INTERNATIONAL STANDARD

**ISO/IEC 10561**

Second edition
1999-05-01

# Information technology — Office equipment — Printing devices — Method for measuring throughput — Class 1 and Class 2 printers

*Technologies de l'information — Équipements de bureau — Dispositifs d'impression — Méthode de mesurage de la capacité — Imprimantes de classes 1 et 2*

Reference number
ISO/IEC 10561:1999(E)

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## Foreword

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

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 10561 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 10561:1991), which has been technically revised.

Annexes A, B, C and D form an integral part of this International Standard. Annex E is for information only.



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# Information technology — Office equipment — Printing devices — Method for measuring throughput — Class 1 and Class 2 printers

## 1 Scope

This International Standard specifies a method for measuring the throughput of class 1 and class 2 printers, as defined in ISO/IEC 11160-1. This International Standard specifies three different test patterns:

- a standard business letter;
- a spreadsheet;
- a graphic pattern.

In addition, this International Standard defines a method for a performance test and one for an endurance test.

These tests are intended to measure only the printer throughput for documents in the same class as the test patterns and not to evaluate any other printer features such as character shaping, print compressions, network/controller performance, colour, etc. The method is relevant to class 1 and class 2 printer types (e.g. dot matrix, daisy wheel, ink jet, thermal transfer printers) and to all configurations (e.g. tractor feed, cut sheet feed, 80-column and over 132-column print width, etc.). It is not the most suitable for comparing performance of other classes of printing devices such as high-speed page-oriented printers or color printers.

This method is intended for use by printer manufacturers and test houses so that a common form of test result presentation shall be obtained. It will also enable a user to make a quick and easy comparison of the printing throughput of different printers.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 11160-1:1995, *Information techology, Office equipment - Minimum information to be included in specification sheets - Part 1: Class 1 and Class 2 printers.*

DIN 32751 - *Büro- und Datentechnik - Drucker - Ermittlung der Druckleistung bezogen auf Prüfvorlagen.*

## 3 Conformance

Test results claimed to be in conformance with this International Standard shall have been obtained in accordance with the method specified in this International Standard.

## 4 Test principles

### 4.1 General

For each test the specified test pattern shall be printed a number of times on the device under test. A test shall be performed under the conditions specified in clause 5. The initial set-up conditions for the printer shall be as described under each individual test. Once started a test shall be performed without interruption.

The performance tests are designed to enable measurement of the printer under typical user application print tasks.

The endurance tests are designed to show any effects of extended high duty print tasks on printing throughput, due to any limiting factors within the printer (for example, dot density limitations, temperature rises, etc.).

For both types of test the throughput unit shall be "printed pages per hour" and shall be calculated by means of the formula:

$$\frac{\text{Number of printed pages} \times 3600 \text{ s/h}}{\text{Measured time in seconds}}$$



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### 4.2 Performance test

In the performance tests the test pattern shall be transmitted from the host system five times, either as a single, five-page document or as five, single-page documents.

The test time measurement shall start from the moment the data arrive at the printer interface. Measurement from the moment the "start" key is depressed on the host computer is permitted, if it can be proved that this does not affect the test time measurement by more than 1 %.

When the test is performed with cut sheet paper the test shall be started with the paper in its normal print mode. For printers pre-loading the paper, the paper path shall be cleared before each test.

The measurement of the time required by the test shall end when the fifth sheet has been ejected.

For a printer operating with continuous paper the test shall start with the paper loaded to the top of form position.

The measurement of the time required by the test shall end after execution of the form feed at the end of printing the fifth page.

The performance figures shall be recorded along with a reference to the matrix used.

### 4.3 Endurance test

In the endurance tests the test pattern shall be transmitted from the host system repeatedly for 1 h.

The test time measurement shall start from the moment the data arrive at the printer interface. Measurement from the moment the "start" key is depressed on the host computer is permitted, if it can be proved that this does not affect the test time measurement by more than 1 %.

When the test is performed with cut sheet paper the test shall be started with the paper in its normal print mode. For printers pre-loading the paper, the paper path shall be cleared before each test.

For a printer operating with continuous paper the test shall start with the paper loaded to the top of form position.

The measurement of the time requested by the test shall end with the completion (ejection) of the first sheet after 1 h has elapsed (1 h and n seconds) so that a whole number of pages shall be printed.

The 1 h test time shall include any time required to reload paper, change ribbon cassette or replenish ink/toner supplies. It is assumed that the test is commenced with new consumables, loaded to capacity.

The endurance figures shall be recorded along with a reference to the matrix used.

## 5 Test conditions

### 5.1 Test environment

The test shall be performed in the following environment.

Temperature: 18 °C to 25 °C
Relative humidity: 30 % to 70 %

The printer, fully enclosed in its normal operating cover set, shall be acclimatized in the test environment in powered condition for at least 1 h.

### 5.2 Voltage

The printer shall be connected to a voltage supply which remains within ± 10 % of the nominal value of the specified operating voltage for the printer under test.

### 5.3 Data input

Data shall be sent to the printer at such a rate that the printer is never waiting for data to arrive and therefore producing a misleading (lower) throughput figure.

### 5.4 Test sequence

Each test sequence shall be completed without stopping.

After each test sequence the printer shall be allowed to re-stabilize (cool down) to its normal powered up ambient state.



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### 5.5 Print paper

The paper used shall have the following weight

- cut sheet: 60 g/m2 to 90 g/m2
- fanfold single ply: 60 g/m2 to 80 g/m2
- fanfold multiply: according to the manufacturer's specification.

For testing with fanfold multiply paper an original plus two copies shall be used. The manufacturer shall specify the type of the paper and carbons.

A printer configured for continuous paper (tractor, pin wheel or friction feed) shall preferably be loaded with 304,8 mm (12 in) form length paper. If this is not possible any near equivalent length may be used but the test patterns can then be printed over more than one page. Any "skip over perforation" feature in the printer shall be disabled.

A printer configured for cut sheet paper shall be operated in automatic mode, not in manual single sheet feed mode. A4 size paper or near equivalent shall be used. If a size other than A4 is used, the size shall be so recorded in the test results.

The printer shall be tested with single ply paper and also with three-ply paper (original plus two copies). The multiply test shall only apply if the printer can handle at least three-ply paper (original plus two copies, with or without carbon interleaves).

## 6 Letter test

### 6.1 General

This test simulates a typical user application of printing a letter.

### 6.2 Test patterns

Two test patterns are defined in annex B. The first one (pattern A) is the standard letter defined in DIN 32751. The second pattern (pattern B) is a letter in English to be used for printers not printing diacritical signs. The results of the two test patterns are not comparable, and the test patterns used shall be declared in the test results.

The printer shall be set up for 0,4 characters per millimetre (10 cpi)[1)] and 0,24 lines per millimetre (6 lpi)[2)] operation.

If the manufacturer declares more than one print quality mode, test 1 shall be made with the printer set to the lowest quality mode, and tests 2 and 3 with the printer set to the highest quality mode.

### 6.3 Test 1 - performance

Set the printer to the lowest quality mode.

### 6.4 Test 2 - performance

Set the printer to the highest quality mode.

### 6.5 Test 3 - endurance

Set the printer to the highest quality mode.

## 7 Spreadsheet test

### 7.1 General

This test simulates a typical user application of printing a spreadsheet.

If the manufacturer declares more than one print quality mode, the test shall be made with the printer set to the lowest quality mode and for 0,24 lines per mm (6 lpi).

### 7.2 Test pattern

The test pattern shall be the 132-column spreadsheet shown in annex C.

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1) cpi = characters per inch

2) lpi = lines per inch



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### 7.3 Test 1 - performance

The printer shall be set up for 0,4 characters per millimetre (10 cpi). This test shall not be performed on printers having a print line length of less than 33,5 cm (13,2 in).

### 7.4 Test 2 - performance

The print density mode shall be set to the compressed mode, normally 0,67 characters per millimetre (17 cpi). If this is not available then a compression in the range 0,65 characters per millimetre to 0,71 characters per millimetre (16,5 cpi to 18 cpi) shall be selected.

## 8 Graphics test

### 8.1 General

The test pattern sent to the printer shall utilize graphics mode printing (e.g. vectors, bit map) and shall not use character mode printing (e.g. block graphic characters).

The dimensions defined are minimum dimensions. Any minor size deviations are permitted if they yield a larger but not a smaller image.

This graphic test shall only apply to the class 2 printers.

### 8.2 Test pattern

The test pattern shall be that reproduced in annex D.

### 8.3 Test 1 - performance

The minimum density to be tested is 2,63 horizontal x 2,83 vertical dots per millimetre (60 horizontal and 72 vertical dots per inch).

## 9 Test report

Results recorded from the tests specified in clauses 6 to 8 shall be presented in the tabular format specified in annex A. The configuration used for the test shall be reported.

It is recommended that this presentation format be used in all technical specifications, sales leaflets and information made available to printer users.



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# Annex A

(normative)

## Presentation of test results

Printer type :

Configuration :

Letter test pattern:

| | | Matrix used | Cont. One ply | Cont. multiply | Cut sheet |
|---|---|---|---|---|---|
| Letter-Performance | Lowest quality | | | | |
| five pages, 0,4 cpmm (10 cpi) | Highest quality | | | | |
| Letter-endurance 1 h, 0,4 cpmm (10 cpi) | Highest quality | | | | |
| Graphics, five pages Performance | | | | | |
| Spreadsheet, five pages Performance 203,2 mm (8 in) Print width | 0,67 cpmm (17 cpi) lowest quality | | | | |
| Spreadsheet, five pages Performance 355,3 mm (13,2 in) Print width | 0,4 cpmm (10 cpi) lowest quality | | | | |

Results are given in printed pages per hour (pph).

The matrix used is indicated by the number of dots (horizontal x vertical) per millimetre (inch).

Results boxes may be left empty depending on the printer type.



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# Annex B

(normative)

# Letter test patterns

Two test patterns are defined and represented in the following pages.

If this International Standard is translated into another language, the text of the standard letters shall not be translated in order to ensure correlation between measurements made at different locations.

For convenience of the user of this International Standard and to indicate the relative positions of the different parts of the text there is a dotted line at the top and at the bottom of the page. These dotted lines are **not part of the text**.

**Pattern A**

Standard test letter of DIN 32751. The text of the letter starts with the word **Eilzustellung** and ends with the word **Mustervordrucke**.

**Pattern B**

This pattern is intended for printers not printing diacritical signs. The text of the letter starts with the word **E X P R E S S** and ends with the number **34921-2654**.



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**Pattern A**

Eilzustellung

Norddeutsche Farbenwerke KG
Herrn Dr. Grauert
Große Elbstraße 64

2000 Hamburg 4

Org. III 5/37 H-A 4 34 22.04.75
17.04.75 Volkmann

Vordruckgestaltung für den allgemeinen Schrift-
verkehr, für das Bestell- und Rechnungswesen E i l t

Sehr geehrter Herr Dr. Grauert,

Sie können das Schreiben der Briefe, Bestellungen, Rechnungen usw. sowie das Bearbeiten des Schriftgutes rationalisieren, wenn die Vordrucke Ihres Unternehmens den folgenden Normen entsprechen:

DIN 676 Geschäftsbrief; Vordrucke A4
DIN 677 -; Vordruck A5
DIN 679 Geschäftspostkarte; Vordruck A6

DIN 4991 Vordrucke im Lieferantenverkehr; Rechnung
DIN 4992 -; Bestellung (Auftrag)
DIN 4993 -; Bestellungsannahme (Auftragsbestätigung)
DIN 4994 -; Lieferschein/Lieferanzeige
DIN 4998 Entwurfsblätter für Vordrucke

Diese Normen enthalten alle Einzelheiten für den sinnvollen und zweckmäßigen Aufdruck. Wenn dazu bei der Beschriftung genormter Vordrucke DIN 5008 "Regeln für Maschinenschreiben" beachtet wird, entstehen übersichtliche und werbewirksame Schriftstücke.

Die beigefügten 6 Mustervordrucke zeigen, daß das Beachten der Normen die künstlerische und werbewirksame Gestaltung der Vordrucke nicht ausschließt.

Da wir uns auf die Herstellung genormter Vordrucke spezialisiert haben, können wir besonders billig liefern. Eine Probebestellung wird Sie und Ihre Geschäftsfreunde von den Vorteilen überzeugen.

Mit bester Empfehlung

NORAG
Druckerei und Verlagshaus KG

Hermann

Anlagen

6 Mustervordrucke

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**Pattern B**

---------!---------!---------!---------!---------!---------!---------!---------!
E X P R E S S  M A I L

October 17,1990

Northern Lights Color Works, Inc.
Dr. Harold M. Smith
8934A North Main Street W105 97H
North Rutherford, New Jersey 78916-9596

Re: X3/SD-10, October,1989
Accredited Standards Committee; X3 - Information Processing Systems

Dear Dr. Smith:

Following our recent discussion, I want to provide you this additional information on X3 Standing Documents.

There is a series of documents. They were developed by X3 and the X3 Secretariat. The series provides an information data base on Accredited Standards Committee X3 - Information Processing Systems. The documents are updated periodically, each on an individual basis.

This series is designed to serve several needs:
first, they describe X3, and explain its program;
second,they teach members of X3 committees the operational procedures of X3; and
third, they insure systematic administration according to procedural requirements of the American National Standards Institute and the X3 Secretariat.

We have found that this set of documents serves well as guidance to the Secretariat staff, as well as to the several working subgroups, members and officers.

You had asked for a partial listing of the Standing Documents. I am pleased to provide them as follows:

X3/SD-0 Informational Brochure - January 1989
X3/SD-1 Master Plan - January 1988
X3/SD-1B Master Plan (Operational) - April 1989
X3/SD-2 Organization and Procedures - July 1987
X3/SD-3 Project Proposal Guide - May 1987
X3/SD-4 Projects Manual - August 1988
X3/SD-5 Standards Criteria - September 1984

Perhaps a few more words of explanation about the last document would be helpful to you.

X3 subgroups produce a required annual report to X3 using the format described in this report. They do so according to the schedule defined in X3/SD-6, Membership and Officers.

I hope that this additional information is helpful to you. Should you wish to obtain copies of the listed documents, I will be pleased to provide them to you.

With warm personal regards,

Jonathan

ABC Institute NEDET
Washington, D. C. 34921-2654
---------!---------!---------!---------!---------!---------!---------!---------!



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# Annex C

(normative)

# Spreadsheet test pattern

The spreadsheet test pattern is reproduced overleaf.

The text of the spreadsheet starts with the word **SPREADSHEET** and ends with the **bottom right-hand last line of 12 double underlined characters**.

For the convenience of the reader of this International Standard and to indicate the relative positions of the different parts of the layout there is a dotted line at the top and at the bottom of the page. These dotted lines **are not part of the text**.

If this International Standard is translated into another language the seven English words and the abbreviated names of the months shall remain in English in order to ensure correlation between measurements made at different locations.

The text on the page overleaf is not intended to give any indication of the actual presentation of the printed page.

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SPREADSHEET TEST

TYPICAL YEARLY CASH FLOW ACCOUNT

| | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May. | Jun. | Jly. | Aug. | Sep. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REVENUE | | | | | | | | | | | | | |
| Salary | 12345 | 67890 | 12345 | 67890 | 12345 | 01234 | 56789 | 01234 | 56789 | 01234 | 50123 | 44567 | 901234567358 |
| OUTGOING EXPENSES | | | | | | | | | | | | | |
| Property Rates | 123 | 456 | 7890 | 1234 | 5678 | 9012 | 2123 | 4501 | 2345 | 6789 | 0123 | 4567 | 89012194678 |
| Car Repayment | 123 | 4567 | 8901 | 2345 | 6789 | 0123 | 4501 | 2345 | 6789 | 0123 | 4567 | 8901 | 23450543224 |
| Food Purchase | 1234 | 4567 | 9012 | 3456 | 7890 | 1234 | 5012 | 3456 | 7890 | 1234 | 5678 | 9012 | 34501659100 |
| Personal Taxes | 1234 | 4567 | 9012 | 3456 | 7890 | 1234 | 5012 | 3456 | 7890 | 1234 | 5678 | 9019 | 34501543224 |
| Gas | | | 012 | | | 012 | | | 012 | | | 012 | 0012210876 |
| Electricity | | 123 | | | 123 | | | 123 | | | 123 | | 1232486050 |
| Insurance | | 908 | | | | | | | 123 | | | | 8905432243 |
| Car Repairs | | 234 | | 567 | | | 895 | | | | | | 1237358004 |
| House Repairs | | | | 678 | | | 901 | | | | | | 6781946780 |
| Entertainment | 55 | 22 | 33 | 45 | 65 | 75 | 85 | 95 | 05 | 16 | 25 | 32 | 4547934568 |
| Pension Fund | 909 | 129 | 349 | 569 | 539 | 695 | 691 | 696 | 914 | 149 | 051 | 493 | 41495807081 |
| Sundry | 566 | 766 | 866 | | | | | | | | | | 9017483242 |
| Accountancy | 123 | 456 | | | | | 7890 | | | | | | 72345041253 |
| Telephone | | | 234 | | | 403 | | | 055 | | | 550 | 12347413106 |
| Travelling Expenses | 455 | 295 | 395 | 095 | 059 | 359 | 451 | 251 | 929 | 051 | 590 | 959 | 52251291405 |
| HOUSE EXPENDITURE | | | | | | | | | | | | | |
| House Repayments | 051 | 011 | 921 | 4519 | 2519 | 5059 | 9299 | 9540 | 2040 | 8544 | 655 | 351 | 95125715432 |
| House Insurance | | | 3185 | | 3185 | | | 0592 | | | 3512 | | 38512795382 |
| TOTAL OUTGOINGS | 7358 | 1946 | 54322 | 6591 | 21007 | 34225 | 56789 | 01234 | 40123 | 44567 | 90123 | 45678 | 901234765502 |
| NET BALANCE | 1234 | 4567 | 901 | 2345 | 6789 | 0123 | 4501 | 2345 | 6789 | 01234 | 5678 | 9012 | 345240743358 |
| BALANCE B/FWD | -1234 | 4567 | 912 | 3456 | 78901 | 23450 | 12345 | 67890 | 12345 | 67890 | 12354 | 12345 | -12345406810 |
| BALANCE C/FWD | 1234 | 4567 | 9017 | 23457 | 78907 | 12345 | 05570 | 45199 | 25199 | 52259 | 12549 | 25959 | 25159109152 |

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# Annex D

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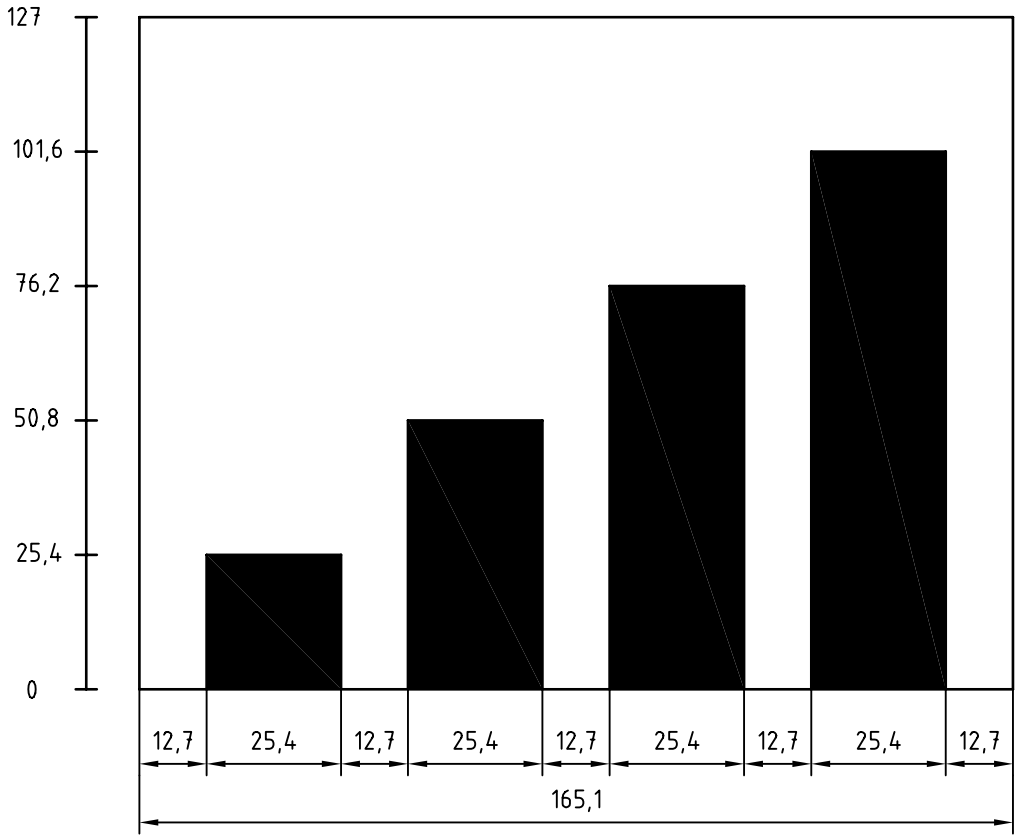
# Graphic test pattern

The graphic test pattern is shown below. The frame of 127 mm x 165,1 mm enclosing the four black rectangles **is part of the test pattern.**

It shall be printed at a distance of 25,4 mm from the left-hand edge of the sheet.

The dimensions indicated in millimetres **are not part of the test pattern.**



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# Annex E

(informative)

## Classification of printers - Classes 1 and 2

Class 1 and class 2 printers are normatively defined in ISO/IEC 11160-1. Class 3 and class 4 printers are normatively defined in ISO/IEC 11160-2.

| No. | | | Class 1 | Class 2 | Class 3 | Class 4 |
|---|---|---|---|---|---|---|
| 1 | **Unit of Printing** | Less than one page | X | X | | |
| | | One Page | | | X | X |
| 2 | **Input Data** | Character Data or Coded Character Data | X | X | X | X |
| | | Raster Data | | X | X | X |
| | | Vector Data | | | | X |
| 3 | **Comments** | | | The source file from the user may have vector data if the system has a host RIP, but the file sent to the printer does not contain any vector data.<br>Dumb printers are also included in this class. | The source file from the user may have vector data if the system has a host RIP, but the file sent to the printer does not contain any vector data.<br>Emulation of Class 1 and/or Class 2 printers may be supported.<br>Input data may be compressed.<br>Dumb printers are also included in this class. | Supports PDL.<br>Emulation of class 1 and/or class 2 printers may be supported. |
| 4 | **Printer examples** | | Character printers only<br>Daisy wheel<br>Wire dot<br>Ink-jet<br>Thermal | PC and hard copy printer<br>Wire dot<br>Ink-jet<br>Thermal | Laser<br>LED<br>LCD<br>Ink-jet | Laser<br>LED<br>LCD<br>Ink-jet<br>Thermal |

Class is defined by the maximum capability of the printer.

This annex is intended for the printer manufacturers to classify their printers so that the appropriate specifications can be generated based upon the ISO/IEC 11160-1 for class 1 and class 2 or ISO/IEC 11160-2 for class 3 and class 4.



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