



International  
Standard

ISO 15339-1

**Graphic technology — Printing  
from digital data across multiple  
technologies —**

**Part 1:  
Principles**

*Technologie graphique — Impression à partir de données  
numériques via des technologies multiples —*

*Partie 1: Principes*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

This first edition of ISO/PAS 15339-1 cancels and replaces ISO/PAS 15339-1, which has been technically revised.

The main changes are as follows:

- the normative references have been updated;
- former subclause 5.4.2 on tolerances has been deleted;
- former Annex B, Tolerancing schema, has been deleted and subsequent annex has been relabelled;
- published as an International Standard.

A list of all parts in the ISO 15339 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is based on the premise that in the printing and publishing industries, electronic data are the intermediary for content storage and exchange throughout production including file preparation, job assembly, proofing, and process colour printing. It further assumes that data preparation can be largely process independent and that choice of the printing process or processes to be used for final production will be based primarily on run length requirements and substrates to be used. There are various tools in place to both define the relationship of digital data to printed colour for specific instances of printing and to manipulate data such that similar results can be obtained between and among different printing processes (see ISO/TS 10128). These specific instances of printing are typically described by colour characterization data.

When producing printed colour reproductions, it is important that the organizations responsible for material preparation, colour separation, proofing, and printing all working to a common set of parameters that uniquely define the intended visual characteristics of the final printed product. Such an agreement enables the correct production of suitable input data and subsequent production of proofs from these data. The purpose of a proof is to simulate the visual characteristics of the finished print product as closely as possible prior to production printing.

There is a unique relationship between ink, substrate, and printing process that limits the maximum chroma of the solids of the printing colorants and therefore limits the range of colours (colour gamut) that can be achieved for particular combinations. While special inks can be used, the commonly available ink pigments are used across all traditional ink processes. While toner and ink-jet systems have different colorant constraints than traditional ink processes, they tend to mimic traditional ink process aims and they will be treated as a variation of traditional ink processes. The achievable chroma range (gamuts) of ink-on-paper characterized reference printing conditions can generally be bracketed between cold-set printing on newsprint on the small end and by printing on gloss coated stocks (by a variety of processes) on the large end. Between these limits there is significant overlap of process/substrate combinations. The number of intermediate characterized reference printing conditions that are logical to define between smallest and largest is in part a function of the tolerances to which printing is expected to conform to the intended characterized reference printing condition. However, the intermediate characterized reference printing conditions also need to represent common widely used printing.

A colour characterization data set is required for each characterized reference printing condition specified. Because the intent of this document is that the data sets provided can be used as the reference for any printing process, they might not be aligned with the typical TVI and trapping associated with any specific printing process. The values selected need to represent in effect virtual printing on a virtual printing system.

It is important to realize that digital data can be encoded as already separated CMYK or can consist of un-separated data (typically in an RGB colour space) with supplementary information (ICC colour profiles, etc.) defining the colour intended on the printed sheet. Such un-separated data plus the associated supplementary data are sometimes referred to as “virtual CMYK” data. All data are encoded according to one of the PDF/X specifications (see the ISO 15930 series) to allow the necessary metadata which identifies the intended characterized reference printing condition to be included.

The colour of the printing substrate is a critical component of the colour appearance of a printed image (it behaves like a 5th colour). For halftone images, the colour of the substrate contributes mostly in the area not covered by ink. ISO 15339 is based on the assumption that the colour characterization data can be adjusted (fine-tuned) for the range of normal substrate colours expected and that different characterized reference printing conditions are not required for moderate differences in substrate colour.

Modern characterization data and profile evaluation tools allow identification of the colour of the solids, the colour and tone values of the single colour scales, and the CMY values associated with the neutral (achromatic) tone scale. Using the values derived from the colour characterization data for one printing process when printing on a printing process with substantially different characteristics, is the recommended input for process control aims used to conform to a particular characterized reference printing condition.

[Annex B](#) provides a description of the process independent workflow that is the basis for the concepts embodied in ISO 15339.

