

Input and Output: Television Luminous System TLS00a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

hue text for the colours

of this page:

$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10

TLS00a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	50.5	76.9	64.5	100.4	40
$Y_e, Ma$	92.6	-20.6	90.7	93.0	102
$G_e, Ma$	83.6	-82.7	79.9	115.0	136
$C_e, Ma$	86.8	-46.1	-13.5	48.0	196
$B_e, Ma$	30.3	76.0	-103.6	128.5	306
$M_e, Ma$	57.3	94.3	-58.4	110.9	328
$N_e, Ma$	0.0	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271

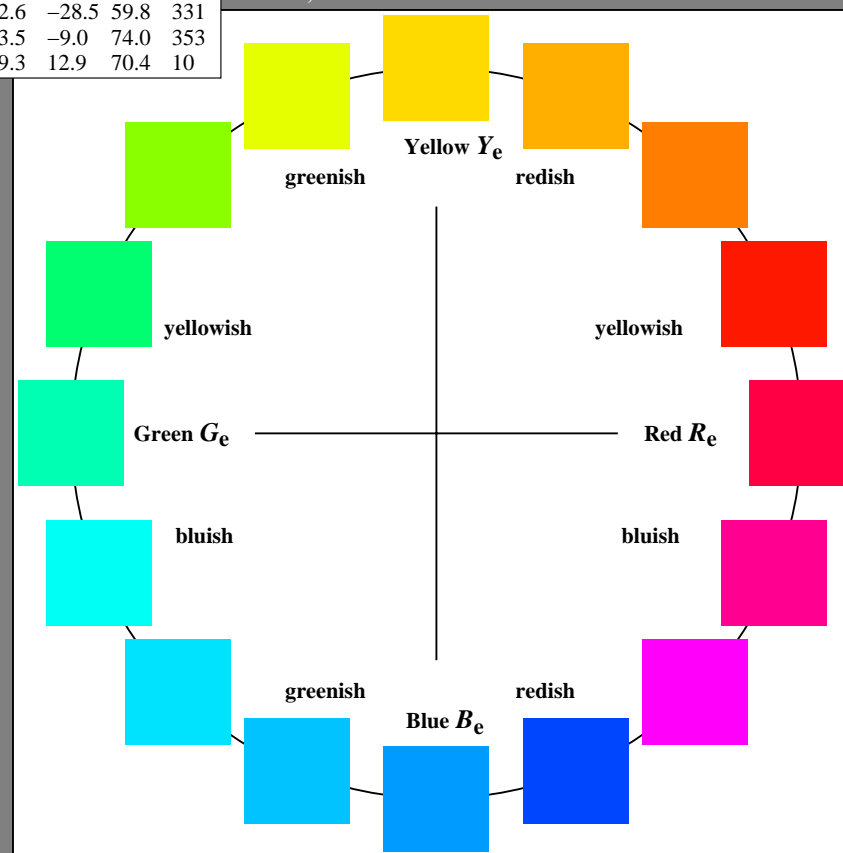
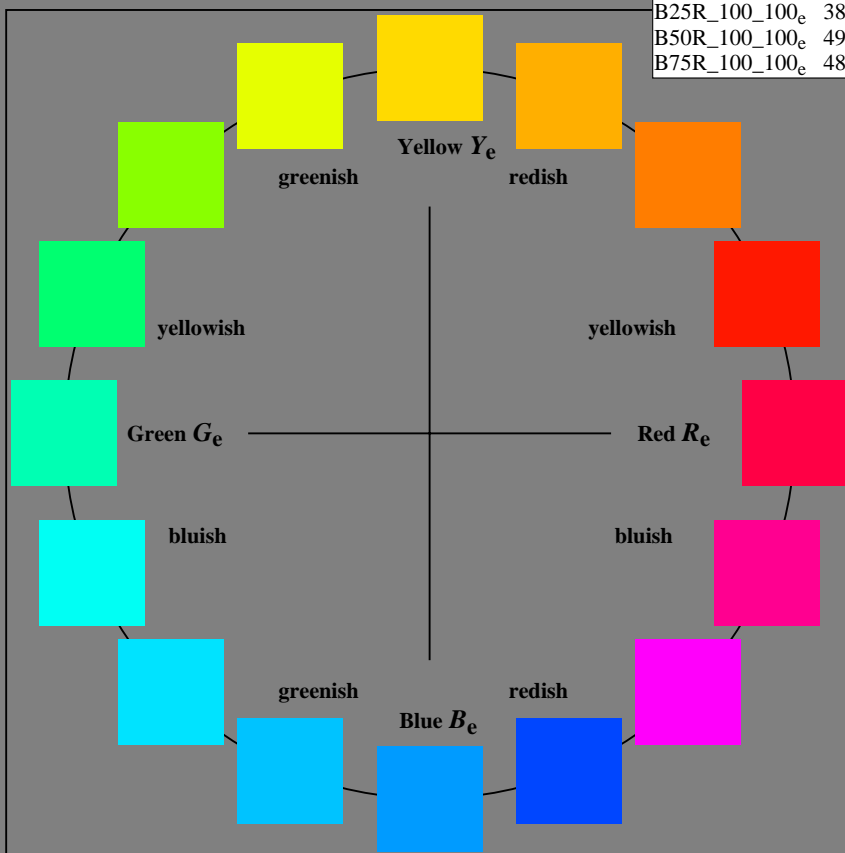
%Gamut

$u^*_{rel} = 158$

%Regularity

$g^*H_{rel} = 19$

$g^*C_{rel} = 37$



1-110000-L0 cmyn6\*

AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

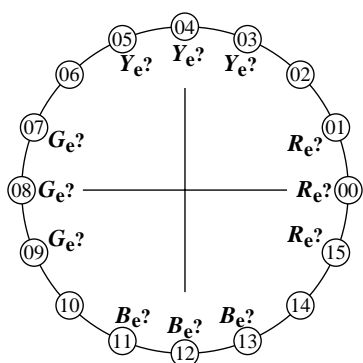
input:  $rgb/cmy0/000n/w$  set...  
output:  $->rgb_{de}$  set $rgbcolor$

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=rha4ta

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 11001

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN8\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN8_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN8\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

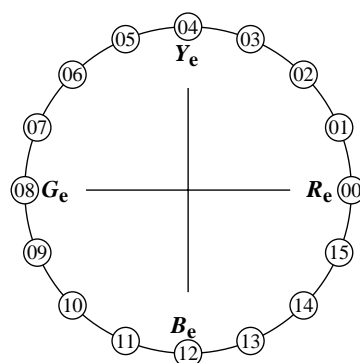
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 11001

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 11001

### 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/AE66/AE66F0PX\\_CYN8\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN8_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN8\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN8_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN8\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN8_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN8\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN8_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 11001

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 3/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

i	LAB <sup>*</sup> <sub>ref</sub>	L <sup>*</sup> <sub>out</sub>	LAB <sup>*</sup> <sub>out</sub>	LAB <sup>*</sup> <sub>out-ref</sub>	ΔE <sup>*</sup>	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

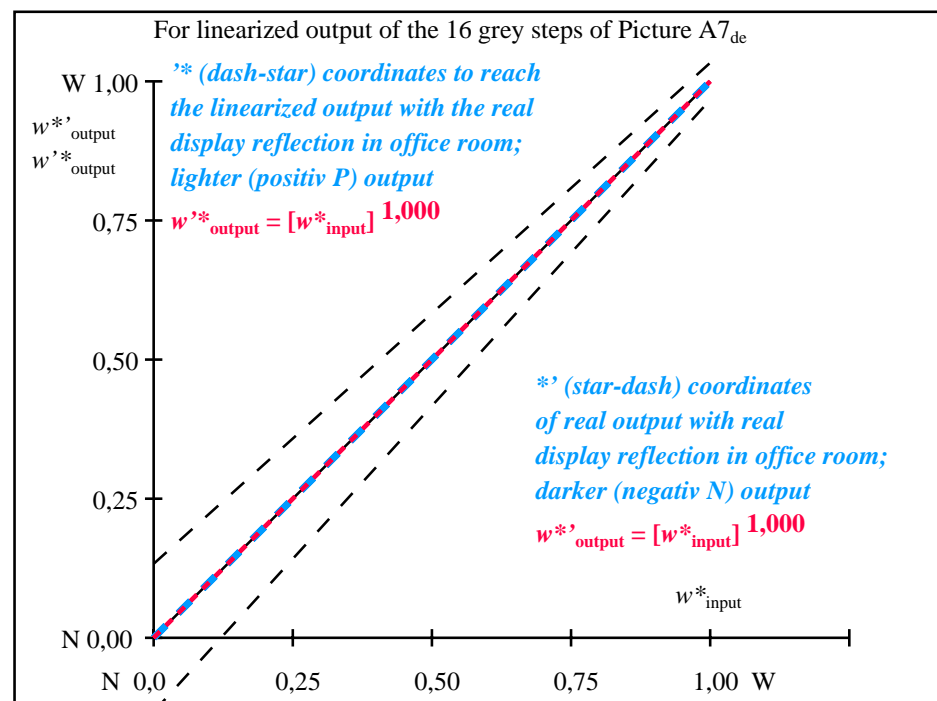
Mean lightness difference (16 steps)  
ΔE<sup>\*</sup><sub>CIELAB</sub> = 0,0

Mean lightness difference (5 steps)  
ΔL<sup>\*</sup><sub>CIELAB</sub> = 0,0

Mean colour reproduction index: R<sup>\*</sup><sub>ab,m</sub> = 99,9

part 1,

AE660-3de: 11002



part 2,

AE661-3de: 11002

L <sup>*</sup> /Y <sub>intended</sub> (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 <sup>*</sup> = l <sup>*</sup> <sub>CIELAB, r</sub> (relative)																
w <sup>*</sup> <sub>intended</sub>	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 <sup>*</sup> <sub>output</sub>	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<sub>de</sub>: 16 visual equidistant L<sup>\*</sup>-grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 11002

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
Viewing Y contrast Y<sub>W</sub>: Y<sub>N</sub>=88,9:0,31; Y<sub>N</sub>-range 0,0 to <0,46

input: rgb/cmy0/000n/w set...  
output: ->rgb<sub>de</sub> setrgbcolor

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rh4ta

Input and Output: Television Luminous System TLS06a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

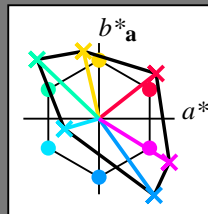
hue text for the colours

of this page:

$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10



%Gamut

$u^*_{rel} = 145$

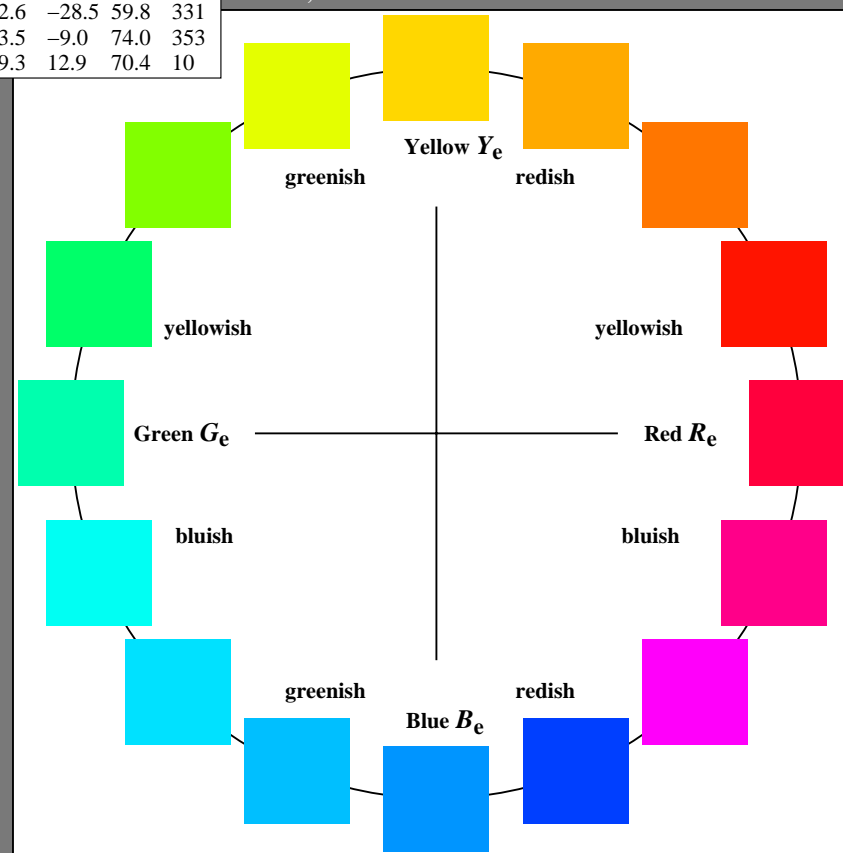
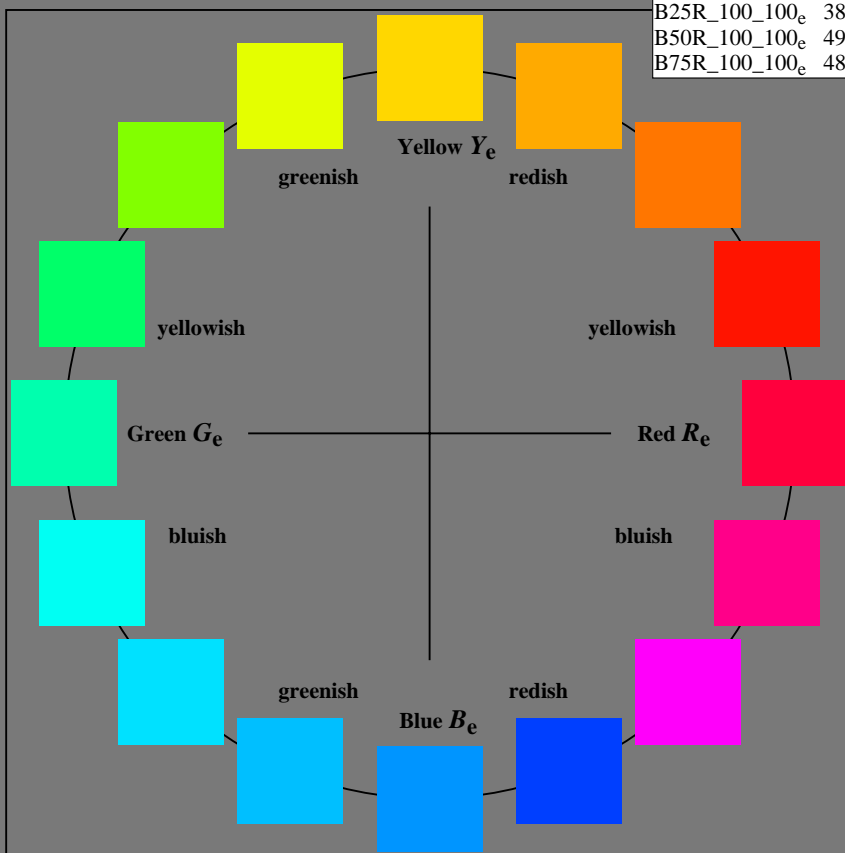
%Regularity

$g^*H_{rel} = 20$

$g^*C_{rel} = 38$

TLS06a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	51.0	75.5	59.6	96.2	38
$Y_e, Ma$	92.6	-20.5	89.2	91.5	102
$G_e, Ma$	83.7	-81.7	78.3	113.2	136
$C_e, Ma$	86.9	-45.7	-13.4	47.6	196
$B_e, Ma$	31.7	72.9	-101.3	124.8	305
$M_e, Ma$	57.7	93.0	-57.7	109.5	328
$N_e, Ma$	5.6	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



1-110000-L0 cmyn6\*

AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

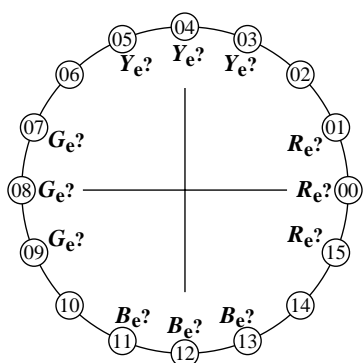
see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 4/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rha4ta



### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 11081

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN7\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN7_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN7\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

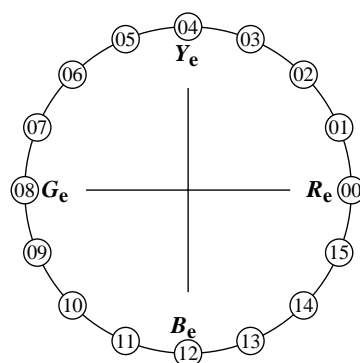
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 11081

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 11081

### 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/AE66/AE66F0PX\\_CYN7\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN7_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN7\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN7_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN7\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN7_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN7\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN7_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 11081

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 6/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

i	LAB* <sub>ref</sub>	L* <sub>out</sub>	LAB* <sub>out</sub>	LAB* <sub>out-ref</sub>	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**

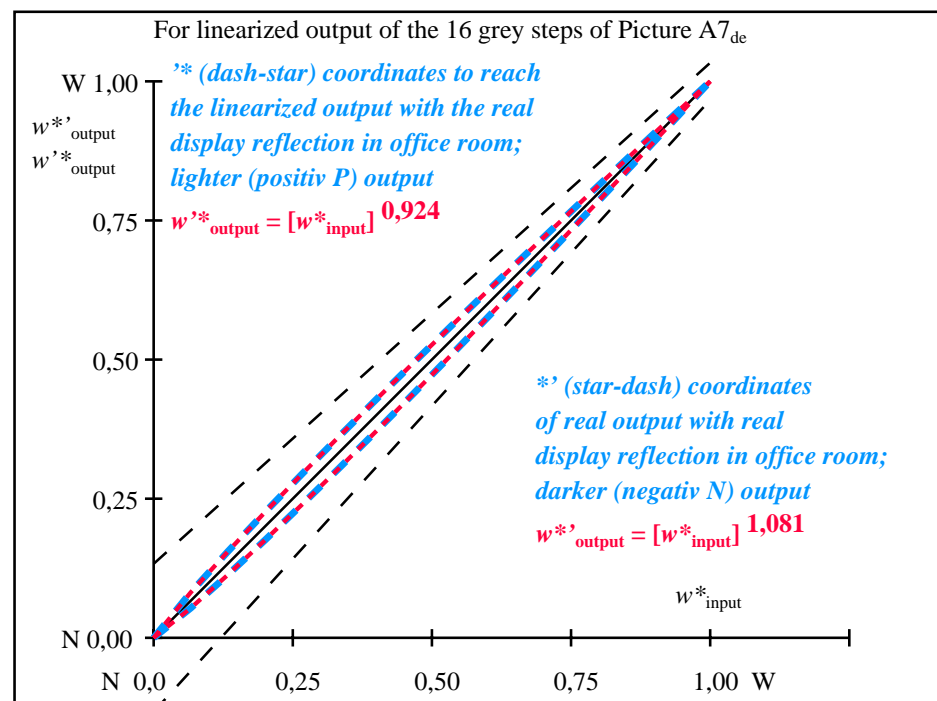
**Mean lightness difference (16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 3,4$

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

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

part 1,

AE660-3de: 11082



part 2,

AE661-3de: 11082

$L^*/Y_{\text{intended}}$ (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																
gN=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
$w^* = l^*_{\text{CIELAB}, r}$ (relative)																
$w^*_{\text{intended}}$	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
$w^*_{\text{output}}$	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<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 11082

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
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:  $->rgb_{\text{de}}$  setrgbcolor

Input and Output: Television Luminous System TLS11a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

hue text for the colours

of this page:

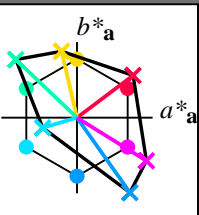
$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10

TLS11a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	51.6	74.2	55.8	92.8	36
$Y_e, Ma$	92.7	-20.3	87.7	90.0	103
$G_e, Ma$	83.8	-80.8	76.8	111.5	136
$C_e, Ma$	87.0	-45.2	-13.3	47.2	196
$B_e, Ma$	33.0	70.0	-99.0	121.3	305
$M_e, Ma$	58.1	91.8	-57.0	108.0	328
$N_e, Ma$	10.9	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



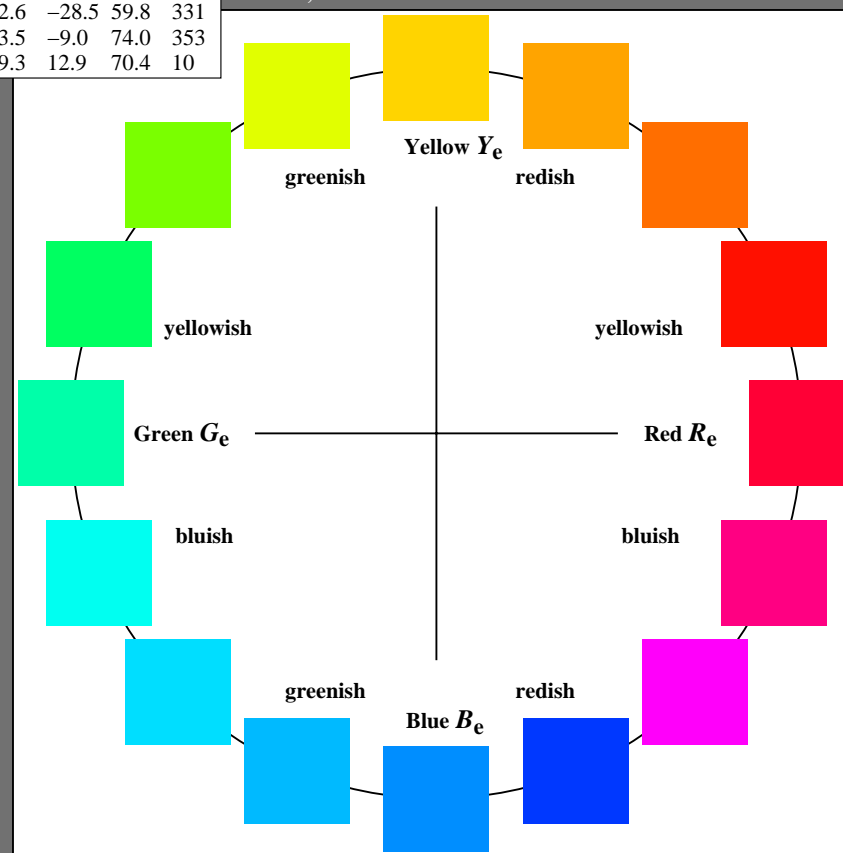
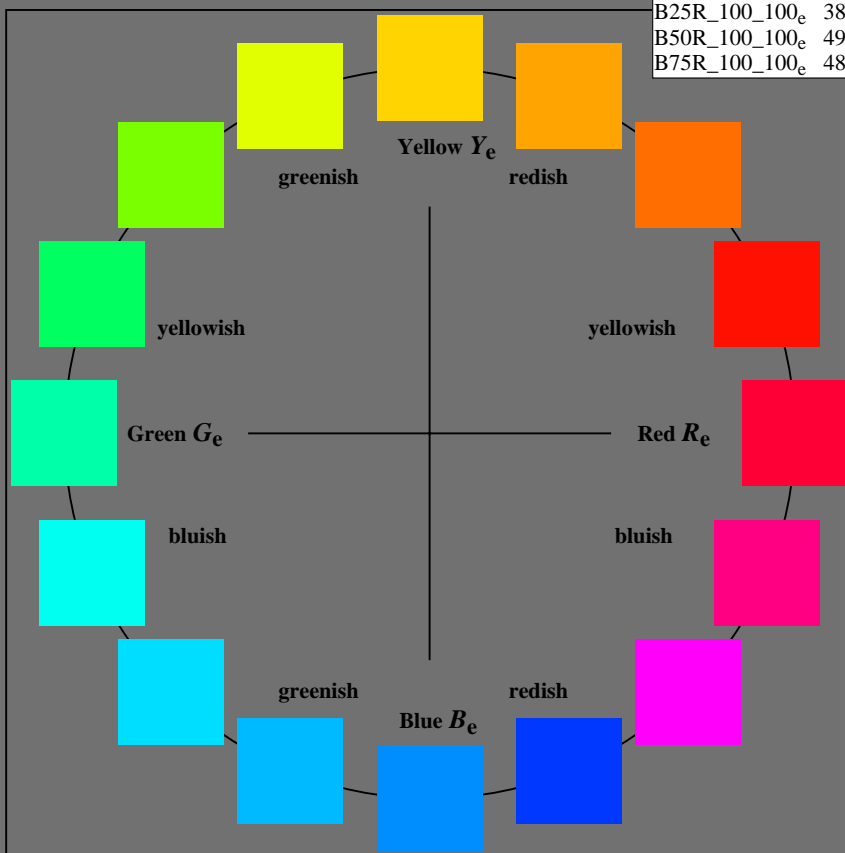
%Gamut

$u^*_{rel} = 134$

%Regularity

$g^*H_{rel} = 21$

$g^*C_{rel} = 38$



1-110000-L0 cmyn6\*

AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

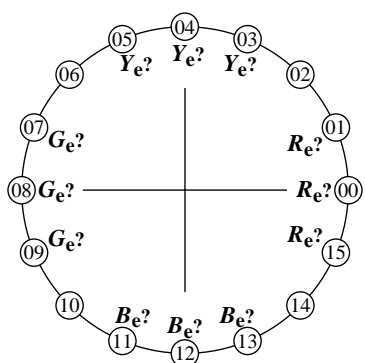
input:  $rgb/cmy0/000n/w$  set...  
output:  $\rightarrow rgb_{de}$  set  $rgbcolor$

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 7/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rha4ta

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blue  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110161

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN6\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN6_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN6\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

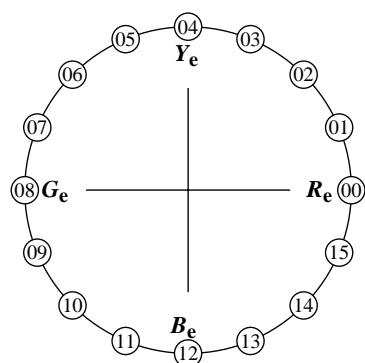
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 110161

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110161

### 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/AE66/AE66F0PX\\_CYN6\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN6_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN6\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN6_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN6\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN6_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN6\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN6_3.PS)

underline: Yes/No

picture A7de

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,

AE661-7de: 110161

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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



see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 9/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

i	LAB <sup>*</sup> <sub>ref</sub>	L <sup>*</sup> <sub>out</sub>	LAB <sup>*</sup> <sub>out</sub>	LAB <sup>*</sup> <sub>out-ref</sub>	ΔE <sup>*</sup>	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 ISO/IEC 15775 Annex G and DIN 33866-1 Annex G
2	16,62 0,00 0,00	0,02	13,11 0,00 0,00	-3, 0,00 0,00	3,50	
3	22,24 0,00 0,00	0,06	16,44 0,00 0,00	-5, 0,00 0,00	5,80	
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	
15	89,78 0,00 0,00	0,91	87,84 0,00 0,00	-1, 0,00 0,00	1,93	
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	
17	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01	
18	32,09 0,00 0,00	0,15	23,80 0,00 0,00	-8, 0,00 0,00	8,29	
19	53,20 0,00 0,00	0,38	43,88 0,00 0,00	-9, 0,00 0,00	9,32	
20	74,30 0,00 0,00	0,67	68,07 0,00 0,00	-6, 0,00 0,00	6,22	
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	

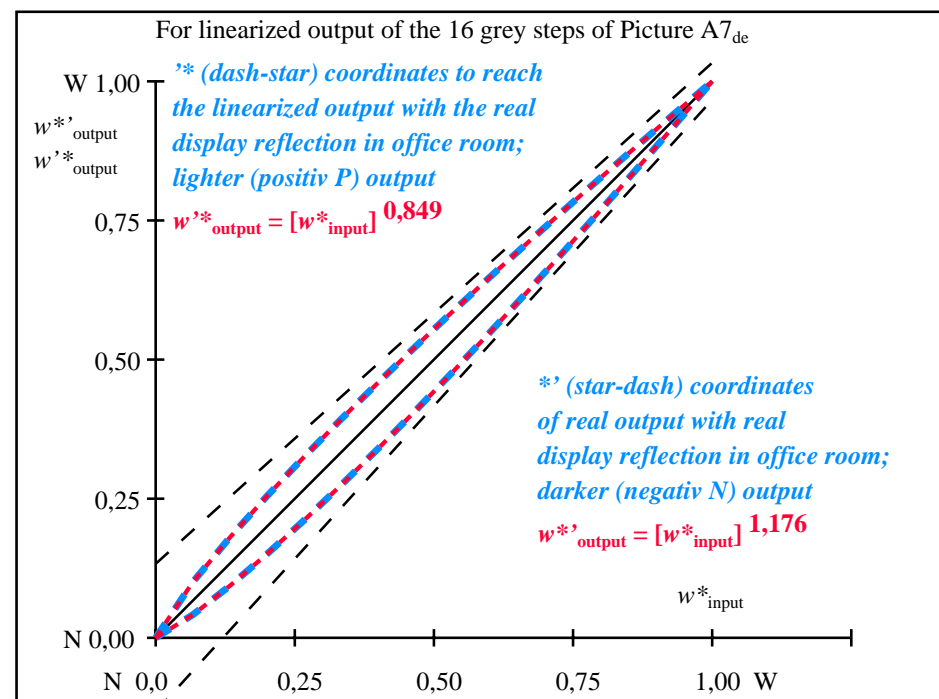
Mean lightness difference (16 steps)  
 $\Delta E^*_{\text{CIELAB}} = 6,0$

Mean lightness difference (5 steps)  
 $\Delta L^*_{\text{CIELAB}} = 4,7$

Mean colour reproduction index:  $R^*_{\text{ab,m}} = 73,7$

part 1,

AE660-3de: 110162



AE661-3de: 110162

$L^*/Y_{\text{intended}}$ (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																
gN=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
$w^* = l^*_{\text{CIELAB}, r}$ (relative)																
$w^*_{\text{intended}}$	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
$w^*_{\text{output}}$	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<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 110162

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
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:  $->rgb_{\text{de}}$  setrgbcolor

Input and Output: Television Luminous System TLS18a

Data for any device (d) or  
elementary (e) colour:

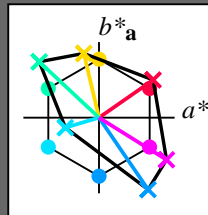
$HIC^*_e$

hue text for the colours

of this page:

$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data					
$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10



%Gamut

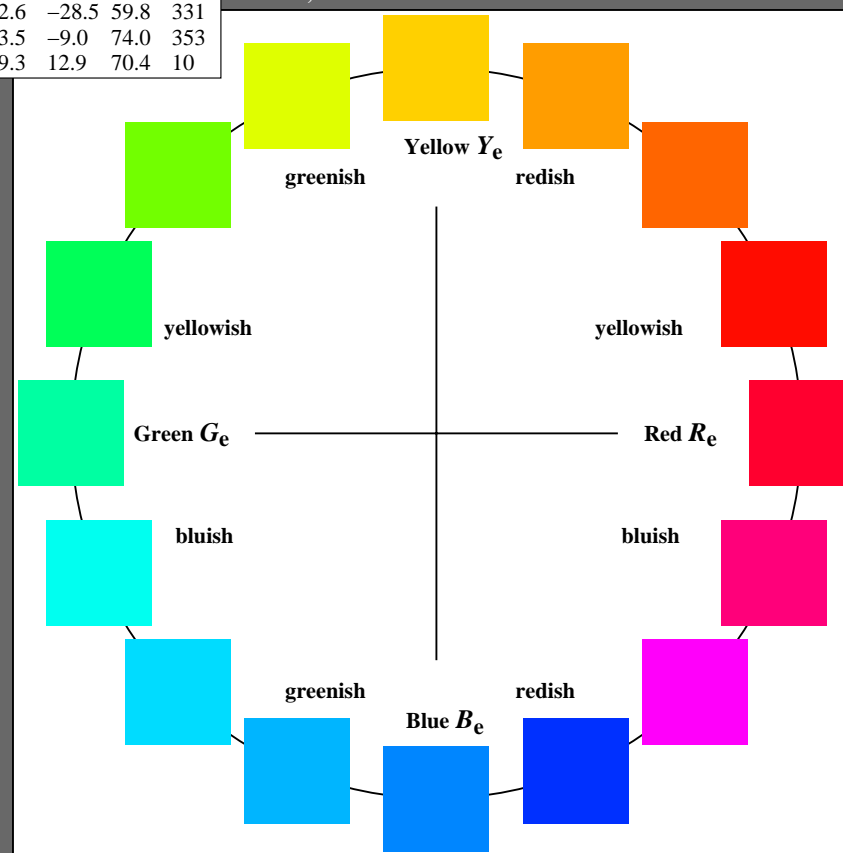
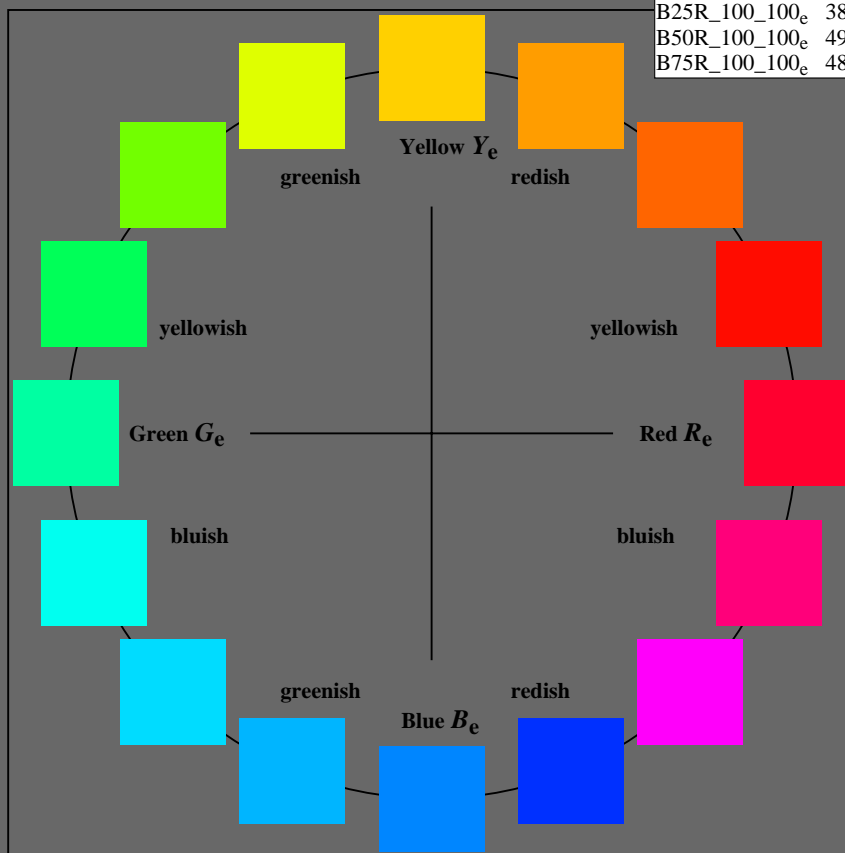
$u^*_{rel} = 118$

%Regularity

$g^*H_{rel} = 22$

$g^*C_{rel} = 40$

TLS18a; adapted (a) CIELAB data					
name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	52.7	71.6	49.8	87.2	34
$Y_e, Ma$	92.7	-20.0	84.9	87.2	103
$G_e, Ma$	84.0	-78.9	73.9	108.1	136
$C_e, Ma$	87.1	-44.4	-13.1	46.3	196
$B_e, Ma$	35.4	64.9	-95.0	115.1	304
$M_e, Ma$	59.0	89.3	-55.6	105.2	328
$N_e, Ma$	18.0	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



1-110000-L0 cmyn6\*

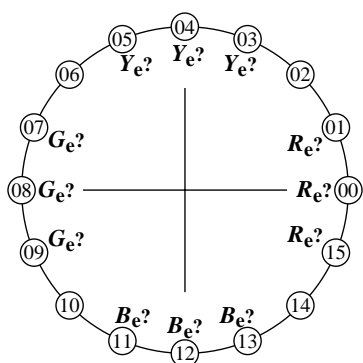
AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110241

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN5\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN5_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN5\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

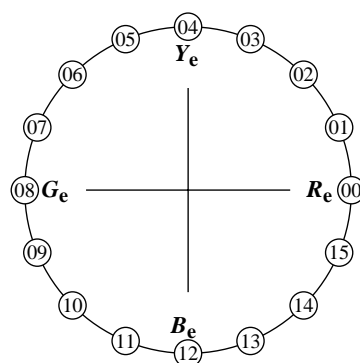
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 110241

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110241

### 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/AE66/AE66F0PX\\_CYN5\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN5_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN5\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN5_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN5\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN5_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN5\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN5_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 110241

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 12/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

i	LAB* <sub>ref</sub>	L* <sub>out</sub>	LAB* <sub>out</sub>	LAB* <sub>out-ref</sub>	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**

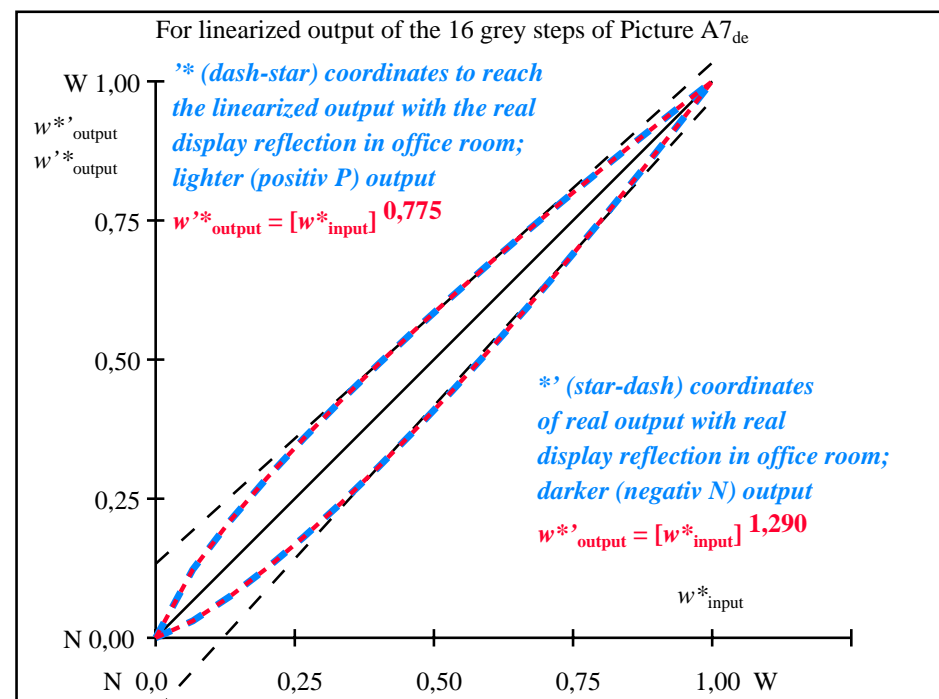
**Mean lightness difference**  
**(16 steps)**  
**ΔE\*<sub>CIELAB</sub> = 7,6**

**Mean lightness difference**  
**(5 steps)**  
**ΔL\*<sub>CIELAB</sub> = 6,1**

**Mean colour reproduction index: R\*<sub>ab,m</sub> = 66,3**

part 1,

AE660-3de: 110242



part 2,

AE661-3de: 110242

L*/Y <sub>intended</sub> (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	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* <sub>intended</sub>	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* <sub>output</sub>	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<sub>de</sub>: 16 visual equidistant L\*-grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 110242

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
Viewing Y contrast Y<sub>W</sub>:Y<sub>N</sub>=88,9:2,5; Y<sub>N</sub>-range 1,87 to <3,75

input: rgb/cmy0/000n/w set...  
output: ->rgb<sub>de</sub> setrgbcolor



Input and Output: Television Luminous System TLS27a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

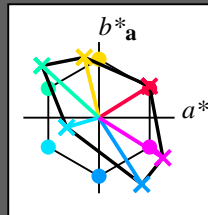
hue text for the colours

of this page:

$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10



%Gamut

$u^*_{rel} = 97$

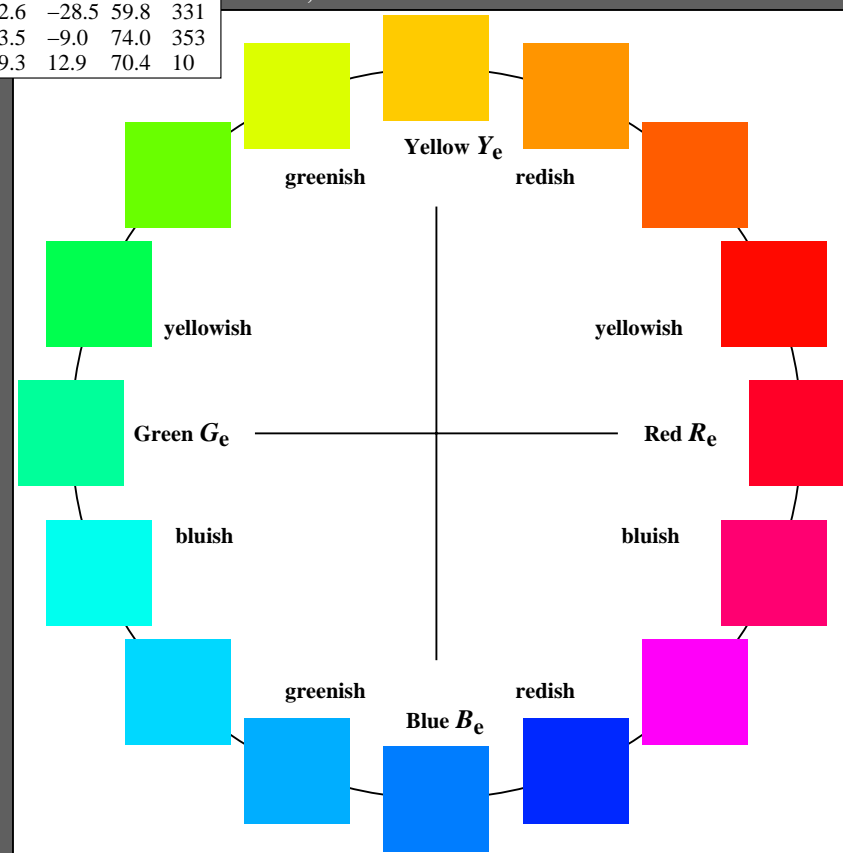
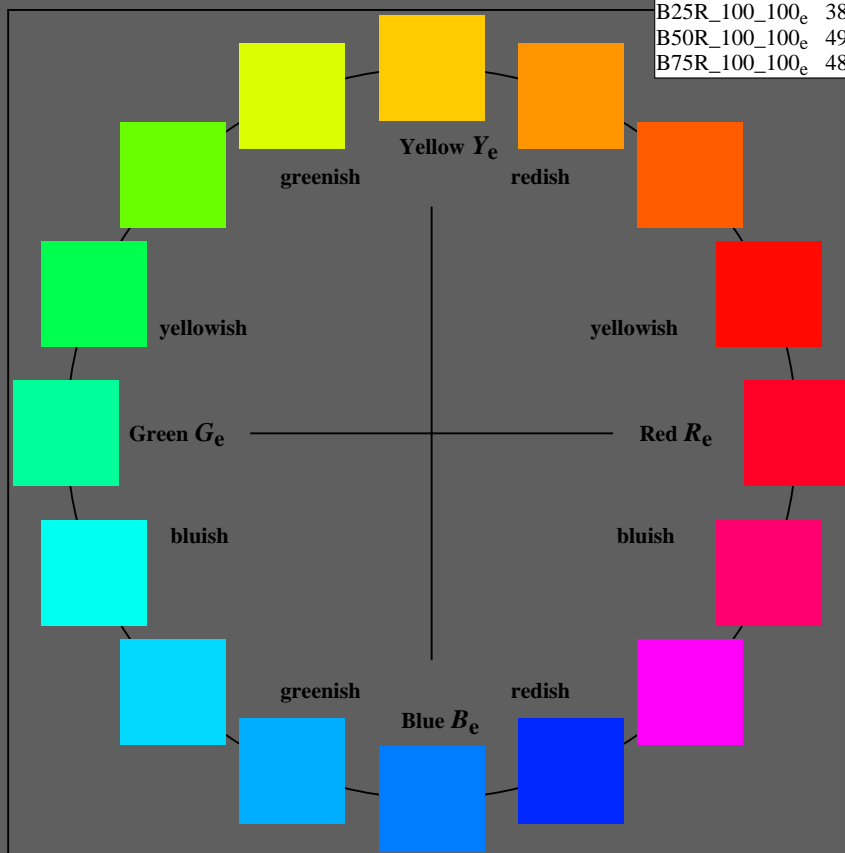
%Regularity

$g^*H_{rel} = 23$

$g^*C_{rel} = 42$

TLS27a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	54.8	66.8	41.6	78.7	31
$Y_e, Ma$	92.8	-19.3	79.8	82.1	103
$G_e, Ma$	84.3	-75.3	68.7	102.0	137
$C_e, Ma$	87.4	-42.7	-12.7	44.5	196
$B_e, Ma$	39.7	56.6	-88.0	104.6	302
$M_e, Ma$	60.6	84.6	-53.0	99.8	327
$N_e, Ma$	26.8	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



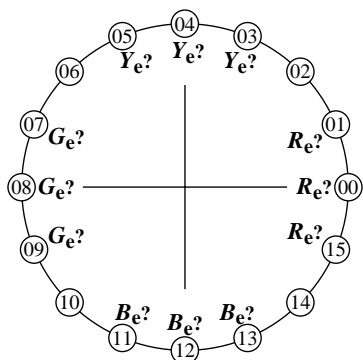
Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rha4ta

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110321

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN4\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN4_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN4\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

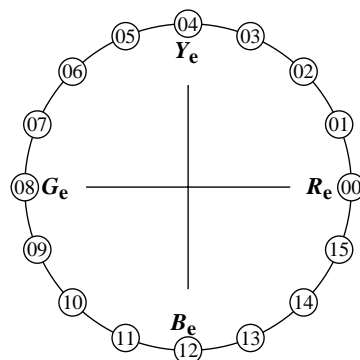
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 110321

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110321

### 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/AE66/AE66F0PX\\_CYN4\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN4_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN4\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN4_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN4\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN4_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN4\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN4_3.PS)

underline: Yes/No

picture A7de

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,

AE661-7de: 110321

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 15/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rh4ta

<i>i</i>	$LAB^*_{ref}$	$L^*_{out}$	$LAB^*_{out}$	$LAB^*_{out-ref}$	$\Delta E^*$	Start output S1
1	26,84	0,00	0,00	26,84	0,00	0,00
2	31,41	0,00	0,00	27,49	0,00	0,00
3	35,98	0,00	0,03	28,99	0,00	0,00
4	40,56	0,00	0,06	31,15	0,00	0,00
5	45,13	0,00	0,10	33,90	0,00	0,00
6	49,70	0,00	0,15	37,21	0,00	0,00
7	54,27	0,00	0,20	41,02	0,00	0,00
8	58,84	0,00	0,26	45,33	0,00	0,00
9	63,41	0,00	0,33	50,10	0,00	0,00
10	67,98	0,00	0,41	55,32	0,00	0,00
11	72,55	0,00	0,49	60,98	0,00	0,00
12	77,12	0,00	0,58	67,06	0,00	0,00
13	81,69	0,00	0,68	73,55	0,00	0,00
14	86,26	0,00	0,78	80,45	0,00	0,00
15	90,83	0,00	0,88	87,73	0,00	0,00
16	95,41	0,00	1,00	95,41	0,00	0,00
17	26,84	0,00	0,00	26,84	0,00	0,00
18	43,98	0,00	0,09	33,16	0,00	0,00
19	61,12	0,00	0,30	47,66	0,00	0,00
20	78,26	0,00	0,60	68,64	0,00	0,00
21	95,41	0,00	1,00	95,41	0,00	0,00

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

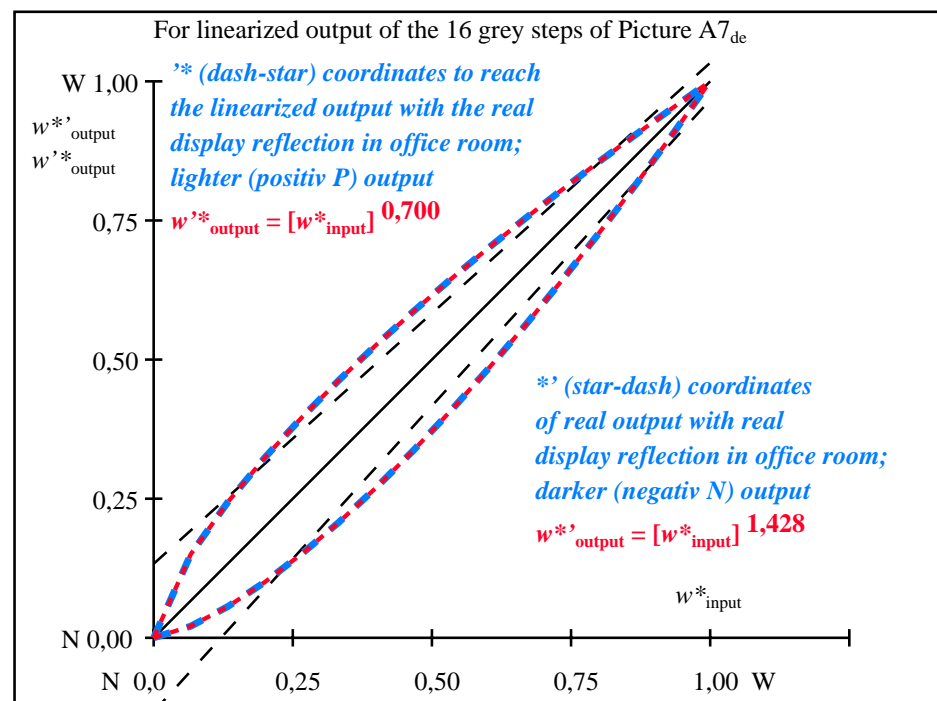
Mean lightness difference (16 steps)  
 $\Delta E^*_{CIELAB} = 8,4$

Mean lightness difference (5 steps)  
 $\Delta L^*_{CIELAB} = 6,7$

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

part 1,

AE660-3de: 110322



part 2,

AE661-3de: 110322

$L^*/Y^*_{intended}$ (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<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 110322

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
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:  $->rgb_{de}$  setrgbcolor

Input and Output: Television Luminous System TLS38a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

hue text for the colours

of this page:

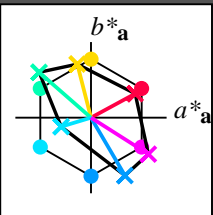
$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10

TLS38a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	58.7	58.4	31.7	66.5	28
$Y_e, Ma$	92.9	-18.1	70.8	73.0	104
$G_e, Ma$	85.1	-68.5	60.0	91.1	138
$C_e, Ma$	87.9	-39.4	-11.8	41.1	196
$B_e, Ma$	46.6	44.9	-76.5	88.7	300
$M_e, Ma$	63.7	75.9	-48.2	89.9	327
$N_e, Ma$	37.9	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



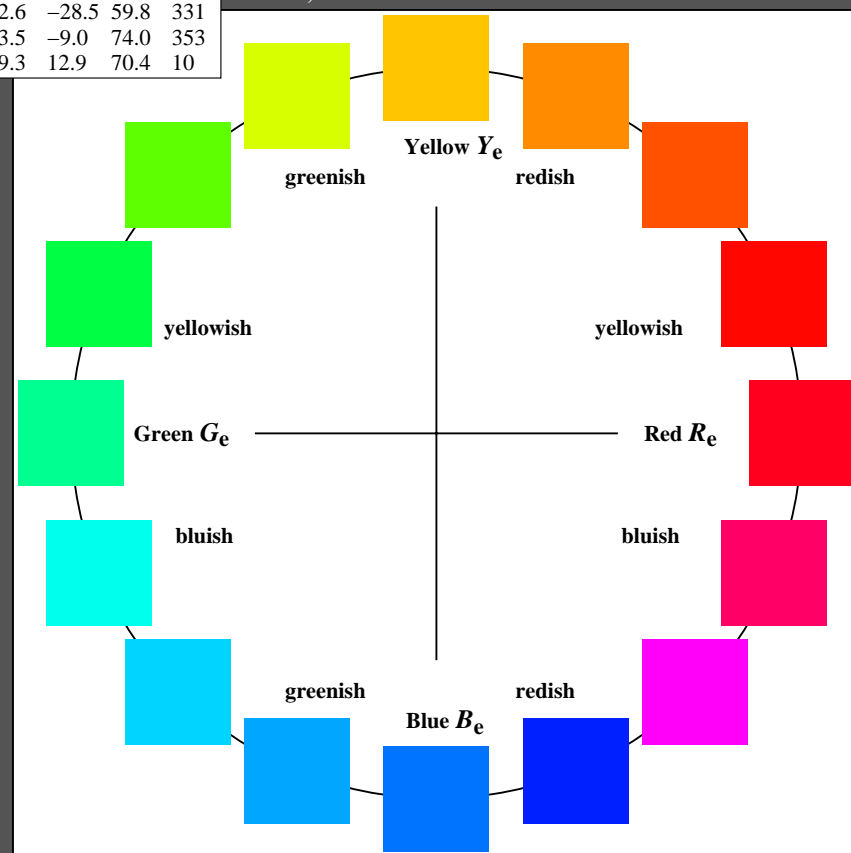
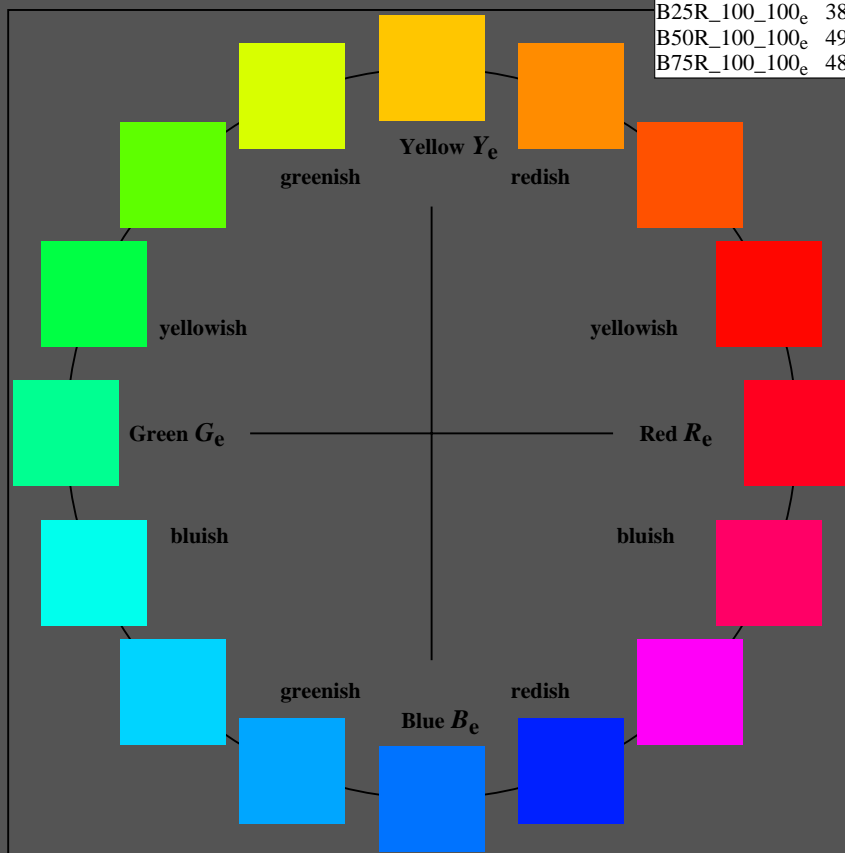
%Gamut

$u^*_{rel} = 71$

%Regularity

$g^*H_{rel} = 26$

$g^*C_{rel} = 45$



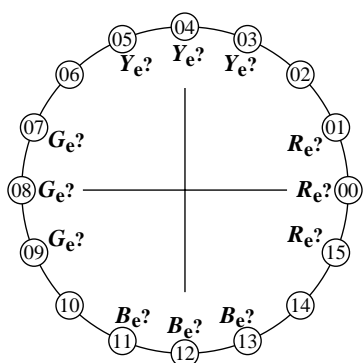
Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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



### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blue  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110401

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN3\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN3_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN3\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

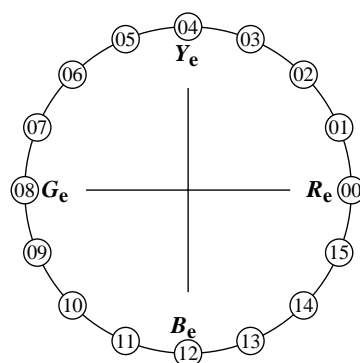
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 110401

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110401

### 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/AE66/AE66F0PX\\_CYN3\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN3_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN3\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN3_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN3\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN3_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN3\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN3_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 110401

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 18/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

i	LAB* <sub>ref</sub>	L* <sub>out</sub>	LAB* <sub>out</sub>	LAB* <sub>out-ref</sub>	ΔE*
1	37,98 0,00 0,00	0,00	37,98 0,00 0,00	0,00 0,00 0,00	0,01
2	41,81 0,00 0,00	0,00	38,32 0,00 0,00	-3, 0,00 0,00	3,49
3	45,64 0,00 0,00	0,02	39,23 0,00 0,00	-6, 0,00 0,00	6,40
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
15	91,58 0,00 0,00	0,87	88,35 0,00 0,00	-3, 0,00 0,00	3,22
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	37,98 0,00 0,00	0,00	37,98 0,00 0,00	0,00 0,00 0,00	0,01
18	52,34 0,00 0,00	0,07	42,10 0,00 0,00	-10, 0,00 0,00	10,23
19	66,69 0,00 0,00	0,26	53,37 0,00 0,00	-13, 0,00 0,00	13,32
20	81,05 0,00 0,00	0,57	71,22 0,00 0,00	-9, 0,00 0,00	9,82
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

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

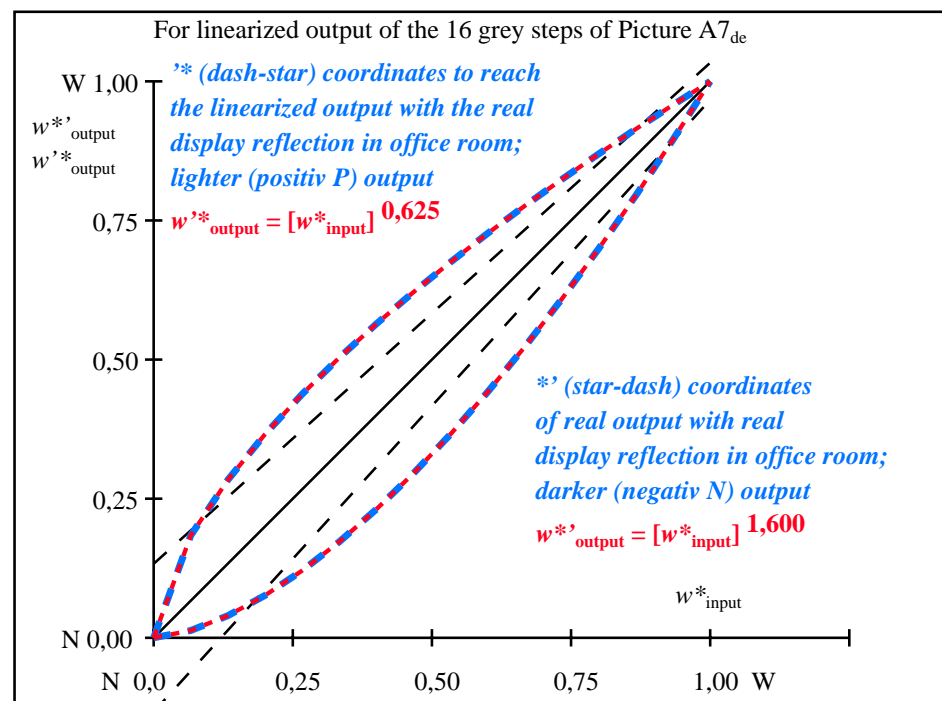
**Mean lightness difference**  
**(16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 8,3$

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

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

part 1,

AE660-3de: 110402



L*/Y <sub>intended</sub> (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<sub>de</sub>: 16 visual equidistant L\*-grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 110402

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
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<sub>de</sub> setrgbcolor*

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

Input and Output: Television Luminous System TLS52a

Data for any device (d) or  
elementary (e) colour:

$HIC^*_e$

hue text for the colours

of this page:

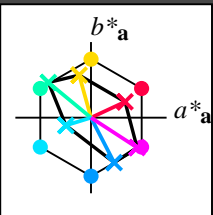
$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data

$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10

TLS52a; adapted (a) CIELAB data

name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R_e, Ma	65.5	45.0	20.9	49.7	24
Y_e, Ma	93.3	-15.6	56.2	58.3	105
G_e, Ma	86.5	-56.3	46.5	73.0	140
C_e, Ma	88.9	-33.1	-10.2	34.7	197
B_e, Ma	57.1	30.6	-59.4	66.8	297
M_e, Ma	69.2	60.9	-39.5	72.6	327
N_e, Ma	52.0	0.0	0.0	0.0	0
W_e, Ma	95.4	0.0	0.0	0.0	0
R_e, CIE	39.9	58.7	27.9	65.0	25
Y_e, CIE	81.2	-2.8	71.5	71.6	92
G_e, CIE	52.2	-42.4	13.6	44.5	162
B_e, CIE	30.5	1.4	-46.4	46.4	271



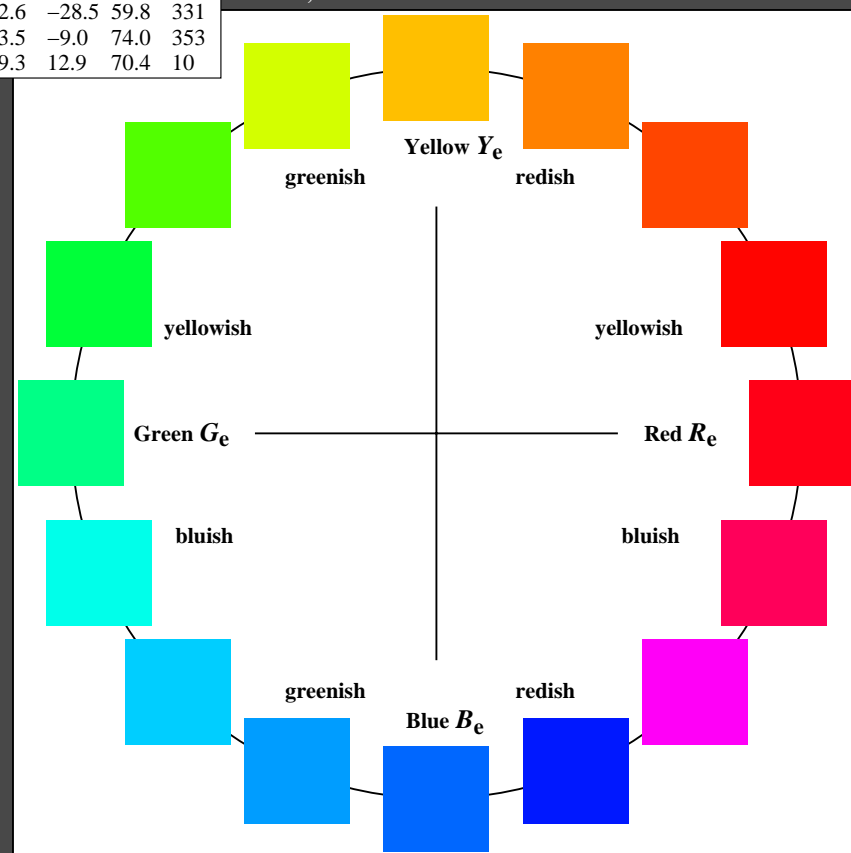
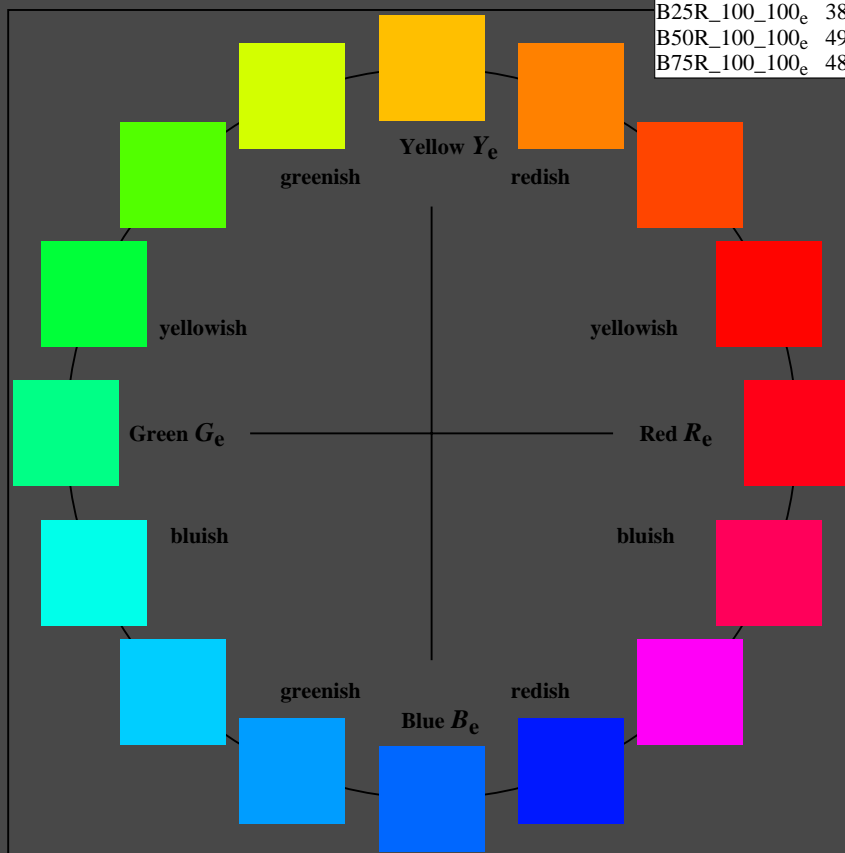
%Gamut

$u^*_{rel} = 42$

%Regularity

$g^*H_{rel} = 29$

$g^*C_{rel} = 47$



1-110000-L0 cmyn6\*

AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

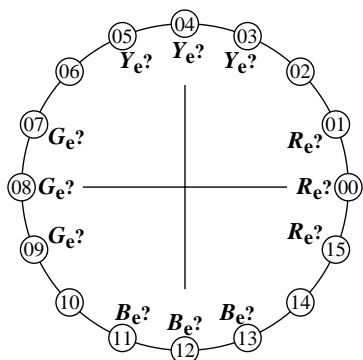
see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 19/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=rha4ta

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110481

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN2\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN2_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN2\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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)

.....

.....

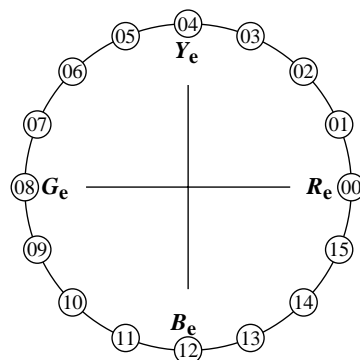
.....

part 3,

AE660-7de: 110481

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.

The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.

List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110481

### 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/AE66/AE66F0PX\\_CYN2\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN2_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN2\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN2_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN2\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN2_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN2\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN2_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 110481

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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





# Input and Output: Television Luminous System TLS70a

Data for any device (d) or  
elementary (e) colour:

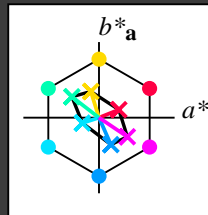
$HIC^*_e$

hue text for the colours

of this page:

$H^*_eR00Y_e, R25Y_e, \dots, B75R_e$

ORS20a; adapted (a) CIELAB data					
$H^*_e$	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
R00Y_100_100_e	48.4	66.1	40.2	77.3	31
R25Y_100_100_e	56.8	48.0	50.5	69.6	46
R50Y_100_100_e	68.6	25.0	63.9	68.6	68
R75Y_100_100_e	80.6	4.8	77.2	77.3	86
Y00G_100_100_e	90.2	-9.6	88.2	88.7	96
Y25G_100_100_e	83.2	-18.4	79.9	81.9	102
Y50G_100_100_e	73.3	-31.7	62.7	70.2	116
Y75G_100_100_e	62.0	-49.7	43.2	65.8	139
G00B_100_100_e	55.8	-65.2	33.8	73.4	152
G25B_100_100_e	59.3	-50.3	-9.0	51.0	190
G50B_100_100_e	63.0	-30.5	-42.0	51.9	234
G75B_100_100_e	45.7	-5.7	-44.6	44.9	262
B00R_100_100_e	27.5	25.9	-47.3	53.9	298
B25R_100_100_e	38.3	52.6	-28.5	59.8	331
B50R_100_100_e	49.5	73.5	-9.0	74.0	353
B75R_100_100_e	48.9	69.3	12.9	70.4	10



%Gamut

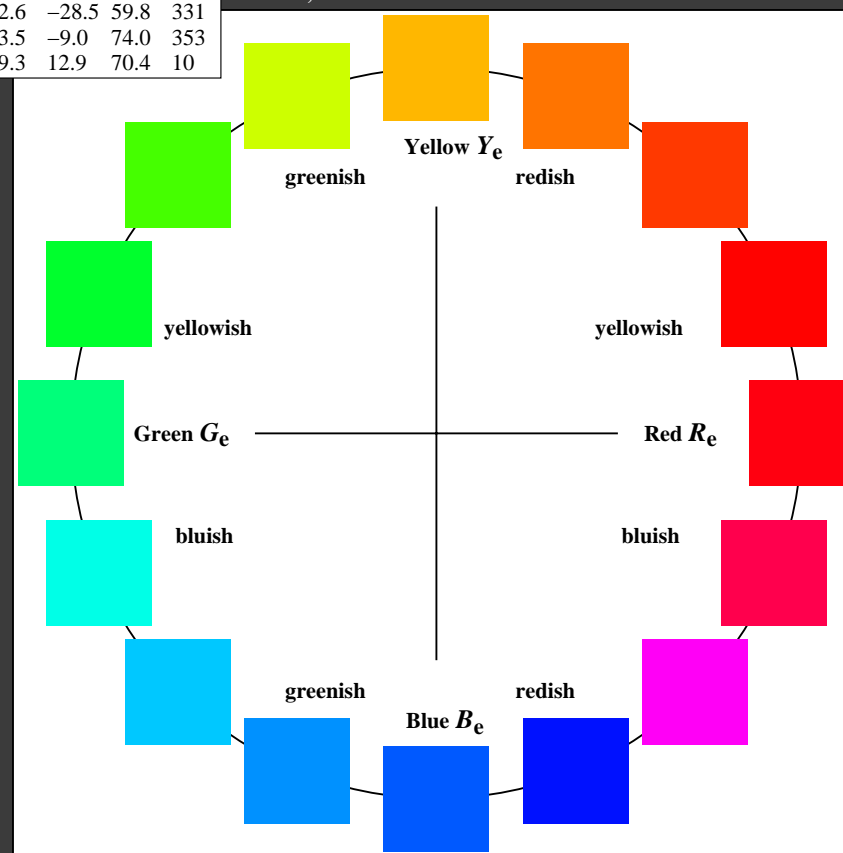
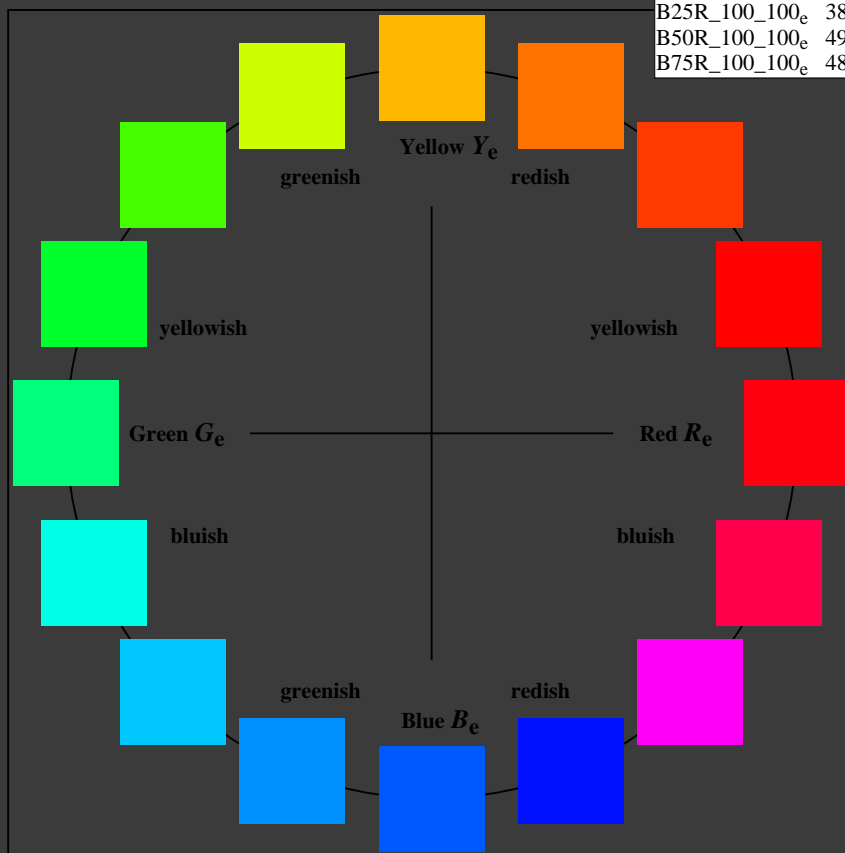
$u^*_{rel} = 15$

%Regularity

$g^*H_{rel} = 33$

$g^*C_{rel} = 51$

TLS70a; adapted (a) CIELAB data					
name	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
$R_e, Ma$	76.4	26.2	10.5	28.3	21
$Y_e, Ma$	93.9	-10.7	34.6	36.2	107
$G_e, Ma$	89.3	-35.8	27.6	45.2	142
$C_e, Ma$	90.9	-21.9	-7.0	23.0	197
$B_e, Ma$	72.1	15.7	-35.6	38.9	293
$M_e, Ma$	78.5	37.5	-25.2	45.2	326
$N_e, Ma$	69.7	0.0	0.0	0.0	0
$W_e, Ma$	95.4	0.0	0.0	0.0	0
$R_e, CIE$	39.9	58.7	27.9	65.0	25
$Y_e, CIE$	81.2	-2.8	71.5	71.6	92
$G_e, CIE$	52.2	-42.4	13.6	44.5	162
$B_e, CIE$	30.5	1.4	-46.4	46.4	271



1-110000-L0 cmyn6\*

AE660-70

Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

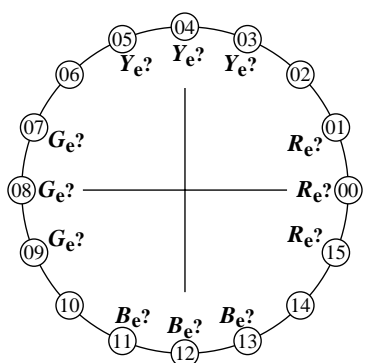
input:  $rgb/cmy0/000n/w$  set...  
output:  $->rgb_{de}$  set $rgbcolor$

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=rha4ta

### 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 0 1 1 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 16 hues.

No. 00 and 08 should be Red  $R_e$  and Green  $G_e$ .  
No. 04 and 12 should be Yellow  $Y_e$  and Blue  $B_e$ .

Are no. 00, 04, 08, and 12 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, 15) ..... (neither yellowish nor blueish)  
Elementary Yellow  $Y_e$  is hue step no. (e. g. 04, 03, 05) ..... (neither reddish nor greenish)  
Elementary Green  $G_e$  is hue step no. (e. g. 08, 07, 09) ..... (neither yellowish nor blueish)  
Elementary Blau  $B_e$  is hue step no. (e. g. 12, 11, 13) ..... (neither reddish nor greenish)

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

part 1,

AE660-3de: 110561

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN1\\_1.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN1_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN1\\_1.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_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 AE66F0PX\_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 AE66F0PX\_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:.....

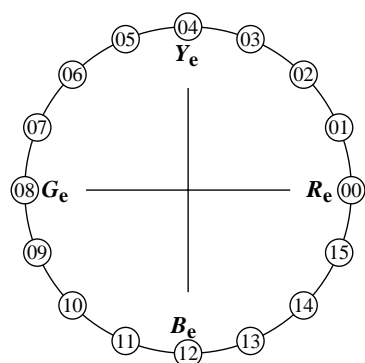
Special remarks: e. g. output of Landscape (L)

part 3,

AE660-7de: 110561

### Discriminability of colours with 16 hues (Yes/No decision)

Layout example: Discriminability of colours with 16 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 0 1 1 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 16 hues.  
All 16 hues should be distinguishable.

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

1. All 16 differences are visually equal.
2. Elementary hues locate at 00, 04, 08, and 12.

Are all 16 colours of the 16 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. 11 and 12) .....are not distinguishable.  
The colours of the two hue steps no. (e. g. 12 and 13) .....are not distinguishable.  
List other pairs: .....

**Result:** Of the 16 hue differences are (e.g. 13) ..... differences visible.

part 2,

AE661-3de: 110561

### 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/AE66/AE66F0PX\\_CYN1\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN1_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN1\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN1_3.PS)

underline: Yes/No

picture A7de 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/AE66/AE66F0PX\\_CYN1\\_3.PDF](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN1_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE66/AE66F0PX\\_CYN1\\_3.PS](http://farbe.li.tu-berlin.de/AE66/AE66F0PX_CYN1_3.PS)

or underline: Yes/No

picture A7de

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,

AE661-7de: 110561

Form A: Test chart AE66 similar to test chart 1 of CIE R8-09  
16 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE66/AE66F0NX.PDF> / .PS; 3D-linearization, page 24/24  
technical information: <http://farbe.li.tu-berlin.de/AE66/AE66LF0NX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE66/AE66L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rh4ta

i	LAB* <sub>ref</sub>	L* <sub>out</sub>	LAB* <sub>out</sub>	LAB* <sub>out-ref</sub>	ΔE*
1	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01
2	71,41 0,00 0,00	0,00	69,75 0,00 0,00	-1, 0,00 0,00	1,65
3	73,12 0,00 0,00	0,01	69,96 0,00 0,00	-3, 0,00 0,00	3,15
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

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

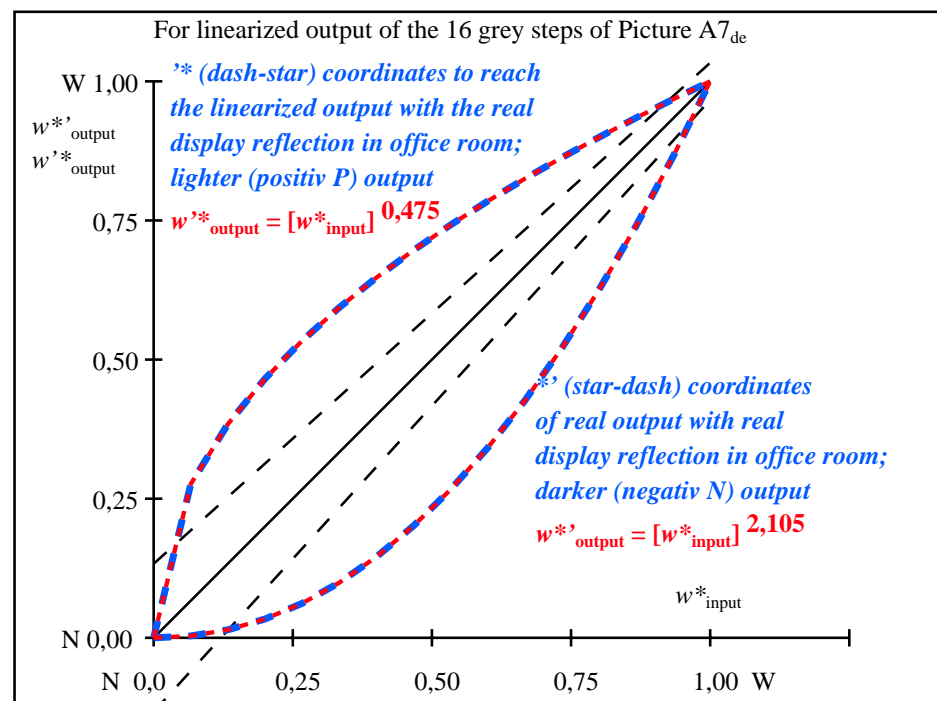
**Mean lightness difference**  
**(16 steps)**  
 $\Delta E^*_{CIELAB} = 4,6$

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

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

part 1,

AE660-3de: 110562



$L^*/Y_{intended}$ (absolute)	69,6/40,3	71,4/42,7	73,1/45,3	74,8/48,0	76,5/50,7	78,2/53,6	79,9/56,6	81,6/59,7	83,4/62,9	85,1/66,2	86,8/69,6	88,5/73,2	90,2/76,8	91,9/80,6	93,6/84,5	95,4/88,5
0 0 0 n* setcmyk																
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
$w^*=l^*_{CIELAB,r}$ (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	0,003	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<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE660-7de: 110562

In-out: Test chart AE66 similar to test chart 1 of CIE R8-09  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:40$ ;  $Y_N$ -range 30 to <60

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