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Information technology – Automatic identification and data capture techniques – Bar code printer and bar code reader performance testing specification

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

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 and www.iec.ch/national-committees.

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Introduction

Bar code printers and bar code readers are key equipment in auto-ID systems. However, manufacturers of this equipment evaluate their products' performance by their own test methods and measures, specifying this performance in their catalogues. As a result, actual performance varies, although there are some performance values that are the same across catalogues. Therefore, users are forced to test the equipment in order to find the most suitable solutions for their applications, at their own cost.

This document was developed to provide standard test and ranking methods giving users a **common ruler** to be able to evaluate performance values in selecting equipment to meet their needs.

Furthermore, this document is expected to be used in avoiding using poor quality products.

NOTE There are ISO/IEC 15419 and ISO/IEC 15423. ISO/IEC 15419 mainly specifies how to print a barcode as a digital image, so that the contents focus on software development and look like a technical suggestion with no details on how to evaluate performances of a bar code printer in total.

This document specifies more details how to test and evaluate complete printer performances including durability of printed labels.

ISO/IEC 15423 is made based on that a scanner and a decoder are separated devices, which is a quite old fashion system. Although, a combination case of a scanner and a decoder is mentioned.

This document specifies more details how to test and evaluate reader performances, which covers test items specified in ISO/IEC 15423.

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Information technology – Automatic identification and data capture techniques – Bar code printer and bar code reader performance testing specification

1 Scope

This document specifies the performance evaluation specifications of thermal transfer type printers (hereinafter referred to as bar code printers), consumables, and bar code readers (regardless of the reading method) used in bar code systems. The rank of performance is also defined by the evaluation items.

This document can be applied to the following evaluation tests by combining ISO/IEC 15416 and ISO/IEC 15415, which define the print qualities of bar code symbols.

NOTE This document is not prevented from being cited in the evaluation of thermal printers using thermal paper and printers using "plain or exclusive paper" (commercial printing, ink jet printers, electrophotographic printers, etc.).

a) Print performance of bar code printers (including consumables)

b) Brightness and smoothness of "reception paper or label", and adhesion of the label

c) Strength of reception paper or label on which the bar code is printed

d) Reading performance of bar code readers

e) Electrical, mechanical and environmental characteristics of bar code printers and bar code readers

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 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-C06, *Textiles — Tests for colour fastness — Part C06: Colour fastness to domestic and commercial laundering*

ISO 105-F09, *Textiles — Tests for colour fastness — Part F09: Specification for cotton rubbing cloth*

ISO 105-X11, *Textiles — Tests for colour fastness — Part X11: Colour fastness to hot pressing*

ISO 105-X12, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

ISO 2470-1, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

ISO 29862, *Self adhesive tapes — Determination of peel adhesion properties*

ISO 6353-2, *Reagents for chemical analysis — Part 2: Specifications — First series*

ISO 8791-5, *Paper and board — Determination of roughness/smoothness (air leak methods) — Part 5: Oken method*

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ISO/IEC 15426-1, *Information technology — Automatic identification and data capture techniques — Bar code verifier conformance specification — Part 1: Linear symbols*

ISO/IEC 15426-2, *Information technology — Automatic identification and data capture techniques — Bar code verifier conformance specification — Part 2: Two-dimensional symbols*

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

ISO/IEC 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold*

ISO/IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

ISO/IEC 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state*

ISO/IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

ISO/IEC 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

ISO/IEC 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test*

ISO/IEC 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

IEC CISPR 32, *Electromagnetic compatibility of multimedia equipment — Emission requirements*

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in ISO/IEC 19762, and the following apply

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

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

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

3.1 Terms and definitions

3.1.1
adhesion characteristics
clinging performance of a label attached to a base material to be adhered.

3.1.2
brightness
degree of whiteness of the print surface of the reception paper or label.

3.1.3
ceramic label
label in which a bar code symbol is printed on the surface of a raw ceramic material before-burning, and then is burned to form a ceramic.

3.1.4
consumables
reception papers, labels and ribbons that shall be refilled by the user as needed.

3.1.5
fixed mount reader
bar code reader (also called a stationary reader) that is fixed to specific locations.

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3.1.6
label
reception paper having an adhesive applied to the back surface thereof.

3.1.7
ladder type print
print state in which the height direction of the bar is perpendicular to the movement direction of the medium to be printed.

3.1.8
lateral motion reading speed
maximum speed at which a one-dimensional symbol can be read while the symbol or the bar code reader is moving in a direction perpendicular to the elements of symbols.

3.1.9
nominal dpi
number of dots per inch, rounded to be conventionally an integral number, multiplied by 25,4 times the number of dots per mm.

3.1.10
performance rank
ranking for performance of each evaluation item.

3.1.11
picket fence print
print state in which the height direction of the bar is in the horizontal direction with respect to the movement direction of the medium to be printed.

3.1.12
print
transfer ink from a ribbon to a reception paper or a label using a thermal transfer printer and represent a bar code, etc.

3.1.13
printing
press a bar code using a plate and ink.

3.1.14
reception paper
paper or film having an ink receptible layer.

3.1.15
release liner
paper or film (also referred to as backing paper) having a surface processed to be anti-adhesive.

3.1.16
ribbon
roll of hot-melt ink applied to one side of a film.

3.1.17
smoothness
degree of the flatness of a reception paper or label surface.

3.1.18
test chart
high-precision bar code symbol printed on a photo paper for use in the reading performance test of bar code readers.

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3.1.19
thermal print head
electronic component having a structure in which a multiple of minute heating resistors are linearly arranged, and which works to apply heat to a ribbon.

3.1.20
thermal transfer printer and bar code printer
equipment that incorporates a function of converting data into a bar code image and transfers ink from a ribbon using heat (by any method of thermal transfer) to the image.

3.2 Symbols

In this document, unless otherwise specified, the following symbols are used:

AV Variation of read time between print quality grades in axial non-uniformity test

B Number of bends in the interface cable strength test

BRPT Test charts for bar code reader performance tests

DCV Variation of reading time between print quality grades in decoding facility test

DOF Reading depth when bar code reader reads symbol (depth of field)

DV Variation of read time between print quality grades in defect test

F Smoothness of the reception paper

FV Variation of read time between print quality grades in fixed pattern damage test

GV Variation of read time between print quality grades in grid non-uniformity test

H Fall distance in non-pack drop test

L Maximum illuminance in the ambient illuminance test

Ms Moving speed of the moving object reading speed test

MV Variation of read time between print quality grades in modulation test

N Number of depressions in the trigger switch endurance test

PSmax Maximum print speed

Re Minimum print resolution

RT Value obtained by dividing the reading time in the reading speed test by the number of readings (100)

RTV Time obtained by subtracting the minimum reading time from the maximum reading time in the symbol contrast test

T Time to print 50 consecutive sets of standard images

Tmps The value obtained by dividing T by 50 when consecutive sets of standard images were printed with print quality overall grade 1,5 or a value more than but close to 1,5

UV Variation of read Time between print quality grades in unused error correction capacity test

Va Electrostatic strength in the air discharge test

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