# INTERNATIONAL STANDARD

## ISO/IEC 29183

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# Information technology — Office equipment — Method for measuring digital copying productivity for a single one-sided original

*Technologies de l'information — Équipement de bureau — Méthode de mesure de la productivité du copiage numérique d'un simple original une face*

# Contents

Page

# 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.

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 or www.iec.ch/members _experts/refdocs).

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) or the IEC list of patent declarations received (see patents.iec.ch).

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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. In the IEC, see www.iec.ch/understanding-standards.

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

This second edition cancels and replaces the first edition (ISO/IEC 29183:2010), which has been technically revised.

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

— "Terms and definitions" clause has been modified to add new definitions and removed definitions of terms not used in the text;

— annex structure was changed to be consistent with other productivity standards;

— added "ready delay time" requirement to "test measurement" procedures;

— added Annex D for the procedure to determine the "ready delay time";

— added *sFCOT* from sleep, *sFCOT* from sleep after 15 min, and *sFCOT* from off tests and reporting;

— added minimum declaration examples to Annex A.

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.

# Introduction

Many digital copying devices produce copied pages at a different rate than their nominal speed when running with different quality modes, different substrate grammage, different job content and job lengths. The degree to which a change in productivity is experienced depends significantly on other parameters of the job stream. The most dominant of the parameters of the job stream are: (image quality modes selected, job content, B&W and colour reproduction job stream, run length). The existing International Standard (ISO/IEC 24735) only addresses the productivity issues for digital copying devices when using both collation and an ADF (automatic document feeder) and cannot be used for a single one sided original.

This document provides a general method for measuring productivity when the above-mentioned job stream parameters for digital copying devices are taken into consideration. This document also includes instructions for the creation of test charts. It allows manufacturers and buyers of digital copying devices to describe the productivity of various digital copying devices with respect to representative office usage.

# Information technology — Office equipment — Method for measuring digital copying productivity for a single one-sided original

## 1 Scope

This document specifies a method for measuring productivity of digital copying devices and multifunctional devices with various copying modes and a single one-sided original. The document is applicable to digital copying devices and multifunctional devices. The document is intended to be used for black and white (B&W) as well as colour digital copying devices and multifunctional devices of any underlying marking technology. This document includes instructions for the creation of test charts, test setup procedure, test procedure, and the reporting requirements for the digital copying productivity measurements.

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*

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

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

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 24734 and the following 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**
**sEFTP**
**effective throughput**
rate at which a device produces pages measured from the initiation of the job through the complete exit of the last *test set* (3.11)

Note 1 to entry: "s" denotes that a single one sided original is used for the measurement.

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

[SOURCE: ISO/IEC 24734:2021, 3.6, modified — The term "EFTP" has been replaced by "sEFTP" and Note 1 to entry has been added.]

**3.2**
**sESAT**
**estimated saturated throughput**
rate at which a device produces pages measured from the complete exit of the first *test set* (3.11) to the complete exit of the last test set

Note 1 to entry: "s" denotes that a single one sided original is used for the measurement.

Note 2 to entry: *sESAT* is expressed in images per minute (ipm).

Note 3 to entry: There is a different definition called "Continuous Copy Speed" for EP (electrophotographic) copying machine is defined in ISO/IEC 21117.

Note 4 to entry: Since each test set is one page. it is by definition the last page of the test set.

[SOURCE: ISO/IEC 24734:2021, 3.7, modified — The term "ESAT" has been replaced by "sESAT" and Notes 1 and 3 to entry have been added.]

**3.3**
**sFCOT**
**first copy out time**
number of seconds between the initiation of the job to the complete exit of the first copy

Note 1 to entry: "s" denotes that a single one sided original is used for the measurement.

Note 2 to entry: For a single one sided original the first copy is the first set and *sFCOT* equals *sFSOT*.

Note 3 to entry: *sFCOT* can refer to *sFCOT* from ready, *sFCOT* from sleep, *sFCOT* from off. Specific usage will be noted by $sFCOT_{ready}$, $sFCOT_{sleep}$, $sFCOT_{off}$.

Note 4 to entry: *sFCOT* is strongly affected by the scanning time.

Note 5 to entry: There is a different definition called "*FCOT*; first copy out time". This "*FCOT*" for EP (electrophotographic) copying machine is defined in ISO/IEC 21117.

**3.4**
**full report**
<single sided copy> presentation of results including the *first copy out time (sFCOT)* (3.3) from ready, *sFCOT* from sleep, *sFCOT* from off, *estimated saturated throughput (sESAT)* (3.2) and *effective throughput (sEFTP)* (3.1) values as well as the calculated averages for each values

**3.5**
**off state**
state from which a device is not capable of making a copy without user intervention to turn on the power

Note 1 to entry: A device may enter off state due to a user turning the device off, or the device may enter off state automatically after a delay.

**3.6**
**performance test**
test used to evaluate productivity by providing *first copy out time (sFCOT)* (3.3), *estimated saturated throughput (sESAT)* (3.2) and *effective throughput (sEFTP)* (3.1)

**3.7**
**power management delay time**
time that a device waits between the exit of the last page of the last job and being in a lower power state such as sleep state or *off state* (3.5)

Note 1 to entry: The power management delay time corresponding to the setting as shipped is referred to as "default power management delay time" or "default delay time".

**3.8**
**recovery time**
time required by a device to recover from a sleep state given by the difference in the exit timing of the first page of the sleep state job and the exit timing of the first page of the ready state job

Note 1 to entry: Other related terms are "resume time" and "return time". Other similar terms have been used in industry as well.

**3.9**
**saturated time per copy**
average time per copy measured from the complete exit of the first copy to the complete exit of the last copy

**3.10**
**test run**
operation of copying one *test target* (3.12), in a particular system configuration, with a particular *test set* (3.11) and page count

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

**3.11**
**test set**
test copy
<single sided copy> single page *test target* (3.12)

[SOURCE: ISO/IEC 24735:2021, 3.11, modified — The definition modified for single page.]

**3.12**
**test target**
test chart
hardcopy page used for testing per the test method, created from the test file

[SOURCE: ISO/IEC 24735:2021, 3.25, modified — The word "document" has been replaced by "page".]

**3.13**
**warm-up time**
time required by a device to recover from *off state* (3.5) given by the difference in *first copy out time (sFCOT)* (3.3) between off state and ready state

Note 1 to entry: Other similar terms, such as "wait time", have been used in industry as well.

## 4 Test parameters and conditions

### 4.1 Copying device setup

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

The copying device shall be fully enclosed in its normal exterior cover. The machine and all of its necessary supplies shall be acclimated in the test environment prior to conducting the test(s) for at least 8 h. All supplies used in the test(s), including copy paper, shall be those specified by the manufacturer. All image and copying modes shall be at their factory preset configuration for the copying device. It is assumed that the settings listed in Table 1 are common to all copying 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. For copying devices that have additional print 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.

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

— automatic cleaning;

— calibration cycles;

— energy save settings.

If the system has automatic media detect (automatic paper type selection), it can be disabled, and paper used in the test shall be selected manually. This shall be noted in the full detailed report (see Annex B). The following preset values in the test will be noted on this report format. Additional optional tests with non-default settings or configurations may be run.

If the copying device is setup with internal or external options such as memory, sorter, or finisher as default, then these options shall be noted on the full detailed report format in the configuration options as shown in Annex B.

EXAMPLE 2     Examples of configurations options to be captured:

— finisher as default;

— 160GB HDD installed.

**Table 1 — Preset settings**

| | **Preset item** | **Preset value** |
|---|---|---|
| Mode | Output resolution | default |
| | Output quality | default |
| | Copying mode | default |
| | Auto density adjustment | default |
| | Collating function | default |
| Paper | Paper sending direction | default |
| | Paper type setting | default |
| Paper-path | Paper feeding | default paper feeder |
| | Paper exit | standard exit tray |
| | Face up exit | default |
| Temporary stop | Fixing capability | default |
| | Image quality stability | default |
| | Capacity of paper | default |
| | Others | default |

## 4.2   Copying device condition

All supplies used in the test(s), including paper and printing device consumables, shall be only those specified as acceptable for use by the manufacturer (or otherwise noted). If available the number of pages printed on the engine and printed on the consumables prior to the start of the test shall be recorded and reported. The machine and all of its necessary supplies shall be acclimated in the test environment prior to conducting the test(s) at least 8 h.

## 4.3   Sample size

Each target shall be tested and measured at least twice for repeatability. All required tests shall be run using one device.

## 4.4 Paper

The output paper used in this test shall be within the range of, and/or not violate, specific written attribute guidelines and recommendations provided by the copying device manufacturer, which may include but are not limited to: size, grammage, composition, paper manufacturer(s), paper type, part number and other physical characteristics. Care shall be taken to use a paper that conforms to the copying device manufacturers' paper specifications for the default copying device settings. The paper used for the performance test 5.4 shall be cut sheet, A4 and/or 8,5" × 11" (215,9 mm × 279,4 mm) size. The paper used in the test shall be recorded in the full detailed test report.

The same paper size should be used for each machine when wanting to compare the productivity results of one machine with other machines. If the copying device is used in "thick paper mode" for copying, then this optional mode should be noted on the full detailed report format in corresponding column in Annex B.

## 4.5 Maintenance

Copying device maintenance routines shall be performed throughout testing per the manufacturer's recommendations on an as needed basis.

EXAMPLE        Examples of maintenance routines:

— cleaning routines;

— consumables replacement.

## 4.6 Preparation of test targets (test charts)

The copying test file is outlined in Annex C.

This test file is from ISO/IEC 24735. The test file consists of four single-sided pages. When using the test file for the copying productivity test, the test targets shall be created by printing the most recent electronic test file. If the intended machine does not have a printer function, then record the name of the printer which is used to print out the actual test targets.

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

a) The test targets shall be printed by the equipment to be tested in its default-printing mode in simplex mode.

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.

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

e) Confirm that there are no defects such as unexpected dots or contamination on the paper.

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

The brightness shall be measured according to ISO 2470-1. The paper grammage shall be measured according to ISO 536.

## 4.7 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 %.

The temperature and humidity ranges of the test environment shall be recorded in the full detailed report.

## 4.8 Voltage

The copying device shall be connected to a voltage supply within the manufacturer specified operating voltage range for the copying device under test. The voltage should be measured under no-load condition prior to each test suite and recorded in the full detailed report.

NOTE     It is possible that devices that utilise a heater have a longer $sFCOT$ time when the line voltage is at the lower value of the recommended operating range.

# 5 Test method

## 5.1 Overview

The test procedures in this document apply to tests using either the scanning glass or ADF. For devices with both ADF and a scanning glass testing with the scanning glass is mandatory, testing with the ADF is optional. If the test is performed with the scanning glass and the ADF, then results from both tests shall be documented in the full test report. It is acceptable to test with only the ADF if it is the only scanner input path. This may be the case on scroll fed scanners, such as those typically found on fax machines.

A single copy (1 copy test) of the relevant test target is copied in order to measure first copy out time from ready ($sFCOT_{ready}$), sleep ($sFCOT_{sleep}$), and off ($sFCOT_{off}$). Multiple, $N$ sets, of each relevant test target are copied and measured for the 1 copy + 30 seconds test run to calculate estimated saturated throughput ($sESAT_{30sec}$) and effective throughput ($sEFTP_{30sec}$), where $N$ is the number of sets needed to meet $sLSOT_{30sec}$ - $sFSOT_{30sec} \geq 30$ s , and $sLSOT_{30sec}$ is the last set out time for the 1 copy + 30 seconds test. The 1 copy + 4 minutes test is a similar concept used to calculate $sEFTP_{4min}$.

The 1 copy + 30 seconds test is used to provide a test for products across varying segments. Without defining and categorizing products by segments, this simple method allows faster products to be tested with more sets and slower products to be tested with fewer sets, therefore more consistent with their usage.

The 1 copy + 4 minutes test is intended to provide a test to illustrate that differences in productivity can occur for longer printing times compared to shorter printing times. It is understood and recognized that 4 min may be a long test for some devices, but a short test for other, higher end devices. The 4 min time is a compromise to meet the needs of the many products across many segments covered in the scope of this document.

In order to ensure clarity between the results of each test and to avoid test result confusion that can be caused by back to back job spooling effect, each copy job test should be started only after the last copy of the previous test has been fully ejected from the machine and the device has returned to a ready state.

Repeat the (1 copy test, 1 copy + 30 seconds test, and 1 copy + 4 minutes test) for each required/ optional test target, test suite, as applicable for the relevant copying modes on the device under test. (See Table 2, and/or Table 3.)

## 5.2 Test measurement procedure

### 5.2.1 Test setup

Before testing, the following setup activities shall be completed.

a) Install the copying 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 copying device has warmed-up and entered a ready state. Use of warm-up copying (that means at least one page is copied just before testing) to ready the copying device is acceptable.

d) Set the system parameters (such as paper grammage selection, paper size and feed orientation, quality mode) for test. Record the copying device model, configuration (options), default condition and any other variations if selected. If the system has automatic media detect (automatic paper type selection), it can be disabled, and paper used in the test shall be selected manually. This shall be noted in the full detailed report.

e) 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.

f) Prepare the test targets (test charts) that will be used in the test, identified as described in 4.6, and place the target on the scanning glass of the device.

g) Refer to 5.4 to decide what tests are to be run.

h) The 1 copy test and the 1 copy + 30 seconds test are required for each test target A, B, C, and D. Only test target A is required for the 1 copy + 4 minutes test while test targets B, C, and D are optional. These tests can be performed in any order with any of the test targets.

   NOTE 1    Four test targets are used in order to test the productivity versus the content of various originals. This document is not designed or intended to test the time it takes for an operator to switch originals on the scanner glass.

i) As described in 5.3.4, if the saturated time per copy is consistent to ±5 % between the four test targets, testing can be carried out on only test target A. If only test target A is used, it shall be noted in the full detailed test report.

j) Determine the ready delay time between jobs. The (*sFCOT*, 1 copy test, 1 copy + 30 seconds test, and 1 copy + 4 minutes test) from ready for some devices is sensitive to the ready delay time from the exit of the last page of the previous copy job to the initiation of the next job. The ready delay time used shall be no shorter than 20 s and no longer than 50 s; however, care shall be taken to select a ready delay time that places the device in a stable condition. If the tester is unsure of what ready delay time will place the device in a stable condition, the procedure in Annex D shall be used to establish a ready delay time to place the device in a stable condition. The ready delay time used may be different from what Annex D would indicate as long as the (*sFCOT*, 1 copy test, 1 copy + 30 seconds test, and 1 copy + 4 minutes test) result is equivalent to the *(sFCOT*, 1 copy test, 1 copy + 30 seconds test, and 1 copy + 4 minutes test) at the ready delay time that Annex D would have selected. The ready delay time and whether a ready delay time found with Annex D was used shall be noted in the full report.

   NOTE 2    In general, electro-photographic devices are in a stable condition at 50 s , although many devices can be in a stable condition in less than 50 s . With inkjet devices, an unstable condition happens during a print head capping or servicing routine.

k) Determine the default power management delay time to the lowest power sleep state.

   This may be done through examining device settings, timing how long until a device user interface (UI) switches from ready to the lowest power sleep state, or by consulting device documentation

or the device manufacturer. If no information can be found on the default power management delay time to the lowest power sleep state, a delay of 60 min shall be used.

An additional wait is added after the power management delay time to sleep determined above. The additional wait is 60 min. If the device under test is an inkjet device, and the recovery time is known to be independent from the length of time elapsed after entering sleep, instead of waiting an additional 60 min, an additional wait of 10 min is allowed. If 60 min is not used as the additional wait time, the additional wait time and reason 60 min was not used shall be noted in the full report.

The total delay time is the sum of the power management delay time and the additional delay time.

The total delay time from the complete exit of the last page of the previous job to the initiation of the next job shall be noted in the full detailed report.

If the device enters off state automatically during the $sFCOT$ from sleep test, the device shall be turned on manually, and noted as such in the full report. The result of the test shall still be reported as $sFCOT$ from sleep.

An optional test is to measure $sFCOT$ from sleep with a total delay time from complete exit of the last page of the previous job to the initiation of the next job after a 15 min total delay time.

l)   Default delay time for $sFCOT$ from off is 60 min.

### 5.2.2   "1 copy" test from ready

The procedure to measure $sFCOT_{ready}$ and $sEFTP_{1copy}$ is defined by the following steps.

a)   Enter copy set count = 1 and press the copy start button. Start the ready delay timer when the page has fully exited from the device.

   NOTE 1      Step a) is skipped when the ready delay timer is started at the end of a different test.

b)   Enter copy count = 1 required for this specific test run on the copying device operation panel.

c)   [Start test run] At the end of the ready delay time, press the copy start button and simultaneously start the timing device (watch or otherwise).

d)   Record the time for completion of one copy to at least two decimal places and start the ready delay timer.

e)   [End test run]

f)   Run the 1 copy test steps b) – e) twice. Determine if the results are consistent within ±5 % according to 5.3.2, and perform a third test run if required. (The data from the test is average of the individual runs. Three iterations are the maximum and the results from all iterations are averaged to get the required data.)

g)   Calculate the average $sFCOT_{ready}$ and $sEFTP_{1copy}$ for the current test target according to Clause 6.

   NOTE 2      If $sFCOT$ is constant regardless of copy count, a copy count of 2 can be used, and this test used as the initial test described in 5.3.2.

### 5.2.3   "1 copy" test from sleep

The procedure to measure $sFCOT_{sleep}$ is defined by the following steps:

a)   Preconfigure the device settings to be the same as the current test run.

   NOTE 1      The intent is to enable pressing just the start button to begin the copy job.

b)   Make a copy job at the device using page A of the test targets and the same copy mode settings as the current test run.

c) When the page has fully exited from the device, start a timing device for the total delay time.

d) Wait until the total delay time has elapsed before continuing.

e) Use one of the following two methods to perform copy job.

1) If the device is in sleep state: when the total delay time has elapsed, select the copy start button and simultaneously start the timing device (watch or otherwise). The time measurement is started when the copy start button is first pressed. In the case that the measured results are the same, quick copy, or similar features may be used to initiate the copy job.

NOTE 2 It is possible that the copy start button needs to be pressed multiple times to wake the device and start the job. Timing will start on the first copy start button press. Some devices can require another button to be hit to wake the device, such as a "Power/Sleep" button. The timer starts when the first button is pressed to wake the device up.

2) If the device is in off state: when the total delay time has elapsed, turn the copy device on using the power button and simultaneously start the timing device. The time measurement is started when the device is turned on. In the case that the measured results are the same, quick copy, or similar features may be used to initiate the copy job. Some copy systems may require some amount of delay between turning on the copy device and selecting copy start button on the control panel for the copy job to successfully execute. For such systems, the delay used shall be noted in the full report.

f) Record the time in seconds for completion of the page (the test page has been fully ejected from the device) to at least two decimal places, and optionally start a timing device for the delay time for the next test run.

g) Determine which steps to run next.

1) If the timing device for the delay time was started in step c), run steps c) – f) once more for a total of 2 measurements before continuing to step h).

2) If the timing device for the delay time was not started in step c), run steps a) – f) once more for a total of 2 measurements before continuing to step h).

h) Determine if the results are consistent according to 5.3.2, and perform a third test run of steps a) – f) if required.

i) Calculate the average $sFCOT_{sleep}$.

### 5.2.4 "1 copy" test from off

The procedure to measure $sFCOT_{off}$ is defined by the following steps.

a) Make a copy job at the device using page A of the test targets and the same copy mode settings as the current test run.

NOTE 1 The intent is to enable pressing just the copy start button to begin the copy job.

b) Place the device in off state by turning the device off using the power button on the device and start a timing device for the delay time.

c) Wait until no earlier than 5 min before the delay time has elapsed before continuing.

d) When the delay time has elapsed, turn the copy device on using the power button and simultaneously start the timing device. The time measurement is started when turning on the device.

e) As soon as copy UI is functional, configure the copy job again using the same settings as the current test run.

f) Select the copy start button on the control panel. In the case that the measured results are the same, the quick copy, or similar features may be used to initiate the copy job. Some copy systems

may require some amount of delay between turning on the copy device and selecting the copy start button on the control panel. For such systems, the delay used shall be noted in the full report.

g) Record the time in seconds for completion of the page (the test page has been fully ejected from the device) to at least two decimal places.

h) Run steps b) – g) twice.

i) Determine if the results are consistent according to 5.3.2, and perform a third test run of steps b) – g) if required.

j) Calculate the average $sFCOT_{off}$.

### 5.2.5   "1 copy + 30 seconds" test from ready

The procedure to measure $sESAT_{30sec}$ and $sEFTP_{30sec}$ is defined by the following steps.

a) Enter copy set count = 1 and press the copy start button. Start the ready delay timer when the page has fully exited from the device.

   NOTE 1     Step a) is skipped when the ready delay timer is started at the end of a different test.

b) Enter copy count = $N$ required for $sLCOT_{30sec} - sFCOT_{30sec} \geq 30$ s. For the second and third tests, use the same copy count as used in the first test.

   NOTE 2     This $sFCOT_{30sec}$ is not the same as $sFCOT_{1copy}$ from the 1 copy test. The $sFCOT_{30sec}$ measured is used to verify $sLCOT_{30sec} - sFCOT_{30sec} \geq 30$ s and to calculate $sESAT_{30sec}$.

c) [Start test run] At the end of the ready delay time, press the copy start button and simultaneously start the timing device (watch or otherwise).

d) Record the time for completion of the $sFCOT_{30sec}$ to at least two decimal places. This is the time from pressing the copy button until the first copy is fully ejected from the machine. If the output paper bin capacity is less than the number of pages to be copied, remove the output paper during the test.

e) Record the time for completion of the $sLCOT_{30sec}$ to at least two decimal places and start the ready delay timer. This is the time from pressing the copy button until the last copy is fully ejected from the machine.

f) [End test run]

g) Run the 1 copy + 30 Seconds test steps b) – f) twice. Calculate $sESAT_{30sec}$ and $sEFTP_{30sec}$ for each test run according to Clause 6.

h) Determine if the results are consistent within ±5 % according to 5.3.2 and perform a third test run if required. (The data from the test is average of the individual runs. Three iterations are the maximum and the results from all iterations are averaged to get the required data.)

i) Calculate the average $sESAT_{30sec}$ and $sEFTP_{30sec}$ for the current test target according to Clause 6.

### 5.2.6   "1 copy + 4 minutes" test from ready

The procedure to measure $sEFTP_{4min}$ is defined by the following steps.

a) Enter copy set count = 1 and press the copy start button. Start the ready delay timer when the page has fully exited from the device.

   NOTE 1     Step a) is skipped when the ready delay timer is started at the end of a different test.

b) Enter copy count = $N$ required for $sLCOT_{4min}$–$sFCOT_{4min}$ ≥ 4 min. For the second and third tests, use the same copy count as used in the first test.

If 1 copy + 4 minutes test estimated copy count is greater than the maximum copy count or input tray capacity, this test shall not be run and reported as N/A in the test report.

NOTE 2　　This $sFCOT_{4min}$ is not the same as $sFCOT_{1copy}$ from the 1 copy test. The $sFCOT_{4min}$ measured here is only used to verify $sLCOT_{4min}$–$sFCOT_{4min}$ ≥ 4 min.

c) [Start test run] At the end of the ready delay time, press the copy button and simultaneously start the timing device (watch or otherwise).

d) Record the time for completion of the $sLCOT_{4min}$ to at least two decimal places and start the ready delay timer. This is the time from pressing the copy button until the last copy is fully ejected from the machine. If the output paper bin capacity is less than the number of pages to be copied, remove the output paper during the test.

e) [End test run]

f) Run the 1 copy + 4 minutes test steps b) – e) twice. Calculate $sEFTP_{4min}$ for each test run according to Clause 6. (The data from the test is average of the individual runs. Three iterations are the maximum and the results from all iterations are averaged to get the required data.)

g) Determine if the results are consistent within ±5 % according to 5.3.2 and perform a third test run if required.

h) Calculate the average $sEFTP_{4min}$ for the current test target according to Clause 6.

## 5.3　Test method process

### 5.3.1　Suggested flow chart

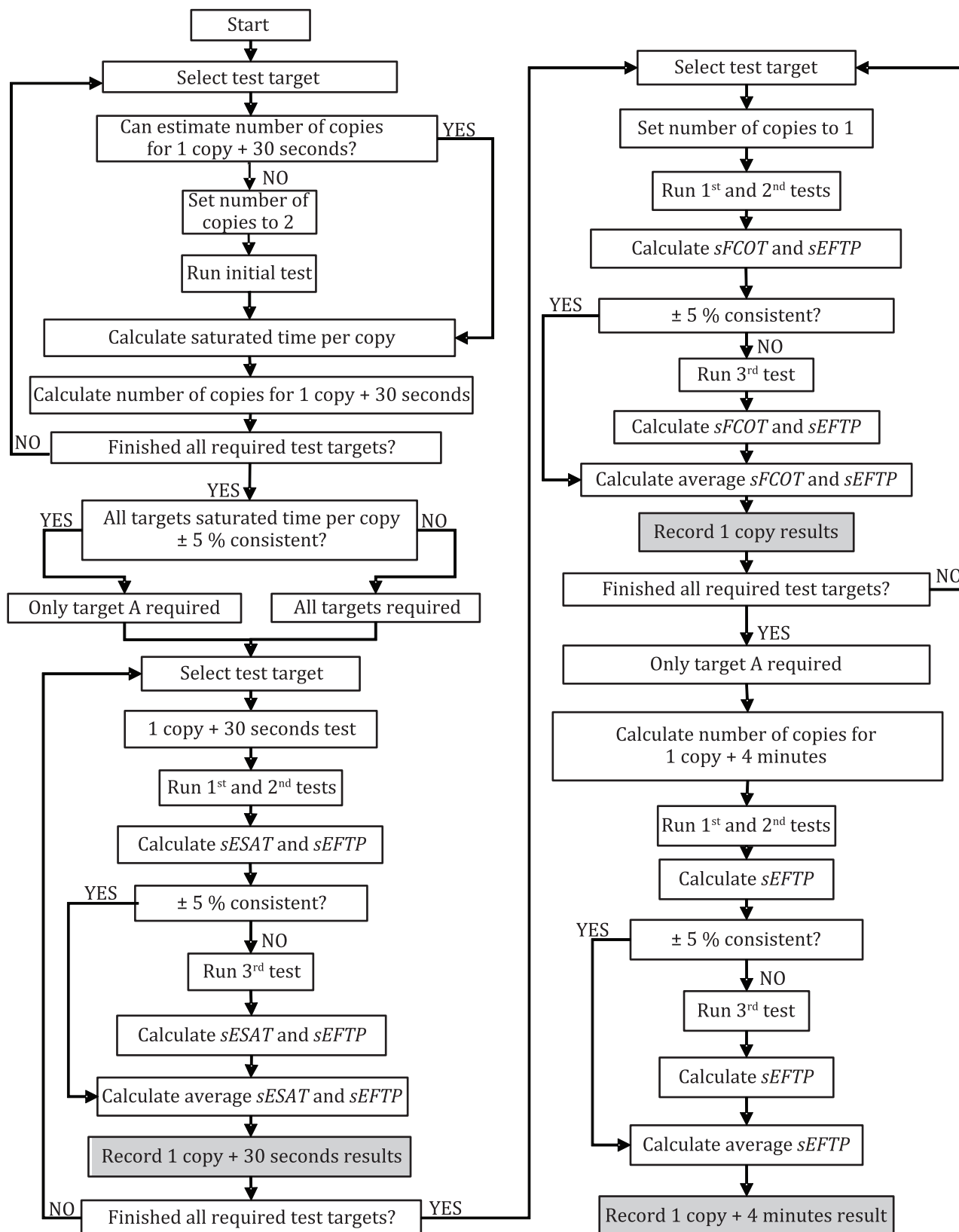The suggested test execution flow is shown in Figure 1.

**Figure 1 — Test flow chart**

### 5.3.2 ± 5 % consistency criteria

If the first two test runs are not consistent within ±5 %, then a third test run is required. Formulae for *sESAT* and *sEFTP* can be found in [Clause 6](#).

$$c_{\text{sFCOT}} = \frac{2 \times S_{\text{sFCOT},1}}{S_{\text{sFCOT},1} + S_{\text{sFCOT},2}} - 1$$

$$c_{\text{sESAT}} = \frac{2 \times S_{\text{sESAT},1}}{S_{\text{sESAT},1} + S_{\text{sESAT},2}} - 1$$

$$c_{\text{sEFTP}} = \frac{2 \times S_{\text{sEFTP},1}}{S_{\text{sEFTP},1} + S_{\text{sEFTP},2}} - 1$$

where

| | |
|---|---|
| $S_{\text{sFCOT},1}$ | is the first measured first copy out time ($sFCOT_1$); |
| $S_{\text{sFCOT},2}$ | is the second measured first copy out time ($sFCOT_2$); |
| $c_{\text{sFCOT}}$ | is the consistency of *sFCOT*; |
| $S_{\text{sESAT},1}$ | is the first measured estimated saturated throughput ($sESAT_1$); |
| $S_{\text{sESAT},2}$ | is the second measured estimated saturated throughput ($sESAT_2$); |
| $c_{\text{sESAT}}$ | is the consistency of *sESAT*; |
| $S_{\text{sEFTP},1}$ | is the first measured first set out time ($sEFTP_1$); |
| $S_{\text{sEFTP},2}$ | is the second measured first set out time ($sEFTP_2$); |
| $c_{\text{sEFTP}}$ | is the consistency of *EFTP*. |

### 5.3.3 Estimating the copy count

#### 5.3.3.1 Overview

This estimation shall be done when multiple test sets are copied.

#### 5.3.3.2 "1 copy + 30 seconds" test

The test may begin with an initial copy count $N_{\text{initial}} = 2$ or by estimating the number of copies needed, provided that the tester has sufficient information for estimation beforehand. If the $N = 2$ test result did not meet the *sLCOT–sFCOT* ≥ 30 s requirement, then calculate necessary copy count $estN_{30\text{sec}}$ as follows and test using the newest $estN_{30\text{sec}}$ as the copy count. The following formula can be used to estimate the number of copies needed:

$$N_{\text{est,30sec}} = \text{Round up} \left[ \frac{30 \times (N_{\text{initial}} - 1)}{S_{\text{sLCOT,initial}} - S_{\text{sFCOT,initial}}} + 1 \right]$$

where

$N_{initial}$      is the estimated number of copies needed for $N_{est,30sec} \geq 30$ s;

$S_{sLCOT,initial}$      is the last set out time with $N_{initial}$ sets ($sLCOT_{initial}$);

$S_{sFCOT,initial}$      is the first set out time with $N_{initial}$ sets ($sFCOT_{initial}$);

$N_{est,30,sec}$      is the estimated set count for 1 set + 30 seconds ($estN_{30sec}$).

The number of copies tested should result in $sLCOT_{30sec} - sFCOT_{30sec} \geq 30$ s as close as possible. If the results of a test run gives $sLCOT_{30sec} - sFCOT_{30sec} < 30$ s the number of copies shall be increased and all runs re-tested.

NOTE      The 1 copy + 30 seconds test is devised to make $sLCOT_{30sec} - sFCOT_{30sec}$ long enough to minimise measurement error of $sESAT$ and short enough to avoid stop caused by calibration.

### 5.3.3.3 "1 copy + 4 minutes" test

Calculate the necessary copy count $estN_{4min}$ as follows by using the results of the 1 copy + 30 seconds test and test using the $estN_{4min}$ as the copy count.

$$N_{est,4min} = \text{Round up} \left[ \frac{240 \times (N_{30sec} - 1)}{S_{sLCOT,30sec} - S_{sFCOT,30sec}} + 1 \right]$$

where

$N_{30sec}$      is the number of copies used for 1 copy + 30 seconds test;

$S_{sLCOT,30sec}$      is the last set out time acquired in the 1 set + 30 seconds test ($sLCOT_{30sec}$);

$S_{sFCOT,30sec}$      is the first set out time acquired in the 1 set + 30 seconds test ($sFCOT_{30sec}$);

$N_{est,4min}$      is the estimated set count for 1 set + 4 minutes ($estN_{4min}$).

The number of sets tested should result in $sLCOT_{4min} - sFCOT_{4min} \geq 4$ min. If the results of a test run give $sLCOT_{4min} - sFCOT_{4min} < 4$ min the number of sets shall be increased and all runs re-tested.

If 1 copy + 4 minutes test estimated copy count is greater than the maximum copy count or input tray capacity, this test shall not be run and reported as N/A in the test report.

### 5.3.4 Single test target criteria

If the saturated time per copy is consistent to ±5 % or less between the four test targets, testing can be carried out on only test target A. The saturated time per copy is calculated with the following formula for each of the four test targets.

$$S_{satTimeCopy} = \frac{S_{sLCOT} - S_{sFCOT}}{N - 1}$$

where

$N$      is either $N_{initial} = 2$ or $N_{30sec}$;

$S_{sLCOT}$      is the last set out time acquired in the initial test or 1 set + 30 seconds test ($sLCOT$);

$S_{sFCOT}$      is the first set out time acquired in the initial test or 1 set + 30 seconds test ($sFCOT$);

$S_{satTimeCopy}$      is the saturated time per copy.

± 5 % consistency is established with the following formulae. Both formulae shall meet the ± 5 % threshold.

$$c_{max} = \frac{\text{Max}\left(S_{\text{satTimeCopy},A}, S_{\text{satTimeCopy},B}, S_{\text{satTimeCopy},C}, S_{\text{satTimeCopy},D}\right)}{\text{Ave}\left(S_{\text{satTimeCopy},A}, S_{\text{satTimeCopy},B}, S_{\text{satTimeCopy},C}, S_{\text{satTimeCopy},D}\right)} - 1$$

$$c_{min} = \frac{\text{Max}\left(S_{\text{satTimeCopy},A}, S_{\text{satTimeCopy},B}, S_{\text{satTimeCopy},C}, S_{\text{satTimeCopy},D}\right)}{\text{Ave}\left(S_{\text{satTimeCopy},A}, S_{\text{satTimeCopy},B}, S_{\text{satTimeCopy},C}, S_{\text{satTimeCopy},D}\right)} - 1$$

where

$S_{\text{satTimeCopy},A}$   is the saturated time per copy for target A ($satTimeCopy_A$);

$S_{\text{satTimeCopy},B}$   is the saturated time per copy for target B ($satTimeCopy_B$);

$S_{\text{satTimeCopy},C}$   is the saturated time per copy for target C ($satTimeCopy_C$);

$S_{\text{satTimeCopy},D}$   is the saturated time per copy for target D ($satTimeCopy_D$);

$c_{max}$         is the consistency of the maximum saturated time per copy;

$c_{min}$         is the consistency of the minimum saturated time per copy.

If only test target A is used, it shall be noted in the full detailed test report.

## 5.4   Performance test

The performance tests require using the 1 copy test for ready, sleep and off, 1 copy + 30 seconds test and 1 copy + 4 minutes test procedures in 5.2.

There are two key parameters, $sFCOT_{ready}$ and $sESAT_{30sec}$, reported in summary report and seven parameters, $sFCOT_{ready}$, $sFCOT_{sleep}$, $sFCOT_{off}$, $sESAT_{30sec}$ and $sEFTP_{1copy}$, $sEFTP_{30sec}$, $sEFTP_{4min}$, reported in the full report. The "full report" provides detailed information for the various test target runs. (average $sFCOT_{ready}$ and $sESAT_{30sec}$ values are the same in the both reports.)

Prepare the four test targets (described in 4.6) from the four-page test file.

The productivity test shall be done for each image in 1:1 mode. Each test will be done in full colour mode (required) in addition to monochrome copying mode (optional), only if the machine is a colour copying device. Only monochrome copying mode will be done if the machine is a B&W copying device.

The measured intervals of time should be recorded to two decimal places.

## 6   Calculations and treatment of data

### 6.1   Overview

The time intervals for each test run are recorded during the test operation. A spreadsheet format that records the time for the tests run is useful for this purpose but is not required.

Data and calculations may include up to two decimal places. Dropping fractions is allowed, but rounding to a faster time (sec) or throughput (ipm) is not allowed. Recorded and reported numbers shall never be better than actual measurement (higher for $sESAT$ and $sEFTP$ or lower for $sFCOT$).

The results for an individual test target are calculated by averaging $sFCOT$, $sESAT$, or $sEFTP$, not by averaging the times, and then calculating a result.

EXAMPLE 1    Calculate $sESAT$ of test run one and $sESAT$ from test run two (and of test run three if required), and then average $sESAT_1$ and $sESAT_2$ (and $sESAT_3$) to yield $sESAT_{ave}$.

The results for individual test target are reported in the full report.

The results of each test targets used shall be used to calculate averages of *sFCOT*, *sESAT* and *sEFTP* across test targets.

EXAMPLE 2    The average *sFCOT* and *sESAT* numbers reported in a summary report are the average of the results for test targets A, B, C, and D.

The number of *sESAT* and *sEFTP* is expressed in ipm in the following way:

a)    less than 10 ipm: round down at two decimal places and express as two significant figures (X,X);

b)    10 ipm to 99 ipm: express with either of the methods below:

1)    round down at one decimal places and express as two significant figures (XX);

2)    round down at two decimal places and express as three significant figures (XX,X);

c)    100 ipm or more: round down at one decimal places and express as three significant figures (XXX).

EXAMPLE 3    If 34,99 is the measured and calculated average of *sESAT*, then a report could record 34,9 or 34 ipm, but NOT 35 ipm.

## 6.2    Performance test

### 6.2.1    "1 copy" test from ready

$sFCOT_{ready}$ and $sEFTP_{1copy}$ shall be calculated using data from a single copy test run, each time recorded is shown in Figure 2.
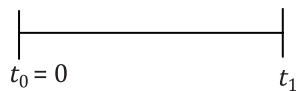


**Figure 2 — 1 copy test**

$$S_{sFCOT,ready} = t_1$$

$$S_{sEFTP,1copy} = \frac{60}{S_{sFCOT,ready}}$$

where

$S_{sFCOT,ready}$      is the first copy out time from ready ($sFCOT_{ready}$);

$S_{sEFTP,1copy}$      is the effective throughput ($sEFTP_{1copy}$).

### 6.2.2    "1 copy" test from sleep

$sFCOT_{sleep}$ shall be calculated using data from a single copy test run, each time recorded is shown in Figure 3. The recovery time when starting from sleep is estimated by using the difference in s*FCOT* between sleep and ready for "1 copy".
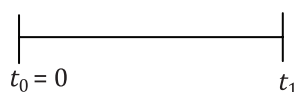


**Figure 3 — 1 copy test from sleep**

$$S_{\text{sFCOT,sleep}} = t_1$$

$$t_{\text{recovery}} = S_{\text{sFCOT,sleep}} - S_{\text{sFCOT,ready}}$$

where

$S_{\text{sFCOT,sleep}}$ is the first copy out time from sleep ($sFCOT_{\text{sleep}}$);

$S_{\text{sFCOT,ready}}$ is the first copy out time from ready ($sFCOT_{\text{ready}}$).

$t_{\text{recovery}}$ is the recovery time.

If the recovery time is less than zero, zero shall be reported for the recovery time.

### 6.2.3 "1 copy" test from off

$sFCOT_{\text{off}}$ shall be calculated using data from a single copy test run, each time recorded is shown in Figure 4. The warm-up time when starting from off is estimated by using the difference in $sFCOT$ of off and ready for simplex printing.
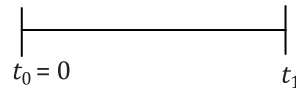


**Figure 4 — 1 copy test from off**

$$S_{\text{sFCOT,off}} = t_1$$

$$t_{\text{warm-up}} = S_{\text{sFCOT,sleep}} - S_{\text{sFCOT,ready}}$$

where

$S_{\text{sFCOT,off}}$ is the first copy out time from off ($sFCOT_{\text{off}}$);

$S_{\text{sFCOT,ready}}$ is the first copy out time from ready ($sFCOT_{\text{ready}}$).

$t_{\text{warm-up}}$ is the warm-up time.

If the warm-up time is less than zero, zero shall be reported for the warm-up time.

### 6.2.4 "1 copy + 30 seconds" test from ready

$sESAT_{\text{30sec}}$ and $sEFTP_{\text{30sec}}$ shall be calculated from the 1 copy + 30 seconds test data by the following formula, each time recorded is shown in Figure 5.
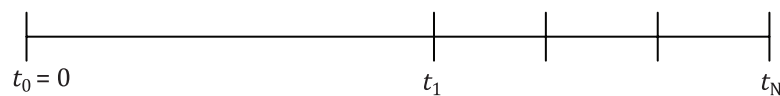


**Figure 5 — 1 set + 30 seconds test**

$$S_{\text{sFCOT,30sec}} = t_1$$

$$S_{\text{sLCOT,30sec}} = t_N$$

$$S_{\text{sESAT},30\text{sec}} = \frac{60 \times (N_{30\text{sec}} - 1)}{S_{\text{sLCOT},30\text{sec}} - S_{\text{sFCOT},30\text{sec}}}$$

$$S_{\text{sEFTP},30\text{sec}} = \frac{60 \times N_{30\text{sec}}}{S_{\text{sLCOT},30\text{sec}}}$$

where

| | |
|---|---|
| $S_{\text{sFCOT},30\text{sec}}$ | is the first copy out time ($sFCOT_{30\text{sec}}$); |
| $S_{\text{sLCOT},30\text{sec}}$ | is the last copy out time ($sLCOT_{30\text{sec}}$); |
| $S_{\text{N},30\text{sec}}$ | is the copy count to reach 30 s ($N_{30\text{sec}}$); |
| $S_{\text{sESAT},30\text{sec}}$ | is the estimated saturated throughput ($sESAT_{30\text{sec}}$); |
| $S_{\text{sEFTP},30\text{sec}}$ | is the effective throughput ($sEFTP_{30\text{sec}}$). |

### 6.2.5 "1 copy + 4 minutes" test from ready

$sEFTP_{4\text{min}}$ shall be calculated using the data of 1 copy + 4 minutes test, each time recorded is shown in [Figure 6](#).
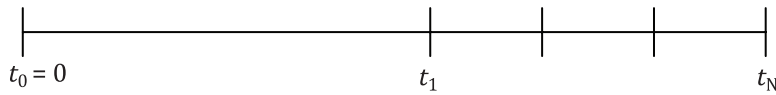


**Figure 6 — 1 set + 4 minutes test**

$$S_{\text{sFCOT},4\text{min}} = t_1$$

$$S_{\text{sFCOT},4\text{min}} = t_N$$

$$S_{\text{sEFTP},4\text{min}} = \frac{60 \times N_{4\text{min}}}{S_{\text{sLCOT},4\text{min}}}$$

where

| | |
|---|---|
| $S_{\text{sFCOT},4\text{min}}$ | is the first copy out time ($sFCOT_{4\text{min}}$); |
| $S_{\text{sLCOT},4\text{min}}$ | is the last copy out time ($sLCOT_{4\text{min}}$); |
| $S_{\text{N},4\text{min}}$ | is the set count to reach 4 min ($N_{4\text{min}}$); |
| $S_{\text{sEFTP},4\text{min}}$ | is the effective throughput ($sEFTP_{4\text{min}}$). |

In case the first copy time is constant regardless of copy counts, i.e. $sFCOT_{30\text{sec}}=sFCOT_{4\text{min}}=sFCOT_{1\text{copy}}$, it is possible to combine 1 copy test, 1 copy + 30 seconds test (and 1 copy + 4 minutes test) to one combined test, whose copy count should be at least $N_{30\text{sec}}$ (or $N_{4\text{min}}$ in case 1 copy + 4 minutes test is combined). Measurement should be done at each timing of 1 copy test, 1 copy + 30 seconds test (and 1 copy + 4 minutes test) as shown in [Figure 7](#). If this option is adopted, it shall be noted in the full detailed report.
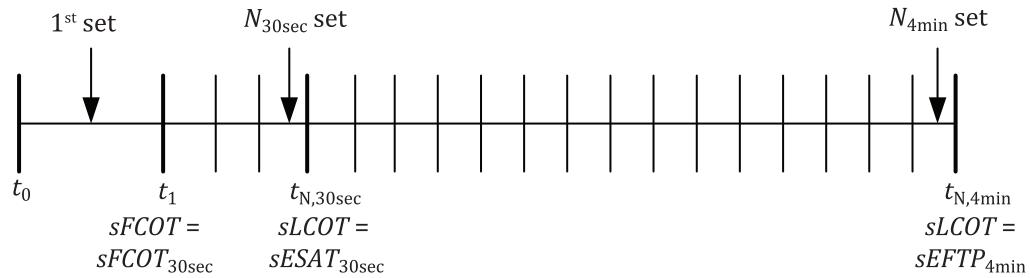
**Figure 7 — combined test measurement points**

# 7 Presentation of results

## 7.1 Sharing testing and reports

Products that are of the same distinct copy system can share testing and reports. Two or more products or bundles may be part of a distinct copy system when they use the same scan and 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 Copy system, and are different copy systems, even if they use the same scan or print mechanism, and shall not share testing and reports.

## 7.2 Performance test

### 7.2.1 Overview

Three reporting formats are described:

a) the minimum declaration is the minimal requirement for presenting results;

b) the "full report" and "full detailed report" should be the "report" format to be presented if requested;

c) the "summary report" should be the "declaration" to be used in marketing materials or packaging.

"declaration" of the whole "summary report" is recommended.

All reporting including minimal declaration, summary and full report tables shall include a pointer to the full detailed report or contact information to obtain the report. An example of a summary report is shown in 7.2.3 and a full report is shown in 7.2.4. Optionally reported data are shown as "O", required as "R", and "R*" for testing which is required to be reported if an optional test mode is selected. An example of the summary report and the full report is included in Annex A. An example of the full detailed report is included in Annex B.

An individual manufacturer can choose whether or not to display the summary report or full report on the brochure or specification sheet. If the report is shown on it, the above table formats are recommended to be used. A pointer to the full detailed report (an example shown in Annex B) or contact information shall be included in the brochure or spec sheet.

### 7.2.2 Minimum declaration

The minimum requirement of "declaration" shall include the following three items:

a) description that the productivity has been determined in accordance with this document (i.e. ISO/IEC 29183);

b) the average of $sESAT_{30sec}$;

c) pointer to the full detailed report or contact information.

### 7.2.3 Summary report

The minimum required presentation of results is that displayed in <u>Table 2</u>, the average of $sFCOT_{ready}$ (s) and $sESAT_{30sec}$ (ipm) for all test targets. Each test should be also done optionally in monochrome mode in addition to the required full colour copying mode, only if the machine is a colour copying device.

The measured intervals of time should be recorded to two decimal places. $sFCOT_{ready}$ (s) should be rounded up, and $sESAT_{30sec}$ (ipm) should be rounded down.

**Table 2 — Results of summary report**

| | $sFCOT_{ready}$ (s) | $sESAT_{30sec}$ (ipm) |
|---|---|---|
| Defaults (colour for colour device, B&W for mono-chrome device) | R | R |
| B&W mode (op-tional for colour device) | R* | R* |
| Reporting on tests is defined by: <br><br> — R is required to report when available on the copying device; <br><br> — R* is required to report if optional B&W mode is run on colour device. <br><br> The following shall be recorded in the first table row after the data: <br><br> a) the device setting; <br><br> b) the copying device settings used for B&W output mode on colour device; <br><br> c) the location to find full detailed report or contact information; <br><br> d) the paper size and paper feed orientation; <br><br> e) the statement "Productivity has been determined in accordance with ISO/IEC 29183". <br><br> NOTE   For a B&W device, the colour rows are omitted or left blank. For a colour device, B&W measurement is optional, so B&W rows are omitted or left blank when not tested. | | |

### 7.2.4 Full report

The required presentation of results is that displayed in <u>Table 3</u>. Each test should be also done optionally in monochrome mode in addition to the required full colour copying mode, only if the machine is a colour copying device.

The full report reports the averages of the test results.

**Table 3 — Results of full report**

| | Target | $sFCOT$(s) | | | | | | $sEFTP$ (ipm) | | | $sESAT_{30sec}$ (ipm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ready | Sleep | Recovery time | Sleep 15 min delay | Off | Warm-up time | 1copy | 1 copy + 30 seconds | 1 copy + 4 minutes | |
| Defaults (colour for colour device, B&W for monochrome device) | A | R | R | R | O | O | O | O | R / # copies | R / # copies | R |
| | B | R | O | O | O | O | O | O | R / # copies | O / # copies | R |
| | C | R | O | O | O | O | O | O | R / # copies | O / # copies | R |
| | D | R | O | O | O | O | O | O | R / # copies | O / # copies | R |
| | Average | R | R | R | O | O | O | O | R | O | R |
| B&W mode (optional for colour device) | A | R* | R* | R* | O | O | O | O | R* / # copies | R* / # copies | R* |
| | B | R* | O | O | O | O | O | O | R* / # copies | O / # copies | R* |
| | C | R* | O | O | O | O | O | O | R* / # copies | O / # copies | R* |
| | D | R* | O | O | O | O | O | O | R* / # copies | O / # copies | R* |
| | Average | R* | R* | R* | O | O | O | O | R* | R* | R* |

Reporting on tests is defined by:

— R is required to report when available on the copying device;

— R* is required to report if optional B&W mode is run on colour device or when original order is run on a device with a default of reverse order;

— O is optional to report for colour copying device.

The following shall be recorded in the first table row after the data:

a) the device setting;

b) the device settings used for B&W output mode on colour device;

c) the location to find full detailed report or contact information;

d) the paper size and paper feed orientation;

e) the start date/time and end date/time:

f) the statement "Productivity has been determined in accordance with ISO/IEC 29183";

g) if Annex D was used to determine ready delay time;

h) the ready delay time used;

i) any differences in ready delay time between B&W and colour.

NOTE   A pointer to the full detailed report is included with reported single values from the general performance test such as FSOT or ESAT.

# Annex A
## (informative)

# Report presentation

## A.1 General

This annex shows how to present the results of measurement in the following tables according to Clause 7.

NOTE    The following data are not real data from copying device or MFD; they are just an example showing how to present the results.

## A.2 Minimum declaration

EXAMPLE    1

Flatbed: 6 ppm [1]

Footnotes:

[1] Tested in accordance with ISO/IEC 29183, for full detailed report: URL: xxxx.xxxx

EXAMPLE    2

Flatbed: 6 ppm, FCOT: 17,2 s [1]

Footnotes:

[1] Tested in accordance with ISO/IEC 29183, for full detailed report: URL: xxxx.xxxx

## A.3 Summary reports

EXAMPLE

**Summary report**

|  | $sFCOT_{1copy}(s)$ | $sESAT_{30sec}(ipm)$ |
|---|---|---|
| Colour | 17,2 | 6,2 |
| B&W | 14,9 | 8,7 |
| NOTES | | |
| 1)   All device settings were default mode. | | |
| 2)   For the B&W results, the copy colour was set to "B&W". | | |
| 3)   A4 paper was used for this test, short edge feed. | | |
| 4)   The full detailed report can be found at URL: xxxx.xxxx | | |
| 5)   Productivity has been determined in accordance with ISO/IEC 29183. | | |

## A.4 Full report

EXAMPLE

**Full report**

| | Target | $sFCOT_{1copy}$(s) | | | | | | $sEFTP$ (ipm) | | | $sESAT_{30sec}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ready | Sleep | Recovery time | Sleep 15 min delay | Off | Warm-up time | 1copy | 1 copy + 30 seconds | 1 copy + 4 minutes | (ipm) |
| Colour | A | 20,3 | 35,8 | 15,5 | 35,1 | 40,1 | 19,8 | 2,9 | 4,0 | 4,4 | 4,7 |
| | | | | | | | | | 4 copies | 11 copies | |
| | B | 15,4 | 35,2 | 19,8d | 35,2 | 41,2 | 25,8 | 3,8 | 6,3 | 7,1 | 7,6 |
| | | | | | | | | | 5 copies | 17 copies | |
| | C | 17,9 | 35,9 | 18,0 | 34,2 | 40,8 | 22,9 | 3,3 | 4,9 | 5,4 | 5,8 |
| | | | | | | | | | 4 copies | 13 copies | |
| | D | 15,2 | 36.8 | 21,6 | 37,6 | 40,6 | 25,4 | 3,9 | 6,5 | 7,3 | 7,8 |
| | | | | | | | | | 5 copies | 17 copies | |
| | Average | 17,2 | 36,0 | 18,8 | 35,6 | 40,7 | 23,5 | 3,4 | 5,4 | 6,0 | 6,4 |
| B&W | A | 16,4 | 30,2 | 13,8 | 29,8 | 40,1 | 23,7 | 3,6 | 6,0 | 6,7 | 7,2 |
| | | | | | | | | | 5 copies | 16 copies | |
| | B | 14,0 | 30,4 | 16,4 | 30,1 | 38,1 | 24,1 | 4,3 | 8,4 | 9,5 | 10,1 |
| | | | | | | | | | 7 copies | 22 copies | |
| | C | 15,3 | 29,8 | 14,5 | 29,8 | 39,2 | 23,9 | 3,9 | 7,0 | 7,8 | 8,3 |
| | | | | | | | | | 6 copies | 18 copies | |
| | D | 13,9 | 31,1 | 17,2 | 31,1 | 39,8 | 25,9 | 4,3 | 8,6 | 9,6 | 10,3 |
| | | | | | | | | | 7 copies | 22 copies | |
| | Average | 14,9 | 30,4 | 15,5 | 30,2 | 39,3 | 24,4 | 4,0 | 7,5 | 8,4 | 8,9 |

NOTES

1) All device settings were default mode.

2) For the B&W results, colour was set to "B&W".

3) A4 paper was used for this test, short edge feed.

4) Productivity has been determined in accordance with ISO/IEC 29183.

5) Annex D was used to establish ready delay time (ready delay time: 50 s).

# Annex B
## (informative)

# Full detailed report example

## B.1 General

This annex shows how to present an example presentation of full detailed report of measurement. When a summary report or full report is provided for users, the following full detailed report is recommended to be provided in response to user's request.

NOTE      The following data are not real data from copying device or MFD; they are just an example showing how to present the full detailed report. And the machine under measurement is not the same one as described in Annex A.

## B.2 Machine setup information

EXAMPLE

**Copying device information record**

| Test start date and time: | 4/September/2009 10:30 am |
|---|---|
| Tester: | XXXXXX |
| Machine name/model: | MFX-2635 |
| Colour or B&W: | Colour MFD |
| Configuration (options): | Duplex copying unit, |
| Test temperature range: | 20 °C to 25 °C |
| Test humidity range: | 40 % to 70 % |
| Test end date and time: | 4/September/2009 03:00 pm |

**Test settings record**

| | Preset item | Preset value |
|---|---|---|
| Mode | Output resolution | default |
| | Output quality | default |
| | Copying mode | default |
| | Auto density adjustment | default |
| | Collating function | default |
| Paper | Paper sending direction | default |
| | Paper type setting | default |
| Paper-path | Paper feeding | default paper feeder |
| | Paper exit | standard exit tray |
| | Face up exit | default |

**Test settings** *(continued)*

| | Preset item | Preset value |
|---|---|---|
| Temporary stop | Fixing capability | default |
| | Image quality stability | default |
| | Capacity of paper | default |
| | Others | default |

**Paper specific information record**

| | Manufacturer | Office Paper Co. |
|---|---|---|
| Paper | Grammage | 60 g/m$^2$ |
| | Size | A4 |
| | Paper type/name | A44FG48A |

## B.3 Machine test results

EXAMPLE

**Summary report**

| | $sFCOT_{1copy}$ (s) | $sESAT_{30sec}$ (ipm) |
|---|---|---|
| Colour | 17,2 | 6,2 |
| B&W | 14,9 | 8,7 |
| NOTES | | |
| 1) All device settings were default mode. | | |
| 2) For the B&W results, the copy colour was set to "B&W". | | |
| 3) A4 paper was used for this test, short edge feed. | | |
| 4) The full detailed report can be found at URL: xxxx.xxxx. | | |
| 5) Productivity has been determined in accordance with ISO/IEC 29183. | | |

**Full report**

| | Target | $sFCOT_{1copy}(s)$ | | | | | | $sEFTP$ (ipm) | | | $sESAT_{30sec}$ (ipm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ready | Sleep | Recovery time | Sleep 15 min | Off | Warm-up time | 1Copy | 1 Copy + 30 seconds | 1 Copy + 4 minutes | |
| Colour | A | 20,3 | 35,8 | 15,5 | 35,1 | 40,1 | 19,8 | 2,9 | 4,0 | 4,4 | 4,7 |
| | | | | | | | | | 4 copies | 11 copies | |
| | B | 15,4 | 35,2 | 19,8d | 35,2 | 41,2 | 25,8 | 3,8 | 6,3 | 7,1 | 7,6 |
| | | | | | | | | | 5 copies | 17 copies | |
| | C | 17,9 | 35,9 | 18,0 | 34,2 | 40,8 | 22,9 | 3,3 | 4,9 | 5,4 | 5,8 |
| | | | | | | | | | 4 copies | 13 copies | |
| | D | 15,2 | 36.8 | 21,6 | 37,6 | 40,6 | 25,4 | 3,9 | 6,5 | 7,3 | 7,8 |
| | | | | | | | | | 5 copies | 17 copies | |
| | Average | 17,2 | 36,0 | 18,8 | 35,6 | 40,7 | 23,5 | 3,4 | 5,4 | 6,0 | 6,4 |
| B&W | A | 16,4 | 30,2 | 13,8 | 29,8 | 40,1 | 23,7 | 3,6 | 6,0 | 6,7 | 7,2 |
| | | | | | | | | | 5 copies | 16 copies | |
| | B | 14,0 | 30,4 | 16,4 | 30,1 | 38,1 | 24,1 | 4,3 | 8,4 | 9,5 | 10,1 |
| | | | | | | | | | 7 copies | 22 copies | |
| | C | 15,3 | 29,8 | 14,5 | 29,8 | 39,2 | 23,9 | 3,9 | 7,0 | 7,8 | 8,3 |
| | | | | | | | | | 6 copies | 18 copies | |
| | D | 13,9 | 31,1 | 17,2 | 31,1 | 39,8 | 25,9 | 4,3 | 8,6 | 9,6 | 10,3 |
| | | | | | | | | | 7 copies | 22 copies | |
| | Average | 14,9 | 30,4 | 15,5 | 30,2 | 39,3 | 24,4 | 4,0 | 7,5 | 8,4 | 8,9 |

NOTES

1) All device settings were default mode.

2) For the B&W results, colour was set to "B&W".

3) A4 paper was used for this test, short edge feed.

4) Productivity has been determined in accordance with ISO/IEC 29183.

5) Annex D was used to establish ready delay time (ready delay time: 50 s).

# Annex C
## (informative)

# Test targets for measurement of copying productivity

The most recent official files can be located at
https://standards.iso.org/ittf/PubliclyAvailableStandards/SC28_Test_Pages/.

These sheets are from ISO/IEC 24735 test suites. When you want to use these test targets (test charts) in copying productivity measurements, the actual test targets shall be created through printing by the measuring machine itself with the most recent official electronic test files as inputs. And if the intended machine does not have a printing function, then record the name of printer which is used to print out the actual test targets.

For a B&W copying device, the test targets will be monochrome and just print out B&W test targets from colour test file; A,B,C,D. For a colour copying device, the test targets will be colour. When using a colour copying device, for the colour result the "colour setting" will be used and for the mono result the "mono setting" will be used. The preparation of test targets is shown in 4.6.

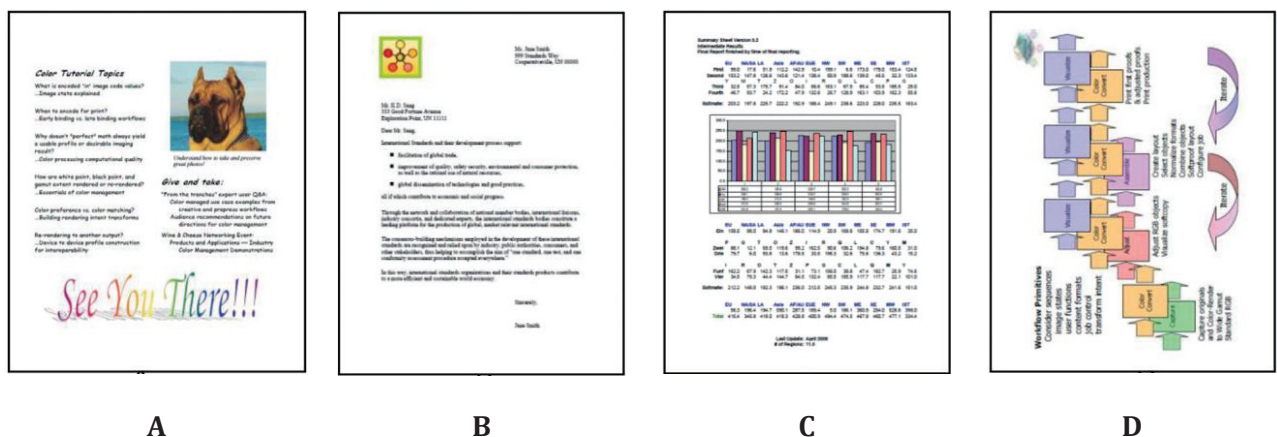Pattern layouts of 4 pages original colour test suites are shown in Figure C.1 (Adobe Reader File).



| A | B | C | D |

**Figure C.1 — Pattern layouts of colour test suite**

# Annex D
## (normative)

# Procedure to establish ready delay time

The following procedure can be used to establish a ready delay time to place a device in a stable condition for the measurement of (*sFCOT,* 1 copy test, 1 copy + 30 seconds test, and 1 copy + 4 minutes test) from ready. ± 5 % is judged using the formula of 5.3.2.

a) Use a ready delay time of 10 s.

b) Make a copy job at the device using page A of the test targets and the same copy mode settings as the current test run.

c) When the page has fully exited from the device, start a timing device for the current ready delay time.

d) Configure the copy job again using the same settings as the current test run.

e) Wait the used ready delay time.

f) When the used ready delay time is expired, select the "Start" button and simultaneously start a timing device (watch or otherwise). The time measurement is started when the "Start" button on the control panel is pressed. In the case that the measured results are the same, the quick copy, or similar features may be used to initiate the copy job.

g) Record the time in seconds for completion of the page (the test page has fully exited from the device) to at least two decimal places, and optionally start a timing device for the ready delay time for the next test run.

h) Set the ready delay time:

    1) if the timing device for the ready delay time was started in step g), run steps d) – g) with a used ready delay time of 50 s;

    2) If the timing device for the ready delay time was not started in step g), Run steps b) – g) with a used ready delay time of 50 s.

i) Determine the consistency of the 10 s and 50 s ready delay times according to 5.3.2:

    1) if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 50 s;

    2) if the results are not consistent to ±5 %, repeat steps b) – g) with a used ready delay time of 30 s before continuing with step j).

j) Determine the consistency of the 30 s and 50 s ready delay times according to 5.3.2:

    1) if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 50 s;

    2) if the results are not consistent to ±5 %, continue with step k).

k) Determine the consistency of the 10 s and 30 s ready delay times according to 5.3.2:

    1) if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 30 s;

2)   if the results are not consistent to ±5 %, repeat steps b) – g) with a used ready delay time of 40 s before continuing with step l).

l)   Determine the consistency of the 40 s and 50 s ready delay times according to 5.3.2:

1)   if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 50 s.

2)   if the results are not consistent to ±5 %, continue with step m).

m)   Determine the consistency of the 30 s and 40 s ready delay times according to 5.3.2:

1)   if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 40 s;

2)   if the results are not consistent to ±5 %, repeat steps b) – g) with a used ready delay time of 20 s before continuing with step n).

n)   Determine the consistency of the 20 s and 30 s ready delay times according to 5.3.2:

1)   if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 30 s;

2)   if the results are not consistent to ±5 %, continue with step o).

o)   Determine the consistency of the 10 s and 20 s ready delay times according to 5.3.2:

1)   if the results are consistent to ±5 %, the *sFCOT* from ready delay time shall be 20 s;

2)   if the results are not consistent to ±5 %, the *sFCOT* from ready delay time shall be 50 s.
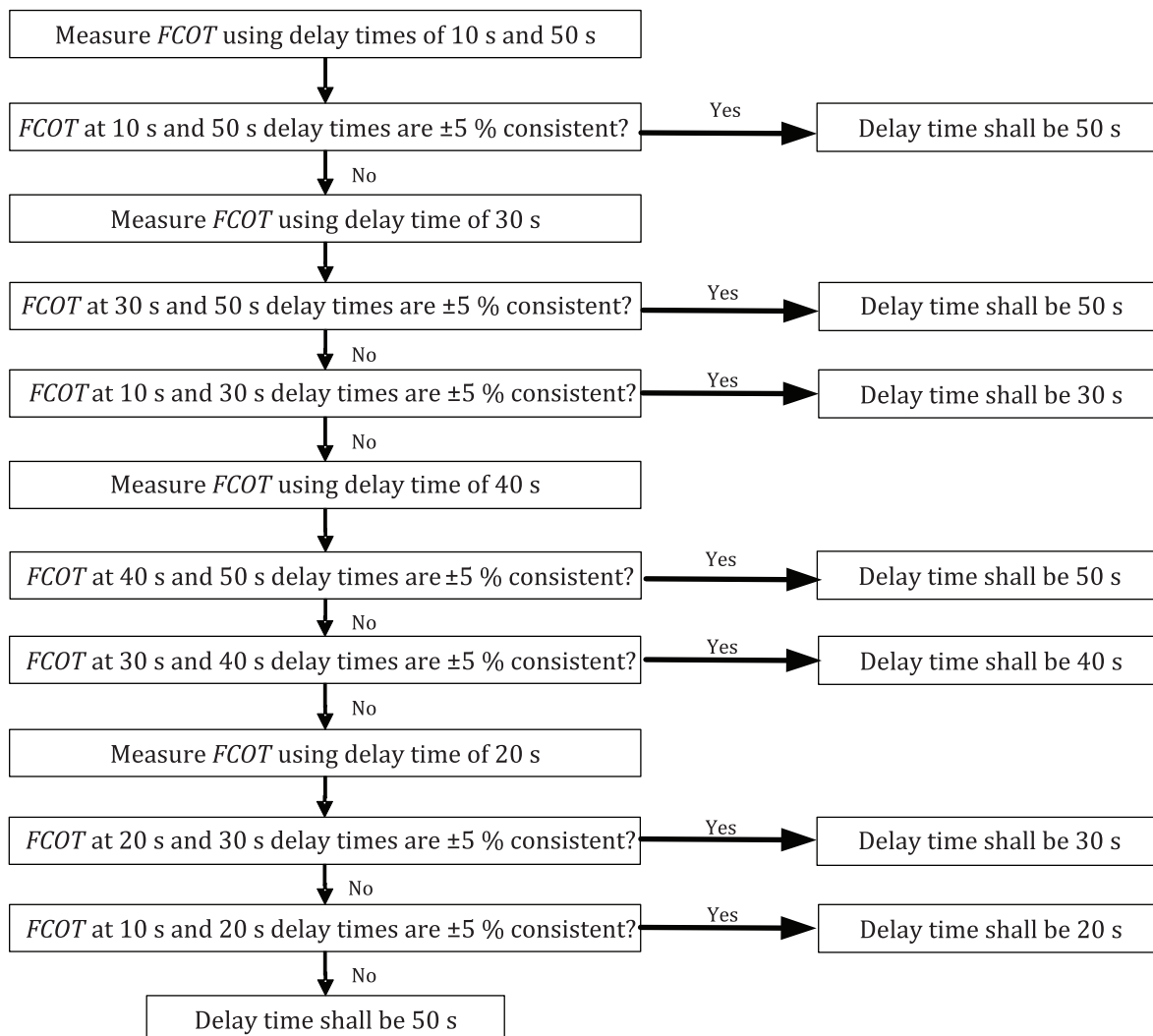
See Figure D.1.

| | |
|---|---|
| Measure *FCOT* using delay times of 10 s and 50 s | |

| | Yes | |
|---|---|---|
| *FCOT* at 10 s and 50 s delay times are ±5 % consistent? | → | Delay time shall be 50 s |

No

| Measure *FCOT* using delay time of 30 s |
|---|

| | Yes | |
|---|---|---|
| *FCOT* at 30 s and 50 s delay times are ±5 % consistent? | → | Delay time shall be 50 s |

No

| | Yes | |
|---|---|---|
| *FCOT* at 10 s and 30 s delay times are ±5 % consistent? | → | Delay time shall be 30 s |

No

| Measure *FCOT* using delay time of 40 s |
|---|

| | Yes | |
|---|---|---|
| *FCOT* at 40 s and 50 s delay times are ±5 % consistent? | → | Delay time shall be 50 s |

No

| | Yes | |
|---|---|---|
| *FCOT* at 30 s and 40 s delay times are ±5 % consistent? | → | Delay time shall be 40 s |

No

| Measure *FCOT* using delay time of 20 s |
|---|

| | Yes | |
|---|---|---|
| *FCOT* at 20 s and 30 s delay times are ±5 % consistent? | → | Delay time shall be 30 s |

No

| | Yes | |
|---|---|---|
| *FCOT* at 10 s and 20 s delay times are ±5 % consistent? | → | Delay time shall be 20 s |

No

| Delay time shall be 50 s |
|---|

**Figure D.1 — Procedure flow chart**

# Bibliography

[1]    ISO/IEC 21117, *Information technology — Office equipment — Copying machines and multi-function devices — Information to be included in specification sheets and related test methods*

[2]    ISO/IEC 24735, *Information technology – Office equipment – Method for measuring digital copying productivity*

**31**

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