DRAFT INTERNATIONAL STANDARD

ISO/IEC DIS 29142-1

ISO/IEC JTC **1**/SC **28**

Secretariat: **JISC**

Voting begins on:
2020-12-15

Voting terminates on:
2021-03-09

Information technology — Print cartridge characterization —

Part 1:
General: terms, symbols, notations and cartridge characterization framework

Technologies de l'information — Caractérisation des cartouches d'impression —

Partie 1: Généralités : termes, symboles, notations et cadre pour la caractérisation des cartouches

ICS: 37.100.10

This document is circulated as received from the committee secretariat.

Reference number
ISO/IEC DIS 29142-1:2020(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee *[or Project Committee]* ISO/IEC JTC1, *Information technology*, Subcommittee SC 28, *Office equipment*.

This second edition cancels and replaces the first edition (ISO/IEC 29142-1:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

— revise the term black-only printer in order to harmonize with ISO/IEC 22505

A list of all parts in the ISO/IEC 29142 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.

Introduction

The purpose of this document is to define the framework for characterizing ink and toner cartridges used in printing devices that have a digital input printing path, including multi-function devices. This document defines terms, symbols, and notations used throughout the ISO/IEC 29142 (all parts) to characterize such ink and toner cartridges.

Customer information related to ink and toner cartridges is not consistent in the global marketplace.

Cartridge manufacturers, including original, non-original manufacturers, refillers, and remanufacturers, have each communicated expressions of cartridge characteristics.

The ISO/IEC 29142 (all parts) is provided to aid transparency between manufacturers, suppliers and their customers regarding selected cartridge characteristics. The selected cartridge characteristics do not provide for an exhaustive cartridge characterization. Where applicable, cartridge attributes and the associated characterization tests are used consistently with both ink and toner cartridge technologies. The selected cartridge attributes are defined for all cartridges, regardless of manufacturing methodology.

Information technology — Print cartridge characterization —

Part 1:
General: terms, symbols, notations and cartridge characterization framework

1 Scope

This document establishes terms, symbols, notations and a framework for characterizing toner and ink cartridges used in printing devices that have a digital input printing path, including multi-function devices. This document is intended for equipment used in office environments.

It primarily provides a foundation for measuring, evaluating, or specifying characteristics of such toner and ink cartridges.

The terms, symbols, notations and framework established herein can be applied to such cartridges.

The characterizations associated with the terms, symbols, notations, and framework established herein are specified throughout the ISO/IEC 29142 (all parts).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5-3, *Photography and graphic technology — Density measurements — Part 3: Spectral conditions*

ISO 13655, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

ISO/IEC 29142-2, *Information technology — Print cartridge characterization — Part 2: Cartridge characterization data reporting*

ISO/IEC 29142-3, *Information technology — Print cartridge characterization — Part 3: Environment*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
all-in-one toner cartridge
cartridge that includes at least: a toner containment part, a photoreceptor part, and a developer part

3.2
monochrome printer
printer only capable of printing black and can never configurable to print another colourant

Note 1 to entry: More than one black cartridge can be installed simultaneously if they have the same cartridge identifier.

3.3
binomial attribute
attribute which either occurs or does not occur and which is characterized by a count of the number of times it occurs in a particular number of observations

Note 1 to entry: A random process is said to be binomial if it satisfies four basic properties:

a) It consists of a sequence of n trials for some $n > 1$.

b) Each trial has exactly two possible outcomes, A and B, which are mutually exclusive.

c) P(A), the probability of A, takes the same value p on all n trials. P(B) is likewise fixed at 1-p.

d) The n trials are independent of one another.

3.4
cartridge
user replaceable unit operating with a printing system that includes at least a containing mechanism designed for materials intended for deposition on a substrate

3.5
cartridge attribute test report
report including the information of a cartridge customer report and the detailed cartridge characterization results of an ISO/IEC 29142 cartridge characterization test reported for customer presentation according to a required format

Note 1 to entry: The format is prescribed according to each ISO/IEC 29142 standardized or specified cartridge characterization test and is in compliance with ISO/IEC 29142-2.

3.6
cartridge characterization test
test method provided in or in compliance with this document for the purpose of evaluating an attribute of a cartridge or cartridge set of interest to cartridge and cartridge set users

3.7
cartridge collector
party providing a cartridge take-back or collection program

EXAMPLE A business entity designated to collect cartridges.

3.8
cartridge element
sub piece of a cartridge other than the containment part of the cartridge

3.9
cartridge end-of-life
point in a cartridge life-cycle from which the cartridge is no longer used for its intended purpose without additional non-customer interaction

3.10
cartridge identifier
formatted human readable arrangement of information uniquely specifying a distinct cartridge

3.11
cartridge life percent completion point
point in the life of a cartridge computed as a percent of expected cartridge life

3.12
cartridge set
group of colourants and their assignment to one or more cartridges as defined by a printer manufacturer to be necessary and sufficient to produce the fully functional default colour renditions

EXAMPLE Default colour renditions: printed black, red, green, blue, cyan, magenta, and yellow.

Note 1 to entry: A printer often have more than one fully functional cartridge set.

3.13
cartridge supplier
cartridge marketer, manufacturer, remanufacturer, refiller, or distributor, being the party or parties responsible for marketing the cartridge and providing customer support for the cartridge

3.14
colour printer
printer with an operating part to apply ink or toner on a substrate, with functionality to produce print output containing colours

3.15
containment part
containing mechanism designed for materials intended for deposition on a substrate

3.16
continuous attribute
attribute which can take on any of a range of values

3.17
cross-systems attribute tolerance range
CSATR
range of actual attribute values for a cartridge characterization attribute of a particular cartridge characterization test method, determined from evaluation of exemplary systems to which the test method applies

3.18
customer report
report, including a cartridge notification, and a cartridge attribute checklist, with summary results of selected ISO/IEC 29142 cartridge attribute characterization tests, presented according to a required format

Note 1 to entry: The format is prescribed according to each ISO/IEC 29142 standardized or specified cartridge characterization test and is in compliance with ISO/IEC 29142-2.

3.19
deposition material
material, ink or toner, liquid or solid, colourant or non-colourant, that can be contained in a cartridge, and that is designed for deposition on a surface by means of a printing system

3.20
developer part
physical mechanism, which is often a cartridge element, which functions to apply toner particles to the latent image on the photoreceptor part of an electrophotographic printing system

3.21
discrete attribute
attribute which can take only a finite number of values within a range, such as an integer count

3.22
dye ink
material designed for liquid state deposition on a substrate, including a chemical dye colourant

3.23
electrophotographic printer
printer principally using opto electric phenomena and electrostatic attraction to move toner to a substrate

3.24
end-of-life
phase in a cartridge life-cycle when the cartridge can no longer be used for its intended purpose without additional non-customer interaction

3.25
expected cartridge life
approximate number of pages likely to be printed from a cartridge when run to cartridge end-of-life according to an ISO/IEC 29142 standardized or specified test method

3.26
filled cartridge
user replaceable unit of a printing system that includes at least ink or toner materials, intended for deposition on a substrate and a containing mechanism for such materials

3.27
incineration
disposal method that involves combustion of waste material converting it into heat, gas, steam and ash but not including smelting

3.28
ink
material, which often include colourant, designed for liquid state deposition on a substrate

3.29
ink cartridge
user replaceable unit of a printing system that includes at least a containing mechanism designed for ink intended for deposition on a substrate

3.30
ink deposition mechanism
imaging apparatus for depositing ink on a printing substrate

EXAMPLE A printhead.

3.31
inkjet printer
printer with an operating part, for example a printhead, to apply ink on a substrate

3.32
integrated ink cartridge
cartridge that includes at least: an ink containment part and an ink deposition mechanism

3.33
landfilled
waste disposal in a landfill or other non-reuse, -recycle, -remanufacture, -waste to energy, or -incineration depository, excluding the residuals from waste to energy and incineration

3.34
life-cycle
consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposition

Note 1 to entry: See ISO 14040

3.35
lifetime attribute
cartridge performance attribute which can only be measured by printing to cartridge end-of-life according to an ISO/IEC 29142 standardized or specified test method

3.36
material safety data sheet
MSDS
safety data sheet
SDS
form containing safety information about the ink or toner contained in cartridges designed for use in printing applications which includes physical, chemical, and toxicological properties, regulatory information, and recommendations to ensure safe handling

3.37
multi-chamber ink cartridge
ink cartridge that is designed to contain two or more inks

3.38
multi-function printer
MFP
printer with an operating part to apply ink or toner on a substrate, and also providing additional functions such as fax and copy

3.39
non-colourant ink
material designed for liquid state deposition on a substrate, such as gloss optimizers and fixatives, not containing a colourant

3.40
non-colourant toner
solid material, not containing colourant, capable of taking on an electrostatic charge, designed for deposition on a substrate under the control of electrostatic forces in conjunction with a surface having a controlled distributed charge such as gloss optimizers and fixatives

3.41
non-original cartridge
cartridge that is marketed by a company other than the company that markets the printing system for which the cartridge is intended

3.42
original cartridge
cartridge that is marketed by the company that markets the printing system for which the cartridge is intended

3.43
original equipment manufacturer
company that markets a printing system

3.44
page attribute value
value of a performance point attribute that is the value of that attribute evaluated from a complete single printed page

3.45
performance attribute
attribute which can be determined only through printing with the cartridge(s) installed in an operational printer

3.46
photo printer
printer with an operating part to apply ink or toner on a substrate, with functionality to print images on photo paper sizes and types

3.47
photoreceptor part
photoconductor
physical mechanism, such as OPC, that includes a surface that accepts a uniform electrostatic charge, with a surface that can subsequently be selectively discharged by exposure to light, and which facilitates transfer of toner to media after such exposure

3.48
physical attribute
attribute which can be determined directly from the cartridge and which is independent of print systems

3.49
pigment ink
material designed for liquid state deposition on a substrate, including a chemical pigment colourant

3.50
point attribute
performance attribute which can be measured on pages printed at any point during the life of the cartridge

3.51
printer
device intended to apply colourant(s) to a substrate in response to a digital signal

3.52
recovery
process to divert cartridges and/or cartridge materials from the solid waste stream and into productive uses

3.53
recycle
reuse, remanufacture or otherwise divert from a solid waste stream

3.54
refill
operation to replace ink or toner in a customer's cartridge that does not involve the replacement or refurbishing of worn cartridge components

3.55
refiller
cartridge supplier that refills customer's cartridges

3.56
remanufacture
operation to replace or clean components and add ink or toner using cartridges from cartridge take-back or collection programs

3.57
remanufacturer
cartridge supplier that produces or markets remanufactured cartridges

3.58
reuse
operation in which a whole or a component part of a cartridge is incorporated in the manufacture or remanufacture of a cartridge, such that the whole or component part is intended to be put into service for the same purpose for which it was conceived