Designation: F 1943 – 98 (Reapproved 2003)

Standard Test Method for Determining the Dynamic Thermal Response of Thermal Mass Transfer Ribbon Products—Atlantek Method[1]

This standard is issued under the fixed designation F 1943; 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.

1. Scope

1.1 This test method covers the measurement of thermal response of various thermal mass transfer ribbons used for facsimile, labels, medical recorders, plotters, and printers.

1.2 The Atlantek Thermal Response Tester Model 200 described in this test method may be used for specification acceptance, product development, and research applications. Although this test method identifies specific printheads, the tester does support additional printheads.

1.3 *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 specific precautionary statements, see Section 8.

2. Referenced Documents

2.1 *ASTM Standards:*

D 685 Practice for Conditioning Paper and Paper Products for Testing[2]

F 1405 Test Method for Determining the Dynamic Thermal Response of Direct Thermal Imaging Products - Atlantek Method[2]

2.2 *ANSI Standards:*[3]

PH2.17 Density Measurements—Geometric Conditions for Reflection Density

PH2.18 Density Measurements—Spectral Conditions

3. Terminology

3.1 *Definitions:*

3.1.1 *back coating*, *n*—the coating placed on the noninked side of a thermal transfer ribbon which imparts abrasion resistance to enhance printhead life and prevents the printhead from sticking to the polyester carrier.

3.1.2 *receptor*, *n*—the surface upon which the transfer is placed which may be paper, film or fabric.

3.1.3 *thermal mass transfer product*, *n*—paper, film, or other substrate upon which multi-component coatings have been applied. The imaging components on the transfer side of the products are generally a pigmented wax or resin. Under heat from the thermal head and pressure roll the image is transferred to a receptor surface. The non-printing side of these ribbons contains a backcoating, which imparts abrasion resistance to enhance printhead life.

3.1.4 *thermal response*, *n*—the relationship between the thermal image optical density (*y*-axis) versus printhead energy (*x*-axis). Printhead energy is a function of both pulse width (strobe time or T_{on}) expressed in milliseconds (ms) and energy expressed in millijoules (mJ). When energy is expressed in millijoules, printhead resistance is taken into account. Thermal response plots are commonly prepared both ways. The latter is preferred.

3.2 *Symbols:*

3.2.1 T_{cycle}—the time between printed lines. The larger the T_{cycle} value, the more time between printed lines. The result is slower print speeds. Smaller T_{cycle} values correspond to faster print speeds. Time between printed lines equals dot "on" time plus dot "off" time ($T_{cycle}=T_{on}+T_{off}$).

3.2.2 T_{on}—the amount of time that the heating elements (dots) on the printhead are energized. Typically, this value is in milliseconds. T_{on} is also called strobe time.

4. Summary of Test Method

4.1 This test method involves imaging mass thermal transfer product using an Atlantek Model 200 Thermal Response Test System. The equipment is the same as that covered in Test Method F 1405. The equipment differs from that used in Test Method F 1405 in that it contains apparatus to allow for thermal ribbon supply and take-up rolls (see Fig. 1). The system is designed to provide thermal response measurements using printheads commonly used in facsimile units, label printers, medical recorders, plotters, and other thermal printers. This system is based on a special purpose controller board, which drives a standard thermal printer using a programmable stepping drive controller. This system includes provisions for mounting standard performance printheads. A personal computer controls the system with parameter programming accomplished from menu-driven software designed specifically for thermal response and performance characterizations.

[1] This test method is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.02 on Inked Transfer Imaging Products.

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[2] *Annual Book of ASTM Standards*, Vol. 15.09.

[3] Available from the American National Standards Institute, 11 West 42nd St., New York, NY 10036.

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