INTERNATIONAL STANDARD

ISO/IEC 15775

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Information technology — Office machines — Method of specifying image reproduction of colour copying machines by analog test charts — Realisation and application

Technologies de l'information — Machines de bureau — Méthode de spécification de la reproduction d'image des copieuses couleur par des organigrammes d'essai analogiques — Réalisation et application

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

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

International Standard ISO/IEC 15775 was prepared by DIN (as DIN 33866) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Annexes A to M of this International Standard are for information only.

Information technology — Office machines — Method of specifying image reproduction of colour copying machines by analog test charts — Realisation and application

1. Scope

This International Standard applies to implementation and application of test charts for colour copying machines. This International Standard serves for testing of reproduction properties of colour copying machines, in order to help to recognize the possibilities and limits of various machines and for their comparison.

To use this International Standard, make copies of at least two test charts (one achromatic and one chromatic) out of eight test charts using the device to be tested. The resulting copies shall be examined visually and may be compared with the original test charts. Objective measurements may be made for these copies.

Eight ISO-test charts, four in halftone (offset reproduction) and four in continuous tone (photographic reproduction), belonging to this International Standard may be produced by different manufacturers. Information about where to obtain test chart layout and colorimetric $L^*a^*b^*$ data to produce the charts may be found in Annex M.

All hard copy patterns (analog test charts) produced according to this International Standard should be discarded after three years.

2. Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possiblibity of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 216:1975, *Writing paper and certain classes of printed matter – Trimmed sizes – A and B series.*

ISO 536:1995, *Paper and board – Determination of grammage.*

ISO 554:1976, *Standard atmospheres for conditioning and/or testing – Specifications.*

ISO 2469:1994, *Paper, board and pulps – Measurement of diffuse reflectance factor.*

ISO 2471:1998, *Paper and board – Determination of opacity (paper backing) – Diffuse reflectance method.*

ISO 2846-1:1997, *Graphic technology – Colour and transparency of ink sets for four-colour-printing – Part 1: Sheetfed and heat-set web offset lithographic printing.*

ISO 5627:1995, *Paper and board – Determination of smoothness (Bekk method).*

ISO 5651:1989, *Paper board and pulps – Units for expressing properties.*

ISO 5737:1983, *Prints – Preparation of standard prints for optical tests.*

ISO 7724-1:1984, *Paints and varnishes – Colorimetry – Part 1: Principles.*

ISO 7724-3:1984, *Paints and varnishes – Colorimetry – Part 3: Calculation of colour differences.*

ISO 8596:1994, *Ophthalmic optics – Visual acuity testing – Standard optotype and its presentation.*

ISO 8597:1994, *Optics and optical instruments – Visual acuity testing – Method of correlating optotypes.*

ISO 12641:1997, *Graphic technology – Prepress digital data exchange – Colour targets for input scanner calibration.*

ISO/CIE 10526:1991, *CIE standard colorimetric illuminants.*

ISO/CIE 10527:1991, *CIE standard colorimetric observers.*

CIE publ. 13.3:1995, *Colour rendering – Method of Measuring and Specifying Colour Rendering Properties of Light Sources.*

CIE publ. 15.2:1986, *Colorimetry.*

DIN 6160:1996, *Anomaloscopes for the diagnosis of red-green colour vision deficiencies (or equivalent).*

DIN 33866-2:1998, *Information technology – Office machines – Colour image reproduction devices – Method of*

specifying image reproduction of colour copying machines by analog test charts.

DIN 58220-5:1996, *Test of visual acuity – Part 5: General test of vision.*

ITU-R BT.709-2:1995, *Parameter Values for the HDTV Standards for Production and International Programme Exchange.*

3. Definitions

For the purposes of this International Standard the following definitions apply.

3.1
colour rendering
relation between the original colour of an object and its reproduction colour either exclusively under other illuminant or additionally after passing through a transfer process

NOTE For calculation with colours of this International Standard see Annex G.

3.2
original colour
the perceived colour of an object in reference condition which is being referred to at the assessment of the colour rendering

3.3
non-luminous (perceived) colour
colour of a non-luminous colour, i. e. an area that requires a reflecting light for its appearance

3.4
standard tristimulus values *X, Y, Z*
describe the psychophysical colour

NOTE 1 Standard tristimulus values are mostly received as an immediate result of a colour measurement

NOTE 2 As standard tristimulus values only allow statements referring to equality of two colours, for statements made beyond that, e. g. concerning the kind and size of colour differences, non-linear transformations of *X, Y, Z* into other colorimetric parameters systems preferably into the colorimetric parameters *L*, a*, b** are necessary.

3.5
colour difference ΔE^*_{ab}
specifies the size of the difference between two colour stimuli

3.6
lightness *L**
the power of a perceived light (inseparably combined with perceived colour)

3.7
chroma *C**
the difference of a colour from the equal light achromatic colour

NOTE The saturation describes the ratio of chroma to lightness *(C* / L*)*.

3.8
Landolt-ring
standard optotype defined by a ring with an open segment which can be in 8 different positions

4. Test Charts

This International Standard identifies the techniques to manufacture test charts. Four test charts are produced by different manufacturers both in halftone and continuous tone. For the tests according to this International Standard two or more out of eight test charts are used, at least one achromatic test chart (1 or 3) and at least one chromatic test chart (2 or 4),

On each test chart there is a picture area and a frame area around it, see Figure 1. Each of the test charts 1, 2, 3 and 4 contains a form (see Annex A, B, C, and D respectively) used for visual tests of the picture area and two forms (see Annex E and F) used for tests of the frame area around it.

At least four forms must be filled out, two for an achromatic test chart (no. 1: form A and E **or** no. 3: form C and E) and two for a chromatic test chart (no. 2: form B and F **or** no. 4: form D and F). The four forms filled out should belong to two test charts both either in halftone or continuous tone.

NOTE Colour copying machines are often used for reproduction of achromatic charts. Therefore an achromatic test chart should also be used for testing colour copying machines.

4.1 Material of test charts

The material of test charts depends on whether the chart is halftone or continuous tone.

4.1.1 Examples of material for halftone test charts available as ISO 15775 test charts.

Test Chart 1: Photographic paper for black and white pictures, glossy, 85 g/m^2
Test Chart 2: Fine art paper, glossy, natural white, non-fading, 100 per cent non-chlorine bleached, 150 g/m^2
Test Chart 3: Fine art paper, glossy, natural white, non-fading, 100 per cent non-chlorine bleached, 150 g/m^2
Test Chart 4: Fine art paper, glossy, natural white, non-fading, 100 per cent non-chlorine bleached, 150 g/m^2
Characteristic of example production see Table L.1. in Annex L.

4.1.2 Examples of materials for continuous tone test charts available as ISO 15775 test charts

Test Chart 1: Photographic paper for colour pictures, glossy, 225 g/m^2
Test Chart 2: Photographic paper for colour pictures, glossy, 225 g/m^2
Test Chart 3: Photographic paper for colour pictures, glossy, 225 g/m^2
Test Chart 4: Photographic paper for colour pictures, glossy, 225 g/m^2
Characteristic of example production seeTable L.2 in Annex L.

4.2 Layout of test charts

The layout of the test charts is defined in the standard format A4 (297 mm x 210 mm) within *PostScript(PS)*-files (or equivalent). The following layout is reduced to half size. One can find the layout in standard format A4 on different web servers (see Annex M). The following figures 1 to 3 show the layout and in figures 4 to 7 the content is shown.

4.2.1 Basic layout of the picture area and the frame area around

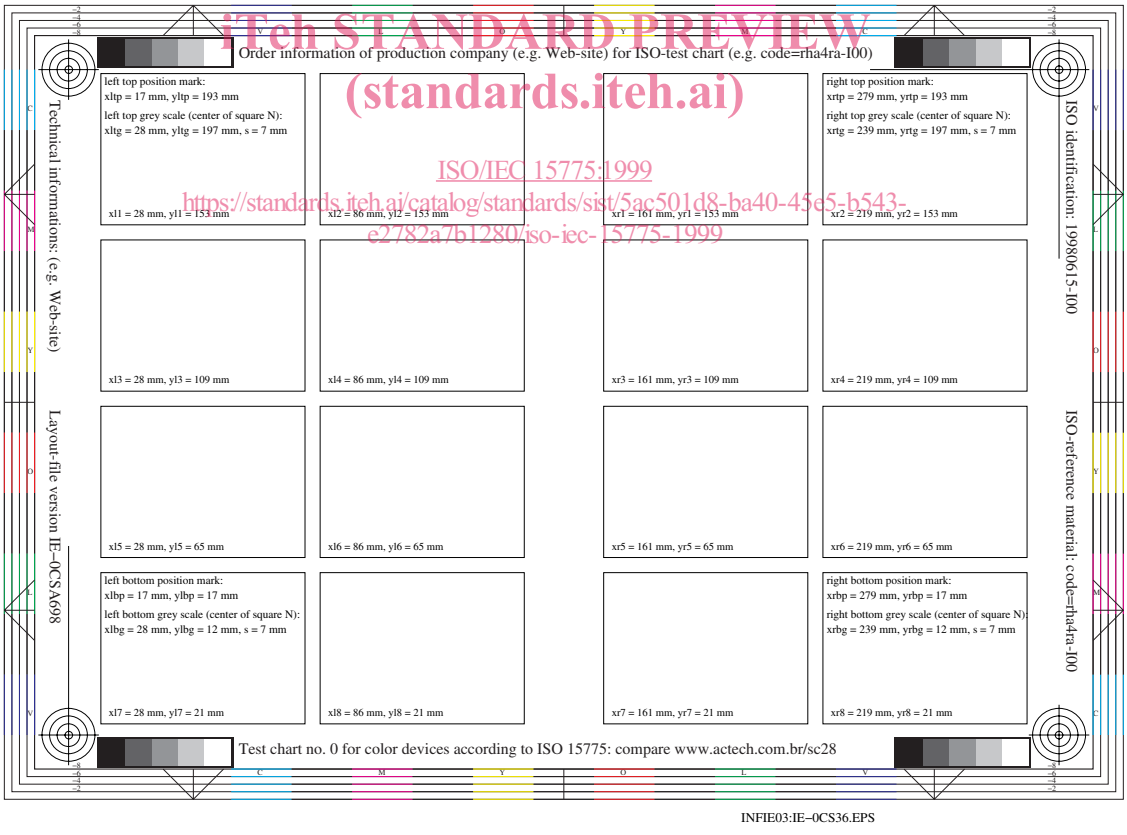

Figure 1: Basic layout of the figures and the frame area around

Figure 1 shows the basic layout of the test charts which includes in the central area the layout of 16 pictures (without content) and in the frame area around text and other elements. The basic format is A4 (297 mm x 210 mm) described by the outer rectangle. The inner rectangle has a thicker line (0,30 mm instead of 0,15 mm) and the size is 282 mm x 194 mm.

Figure 1 includes *x*- and *y*-data in mm for all test elements shown with an arrow point at the left bottom corner of the

format A4. One can find the *x*- and *y*-data of:

- left bottom corner of 16 pictures
- four position marks
- center of four squares with black colours N of a 5-step grey scale
- five rectangles located 2 mm up and to the right compared to the outer one and 4 mm smaller on both sides.

NOTE 1 Arrows help to detect the distance to the outer rectangle of the format A4. There is no visual test based on arrows within this International Standard.

NOTE 2 There are some additional lines dividing the format A4 in four equal formats A6. There is a need to get the pixel picture B1 (equal to D1) in the format A6 and on slide and negative film for special applications. The four parts of the format A6 can be mounted to one part of the format A4 if this is useful for special applications.

NOTE 3 The position marks allow exact positioning of colorimeters to measure the *L*a*b** colorimetric data for the colour samples in the test charts. Figures 2 and 3 includes the position data of all samples in all test charts and simplifies colorimetric measurements.

4.2.2 Layout of the picture area and the frame area around of test charts 1 to 4

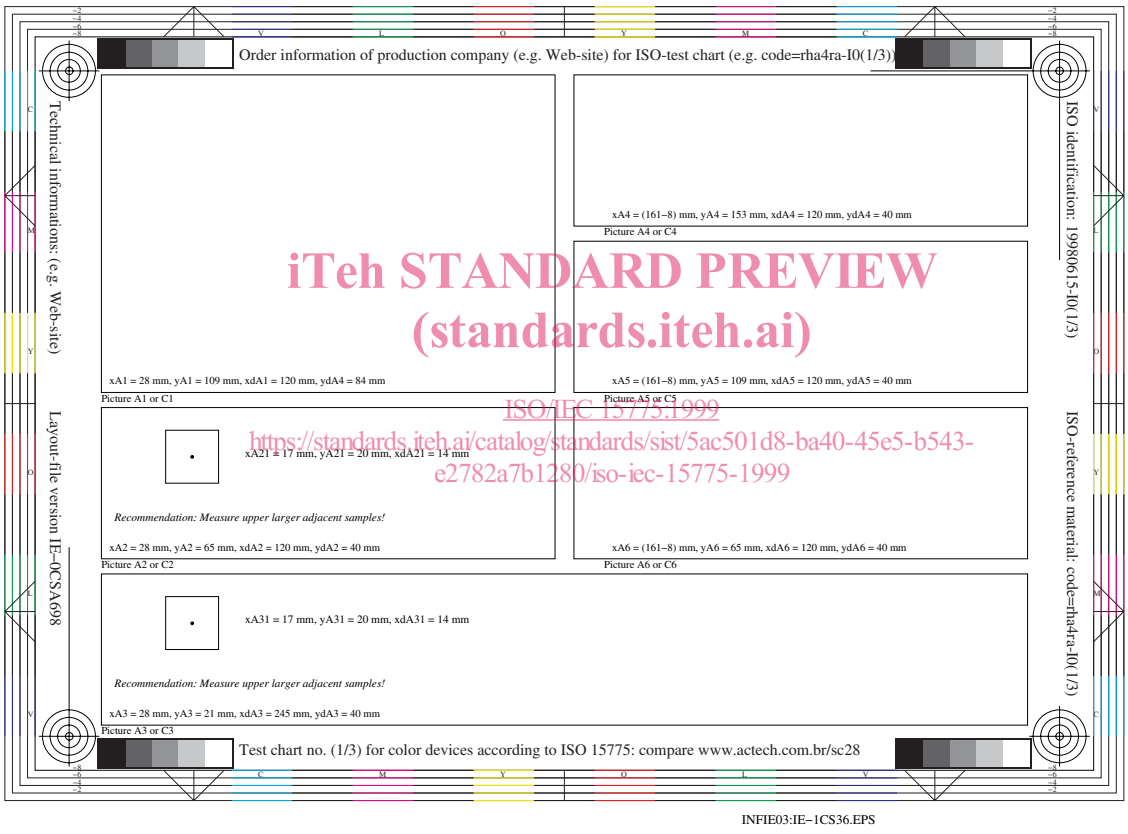

Figure 2: Layout of picture and frame area of test charts 1 and 3

Figure 3: Layout of picture and frame area of test charts 2 and 4

Figure 2 shows the layout of test charts 1 and 3 with six pictures and a frame area around. The layout of the pictures and the frame area is very similar to the basic layout of Figure 1. Instead of 16 there are now six pictures A1 to A6 and C1 to C6 in test charts 1 and 3 respectively.

Within the area of pictures A2 and A3 there is a square which represents the first sample (black) of the 5-step and 16-step grey scales. The *x*- and *y*-data of the square center is given relative to the left bottom corner of pictures A2 and A3. The grey sample distance of the 5- or 16-step grey series is 14 mm.

NOTE There are two additional samples which appear black *(N_0)* and white *(W_1)*. In digital *PS*-files (or equivalent) absolute or relative colorimetric space with lightness L^* **or** $l^*_{relative} = (L^* - L^*_N) / (L^*_W - L^*_N)$ can be used. The colorimetric data $L^* = 0$ and $L^* = 100$ produce the darkest black *(N_0)* and lightest white *(W_1)* on the material used, which may be different compared to L^*_N and L^*_W of the contrast range.

Figure 3 shows the layout of test charts 2 and 4 with seven pictures and a frame area around. The layout of the pictures and the frame area is very similar to the basic layout of Figure 1. Instead of 16 there are now seven pictures B1 to B7 and D1 to D7 in test charts 2 and 4 respectively.

Within the pictures B1 and B3 (or D1 and D3) there are two squares which represent the first CIE-test colour and the black sample of the 16-step grey scale. The *x*- and *y*-data of the square centers are given relative to the left bottom corner of pictures B1 and B3 (D1 and D3). The sample distance of the steps is 7,7 mm.

Within the picture B4 (or D4) there are four squares which represent the first samples of colour series *W–C*, *W–M*, *W–Y*, and *W–N* (or *W–O*, *W–L*, *W–V*, and *W–N*). The sample distance of the steps is 7,0 mm.

4.2.3 Restrictions for layout and content of picture B1

In picture B1 of test chart 2 (which is identical to picture D1 of test chart 4) the subject matter may be chosen by the manufacturer. Any picture which satisfies the following restrictions is allowed for an ISO-test chart manufacturer:

The picture B1 consists of three parts (compare layout of picture B1 in Figure 5).

Restrictions for the three parts of the picture B1:

Part 1: The picture must include a large variety of colours in the upper part (130 mm x 60 mm).
Part 2: 14 CIE-test colours plus black N_0 (darkest black) and white W_1 (whitest white) (130 mm x 11 mm).
Part 3: 16-step equidistant gray scale between black *N* ($L^*_N = 10$) and white *W* ($L^*_W = 94$) (130 mm x 15 mm).

NOTE An ISO-test chart manufacturer can add in part 1 a black and white Siemens-star equal in size and colour (L^*_N and L^*_W) to the Siemens-star *N–W* of picture B2. A user will get important information about the actual resolution of identical Siemens-stars by the pixel image (picture B1) and direct vector based reproduction (picture B2).

The intended colorimetric data for the 14 CIE-test colours and the 16-step equidistant grey samples are equal to the intended data of these colours in picture B3.

NOTE 1 The photographic process (film material, taken illuminant exposure, development) used to take the picture B1 (with the three parts in one exposure) and the scanning process producing the digital image will result in different CIE-test colours and grey samples in pictures B1 and B3.

NOTE 2 By a least squares technique, a transform of the digital image data (e.g. *RGB*) is used to calculate *L*a*b** colorimetric data. If the *L*a*b**-data of picture B1 are equal within 3 CIELAB units to the *L*a*b**-data of picture B3 then the colours in picture B1 and B3 appear equal.

4.2.4 Restrictions for digital image data and resolution of picture B1

ISO-test chart manufacturers must publish *RGB*-image data of the picture B1 in five resolutions:
192 x 128, 384 x 256, 786 x 512, 1536 x 1024, and 3072 x 2048.

NOTE 1 *RGB*-image data in these five resolutions may be (for example) produced by the *KODAK*-Photo-CD-process with the option „Transfer to *EPS (Encapsulated PostScript)* (or equivalent) with 24 bit colour“.

NOTE 2 A transform from *RGB*-image data to *L*a*b**-image data may be recommended by the ISO-test chart manufacturer.

NOTE 3 In ISO-test charts within the header of the *EPS*-file (or equivalent) of the picture B1 numerical data of a 3x4 matrix transform are given. The transformation from *RGB*-image data to *L*a*b**-image data may be (for example) calculated by a *PS*-interpreter (or equivalent).

NOTE 4 The transformation from *RGB*-image data to *L*a*b**-image data is equal for all image resolutions. The lowest resolution can be used to get a table of the *RGB*-image data of the 32 colours (14 CIE-test colours + N_0 + W_1 and the 16-step grey samples).

NOTE 5 The intended CIE-test and grey colours are known. This allows to calculate an optimized transformation from *RGB*-image data to *L*a*b**-image data.

NOTE 6 For negative film between 2 stops underexposure and 3 stops overexposure the *RGB*-image data are very different. An optimized transform leads to *L*a*b**-image data which produce very similar output.

4.2.5 Restrictions for producing ISO-test charts in halftone technique

A test pattern producer can use any line screen and must disclose the line screen used. The line screen used must be described by a complete definition of the halftone type.

The halftone type definition includes either the entries:

„Width, Height and Threshold“ of „HalftoneType 3“
and/or
„Frequency, Orientation and SpotFunction“ of „HalftoneType 1“

An example of an „HalftoneType 3“-matrix used to produce halftone test charts is given in Annex J.

NOTE 1 This allows repeating the production at any time.

NOTE 2 Copiers often produce different output with test charts of identical colorimetric *L*a*b**-data but with a different halftone type.

4.3 Layout files and *EPS*-picture files (or equivalent)

Standard *PS*- and *PDF*-layout files (or equivalent) produce the A4-layout of the ISO-test charts. The standard layout files produce only the layout without any picture content.

At specific lines within a *PS*-layout file (or equivalent) the content of the pictures is included. The content is defined in „*EPS*-picture files“ (or equivalent).

Each *EPS*-picture file (or equivalent) of test charts 1 and 3 produces only one picture different in size between 120 mm x 40 mm (A2, A4, A5, and A6), 120 mm x 84 mm (A1), 245 mm x 40 mm (A3) (see Figure 2).

Each *EPS*-picture file (or equivalent) of test charts 2 and 4 produces only one picture different in size between 130 mm x 86 mm (B1), 130 mm x 40 mm (B2 and B3), and 112 mm x 40 mm (B4, B5, B6 and B7) (see Figure 3).

One can find the *EPS*-picture files (or equivalent) as „Technical information“. The standard *EPS*-picture files produce the picture content located 25,4 mm in *x*- and *y*-direction from the left bottom corner of the output paper (see Annex M).

4.4 Digital *PS*-files and *PDF*-files (or equivalent) for ISO-test charts

Combined *PS*-files (or equivalent) include both the layout specification and the picture content. These *PS*-files (or equivalent) are called the ***„digital“*** ISO-test charts no. 1 to 4. They are shown in Figure 4 to Figure 7 reduced to half size.

NOTE The output of line rasters in pictures A5, A6, C5, and C6 is often different for *PS*- and *PDF*-files (or equivalent). ISO-test charts 1 and 3 show the reference output with line rasters.

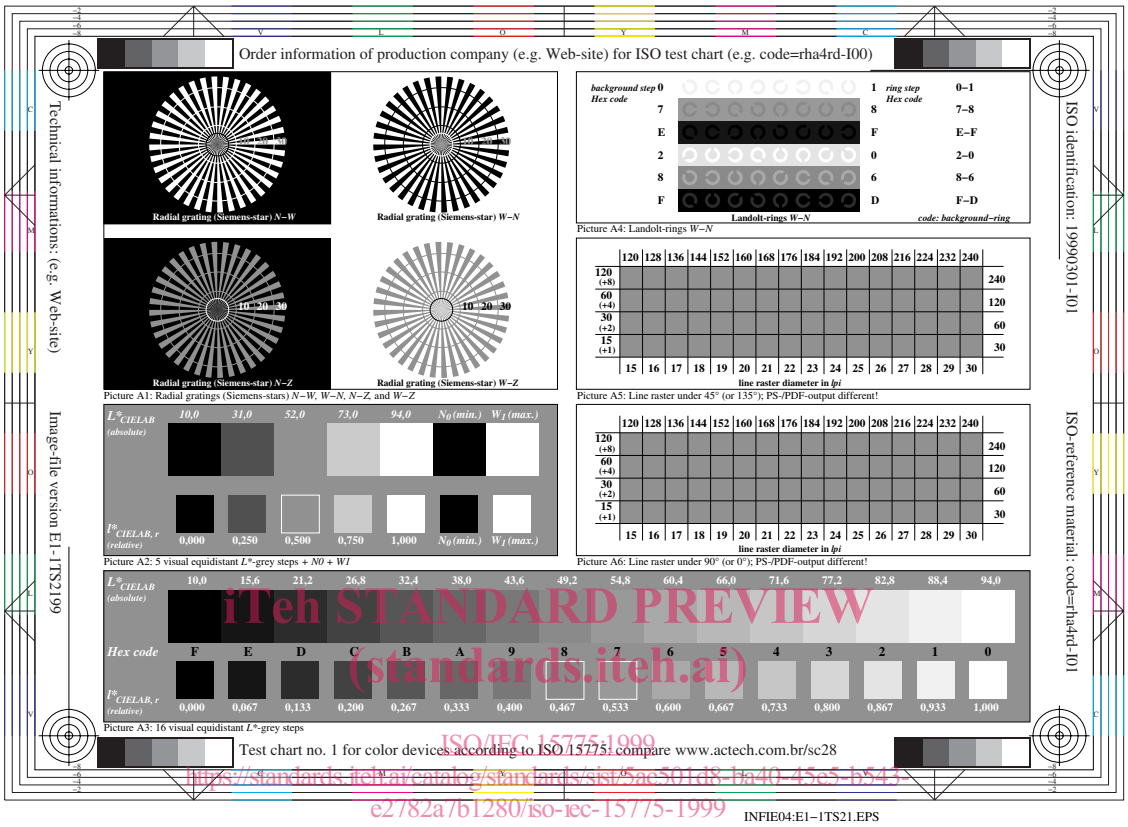

Figure 4: *PS*-file (or equivalent) output of digital ISO-test chart 1 (reduced to half size)

Figure 5: *PS*-file (or equivalent) output of digital ISO-test chart 2 (reduced to half size)

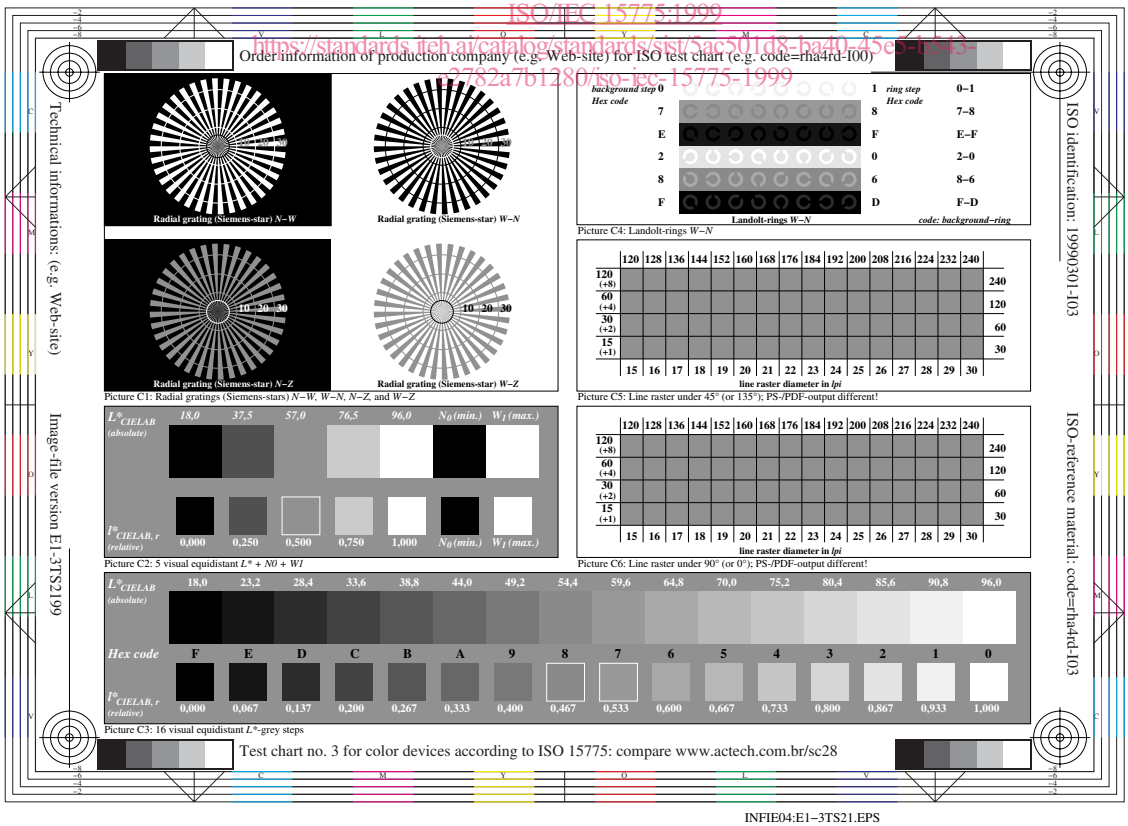

Figure 6: *PS*-file (or equivalent) output of digital ISO-test chart 3 (reduced to half size)

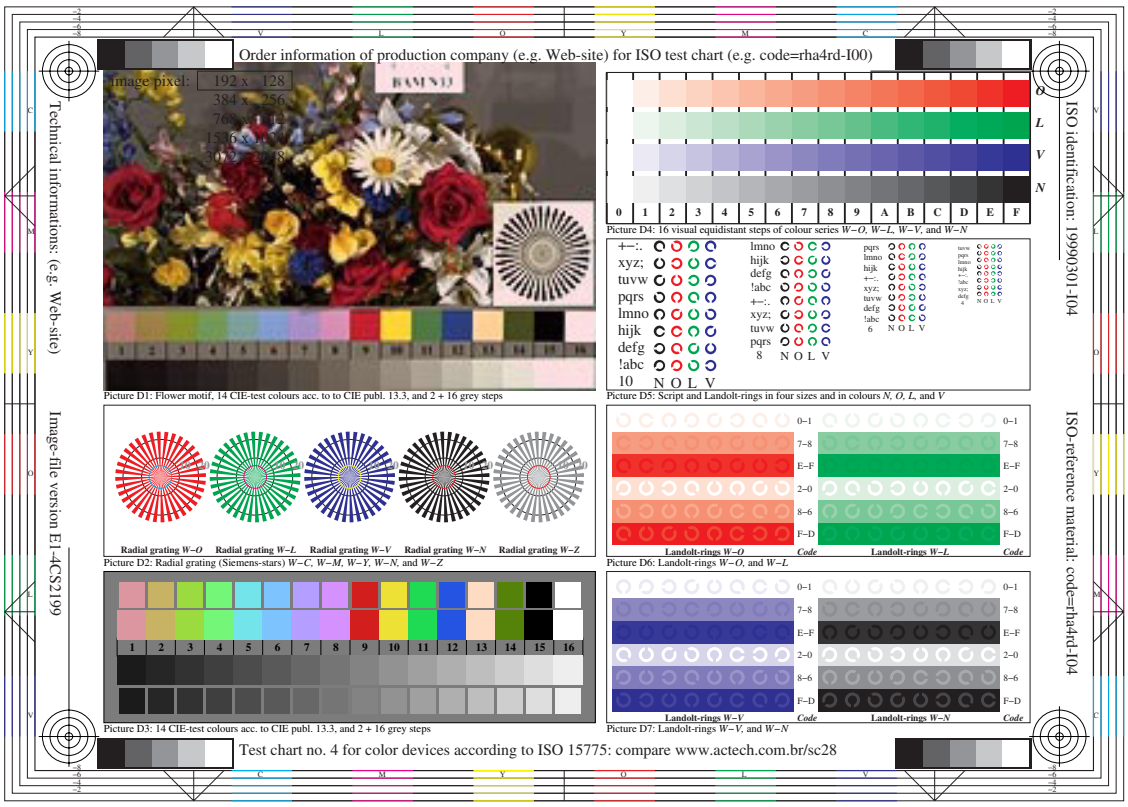

Figure 7: *PS*-file (or equivalent) output of digital ISO-test chart 4 (reduced to half size)

The output of the digital standard *PS*-files (or equivalent) in the format A4 are shown separately on web sites (see Annex M). Manufacturers of ISO-test charts will use these digital *PS*-files (or equivalent) as starting files for the production of analog ISO-test charts 1 to 4.

The digital ISO-test charts include both the layout and the picture content including the colorimetric data of each test sample. Most of the intended colorimetric data one can find in Table 1 and Table 2, and in Annex G and H. The colorimetric agreement of the produced colours of analog test charts and the intended colours of digital test charts can be measured and evaluated by the method given in Annex G and H.

4.5 Production of ISO-test charts

The production of the ISO-test charts by different manufacturers will show colorimetric differences. No colorimetric tolerance is given within this International Standard for the manufacturers. The differences between intended and produced colours within the production of ISO-test charts 1 to 4 are given in Table 3, Table 4 and Tables H.1 to H.11 of Annex H. Differences between intended and produced colours in these tables set an orientation tolerance for a possible ISO-colorimetric tolerance in the future.

All hard copy patterns (analog test charts) produced according to this International Standard should be discarded after three years. Due to time, temperature, and humidity, they change and therefore need replacement. Test charts should be kept in a sealed opaque container when not in use.

The usage of the produced ISO-test charts is limited for a three years time beginning with the ISO identification date.

4.6 Intended printing colours and comparison with produced colours

Table 1: Intended printing colours *CMYOLVNW* and comparison with produced colours

Basic test colour	Intended CIELAB data ISO-2846 (CMYNW) DIN-33866 (OLV)				Produced CIELAB data DIN-33866 (all) ITU-R BT709.2 (all)			CIELAB differences of test colours Difference (o−r)			CIELAB-test colour difference	
name	L^*_r	a^*_r	b^*_r		L^*_o	a^*_o	b^*_o	ΔL^*_{o-r}	Δa^*_{o-r}	Δb^*_{o-r}	ΔE^*_{ab}	
C	58.62	−30.62	−42.74		59.96	−27.8	−43.15	1.34	2.82	−0.4	3.15	
M	48.13	75.2	−6.79		49.19	74.03	−7.4	1.06	−1.16	−0.6	1.69	
Y	90.37	−11.15	96.17		87.12	−5.58	105.61	−3.24	5.57	9.44	11.43	
O	47.94	65.31	52.07		47.94	65.31	52.07	0.0	0.0	0.0	0.01	
L	50.9	−62.96	36.71		50.9	−62.96	36.71	0.0	0.0	0.0	0.01	
V	25.72	31.45	−44.35		25.72	31.45	−44.35	0.0	0.0	0.0	0.01	
N	18.01	0.5	−0.46		17.16	−0.06	−2.71	−0.84	−0.56	−2.24	2.47	
W	95.41	−0.98	4.76		94.98	−0.58	3.28	−0.42	0.4	−1.47	1.59	**2.5**
C	58.62	−30.62	−42.74		86.88	−46.17	−13.56	28.26	−15.54	29.18	43.5	
M	48.13	75.2	−6.79		57.3	94.35	−20.7	9.17	19.15	−13.9	25.38	
Y	90.37	−11.15	96.17		92.66	−20.7	90.75	2.29	−9.54	−5.41	11.22	
O	47.94	65.31	52.07	***(R)***	50.5	76.92	64.55	2.56	11.61	12.48	17.24	
L	50.9	−62.96	36.71	***(G)***	83.63	−82.76	79.9	32.73	−19.79	43.19	57.69	
V	25.72	31.45	−44.35	***(B)***	30.39	76.06	−103.59	4.67	44.61	−59.23	74.31	
N	18.01	0.5	−0.46		1.57	0.0	0.0	−16.43	−0.49	0.47	16.45	
W	95.41	−0.98	4.76		95.41	0.01	0.01	0.0	1.0	−4.74	4.85	**31.5**

INFIE06:IETA011.EPS

Table 1 shows intended colours *CMYOLVNW* compared to produced colours of DIN 33866 in the upper part. The intended colours are additionally compared with television colours acc. to ITU-R BT709.2 in the lower part.

ISO-2846-1: 1997 defines in an *informative* Annex D in Table D.3 the intended colours of offset printing. Five colours $CMYNW_{PR}$ (PR = Print) are given for CIE-standard illuminant D65, the 2°-standard observer and the 45°/0°-standard geometry. Additionally a nonfluorescent reference paper is described. The chromatic colours OLV_{PR} are not given.

The DIN 33866 test charts 2 to 4 are produced on this ISO-reference paper *W* and with chromatic inks $CMYN_{PR}$ acc. to ISO 2846.

The colorimetric data *L*a*b** of reference (r = ISO 2846-1:1977, Table D.3) and the average colorimetric data of production (o = output) are given in the upper part of Table 1. The differences between reference and production (output) are small for the colours $CMYNW_{PR}$. The largest difference is ΔE^*_{ab} = 11,43 for yellow *Y* and the average difference is $\Delta E^*_{ab,m}$ = 2,5. One must have in mind that less than three units between pictural images cannot be detected by human viewers. Therefore we can add the colours *OLV* of production to get the colorimetric *L*a*b**-data for the full intended colour set $CMYOLVNW_{PR}$.

One must remember that this International Standard is used for colour copying machines and only the difference between copy and reference is of importance and not the absolute colorimetric *L*a*b**-data.

In DIN 33866 the short terms *OLV* are used for the colours OLV_{PR}. These short terms help to keep in mind that there are very large differences compared to the colours OLV_{TV} which are in standards usually called *RGB*. The short terms *RGB* used for colours on monitors conflict with the short terms *R*, *G*, and *B* for elementary colours (see Annex K).

In the lower part of Table 1 the printing colours are compared to the television colours defined in ITU-R BT709.2 for CIE-standard illuminant D65 and the 2°-standard observer. The normalization to *L** = 95,41 for white D65 as defined in ISO-2846 for white is used (see tables in DIN 33866-1). This part shows the differences between the colours $CMYOLVNW_{PR}$ and $CMYOLVNW_{TV}$. There are differences up to ΔE^*_{ab} = 74 for the colour violet blue *V* (called blue *B* in television) and the average difference is $\Delta E^*_{ab,m}$ = 31,5.

Table 2: Reference and production of CIE-test colours

CIE test colour	Intended CIELAB data CIE publ. 13.3 Reference (r)			Produced CIELAB data DIN 33866, Picture B6 Output (o)			CIELAB differences of test colours Difference (o–r)			CIELAB-test colour difference
no.	L^*_r	a^*_r	b^*_r	L^*_o	a^*_o	b^*_o	ΔL^*_{o-r}	Δa^*_{o-r}	Δb^*_{o-r}	ΔE^*_{ab}
1	61.45	17.53	11.74	56.8	12.93	19.6	–4.64	–4.59	7.86	10.23
2	60.69	0.08	28.92	55.0	–2.42	35.85	–5.68	–2.5	6.93	9.31
3	62.02	–20.58	44.41	56.74	–24.61	42.51	–5.27	–4.02	–1.89	6.91
4	61.2	–33.16	17.07	60.9	–48.14	23.62	–0.29	–14.97	6.55	16.35
5	62.4	–17.47	–8.55	58.17	–19.98	–13.31	–4.22	–2.5	–4.75	6.84
6	61.51	–0.36	–28.39	57.44	0.1	–31.83	–4.06	0.47	–3.43	5.35
7	61.12	20.15	–24.55	56.85	18.29	–25.86	–4.26	–1.85	–1.3	4.84
8	62.77	27.42	–13.63	57.87	27.63	–21.75	–4.89	0.21	–8.11	9.49
9	39.92	58.74	27.99	41.87	38.7	33.27	1.95	–20.03	5.28	20.82
10	81.26	–2.89	71.56	75.56	4.2	74.01	–5.69	7.1	2.45	9.43
11	52.23	–42.42	13.6	47.15	–47.28	18.53	–5.07	–4.85	4.93	8.59
12	30.57	1.41	–46.47	34.8	1.37	–28.6	4.23	–0.03	17.87	18.36
13	80.23	11.37	21.04	77.59	15.62	29.57	–2.63	4.25	8.53	9.89
14	40.75	–13.8	24.23	36.07	–18.23	23.81	–4.67	–4.42	–0.41	6.46
							Mean CIELAB colour difference:			$\Delta E^*_{ab,m}$ = *10.2*

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Table 2 shows intended CIE-test colours compared to produced CIE-test colours in DIN-test chart 2, picture B6. The mean CIELAB colour difference is $\Delta E^*_{ab,m}$ = 10. The largest colour differences occur for the CIE-test colours red (no. 9) and blue (no. 12) with ΔE^*_{ab} = 20,82 and 18,36 respectively.

The intended and produced colours may differ. The original test charts produced by different manufacturers may be different. Therefore copies from a specific original should only be compared with each other or with the original which was used to produce the copies.

4.7 ISO-identification, ISO-reference material code, and ISO-image file version

Different ISO-codes are useful to manage, sort and distinguish the different ISO-test charts.

The figures 1 to 7 include examples of the following codes:

- ISO-reference material code on the right bottom side
- ISO-identification code on the right top side
- ISO-image version code on the left bottom side

The ISO-reference material code is decribed in the following Table 3.