor*—Test Method D 1296. 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 D 1319 or Test Method D 1159.

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 60°F (15.6°C) or 77°F (25°C). See Guide D 268 or Test Method D 4052. In case of dispute, apparent specific gravity at 60/60°F (15.6/15.6°C) is controlling.

### 7. Packaging and Package Marking

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

**TABLE 1 Physical and Chemical Properties of VM&P Naphthas**

	Type I <sup>A</sup>	Type II <sup>A</sup>	Type III <sup>B</sup>	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	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)
<del>50 % recovered, max</del>	<del>265 (129)</del>	<del>320 (160)</del>	<del>265 (129)</del>	<del>265 (129)</del>
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)	80 (27)	40 (4)	40 (4)
Kauri-butanol value:				
<del>min</del>	<del>32</del>	<del>---</del>	<del>---</del>	<del>---</del>
min	32	30	---	30
max	45	45	38	38
Odor	nonresidual	nonresidual	nonresidual	nonresidual
Apparent specific gravity, 60/60°F (15.6/15.6°C):				
<del>min</del>	<del>0.745</del>	<del>0.732</del>	<del>0.745</del>	<del>0.745</del>
min	0.715	0.715	0.715	0.715
max	0.792	0.792	0.760	0.760
Apparent specific gravity, 77/77°F (25/25°C):				
<del>min</del>	<del>0.709</del>	<del>0.726</del>	<del>0.709</del>	<del>0.709</del>
min	0.709	0.709	0.709	0.709
max	0.786	0.786	0.754	0.754

<sup>A</sup> Type I and Type II may be commercially available to meet certain air pollution regulations that limit C<sub>8</sub> 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 %.

<sup>B</sup> Only products that have a very high isoparaaffinic hydrocarbon content, that is, approaching 100 %, are considered to fit the "odorless" category.

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

### SUMMARY OF CHANGES

Committee D01.35 has identified the location of selected changes to this standard since the last issue (D 3635 - (2001)<sup>e1</sup>) that may impact the use of this standard.

- (1) Added Practice E 29 on significant digits to the Scope.
- (2) Added Practice E 29 to the Referenced Documents section.
- (3) Increased the distillation midpoints to more accurately reflect current production values in Table 1.
- (4) Reduced minimum flash point requirement for Type II to 74F(23C) in Table 1.
- (5) Established a minimum KB value of 30 for all Types except Type III in Table 1.
- (6) Established a maximum KB value of 30 for Type III and 38 for Type IV in Table 1.
- (7) Changed the Apparent Specific Gravity of Type II to be consistent with other Types in Table 1.

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