



Designation: D4713 – 92 (Reapproved 2007)

# Standard Test Methods for Nonvolatile Content of Heatset and Liquid Printing Ink Systems<sup>1</sup>

This standard is issued under the fixed designation D4713; 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 These test methods cover the determination of weight content of nonvolatile matter in two types of printing inks.

1.2 Test Method A is applicable to heatset-type printing inks and resin solutions; solvents in such systems typically have initial boiling points in the range from 240 to 275°C (470 to 535°F) and vapor pressures less than 0.2 mm Hg.

1.3 Test Method B is applicable to liquid-type printing inks and vehicles based on aqueous or organic solvents that evaporate readily at ordinary room temperatures.

NOTE 1—Test Method A (for heatset systems) specifies a specimen film thickness that is much thinner than those produced by related test methods; one exception is Test Method B in Test Methods D1259, which is recommended as a referee test.

NOTE 2—Test Method B (for liquid ink systems) is similar to Test Method D2369 except that a solvent is not required for spreading the test specimen.

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

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.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D1259 Test Methods for Nonvolatile Content of Resin Solutions

D2369 Test Method for Volatile Content of Coatings

E1 Specification for ASTM Liquid-in-Glass Thermometers

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

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<sup>2</sup> 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.

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

## 3. Summary of Test Methods

3.1 *Test Method A—Heatset Systems.* A 0.15-g specimen is mechanically spread in a 57-mm weighing dish to a nominal thickness of  $80 \pm 10$  g/m<sup>2</sup> and heated in a forced ventilation oven at 110°C for 3 h.

3.2 *Test Method B—Liquid Ink Systems.* A 0.5-g specimen is dispensed into a 57-mm weighing dish by means of a disposable syringe, mechanically spread out, and heated in an oven at 110°C for 1 h.

## 4. Significance and Use

4.1 Nonvolatile content of printing inks is useful for specification acceptance between the producer and the user.

4.2 In order to obtain accurate results for heatset systems within the specified 3-h heating time, the specimen film thickness must be less than 100 g/m<sup>2</sup>, and the oven must have forced ventilation. Thickness of the specimen film is less critical for liquid ink systems.

## 5. Apparatus

5.1 *Balance*, accurate to 1 mg.

5.2 *Oven*, forced-ventilation type conforming to Type IIB in Specification E145 and maintained at  $110 \pm 2^\circ\text{C}$ .

5.3 *Thermometer*, bulb-type, capable of reading  $110 \pm 2^\circ\text{C}$ , such as Thermometer 88C prescribed in Specification E1.

5.4 *Weighing Dish*, such as an aluminum foil dish 57 mm wide, the lid of a 1-lb ink can 94 mm wide, or other flat-bottomed container. The bottom of the container must not have a trough or depression into which the test material might collect.

5.5 *Spatula*, or small ink knife.

5.6 *Spreading Device*, one per weighing dish, of heat-stable material, such as a glass stirring rod or thick L-shaped wire.

5.7 *Forceps*,