



Standard Test Method for Determining Dynamic Thermal Response of Direct Thermal Paper-Label Printer Method¹

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1. Scope

1.1 This test method covers the thermal response of direct thermal papers to determine uniformity within and between lots. This test method may also be used to test direct thermal products other than paper.

1.2 The Hobart 18VP Thermal Label Printer² described in this test method may be used for specification acceptance, product development or research applications, or both, and manufacturing control.

1.3 Although a specific manufacturer has been identified for this equipment, any thermal label printer with equivalent signal output capabilities and sample size requirements would be suitable.

1.4 The values stated in inch-pound units are to be regarded as the standard. The SI units 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. (Warning—This test method requires making power adjustments and trigger printing while the protective cover is off, thereby exposing the user to electrical hazards.)*

2. Referenced Document

2.1 ANSI Standards:³

IT 2.16–1995

IT 2.17–1995

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *dynamic thermal response curve*—the graphical representation of the response characteristic of a thermal printing system over a given range of print energies. The y-axis of the graph is optical density (reflectance density), while the x-axis is calibrated in terms of print energy or energy density. Typical units for print energy are watts/dot or millijoules (mj), whereas the units for print density are millijoules per square millimetre, mj/mm².

3.1.2 *dynamic thermal sensitivity*—the generation of the thermal response of thermal paper within a given printing system over a specific operating range of energy levels.

4. Summary of Practice

4.1 This practice is intended to determine the dynamic thermal sensitivity of direct thermal papers. The energy versus image density relationship obtained is a characterization of a given coating and base paper. Curves can be used to determine uniformity within and between direct thermal paper lots. The test equipment and test procedures are not intended to simulate thermal response under actual end use conditions in a facsimile machine.

4.2 To determine the dynamic thermal sensitivity of direct thermal facsimile, chart, or label papers, a 2.5 in. (6.35 cm) wide sample is fed into the printer (minimum 11 in. (27.94 cm) length is suggested).

4.3 A voltage controller on the power board allows the adjustment of the power to the thermal head (watts per dot). Voltage squared is a function of energy usually expressed in watts/dot or millijoules (mj).

4.4 The thermal response or density saturation curve can be obtained by generating one of six available label patterns on test samples using a range of energy levels.

5. Significance and Use

5.1 This test method enables dynamic thermal response comparisons between direct thermal papers.

5.2 This test method makes comparisons between and within thermal paper production lots from the same manufacturer.

¹ This test method is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.06 on Carbonless and Thermal Imaging Products.

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² The sole source of supply of the apparatus known to the committee at this time is Hobart Canada Inc., Don Mills, Ontario, M3A 1B1.. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee¹, which you may attend.

³ Available from American National Standards Institute, 25 West 43rd St., 4th Floor, New York, NY 10036.