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Standard Test Methods for Nonvolatile Content of Heatset and Liquid Printing Ink Systems[1]

This standard is issued under the fixed designation D 4713; 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.

ε[1] NOTE—Editorial change made in Keywords Section in December l997.

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.

1.4 *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.*

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 Method D 1259, which is recommended as a referee test.

NOTE 2—Test Method B (for liquid ink systems) is similar to Test Method D 2369 except that a solvent is not required for spreading the test specimen.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1259 Test Methods for Nonvolatile Content of Resin Solutions[2]

D 2369 Test Method for Volatile Content of Coatings[2]

E 1 Specification for ASTM Thermometers[3]

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens[4]

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method[4]

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 ± 10 g/m^2 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^2, 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 E 145 and maintained at 110 ± 2°C.

5.3 *Thermometer*, bulb-type, capable of reading 110 ± 2°C, such as Thermometer 88C prescribed in Specification E 1.

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*,

5.8 *Desiccator*,

5.9 *Syringe* [5] (*for liquid ink systems only*), single-use 2 to

[1] These test methods are under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.56 on Printing Inks.

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

[3] *Annual Book of ASTM Standards*, Vol 14.03.

[4] *Annual Book of ASTM Standards*, Vol 14.02.

[5] Available from any scientific supply house.

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