



Standard Practice for Caking Temperature of Dry Electrostatic Toner¹

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1. Scope

1.1 This practice covers the determination of the temperature at which a dry toner will cake as storage temperatures are raised.

1.2 In certain cases the effects of pressure or pressure combined with heat can cause blocking and caking of a dry toner. This recommended practice does not provide for evaluation of such pressure effects.

1.3 This practice consists of testing samples at controlled temperatures and evaluating them for any sign of blocking after a specified period.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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. Significance and Use

2.1 Dry toners for use in electrostatic copiers and printers are normally free-flowing powders at room temperatures. They are often formulated to fuse at elevated temperatures as part of the electrostatic printing and copying process. The specific temperature at which fusing takes place has implications of premature change in the physical characteristics of a given toner, defined as blocking or caking. This is undesirable, but can result when the dry toner is subjected to temperatures in the range of its fusing point during conditions of transport, storage, or local handling; as well as to the environmental parameters in a given location after the product is introduced and held for use in the machine reservoir itself.

¹ This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.04 on Electrostatic Imaging Products.

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3. Apparatus

3.1 *Circulating Air Oven*, forced, provided with a thermometer and capable of being set at various temperatures and of remaining at $\pm 1^\circ\text{C}$ over a range from 40 to 80°C.

3.2 *Weighing Dishes*, round, aluminum, approximately 60 mm in diameter and 17 mm deep.

3.3 *Balance*, capable of weighing 10 g with a precision of 0.1 g.

3.4 *Spatulas, Tongs*, etc.

4. Procedure

4.1 Set the oven to remain at 40°C.

4.2 In separate aluminum weighing dishes, weigh two samples each of 5.0 g of toner and, using a spatula, spread the samples evenly over the dish bottoms. Provide the dishes with suitable covers.

4.3 Place one covered dish and sample in the oven, close to its center, and leave at 40°C for 24 h. Keep the other sample at room temperature.

4.4 Remove the dish and sample from the oven, allow to cool, examine visually, stir with a spatula, and look for any evidence of caking. Use the room temperature sample for comparison purposes.

4.5 If the oven-treated sample shows any evidence of clumping, record its blocking temperature as below 40°C. If no evidence is noted, set the oven for 45°C and repeat with a fresh sample of toner. Repeat the test at 5°C increments until the caking temperature is determined. If the sample does not cake before or at 80°C, record its blocking temperature as above 80°C.

5. Report

5.1 Report the blocking temperature or the caking temperature.

6. Precision

6.1 When this practice is used to compare two or more toners within a laboratory, the comparable ranking order is repeatable. Because the interpretation of results is dependent upon the subjectivity of the observations, reproducibility between laboratories may not be possible.

7. Keywords

7.1 caking temperature; dry toners; electrostatic toners

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