INTERNATIONAL STANDARD

ISO/IEC 11160-2

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Information technology — Office equipment — Minimum information to be included in specification sheets — Printers —

Part 2:
Class 3 and Class 4 printers

Technologies de l'information — Équipements de bureau — Information minimale devant figurer dans les notices techniques — Imprimantes —

Partie 2: Imprimantes classe 3 et classe 4

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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 11160-2 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 which has been technically revised.

ISO/IEC 11160 consists of the following parts, under the general title *Information technology — Office equipment — Minimum information to be included in specification sheets — Printers*:

⎯ *Part 1: Class 1 and Class 2 printers*

⎯ *Part 2: Class 3 and Class 4 printers*

Annex A forms an integral part of this part of ISO/IEC 11160. Annexes B, C and D are for information only.

Introduction

Printers of many different types and capacities are now available and their specifications vary so widely that it is difficult for potential users to assess which machine might best meet their requirements.

Information technology — Office equipment — Minimum information to be included in specification sheets — Printers —

Part 2:
Class 3 and Class 4 printers

1   Scope

ISO/IEC 11160 is intended to facilitate users in selecting a printer which meets their requirements.

ISO/IEC 11160 specifies the minimum information to be included in the specification sheets of printers in order for users to compare the characteristics of different machines. The term "Specification Sheets" applies to documents which describe the performance characteristics of the printers to be included in instruction manuals, product brochures or on websites.

ISO/IEC 11160 applies to printers that could be operated in an office environment. Printers requiring specially equipped rooms or specially instructed operators are not considered in ISO/IEC 11160.

ISO/IEC 11160 deals with different classes of printers. This part of ISO/IEC 11160 accommodates Class 3 and Class 4 printers, as defined in Annex C. Detailed descriptions of Class 3 and Class 4 printers are specified in Annex A. Serial printers are classified as Class 1 or Class 2 printers as defined in Annex C and covered by Part-1 of ISO/IEC 11160.

2   Conformance

In order to comply with this part of ISO/IEC 11160, specification sheets shall include, in the order shown, all required items listed in clause 5 which are relevant to the machine being described.

3   Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7779, *Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment*

ISO 9295, *Acoustics — Measurement of high-frequency noise emitted by computer and business equipment*

ISO 9296, *Acoustics — Declared noise emission values of computer and business equipment*

ISO/IEC 19752, *Information technology — Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components*

ISO/IEC 19798, *Information technology — Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components*

ISO/IEC 24711, *Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components*

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

4 Test and measurement conditions

Unless otherwise specified, all tests and measurements shall be conducted at the following conditions:

a) Temperature: 23 °C ± 5°C
b) Relative humidity: 50 % ± 20 %
c) Line Voltage: rated input voltage
d) Line Frequency: rated frequency
e) Paper size: A4
f) Paper weight: 60 g/m^2 to 90 g/m^2
g) Paper transport direction: standard direction

For the test pattern, the document in Annex B (Informative) should be used.

Annex B is derived from ISO/IEC 10561, where the guide line (character art, size etc) is given for the creation of the test target. So long as the document is text only, a bit of modification causes no influence over the results of measurement.

For monochrome test pattern, all letters should be black. For colour test pattern, arbitrary letters should be colourized by using the primary colorants of the printer.

Instead of A4 paper size, the size most commonly used in the country may be used, both for the test page and the copies. This shall be indicated in the specification sheet.

5 Information to be included in the specification sheets

Table 1 defines, for each parameter, the name of the parameter and a short description of the entry. These constitute the information to be included in the specification sheet. Parameters whose properties shall be included in the specification sheets are marked as "R" (required), while other parameters whose properties are recommended to be included are marked as "O" (optional).

The heading of the specification sheet shall indicate that it has been prepared in accordance with this part of ISO/IEC 11160. For every parameter, if any special instruction is not given, the name of the parameter of Table 1 shall be used without change. Non-applicable parameters may be ignored, without changing the order of remaining parameters.

Additional parameters may be adjacently inserted to the related parameter in Table 1 for the purpose of describing the function which is not covered by other parameters.

For a parameter with voluminous description, it may be stated separately and may use a figure or a table. In such case, the caption of the figure or the table shall be identical with the name of parameter shown in Table 1.

The "Remarks and examples" column is provided for the persons who prepare the information sheet, and it is not intended to appear in the specification sheet. The column includes informative examples and normative test methods and descriptions. Test methods to be applied, when not defined in other International Standards, are defined in this column.

Whenever a capacity is given in sheets, the reference paper weight (g/m^2) shall be specified

Numbers attached to parameters are not normative but only for convenience.

Table 1 — Information to be included

Parameter	R/O	Description of the entry	Remarks and examples
1 General data			
1.1 Printer class	O	Class 3 or Class 4 printer.	See Annex A for description of classes.
1.2 Machine name, model and/or model number	R	Product name, model number.	
1.3 Type	O	State the machine type.	State if the machine is portable, desktop or floor-standing for the standard configuration, without optional devices.
1.4 Printing method	R	The printing process used	Such as ink-jet, thermal transfer, electro-photographic (laser), electrophotographic (LED).
1.5 Print resolution	R	Indicate horizontal and vertical dots per 25,4 mm (dpi), in this order. The maximum value shall be indicated in the order of horizontal and vertical. The design capability of the machine to place the dots.	Note that the theoretical writing resolution and the actual printing resolution may be different. If the dot density can be stepped up and down, all grades should be indicated. If technologies which can improve apparent resolution (line smoothing technology, bit depth control for each dot, etc.) are applied, resultant resolution, its method or trade name of such technology should be additionally indicated.
1.6 Tone	O	Indicate the available number of tone or colours in design theory.	
2. Performance data			
2.1 Warm-up time	R	Indicate both 1) and 2). 1) Send the print signal (i.e. click on PC), just after power-on. Measure time in minutes and/or seconds from the power-on to the completion of the first paper ejection. Warm-up time is described as the difference of the measured time and First print out time (2.2). 2) Send the print signal (i.e. click on PC) from power save mode. Measure time in minutes and/or seconds from the print start to the completion of the first paper ejection. Warm-up time is described as the difference of the measured time and First print out time (2.2).	If the value measured by 2) is equal to or longer than the value of 1), indicate both values of 1) and 2). If the value of 1) is longer than the value 2), the value 2) is omissible. The results measured at 23 °C should be indicated. Round off the results to integer number. In the case of less than 10 seconds round off the results to one decimal places and report two significant digits (e. g. from 5,35 to 5,4 seconds). Or after rounding up the results, it may report as "less than or equal to the figure" or " less than the figure". If there is more than one power saver mode, indicate the results for each mode, or indicate the longest result.

Table 1 (cont'd)

Parameter	R/O	Description of the entry	Remarks and examples
2.2 First print out time	R	The number of seconds between the initiation of the job until the complete exit of the first sheet	The number of seconds shall be described with the measuring condition and/or the name of international standard which was used for the measurement.
2.3 Continuous print speed	O	Measure the time (t in second) from just after complete discharge of the first sheet to end of discharge of the last sheet (n_{th} sheet) for more than one minute. The sustained throughput (S) is calculated using following equation: $$S = \frac{60}{t \div (n-1)}$$ For printers with duplex mode, measure the throughput at duplex printing mode. Indicate; For simplex print: pages/min For duplex print: images/min (doubling S obtained from the above equation)	The Continuous Print Speed shall not include the time for maintenance, such as cleaning. Significant digits for the sustained throughput (S in sheets/min) are, For less than 10 sheets/min : two digits ",0" can be deleted and make integer number (for example, 6,0 to 6). For 10 pages/min or more and less than 100 pages/min: two digits or three digits may be selected at company's option. For 100 pages/min or more : three digits Describe the value whether it is for monochrome, colour or both. For the test pattern, see Clause 4.
2.4 Printing productivity	R	State FSOT and ESAT parameters and a pointer to the full test report.	ISO/IEC 24734.
3 Control			Item 3.2 may be described together with item 3.1 at the end of 3.1.
3.1 Interface for hardware connection	R	State the hardware connections available. and the name of standard for connection, etc.	For example, IEEE1284, USB(2.0) , 100BASE-TX/10BASE-T, wireless LAN(IEEE 802.11b). For optional feature, state as it is.
3.2 Interface for connection control	O	Identify communication protocols.	For example, TCP/IP, IPX/SPX, IPP, etc.
3.3 Command	R	Identify page description language, emulation and/or host-based.	
3.4 Supported operating systems	O	Identify the supported operating systems.	
3.5 Processor	O	Identify the trade name and clock frequency of Processor.	

Table 1 (cont'd)

Parameter	R/O	Description of the entry	Remarks and examples
3.6 Memory			This item may be described together with item 3.6.1 and 3.6.2.
3.6.1 Standard memory	R	Describe the capacity of memory in number of bytes.	Megabyte (MB) or gigabyte (GB), etc.
3.6.2 Optional memory	O	Describe the capacity of optional memory in number of bytes. Method of installation may also be described.	Megabyte (MB) or gigabyte (GB), etc. Name of card or DIMM type may also be described.
3.6.3 Hard disc drive	O	Describe the capacity of hard disk in number of bytes.	If the hard disc is optional, describe as it is.
4 Fonts			
4.1 Standard fonts	O	List fonts or indicate number of fonts available in the printer. List the character set of standard equipment available.	Times Regular Type 1, Roman Italic True Type, 35 Type 1 fonts, 45 True Type
4.2 Optional fonts	O	List fonts and character set optionally available. List the methods for optional font handling capability.	Download from a host computer. Additional hard disk needed for fonts.
5 Paper and paper handling			Item 5.1 to 5.5 for each paper input device may be described together.
5.1 Paper type	R	List paper type available.	Plain paper, recycled paper, coated paper, transparencies, labels, postcards, envelopes, etc. If paper types are different between paper input devices, describe them for each input device.
5.2 Paper size	R	State paper size by the name of standard paper sizes or in millimetres (mm) of paper which is acceptable for the printer.	Name of standard paper sizes (ISO 216): A4, B4, etc. For free size paper, indicate in millimetres (mm) of width (maximum and minimum) and length (maximum and minimum), etc. If these are not same between paper input devices, describe them for each device.
5.3 Printable area	O	State the print margin	For example, print margin for top, bottom and both sides is 4,1 mm.
5.4 Paper weight	R	Minimum and maximum in g/m^2.	Describe for each paper feeding device.

Table 1 (cont'd)

Parameter	R/O	Description of the entry	Remarks and examples
5.5 Paper input tray and capacity	R	State the capacity for each paper feeder in number of sheets and paper weight.	Manual, cassette, tray, drawer, etc. Indicate standard paper feed device or optional. Indicate how many paper feed devices can be installed at one time. Indicate paper feed direction, if applicable.
5.6 Paper output tray and capacities	R	State the capacity for each output tray both in number of sheets and paper weight, with face-up or face-down. Same for additional output tray.	If there are differences in capability for paper size, paper weight or paper types for each tray, describe them.
5.7 Finishing Features	O	Describe the finishing features.	Offsetting, punching, sorting, collating, binding, stapling, folding, addressable bins, Mail Box, etc. Optional devices shall be indicated as optional.
6 Automatic duplex printing	O	Indicate available (standard or optional), or not-available. Indicate available paper size, paper weight and paper types.	
7 Physical characteristics			
7.1 Dimensions	R	Indicate width x depth x height in millimetres.	Indicate if it is the envelope around or if trays, knobs or other are not included.
7.2 Space required for printing and operation	O	Indicate space (width x depth x height in millimetres) required for printing and operation. Graphical explanation is acceptable. For printing: Indicate machinery space required for printing. If it varies with paper, describe such condition. For operation: Indicate machinery space required for operation, such as paper handling and jam removal.	Indicate if it is with or without accessories. Operation means paper handling, jam removal, replacing consumables.
7.3 Weight	R	Indicate installed weight in kilograms.	Indicate if it is with or without accessories and supplies. Indicate weight with consumable supplies (the state of ready to print), without paper.
8 Operating environment	O	Indicate minimum and maximum ambient temperature, and range of relative humidity for printing.	This indication is intended to give the user a guide to the expected machine operating environment.
9 Power source			Entries of Item 9.1 to 9.3 may be combined and described as power source. Entries of Item 9.4 to 9.5 may be combined and described as power consumption.

Table 1 (cont'd)

Parameter	R/O	Description of the entry	Remarks and examples
9.1 Rated voltage or voltage range	R	Expressed in volts.	Indicate if AC or DC. For AC power: indicate the number of phases. For DC power: indicate if built-in battery. Indicate tolerances.
9.2 Rated frequency or frequency range	R	Expressed in hertz.	For AC power only.
9.3 Current	O	Maximum current in amperes.	The maximum current shall be measured and indicated in amperes. This measurement shall be made with all the settings that can have an influence on the current value set to produce the maximum value. The inrush current at the starting of the machine shall not be considered for this indication, but shall be taken into consideration for the specification of the fuses. Indicate if special mains fuses are required. Specify for both basic and maximum configuration. The maximum configuration means the configuration that requires the highest current. Exclude the current for the additional devices with independent power source.
9.4 Power	R	Indicate maximum power in kilowatts or watts.	The maximum power shall be measured and indicated in kilowatts or watts. This measurement shall be made with all the settings that can influence on the current value set to the case producing the maximum value. Indicate the value at the rated input voltage. Exclude the power for the additional devices with independent power source.
9.5 Average power consumption	O	Average power consumption per hour in kilowatts for; 　-operating 　-ready 　-power save mode. Specify for both basic and maximum configuration. In the case different results obtained from monochrome and colour, indicate both or higher value.	Measure power consumption during stable printing by using integrating type instrument. For the test pattern, see Clause 4. Measure for the basic configuration and describe as it is. Measurement for the maximum configuration with additional devices may be described.
9.6 Typical Electricity Consumption (TEC)	O	Describe the TEC value for a week.	Report three significant digits in kWh. Measuring method and notation system shall comply with International Energy Star Program

Table 1 (cont'd)

Parameter	R/O	Description of the entry	Remarks and examples
10 Relevant laws and standards			Item 10.1 to 10.3 may be described together.
10.1 Equipment Safety regulations	O	List the applicable standards or laws.	
10.2 Electromagnetic compatibility (EMC)	R	State the specifications, standards or regulation that the equipment complies with.	Compliant with class B of VCCI (Voluntary Control Council for Interference by Information Technology Equipment)
10.3 Environmental regulations	O	State the specifications, standards that the equipment complies with.	For example, International Energy Star Program, acquisition of Eco label
11 Emissions			
11.1 Acoustical noise	R	Sound power levels and sound pressure levels -operating -ready	Measured in accordance with ISO 7779 and ISO 9295. The reference box specified in ISO 7779 includes, unless otherwise specified, cassette, trays and raised parts of the printer. Declared in accordance with ISO 9296. The determination shall be made according ISO 9296. Specify the configuration used.
11.2 Heat emission	O	The heat emission per hour shall be indicated in joule (J) or kilo joule (kJ), for three conditions specified under 9.5.	For estimating purposes it may be considered that the power consumed by a printer is nearly completely transformed in heat. Heat emmision in [kJ/h] = Powre Consumption[kW] / 3 600 *Note: 1 kJ/h= 1 kWs/3 600 s*
12 Consumable supplies	R	(List the consumable items which are replaceable by customer.) Describe method for the determination of toner/ink cartridge yield.	For example, toner cartridge capable of 10,000 pages, ISO/IEC 19752: for monochromatic printers ISO/IEC 19798: for colour printers ISO/IEC 24711: for inkjet colour printers
13 Optional equipment	O	List the optional or accessory equipment.	For example, duplex device, additional cassette, mounting, etc.
14 Accessory list	O	List accessories in the package. If the cartrige in the package is different capacity with the consumable supply shown in item 12, indicate the capacity.	For example, operation manual, CD(s) with printer software, toner cartridge (2,000 pages), etc.
15 Other features	O	Describe other features.	Such as self-diagnosis function.

Annex A
(normative)

Classification of printers -Class 3 and Class 4

A.1 Specific terminology

A.1.1 printer

The physical device which contains the image transducer, the marking process and paper transport mechanism device. This may also contain other functional unit such as Raster Image Processor (RIP).

A.1.2 page

A collection of text and graphic objects intended to print on one side of a sheet of paper.

A.1.3 Raster Image Processor (RIP)

A device which converts coded character data and/or vector data into raster data.

A.1.4 Unit of printing

A source file can be partitioned into blocks of data that correspond to a mechanical unit. The size of such a partition is the unit of printing.

A.2 Elements for classification of printers

A.2.1 Characteristics of the input data to the printer

- Character data or coded character data

- Raster data

- Vector data

A.2.2 Smallest unit of printing

- One page or less than one page, for example several lines.

A.3 Class 3 printer

A.3.1 Definition

- Input data to the printer is only "raster data" or "character, coded character data, or raster data".

- The smallest unit of printing is one page.

A.3.2 Comments

- The source file from the user may have vector data if the system has a RIP, but the file sent to the printer does not contain any vector data.

- Input data may be compressed.

- Emulation of class 1 and/or class 2 printers may be supported.

A.3.3 Example

- Laser printer receives bit stream of Kanji characters that are generated in the host computer.

A.4 Class 4 printer

A.4.1 Definition

- Input data to the printer are character data, coded character data, raster data, or vector.

- The smallest unit of printing is one page.

A.4.2 Comments

- Emulation of class 1 and/or class 2 printers may be supported.

- Page Description Language (PDL) is supported.

A.4.3 Example

- Laser printer that accepts PDL input.

Annex B
(informative)

Test Pattern

For the test pattern, the target document shown in the following page should be used. This pattern is based on ISO/IEC 10561 Annex B (Pattern B). The target document should be rendered in 10 point size in a fixed-width Courier font (or nearest equivalent).

In the case a different test pattern is used, differences should be written in the specification sheet. For reference, the image of actually used test pattern is recommended to be attached to the specification sheet.

Target Document

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 X3Secretariat. 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

Annex C
(informative)

Classification of Printers

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. 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. Emulation of Class 1 and/or Class 2 printers may be supported. Input data may be compressed. Dumb printers are also included in this class.	Supports PDL. Emulation of class 1 and/or class 2 printers may be supported.
4	Printer examples		Character printers only Daisy wheel Wire dot Ink-jet Thermal	PC and hard copy printer Daisy wheel Wire dot Ink-jet Thermal	Laser LED LCD Ink-jet	Laser LED LCD Ink-jet 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 on ISO/IEC 11160-1 for class 1 and class 2 or ISO/IEC 11160-2 for class 3 and class 4.