

Input: Colorimetric Television Luminous System TLS00a

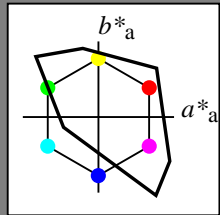
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

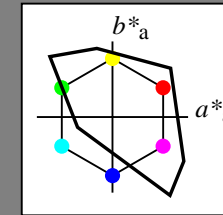
$n = 00$ to 19

00 = Red R_e

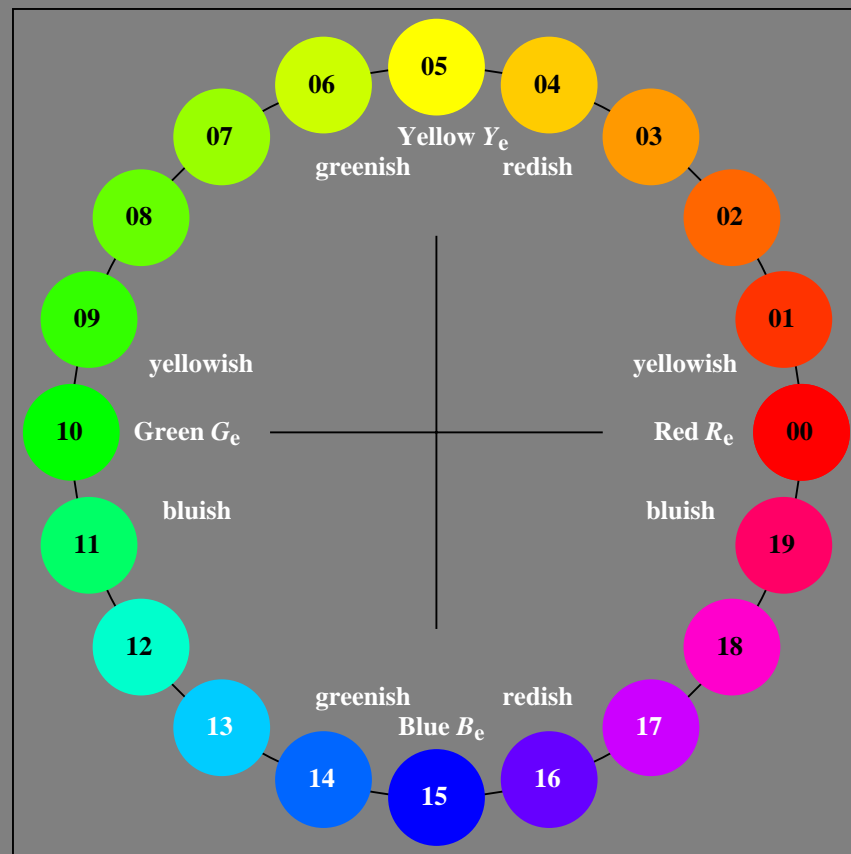
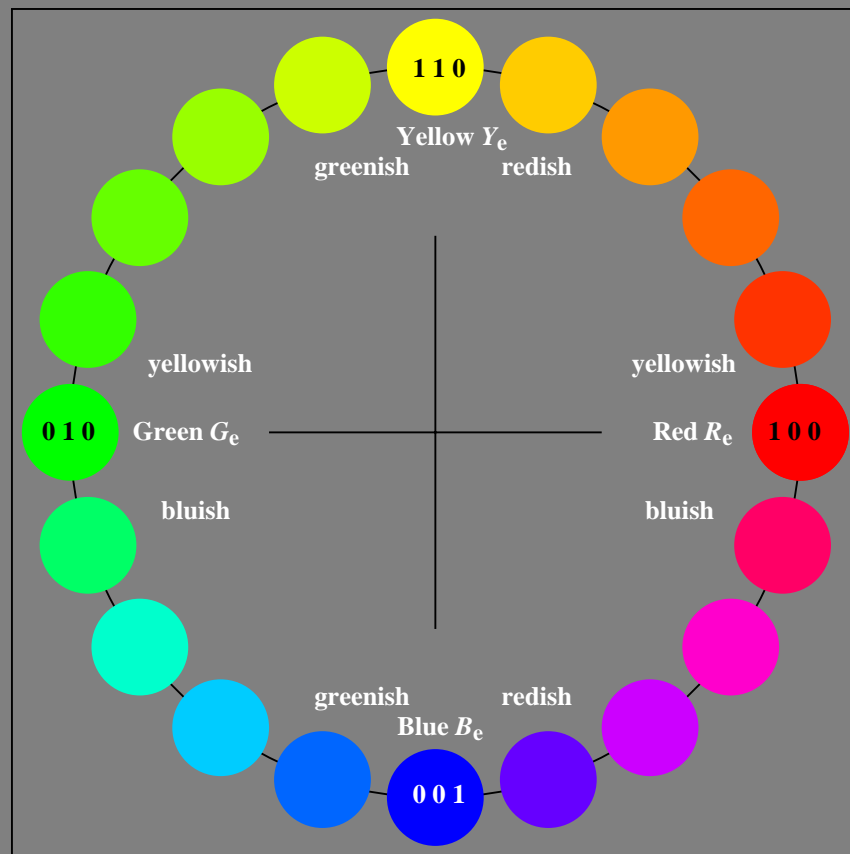
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
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M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-100-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

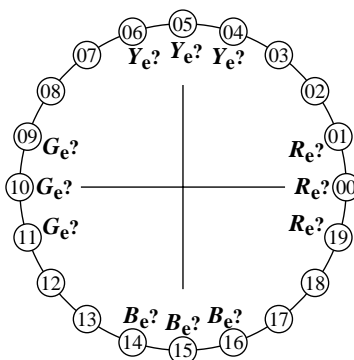
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: *->rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 01001

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN8_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN8_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 AE39F0PX_CYN8_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 AE39F0PX_CYN8_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)

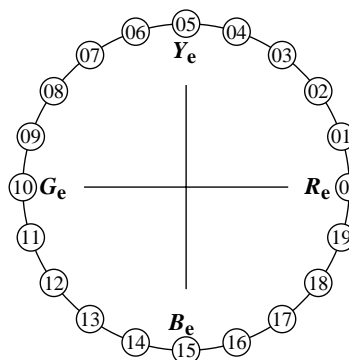
.....
.....
.....

part 3,

AE390-7dd: 01001

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e .
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 01001

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/AE39/AE39F0PX_CYN8_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN8_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/AE39/AE39F0PX_CYN8_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN8_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,

AE391-7dd: 01001

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

input: `rgb/cmy0/000n/w set...`
output: `->rgbdd setrgbcolor`

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 3/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

i	LAB [*] _{ref}	L [*] _{out}	LAB [*] _{out}	LAB [*] _{out-ref}	ΔE [*]	Start output S1
1	0,00	0,00	0,00	0,00	0,00	0,01
2	6,36	0,00	0,06	6,36	0,00	0,01
3	12,72	0,00	0,13	12,72	0,00	0,01
4	19,08	0,00	0,20	19,08	0,00	0,01
5	25,44	0,00	0,26	25,44	0,00	0,01
6	31,80	0,00	0,33	31,80	0,00	0,01
7	38,16	0,00	0,40	38,16	0,00	0,01
8	44,52	0,00	0,46	44,52	0,00	0,01
9	50,88	0,00	0,53	50,88	0,00	0,01
10	57,24	0,00	0,60	57,24	0,00	0,01
11	63,60	0,00	0,66	63,60	0,00	0,01
12	69,96	0,00	0,73	69,96	0,00	0,01
13	76,32	0,00	0,80	76,32	0,00	0,01
14	82,68	0,00	0,86	82,68	0,00	0,01
15	89,04	0,00	0,93	89,04	0,00	0,01
16	95,41	0,00	1,00	95,41	0,00	0,01
17	0,00	0,00	0,00	0,00	0,00	0,01
18	23,85	0,00	0,25	23,85	0,00	0,01
19	47,70	0,00	0,50	47,70	0,00	0,01
20	71,55	0,00	0,75	71,55	0,00	0,01
21	95,41	0,00	1,00	95,41	0,00	0,01

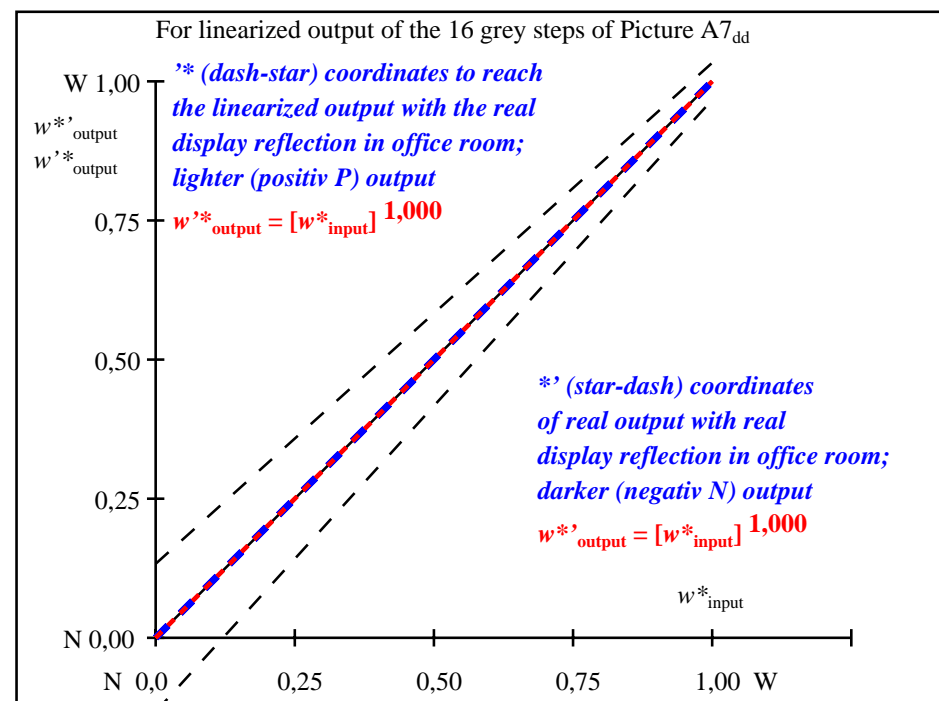
Mean lightness difference (16 steps)
 $\Delta E^*_{\text{CIELAB}} = 0,0$

Mean lightness difference (5 steps)
 $\Delta L^*_{\text{CIELAB}} = 0,0$

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

part 1,

AE390-3dd: 01002



part 2,

AE391-3dd: 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)																
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

AE390-7dd: 01002

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
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*

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

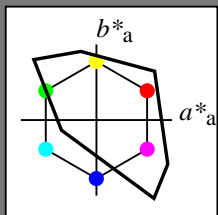
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

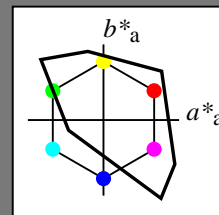
$n = 00$ to 19

00 = Red R_e

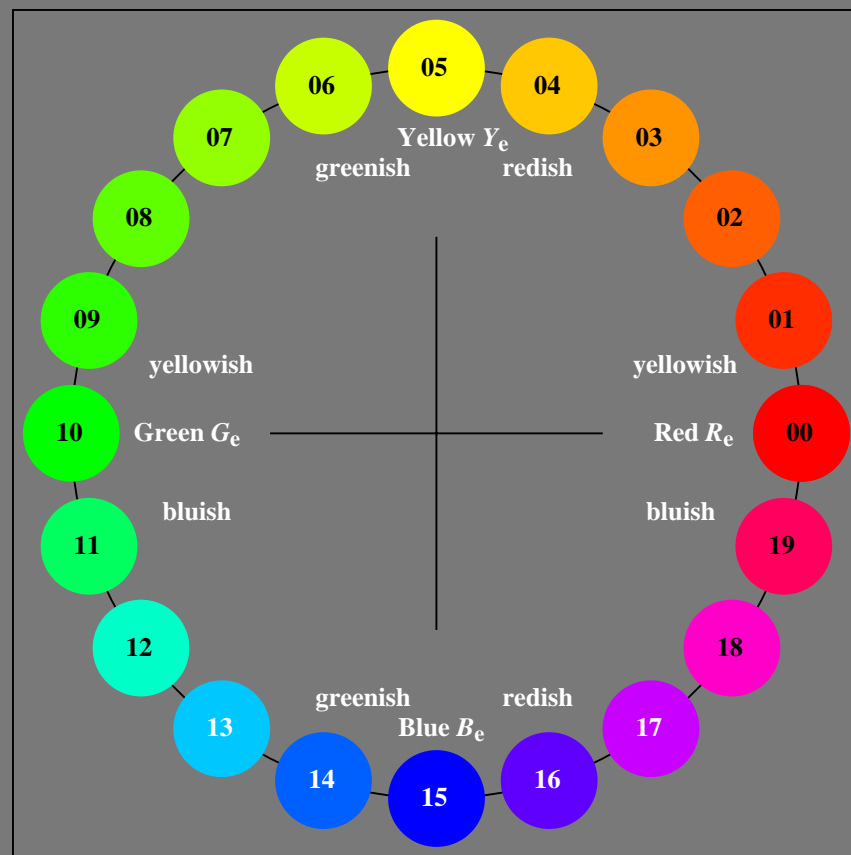
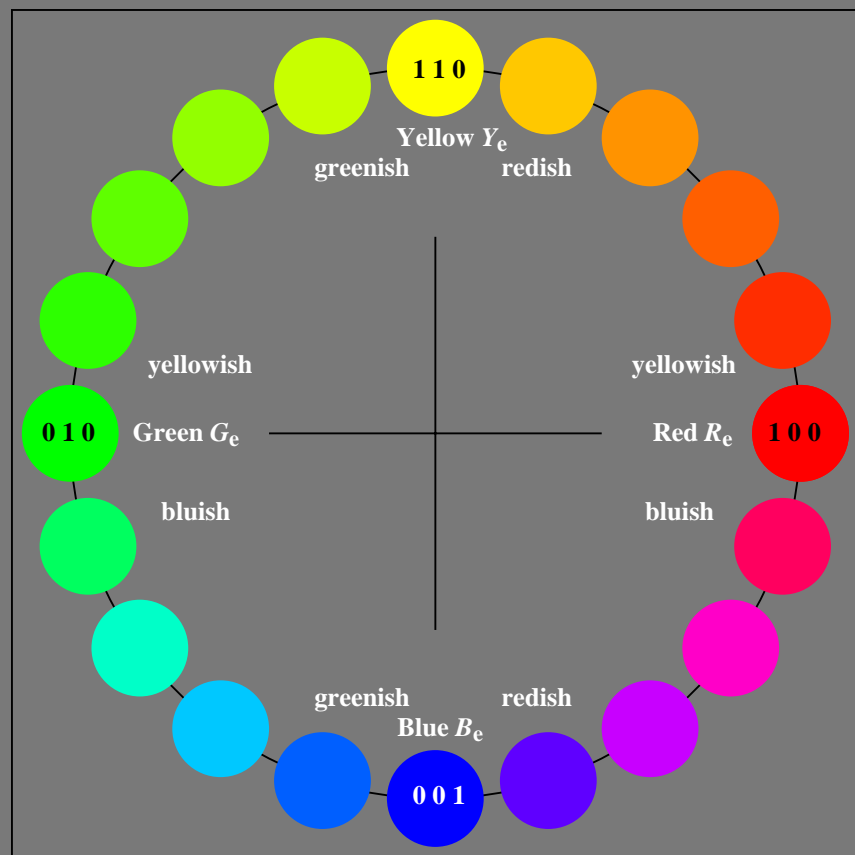
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-101-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

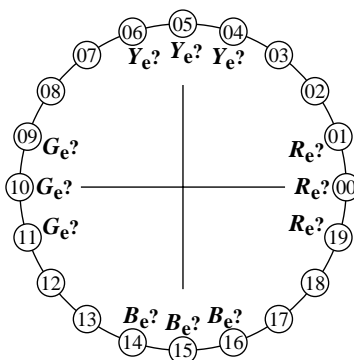
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: \rightarrow *rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 01081

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN7_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN7_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 AE39F0PX_CYN7_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 AE39F0PX_CYN7_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)

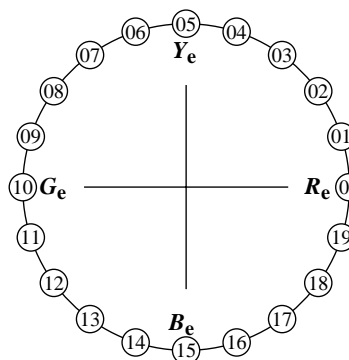
.....
.....
.....

part 3,

AE390-7dd: 01081

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e .

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e .
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 01081

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/AE39/AE39F0PX_CYN7_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN7_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/AE39/AE39F0PX_CYN7_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN7_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,

AE391-7dd: 01081

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 6/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

i	LAB* _{ref}	L* _{out}	LAB* _{out}	LAB* _{out-ref}	ΔE*
1	5,69 0,00 0,00	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	0,04 0,00 0,00	9,36 0,00 0,00	-2, 0,00 0,00	2,30
3	17,65 0,00 0,00	0,09 0,00 0,00	14,01 0,00 0,00	-3, 0,00 0,00	3,63
4	23,63 0,00 0,00	0,14 0,00 0,00	19,12 0,00 0,00	-4, 0,00 0,00	4,51
5	29,61 0,00 0,00	0,21 0,00 0,00	24,55 0,00 0,00	-5, 0,00 0,00	5,06
6	35,59 0,00 0,00	0,27 0,00 0,00	30,23 0,00 0,00	-5, 0,00 0,00	5,36
7	41,57 0,00 0,00	0,33 0,00 0,00	36,12 0,00 0,00	-5, 0,00 0,00	5,45
8	47,55 0,00 0,00	0,40 0,00 0,00	42,19 0,00 0,00	-5, 0,00 0,00	5,36
9	53,54 0,00 0,00	0,47 0,00 0,00	48,42 0,00 0,00	-5, 0,00 0,00	5,11
10	59,52 0,00 0,00	0,54 0,00 0,00	54,79 0,00 0,00	-4, 0,00 0,00	4,72
11	65,50 0,00 0,00	0,61 0,00 0,00	61,29 0,00 0,00	-4, 0,00 0,00	4,20
12	71,48 0,00 0,00	0,69 0,00 0,00	67,91 0,00 0,00	-3, 0,00 0,00	3,57
13	77,46 0,00 0,00	0,76 0,00 0,00	74,64 0,00 0,00	-2, 0,00 0,00	2,82
14	83,44 0,00 0,00	0,84 0,00 0,00	81,47 0,00 0,00	-1, 0,00 0,00	1,97
15	89,42 0,00 0,00	0,92 0,00 0,00	88,39 0,00 0,00	-1, 0,00 0,00	1,03
16	95,41 0,00 0,00	1,00 0,00 0,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	5,69 0,00 0,00	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	0,19 0,00 0,00	23,16 0,00 0,00	-4, 0,00 0,00	4,95
19	50,55 0,00 0,00	0,44 0,00 0,00	45,28 0,00 0,00	-5, 0,00 0,00	5,26
20	72,98 0,00 0,00	0,71 0,00 0,00	69,58 0,00 0,00	-3, 0,00 0,00	3,39
21	95,41 0,00 0,00	1,00 0,00 0,00	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

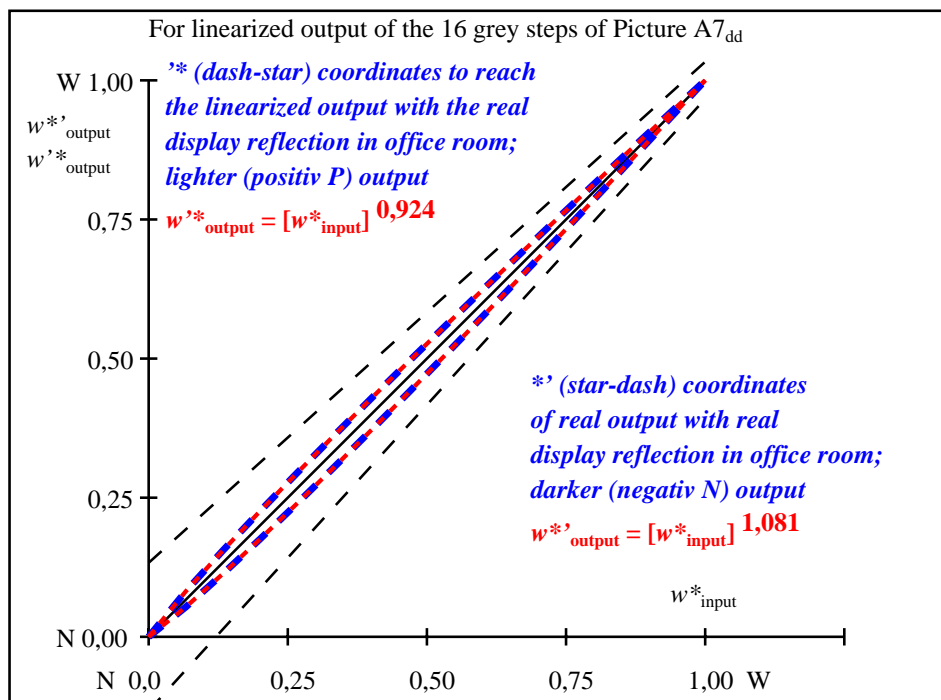
Mean lightness difference (16 steps)
 $\Delta E^*_{CIELAB} = 3,4$

Mean lightness difference (5 steps)
 $\Delta L^*_{CIELAB} = 2,7$

Mean colour reproduction index: $R^*_{ab,m} = 84,9$

part 1,

AE390-3dd: 01082



part 2,

AE391-3dd: 01082

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																
g _N =1,081																
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	0,053	0,112	0,175	0,239	0,304	0,371	0,439	0,506	0,575	0,645	0,714	0,785	0,857	0,927	1,000

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

AE390-7dd: 01082

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
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: *->rgb_{dd} setrgbcolor*

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

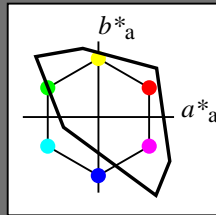
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

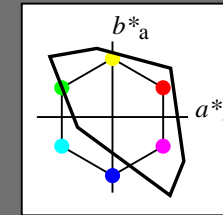
$n = 00$ to 19

00 = Red R_e

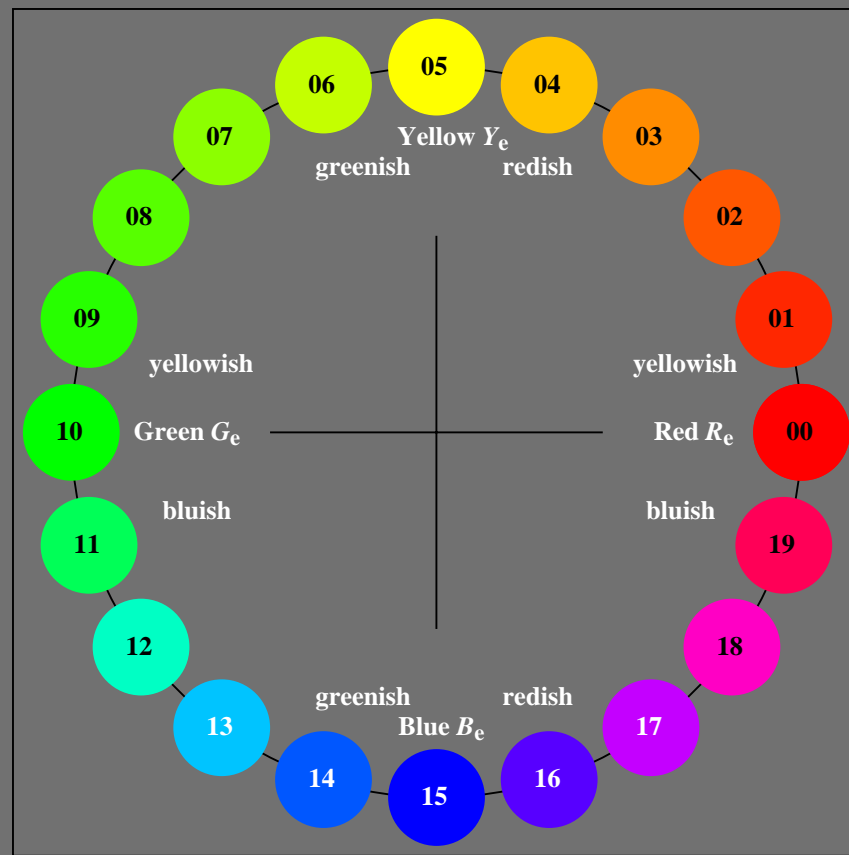
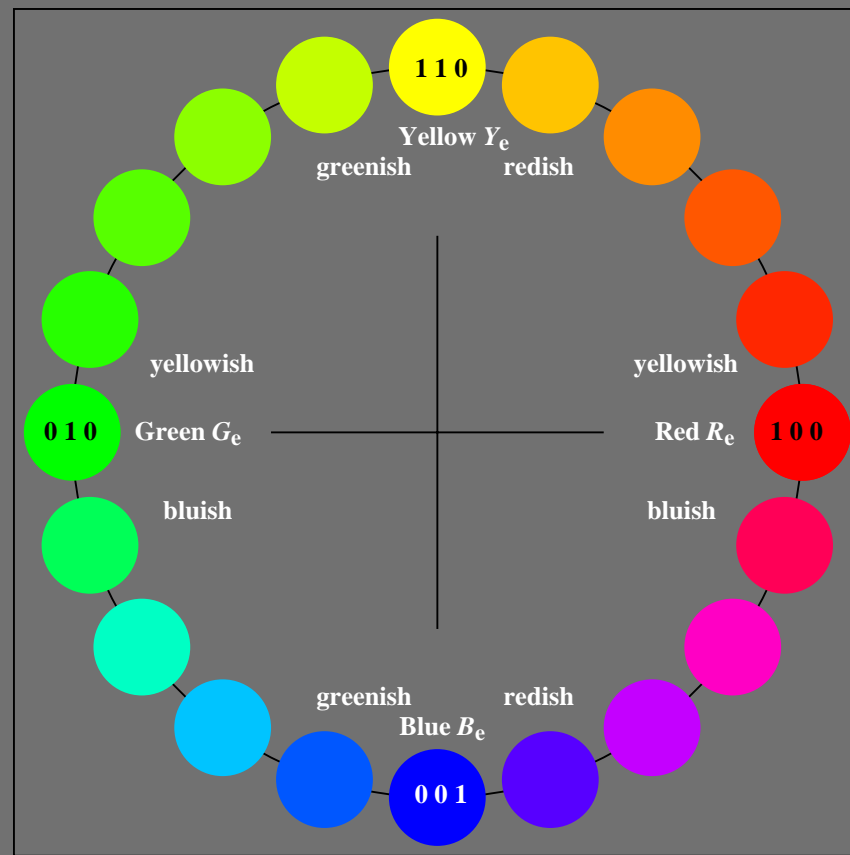
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-102-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

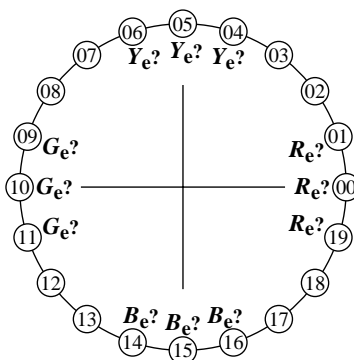
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: ->*rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010161

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN6_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN6_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 AE39F0PX_CYN6_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 AE39F0PX_CYN6_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)

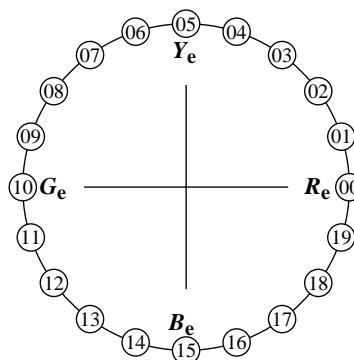
.....
.....
.....

part 3,

AE390-7dd: 010161

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e .
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010161

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/AE39/AE39F0PX_CYN6_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN6_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/AE39/AE39F0PX_CYN6_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN6_3.PS

or 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,

AE391-7dd: 010161

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

TUB Registration: 20190301-AE39/AE39L0FA.TXT /PS
application for measurement or viewing of display and print output

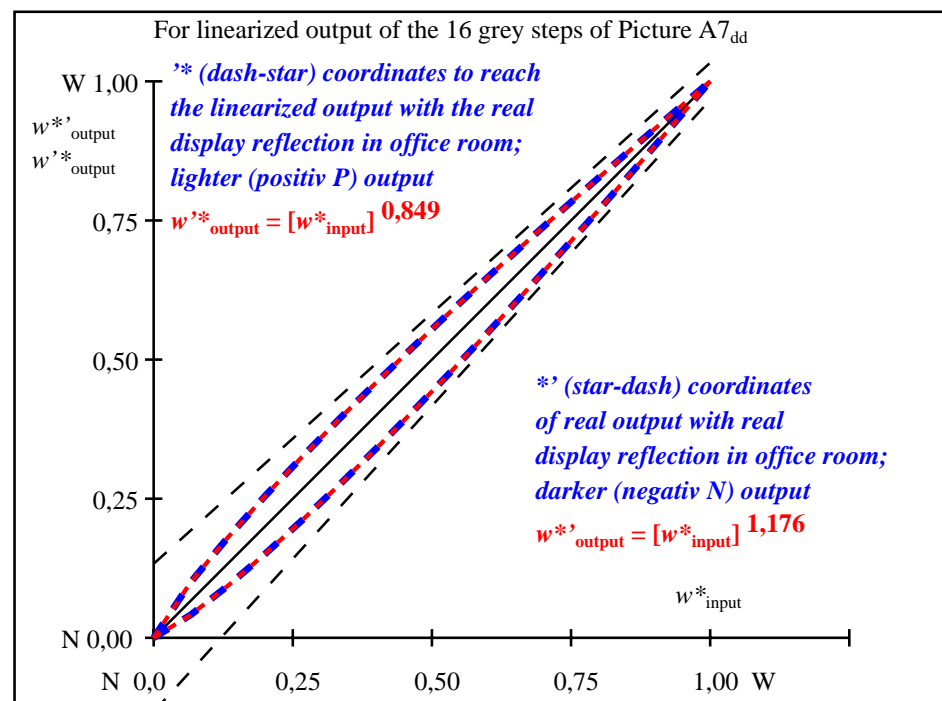
TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 9/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

i	LAB [*] _{ref}	L [*] _{out}	LAB [*] _{out}	LAB [*] _{out-ref}	ΔE [*]	Start output S1
1	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	16,62 0,00 0,00	0,02	13,11 0,00 0,00	-3, 0,00 0,00	3,50	ISO/IEC 15775 Annex G
3	22,24 0,00 0,00	0,06	16,44 0,00 0,00	-5, 0,00 0,00	5,80	and DIN 33866-1 Annex G
4	27,87 0,00 0,00	0,11	20,45 0,00 0,00	-7, 0,00 0,00	7,42	
5	33,50 0,00 0,00	0,16	24,98 0,00 0,00	-8, 0,00 0,00	8,52	
6	39,13 0,00 0,00	0,22	29,94 0,00 0,00	-9, 0,00 0,00	9,19	
7	44,75 0,00 0,00	0,28	35,27 0,00 0,00	-9, 0,00 0,00	9,48	
8	50,38 0,00 0,00	0,35	40,93 0,00 0,00	-9, 0,00 0,00	9,45	
9	56,01 0,00 0,00	0,42	46,89 0,00 0,00	-9, 0,00 0,00	9,11	
10	61,64 0,00 0,00	0,49	53,13 0,00 0,00	-8, 0,00 0,00	8,50	
11	67,27 0,00 0,00	0,57	59,62 0,00 0,00	-7, 0,00 0,00	7,64	
12	72,89 0,00 0,00	0,65	66,35 0,00 0,00	-6, 0,00 0,00	6,54	
13	78,52 0,00 0,00	0,73	73,31 0,00 0,00	-5, 0,00 0,00	5,21	
14	84,15 0,00 0,00	0,82	80,48 0,00 0,00	-3, 0,00 0,00	3,67	Mean lightness difference
15	89,78 0,00 0,00	0,91	87,84 0,00 0,00	-1, 0,00 0,00	1,93	(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} = 6,0
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	0,15	23,80 0,00 0,00	-8, 0,00 0,00	8,29	Mean lightness difference
19	53,20 0,00 0,00	0,38	43,88 0,00 0,00	-9, 0,00 0,00	9,32	(5 steps)
20	74,30 0,00 0,00	0,67	68,07 0,00 0,00	-6, 0,00 0,00	6,22	ΔL [*] _{CIELAB} = 4,7
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	Mean colour reproduction index: R [*] _{ab,m} = 73,7

part 1,

AE390-3dd: 010162



part 2,

AE391-3dd: 010162

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																
g _N =1,176 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	0,041	0,093	0,150	0,211	0,274	0,340	0,408	0,476	0,548	0,620	0,693	0,769	0,845	0,921	1,000

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

AE390-7dd: 010162

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
Viewing Y contrast Y_W:Y_N=88,9:1,25; Y_N-range 0,93 to <1,87

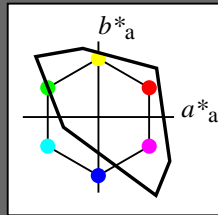
input: rgb/cmy0/000n/w set...
output: ->rgb_{dd} setrgbcolor

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the
four elementary hues

1 0 0 = Red R_e
1 1 0 = Yellow Y_e
0 1 0 = Green G_e
0 0 1 = Blue B_e



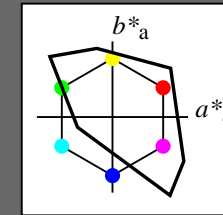
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

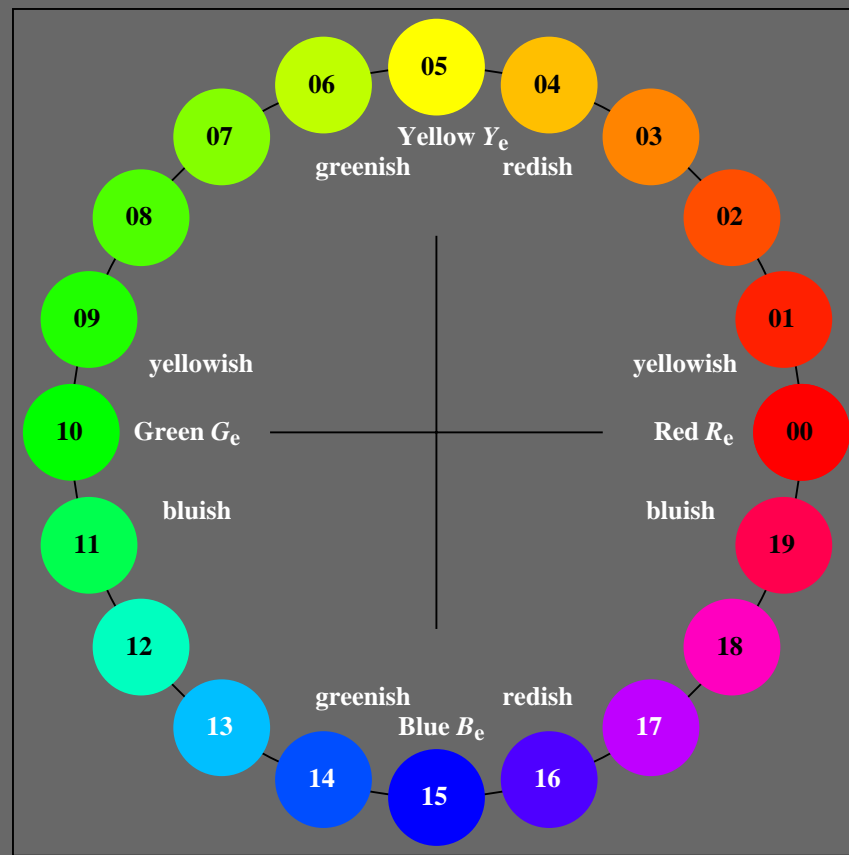
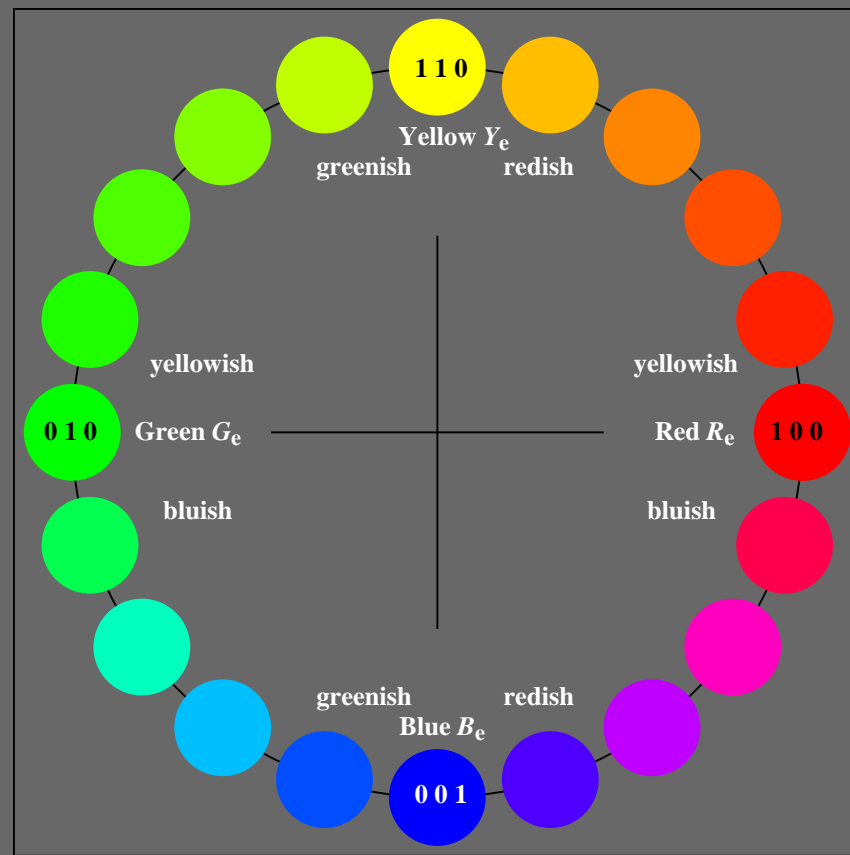
with hue number

$n = 00$ to 19

00 = Red R_e
05 = Yellow Y_e
10 = Green G_e
15 = Blue B_e



	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-103-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

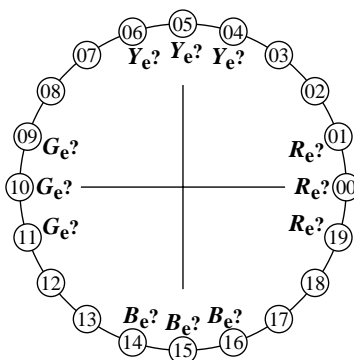
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: -> *rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010241

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN5_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN5_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 AE39F0PX_CYN5_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 AE39F0PX_CYN5_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:.....

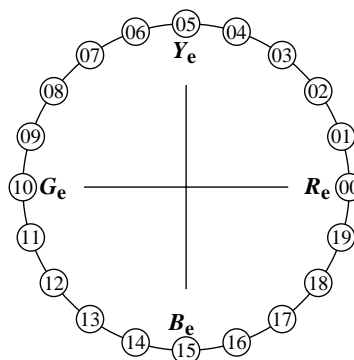
Special remarks: e. g. output of Landscape (L)

part 3,

AE390-7dd: 010241

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e .

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e , and Green G_e .
Green G_e and Blue B_e , Blue B_e , and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010241

Documentation of assessor colour-vision properties for visual assessment

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

underline: Yes/No

either according to DIN 6160:1996 with Anomaloskop of Nagel

underline: Yes/unknown

or with test charts using colour points according to Ishihara

underline: Yes/unknown

or tested with, please specify:

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/AE39/AE39F0PX_CYN5_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN5_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/AE39/AE39F0PX_CYN5_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN5_3.PS

underline: Yes/No

picture A7dd

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,

AE391-7dd: 010241

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

input: `rgb/cmy0/000n/w set...`
output: `->rgbdd setrgbcolor`

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 12/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

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	0,01	19,20 0,00 0,00	-3, 0,00 0,00	3,96
3	28,32 0,00 0,00	0,04	21,48 0,00 0,00	-6, 0,00 0,00	6,84
4	33,48 0,00 0,00	0,08	24,50 0,00 0,00	-8, 0,00 0,00	8,98
5	38,64 0,00 0,00	0,13	28,11 0,00 0,00	-10, 0,00 0,00	10,53
6	43,80 0,00 0,00	0,18	32,26 0,00 0,00	-11, 0,00 0,00	11,54
7	48,96 0,00 0,00	0,24	36,88 0,00 0,00	-12, 0,00 0,00	12,08
8	54,12 0,00 0,00	0,30	41,94 0,00 0,00	-12, 0,00 0,00	12,18
9	59,28 0,00 0,00	0,37	47,40 0,00 0,00	-11, 0,00 0,00	11,88
10	64,44 0,00 0,00	0,45	53,25 0,00 0,00	-11, 0,00 0,00	11,19
11	69,60 0,00 0,00	0,53	59,46 0,00 0,00	-10, 0,00 0,00	10,14
12	74,76 0,00 0,00	0,62	66,01 0,00 0,00	-8, 0,00 0,00	8,75
13	79,92 0,00 0,00	0,70	72,90 0,00 0,00	-7, 0,00 0,00	7,02
14	85,08 0,00 0,00	0,80	80,10 0,00 0,00	-4, 0,00 0,00	4,98
15	90,24 0,00 0,00	0,89	87,60 0,00 0,00	-2, 0,00 0,00	2,64
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	0,11	27,16 0,00 0,00	-10, 0,00 0,00	10,19
19	56,70 0,00 0,00	0,34	44,62 0,00 0,00	-12, 0,00 0,00	12,08
20	76,05 0,00 0,00	0,64	67,70 0,00 0,00	-8, 0,00 0,00	8,35
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

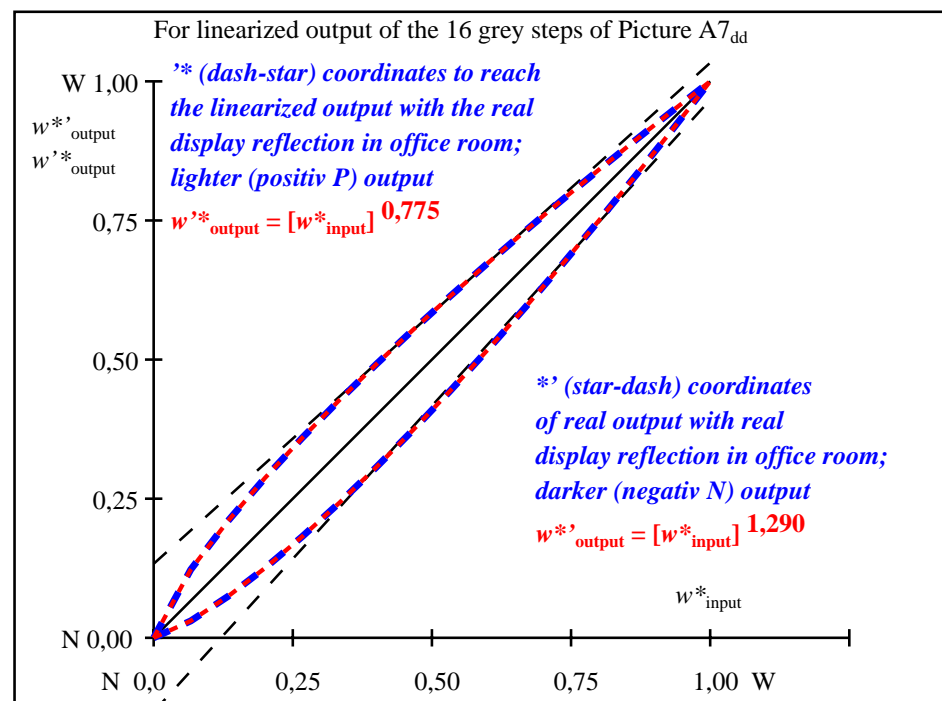
Mean lightness difference
(16 steps)
 $\Delta E^*_{CIELAB} = 7,6$

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

Mean colour reproduction index: $R^*_{ab,m} = 66,3$

part 1,

AE390-3dd: 010242



part 2,

AE391-3dd: 010242

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																
gN=1,290																
No. and																
Hex code																
$w^* = l^*_{CIELAB, r}$ (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	0,030	0,074	0,125	0,181	0,241	0,306	0,374	0,444	0,517	0,593	0,669	0,749	0,831	0,914	1,000

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

AE390-7dd: 010242

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
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: $->rgb_{dd}$ setrgbcolor

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output

TUB material: code=rh4ta

Input: Colorimetric Television Luminous System TLS00a

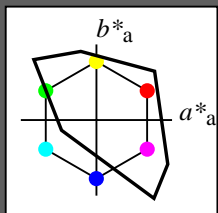
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

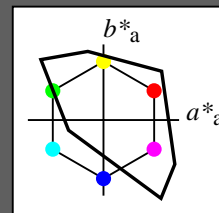
$n = 00$ to 19

00 = Red R_e

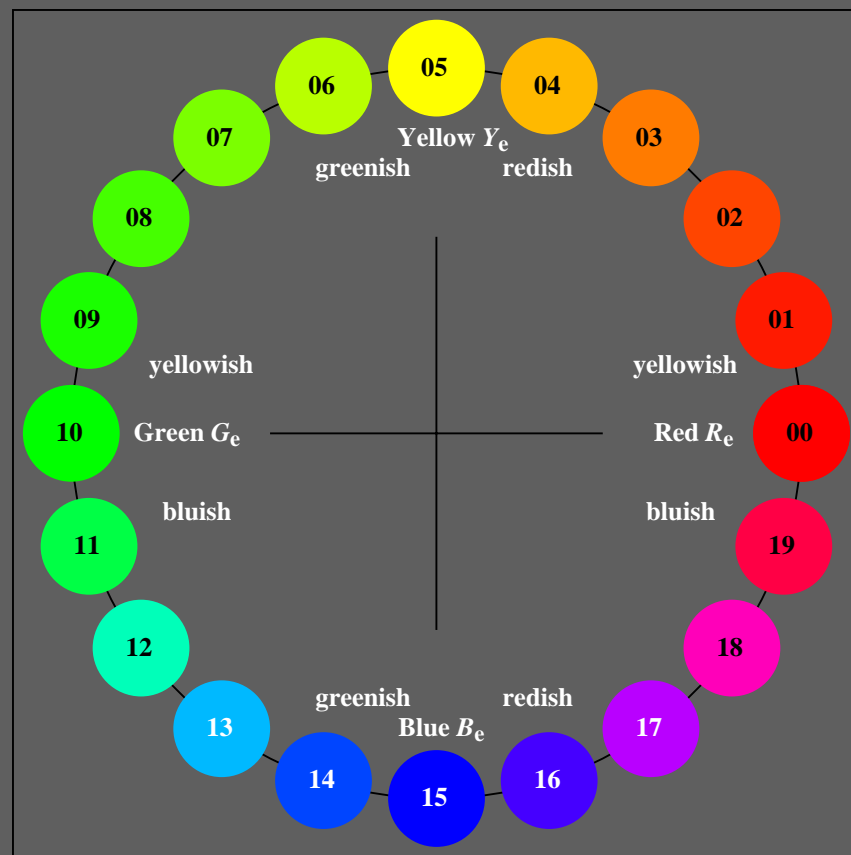
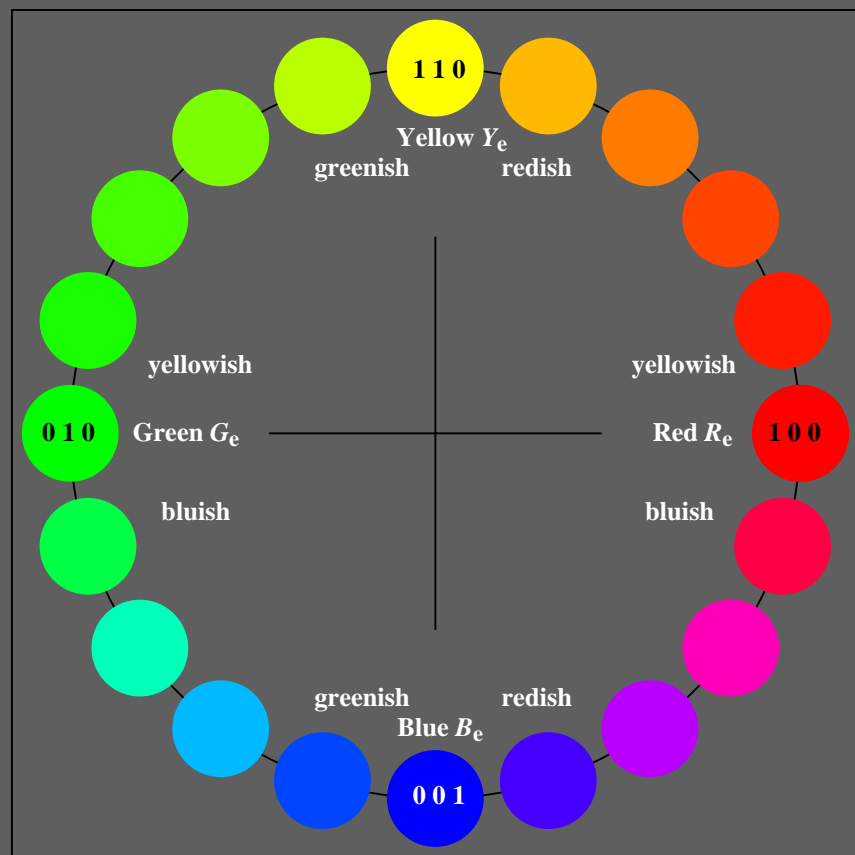
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-104-0: 20 step hue circle with 4 elementary colours R_e , J_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , J_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

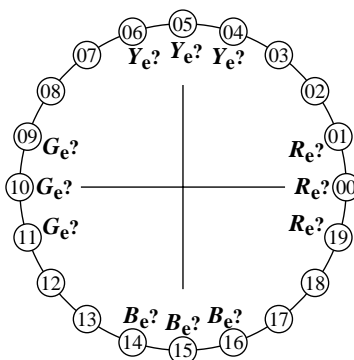
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: ->*rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010321

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN4_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN4_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 AE39F0PX_CYN4_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 AE39F0PX_CYN4_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)

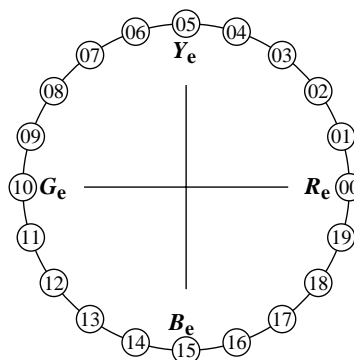
.....
.....
.....

part 3,

AE390-7dd: 010321

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e .
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010321

Documentation of assessor colour-vision properties for visual assessment

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

underline: Yes/No

either according to DIN 6160:1996 with Anomaloskop of Nagel

underline: Yes/unknown

or with test charts using colour points according to Ishihara

underline: Yes/unknown

or tested with, please specify:

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/AE39/AE39F0PX_CYN4_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN4_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/AE39/AE39F0PX_CYN4_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN4_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,

AE391-7dd: 010321

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

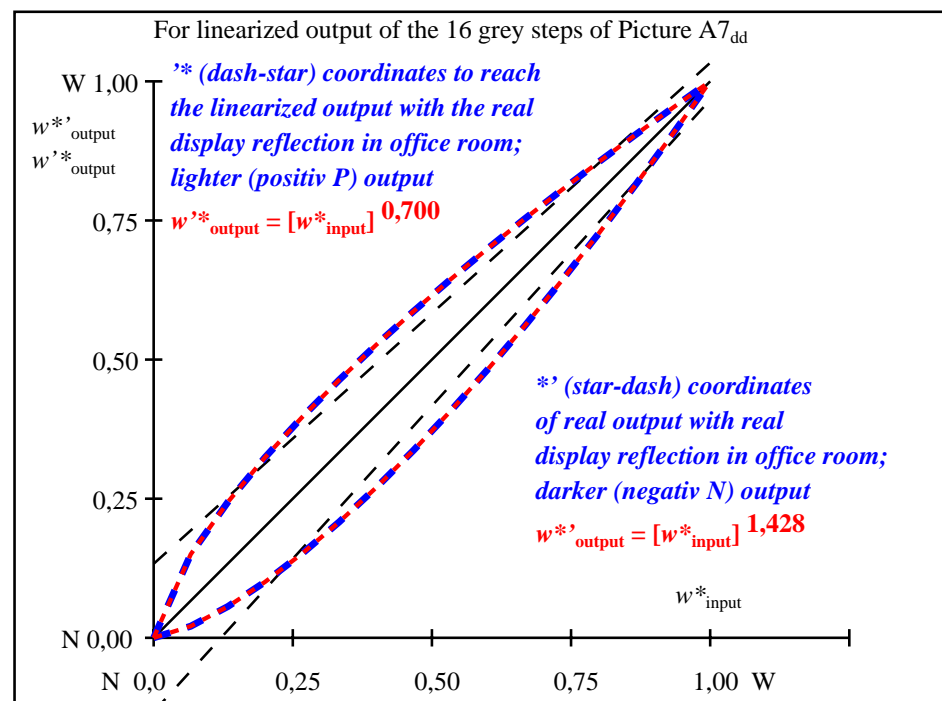
see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 15/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

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	0,00	27,49 0,00 0,00	-3, 0,00 0,00	3,92	ISO/IEC 15775 Annex G
3	35,98 0,00 0,00	0,03	28,99 0,00 0,00	-6, 0,00 0,00	6,99	and DIN 33866-1 Annex G
4	40,56 0,00 0,00	0,06	31,15 0,00 0,00	-9, 0,00 0,00	9,40	
5	45,13 0,00 0,00	0,10	33,90 0,00 0,00	-11, 0,00 0,00	11,22	
6	49,70 0,00 0,00	0,15	37,21 0,00 0,00	-12, 0,00 0,00	12,49	
7	54,27 0,00 0,00	0,20	41,02 0,00 0,00	-13, 0,00 0,00	13,24	
8	58,84 0,00 0,00	0,26	45,33 0,00 0,00	-13, 0,00 0,00	13,51	
9	63,41 0,00 0,00	0,33	50,10 0,00 0,00	-13, 0,00 0,00	13,31	
10	67,98 0,00 0,00	0,41	55,32 0,00 0,00	-12, 0,00 0,00	12,65	
11	72,55 0,00 0,00	0,49	60,98 0,00 0,00	-11, 0,00 0,00	11,57	
12	77,12 0,00 0,00	0,58	67,06 0,00 0,00	-10, 0,00 0,00	10,06	
13	81,69 0,00 0,00	0,68	73,55 0,00 0,00	-8, 0,00 0,00	8,14	
14	86,26 0,00 0,00	0,78	80,45 0,00 0,00	-5, 0,00 0,00	5,81	Mean lightness difference
15	90,83 0,00 0,00	0,88	87,73 0,00 0,00	-3, 0,00 0,00	3,10	(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} = 8,4
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	0,09	33,16 0,00 0,00	-10, 0,00 0,00	10,82	
19	61,12 0,00 0,00	0,30	47,66 0,00 0,00	-13, 0,00 0,00	13,46	Mean lightness difference
20	78,26 0,00 0,00	0,60	68,64 0,00 0,00	-9, 0,00 0,00	9,62	(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} = 6,7

Mean colour reproduction index: $R^*_{ab,m} = 62,8$

part 1,

AE390-3dd: 010322



part 2,

AE391-3dd: 010322

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																
g _N =1,428																
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	0,021	0,056	0,100	0,151	0,207	0,270	0,336	0,407	0,482	0,560	0,641	0,727	0,815	0,905	1,000

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

AE390-7dd: 010322

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
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*

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rh4ta

Input: Colorimetric Television Luminous System TLS00a

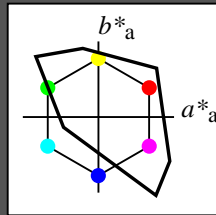
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

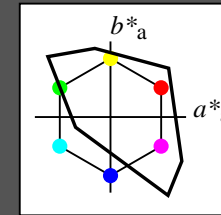
$n = 00$ to 19

00 = Red R_e

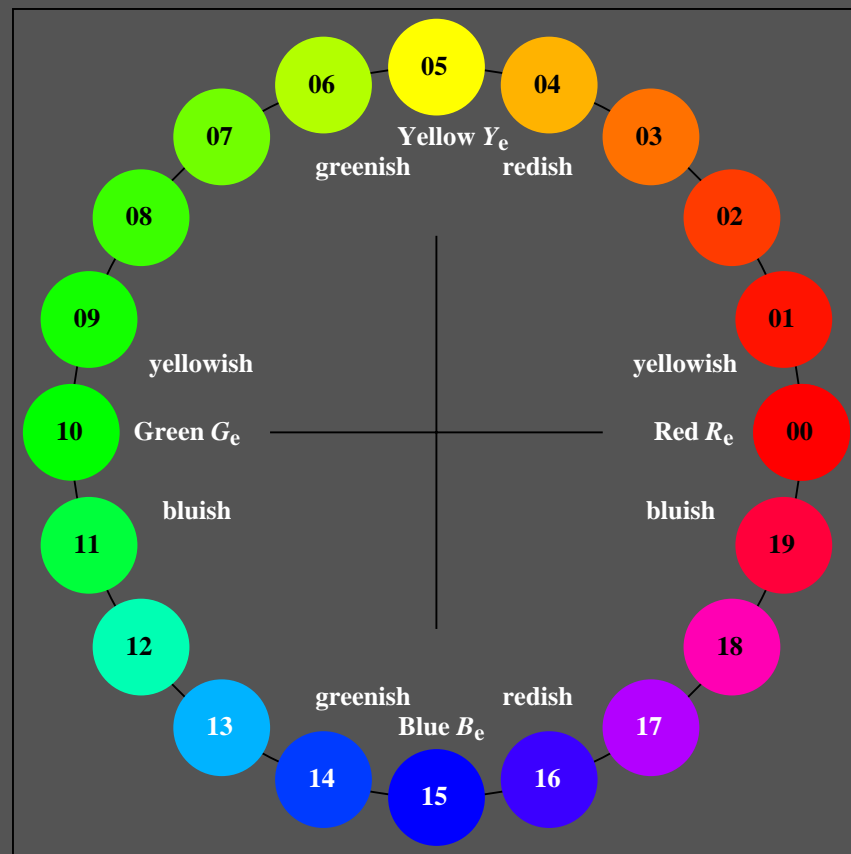
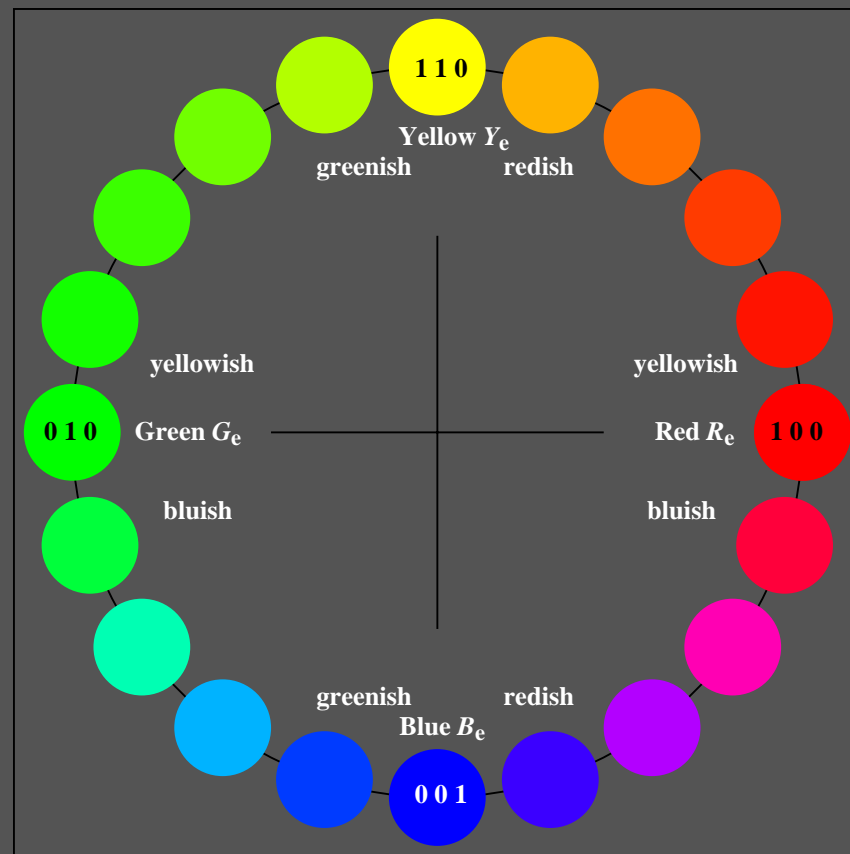
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-105-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

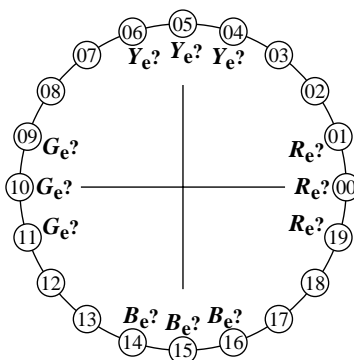
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: -> *rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010401

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN3_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN3_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 AE39F0PX_CYN3_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 AE39F0PX_CYN3_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)

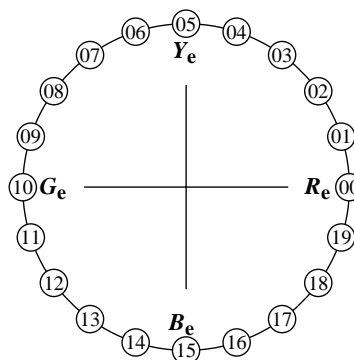
.....
.....
.....

part 3,

AE390-7dd: 010401

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e ,
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010401

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/AE39/AE39F0PX_CYN3_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN3_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/AE39/AE39F0PX_CYN3_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN3_3.PS

or 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,

AE391-7dd: 010401

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

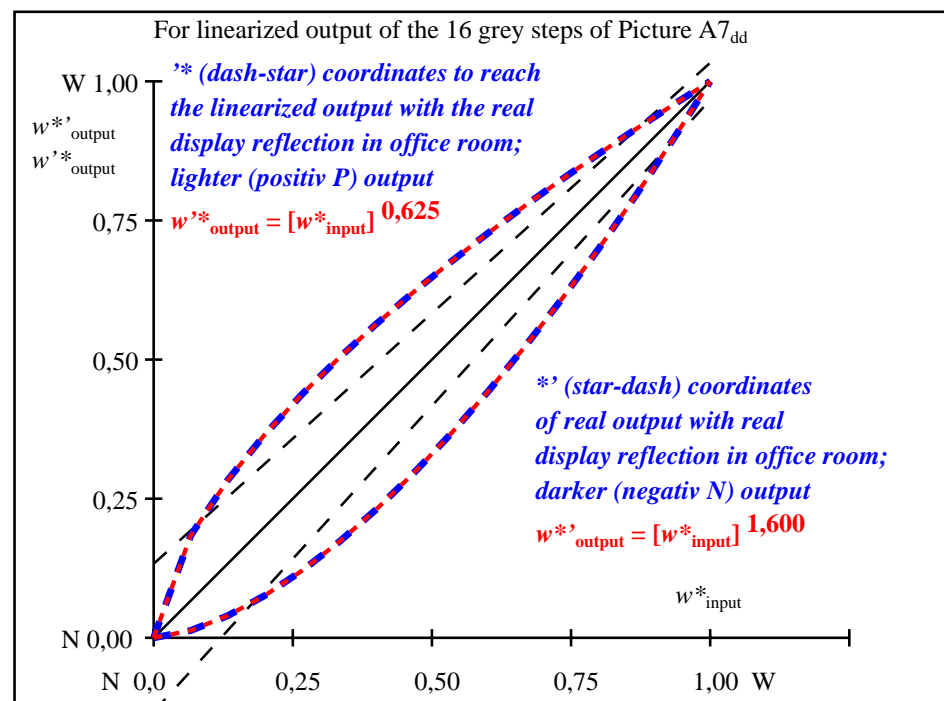
see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 18/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

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	0,00	38,32 0,00 0,00	-3, 0,00 0,00	3,49	ISO/IEC 15775 Annex G
3	45,64 0,00 0,00	0,02	39,23 0,00 0,00	-6, 0,00 0,00	6,40	and DIN 33866-1 Annex G
4	49,47 0,00 0,00	0,04	40,68 0,00 0,00	-8, 0,00 0,00	8,78	
5	53,29 0,00 0,00	0,08	42,64 0,00 0,00	-10, 0,00 0,00	10,65	
6	57,12 0,00 0,00	0,12	45,10 0,00 0,00	-12, 0,00 0,00	12,02	
7	60,95 0,00 0,00	0,17	48,05 0,00 0,00	-12, 0,00 0,00	12,90	
8	64,78 0,00 0,00	0,23	51,48 0,00 0,00	-13, 0,00 0,00	13,30	
9	68,61 0,00 0,00	0,30	55,37 0,00 0,00	-13, 0,00 0,00	13,23	
10	72,44 0,00 0,00	0,37	59,74 0,00 0,00	-12, 0,00 0,00	12,69	
11	76,26 0,00 0,00	0,46	64,56 0,00 0,00	-11, 0,00 0,00	11,70	
12	80,09 0,00 0,00	0,55	69,83 0,00 0,00	-10, 0,00 0,00	10,25	
13	83,92 0,00 0,00	0,65	75,56 0,00 0,00	-8, 0,00 0,00	8,35	
14	87,75 0,00 0,00	0,76	81,73 0,00 0,00	-6, 0,00 0,00	6,01	Mean lightness difference
15	91,58 0,00 0,00	0,87	88,35 0,00 0,00	-3, 0,00 0,00	3,22	(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	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	0,07	42,10 0,00 0,00	-10, 0,00 0,00	10,23	Mean lightness difference
19	66,69 0,00 0,00	0,26	53,37 0,00 0,00	-13, 0,00 0,00	13,32	(5 steps)
20	81,05 0,00 0,00	0,57	71,22 0,00 0,00	-9, 0,00 0,00	9,82	ΔL* _{CIELAB} = 6,6
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	

Mean colour reproduction index: $R^*_{ab,m} = 63,5$

part 1,

AE390-3dd: 010402



part 2,

AE391-3dd: 010402

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																
gN=1,600																
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	0,013	0,039	0,076	0,120	0,172	0,230	0,295	0,365	0,441	0,523	0,608	0,699	0,795	0,894	1,000

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

AE390-7dd: 010402

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
Viewing Y contrast $Y_W:Y_N=88,9:10$; Y_N -range 7,5 to <15

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

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rh4ta

Input: Colorimetric Television Luminous System TLS00a

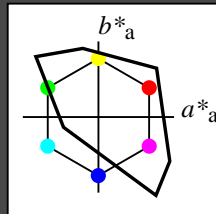
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272

Output: Colorimetric Television Luminous System TLS00a

with hue number

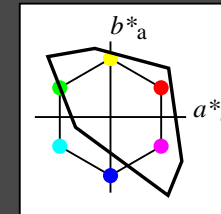
$n = 00$ to 19

00 = Red R_e

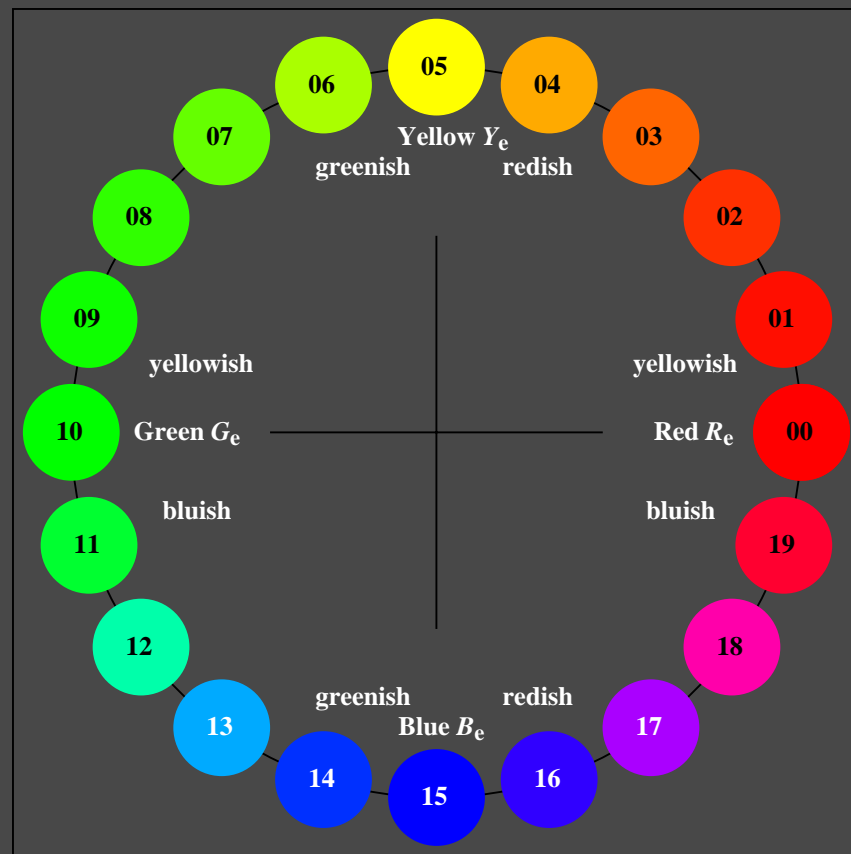
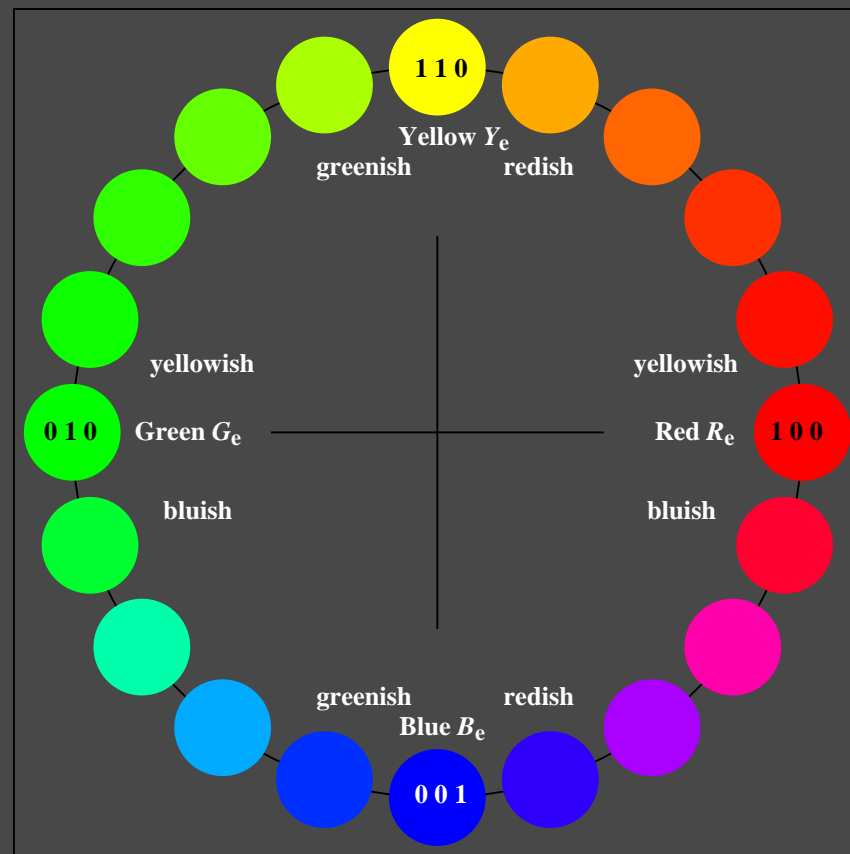
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$
O _{Ma}	50.5	76.92	64.55	100.42	40
Y _{Ma}	92.66	-20.69	90.75	93.08	103
L _{Ma}	83.63	-82.75	79.9	115.04	136
C _{Ma}	86.88	-46.16	-13.55	48.12	196
V _{Ma}	30.39	76.06	-103.59	128.52	306
M _{Ma}	57.3	94.35	-58.41	110.97	328
N _{Ma}	0.01	0.0	0.0	0.0	0
W _{Ma}	95.41	0.0	0.0	0.0	0
R _{CIE}	39.92	58.74	27.99	65.07	25
J _{CIE}	81.26	-2.88	71.56	71.62	92
G _{CIE}	52.23	-42.41	13.6	44.55	162
B _{CIE}	30.57	1.41	-46.46	46.49	272



AE390-7N-106-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

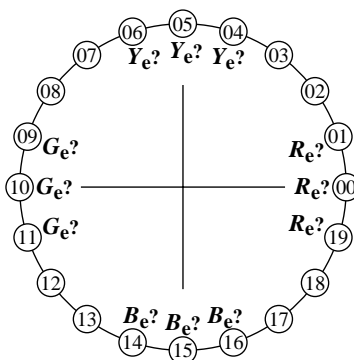
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: -> *rgb_{dd} setrgbcolor*

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010481

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN2_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN2_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 AE39F0PX_CYN2_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 AE39F0PX_CYN2_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:.....

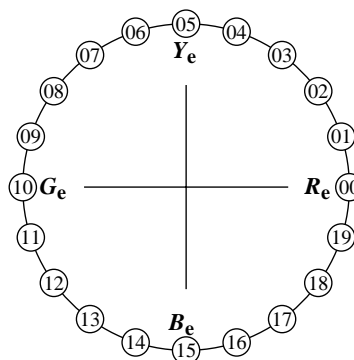
Special remarks: e. g. output of Landscape (L)

part 3,

AE390-7dd: 010481

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e ,
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010481

Documentation of assessor colour-vision properties for visual assessment

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

underline: Yes/No

either according to DIN 6160:1996 with Anomaloskop of Nagel

underline: Yes/unknown

or with test charts using colour points according to Ishihara

underline: Yes/unknown

or tested with, please specify:

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/AE39/AE39F0PX_CYN2_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN2_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/AE39/AE39F0PX_CYN2_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN2_3.PS

or 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,

AE391-7dd: 010481

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 21/24
technical information: <http://farbe.li.tu-berlin.de/AE39/AE39LF0NX.PDF> / .PS in file (F)

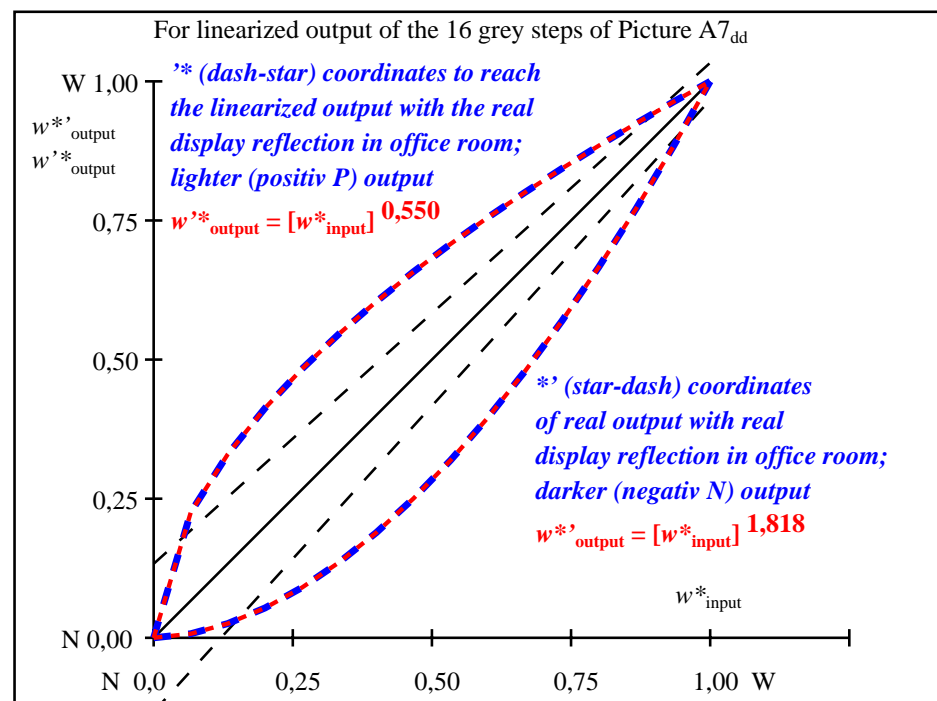
TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rh4ta

i	LAB [*] _{ref}	L [*] _{out}	LAB [*] _{out}	LAB [*] _{out-ref}	ΔE [*]	Start output S1
1	52,01 0,00 0,00	0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	54,91 0,00 0,00	0,00	52,17 0,00 0,00	-2, 0,00 0,00	2,73	ISO/IEC 15775 Annex G
3	57,80 0,00 0,00	0,01	52,67 0,00 0,00	-5, 0,00 0,00	5,12	and DIN 33866-1 Annex G
4	60,69 0,00 0,00	0,03	53,54 0,00 0,00	-7, 0,00 0,00	7,15	
5	63,58 0,00 0,00	0,06	54,79 0,00 0,00	-8, 0,00 0,00	8,79	
6	66,48 0,00 0,00	0,10	56,43 0,00 0,00	-10, 0,00 0,00	10,04	
7	69,37 0,00 0,00	0,14	58,46 0,00 0,00	-10, 0,00 0,00	10,90	
8	72,26 0,00 0,00	0,20	60,90 0,00 0,00	-11, 0,00 0,00	11,35	
9	75,16 0,00 0,00	0,27	63,75 0,00 0,00	-11, 0,00 0,00	11,40	
10	78,05 0,00 0,00	0,34	67,01 0,00 0,00	-11, 0,00 0,00	11,03	
11	80,94 0,00 0,00	0,43	70,68 0,00 0,00	-10, 0,00 0,00	10,25	
12	83,83 0,00 0,00	0,52	74,78 0,00 0,00	-9, 0,00 0,00	9,05	
13	86,73 0,00 0,00	0,62	79,29 0,00 0,00	-7, 0,00 0,00	7,43	
14	89,62 0,00 0,00	0,74	84,23 0,00 0,00	-5, 0,00 0,00	5,38	Mean lightness difference
15	92,51 0,00 0,00	0,86	89,60 0,00 0,00	-2, 0,00 0,00	2,90	(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} = 7,1
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	0,05	54,44 0,00 0,00	-8, 0,00 0,00	8,42	
19	73,71 0,00 0,00	0,23	62,28 0,00 0,00	-11, 0,00 0,00	11,43	Mean lightness difference
20	84,56 0,00 0,00	0,54	75,87 0,00 0,00	-8, 0,00 0,00	8,69	(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} = 5,7

Mean colour reproduction index: $R^*_{ab,m} = 68,8$

part 1,

AE390-3dd: 010482



AE391-3dd: 010482

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																
g _N =1,818																
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	0,007	0,025	0,053	0,090	0,135	0,189	0,250	0,318	0,395	0,478	0,568	0,666	0,771	0,881	1,000

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

AE390-7dd: 010482

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
Viewing Y contrast $Y_W:Y_N=88,9:20$; Y_N -range 15 to <30

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

Input: Colorimetric Television Luminous System TLS00a

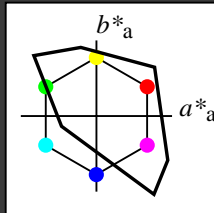
with *rgb* data of the
four elementary hues

1 0 0 = Red R_e

1 1 0 = Yellow Y_e

0 1 0 = Green G_e

0 0 1 = Blue B_e



TLS00a; adapted (a) CIELAB data					
$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$	
O _{Ma} 50.5	76.92	64.55	100.42	40	
Y _{Ma} 92.66	-20.69	90.75	93.08	103	
L _{Ma} 83.63	-82.75	79.9	115.04	136	
C _{Ma} 86.88	-46.16	-13.55	48.12	196	
V _{Ma} 30.39	76.06	-103.59	128.52	306	
M _{Ma} 57.3	94.35	-58.41	110.97	328	
N _{Ma} 0.01	0.0	0.0	0.0	0	
W _{Ma} 95.41	0.0	0.0	0.0	0	
R _{CIE} 39.92	58.74	27.99	65.07	25	
J _{CIE} 81.26	-2.88	71.56	71.62	92	
G _{CIE} 52.23	-42.41	13.6	44.55	162	
B _{CIE} 30.57	1.41	-46.46	46.49	272	

Output: Colorimetric Television Luminous System TLS00a

with hue number

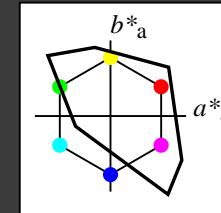
$n = 00$ to 19

00 = Red R_e

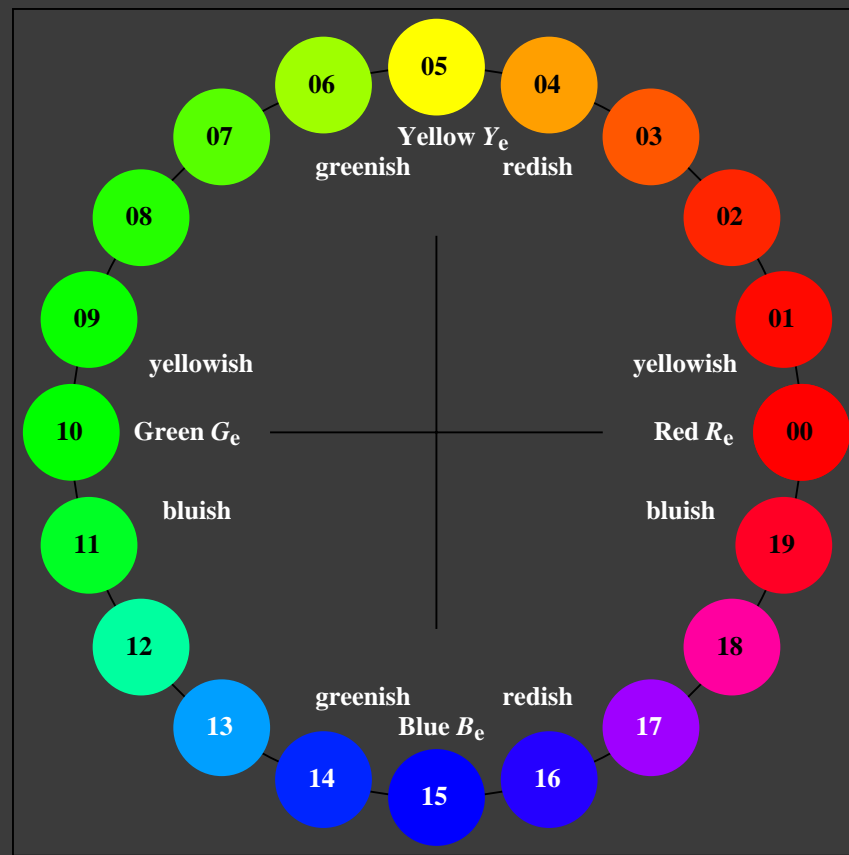
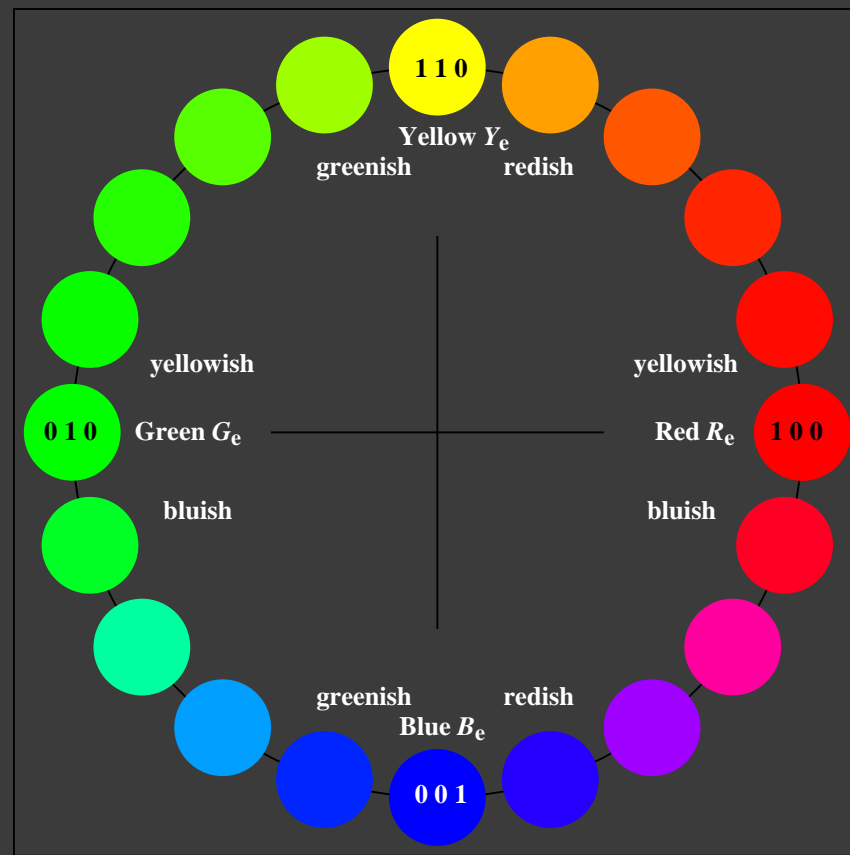
05 = Yellow Y_e

10 = Green G_e

15 = Blue B_e



TLS00a; adapted (a) CIELAB data					
$L^*=L^*_a$	a^*_a	b^*_a	$C^*_{ab,a}$	$h^*_{ab,a}$	
O _{Ma} 50.5	76.92	64.55	100.42	40	
Y _{Ma} 92.66	-20.69	90.75	93.08	103	
L _{Ma} 83.63	-82.75	79.9	115.04	136	
C _{Ma} 86.88	-46.16	-13.55	48.12	196	
V _{Ma} 30.39	76.06	-103.59	128.52	306	
M _{Ma} 57.3	94.35	-58.41	110.97	328	
N _{Ma} 0.01	0.0	0.0	0.0	0	
W _{Ma} 95.41	0.0	0.0	0.0	0	
R _{CIE} 39.92	58.74	27.99	65.07	25	
J _{CIE} 81.26	-2.88	71.56	71.62	92	
G _{CIE} 52.23	-42.41	13.6	44.55	162	
B _{CIE} 30.57	1.41	-46.46	46.49	272	



AE390-7N-107-0: 20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (left)

20 step hue circle with 4 elementary colours R_e , Y_e , G_e , B_e (right)

Test chart AE39 similar to test chart 1 of DIN 33872-5

20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: *->rgb_{dd} setrgbcolor*

Test chart AE39 similar to test chart 1 of DIN 33872-5

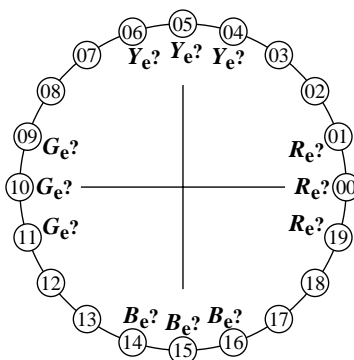
20 step elementary hue circle; Test chart according to DIN 33872-5

Test chart AE39 similar to test chart 1 of DIN 33872-5

20 step elementary hue circle; Test chart according to DIN 33872-5

Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

The elementary hues Red R_e and Green G_e
should locate on the horizontal axis.

The elementary hues Yellow Y_e and Blue B_e
should locate on the vertical axis.

This test uses a hue circle with 20 hues.

No. 00 and 10 should be Red R_e and Green G_e .
No. 05 and 15 should be Yellow Y_e and Blue B_e .

Are no. 00, 05, 10, and 15 the four elementary hues R_e , Y_e , G_e and B_e ? underline: Yes/No
Only in case of "No":

Elementary Red R_e is hue step no. (e. g. 00, 01, 19) (neither yellowish nor blueish)
Elementary Yellow Y_e is hue step no. (e. g. 05, 04, 06) (neither reddish nor greenish)
Elementary Green G_e is hue step no. (e. g. 10, 09, 11) (neither yellowish nor blueish)
Elementary Blau B_e is hue step no. (e. g. 15, 14, 16) (neither reddish nor greenish)

Result: Of the 4 elementary hues (e.g. three) are at the intended location.

part 1,

AE390-3dd: 010561

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

PDF file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN1_1.PDF

underline: Yes/No

PS file:

http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN1_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 AE39F0PX_CYN1_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 AE39F0PX_CYN1_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)

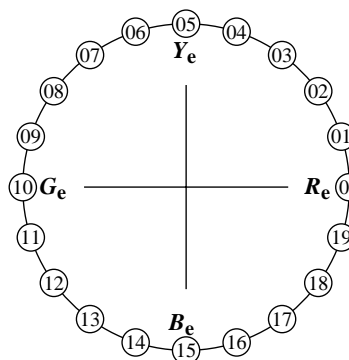
.....
.....
.....

part 3,

AE390-7dd: 010561

Discriminability of colours with 20 hues (Yes/No decision)

Layout example: Discriminability of colours with 20 hues.



There are four elementary hues on each page:
Red R_e , Yellow Y_e , Green G_e , and Blue B_e

Input data 1 0 0 may produce: Red R_e .
Input data 0 1 0 may produce: Green G_e .
Input data 0 0 1 may produce: Blue B_e .
Input data 1 1 0 may produce: Yellow Y_e .

Four hue steps are between:
Red R_e and Yellow Y_e , Yellow Y_e and Green G_e ,
Green G_e and Blue B_e , Blue B_e and Red R_e .

This test uses a hue circle with 20 hues.
All 20 hues should be distinguishable.

For this test it is **not** necessary:

1. All 20 differences are visually equal.
2. Elementary hues locate at 00, 05, 10, and 15.

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01)are not distinguishable.
The colours of the two hue steps no. (e. g. 14 and 15)are not distinguishable.
The colours of the two hue steps no. (e. g. 15 and 16)are not distinguishable.
List other pairs:

Result: Of the 20 hue differences are (e.g. 18) differences visible.

part 2,

AE391-3dd: 010561

Documentation of assessor colour-vision properties for visual assessment

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

underline: Yes/No

either according to DIN 6160:1996 with Anomaloskop of Nagel

underline: Yes/unknown

or with test charts using colour points according to Ishihara

underline: Yes/unknown

or tested with, please specify:

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/AE39/AE39F0PX_CYN1_3.PDF

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN1_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/AE39/AE39F0PX_CYN1_3.PDF

underline: Yes/No

picture A7dd

underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE39/AE39F0PX_CYN1_3.PS

or 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,

AE391-7dd: 010561

Form A: Test chart AE39 similar to test chart 1 of DIN 33872-5
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE39/AE39F0NX.PDF> / .PS; 3D-linearization, page 24/24
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE39F0NX.PDF> / .PS in file (F)

<i>i</i>	<i>LAB</i> [*] _{ref}	<i>L</i> [*] _{out}	<i>LAB</i> [*] _{out}	<i>LAB</i> [*] _{out-ref}	ΔE^*	Start output S1
1	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	71,41 0,00 0,00	0,00	69,75 0,00 0,00	-1, 0,00 0,00	1,65	ISO/IEC 15775 Annex G
3	73,12 0,00 0,00	0,01	69,96 0,00 0,00	-3, 0,00 0,00	3,15	and DIN 33866-1 Annex G
4	74,83 0,00 0,00	0,02	70,37 0,00 0,00	-4, 0,00 0,00	4,46	
5	76,55 0,00 0,00	0,05	70,99 0,00 0,00	-5, 0,00 0,00	5,56	
6	78,26 0,00 0,00	0,08	71,84 0,00 0,00	-6, 0,00 0,00	6,42	
7	79,98 0,00 0,00	0,12	72,93 0,00 0,00	-7, 0,00 0,00	7,04	
8	81,69 0,00 0,00	0,17	74,28 0,00 0,00	-7, 0,00 0,00	7,40	
9	83,41 0,00 0,00	0,24	75,90 0,00 0,00	-7, 0,00 0,00	7,50	
10	85,12 0,00 0,00	0,31	77,80 0,00 0,00	-7, 0,00 0,00	7,32	
11	86,83 0,00 0,00	0,39	79,98 0,00 0,00	-6, 0,00 0,00	6,85	
12	88,55 0,00 0,00	0,49	82,45 0,00 0,00	-6, 0,00 0,00	6,09	
13	90,26 0,00 0,00	0,60	85,22 0,00 0,00	-5, 0,00 0,00	5,04	
14	91,98 0,00 0,00	0,72	88,30 0,00 0,00	-3, 0,00 0,00	3,67	
15	93,69 0,00 0,00	0,85	91,69 0,00 0,00	-1, 0,00 0,00	1,99	
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	0,04	70,81 0,00 0,00	-5, 0,00 0,00	5,30	
19	82,55 0,00 0,00	0,20	75,06 0,00 0,00	-7, 0,00 0,00	7,48	
20	88,98 0,00 0,00	0,52	83,11 0,00 0,00	-5, 0,00 0,00	5,86	
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	

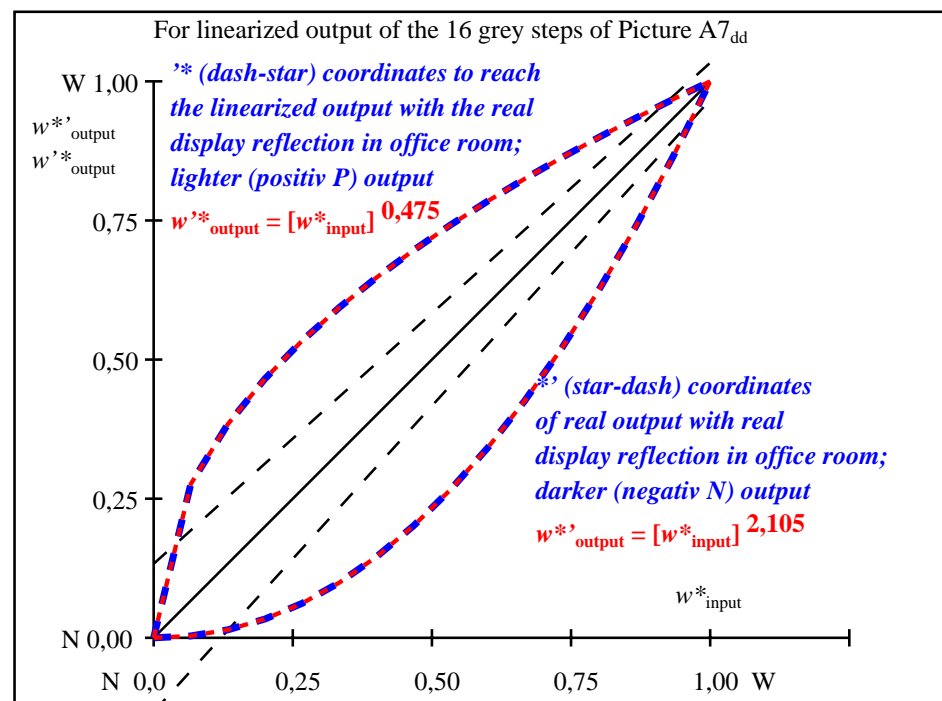
Mean lightness difference (16 steps)
 $\Delta E^*_{\text{CIELAB}} = 4,6$

Mean lightness difference (5 steps)
 $\Delta L^*_{\text{CIELAB}} = 3,7$

Mean colour reproduction index: $R^*_{\text{ab,m}} = 79,6$

part 1,

AE390-3dd: 010562



AE391-3dd: 010562

<i>L</i> [*] / <i>Y</i> _{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																
gN=2,105 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
<i>w</i> [*] = <i>L</i> [*] _{CIELAB, r} (relative)																
<i>w</i> [*] _{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
<i>w</i> [*] _{output}	0,000	0,003	0,014	0,033	0,062	0,098	0,145	0,201	0,265	0,341	0,426	0,520	0,625	0,740	0,864	1,000

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

AE390-7dd: 010562

In-out: Test chart AE39 similar to test chart 1 of DIN 33872-5
Viewing *Y* contrast $Y_W:Y_N=88,9:40$; Y_N -range 30 to <60

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

TUB Registration: 20190301-AE39/AE39L0FA.TXT /.PS
application for measurement or viewing of display and print output
TUB material: code=rha4ta