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Method 5203—Federal Test
Method Standard No. 791b
(Doctor Test, Section 4.2.6 of D 484)

Standard Specification for HYDROCARBON DRY CLEANING SOLVENTS

This Standard is issued under the fixed designation D 484; 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.

1. Scope

1.1 This specification covers four types of hydrocarbon solvents, normally petroleum distillates, of low flammability used in dry cleaning of textile materials.

2. Classification

2.1 Hydrocarbon dry cleaning solvents shall be of the following types, as specified:

Type I—Stoddard Solvent

Type II—140 F solvent

Type III—Odorless Solvent

Type IV—Low Dry Point Solvent

3. Physical and Chemical Requirements

3.1 The physical and chemical properties of the hydrocarbon dry cleaning solvents shall conform to the requirements specified in Table 1.

4. Methods of Test

4.1 The material shall be sampled in accordance with ASTM Method D 270, Sampling Petroleum and Petroleum Products.²

4.2 The properties enumerated in this specification shall be determined in accordance with the following ASTM Methods of Test:

4.2.1 *Flash Point*—Method D 56, Test for Flash Point by Tag Closed Tester.³

4.2.2 *Distillation*—Method D 86, Test for Distillation of Petroleum Products.³

4.2.3 *Kauri-Butanol Value*—Method D 1133, Test for Kauri-Butanol Value of Hydrocarbon Solvents.⁴

4.2.4 *Color*—Method D 156, Test for Saybolt Color of Petroleum Products (Saybolt Chromometer Method).³

4.2.5 *Acidity*—Method D 1093, Test for

Acidity of Distillation Residues or Hydrocarbon Liquids.³

4.2.6 Doctor Test:

4.2.6.1 *Preparation of Doctor (Sodium Plumbite) Solution*—Dissolve approximately 125 g of sodium hydroxide (NaOH) in 1 liter of distilled water. Add 60 g of lead oxide (PbO) and shake vigorously for 15 min, or let stand with occasional shakings for at least a day. Allow to settle, and decant or siphon off the clear liquid. Filtration through a mat of asbestos may be employed if the solution does not settle clear. The solution should be kept in a tightly corked bottle, and should be refiltered before use if not perfectly clear.

4.2.6.2 *Procedure*—Shake vigorously together in a test tube 10 ml of the sample to be tested and 5 ml of sodium plumbite solution for about 15 s. Add a small pinch of pure, dry flowers of sulfur, again shake for 15 s and allow to settle. Observe within a 2-min period. The quantity of sulfur used should be such that practically all of it floats on the interface between the sample and the sodium plumbite solution.

4.2.6.3 *Interpretation of Results*—If the sample is discolored or if the yellow color of the sulfur film is noticeably masked, the test shall be reported as positive and the sample condemned as “sour.” If the sample remains unchanged in color, and if the sulfur film is bright yellow or only slightly discolored with

¹ This specification is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants.

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² *Annual Book of ASTM Standards*, Part 18.

³ *Annual Book of ASTM Standards*, Part 17.

⁴ *Annual Book of ASTM Standards*, Part 20.

gray or flecked with black, the test shall be reported negative and the sample considered "sweet."

4.2.7 *Corrosion*—Method D 130, Detection of Copper Corrosion from Petroleum Products by the Copper Strip Test.³ Perform test under the prescribed conditions for 3 h at 100 C.

4.2.8 *Odor*—Method D 1296, Test for Odor of Volatile Solvents and Diluents.⁴ The sample shall be free from rancid and objec-

tionable odor, and shall be typical of a "sweet" refined naphtha. Samples of particular types of products being tested, having odor characteristics satisfactory to consumer and producer, are to be used as reference standards for comparison.

4.2.9 *Bromine Number*—Method D 1159, Test for Bromine Number of Petroleum Distillates and Commercial Aliphatic Olefins by Electrometric Titration.³

TABLE 1 Physical and Chemical Properties of Hydrocarbon Drycleaning Solvents

	Type I	Type II	Type III	Type IV
Commercial reference	Stoddard	140 F Solvent	odorless	low dry point
Appearance	Clear and free of suspended matter and undissolved water			
Flash point, min, deg F	100	140	100	100
Distillation, deg F:				
Initial boiling point, min	300	350	300	300
50 percent recovered, max	350	385	375	345
Dry point, max	407	412	412	365
Kauri-butanol value:				
min	29	29	...	29
max	45	45	29	45
Color, max		water-white or not darker than +21		
Residue from distillation:				
Percent, max	1.5	1.5	1.5	1.5
Acidity	neutral	neutral	neutral	neutral
Doctor test	negative	negative	negative	negative
Copper corrosion, max rating	1	1	1	1
Odor	...	characteristic, nonresidual		...
Bromine No., max	5.0	5.0	5.0	5.0

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