

see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 2/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.

In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.

For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY8_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY8_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.

In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.

For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY8_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 4,

AE491-7dd: 01001

input: *rgb/cmy0/000n/w set...*
output: *->rgb_{dd} setrgbcolor*



TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 3/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rh4ta

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	0,00	0,00	0,00	0,00	0,01
2	6,36	0,00	0,06	0,00	0,01
3	12,72	0,00	0,13	0,00	0,01
4	19,08	0,00	0,20	0,00	0,01
5	25,44	0,00	0,26	0,00	0,01
6	31,80	0,00	0,33	0,00	0,01
7	38,16	0,00	0,40	0,00	0,01
8	44,52	0,00	0,46	0,00	0,01
9	50,88	0,00	0,53	0,00	0,01
10	57,24	0,00	0,60	0,00	0,01
11	63,60	0,00	0,66	0,00	0,01
12	69,96	0,00	0,73	0,00	0,01
13	76,32	0,00	0,80	0,00	0,01
14	82,68	0,00	0,86	0,00	0,01
15	89,04	0,00	0,93	0,00	0,01
16	95,41	0,00	1,00	0,00	0,01
17	0,00	0,00	0,00	0,00	0,01
18	23,85	0,00	0,25	0,00	0,01
19	47,70	0,00	0,50	0,00	0,01
20	71,55	0,00	0,75	0,00	0,01
21	95,41	0,00	1,00	0,00	0,01

Start output S1
Specification according to
ISO/IEC 15775 Annex G
and DIN 33866-1 Annex G

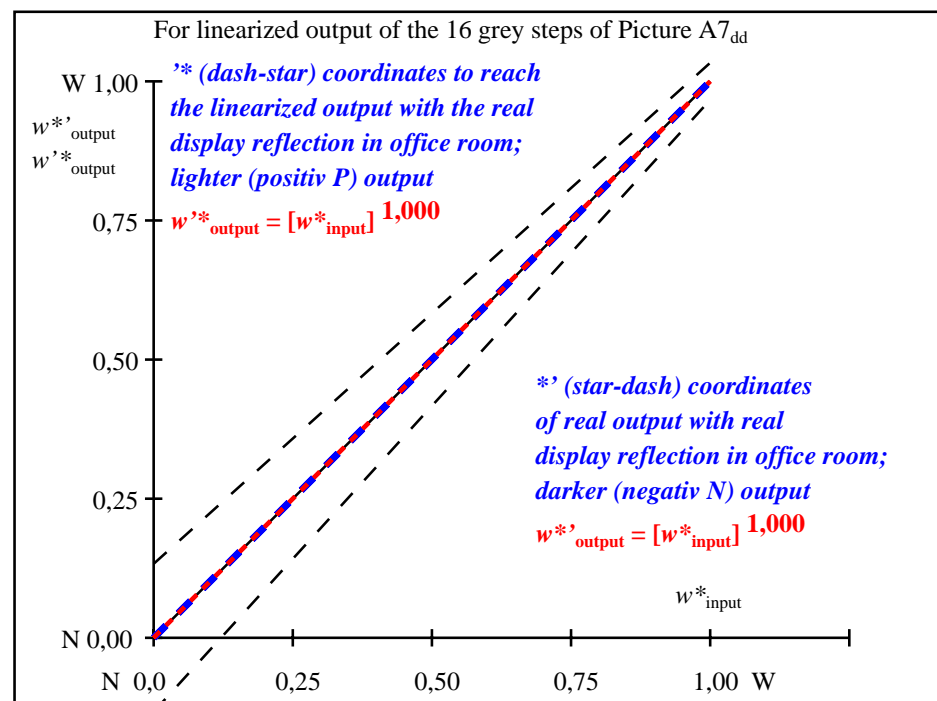
Mean lightness difference
(16 steps)
ΔE*_{CIELAB} = 0,0

Mean lightness difference
(5 steps)
ΔL*_{CIELAB} = 0,0

Mean colour reproduction index: R*_{ab,m} = 99,9

part 1,

AE490-3dd: 01002



part 2,

AE491-3dd: 01002

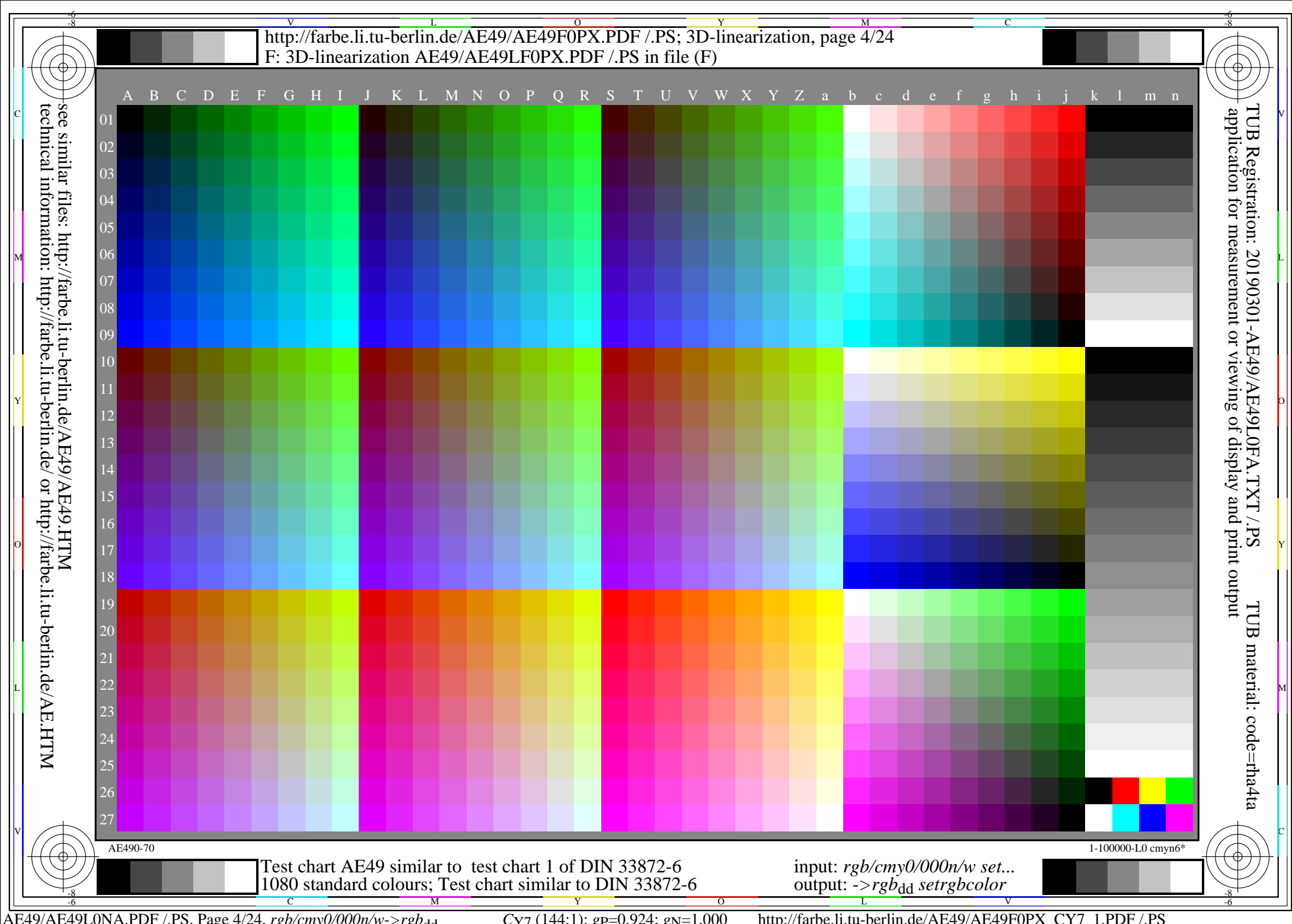
L*/Y _{intended} (absolute)	0,0/0,0	6,3/0,7	12,7/1,5	19,0/2,7	25,4/4,5	31,8/6,9	38,1/10,1	44,5/14,2	50,8/19,1	57,2/25,1	63,6/32,3	69,9/40,7	76,3/50,4	82,6/61,5	89,0/74,2	95,4/88,5
0 0 0 n* setcmyk gp=1,000 No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
w* = l* CIELAB, r (relative)	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w* _{intended}	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w* _{output}	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000

part 3, picture A7_{dd}: 16 visual equidistant L*-grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01002

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast Y_W:Y_N=88,9:0,31; Y_N-range 0,0 to <0,46

input: rgb/cmy0/000n/w set...
output: ->rgb_{dd} setrgbcolor



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49F0PX_CY7_1.PDF



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY7_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY7_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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AE490-7dd: 01011

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY7_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 4,

AE491-7dd: 01011

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{dd}$ setrgbcolor

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 6/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	5,69 0,00 0,00	0,00	5,69 0,00 0,00	0,00 0,00 0,00	0,01
2	11,67 0,00 0,00	0,10	14,73 0,00 0,00	3,05 0,00 0,00	3,05
3	17,65 0,00 0,00	0,18	21,95 0,00 0,00	4,30 0,00 0,00	4,30
4	23,63 0,00 0,00	0,25	28,62 0,00 0,00	4,99 0,00 0,00	4,99
5	29,61 0,00 0,00	0,32	34,96 0,00 0,00	5,34 0,00 0,00	5,34
6	35,59 0,00 0,00	0,39	41,05 0,00 0,00	5,45 0,00 0,00	5,45
7	41,57 0,00 0,00	0,46	46,96 0,00 0,00	5,38 0,00 0,00	5,38
8	47,55 0,00 0,00	0,52	52,72 0,00 0,00	5,16 0,00 0,00	5,16
9	53,54 0,00 0,00	0,58	58,35 0,00 0,00	4,81 0,00 0,00	4,81
10	59,52 0,00 0,00	0,64	63,88 0,00 0,00	4,36 0,00 0,00	4,36
11	65,50 0,00 0,00	0,70	69,31 0,00 0,00	3,81 0,00 0,00	3,81
12	71,48 0,00 0,00	0,76	74,67 0,00 0,00	3,18 0,00 0,00	3,18
13	77,46 0,00 0,00	0,82	79,95 0,00 0,00	2,48 0,00 0,00	2,48
14	83,44 0,00 0,00	0,88	85,16 0,00 0,00	1,71 0,00 0,00	1,71
15	89,42 0,00 0,00	0,94	90,31 0,00 0,00	0,88 0,00 0,00	0,88
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	5,69 0,00 0,00	0,00	5,69 0,00 0,00	0,00 0,00 0,00	0,01
18	28,12 0,00 0,00	0,30	33,40 0,00 0,00	5,28 0,00 0,00	5,28
19	50,55 0,00 0,00	0,55	55,55 0,00 0,00	5,00 0,00 0,00	5,00
20	72,98 0,00 0,00	0,78	75,99 0,00 0,00	3,01 0,00 0,00	3,01
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

Start output S1
Specification according to
ISO/IEC 15775 Annex G
and DIN 33866-1 Annex G

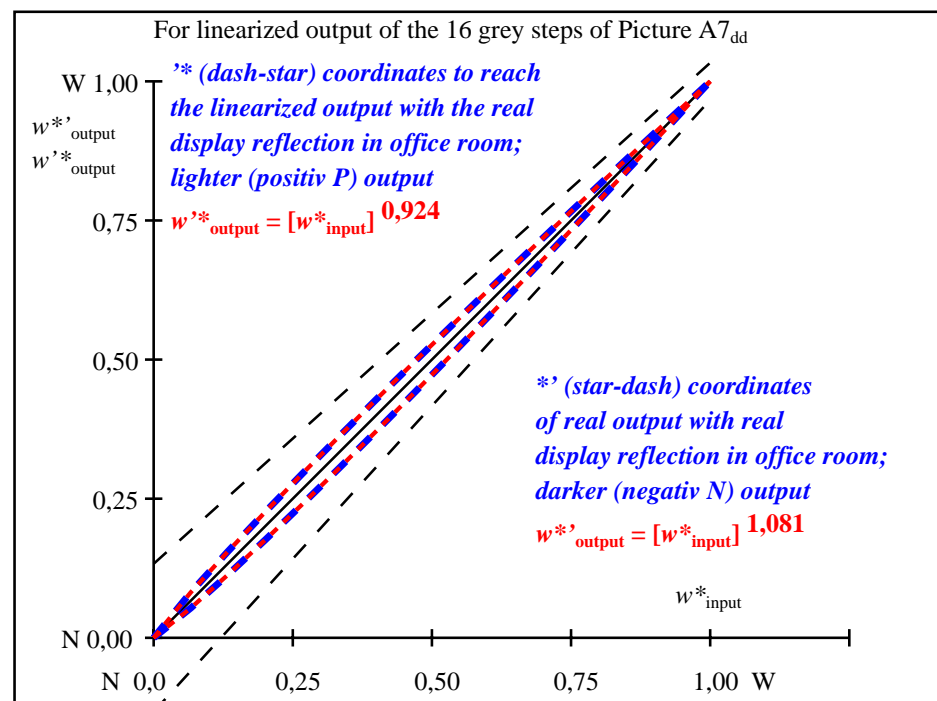
Mean lightness difference
(16 steps)
 $\Delta E^*_{\text{CIELAB}} = 3,4$

Mean lightness difference
(5 steps)
 $\Delta L^*_{\text{CIELAB}} = 2,6$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 85,0$

part 1,

AE490-3dd: 01012



part 2,

AE491-3dd: 01012

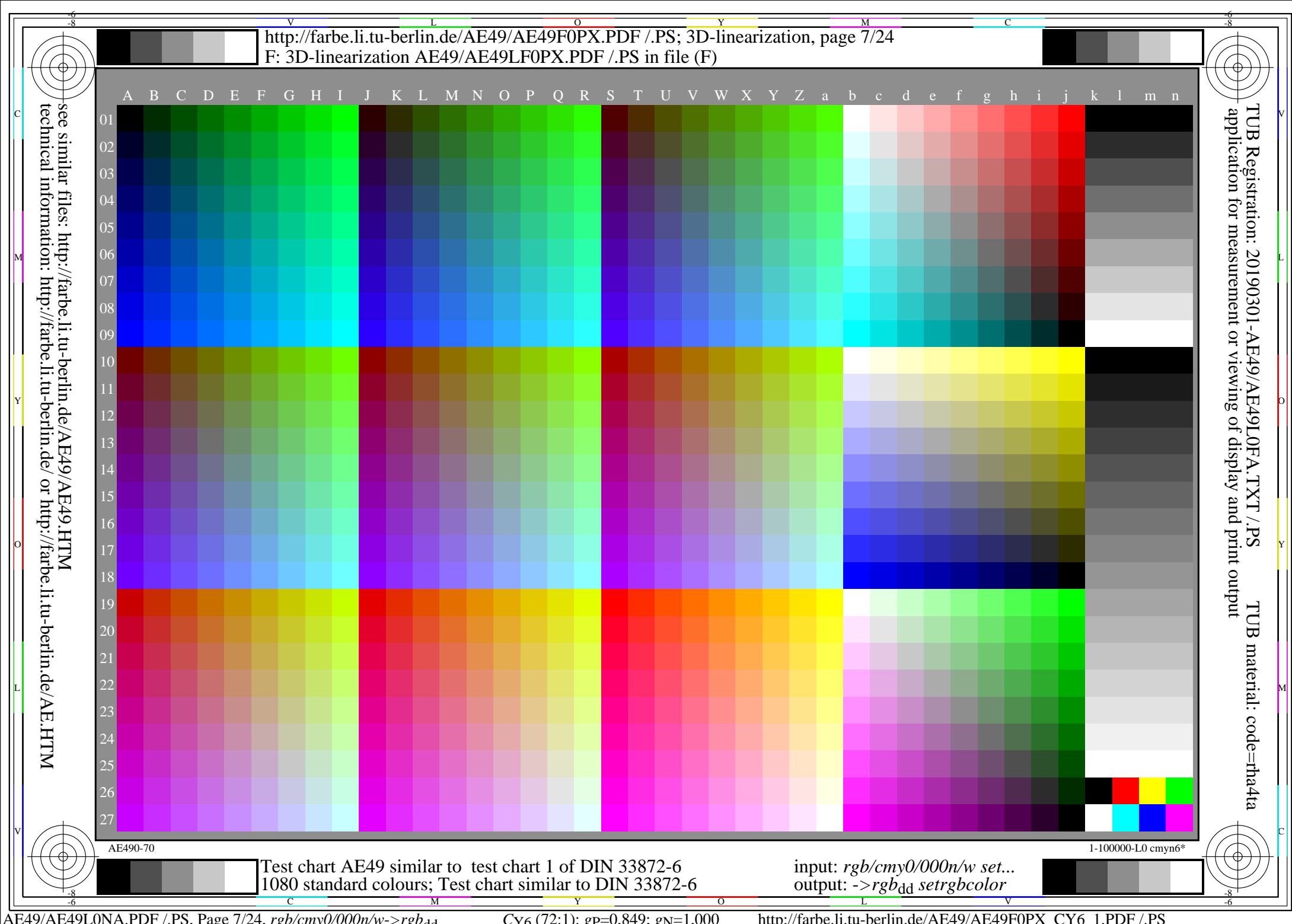
L^*/Y_{intended} (absolute)	5,6/0,6	11,6/1,3	17,6/2,4	23,6/3,9	29,6/6,0	35,5/8,8	41,5/12,2	47,5/16,4	53,5/21,5	59,5/27,5	65,5/34,6	71,4/42,8	77,4/52,3	83,4/63,0	89,4/75,0	95,4/88,5
0 0 0 n*																
setcmyk																
gp=0,924																
No. and																
Hex code																
$w^* = l^*_{\text{CIELAB}, r}$ (relative)																
w^*_{intended}	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{output}	0,000	0,082	0,154	0,225	0,294	0,361	0,428	0,494	0,558	0,623	0,687	0,750	0,813	0,876	0,937	1,000

part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01012

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:0,62$; Y_N -range 0,46 to <0,93

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{\text{dd}}$ setrgbcolor



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_1.PDF



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY6_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY6_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY6_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

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AE491-7dd: 01021

part 4,

input: *rgb/cmy0/000n/w set...*
output: *->rgb_{dd} setrgbcolor*



AE491-7dd: 01021

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TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 9/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rh4ta

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01
2	16,62 0,00 0,00	0,13	22,51 0,00 0,00	5,89 0,00 0,00	5,89
3	22,24 0,00 0,00	0,22	30,17 0,00 0,00	7,93 0,00 0,00	7,93
4	27,87 0,00 0,00	0,30	36,84 0,00 0,00	8,96 0,00 0,00	8,96
5	33,50 0,00 0,00	0,37	42,93 0,00 0,00	9,42 0,00 0,00	9,42
6	39,13 0,00 0,00	0,44	48,62 0,00 0,00	9,49 0,00 0,00	9,49
7	44,75 0,00 0,00	0,50	54,02 0,00 0,00	9,26 0,00 0,00	9,26
8	50,38 0,00 0,00	0,57	59,19 0,00 0,00	8,80 0,00 0,00	8,80
9	56,01 0,00 0,00	0,62	64,16 0,00 0,00	8,15 0,00 0,00	8,15
10	61,64 0,00 0,00	0,68	68,97 0,00 0,00	7,33 0,00 0,00	7,33
11	67,27 0,00 0,00	0,74	73,64 0,00 0,00	6,37 0,00 0,00	6,37
12	72,89 0,00 0,00	0,79	78,19 0,00 0,00	5,29 0,00 0,00	5,29
13	78,52 0,00 0,00	0,84	82,63 0,00 0,00	4,10 0,00 0,00	4,10
14	84,15 0,00 0,00	0,90	86,97 0,00 0,00	2,82 0,00 0,00	2,82
15	89,78 0,00 0,00	0,95	91,23 0,00 0,00	1,45 0,00 0,00	1,45
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01
18	32,09 0,00 0,00	0,36	41,45 0,00 0,00	9,35 0,00 0,00	9,35
19	53,20 0,00 0,00	0,60	61,70 0,00 0,00	8,50 0,00 0,00	8,50
20	74,30 0,00 0,00	0,80	79,31 0,00 0,00	5,00 0,00 0,00	5,00
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

Start output S1
Specification according to ISO/IEC 15775 Annex G and DIN 33866-1 Annex G

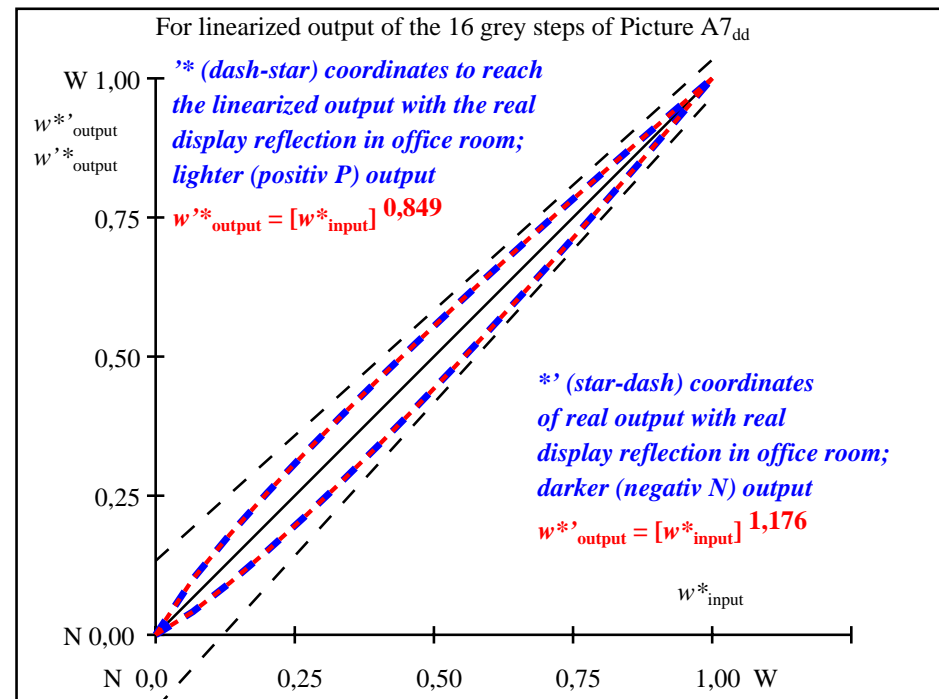
Mean lightness difference (16 steps)
 $\Delta E^*_{CIELAB} = 5,9$

Mean lightness difference (5 steps)
 $\Delta L^*_{CIELAB} = 4,5$

Mean colour reproduction index: $R^*_{ab,m} = 74,1$

part 1,

AE490-3dd: 01022



part 2,

AE491-3dd: 01022

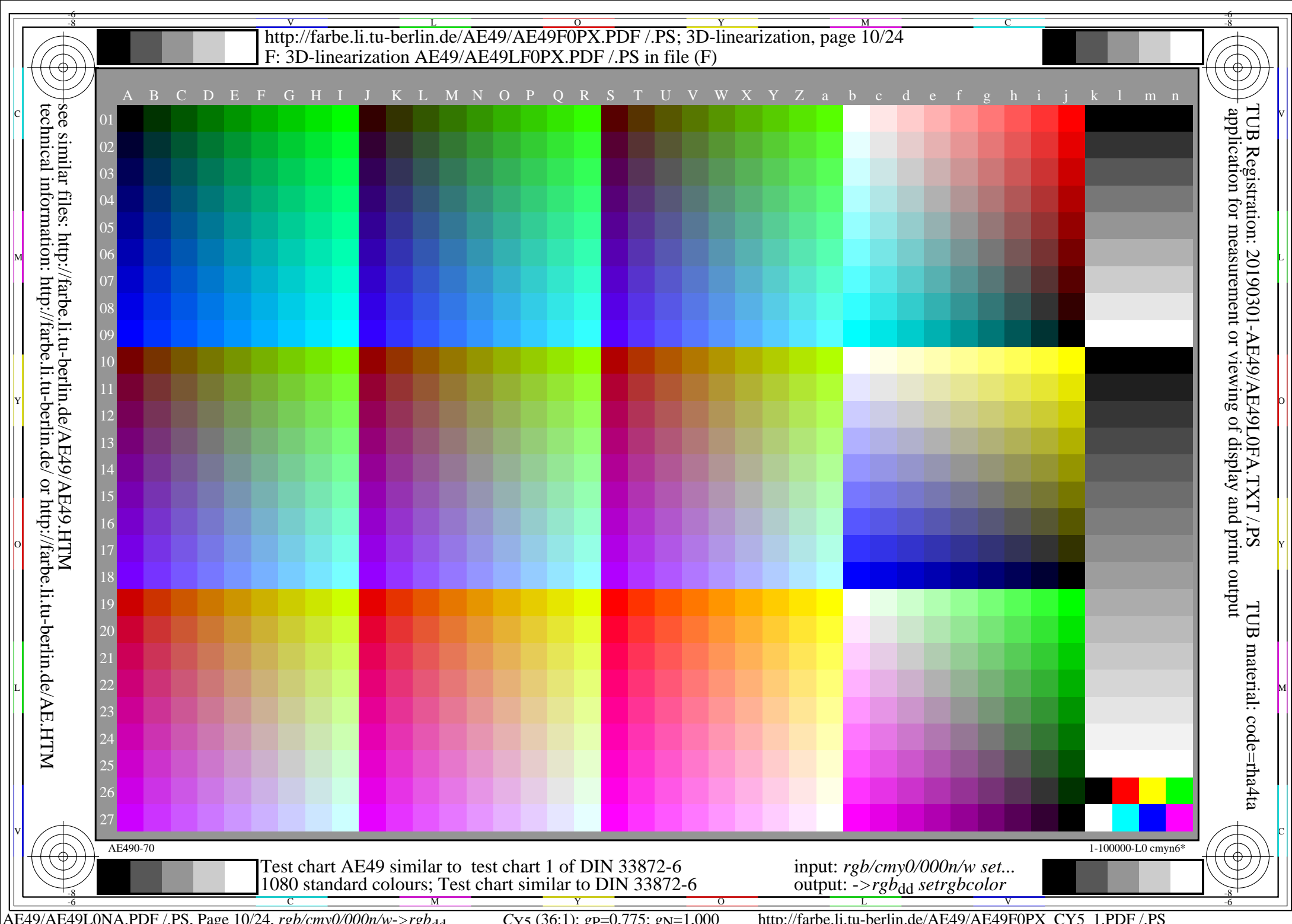
$L^*/Y_{intended}$ (absolute)	10,9/1,2	16,6/2,2	22,2/3,5	27,8/5,4	33,5/7,7	39,1/10,7	44,7/14,3	50,3/18,7	56,0/23,9	61,6/29,9	67,2/36,9	72,8/45,0	78,5/54,1	84,1/64,3	89,7/75,8	95,4/88,5
0 0 0 n*																
setcmyk																
gP=0,849																
No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^*=l^*_{CIELAB,r}$ (relative)																
$w^*_{intended}$	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{output}	0,000	0,100	0,180	0,254	0,325	0,392	0,458	0,523	0,585	0,647	0,708	0,767	0,827	0,885	0,942	1,000

part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01022

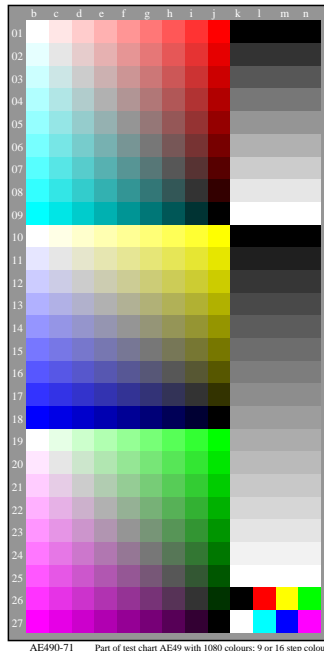
In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:1,25$; Y_N -range 0,93 to <1,87

input: $rgb/cmy0/000n/w$ set...
output: $->rgb_{dd}$ setrgbcolor



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 11/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different? **Yes/No**
Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different? **Yes/No**
Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different? **Yes/No**
Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.
Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb 1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output: **underline: monitor/data projector/printer**

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY5_1.PDF

either PDF-file transfer "download, copy" to PDF device.....
or with computer system interpretation by "Display-PDF":.....
or with software e. g. Adobe-Reader/-Acrobat and version:.....
or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY5_1.PS

either PS-file transfer "download, copy" to PS device.....
or with computer system interpretation by "Display-PS":.....
or with software e. g. Ghostscript and version:.....
or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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part 3,

AE490-7dd: 01031

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps
Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ? **Yes/No**
Only in case of "No": The colour at this position appears: yellowish/bluish

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ? **Yes/No**
Only in case of "No": The colour at this position appears: reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ? **Yes/No**

Only in case of "No": The colour at this position appears: reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ? **Yes/No**
Only in case of "No": The colour at this position appears: yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable? **Yes/No**

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable? **Yes/No**

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.
Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb 1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY5_3.PS

underline: Yes/No

picture A7dd

or underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 4,

AE491-7dd: 01031

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{dd}$ setrgbcolor

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 12/24
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE49.HTM>

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	18,00 0,00 0,00	0,00	18,00 0,00 0,00	0,00 0,00 0,00	0,01
2	23,16 0,00 0,00	0,17	31,34 0,00 0,00	8,17 0,00 0,00	8,17
3	28,32 0,00 0,00	0,27	38,92 0,00 0,00	10,59 0,00 0,00	10,59
4	33,48 0,00 0,00	0,35	45,22 0,00 0,00	11,73 0,00 0,00	11,73
5	38,64 0,00 0,00	0,42	50,81 0,00 0,00	12,16 0,00 0,00	12,16
6	43,80 0,00 0,00	0,48	55,93 0,00 0,00	12,12 0,00 0,00	12,12
7	48,96 0,00 0,00	0,55	60,70 0,00 0,00	11,73 0,00 0,00	11,73
8	54,12 0,00 0,00	0,60	65,19 0,00 0,00	11,06 0,00 0,00	11,06
9	59,28 0,00 0,00	0,66	69,46 0,00 0,00	10,17 0,00 0,00	10,17
10	64,44 0,00 0,00	0,71	73,55 0,00 0,00	9,11 0,00 0,00	9,11
11	69,60 0,00 0,00	0,76	77,49 0,00 0,00	7,88 0,00 0,00	7,88
12	74,76 0,00 0,00	0,81	81,29 0,00 0,00	6,52 0,00 0,00	6,52
13	79,92 0,00 0,00	0,86	84,96 0,00 0,00	5,03 0,00 0,00	5,03
14	85,08 0,00 0,00	0,91	88,54 0,00 0,00	3,45 0,00 0,00	3,45
15	90,24 0,00 0,00	0,95	92,01 0,00 0,00	1,76 0,00 0,00	1,76
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	18,00 0,00 0,00	0,00	18,00 0,00 0,00	0,00 0,00 0,00	0,01
18	37,35 0,00 0,00	0,40	49,47 0,00 0,00	12,11 0,00 0,00	12,11
19	56,70 0,00 0,00	0,63	67,35 0,00 0,00	10,64 0,00 0,00	10,64
20	76,05 0,00 0,00	0,82	82,22 0,00 0,00	6,16 0,00 0,00	6,16
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

Specification according to ISO/IEC 15775 Annex G and DIN 33866-1 Annex G

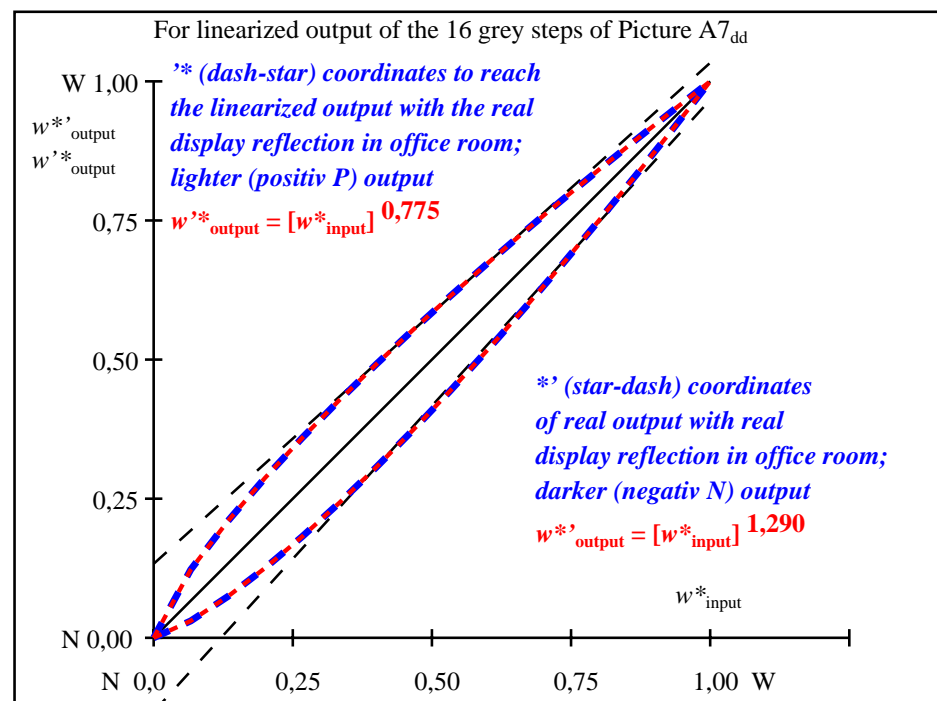
Mean lightness difference (16 steps)
 $\Delta E^*_{\text{CIELAB}} = 7,5$

Mean lightness difference (5 steps)
 $\Delta L^*_{\text{CIELAB}} = 5,7$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 67,0$

part 1,

AE490-3dd: 01032



part 2,

AE491-3dd: 01032

L^*/Y_{intended} (absolute)	18,0/2,5	23,1/3,8	28,3/5,5	33,4/7,7	38,6/10,4	43,8/13,7	48,9/17,5	54,1/22,0	59,2/27,3	64,4/33,3	69,6/40,1	74,7/47,9	79,9/56,5	85,0/66,1	90,2/76,8	95,4/88,5
0 0 0 n* setcmyk gp=0,775 No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^* = l^*_{\text{CIELAB}, r}$ (relative)	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{intended} w^*_{output}	0,000 0,000	0,067 0,123	0,133 0,209	0,200 0,287	0,267 0,359	0,333 0,426	0,400 0,491	0,467 0,554	0,533 0,614	0,600 0,673	0,667 0,730	0,733 0,786	0,800 0,841	0,867 0,895	0,933 0,947	1,000 1,000

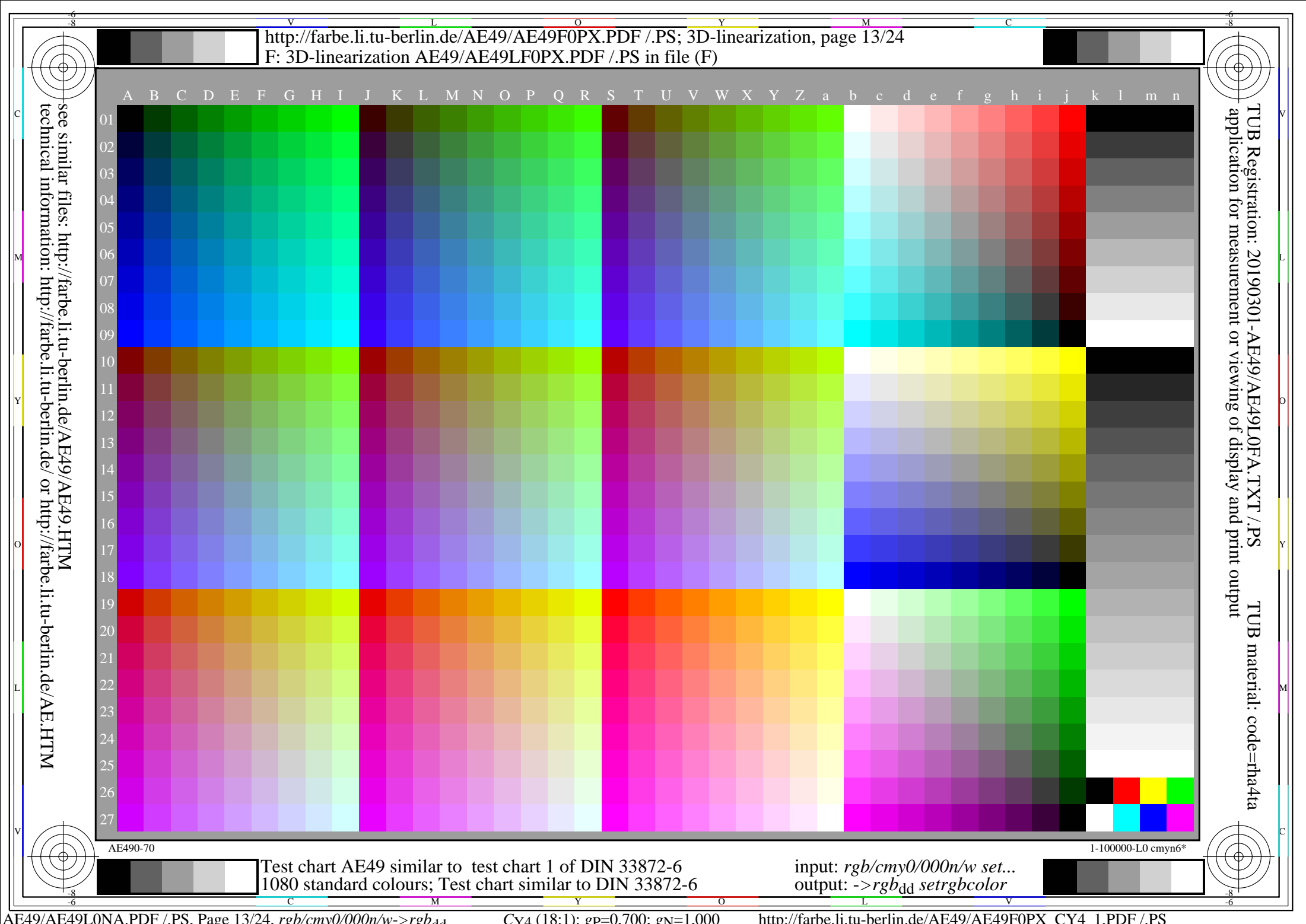
part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01032

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:2,5$; Y_N -range 1,87 to <3,75

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{\text{dd}}$ setrgbcolor

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 14/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY4_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY4_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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AE490-7dd: 01041

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue B_e (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY4_3.PS

underline: Yes/No

picture A7dd

or underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 4,

AE491-7dd: 01041

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{dd}$ setrgbcolor



TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 15/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

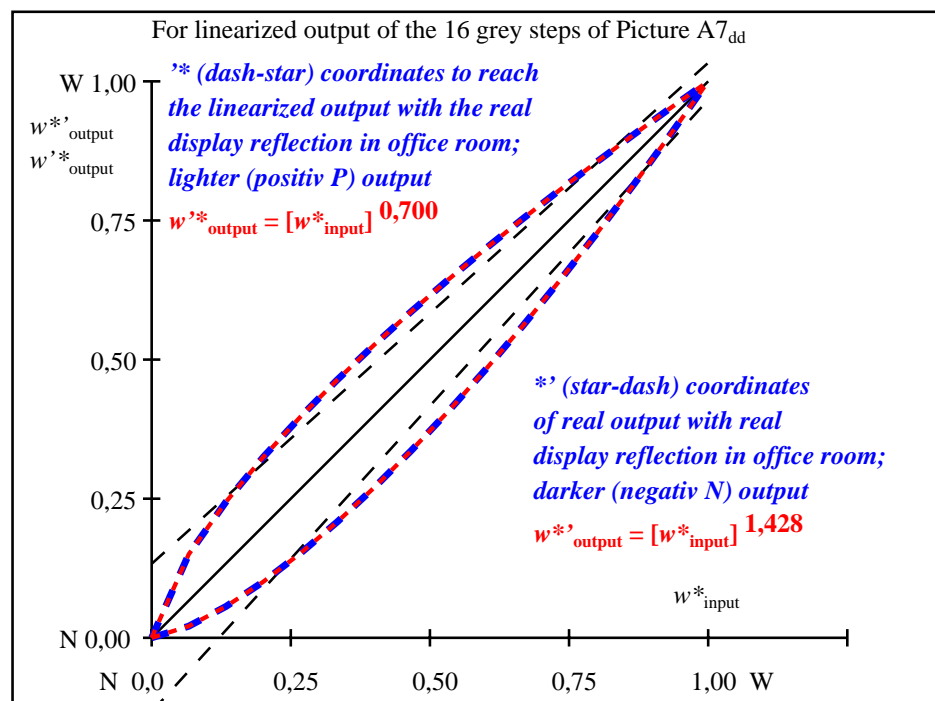
TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

i	LAB [*] _{ref}	L [*] _{out}	LAB [*] _{out}	LAB [*] _{out-ref}	ΔE [*]	Start output S1
1	26,84 0,00 0,00	0,00	26,84 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	31,41 0,00 0,00	0,20	41,04 0,00 0,00	9,62 0,00 0,00	9,62	ISO/IEC 15775 Annex G
3	35,98 0,00 0,00	0,30	48,09 0,00 0,00	12,10 0,00 0,00	12,10	and DIN 33866-1 Annex G
4	40,56 0,00 0,00	0,39	53,74 0,00 0,00	13,18 0,00 0,00	13,18	
5	45,13 0,00 0,00	0,46	58,64 0,00 0,00	13,51 0,00 0,00	13,51	
6	49,70 0,00 0,00	0,52	63,04 0,00 0,00	13,34 0,00 0,00	13,34	
7	54,27 0,00 0,00	0,58	67,09 0,00 0,00	12,82 0,00 0,00	12,82	
8	58,84 0,00 0,00	0,64	70,86 0,00 0,00	12,02 0,00 0,00	12,02	
9	63,41 0,00 0,00	0,69	74,42 0,00 0,00	11,00 0,00 0,00	11,00	
10	67,98 0,00 0,00	0,74	77,79 0,00 0,00	9,80 0,00 0,00	9,80	
11	72,55 0,00 0,00	0,78	81,01 0,00 0,00	8,45 0,00 0,00	8,45	
12	77,12 0,00 0,00	0,83	84,09 0,00 0,00	6,97 0,00 0,00	6,97	
13	81,69 0,00 0,00	0,87	87,06 0,00 0,00	5,37 0,00 0,00	5,37	
14	86,26 0,00 0,00	0,92	89,93 0,00 0,00	3,66 0,00 0,00	3,66	Mean lightness difference
15	90,83 0,00 0,00	0,96	92,71 0,00 0,00	1,87 0,00 0,00	1,87	(16 steps)
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	ΔE [*] _{CIELAB} = 8,3
17	26,84 0,00 0,00	0,00	26,84 0,00 0,00	0,00 0,00 0,00	0,01	
18	43,98 0,00 0,00	0,44	57,47 0,00 0,00	13,48 0,00 0,00	13,48	
19	61,12 0,00 0,00	0,66	72,66 0,00 0,00	11,54 0,00 0,00	11,54	Mean lightness difference
20	78,26 0,00 0,00	0,84	84,85 0,00 0,00	6,58 0,00 0,00	6,58	(5 steps)
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	ΔL [*] _{CIELAB} = 6,3

Mean colour reproduction index: $R^*_{ab,m} = 63,7$

part 1,

AE490-3dd: 01042



part 2,

AE491-3dd: 01042

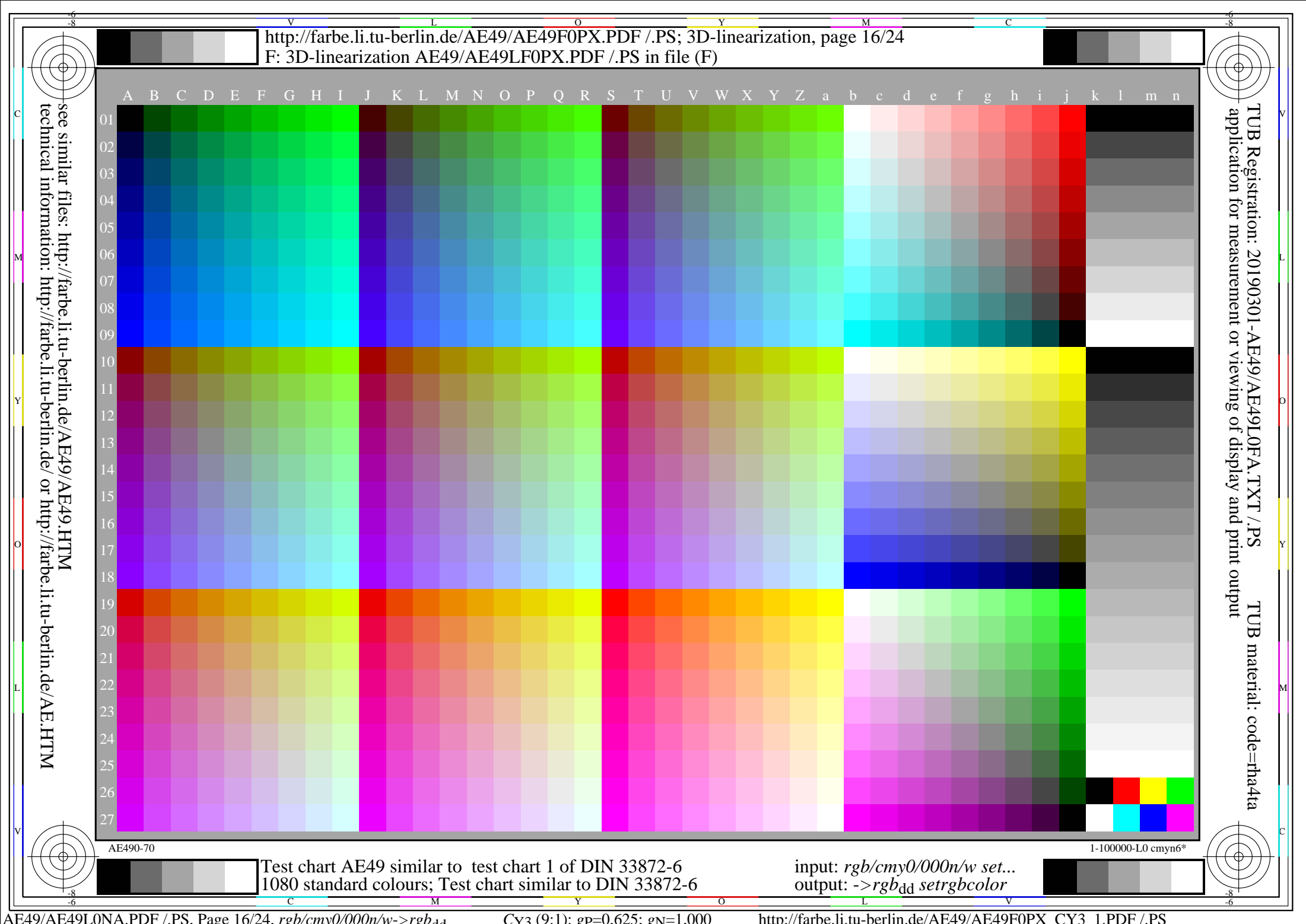
$L^*/Y_{intended}$ (absolute)	26,8/5,0	31,4/6,8	35,9/9,0	40,5/11,5	45,1/14,6	49,7/18,1	54,2/22,2	58,8/26,8	63,4/32,0	67,9/37,9	72,5/44,4	77,1/51,7	81,6/59,7	86,2/68,5	90,8/78,1	95,4/88,5
0 0 0 n [*] setcmyk gp=0,700 No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^* = l^*_{CIELAB, r}$ (relative)	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
$w^*_{intended}$ w^*_{output}	0,000 0,000	0,067 0,150	0,133 0,243	0,200 0,324	0,267 0,396	0,333 0,463	0,400 0,526	0,467 0,586	0,533 0,643	0,600 0,699	0,667 0,753	0,733 0,804	0,800 0,855	0,867 0,904	0,933 0,952	1,000 1,000

part 3, picture A7_{dd}: 16 visual equidistant L^{*}-grey steps; PS operator: 0 0 0 n^{*} setcmykcolor

AE490-7dd: 01042

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:5$; Y_N -range 3,75 to <7,5

input: $rgb/cmy0/000n/w$ set...
output: $->rgb_{dd}$ setrgbcolor



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 17/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY3_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY3_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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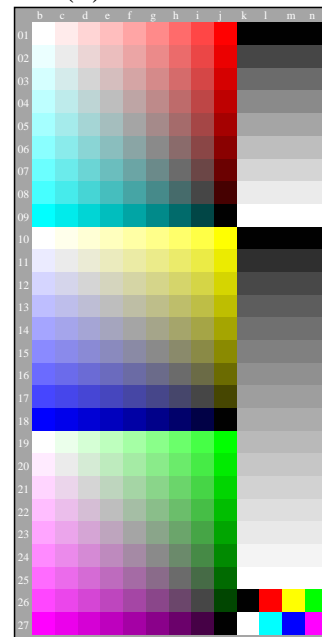
.....

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Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue B_e (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY3_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 3,

AE490-7dd: 01051

part 4,

AE491-7dd: 01051

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6

input: `rgb/cmy0/000n/w set...`

output: `->rgbdd setrgbcolor`

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 18/24
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE49.HTM>

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*	Start output S1
1	37,98 0,00 0,00	0,00	37,98 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	41,81 0,00 0,00	0,24	51,79 0,00 0,00	9,97 0,00 0,00	9,97	ISO/IEC 15775 Annex G
3	45,64 0,00 0,00	0,34	57,87 0,00 0,00	12,22 0,00 0,00	12,22	and DIN 33866-1 Annex G
4	49,47 0,00 0,00	0,42	62,60 0,00 0,00	13,13 0,00 0,00	13,13	
5	53,29 0,00 0,00	0,49	66,62 0,00 0,00	13,32 0,00 0,00	13,32	
6	57,12 0,00 0,00	0,56	70,19 0,00 0,00	13,06 0,00 0,00	13,06	
7	60,95 0,00 0,00	0,61	73,43 0,00 0,00	12,48 0,00 0,00	12,48	
8	64,78 0,00 0,00	0,66	76,43 0,00 0,00	11,65 0,00 0,00	11,65	
9	68,61 0,00 0,00	0,71	79,23 0,00 0,00	10,62 0,00 0,00	10,62	
10	72,44 0,00 0,00	0,76	81,87 0,00 0,00	9,43 0,00 0,00	9,43	
11	76,26 0,00 0,00	0,80	84,37 0,00 0,00	8,10 0,00 0,00	8,10	
12	80,09 0,00 0,00	0,84	86,76 0,00 0,00	6,66 0,00 0,00	6,66	
13	83,92 0,00 0,00	0,88	89,04 0,00 0,00	5,12 0,00 0,00	5,12	
14	87,75 0,00 0,00	0,92	91,24 0,00 0,00	3,49 0,00 0,00	3,49	
15	91,58 0,00 0,00	0,96	93,36 0,00 0,00	1,78 0,00 0,00	1,78	
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	
17	37,98 0,00 0,00	0,00	37,98 0,00 0,00	0,00 0,00 0,00	0,01	
18	52,34 0,00 0,00	0,48	65,66 0,00 0,00	13,32 0,00 0,00	13,32	
19	66,69 0,00 0,00	0,69	77,85 0,00 0,00	11,15 0,00 0,00	11,15	
20	81,05 0,00 0,00	0,85	87,34 0,00 0,00	6,28 0,00 0,00	6,28	
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	

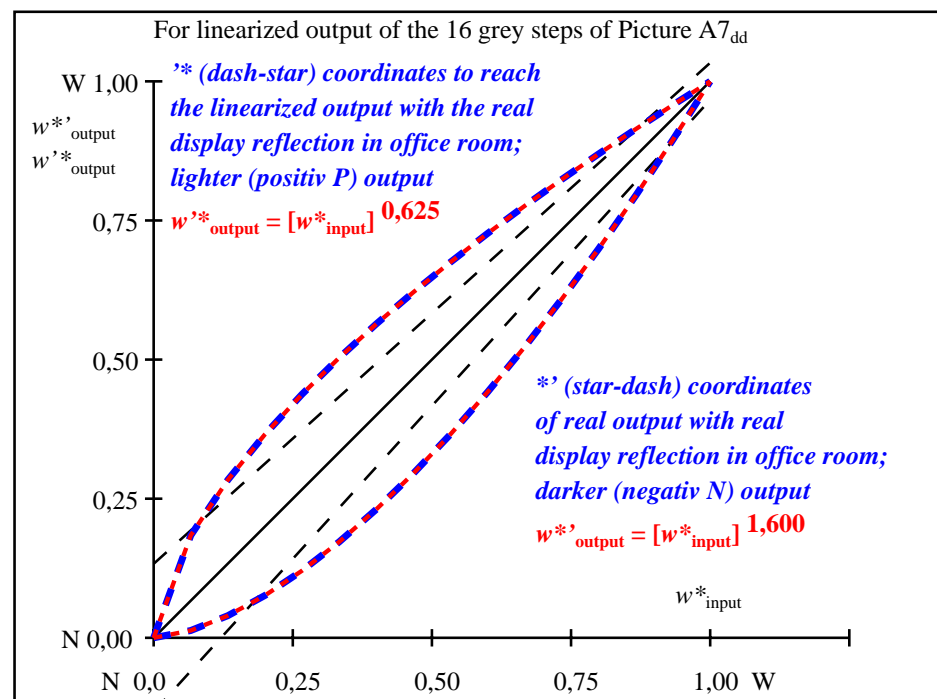
Mean lightness difference (16 steps)
 $\Delta E^*_{\text{CIELAB}} = 8,1$

Mean lightness difference (5 steps)
 $\Delta L^*_{\text{CIELAB}} = 6,1$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 64,5$

part 1,

AE490-3dd: 01052



part 2,

AE491-3dd: 01052

L^*/Y_{intended} (absolute)	37,9/10,0	41,8/12,3	45,6/15,0	49,4/17,9	53,2/21,3	57,1/25,0	60,9/29,1	64,7/33,7	68,6/38,8	72,4/44,3	76,2/50,3	80,0/56,8	83,9/63,9	87,7/71,5	91,5/79,7	95,4/88,5
0 0 0 n* setcmyk gp=0,625 No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^* = l^*_{\text{CIELAB}, r}$ (relative)	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{intended} w^*_{output}	0,000 0,000	0,067 0,184	0,133 0,283	0,200 0,365	0,267 0,438	0,333 0,502	0,400 0,564	0,467 0,621	0,533 0,674	0,600 0,726	0,667 0,776	0,733 0,823	0,800 0,869	0,867 0,914	0,933 0,957	1,000 1,000

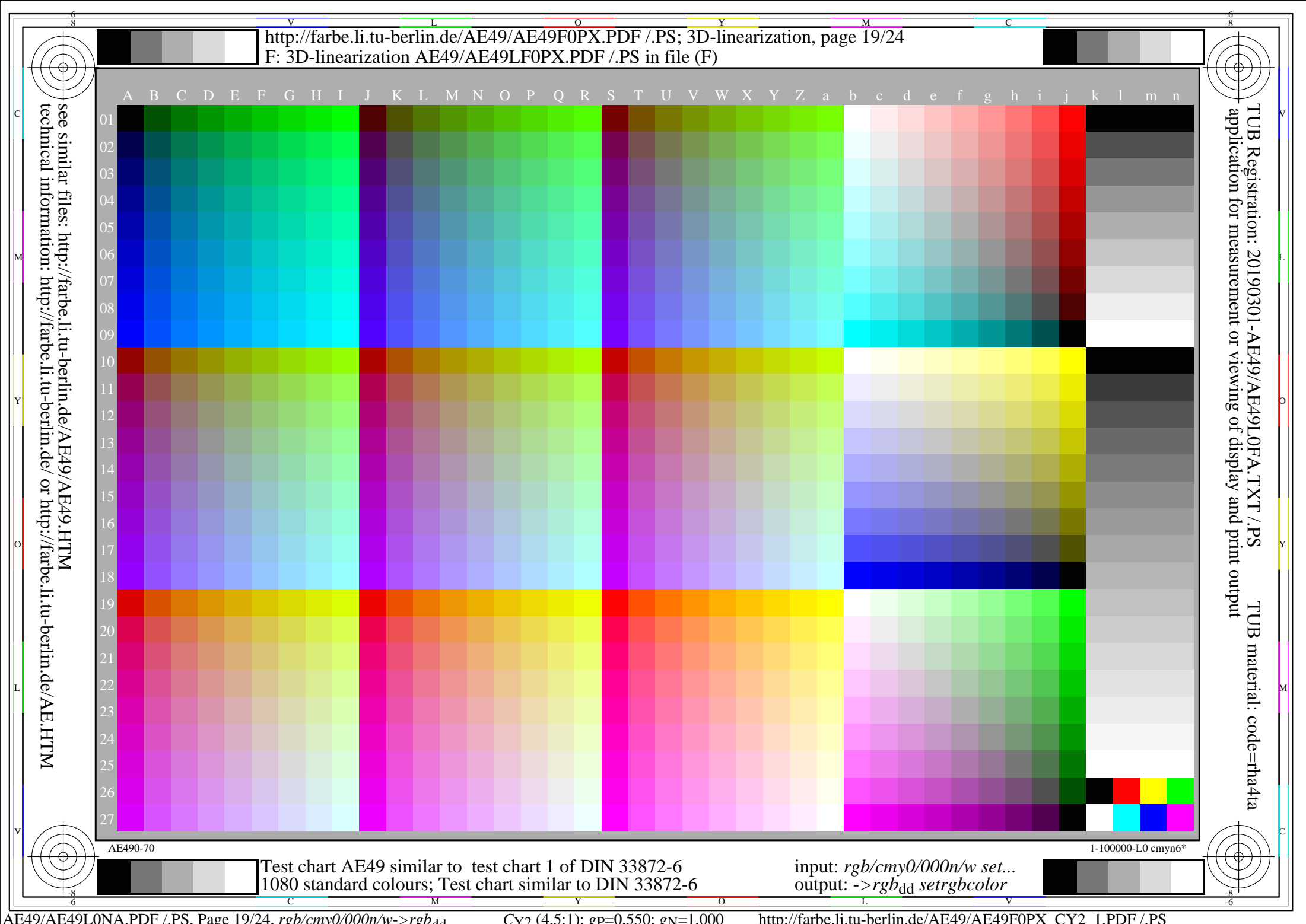
part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01052

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:10$; Y_N -range 7,5 to <15

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{dd}$ setrgbcolor

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 20/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY2_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY2_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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.....

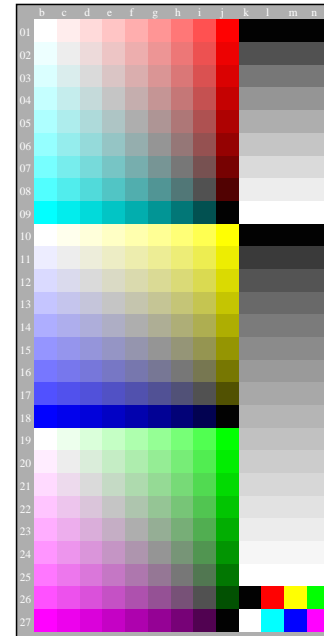
.....

.....

.....

.....

AE490-7dd: 01061



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue B_e (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.

In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.

For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY2_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 4,

AE491-7dd: 01061

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6

input: *rgb/cmy0/000n/w set...*

output: *->rgb_{dd} setrgbcolor*

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 21/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	52,01 0,00 0,00	0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01
2	54,91 0,00 0,00	0,27	63,82 0,00 0,00	8,90 0,00 0,00	8,90
3	57,80 0,00 0,00	0,37	68,48 0,00 0,00	10,68 0,00 0,00	10,68
4	60,69 0,00 0,00	0,46	72,03 0,00 0,00	11,33 0,00 0,00	11,33
5	63,58 0,00 0,00	0,52	75,00 0,00 0,00	11,41 0,00 0,00	11,41
6	66,48 0,00 0,00	0,58	77,60 0,00 0,00	11,12 0,00 0,00	11,12
7	69,37 0,00 0,00	0,64	79,94 0,00 0,00	10,57 0,00 0,00	10,57
8	72,26 0,00 0,00	0,69	82,09 0,00 0,00	9,83 0,00 0,00	9,83
9	75,16 0,00 0,00	0,73	84,09 0,00 0,00	8,93 0,00 0,00	8,93
10	78,05 0,00 0,00	0,78	85,96 0,00 0,00	7,90 0,00 0,00	7,90
11	80,94 0,00 0,00	0,82	87,72 0,00 0,00	6,77 0,00 0,00	6,77
12	83,83 0,00 0,00	0,86	89,39 0,00 0,00	5,56 0,00 0,00	5,56
13	86,73 0,00 0,00	0,89	90,99 0,00 0,00	4,26 0,00 0,00	4,26
14	89,62 0,00 0,00	0,93	92,52 0,00 0,00	2,90 0,00 0,00	2,90
15	92,51 0,00 0,00	0,96	93,99 0,00 0,00	1,47 0,00 0,00	1,47
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	52,01 0,00 0,00	0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01
18	62,86 0,00 0,00	0,51	74,30 0,00 0,00	11,43 0,00 0,00	11,43
19	73,71 0,00 0,00	0,71	83,11 0,00 0,00	9,39 0,00 0,00	9,39
20	84,56 0,00 0,00	0,87	89,80 0,00 0,00	5,24 0,00 0,00	5,24
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

Start output S1
Specification according to
ISO/IEC 15775 Annex G
and DIN 33866-1 Annex G

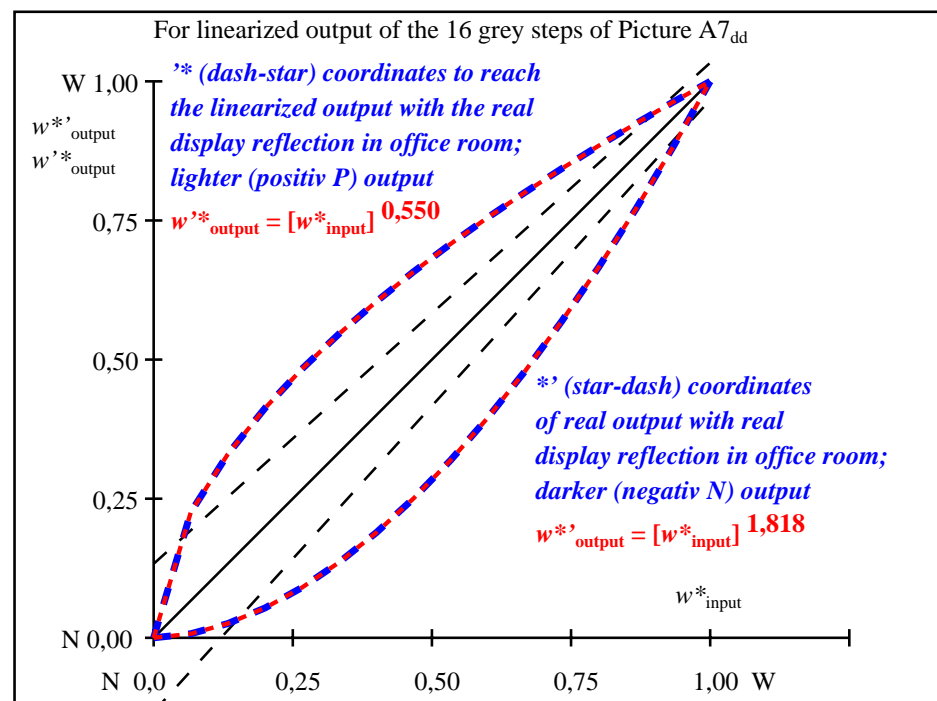
Mean lightness difference
(16 steps)
 $\Delta E^*_{\text{CIELAB}} = 6,9$

Mean lightness difference
(5 steps)
 $\Delta L^*_{\text{CIELAB}} = 5,2$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 69,8$

part 1,

AE490-3dd: 01062



part 2,

AE491-3dd: 01062

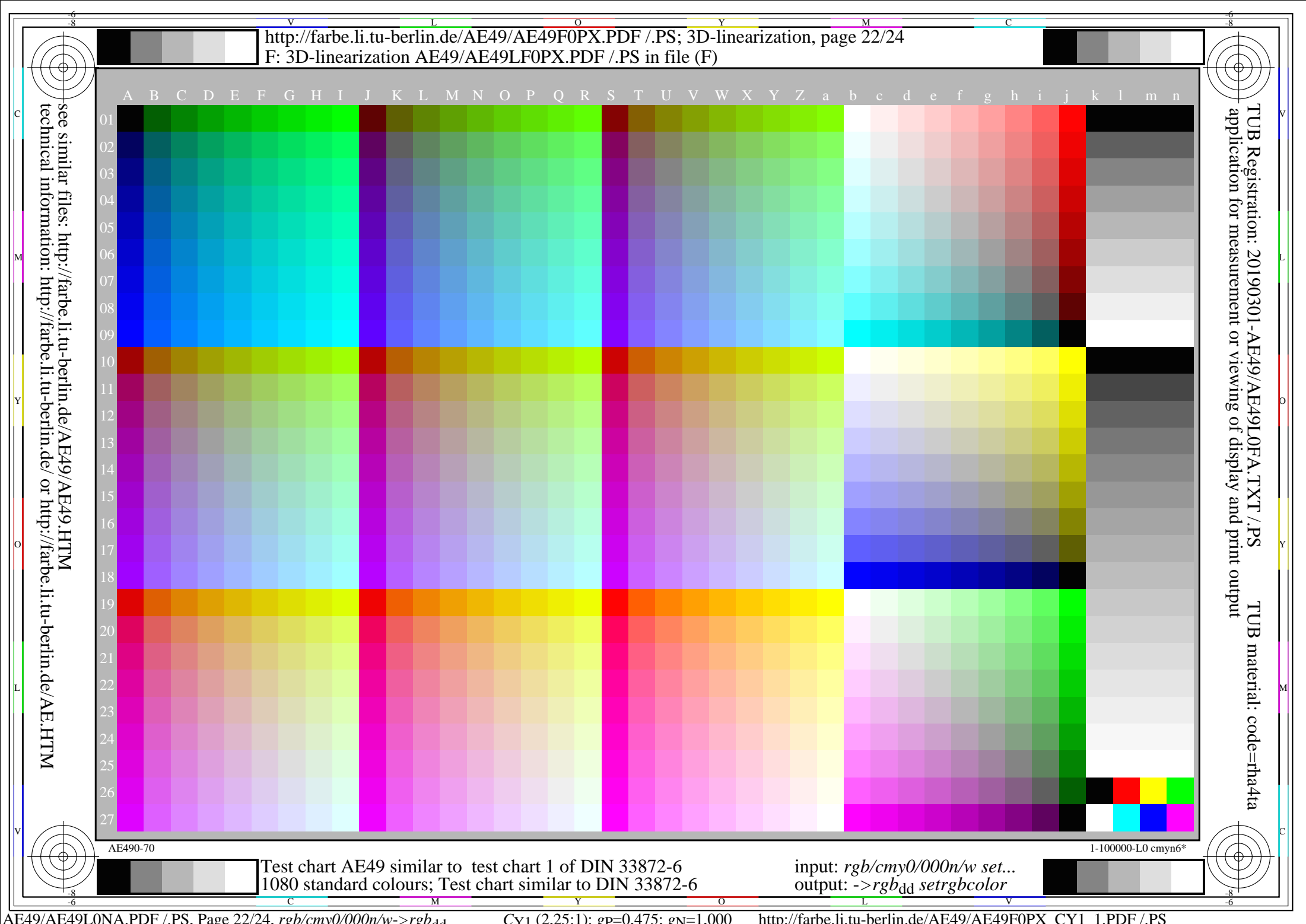
L^*/Y_{intended} (absolute)	52,0/20,1	54,9/22,8	57,8/25,7	60,6/28,9	63,5/32,2	66,4/35,9	69,3/39,8	72,2/44,0	75,1/48,5	78,0/53,3	80,9/58,3	83,8/63,7	86,7/69,4	89,6/75,4	92,5/81,8	95,4/88,5
0 0 0 n*																
setcmyk																
gp=0,550																
No. and																
Hex code																
$w^* = l^*_{\text{CIELAB}, r}$ (relative)																
w^*_{intended}	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{output}	0,000	0,226	0,329	0,412	0,483	0,546	0,604	0,657	0,707	0,755	0,800	0,842	0,884	0,924	0,962	1,000

part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01062

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:20$; Y_N -range 15 to <30

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{dd}$ setrgbcolor



see similar files: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_1.PDF
technical information: <http://farbe.li.tu-berlin.de/> or http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_1.PDF

<http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> /.PS; 3D-linearization, page 23/24
F: 3D-linearization AE49/AE49LF0PX.PDF /.PS in file (F)



Discriminability of chromatic colours

Remarks: This test uses many colour scales of 9 steps

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Yellow - Blue (rows 10 to 18, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Discriminability of 81 chromatic colours

Are all the 81 colours different?

Yes/No

Only in case of "No": How many are different? Of the 81 are different

Result: Of the 243 (=3x81) colours are different

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.
In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.
For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of file format, hardware and software for this test:

PDF file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_1.PS

underline: Yes/No

Used computer operating system:

either one of Windows/Mac/Unix/other and version:.....

This evaluation is for the output:

underline: monitor/data projector/printer

Device model, driver and version:.....

output with PDF/PS-file:

underline: PDF/PS file

For output with PDF file AE49F0PX_CY1_1.PDF

either PDF-file transfer "download, copy" to PDF device:.....

or with computer system interpretation by "Display-PDF":.....

or with software e. g. Adobe-Reader/-Acrobat and version:.....

or with software e. g. Ghostscript and version:.....

For output with PS file AE49F0PX_CY1_1.PS

either PS-file transfer "download, copy" to PS device:.....

or with computer system interpretation by "Display-PS":.....

or with software e. g. Ghostscript and version:.....

or with software e. g. Mac-Yap and version:.....

Special remarks: e. g. output of Landscape (L)

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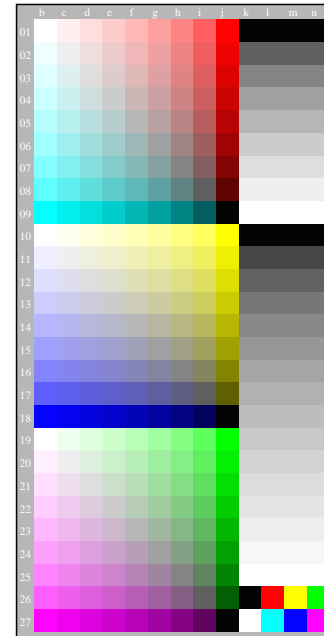
.....

.....

.....

.....

.....



Agreement with elementary colours

Remarks: This test uses many colour scales of 9 steps

Red R_e and Green G_e are defined by the visual criteria: *neither yellowish nor bluish*.
Yellow Y_e and Blue B_e are defined by the visual criteria: *neither reddish nor greenish*.

Hue plane Red - Cyan blue (rows 01 to 09, column b to j)

Agreement with elementary colours

Is the colour at the position (j,01) the elementary colour Red R_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Hue plane Yellow - Blue B_e (rows 10 to 18, column b to j)

Agreement with elementary colours

Is the colour at the position (j,10) the elementary colour Yellow Y_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Is the colour at the position (b,18) the elementary colour Blue B_e ?

Yes/No

Only in case of "No": The colour at this position appears:

reddish/greenish

Hue plane Green - Magenta red (rows 19 to 27, column b to j)

Agreement with elementary colours

Is the colour at the position (j,19) the elementary colour Green G_e ?

Yes/No

Only in case of "No": The colour at this position appears:

yellowish/bluish

Result: Of the 4 elementary colours (e. g. 3) are acceptable as elementary colours.

Discriminability of 9 and 16 grey steps

Discriminability of 9 steps (rows 01 to 09, column k to n)

Are the 9 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 9 greys are distinguishable.

Discriminability of 16 steps (rows 10 to 27, column k to n)

Are the 16 steps distinguishable?

Yes/No

If No: How many can be distinguished? of 16 greys are distinguishable.

Artifacts, please describe if visible:

Remarks about the creation and content of the PDF files:

Sometimes "colour smoothing" is a default setting.

In this case the 9 steps are often not visible and may be counted as one step.

Sometimes "optimizing the PDF output for the web" is a default setting.

For example this setting may reduce the 1080 colours on a page to 256 colours.

AE490-71 Part of test chart AE49 with 1080 colours; 9 or 16 step colour scales; data in column (b-n): rgb

1-100110-L0 cmy6*

Documentation of assessor colour-vision properties for visual assessment

The assessor has **normal** colour vision according to one test:

either according to DIN 6160:1996 with Anomaloskop of Nagel

or with test charts using colour points according to Ishihara

or tested with, please specify:

underline: Yes/No

underline: Yes/unknown

underline: Yes/unknown

underline: Yes/unknown

For visual evaluation of the display (Monitor, data projector) output

Office workplace illumination is daylight (clouded/north sky)

underline: Yes/No

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_3.PS

underline: Yes/No

picture A7dd contrast range: (>F:0) (F:0) (E:0) (D:0) (C:0) (A:0) (9:0) (7:0) (5:0) (3:0) (<3:0)

compare standard print output according to ISO/IEC 15775 with range F:0

underline: Yes/No

Remark: In daylighted offices the contrast range is in many cases:

on display between: >F:0 and E:0 (monitor), D:0 and 3:0 (data projector)

Only for optional colorimetric specification with PDF/PS file output

PDF file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE49/AE49F0PX_CY1_3.PS

underline: Yes/No

picture A7dd

underline: Yes/No

colour measurement and specification for:

CIE standard illuminant D65, 2 degree observer, CIE 45/0 geometry:

underline: Yes/No

If No, please give other parameters:

Colorimetric specification for 17 step colours of <http://farbe.li.tu-berlin.de/OE70/OE70L1NP.PDF>

Exchange of CIELAB data in file <http://farbe.li.tu-berlin.de/AE82/AE82L0NP.TXT> and transfer

of the PS file AE82L0NP.PS (= .TXT) to the PDF-file AE82L0NP.PDF

underline: Yes/No

If No, please describe other method:

part 3,

AE490-7dd: 01071

part 4,

AE491-7dd: 01071

Form A: Test chart AE49 similar to test chart 1 of DIN 33872-6
1080 standard colours; Test chart similar to DIN 33872-6

input: *rgb/cmy0/000n/w set...*
output: *->rgb_{dd} setrgbcolor*

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE49/AE49F0PX.PDF> / .PS; 3D-linearization, page 24/24
technical information: <http://farbe.li.tu-berlin.de/AE49/AE49LF0PX.PDF> / .PS in file (F)

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01
2	71,41 0,00 0,00	0,30	77,45 0,00 0,00	6,04 0,00 0,00	6,04
3	73,12 0,00 0,00	0,41	80,23 0,00 0,00	7,11 0,00 0,00	7,11
4	74,83 0,00 0,00	0,49	82,31 0,00 0,00	7,47 0,00 0,00	7,47
5	76,55 0,00 0,00	0,55	84,02 0,00 0,00	7,47 0,00 0,00	7,47
6	78,26 0,00 0,00	0,61	85,51 0,00 0,00	7,24 0,00 0,00	7,24
7	79,98 0,00 0,00	0,66	86,83 0,00 0,00	6,85 0,00 0,00	6,85
8	81,69 0,00 0,00	0,71	88,04 0,00 0,00	6,35 0,00 0,00	6,35
9	83,41 0,00 0,00	0,75	89,16 0,00 0,00	5,75 0,00 0,00	5,75
10	85,12 0,00 0,00	0,79	90,20 0,00 0,00	5,08 0,00 0,00	5,08
11	86,83 0,00 0,00	0,83	91,18 0,00 0,00	4,34 0,00 0,00	4,34
12	88,55 0,00 0,00	0,87	92,11 0,00 0,00	3,55 0,00 0,00	3,55
13	90,26 0,00 0,00	0,90	92,99 0,00 0,00	2,72 0,00 0,00	2,72
14	91,98 0,00 0,00	0,93	93,83 0,00 0,00	1,85 0,00 0,00	1,85
15	93,69 0,00 0,00	0,96	94,63 0,00 0,00	0,94 0,00 0,00	0,94
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01
18	76,12 0,00 0,00	0,54	83,62 0,00 0,00	7,49 0,00 0,00	7,49
19	82,55 0,00 0,00	0,73	88,61 0,00 0,00	6,06 0,00 0,00	6,06
20	88,98 0,00 0,00	0,88	92,33 0,00 0,00	3,35 0,00 0,00	3,35
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

Start output S1
Specification according to
ISO/IEC 15775 Annex G
and DIN 33866-1 Annex G

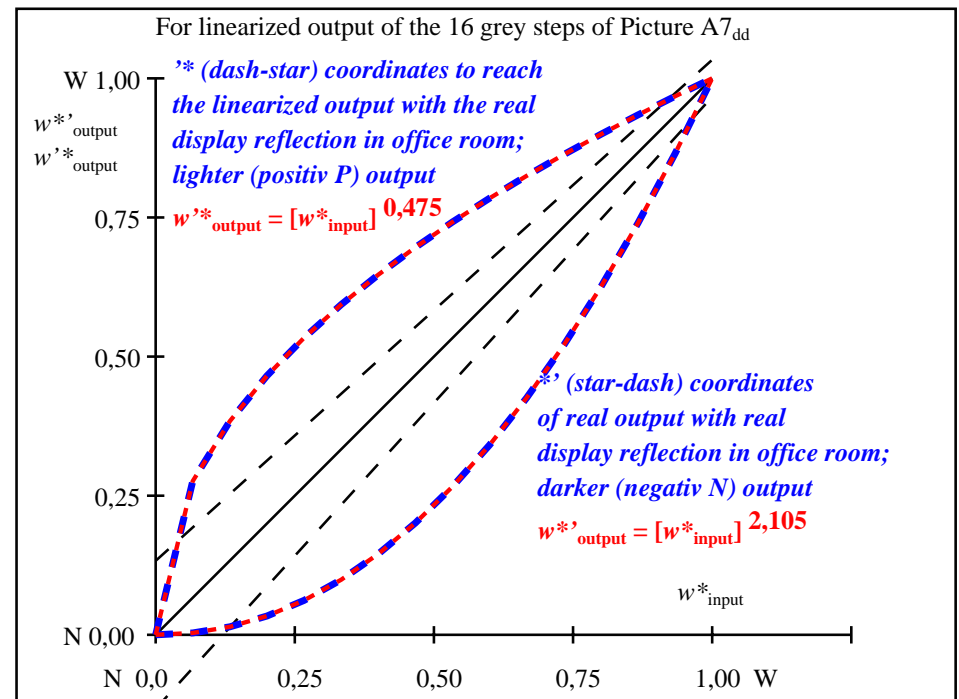
Mean lightness difference
(16 steps)
 $\Delta E^*_{\text{CIELAB}} = 4,5$

Mean lightness difference
(5 steps)
 $\Delta L^*_{\text{CIELAB}} = 3,3$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 80,3$

part 1,

AE490-3dd: 01072



part 2,

AE491-3dd: 01072

L^*/Y_{intended} (absolute)	69,6/40,3	71,4/42,7	73,1/45,3	74,8/48,0	76,5/50,7	78,2/53,6	79,9/56,6	81,6/59,7	83,4/62,9	85,1/66,2	86,8/69,6	88,5/73,2	90,2/76,8	91,9/80,6	93,6/84,5	95,4/88,5
0 0 0 n*																
setcmyk																
gp=0,475																
No. and																
Hex code																
$w^* = l^*_{\text{CIELAB}, r}$ (relative)																
w^*_{intended}	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w^*_{output}	0,000	0,276	0,383	0,465	0,534	0,593	0,647	0,696	0,741	0,784	0,825	0,862	0,899	0,934	0,967	1,000

part 3, picture A7_{dd}: 16 visual equidistant L^* -grey steps; PS operator: 0 0 0 n* setcmykcolor

AE490-7dd: 01072

In-out: Test chart AE49 similar to test chart 1 of DIN 33872-6
Viewing Y contrast $Y_W:Y_N=88,9:40$; Y_N -range 30 to <60

input: $rgb/cmy0/000n/w$ set...
output: $\rightarrow rgb_{\text{dd}}$ setrgbcolor

TUB Registration: 20190301-AE49/AE49L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta