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Information technology — Office equipment — Method for Measuring Scanning Productivity of Digital Multifunctional Devices

Technologie de l'information — Équipement d'Office — Méthode pour Productivité du Scanner d'Appareils Multifonctionnels Numériques

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Foreword

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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).

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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.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 28, *Office Equipment*.

Introduction

The actual productivity measurement methods of copying and printing were published as ISO/IEC 24735 and ISO/IEC 24734. However, ISO/IEC 24735 contains no measurement method for the scanning productivity of multifunctional devices to be used for comparison and procurement of these machines.

This International Standard provides a general method for measuring “scanning productivity” of the multifunctional devices. The International Standard also includes a test chart for scanning productivity measurement. It allows the manufacturers and the buyers of digital multifunctional devices to describe the productivity of various digital scanning devices with respect to representative office usage.

Information technology — Office equipment — Method for Measuring Scanning Productivity of Digital Multifunctional Devices

1 Scope

This International Standard specifies a method for determining scanning productivity by measuring "scanning speed" and "scan to network folder speed". It includes test files, test setup procedure, test procedure, and the reporting requirements for the scanning productivity measurements. This International Standard is applicable to black and white (B&W) as well as colour digital multifunctional devices of any underlying marking technology.

This International Standard is applicable to devices which are able to scan a media size of A4/8,5" × 11", and which have an automatic document feeder (ADF), an ability to scan to network folder, and do not need other application programs on a computer or another devices to do a scanning job.

This International Standard is not intended to be use for image quality measurement, document or record management of any scanned images.

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/IEC 24734, *Information technology — Office equipment — Method for measuring digital printing productivity*

ISO/IEC 24735, *Information technology — Office equipment — Method for measuring digital copying productivity*

ISO 2470-1:2009, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

ISO 536:2012, *Paper and board — Determination of grammage*

3 Terms and definitions

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

3.1
ADF speed
rate at which a device scans documents using an auto document feeder (ADF) to demonstrate the productivity of the ADF

Note 1 to entry: Suffix "$_{A}$" means "ADF Productivity Measurement". For example, suffix such as "$_{1setA}$" means a test of "1 set" test of the object to measure "ADF Productivity".

3.2
duplex scanning
use of a scanning device with the scanning being done to both sides of the sheet

Note 1 to entry: An equivalent term is "double-sided scanning".

3.3
scanning Effective Throughput
scEFTP
rate at which a device scans pages measured from the initiation of the job through the full ejection of the last page of the scanning sets or through the complete creation of the file on the shared network folder after the transfer of the last page of the last test set

Note 1 to entry: There are suffixes such as "$_{1setA}$" or "$_{30secF}$". Each suffix is used to classify tests such as "1 set Test" or "1 set + 30 second test" of the objects of tests for "ADF Productivity Measurement" (using suffix "$_{A}$") or "Scan to Network Folder Productivity Measurement"(using suffix "$_{F}$") test respectively. For example, $scEFTP_{1setA}$ means scanning effective throughput of "1 set Test" for "ADF Productivity Measurement".

Note 2 to entry: scEFTP is expressed in images per minute (ipm); it can be affected by scan time, digital processing time, maintenance and the run time of the test.

Note 3 to entry: A different term ("EFTP; effective throughput" for digital copying machines) is defined in ISO/IEC 24735.

Note 4 to entry: As for $scEFTP_{30secF}$, measurement parameters involving the measurement of file transmission to a network folder are dependent on other factors like the computer and network configuration and represent relative values and not absolute values.

3.4
scanning Estimated Saturated Throughput
scESAT
rate at which a device scans pages measured from full ejection of the last page of the first test set from ADF through the full ejection of the of the last page of the scanning sets (using suffix "$_{A}$")

Note 1 to entry: scESAT is expressed in images per minute (ipm).

Note 2 to entry: There are suffixes such as "$_{1setA}$" or "$_{30secF}$". Each suffix is used to classify tests such as "1 set Test" or "1 set + 30 second test" for "ADF Productivity Measurement"(using suffix "$_{A}$") or "Scan to Network Folder Productivity Measurement"(using suffix "$_{F}$") test respectively. There is no measurement for "Scan to Network Folder Productivity Measurement" of scESAT, $scESAT_{30secF}$ defined, therefore $scESAT_{1setA}$ and $scESAT_{1setF}$ are not used as classifications.

3.5
scanning First Set Out Time
scFSOT
number of seconds between the initiation of the job to full ejection of the last page of the first test set from ADF

Note 1 to entry: There are suffixes such as "$_{1setA}$" or "$_{30secF}$". Each suffix is used to classify tests such as "1 set Test" or "1 set + 30 second test" for "ADF Productivity Measurement"(using suffix "$_{A}$") or "Scan to Network Folder Productivity Measurement"(using suffix "$_{F}$") test respectively.

3.6
full detailed report
presentation of information including machine setup and measured test results

3.7
full report
presentation of results including the scFSOT, scESAT, and scEFTP values in performance test as well as the calculated averages for each value

3.8
network folder speed
rate at which a device scans and stores the scanned image file in the network folder to demonstrate the overall productivity of the device when scanning documents

Note 1 to entry: Suffix "$_{F}$" means "Scan to Network Folder Productivity Measurement". For example, suffix such as "$_{30secF}$" means a test of "1 set + 30 second" test for "Scan to Network Folder Productivity".

3.9
performance test
test used to evaluate productivity by providing scFSOT, scESAT, and scEFTP without using any special feature or mode, and includes both the simplex scanning mode and the duplex scanning modes if available

3.10
scanning Last Set Out Time
scLSOT
number of seconds between the initiation of the job to full ejection of the last page of the last test set from ADF

Note 1 to entry: There are suffixes such as "$_{1setA}$" or "$_{30secF}$". Each suffix is used to classify tests such as "1 set Test" or "1 set + 30 second test" for "ADF Productivity Measurement"(using suffix "$_{A}$") or "Scan to Network Folder Productivity Measurement"(using suffix "$_{F}$") test respectively.

3.11
simplex scanning
use of a scanning device when only a single side of a sheet is scanned

Note 1 to entry: Other equivalent term is "single sided scanning".

3.12
summary report
presentation of results including the average overall scEFTP in the performance test for the scanning device default base line performance

3.13
test file
digital file used for creating test targets

3.14
test set
all of the pages of test target

3.15
test target
hard copy document used for testing per the test method, and created from test file

Note 1 to entry: An equivalent term is "test chart".

3.16
time measurement
number of seconds measured by timing device (stopwatch or other device) or by reading time display on the PC dock

Note 1 to entry: Suffixes such as "$_{SW}$" and "$_{PC}$" are used to show which time measurement is done; by timing device (stopwatch or other device) or by reading time display on the PC dock. For example, "t_{SW1A}" is the time measured via stopwatch or other device for completion of the first set out and "t_{PC1F}" is the time measured via PC clock for completion of the first set file written to the network folder.

3.17
scanning resolution
resolution at which the document is scanned

4 Test Parameters and Conditions

4.1 Environment

The test environment, including temperature and humidity, shall be within the ranges recommended by the manufacturer for operating the device. If no recommendation is available, the following ranges shall apply.

Temperature: 18 °C to 25 °C

Relative humidity: 30 % to 70 %

NOTE The temperature and humidity of the test environment should be recorded in the full detailed report (Annex B).

4.2 Voltage

The scanning device shall be connected to a voltage supply within the manufacturer specified operating voltage range for the scanning device under test.

NOTE The measurement should be made under no-load condition prior to each test.

4.3 Scanning Device Setup

Place the scanning device on a horizontal surface and set up the scanning device according to the manufacturer's recommendations.

The scanning device shall be fully enclosed in its normal exterior cover. The machine shall be acclimated in the test environment prior to conducting the test(s) at least 8 h. All images and scanning modes should be at their factory preset configuration for the scanning device. It is assumed that the settings listed in table 1 are common to all scanning devices. These listed settings shall be set to the manufacturer's default or preset condition for the device. If a device has settings not listed in Table 1, they too shall be set to default settings. All settings shall be explicitly stated in either case of default or non-default settings. For scanning devices that have additional scan quality and digital image processing features, those features shall be set to match their normal default condition, and included in the result reporting. Disabling manufacturer default installed features, routines or applications, is not allowed. The following preset values in the test shall be noted in the full detailed report (Annex B).

Table 1 — Preset settings

	Preset item	Preset value	Example
Mode	Scanning resolution	default	200 dpi
	Colour or grey scale/B&W	default	Colour
	Duplex/simplex	default	Simplex
	Original page size	default	A4
	Paper feed orientation (long/short edge)	default	Long edge
	Scan destination	default	Shared network
	Storing File Type	default	PDF (multi)
	Auto scan quality adjustment	default	(Factory preset default setting)

If the scanning device is setup with internal or external options such as memory as default, then these options shall be noted on the full detailed report format in the configuration options as shown in Annex B, for example "160 GB HDD installed".

Additional tests may be conducted using other, non-default settings for the scanning device. The results of such additional tests shall be documented as having parameters that differ from the factory defaults and shown in comparison to the default system parameter results.

Optional paper sizes may be used for the scanning device tests such as A3 and/or 11" × 17" size as appropriate for the test mode. When sheets of paper size other than A4/8.5"x11" are used, the sizes shall be indicated in the places of A4/8.5" × 11" in the measurement results tables. When a comparison needs

to be made between the productivity of one machine with that of other machines the measurement shall be done with the same paper sizes.

NOTE There are digital multifunctional devices that may use PC based scanning software. For reference, the measurement of scanning productivity applied for out of scope scanning systems is shown in Annex D (informative).

4.4 Maintenance

Scanning device maintenance shall be performed throughout testing per the manufacturer's recommendations.

4.5 Preparation of Test Targets (Test Charts)

The scanning test file is outlined in Annex C.

This test file is from ISO/IEC 24735 "Method of measuring digital copying productivity". The test file consists of 4 single sided pages. When using the test file for the scanning productivity test, the test targets shall be created by printing the most recent electronic test file on the device to be tested if it has print capability. If the test device to be tested does not have a printer function or if the device is a colour capable scanner but does not have a printing function of colour test targets (for the colour scanning test), then record the name of printer which is used to print out the actual test targets. The most recent official electronic file (ISO_IEC_24735_2009_Test_Pages.pdf) can be located at http://standards.iso.org/ittf/PubliclyAvailableStandards/SC28_Test_Pages/ .

As for preparation method for double-sided targets, refer to Annex C.

The quality of test targets may affect the productivity measurement. Test targets should be created according to the following:

a) The test targets shall be printed by the equipment to be tested itself in its default-printing mode. (If the test device to be tested does not have a printer function or if the device is a colour capable scanner but does not have a printing function of colour test targets (for the colour scanning test), then record the name of printer which is used to print out the actual test targets.)

b) The paper used for creating the test targets shall have a brightness of at least 80 % to eliminate the influence of background.

c) The paper used for creating the test targets shall be 64 g/m^2 or above and sufficiently opaque to prevent scanning of images on the backside.

d) The paper used for creating the test targets shall be free of wrinkles or other surface defects.

e) Confirm that the there are no defects such as unexpected dots or contaminations.

f) Page scaling shall not be used in performance test. Typically, this is done by setting page scaling to "none". Options such as "Fit to printable area" shall not be used in performance testing, either.

g) Paper shall conform to the scanning device manufacturer's paper specifications.

The brightness shall be measured according to ISO 2470-1:2009. The paper weight shall be measured according to ISO 536:1995.

5 Test Method

5.1 Test Setup

The objectives of this test are summarized as follows:

The intent of "ADF Productivity Measurement" test is to demonstrate the productivity of the ADF that may be achieved with the specific settings. ADF speed is a component of scanning productivity.

The intent of "Scan to Network Folder Productivity Measurement" test is to demonstrate the overall productivity of the device in scanning documents. This test is a representative of a variety of scanning tasks (e.g. scan to file server, scan to fax server, scan to email, scan to workflow, etc.).

Before test, the machine under test shall be preconditioned as follows:

a) Install the scanning device following the manufacturer's recommendations.

b) Clean the surface of the image scanning device if needed.

c) The default required tests shall be run after the scanning device has warmed-up and entered a "ready" state. Use of warm-up scanning (that means at least one page is scanned just before testing) to ready the scanning device is acceptable.

d) Set the system parameters (such as paper size and feed orientation, image quality mode) for test. Record the scanning device model, configuration (options), default condition and any other variations if selected.

Refer to Annex B for an example of settings to record. Refer to 5.4 for information on required tests. Refer to Clause 6 for information on the calculation and treatment of data. Refer to Clause 7 for information on data reporting.

5.2 Test Measurement Procedure

5.2.1 Overview

The productivity of a digital scanning device like "scan to network folder speed" depends on factors other than the scanning device itself. These include, but are not limited to, computer performance and network configuration or the general environment in which the test is being held. Because of this, in order to make useful and accurate direct comparisons of scanning productivity with this International Standard, the same computer system hardware and software and the network configuration shall be used for measuring the scanning devices if for the purpose of being directly compared one to another. For every scanning productivity measurement, the basic specifications of the computer and the network shall be included with the results of the scanning productivity measurement.

This measurement procedure defines how to measure "ADF Productivity Measurement" and how to measure "Scan to Network Folder Productivity Measurement". A single set of each test target is scanned and measured to determine $scEFTP_{1set}$. Multiple, N sets of test target are scanned and measured for the 1 Set + 30 Seconds Test run to calculate $scESAT_{30sec}$ and $scEFTP_{30sec}$, where N is the number of sets needed to meet $scLSOT_{Nsets} - scFSOT_{1set}$ more than 30 seconds. (To estimate N, number of sets for test target, refer to 5.3.2.)

This method is used to provide varying tests for products across varying segments. This simple approach allows faster products to be tested with more sets and slower products to be tested with fewer sets without defining and categorizing products by segment.

Both the "ADF Productivity Measurement" and the "Scan to Network Folder Productivity Measurement" have a destination to network folder. Therefore both tests can be measured in the same test run.

Preparation for test run

a) Estimate the number of sets (= N sets) which met $scLSOT_{Nsets} - scFSOT_{1set} \geq 30$ seconds. (1 set consists of 4 originals.) (To estimate N, number of sets for test target, refer to 5.3.2.)

b) Prepare N sets of test targets that will be used in the test, identified as described in 4.5.

c) Before test, the machine under test shall be preconditioned as described in 5.1.

