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Graphic technology — Color reproduction and process control for packaging printing

SECRETARIAT

NPES THE ASSOCIATION FOR SUPPLIERS OF PRINTING,

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ANSI TECHNICAL REPORT

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Any questions regarding this Technical Report should be addressed to the CGATS Secretariat, NPES The Association for Suppliers of Printing, Publishing and Converting Technologies, 1899 Preston White Drive, Reston, Virginia 20191-4367.

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Foreword

Publication of this ANSI Technical Report has been approved by the ANSI Accredited Standards Committee for Graphic Arts Technologies Standards (CGATS). This document is registered as a Technical Report according to the *Procedures for the Registration of ANSI Technical Reports*. This document is not an American National Standard and the material contained herein is not normative in nature. Comments on the contents of this document should be sent to the Committee for Graphic Arts Technologies Standards, NPES The Association for Suppliers of Printing, Publishing and Converting Technologies, 1899 Preston White Drive, Reston, VA 22091-4367, which was responsible for this work.

This report was prepared by the members of CGATS Special Task Force 2 (STF2), Color Reproduction and Process Control for Packaging Printing. At the time of its approval, the following were the Participating Members and Observers of CGATS Special Task Force 2:

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Introduction

Consumer Product Companies are becoming increasingly aware that color reproduction variability between printers and within printers adversely affects their brand images and thus their sales. They also want to maximize the benefits of a color managed workflow for all printed packaging whether it is printed by gravure, flexography or lithography. Printers also want to minimize waste of materials, time and money in starting new press runs that meet customer requirements.

Even though each organization (and product that is printed) follows a unique workflow based on individual needs, there are many elements that are common, and there are certain fundamentals of printing that are common to all. This technical report, ANSI CGATS TR 012, is intended to provide a guide to the steps necessary to perform process control, fingerprinting and characterization independent of the organizational structure of the companies involved or the particular properties of the product being printed. It deals with the issues of color control and, in particular, the development of representative color characterization data to support both the preparatory steps in package development as well as the ongoing production requirements.

CGATS TR 012 is part of a series of technical reports and standards being developed by the ANSI-accredited Committee for Graphic Arts Technologies Standards (CGATS) to facilitate communication among all participants in the supply chain involved in the design, preparation and printing of packaging materials. It builds upon ANSI CGATS TR 011, the first technical report in this series. ANSI CGATS TR 011, *Graphic technology — Package development workflow — Design concept through approved production file,* provides guidelines to bring a packaging project from concept through an approved production file. It establishes tools, recommends roles and responsibilities of participants, provides default specifications for communicating color issues, and identifies guidelines and standards that can be used to further define required parameters. For the purposes of these technical reports and associated workflows, the division between preparation and printing has been chosen to be an approved one-up production file. Other future technical reports will deal with additional steps in the process through final print production and finishing.

As color management, digital data, and digital proofing play a larger role in the preparation of press ready material, the need for and importance of color characterization data becomes more significant. Too often, color characterization data is measured, or selected, that is not representative of the expected printing conditions that will be actually used for the live work. The recommendations and steps included in CGATS TR 012 help ensure that the characterization data prepared will properly represent real printing conditions and thus will facilitate valid digital proofing aims and data preparation that matches the expected printing condition.

While the primary focus of CGATS TR 012 is the issue of color control and the development of representative color characterization data, it also provides a common language for communicating color problems, issues and solutions. It sets expectations of a better workflow. It identifies the roles and responsibilities of the various participants in the process, thus bridging many communication gaps that currently exist between participants. While current customer satisfaction may ultimately be the most important of the benefits, the concepts outlined in this technical report also set the stage for further process improvements as color management and color proofing tools become more effective. The concepts outlined in this technical report are a basic requirement to tap into these powerful tools today or in the future.

All improvements to process consistency ultimately translate into greater customer satisfaction. A more efficient operation coupled with greater customer satisfaction often leads to greater capacity and additional business. Further, once a process is stabilized and consistent, then it is possible to optimize parameters. This step-wise process improvement is the best way to achieve the full capability of a process and facility.

However, it must be remembered that in addition to printing, package manufacturing may involve several manufacturing processes that contribute to the final product. When integrated, the requirements of these processes may place constraints on the printing process. In addition, manufacturing processes downstream of the printing stage may affect the color

appearance of printed materials. Some of the concerns relating to these processes would be appropriately identified at one of the Project Planning Stages (see ANSI CGATS TR 011-2002, sections 5.5 – 5.8, for a description of these stages).

The need for testing usually becomes evident as a design progresses toward completion and production requirements are identified (equipment, substrate, colors/inks, materials for finishing or converting treatments). During this period, production concerns will surface, usually leading to identification of testing parameters. Thus, the determination of testing parameters for process control, fingerprinting, and characterization for a given project necessarily requires collective input from the various involved parties.

Further, the scope and depth of the testing should balance acceptable predictability of results and budgetary considerations. Available historical data may preclude the necessity of some aspects of the testing. These judgments are generally made by the group, guided by the printer/converter, with the customer's input and expectations in mind.

The members of the task force believe that the principals described in this technical report will have applicability well beyond packaging printing, and urge the consideration of these principals by other segments of the printing industry.

Graphic technology – Color reproduction and process control for packaging printing

1 Scope

This Technical Report outlines the steps necessary to understand and objectively define the color and tone reproduction capabilities (and limitations) of a printing process. These steps include optimization, fingerprinting, process control, and characterization, which provide the information required in the package development workflow defined in ANSI CGATS TR 011.

This report also suggests steps that may be taken to control the printing processes to achieve consistent and predictable color.

2 Terms and definitions

For the purposes of this technical report the following terms and definitions apply:

2.1
bearer bars
narrow strips on either side of a flexographic plate meant to promote stability by providing continuous contact between the plate, anilox and substrate along the entire image area

2.2
characterization
act of determining the relationship between input tone values and resulting colorimetric output from a printing process

2.3
chromatic colors
color possessing a clearly defined hue

2.4
color management
method for the controlled conversion of color data from input to display or print output by means of device profiles, which provide the information necessary for the conversion between native device color space and device independent ones

2.5
fingerprinting
act of benchmarking the performance of a press or a proofing system under known conditions at a given point in time

2.6
metameric match
two-colored areas that have the same color appearance but have different spectral reflectances

2.7
metamerism
spectrally different color stimuli that have the same tristimulous values (color appearance)