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Information technology — Office equipment — Information to be included in specification sheets for data projectors

Technologies de l'information — Équipements de bureau — Information à inclure dans les feuilles de spécifications pour projecteurs de données

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation 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.

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

This third edition cancels and replaces the second edition (ISO/IEC 21118:2012), which has been technically revised.

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

— progress of light source technologies (from lamp to laser, LED, etc.);

— diversification of input/output signals (HDMI, display port, HDBase-T, etc.);

— move toward higher resolution (4K, 8K, pixel shift technology, etc.);

— description of colour quality (colour gamut ratio).

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.

Information technology — Office equipment — Information to be included in specification sheets for data projectors

1 Scope

This document specifies the information to be included in the specification sheets for front projection type data projectors and the form of specification sheets.

This document is not applicable to units for a rear screen projection.

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 7779:2018, *Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment*

ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

IEC 60107-2:1997, *Methods of measurement on receivers for television broadcast transmissions — Part 2: Audio channels — General methods and methods for monophonic channels*

IEC 61947-1, *Electronic projection — Measurement and documentation of key performance criteria — Part 1: Fixed resolution projectors*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

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

3.1
data projector
display equipment that converts electrical signals containing image information from automatic data processing machines into optical signals and projects onto a projection screen

3.2
light valve
light-modulation device (such as a transmissive or reflective liquid crystal display, or a micro mirror device) used to create an optical image from an external light source that corresponds to an electrical signal

3.3
wide-angle end
minimum focal length position of the zoom lens

3.4
lens shift
projecting function which is vertical or horizontal repositioning of the projection lens relative to the *light valve* (3.2) to compensate for projector to screen alignment differences

3.5
image position
presentation of shifts of projected image on horizontal and vertical directions

Note 1 to entry: It is calculated as per Formulae (1) and (2):

$$X_{shift} = (X_{cpi} - X_{axis}) / W_{pi} \times 100\ \% \quad (1)$$

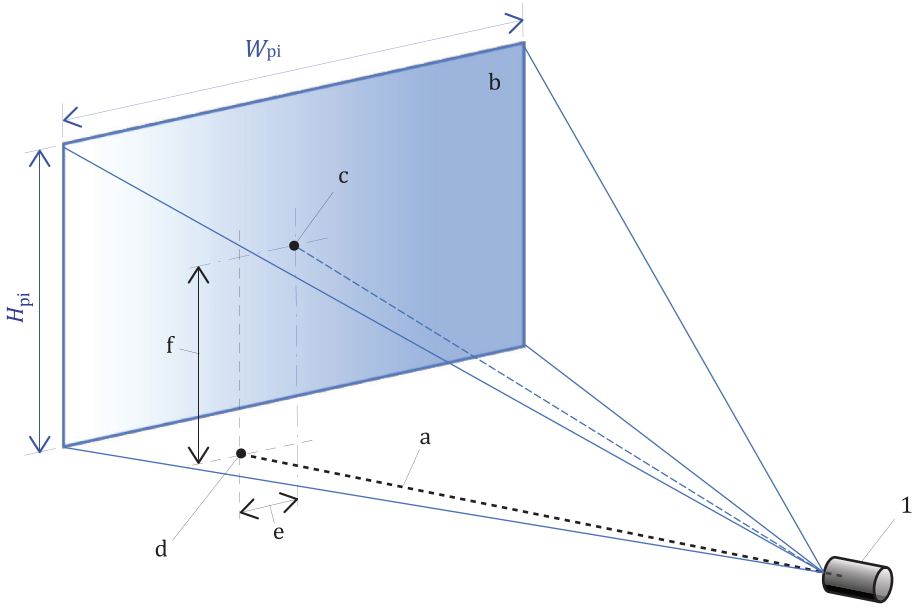
$$Y_{shift} = (Y_{cpi} - Y_{axis}) / H_{pi} \times 100\ \% \quad (2)$$

where

X_{shift} , Y_{shift}	are the horizontal and vertical image shift ratios;
X_{cpi} , Y_{cpi}	are *x* and *y* coordinates of P_{cpi} (X_{cpi}, Y_{cpi}) (as shown in Figure 1), the centre of the projected image;
X_{axis} , Y_{axis}	are *x* and *y* coordinates of P_{axis} (X_{axis}, Y_{axis}) (as shown in Figure 1), the point at which the axis of the projection lens intersects the screen;
W_{pi}, H_{pi}	are the overall width and height of the projected image.

Note 2 to entry: The horizontal image shift ratio is positive when P_{cpi} is at the right of P_{axis}, and negative when P_{cpi} is at the left of P_{axis}.

Note 3 to entry: The vertical image shift ratio is positive when P_{cpi} is above P_{axis}, and negative when P_{cpi} is below P_{axis}.



Key

1 projection lens

a Axis of projection lens.

b Projected image.

c Centre of projected image; P_{cpi} (X_{cpi}, Y_{cpi}).

d Intersection of axis of projection lens and surface of projected image; P_{axis} (X_{axis}, Y_{axis}).

e Horizontal image shift.

f Vertical image shift.

Figure 1 — Shifted image position

3.6
projection distance
distance between the projector and the screen measured in linear units (i.e. metres, feet, or inches)

Note 1 to entry: This distance is considered to be the distance from the image displayed on the screen to the outermost element of the projection lens.

[SOURCE: IEC 61947-1:2002, 3.29]

3.7
rear screen projection
projection with image projected through a light-transmitting screen to the audience side of the screen

[SOURCE: IEC 61947-1:2002, 3.30]

3.8
standard outside dimensions
maximum dimensions of the product after removing the packaging, including any protrusions

4 Measuring methods and conditions

The measuring methods and conditions in terms of the performance specification items in Table 1 shall be in accordance with Annex B.

5 Items in specification sheets

Table 1 lists the items that shall appear in the specification sheets. Items whose properties shall be included in the specification sheets are marked as “R” (required), while other items whose properties are given for information are marked as “O” (optional).

Values in the specification of light output, contrast ratio (full white/full black) and centre to corner zone ratio shall be defined as averages of productions. The lower-limit values of the product at the time of shipment shall be at least 80 % of the values in specification sheets for these three items.

The specification sheets shall have a statement indicating accordance with this document. The terminology shown in the “Item” column of Table 1 shall be used in the specification sheets. Items marked as optional may be omitted, along with any items that do not apply to the particular projector model. If an item is omitted; the order of items included in the specification sheets shall maintain the same order as shown in Table 1.

The form of the specification sheets shall be as given in Annex A.

NOTE The term “specification sheets” applies to documents which describe the performance characteristics of the data projector which can be included in instruction manuals, product catalogues or on websites.

Table 1 — Performance specification items

No.	Item	R/O	Item specification	Description example
1	Product number, type name, or model number	R	The product name, type name, model numbers, or product numbers shall be indicated.	—
2	Display system	R	The light valve type and the display system shall be indicated.	a) LCD, micro mirror, other b) transmitting, reflecting c) single display device, 3 display devices, other
3	Optical system	O	The optics for colour separation and convergence should be indicated.	a) dichroic mirror separation-prism convergence system b) time sharing separation/ convergence system c) other
4	Display device			
4.1	Size of effective display area	R	Diagonal size, number of display device and aspect ratio shall be indicated.	33 mm × 3 / 1,3 in × 3, aspect ratio 4 : 3
4.2	Number of pixels	R	Pixel count per display device and pixel dimensions shall be indicated.	786 432 pixels (1 024 × 768) 1 024 000 pixels (1 280 × 800)
		O	Pixel count per projected image inclosing enhanced pixel number and such technology should be indicated.	2 211 840 pixels (2 048 × 1 080) by pixel shift
4.3	Other	O	Additional features of the display device should be indicated.	
5	Projection lens			
"R" in the R/O column means required items and "O" means optional items.				

Table 1 *(continued)*

No.	Item	R/O	Item specification	Description example
5.1	Zoom	R	Zoom magnifications shall be indicated.	Power zoom (1,4 ×)
5.2	Focus	R	Method of focus adjustment shall be indicated.	Manual or powered
5.3	Lens shift	O	Image position, fixed/variable, manual/ powered should be indicated. Indicate lens shift range, fixed/variable type and manual/powered. Range of single vertical lens shift may be described as "Lens shift XX % to XX %" Image position for fixed lens shift. Image position for variable shift. In case an optical axis position is unavailable, an illustration may be used.	Fixed lens shift: xx (%) Vertical lens shift range, XX %(up) - XX %(down) XX %(right) - XX %(left) (see 3.5)
5.4	Focal length f/number	O	-	f = 52 mm — 73 mm f / 2,5 — 2,9
5.5	Changeable lens	O	If the projection lens can be changed, it should be indicated.	Yes or no
6	Light source	R	Light source type shall be indicated. If the light source type is a lamp, the lamp type, wattage and quantity shall be indicated.	Lamp, laser diode, LED, other high pressure mercury lamp, 300 W, × 2
7	Life expectancy of light Source	O	The time when light source output halves should be indicated. In the case of lamp, see IEC 61947-1. Other case of light source, driving sequence is continuous lighting. The operating mode shall be indicated.	20 000 h at normal mode
8	Screen size [projection distance]	R	The minimum and maximum diagonal sizes of the projected image shall be indicated.	Minimum: 58,4 cm / 23 in to maximum: 762 cm / 300 in
		O	The associated projection distance should also be indicated. For products with an indefinite measurement, the projection distance should be indicated using illustrations.	Projection distance: 1,2 m to 11,5 m
9	Throw ratio	O	Throw ratio = projection distance / width of the projected image. When projection distance differs from the definition given in 3.6, it shall be explained independently.	Throw ratio: 0,5
10	Number of colours	O	The maximum number of reproducible colours shall be indicated.	16 700 000 colours
11	Light output	R	The light output on a projected screen shall be measured and indicated.	As average value of production units 2 000 lm (see B.2.2)
"R" in the R/O column means required items and "O" means optional items.				

Table 1 *(continued)*

No.	Item	R/O	Item specification	Description example
12	Contrast ratio (full white/ full black)	O	The ratio of screen illuminance between the full white and full black levels of projected images should be indicated. Measurement conditions shall be indicated.	As average value of production units 2 000: 1 in high contrast mode for iris ON, standard lens (see B.2.3)
13	Centre to corner zone ratio	O	The ratio between the centre illuminance and 4-peripheral-point average illuminance of a full-white image should be indicated.	As average value of production units 85 % (see B.2.4)
14	Colour gamut ratio	O	The reference standard colour gamut area-coverage ratios in the CIE 1931 xy chromaticity diagram. The operating mode shall be indicated.	90 % (sRGB) (see B.6)
15	Speaker	R	The output power of the speaker shall be indicated.	10 W × 2 stereo (see B.3)
		O	The number of speakers and whether stereo or monaural should be indicated as well.	2 speakers, stereo
16	Displayable scanning frequency			
16.1	Horizontal	R	The range of displayable horizontal frequencies shall be indicated. Detail of corresponding frequency may be indicated in a separate sheet.	15 kHz to 100 kHz
16.2	Vertical	R	The range of displayable vertical frequencies shall be indicated. Detail of corresponding frequency may be indicated in a separate sheet.	50 Hz to 120 Hz
17	Input compatibility			
17.1	Data input signal	O	The maximum input resolution for a data signal input should be indicated. Notational convention method shall be indicated as well. If there are two or more signal types (systems), all of them should be specified.	Maximum input resolution 1 280 × 800 dots (resizing display)
17.2	Video input signal	O	The displayable video signal type (system) should be indicated.	NTSC, PAL / SECAM
18	Signal input/output terminals			
"R" in the R/O column means required items and "O" means optional items.				