



Designation: D 6419 – 00

## Test Method for Volatile Content of Sheet-Fed and Coldset Web Offset Printing Inks<sup>1</sup>

This standard is issued under the fixed designation D 6419; 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.

### 1. Scope

1.1 This test method describes a procedure for determination of the weight percent volatile content of sheet-fed and coldset web offset printing inks. Test specimens are heated at  $110^{\circ} \pm 1^{\circ}\text{C}$  for 60 min.

NOTE 1—Coldset web offset printing is often (also) referred to as non-heatset web offset printing.

1.2 This test method is also applicable to sheet-fed and coldset web offset printing ink vehicles.

NOTE 2—Vehicle is the liquid portion of the printing ink. Any substance that is dissolved in the liquid portion of the ink is a part of the vehicle.

1.3 This test method is not applicable to ultra-violet (UV) or electron beam cured materials, which must be cured by exposure to UV light or an electron beam as part of the test for volatile content.

1.4 This test method is based on Test Method D 2369, in which the allowable ranges are  $\pm 0.1\text{g}$  for specimen weight and  $\pm 5^{\circ}\text{C}$  for oven temperature. Interlaboratory studies have shown that specimen weight and oven temperature must both be more tightly controlled in order to improve the precision of test results for sheet-fed and coldset web-offset inks. Such inks typically contain a wide range of high-boiling hydrocarbons and often have a volatile content below 25 %.

1.5 *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. For a specific hazard statement see 7.5.1.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 2369 Test Method for Volatile Content of Coatings<sup>2</sup>

D 362 Specification for Industrial Grade Toluene<sup>3</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.56 on Printing Inks.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 06.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 06.03.

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens<sup>4</sup>

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method<sup>5</sup>

#### 2.2 Other Standards:

EPA Reference Method 24 - Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings<sup>6</sup>

### 3. Summary of Test Method

3.1 A specimen size of  $0.300 \pm 0.001\text{ g}$  is weighed into an aluminum foil dish, dispersed in 3 mL of toluene, and heated in an oven at  $110 \pm 1^{\circ}\text{C}$  for 60 min. The percent volatile is calculated from the loss in weight.

### 4. Significance and Use

4.1 This test method is the procedure of choice for determining volatile content of sheet-fed and coldset web offset inks. This information is useful to the ink manufacturer and user and to environmental interests as part of the determination of the mass of volatile organic compounds emitted from the ink.

NOTE 3—Since these inks do not contain water or any materials currently classified by US EPA as negligibly photochemically reactive (exempt solvents), volatile organic compound content is the same as volatile content. The volatile organic compounds in these inks are high boiling hydrocarbon oils which are, according to US EPA guidelines, 95 % retained in the printed substrate or oxidized into the ink film. Therefore, the mass of volatile organic compound emitted from the ink would be calculated as only 5 % of the volatile organic compound content of the ink as derived from the results of this test method.

### 5. Apparatus

5.1 *Aluminum Foil Dishes*, 58 mm in diameter by 18 mm high with a smooth (planar) bottom surface. Precondition the dishes for 30 min. in an oven at  $110 \pm 1^{\circ}\text{C}$  and store in a desiccator prior to use. Use tongs or rubber gloves or both, to handle the dishes.

<sup>4</sup> Annual Book of ASTM Standards, Vol 14.04.

<sup>5</sup> Annual Book of ASTM Standards, Vol 14.02.

<sup>6</sup> Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or Brezinski, J. J., ed., *Determination of Volatile Organic Compound (VOC) Content in Paints, Inks, and Related Coating Products*, MNL 4, ASTM, 1993.