DRAFT INTERNATIONAL STANDARD
ISO/IEC DIS 24734

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

Secretariat: **JISC**

Voting begins on:
2020-05-19

Voting terminates on:
2020-08-11

Information technology — Office equipment — Method for measuring digital printing productivity

Technologies de l'information — Équipements de bureau — Méthode de mesure de la productivité d'impression numérique

ICS: 37.100.10

This document is circulated as received from the committee secretariat.

Reference number
ISO/IEC DIS 24734:2020(E)

© ISO/IEC 2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)

COPYRIGHT PROTECTED DOCUMENT

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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.

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 document 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).

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member 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. 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO/IEC 24734 was prepared by joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC 28, *Office equipment*.

This third edition cancels and replaces the second edition (ISO/IEC 24734:2014), of which it constitutes a minor revision.

This edition includes the following changes with respect the previous edition:

a) Updated document formatting based on ISO/IEC Directives, Part 2, 2016.

b) Added empty "Normative references" based on ISO/IEC Directives, Part 2, 2016.

c) Change the Annex structure to be consistent with other productivity standards.

d) "Terms and definitions" clause has been modified to add new definitions and removed definitions of terms not used in the text.

e) Added a requirement that single copy output shall use the default "Output Order" setting and the alternate "Order Output" is an optional test.

f) Added reporting of the "Output order" setting as part of the summary and detailed reports since it has a direct impact on the ability for results to be repeatable.

g) Added "Ready delay time" requirement to "Test measurement" procedures.

h) Added [Annex D] for the procedure to determine the "Ready delay time".

i) Changed paper weight to paper grammage in body and reporting.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

INTRODUCTION

Many digital printing devices produce printed pages at a different rate than their nominal speed when running with different modes (simplex, duplex, print quality modes), different substrate grammage, system environments, applications and file content, and finishing options. The degree to which a reduction in productivity is experienced depends significantly on multiple parameters of the job workflow. The most dominant of the parameters of the job workflow are: system environment, application, and job characteristics such as the number of pages in a set to be printed, single-sided or double-sided output pages, quality mode, number of print sets to be produced, substrate grammage/size used, and finishing options, and job content complexities such as monochrome vs. colour, text/vector vs. raster, page scaling and colour conversion. The existing International Standard (ISO/IEC 10561) only addresses printing throughput for Class 1 and Class 2 printers and, therefore is not suitable for comparing colour printing devices or high-speed page-oriented printing devices with many finishing options and connectivity configurations.

This document provides a general method for measuring the productivity when the above-mentioned job workflow parameters for digital printing devices are taken into consideration. This document also includes a suite of test files, test-platform (hardware and software) setup guidelines, and a procedure to be used for measuring digital printing productivity. It allows manufacturers and buyers of digital printing devices to describe the productivity of various digital printing devices with respect to representative office usage patterns.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Information technology — Office equipment — Method for measuring digital printing productivity — Revision DIS

1 Scope

This document specifies a method for measuring the productivity of digital printing devices with various office applications and print job characteristics. This document is applicable to digital printing devices, including single-function and multi-function devices, regardless of print technology (e.g. inkjet, laser). Devices can be equipped with a range of paper feed and finishing options either directly connected to the computer system or via a network. It is intended to be used for black and white (B&W) as well as colour digital printing devices. It allows for the comparison of the productivity of machines operating in various available modes (simplex, duplex, size of substrates, etc.) and office applications when the test system environment, operating modes, and job mix for each machine are held identical. This document includes test files, test setup procedure, test runtime procedure, and the reporting requirements for the digital printing productivity measurements.

This document is not intended to be used for devices which are not able to print on a media size of A4/8.5"x11" or for devices, which are not able to collate multiple copies of a print.

This document is not intended to replace manufacturer's rated speeds.

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 536, *Paper and board — Determination of grammage*

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 http://www.iso.org/obp

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

3.1
category test
test pertaining to one of two separate categories; Office category and Advertising and Graphics category, whereby the Office Category test is used to test and report *FSOT* (3.10), *ESAT* (3.7) and *EFTP* (3.6) using content from typical office applications and the Advertising and Graphics Category test is used to test and report FSOT, ESAT and EFTP using applications and files representing more complexity, higher coverage and a higher ratio of image and graphic content such as pictures, gradients and embedded elements

3.2
collate
collation
collated
printing device's (3.22) ability to produce multiple hard copies of an electronic document in repeating original order which may be achieved through either software features or via a hardware finishing device

EXAMPLE Repeating original order 1234, 1234, 1234, etc..

3.3
default driver
printing device (3.22) driver that is automatically selected as the default per the manufacturers' installation procedure

3.4
dual output order device
printing devices (3.22) that support both *original order output* (3.18) and *reverse order output* (3.26)

3.5
duplex
duplex printing
printing where the *printing device* (3.22) can make a number of prints with the printing being done to both sides of the sheet

Note 1 to entry: Other equivalent terms are "two-sided printing" or "two-sided perfecting".

3.6
EFTP
effective throughput
rate at which a device produces pages measured from the initiation of the job through the complete exit of the last page of the last *test set* (3.33)

Note 1 to entry: EFTP is expressed in *images per minute* (*ipm*) (3.13). EFTP can be affected by the digital processing time of the test set as well as the run time of the test set.

3.7
ESAT
estimated saturated throughput
rate at which a device produces pages measured from the complete exit of the last page of the first *test set* (3.33) through the complete exit of the last page of the last test set

Note 1 to entry: ESAT is expressed in *images per minute* (*ipm*) (3.13).

3.8
feature performance ratio
ratio of the printing performance (such as *FSOT* (3.10) and *ESAT* (3.7)) with the subject feature ON versus the *printing device* (3.22) default baseline performance (without the subject feature ON)

3.9
feature performance test
optional test used to evaluate productivity changes with various printing and finishing features enabled

Note 1 to entry: The feature *performance test* (3.21) suite is run with default printing system settings to establish a base line, and then with the selected feature (e.g. stapling) ON, for comparison.

3.10
FSOT
first set out time
number of seconds between the initiation of the job to the complete exit of the last page of the first *test set* (3.33)

3.11
full detailed report
presentation of information including machine setup and full measured test results

Note 1 to entry: An example of a full detailed report is shown in [Annex B].

3.12
full report
presentation of results including the *FSOT* (3.10), *EFTP* (3.6) and *ESAT* (3.7) values for each file tested for a given category or feature test as well as the calculated averages for the overall FSOT, EFTP and ESAT values

3.13
ipm
images per minute
printing rate, excluding time to first page printed, as measured when producing pages in a continuous print mode for one minute with a single static document using a nominal grammage substrate

Note 1 to entry: Nominal printing speed is expressed in pages per minute or images per minute.

3.14
initial installation state
state of the *test platform* (3.31) after the installation and configuration of the operating system and applications but before the installation of unique software, e.g. print driver for the *printing device* (3.22) under test

3.15
interface
data transmission between the host and the *printing device* (3.22), such as a direct (via parallel, serial, USB, Firewire, network or wireless) or an indirect (via network router/server) connection

3.16
LSOT
last set out time
number of seconds between the initiation of the job to the complete exit of the last page of the last *test set* (3.33)

3.17
N-up
inclusion of N page images on a single side of a single sheet of paper. N is typically 1, 2 or 4 original images.

EXAMPLE   2-up copy mode scans two originals and creates one sheet of paper with two originals on it.

3.18
original order output
printed document output stack is in the same order as the original electronic document

Note 1 to entry: For a device that prints *simplex* (3.28) imaged media side up, the device would print pages in reverse order 4321 for the output stack to be in the same order 1234 as the original electronic document when viewed by the user.

Note 2 to entry: For a device that prints simplex imaged media side down, the device would print pages in order 1234 for the output stack to be in the same order as the original electronic document when viewed by the user.

Note 3 to entry: This is commonly referred to as "In-Order" Output.

3.19
output order
the order of printed pages in the output stack relative to the original electronic document

Note 1 to entry: The original document is ordered 1234, the printed output can be either 1234 or 4321.

3.20
PDL
page description language
commands and data structures that a printing system interprets to produce an intended print page image

3.21
performance test
test used to evaluate productivity by providing *FSOT* (3.10), *EFTP* (3.6) and *ESAT* (3.7) without using any special feature or mode, including both the *simplex* (3.28) printing mode and *duplex* (3.5) printing mode if available

3.22
printing device
device that produces hard copy output, or prints on media such as paper, from digital electronic documents

Note 1 to entry: The function of the device is not limited to printing only, such as is the case with multi-function devices, which have the ability to print and perform other functions such as copy, scan and/or digital send

3.23
RIP
raster image processor
component used in a printing system, which produces a bitmap

3.24
ready
ready state
state which a device typically enters after the exit of the last page of the last job and the printing engine is in a stable condition, but fully warmed up and prepared to operate

Note 1 to entry: While in the Ready state, systems not directly involved with marking the media are allowed to be in motion.

EXAMPLE   Fans may still be spinning and all other motors stopped.

3.25
ready delay time
required delay time from the complete exit of the last page of the previous print job to the start of the next job

3.26
reverse order output
printed document output stack is in the reverse order as the original electronic document

Note 1 to entry: For a device that prints *simplex* (3.28) imaged media side up, the device would print pages in order 1234 for the output stack to be in the reverse order 4321 as the original electronic document when viewed by the user.

Note 2 to entry: For a device that prints simplex imaged media side down, the device would print pages in reverse order 4321 for the output stack to be in the reverse order 4321 as the original electronic document when viewed by the user.

3.27
set count
the total number of sets printed during a *test run* (3.32), with set count N, and then N (as in N *test sets* (3.33)) x M (number of pages in one *test file* (3.30)) pages will be printed

Note 1 to entry: This is often referred to as copy count in the application or print driver setting.

3.28
simplex
simplex printing
use of a *printing device* (3.22) when only a single side of a sheet is printed on

Note 1 to entry: Single-sided printing mode is similar to the copying modes often referred to as 1:1 mode, Simplex to simplex, or single-sided originals to single-sided copies.

3.29
summary report

presentation of results including the average overall *FSOT* (3.10) and *ESAT* (3.7) values calculated for a given category or feature test

3.30
test file
individual files used for testing as per the test method

EXAMPLE   A single Microsoft Excel file within the Office test is a "test file".

3.31
test platform
set of hardware and software system components configured to perform the collection of digital printing productivity tests, including, but not limited to a computer installed with an operating system and applicable application software, installed *printing device* (3.22) software, hardware and software *interfaces* (3.15), and timing devices (stopwatch or automated)

3.32
test run
operation of printing one *test file* (3.30), in a particular system configuration, with a particular set and page count

Note 1 to entry: Print times are recorded for each test run.

3.33
test set
all of the pages of a single *test file* (3.30)

3.34
test suite
the combination of *test files* (3.30) for each *category test* (3.1)

EXAMPLE 1   The Office Category test suite consists of three test files.

EXAMPLE 2   The Advertising and Graphics Category test suite consists of four test files.

4   Test parameters and ponditions

4.1   Test platform

Due to the rapid change of computer technology, a common test platform (hardware and software) that can be used for productivity testing over time is considered to be not practical. Instead, when a test platform is used, the test platform system parameters that may affect digital printing productivity measurements (see [Annex E]) shall be recorded.

4.2   Test platform test setup procedures

4.2.1   Initial platform setup

The test platform hardware should be installed as per the manufacturer's instructions. The test platform hardware information shall be recorded as listed in [Annex E]. The test platform operating system and applications should be installed as per the manufacturer's instructions. The test platform operating system and application information shall be recorded as per [Annex E]. All settings or selections made during installation that differ from the application's default settings or operating system's default settings shall be recorded.

The test platform should be configured for the appropriate connection environment, such as direct USB connection or network Ethernet connection, and the information shall be recorded as per [Annex E] along with all settings and selections that differ from the installation default configuration.

It should be verified that the test platform is configured for optimal performance by evaluating system parameters such as hard disk fragmentation and compression, swap memory size, etc. Any settings, changes or optimizations made that differ from the installation default condition shall be recorded.

The test platform is now in the Initial Installation State. All recorded settings shall be included in the Full Detailed Report.

4.2.2 Creation of disk image of test platform (optional)

Disk imaging software may be used to enable the system to be restored to the Initial Installation State. Create the disk image after the test platform has been configured and before the print driver for the printing device is installed. Record the disk imaging software used and all settings that differ from the imaging software's installation default condition.

4.2.3 Initial test state

The test platform shall be restored to the Initial Installation State before beginning the sequence of tests for each new printing device. Products that are of the same distinct print system can share testing and reports. Two or more products or bundles may be part of a distinct print system when they use the same print mechanism and operating points, and there are no differences that might be expected to affect performance. Devices with differences that could affect performance are not part of the same distinct print system, and are different print systems, even if they use the same print mechanism, and shall not share testing and reports. Record the method used to establish the Initial Installation State.

4.3 Printing device system setup

iTeh STANDARD PREVIEW

Place the printing device on a horizontal surface and setup the printing device according to the manufacturer's recommendation. Install the software (driver, port, etc.) recommended by the manufacturer. Use the most recent print driver available from the manufacturer. The driver and driver version shall be recorded on the test report.

The standard test shall be conducted using the manufacturer's default driver for the given printing device. If a default driver is not installed/selected automatically by the manufacturer's installation procedure, consult the manufacturer's documentation and use the recommended driver. All image, print quality, mode and speed modifiers shall be at their factory pre-set configuration for the printing device and default installed condition for the driver. If the printing device and driver differ, then the driver defaults shall be used. Disabling manufacturer default installed features, routines or applications, is not allowed.

EXAMPLE 1   Example routines that may not be disabled include, but are not limited to the following

— automatic cleaning

— calibration cycles

— energy save settings

Testing shall be carried out in the specified modes, regardless of whether they are default settings or not.

EXAMPLE 2

If the default driver setting is duplex, the setting shall be changed to simplex for the simplex tests.

Other modes that may need to be modified for specific tests include B&W mode on colour devices, paper size, paper scaling, and collation. It is allowable to disable automatic media detect and select plain paper. All changes to the default settings shall be recorded in the Full Detailed Report.

The file shall be rendered on the page in a size corresponding to the dimensions in the test page description.

EXAMPLE 3

When testing an A4 sized document, the media settings shall be set to A4, and when testing a 8.5"x11" size document, set to 8.5"x11", and so forth.

Verify the printing device and print driver default page margin settings are not larger than 12,7 mm (0,5 inches). Adjust the settings as necessary to insure the test page printable area is rendered correctly. Adjust the settings as necessary to insure the test pages printable area is rendered to cover the paper page area as shown in the softcopy display of the test file. Any modifications to the printing device or print driver settings shall be recorded. Page placement modifiers such as page centering and auto-rotation can be used to place the image properly on the page. Any change from the printing device defaults shall be recorded in the Full Detailed Report.

Adjust the settings such as turning off "page scaling" setting to ensure the test page printable area is rendered correctly.

Multiple copy output shall be collated. If collated output is not included in the default settings, follow the manufacturer's recommendation for obtaining collated output. In the case that collation settings do affect performance, the faster of the results should be reported. As with other settings, the test report shall disclose the manner in which collation was achieved.

Single and multiple copy output will be ordered according to default settings. If not the default and if supported, optional Original Order output may be done by following the manufacturer's instructions on how to change the printing device or driver for the result of producing Original Order output. If other settings change automatically as a result of changing to Original Order output this shall be noted on the test report.

For colour and B&W printing devices, printing the three files in the Office suite, using default settings is required. The output of the three files on a colour device shall be in colour, whereas the output of the three files on a B&W device shall be in B&W. For colour printing devices, an optional B&W result may be reported by using the same three colour files, changing the printing device or driver to produce B&W output, but maintaining the default quality or resolution setting.

Procedurally, the optional B&W output on a colour device test shall be done as follows: Select the printing device or driver options which are intended to produce B&W only output. Follow the manufacturer's instructions on how to change the printing device or driver for the result of producing B&W output utilizing only the black toner or ink. If other settings change automatically as a result of changing to B&W mode, such as quality mode, this shall be noted on the test report. If B&W printing is performed by composite black, it should be reported.

NOTE Common means of setting a printing device in B&W include, but are not limited to, selecting a B&W option in the driver. In the driver, this might appear as: "print in B&W", "print in grayscale" or "print in black only". The selection of B&W printing can occur in several places in the driver and printing device. When the best method to set the printing device to print in B&W only is in question, it is best to contact the manufacturer regarding the best method to change this setting.

Additional tests may be conducted using other, non-default, drivers or printing device description languages provided by the manufacturer for the printing device. Additional tests may also be conducted using other settings available with the device. Such settings may be, but are not limited to, print quality and speed modifier choices available in the driver. The results of such additional tests will be documented as having system parameters that differ from the factory defaults and shown in comparison to the default system parameter results.

4.4   Printing device connection

Connection to the test platform should be determined by the manufacturer's targeted usage. A printing device intended to be shared by several users should be connected via the network connection with which the