Designation: D 2245 – 90 (Reapproved 1999)

Standard Test Method for Identification of Oils and Oil Acids in Solvent-Reducible Paints[1]

This standard is issued under the fixed designation D 2245; 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.

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

1. Scope

1.1 This test method covers the identification of oils and oil acids in vehicles that have been separated from solvent-reducible paints. The test method is based on a gas chromatographic technique (of the methyl esters) applicable to products containing both saturated and unsaturated, animal and vegetable, unpolymerized or partially polymerized fatty acids having 8 to 20 carbon atoms.

1.2 This test method is not applicable to products containing fatty acids that have been polymerized or oxidized to such an extent that no characteristic monomeric fatty acids remain.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1398 Test Method for Fatty Acid Content of Alkyd Resins and Resin Solutions[2]

D 1983 Test Method for Fatty Acid Composition by Gas-Liquid Chromatography of Methyl Esters[2]

D 2372 Practice for Separation of Vehicle from Solvent-Reducible Paints[3]

D 2800 Test Method for Preparation of Methyl Esters from Oils for Determination of Fatty Acid Composition by Gas Chromatography[2]

3. Summary of Test Method

3.1 This test method is based upon the differential migration and partitioning of constituent fatty acids in the form of vaporized methyl esters between a flowing gas phase and a supported liquid phase in a gas chromatographic column. The test method is based on isothermal operation of the gas chromatograph and a hot wire, thermal conductivity detector.

3.2 The test method consists in the separation of the vehicle from the paint by centrifugation, extraction of fatty acids from the vehicle after saponification, conversion of fatty acids and a measured addition of margaric acid (internal standard) into methyl esters, preparation of the gas chromatogram, and interpretation of the chromatogram. The amount of each monomeric fatty acid ester is calculated, totaled, subtracted from 100 % to yield polymerized fatty acids, reported as is, and interpreted by comparison with standards as being from specific oils or oil acids.

4. Significance and Use

4.1 This test method provides a procedure to identify the fatty acids present in the vehicle of a paint.

5. Apparatus

5.1 *Centrifuge*, high-speed, capable of developing in excess of 10 000 *g*.

5.2 *Separatory Funnels*, with PTFE-fluorocarbon stopcocks.

5.3 *Gas Chromatograph and Accessories*, suitable for analysis of fatty acids as methyl esters (see Test Method D 1983).

6. Reagent

6.1 *Hydroquinone*.

7. Calibration and Standardization

7.1 Establish optimum operating conditions on the gas chromatograph with known samples of methyl esters as described in Test Method D 1983.

[1] This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

Current edition approved May 25, 1990. Published July 1990. Originally published as D 2245 – 64 T. Last previous edition D 2245 – 72 (1984)$^{\epsilon 1}$.

[2] *Annual Book of ASTM Standards*, Vol 06.03.

[3] *Annual Book of ASTM Standards*, Vol 06.01.

TABLE 1 Fatty Acid Composition of Oils Used in Paint Products[A]

Caster Oil, %		Oiticica Oil,%	
Palmitic	2	Palmitic	7
Stearic	1	Stearic	5
Oleic	7	Oleic	6
Ricinoleic	87	Licanic	78
Linoleic	3	Hydroxy acids	4
Coconut Oil,%		**Perilla Oil,%**	
Caproic	trace	Palmitic	7
Caprylic	6	Stearic	2
Capric	6	Oleic	13
Lauric	44	Linoleic	14
Myristic	18	Linolenic	64
Palmitic	11	**Safflower Oil,%**	
Stearic	6	Myristic	trace
Oleic	7	Myristoleic	trace
Linoleic	2	Palmitic	8
Linolenic	trace	Palmitoleic	trace
Cottonseed Oil,%		Stearic	3
Capric	trace	Oleic	13
Lauric	trace	Linoleic	75
Myristic	1	Linolenic	1
Myristoleic	trace	Arachidic	trace
Palmitic	29	Gadoleic	trace
Palmitoleic	2	**Soybean Oil,%**	
Stearic	4	Myristic	trace
Oleic	24	Palmitic	11
Linoleic	40	Stearic	4
Arachidic	trace	Oleic	25
Linseed Oil,%		Linoleic	51
Palmitic	6	Linolenic	9
Palmitoleic	trace	Arachidic	trace
Stearic	4	Gadoleic	trace
Oleic	22	**Tall Oil,[B]%**	
Linoleic	16	Palmitic	5
Linolenic	52	Stearic	3
Arachidic	trace	Oleic	46
Gadoleic	trace	Linoleic	41
Menhaden Oil,%		Linolenic	3
Lauric	trace	Arachidic	2
Myristic	7	**Tung Oil,%**	
Myristoleic	trace	Palmitic	4
Palmitic	16	Stearic	1
Palmitoleic	16	Oleic	8
Stearic	2	Linoleic	4
Oleic	15	Linolenic	3
Linoleic	7	Eleostearic	80
Linolenic	2		
Arachidonic	17		
Clupanodonic	11		
Nisinic	4		
Shibic	1		
Unidentified unsaturate	2		

[A]The acids and percents presented in this table are taken from the "Composition and Constants of Fatty Acids" chart and used by permission of the Archer-Daniels-Midland Co.

[B]The percent rosin acids in tall oil may vary from 0 to 42 %, the percent terpenes from 0 to 13 %. Both variations depend on the grade and refining of the oil.

7.2 Prepare working standards by running known paints or vehicles through the procedure described in Section 8. Include particularly compositions with chemical or structural modifications that might be expected to alter the fatty acid distribution or the apparent polymer content of the starting raw materials.

8. Procedure

8.1 Separate the vehicle from the paint by direct high-speed centrifuging (see Practice D 2372).