
**Information technology — Print
cartridge characterization —**

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

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*Technologies de l'information — Caractérisation de cartouche
d'impression —*
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*Partie 1: Généralités: termes, symboles, notations et cadre de travail
de caractérisation de cartouche*

ISO/IEC 29142-1:2013

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29142-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 28, *Office equipment*.

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Introduction

The purpose of this part of ISO/IEC 29142 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 part of ISO/IEC 29142 defines terms, symbols, and notations used throughout the ISO/IEC 29142 series 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 series 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.

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Information technology — Print cartridge characterization —

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

1 Scope

This part of ISO/IEC 29142 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 part of ISO/IEC 29142 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 series.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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.

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

black-only printer

printer with an operating part to apply ink or toner on a substrate with functionality limited to print output using only a single black colourant

Note 1 to entry: In the case of a printer capable to operate with only a black colourant cartridge and alternatively to operate with other cartridge configurations that include other colourants, the black-only printer condition is limited to when only the single black colourant cartridge is installed.

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 ISO/IEC 29142-1 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

any 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 may 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 may or may not be 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 may or may not 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.

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3.31

ink transport part

ink channelling mechanism operating between an ink deposition mechanism and an ink containment part, particularly when the ink deposition mechanism and the ink containment part are not physically abutted

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3.32

inkjet printer

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

3.33

integrated ink cartridge

cartridge that includes at least: an ink containment part, an ink transport part, and an ink deposition mechanism

3.34

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

3.35

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

3.36

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

3.37**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

3.38**multi-chamber ink cartridge**

ink cartridge that is designed to contain two or more inks

Note 1 to entry: It may or may not be an integrated ink cartridge.

3.39**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

3.40**non-colourant ink**

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

3.41**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

3.42**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

3.43**original cartridge**

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

3.44**original equipment manufacturer**

company that markets a printing system

3.45**page attribute value**

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

3.46**performance attribute**

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

3.47**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

3.48

photoreceptor part

photoconductor

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

3.49

physical attribute

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

3.50

pigment ink

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

3.51

point attribute

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

3.52

printer

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

3.53

recovery

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

3.54

recycle

reuse, remanufacture or otherwise divert from a solid waste stream

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3.55

refill

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

3.56

refiller

cartridge supplier that refills customer's cartridges

3.57

remanufacture

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

3.58

remanufacturer

cartridge supplier that produces or markets remanufactured cartridges

3.59

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

3.60

single chamber ink cartridge

ink cartridge that is designed to contain one ink

Note 1 to entry: It may or may not be an integrated ink cartridge.