

Input: Colorimetric Television Luminous System TLS00a

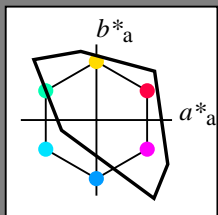
with *rgb* data of the  
four elementary hues

1 0 0 = Red  $R_e$

1 1 0 = Yellow  $Y_e$

0 1 0 = Green  $G_e$

0 0 1 = Blue  $B_e$



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

Output: Colorimetric Television Luminous System TLS00a

with hue number

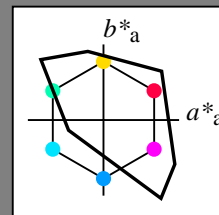
$n = 00$  to 19

00 = Red  $R_e$

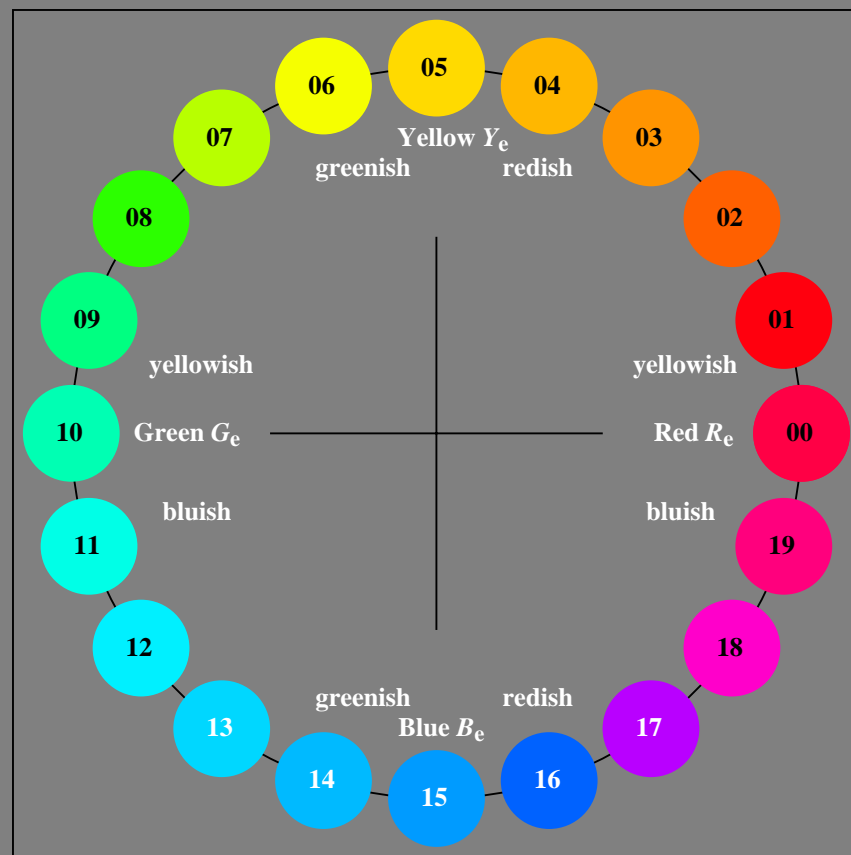
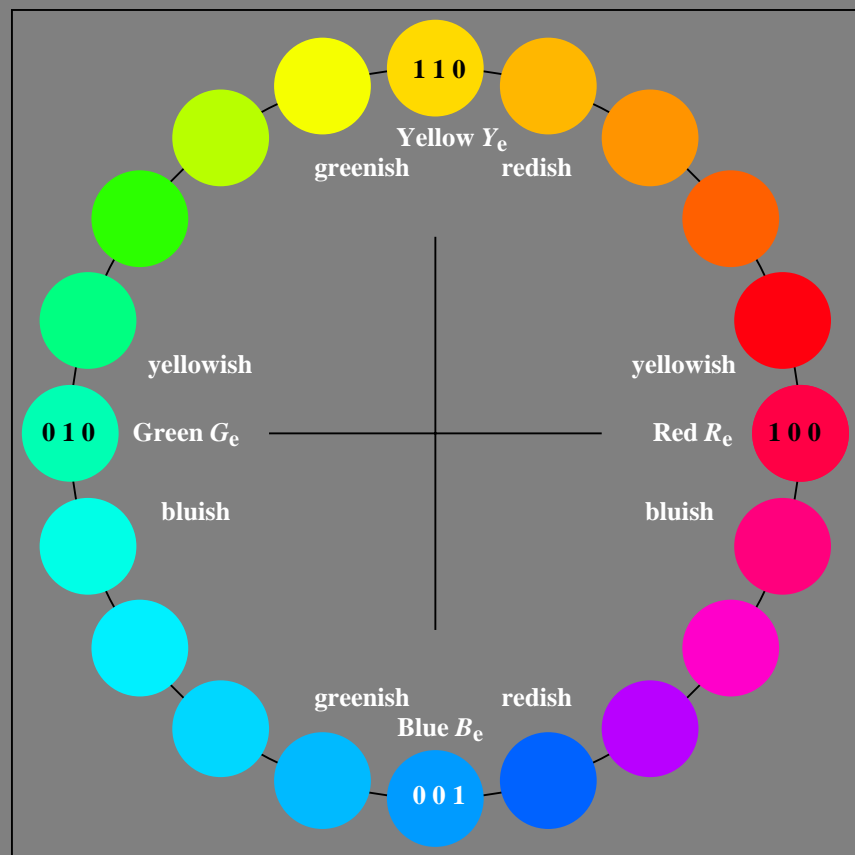
05 = Yellow  $Y_e$

10 = Green  $G_e$

15 = Blue  $B_e$



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
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R <sub>CIE</sub>	39.92	58.74	27.99	65.07	25
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B <sub>CIE</sub>	30.57	1.41	-46.46	46.49	272



AE360-7N-100-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $Y_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

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

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

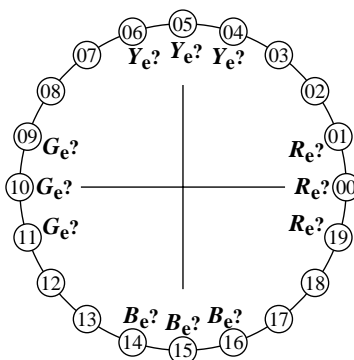
output: *->rgb<sub>de</sub> setrgbcolor*

TUB Registration: 20190301-AE36/AE36L0FA.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 1 1 0 may produce: Yellow  $Y_e$ .

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11001

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY8\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY8\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY8\_1.PDF

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

#### For output with PS file AE36F0PX\_CY8\_1.PS

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

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

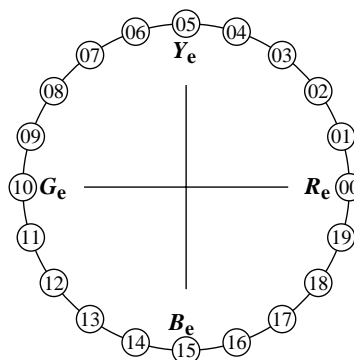
.....  
.....  
.....

part 3,

AE360-7de: 11001

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11001

### 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/AE36/AE36F0PX\\_CY8\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY8\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_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/AE36/AE36F0PX\\_CY8\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY8\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY8_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,

AE361-7de: 11001

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36L0FA.TXT /.PS>  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE36/AE36L0FA.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	0,00	0,00	0,00	0,00	0,00	Specification according to
2	6,36	0,00	0,06	0,00	0,00	ISO/IEC 15775 Annex G
3	12,72	0,00	0,13	0,00	0,00	and DIN 33866-1 Annex G
4	19,08	0,00	0,20	0,00	0,00	
5	25,44	0,00	0,26	0,00	0,00	
6	31,80	0,00	0,33	0,00	0,00	
7	38,16	0,00	0,40	0,00	0,00	
8	44,52	0,00	0,46	0,00	0,00	
9	50,88	0,00	0,53	0,00	0,00	
10	57,24	0,00	0,60	0,00	0,00	
11	63,60	0,00	0,66	0,00	0,00	
12	69,96	0,00	0,73	0,00	0,00	
13	76,32	0,00	0,80	0,00	0,00	
14	82,68	0,00	0,86	0,00	0,00	
15	89,04	0,00	0,93	0,00	0,00	
16	95,41	0,00	1,00	0,00	0,00	
17	0,00	0,00	0,00	0,00	0,00	
18	23,85	0,00	0,25	0,00	0,00	
19	47,70	0,00	0,50	0,00	0,00	
20	71,55	0,00	0,75	0,00	0,00	
21	95,41	0,00	1,00	0,00	0,00	

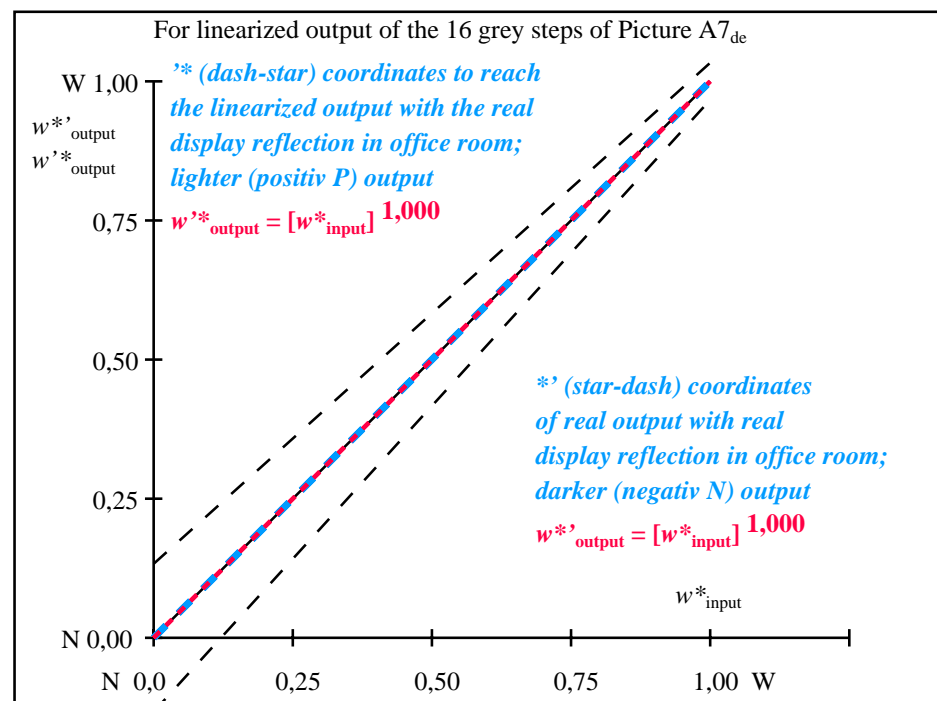
Mean lightness difference (16 steps)  
ΔE<sup>\*</sup><sub>CIELAB</sub> = 0,0

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,

AE360-3de: 11002



part 2,

AE361-3de: 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 <sup>*</sup> 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<sup>\*</sup> setcmykcolor

AE360-7de: 11002

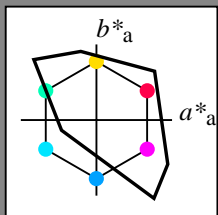
In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing Y contrast Y<sub>W</sub>:Y<sub>N</sub>=88,9:0,31; Y<sub>N</sub>-range 0,0 to <0,46

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

Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the  
four elementary hues

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



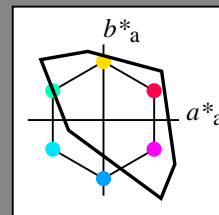
TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
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Output: Colorimetric Television Luminous System TLS00a

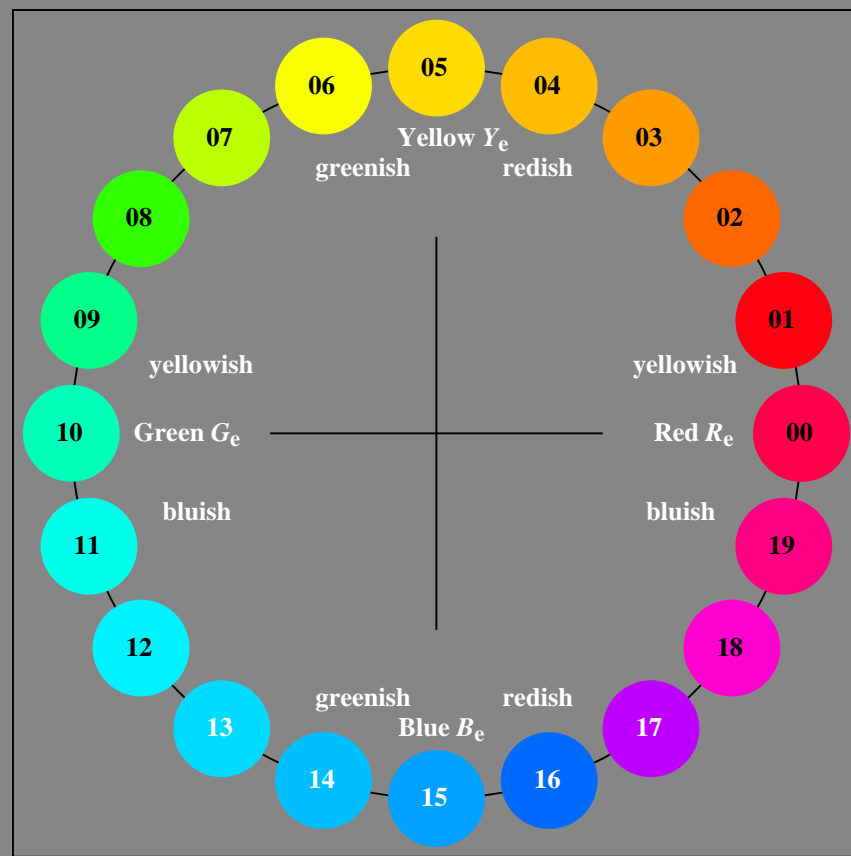
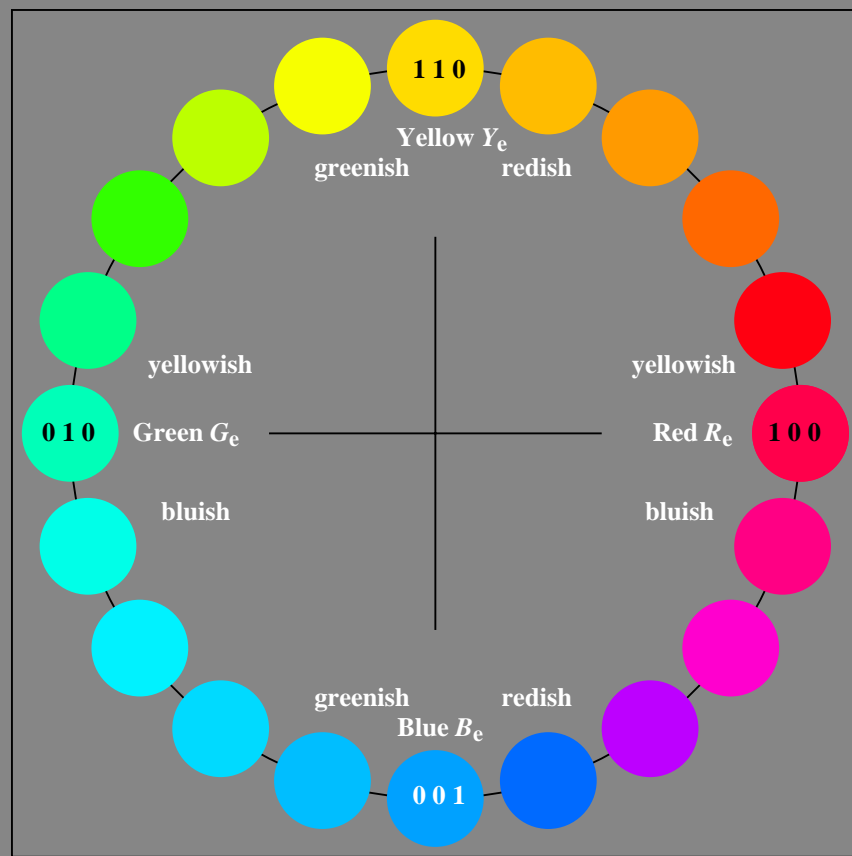
with hue number

$n = 00$  to 19

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



TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
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AE360-7N-101-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $J_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

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

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

output: *->rgb<sub>de</sub> setrgbcolor*

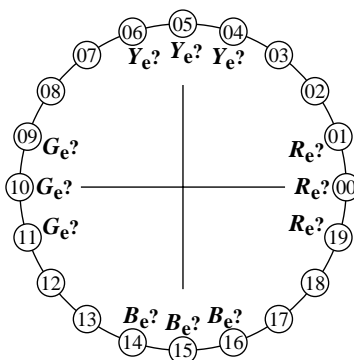
TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output

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 1 1 0 may produce: Yellow  $Y_e$ .

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11011

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY7\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY7\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY7\_1.PDF

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

#### For output with PS file AE36F0PX\_CY7\_1.PS

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

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

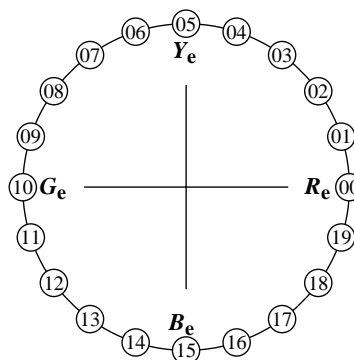
.....  
.....  
.....

part 3,

AE360-7de: 11011

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11011

### 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/AE36/AE36F0PX\\_CY7\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY7\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_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/AE36/AE36F0PX\\_CY7\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY7\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY7_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,

AE361-7de: 11011

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36F0PX.PDF> / .PS; 3D-linearization, page 6/24  
technical information: <http://farbe.li.tu-berlin.de/AE36/AE36LF0PX.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	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	Specification according to
2	11,67 0,00 0,00	0,10 0,00 0,00	14,73 0,00 0,00	3,05 0,00 0,00	3,05	ISO/IEC 15775 Annex G
3	17,65 0,00 0,00	0,18 0,00 0,00	21,95 0,00 0,00	4,30 0,00 0,00	4,30	and DIN 33866-1 Annex G
4	23,63 0,00 0,00	0,25 0,00 0,00	28,62 0,00 0,00	4,99 0,00 0,00	4,99	
5	29,61 0,00 0,00	0,32 0,00 0,00	34,96 0,00 0,00	5,34 0,00 0,00	5,34	
6	35,59 0,00 0,00	0,39 0,00 0,00	41,05 0,00 0,00	5,45 0,00 0,00	5,45	
7	41,57 0,00 0,00	0,46 0,00 0,00	46,96 0,00 0,00	5,38 0,00 0,00	5,38	
8	47,55 0,00 0,00	0,52 0,00 0,00	52,72 0,00 0,00	5,16 0,00 0,00	5,16	
9	53,54 0,00 0,00	0,58 0,00 0,00	58,35 0,00 0,00	4,81 0,00 0,00	4,81	
10	59,52 0,00 0,00	0,64 0,00 0,00	63,88 0,00 0,00	4,36 0,00 0,00	4,36	
11	65,50 0,00 0,00	0,70 0,00 0,00	69,31 0,00 0,00	3,81 0,00 0,00	3,81	
12	71,48 0,00 0,00	0,76 0,00 0,00	74,67 0,00 0,00	3,18 0,00 0,00	3,18	
13	77,46 0,00 0,00	0,82 0,00 0,00	79,95 0,00 0,00	2,48 0,00 0,00	2,48	
14	83,44 0,00 0,00	0,88 0,00 0,00	85,16 0,00 0,00	1,71 0,00 0,00	1,71	
15	89,42 0,00 0,00	0,94 0,00 0,00	90,31 0,00 0,00	0,88 0,00 0,00	0,88	
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	0,30 0,00 0,00	33,40 0,00 0,00	5,28 0,00 0,00	5,28	
19	50,55 0,00 0,00	0,55 0,00 0,00	55,55 0,00 0,00	5,00 0,00 0,00	5,00	
20	72,98 0,00 0,00	0,78 0,00 0,00	75,99 0,00 0,00	3,01 0,00 0,00	3,01	
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	

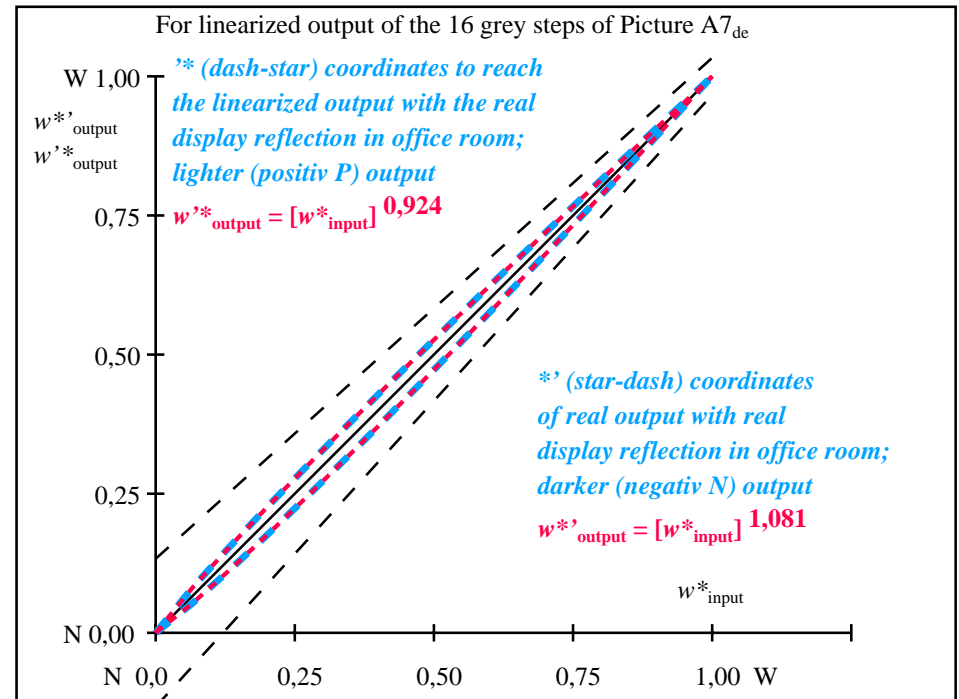
Mean lightness difference (16 steps)  
 $\Delta E^*_{\text{CIELAB}} = 3,4$

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

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

part 1,

AE360-3de: 11012



part 2,

AE361-3de: 11012

$L^*/Y_{\text{intended}}$ (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																
gp=0,924																
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	0,082	0,154	0,225	0,294	0,361	0,428	0,494	0,558	0,623	0,687	0,750	0,813	0,876	0,937	1,000

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE360-7de: 11012

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:0,62$ ;  $Y_N$ -range 0,46 to <0,93

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

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

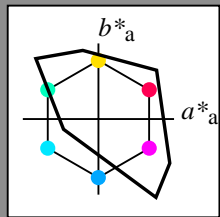
with *rgb* data of the  
four elementary hues

1 0 0 = Red  $R_e$

1 1 0 = Yellow  $Y_e$

0 1 0 = Green  $G_e$

0 0 1 = Blue  $B_e$



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

Output: Colorimetric Television Luminous System TLS00a

with hue number

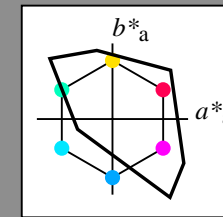
$n = 00$  to 19

00 = Red  $R_e$

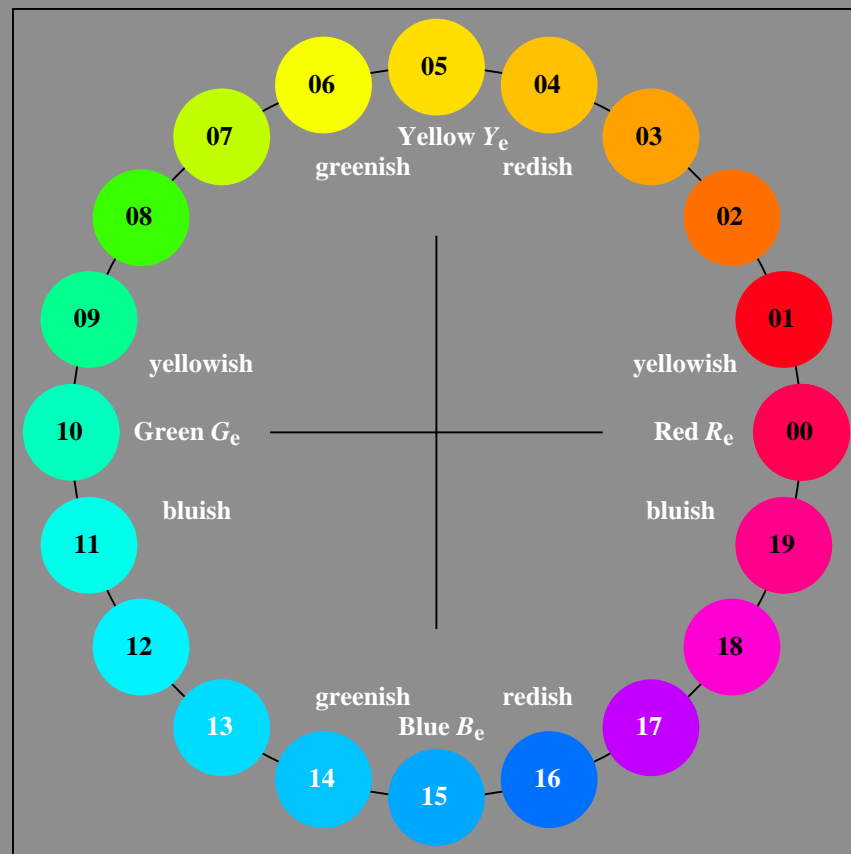
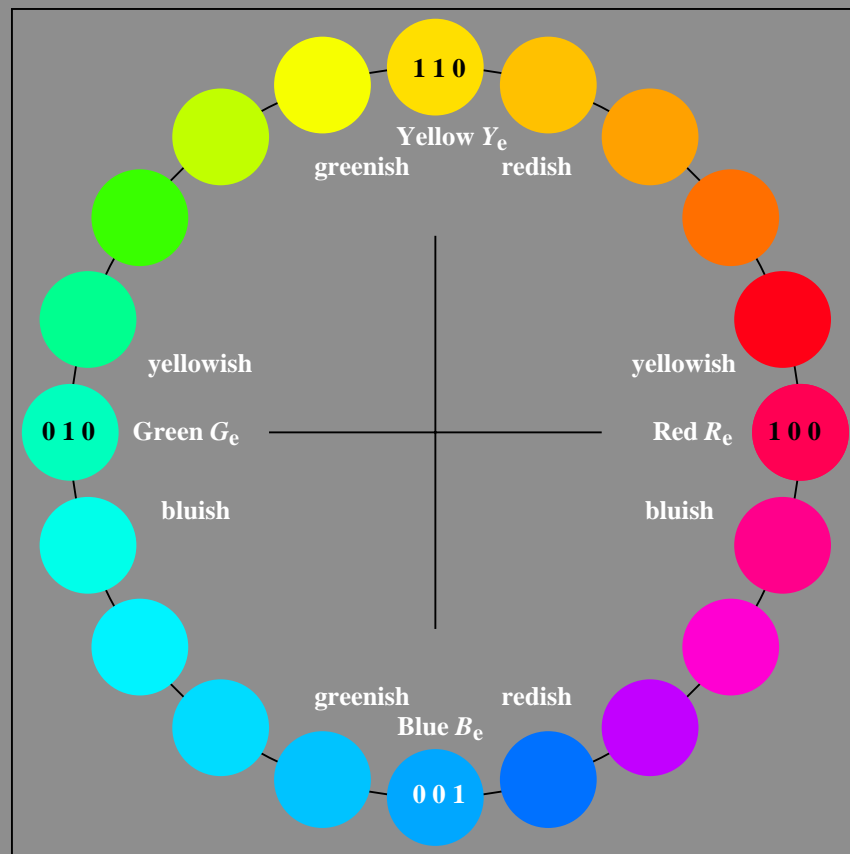
05 = Yellow  $Y_e$

10 = Green  $G_e$

15 = Blue  $B_e$



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



AE360-7N-102-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $Y_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

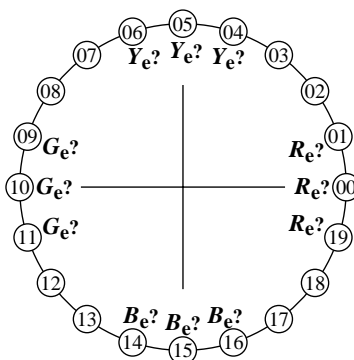
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output:  $\rightarrow$  *rgb<sub>de</sub> setrgbcolor*

### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11021

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY6\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY6\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY6\_1.PDF

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

#### For output with PS file AE36F0PX\_CY6\_1.PS

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

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

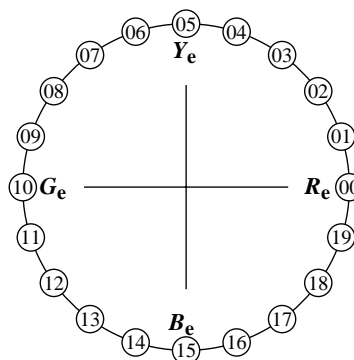
.....  
.....  
.....

part 3,

AE360-7de: 11021

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11021

### 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/AE36/AE36F0PX\\_CY6\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY6\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_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/AE36/AE36F0PX\\_CY6\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY6\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY6_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,

AE361-7de: 11021

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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



see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36L0FA.TXT /.PS>  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

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
2	16,62 0,00 0,00	0,13	22,51 0,00 0,00	5,89 0,00 0,00	5,89	ISO/IEC 15775 Annex G
3	22,24 0,00 0,00	0,22	30,17 0,00 0,00	7,93 0,00 0,00	7,93	and DIN 33866-1 Annex G
4	27,87 0,00 0,00	0,30	36,84 0,00 0,00	8,96 0,00 0,00	8,96	
5	33,50 0,00 0,00	0,37	42,93 0,00 0,00	9,42 0,00 0,00	9,42	
6	39,13 0,00 0,00	0,44	48,62 0,00 0,00	9,49 0,00 0,00	9,49	
7	44,75 0,00 0,00	0,50	54,02 0,00 0,00	9,26 0,00 0,00	9,26	
8	50,38 0,00 0,00	0,57	59,19 0,00 0,00	8,80 0,00 0,00	8,80	
9	56,01 0,00 0,00	0,62	64,16 0,00 0,00	8,15 0,00 0,00	8,15	
10	61,64 0,00 0,00	0,68	68,97 0,00 0,00	7,33 0,00 0,00	7,33	
11	67,27 0,00 0,00	0,74	73,64 0,00 0,00	6,37 0,00 0,00	6,37	
12	72,89 0,00 0,00	0,79	78,19 0,00 0,00	5,29 0,00 0,00	5,29	
13	78,52 0,00 0,00	0,84	82,63 0,00 0,00	4,10 0,00 0,00	4,10	
14	84,15 0,00 0,00	0,90	86,97 0,00 0,00	2,82 0,00 0,00	2,82	
15	89,78 0,00 0,00	0,95	91,23 0,00 0,00	1,45 0,00 0,00	1,45	
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	
17	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01	
18	32,09 0,00 0,00	0,36	41,45 0,00 0,00	9,35 0,00 0,00	9,35	
19	53,20 0,00 0,00	0,60	61,70 0,00 0,00	8,50 0,00 0,00	8,50	
20	74,30 0,00 0,00	0,80	79,31 0,00 0,00	5,00 0,00 0,00	5,00	
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	

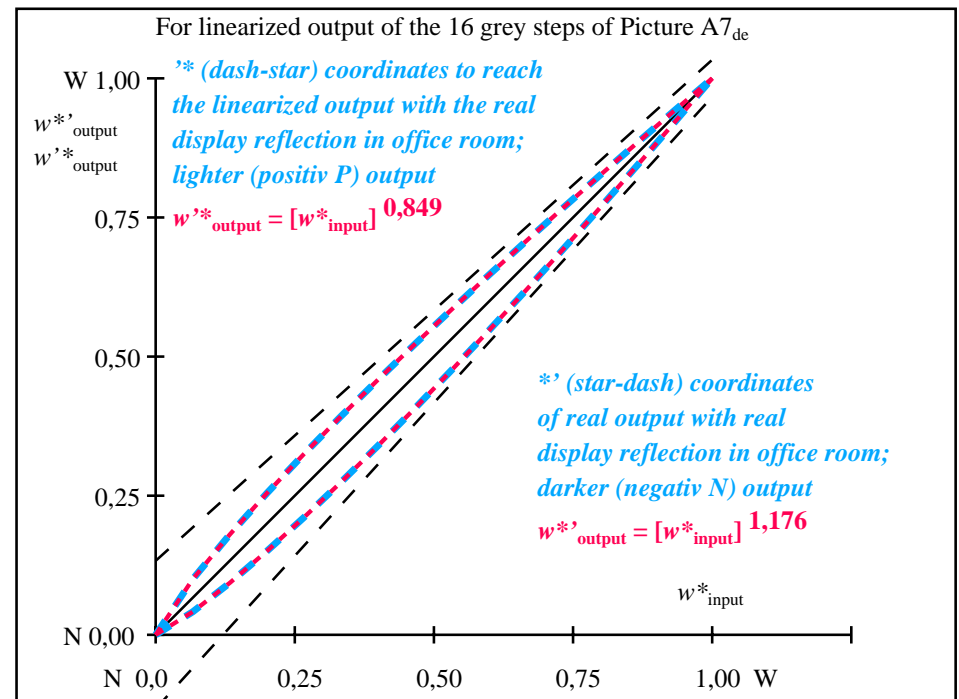
Mean lightness difference (16 steps)  
 $\Delta E^*_{\text{CIELAB}} = 5,9$

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

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

part 1,

AE360-3de: 11022



part 2,

AE361-3de: 11022

$L^*/Y_{\text{intended}}$ (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																
gp=0,849																
No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^* = l^*_{\text{CIELAB}, r}$ (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	0,100	0,180	0,254	0,325	0,392	0,458	0,523	0,585	0,647	0,708	0,767	0,827	0,885	0,942	1,000

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE360-7de: 11022

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:1,25$ ;  $Y_N$ -range 0,93 to <1,87

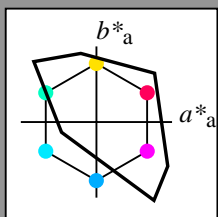
input:  $rgb/cmy0/000n/w$  set...  
output:  $->rgb_{\text{de}}$  setrgbcolor

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the  
four elementary hues

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



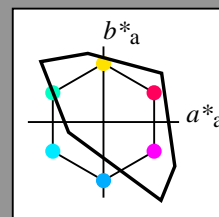
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
Y <sub>Ma</sub>	92.66	-20.69	90.75	93.08	103
L <sub>Ma</sub>	83.63	-82.75	79.9	115.04	136
C <sub>Ma</sub>	86.88	-46.16	-13.55	48.12	196
V <sub>Ma</sub>	30.39	76.06	-103.59	128.52	306
M <sub>Ma</sub>	57.3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

Output: Colorimetric Television Luminous System TLS00a

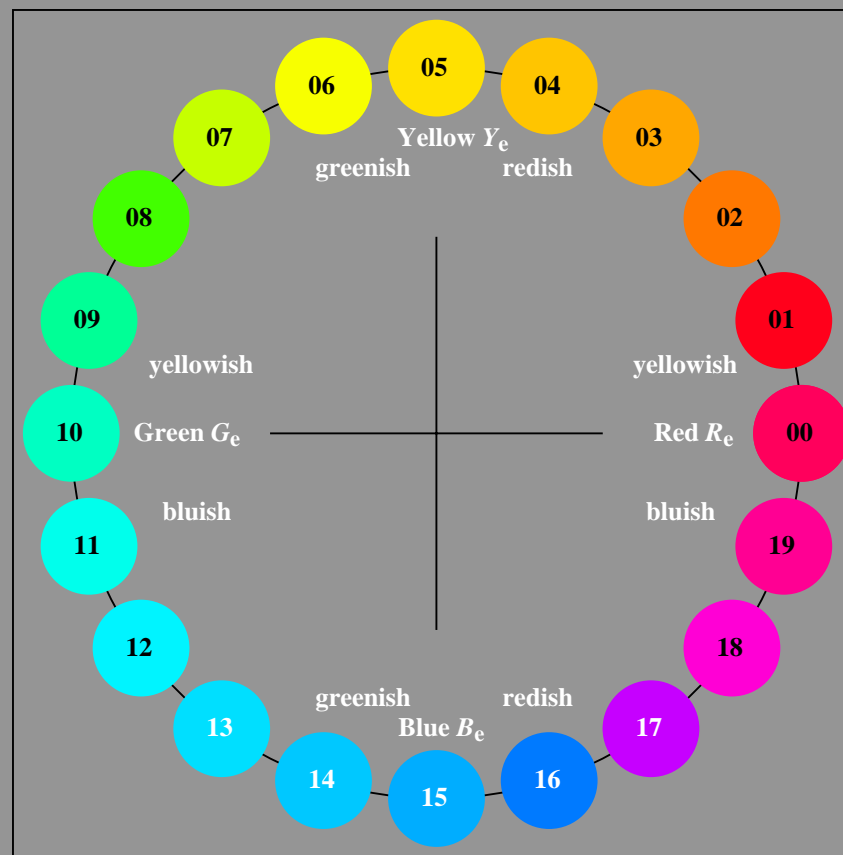
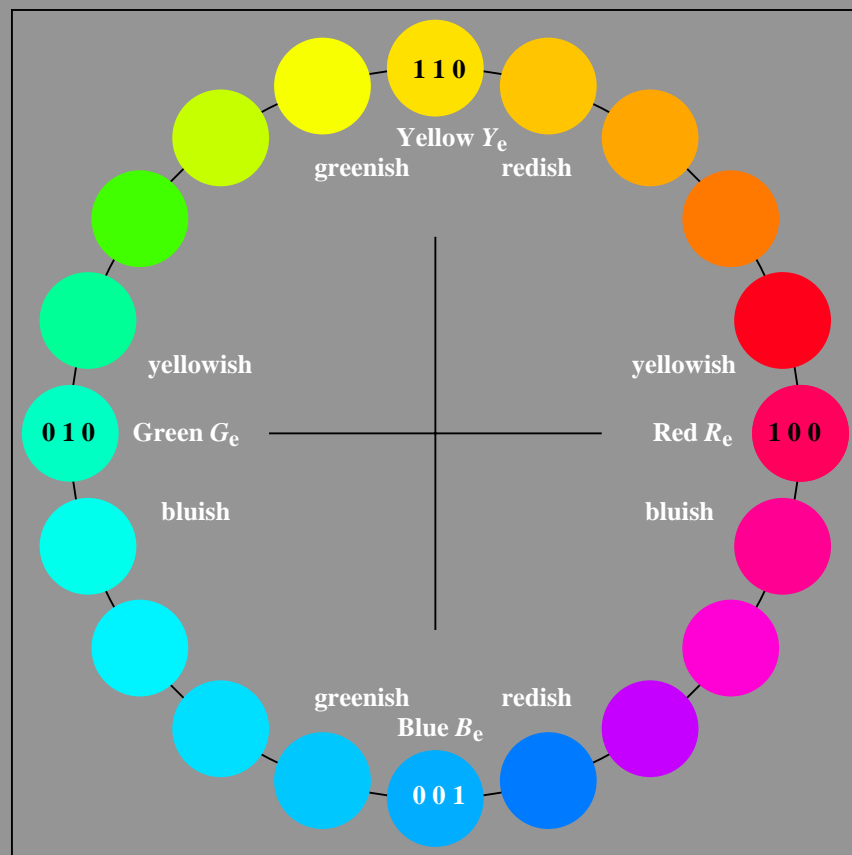
with hue number

$n = 00$  to 19

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



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



AE360-7N-103-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $Y_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

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

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

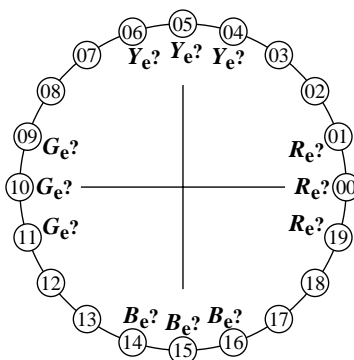
output:  $\rightarrow$  *rgb<sub>de</sub> setrgbcolor*

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta

### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11031

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY5\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY5\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY5\_1.PDF

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

#### For output with PS file AE36F0PX\_CY5\_1.PS

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

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

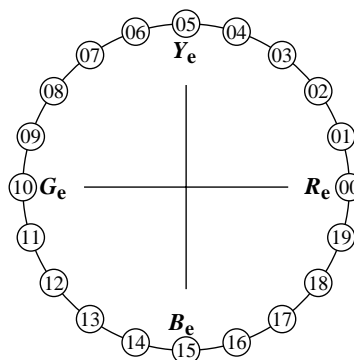
.....  
.....  
.....

part 3,

AE360-7de: 11031

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11031

### 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/AE36/AE36F0PX\\_CY5\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY5\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_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/AE36/AE36F0PX\\_CY5\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY5\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY5_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,

AE361-7de: 11031

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36L0FA.TXT /.PS>  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE36/AE36L0FA.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	0,17	31,34 0,00 0,00	8,17 0,00 0,00	8,17
3	28,32 0,00 0,00	0,27	38,92 0,00 0,00	10,59 0,00 0,00	10,59
4	33,48 0,00 0,00	0,35	45,22 0,00 0,00	11,73 0,00 0,00	11,73
5	38,64 0,00 0,00	0,42	50,81 0,00 0,00	12,16 0,00 0,00	12,16
6	43,80 0,00 0,00	0,48	55,93 0,00 0,00	12,12 0,00 0,00	12,12
7	48,96 0,00 0,00	0,55	60,70 0,00 0,00	11,73 0,00 0,00	11,73
8	54,12 0,00 0,00	0,60	65,19 0,00 0,00	11,06 0,00 0,00	11,06
9	59,28 0,00 0,00	0,66	69,46 0,00 0,00	10,17 0,00 0,00	10,17
10	64,44 0,00 0,00	0,71	73,55 0,00 0,00	9,11 0,00 0,00	9,11
11	69,60 0,00 0,00	0,76	77,49 0,00 0,00	7,88 0,00 0,00	7,88
12	74,76 0,00 0,00	0,81	81,29 0,00 0,00	6,52 0,00 0,00	6,52
13	79,92 0,00 0,00	0,86	84,96 0,00 0,00	5,03 0,00 0,00	5,03
14	85,08 0,00 0,00	0,91	88,54 0,00 0,00	3,45 0,00 0,00	3,45
15	90,24 0,00 0,00	0,95	92,01 0,00 0,00	1,76 0,00 0,00	1,76
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	18,00 0,00 0,00	0,00	18,00 0,00 0,00	0,00 0,00 0,00	0,01
18	37,35 0,00 0,00	0,40	49,47 0,00 0,00	12,11 0,00 0,00	12,11
19	56,70 0,00 0,00	0,63	67,35 0,00 0,00	10,64 0,00 0,00	10,64
20	76,05 0,00 0,00	0,82	82,22 0,00 0,00	6,16 0,00 0,00	6,16
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

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

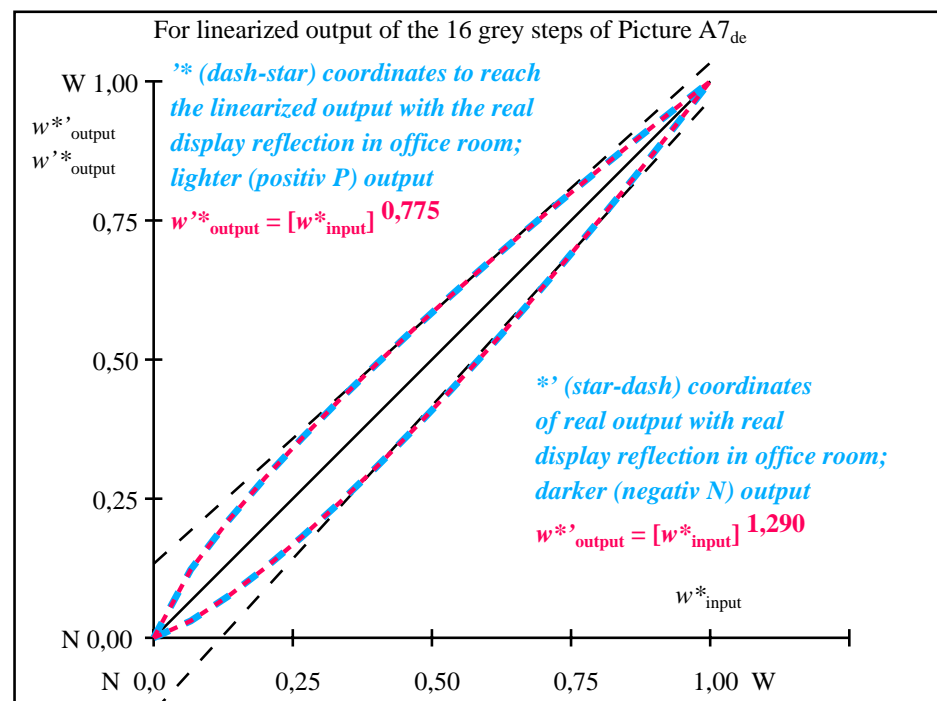
**Mean lightness difference (16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 7,5$

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

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

part 1,

AE360-3de: 11032



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

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE360-7de: 11032

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:2,5$ ;  $Y_N$ -range 1,87 to <3,75

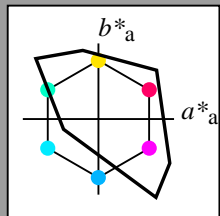
input:  $rgb/cmy0/000n/w$  set...  
output:  $\rightarrow rgb_{\text{de}}$  setrgbcolor



Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the  
four elementary hues

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



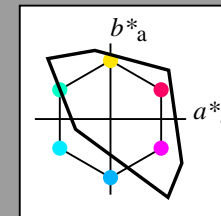
TLS00a; adapted (a) CIELAB data					
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
Y <sub>Ma</sub>	92.66	-20.69	90.75	93.08	103
L <sub>Ma</sub>	83.63	-82.75	79.9	115.04	136
C <sub>Ma</sub>	86.88	-46.16	-13.55	48.12	196
V <sub>Ma</sub>	30.39	76.06	-103.59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

Output: Colorimetric Television Luminous System TLS00a

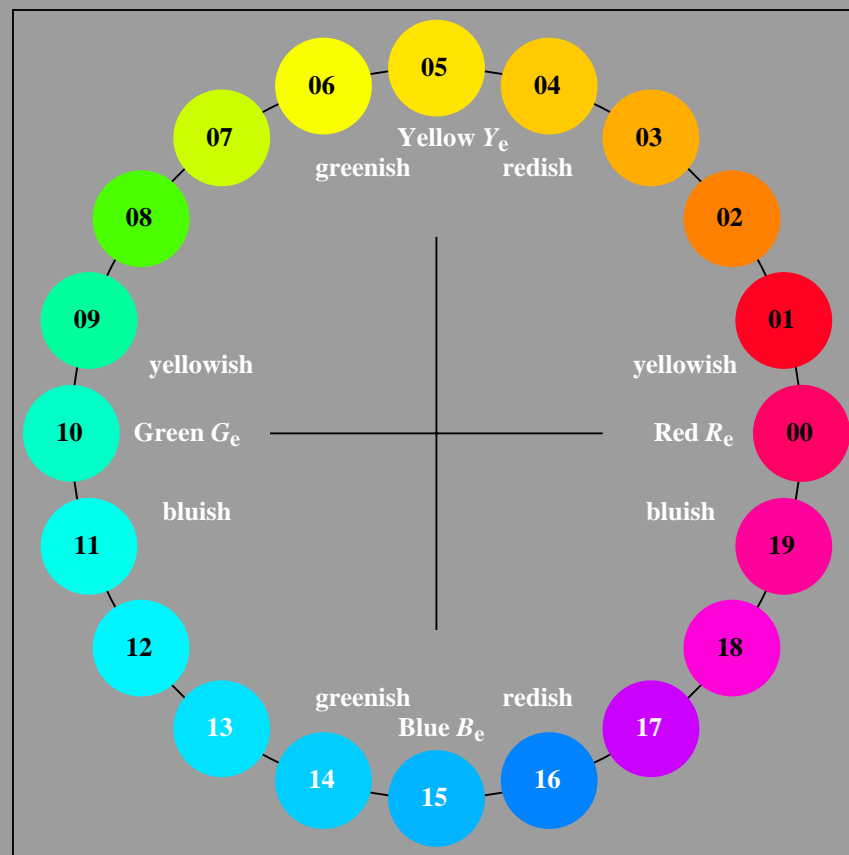
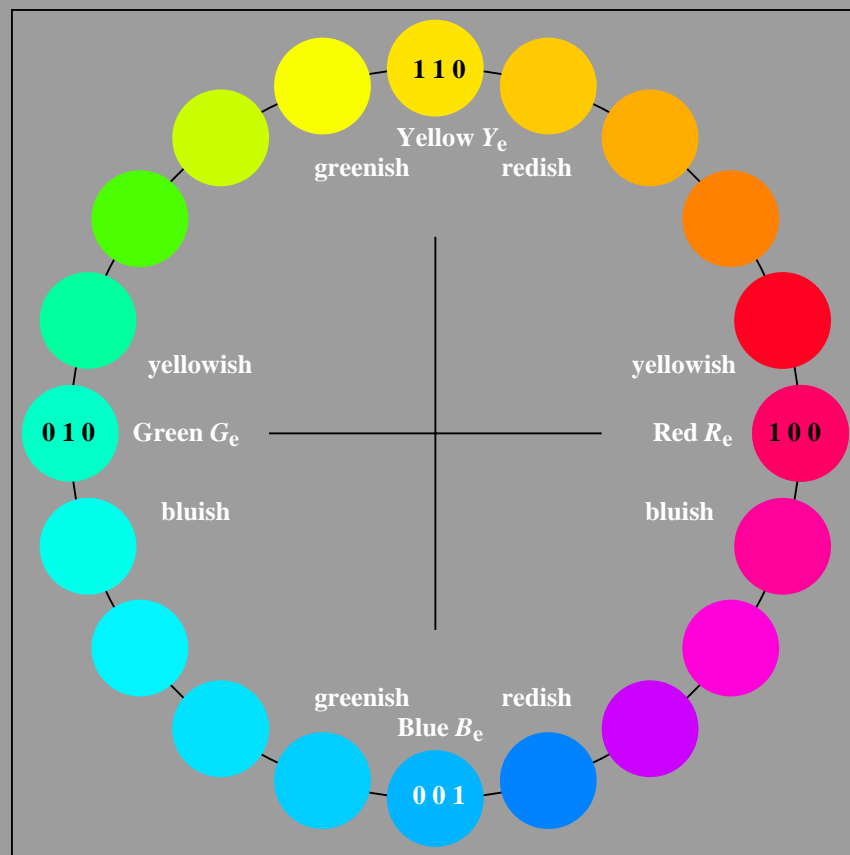
with hue number

$n = 00$  to 19

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



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



AE360-7N-104-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $Y_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

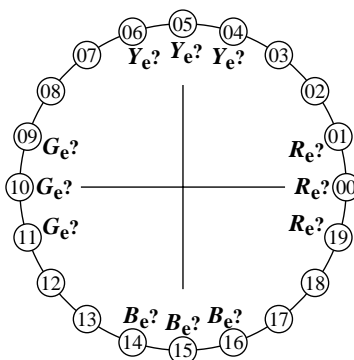
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output:  $\rightarrow$  *rgb<sub>de</sub> setrgbcolor*

### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11041

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY4\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY4\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY4\_1.PDF

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

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

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

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

#### For output with PS file AE36F0PX\_CY4\_1.PS

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

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

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

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

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

.....

.....

.....

.....

.....

.....

.....

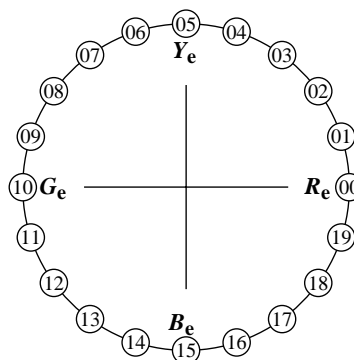
.....

.....

.....

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

The colours of the two hue steps no. (e. g. 00 and 01) .....are not distinguishable.

The colours of the two hue steps no. (e. g. 14 and 15) .....are not distinguishable.

The colours of the two hue steps no. (e. g. 15 and 16) .....are not distinguishable.

List other pairs: .....

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

part 2,

AE361-3de: 11041

### 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/AE36/AE36F0PX\\_CY4\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY4\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_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/AE36/AE36F0PX\\_CY4\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY4\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY4_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,

AE361-7de: 11041

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

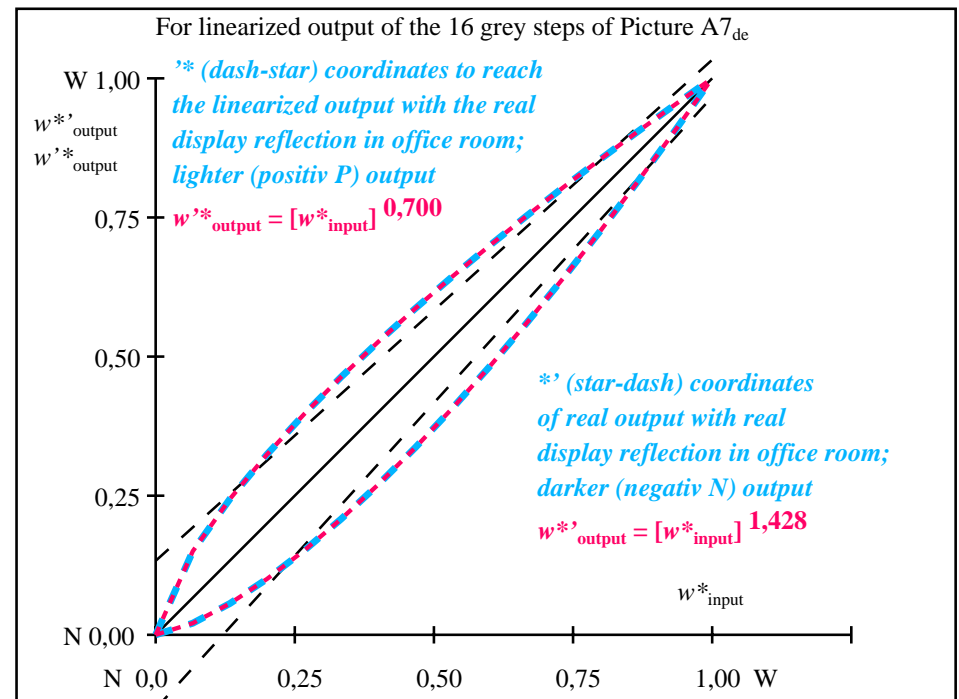
input:  $rgb/cmy0/000n/w$  set...  
output:  $->rgb_{de}$  set $rgbcolor$

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36F0PX.PDF> / .PS; 3D-linearization, page 15/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE36F0PX.PDF> 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	26,84 0,00 0,00	0,00	26,84 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	31,41 0,00 0,00	0,20	41,04 0,00 0,00	9,62 0,00 0,00	9,62	ISO/IEC 15775 Annex G
3	35,98 0,00 0,00	0,30	48,09 0,00 0,00	12,10 0,00 0,00	12,10	and DIN 33866-1 Annex G
4	40,56 0,00 0,00	0,39	53,74 0,00 0,00	13,18 0,00 0,00	13,18	
5	45,13 0,00 0,00	0,46	58,64 0,00 0,00	13,51 0,00 0,00	13,51	
6	49,70 0,00 0,00	0,52	63,04 0,00 0,00	13,34 0,00 0,00	13,34	
7	54,27 0,00 0,00	0,58	67,09 0,00 0,00	12,82 0,00 0,00	12,82	
8	58,84 0,00 0,00	0,64	70,86 0,00 0,00	12,02 0,00 0,00	12,02	
9	63,41 0,00 0,00	0,69	74,42 0,00 0,00	11,00 0,00 0,00	11,00	
10	67,98 0,00 0,00	0,74	77,79 0,00 0,00	9,80 0,00 0,00	9,80	
11	72,55 0,00 0,00	0,78	81,01 0,00 0,00	8,45 0,00 0,00	8,45	
12	77,12 0,00 0,00	0,83	84,09 0,00 0,00	6,97 0,00 0,00	6,97	
13	81,69 0,00 0,00	0,87	87,06 0,00 0,00	5,37 0,00 0,00	5,37	
14	86,26 0,00 0,00	0,92	89,93 0,00 0,00	3,66 0,00 0,00	3,66	Mean lightness difference
15	90,83 0,00 0,00	0,96	92,71 0,00 0,00	1,87 0,00 0,00	1,87	(16 steps)
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	ΔE <sup>*</sup> <sub>CIELAB</sub> = 8,3
17	26,84 0,00 0,00	0,00	26,84 0,00 0,00	0,00 0,00 0,00	0,01	
18	43,98 0,00 0,00	0,44	57,47 0,00 0,00	13,48 0,00 0,00	13,48	
19	61,12 0,00 0,00	0,66	72,66 0,00 0,00	11,54 0,00 0,00	11,54	Mean lightness difference
20	78,26 0,00 0,00	0,84	84,85 0,00 0,00	6,58 0,00 0,00	6,58	(5 steps)
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	ΔL <sup>*</sup> <sub>CIELAB</sub> = 6,3
Mean colour reproduction index: R <sup>*</sup> <sub>ab,m</sub> = 63,7						

part 1,

AE360-3de: 11042



part 2,

AE361-3de: 11042

L <sup>*</sup> /Y <sub>intended</sub> (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 <sup>*</sup> setcmyk																
gp=0,700																
No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
w <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	0,150	0,243	0,324	0,396	0,463	0,526	0,586	0,643	0,699	0,753	0,804	0,855	0,904	0,952	1,000

part 3, picture A7<sub>de</sub>: 16 visual equidistant L<sup>\*</sup>-grey steps; PS operator: 0 0 0 n<sup>\*</sup> setcmykcolor

AE360-7de: 11042

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing Y contrast Y<sub>W</sub>:Y<sub>N</sub>=88,9:5; Y<sub>N</sub>-range 3,75 to <7,5

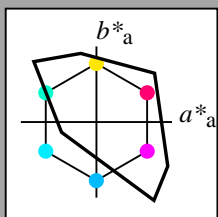
input: rgb/cmy0/000n/w set...  
output: ->rgb<sub>de</sub> setrgbcolor

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the  
four elementary hues

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



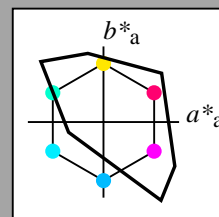
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
Y <sub>Ma</sub>	92.66	-20.69	90.75	93.08	103
L <sub>Ma</sub>	83.63	-82.75	79.9	115.04	136
C <sub>Ma</sub>	86.88	-46.16	-13.55	48.12	196
V <sub>Ma</sub>	30.39	76.06	-103.59	128.52	306
M <sub>Ma</sub>	57.3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

Output: Colorimetric Television Luminous System TLS00a

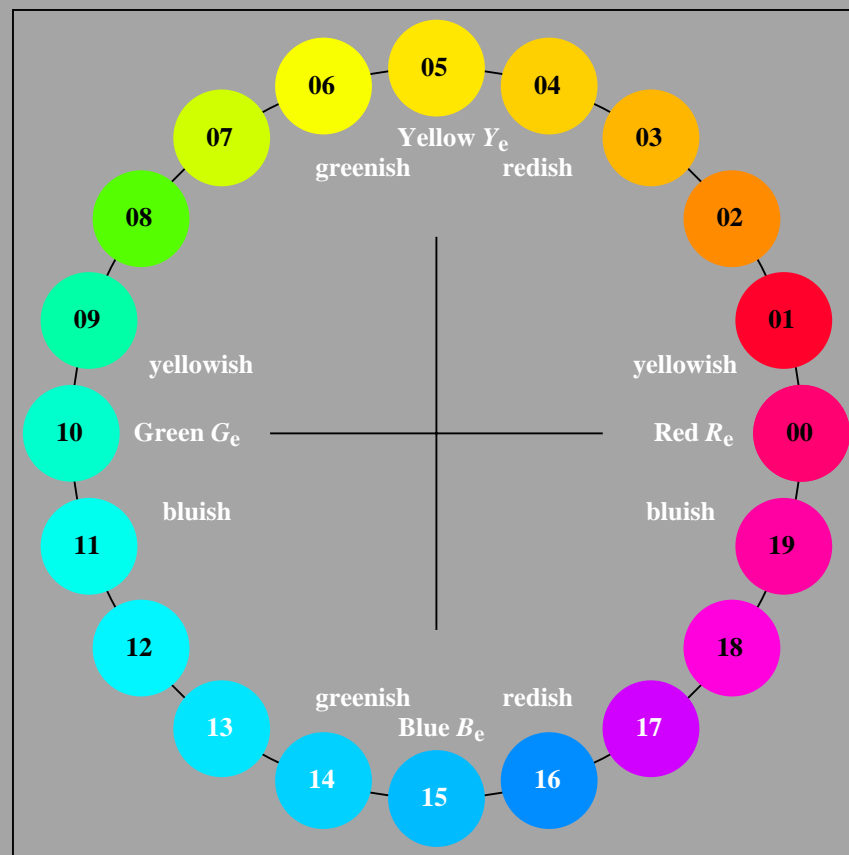
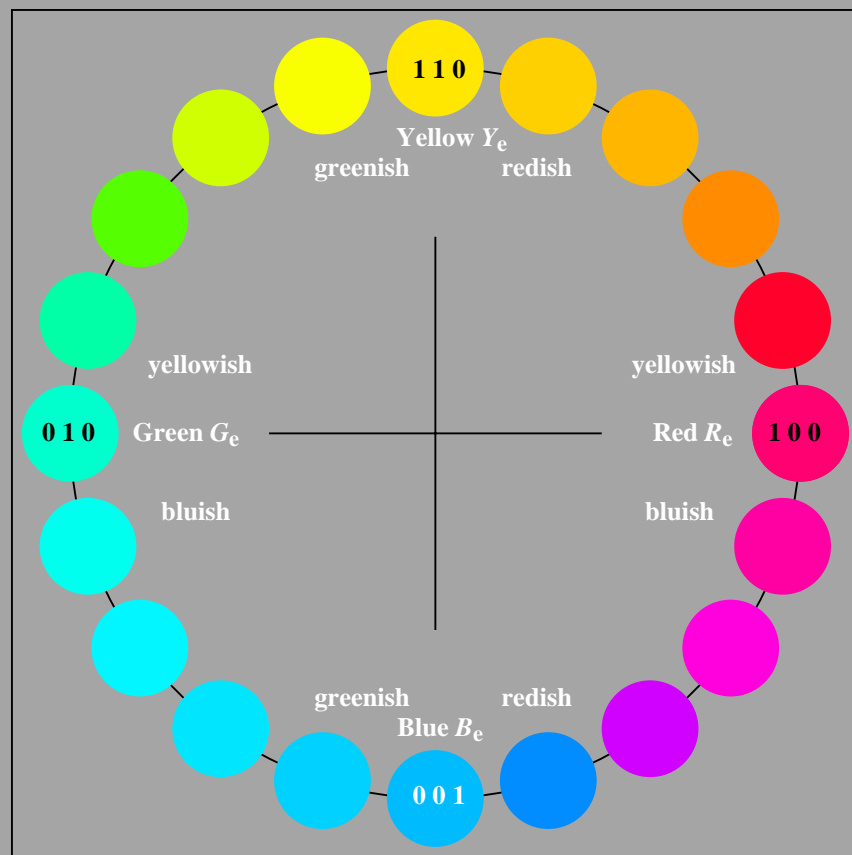
with hue number

$n = 00$  to 19

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



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



AE360-7N-105-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $Y_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

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

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

output:  $\rightarrow$  *rgb<sub>de</sub> setrgbcolor*

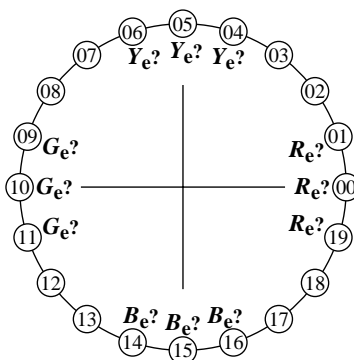
TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta



### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11051

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY3\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY3\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY3\_1.PDF

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

#### For output with PS file AE36F0PX\_CY3\_1.PS

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

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

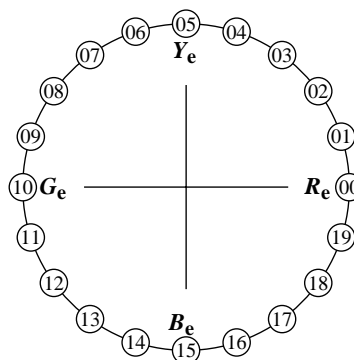
.....  
.....  
.....

part 3,

AE360-7de: 11051

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11051

### 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/AE36/AE36F0PX\\_CY3\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY3\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_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/AE36/AE36F0PX\\_CY3\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY3\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY3_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,

AE361-7de: 11051

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36F0PX.PDF> / .PS; 3D-linearization, page 18/24  
F: 3D-linearization AE36/AE36LF0PX.PDF /.PS in file (F)

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

<i>i</i>	$LAB^*_{ref}$	$L^*_{out}$	$LAB^*_{out}$	$LAB^*_{out-ref}$	$\Delta E^*$	Start output S1
1	37,98	0,00	0,00	37,98	0,00	0,00
2	41,81	0,00	0,24	51,79	0,00	0,00
3	45,64	0,00	0,34	57,87	0,00	0,00
4	49,47	0,00	0,42	62,60	0,00	0,00
5	53,29	0,00	0,49	66,62	0,00	0,00
6	57,12	0,00	0,56	70,19	0,00	0,00
7	60,95	0,00	0,61	73,43	0,00	0,00
8	64,78	0,00	0,66	76,43	0,00	0,00
9	68,61	0,00	0,71	79,23	0,00	0,00
10	72,44	0,00	0,76	81,87	0,00	0,00
11	76,26	0,00	0,80	84,37	0,00	0,00
12	80,09	0,00	0,84	86,76	0,00	0,00
13	83,92	0,00	0,88	89,04	0,00	0,00
14	87,75	0,00	0,92	91,24	0,00	0,00
15	91,58	0,00	0,96	93,36	0,00	0,00
16	95,41	0,00	1,00	95,41	0,00	0,00
17	37,98	0,00	0,00	37,98	0,00	0,00
18	52,34	0,00	0,48	65,66	0,00	0,00
19	66,69	0,00	0,69	77,85	0,00	0,00
20	81,05	0,00	0,85	87,34	0,00	0,00
21	95,41	0,00	1,00	95,41	0,00	0,00

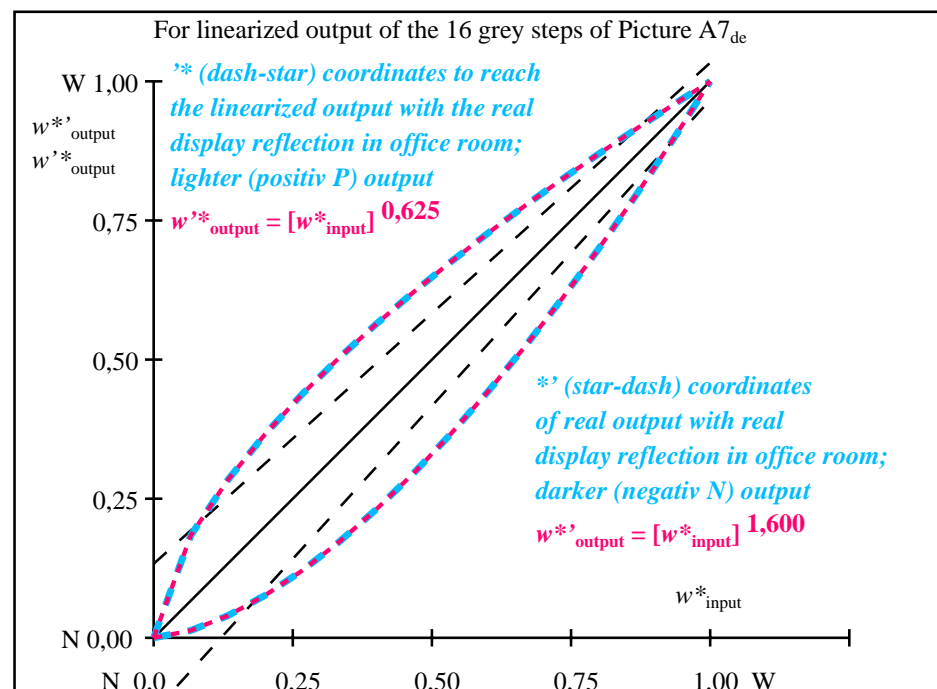
Mean lightness difference (16 steps)  
 $\Delta E^*_{CIELAB} = 8,1$

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

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

part 1,

AE360-3de: 11052



part 2,

AE361-3de: 11052

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

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmkcolor

AE360-7de: 11052

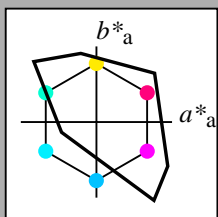
In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:10$ ;  $Y_N$ -range 7,5 to <15

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

Input: Colorimetric Television Luminous System TLS00a

with *rgb* data of the  
four elementary hues

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



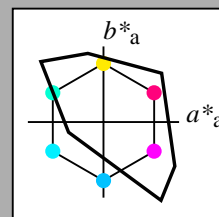
	$L^*=L^*_a$	$a^*_a$	$b^*_a$	$C^*_{ab,a}$	$h^*_{ab,a}$
O <sub>Ma</sub>	50.5	76.92	64.55	100.42	40
Y <sub>Ma</sub>	92.66	-20.69	90.75	93.08	103
L <sub>Ma</sub>	83.63	-82.75	79.9	115.04	136
C <sub>Ma</sub>	86.88	-46.16	-13.55	48.12	196
V <sub>Ma</sub>	30.39	76.06	-103.59	128.52	306
M <sub>Ma</sub>	57.3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

Output: Colorimetric Television Luminous System TLS00a

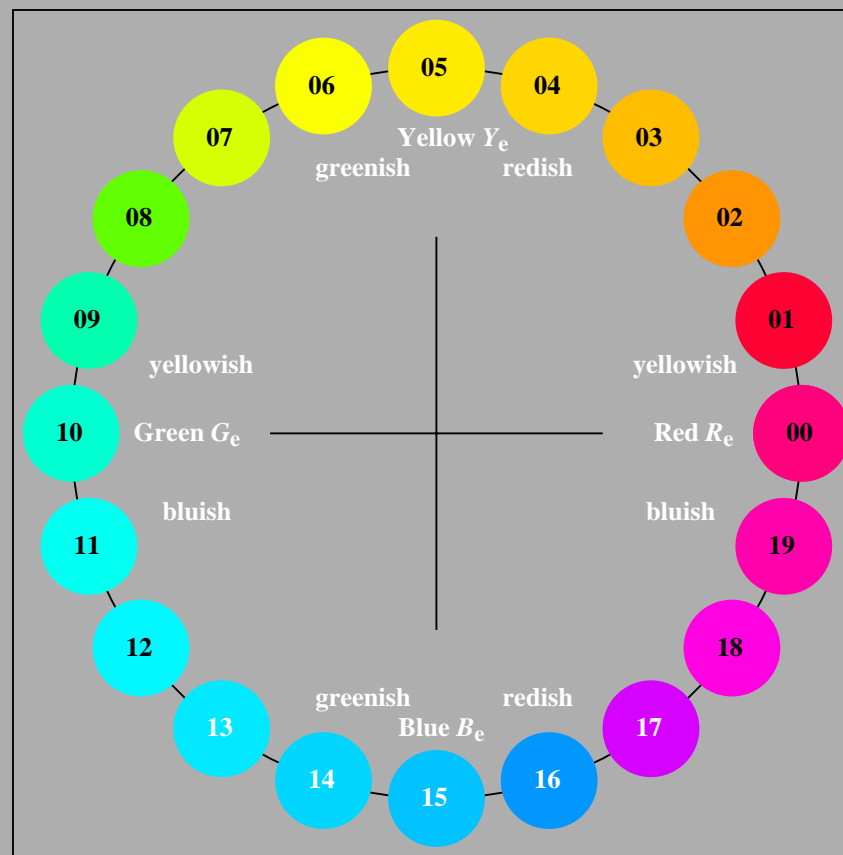
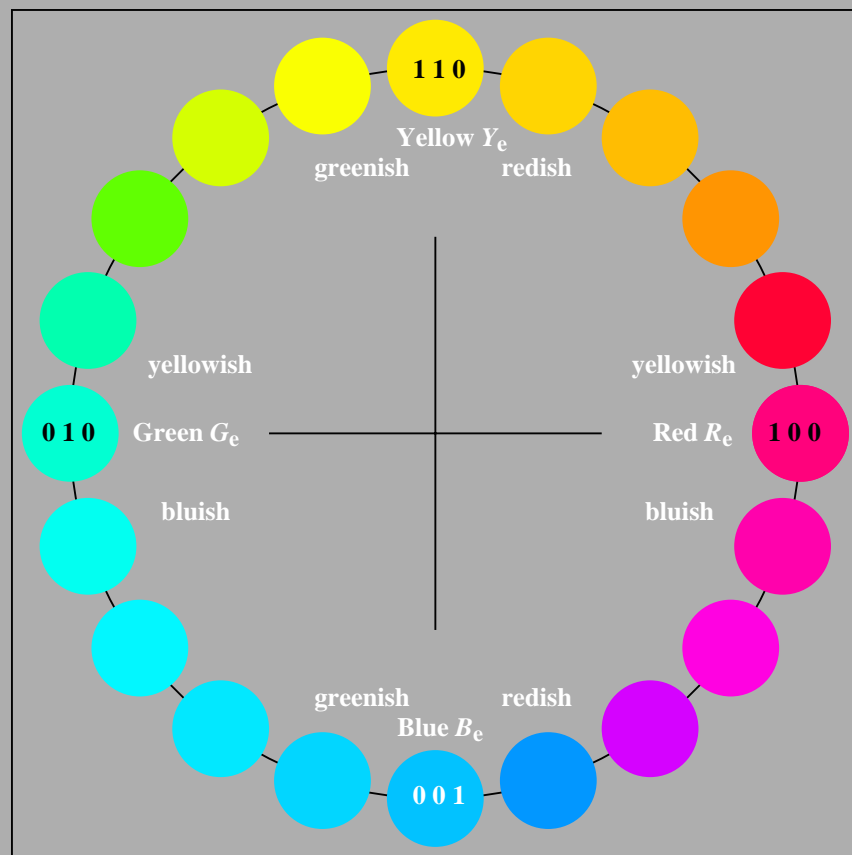
with hue number

$n = 00$  to 19

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



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



AE360-7N-106-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $J_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

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

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

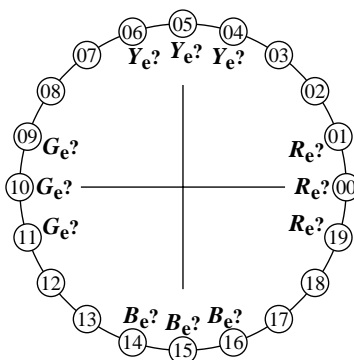
output: *->rgb<sub>de</sub> setrgbcolor*

TUB Registration: 20190301-AE36/AE36L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta

### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11061

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY2\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY2\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY2\_1.PDF

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

#### For output with PS file AE36F0PX\_CY2\_1.PS

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

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

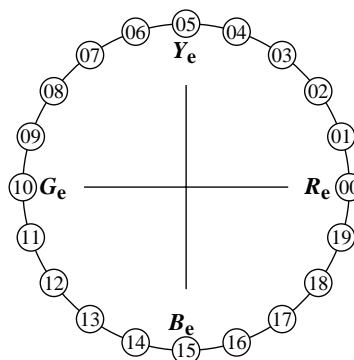
.....  
.....  
.....

part 3,

AE360-7de: 11061

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11061

### 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/AE36/AE36F0PX\\_CY2\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY2\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_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/AE36/AE36F0PX\\_CY2\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY2\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY2_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,

AE361-7de: 11061

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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



see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36L0FA.TXT /.PS>  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE36/AE36L0FA.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	52,01 0,00 0,00	52,01 0,00 0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01
2	54,91 0,00 0,00	0,27 63,82 0,00	0,00 0,00 8,90	0,00 0,00 8,90	8,90
3	57,80 0,00 0,00	0,37 68,48 0,00	0,00 0,00 10,68	0,00 0,00 10,68	10,68
4	60,69 0,00 0,00	0,46 72,03 0,00	0,00 0,00 11,33	0,00 0,00 11,33	11,33
5	63,58 0,00 0,00	0,52 75,00 0,00	0,00 0,00 11,41	0,00 0,00 11,41	11,41
6	66,48 0,00 0,00	0,58 77,60 0,00	0,00 0,00 11,12	0,00 0,00 11,12	11,12
7	69,37 0,00 0,00	0,64 79,94 0,00	0,00 0,00 10,57	0,00 0,00 10,57	10,57
8	72,26 0,00 0,00	0,69 82,09 0,00	0,00 0,00 9,83	0,00 0,00 9,83	9,83
9	75,16 0,00 0,00	0,73 84,09 0,00	0,00 0,00 8,93	0,00 0,00 8,93	8,93
10	78,05 0,00 0,00	0,78 85,96 0,00	0,00 0,00 7,90	0,00 0,00 7,90	7,90
11	80,94 0,00 0,00	0,82 87,72 0,00	0,00 0,00 6,77	0,00 0,00 6,77	6,77
12	83,83 0,00 0,00	0,86 89,39 0,00	0,00 0,00 5,56	0,00 0,00 5,56	5,56
13	86,73 0,00 0,00	0,89 90,99 0,00	0,00 0,00 4,26	0,00 0,00 4,26	4,26
14	89,62 0,00 0,00	0,93 92,52 0,00	0,00 0,00 2,90	0,00 0,00 2,90	2,90
15	92,51 0,00 0,00	0,96 93,99 0,00	0,00 0,00 1,47	0,00 0,00 1,47	1,47
16	95,41 0,00 0,00	1,00 95,41 0,00	0,00 0,00 0,00	0,00 0,00 0,00	0,01
17	52,01 0,00 0,00	52,01 0,00 0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01
18	62,86 0,00 0,00	0,51 74,30 0,00	0,00 0,00 11,43	0,00 0,00 11,43	11,43
19	73,71 0,00 0,00	0,71 83,11 0,00	0,00 0,00 9,39	0,00 0,00 9,39	9,39
20	84,56 0,00 0,00	0,87 89,80 0,00	0,00 0,00 5,24	0,00 0,00 5,24	5,24
21	95,41 0,00 0,00	1,00 95,41 0,00	0,00 0,00 0,00	0,00 0,00 0,00	0,01

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

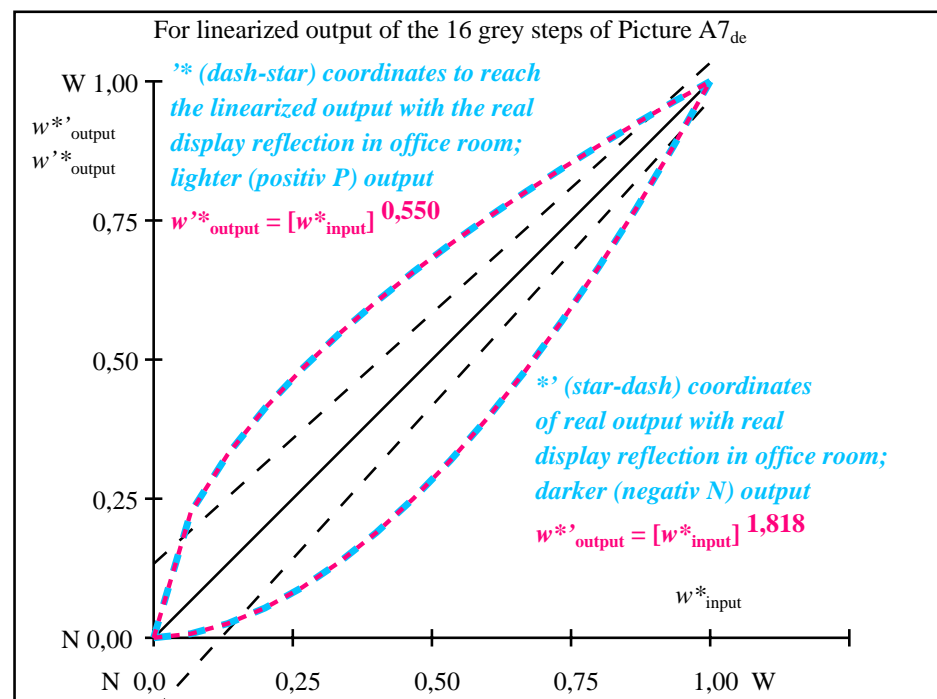
**Mean lightness difference (16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 6,9$

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

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

part 1,

AE360-3de: 11062



$L^*/Y_{\text{intended}}$ (absolute)	52,0/20,1	54,9/22,8	57,8/25,7	60,6/28,9	63,5/32,2	66,4/35,9	69,3/39,8	72,2/44,0	75,1/48,5	78,0/53,3	80,9/58,3	83,8/63,7	86,7/69,4	89,6/75,4	92,5/81,8	95,4/88,5
0 0 0 n* setcmyk gp=0,550 No. and Hex code	00;F	01;E	02;D	03;C	04;B	05;A	06;9	07;8	08;7	09;6	10;5	11;4	12;3	13;2	14;1	15;0
$w^* = l^*_{\text{CIELAB}, r}$ (relative)	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
$w^*_{\text{intended}}$ $w^*_{\text{output}}$	0,000 0,000	0,067 0,226	0,133 0,329	0,200 0,412	0,267 0,483	0,333 0,546	0,400 0,604	0,467 0,657	0,533 0,707	0,600 0,755	0,667 0,800	0,733 0,842	0,800 0,884	0,867 0,924	0,933 0,962	1,000 1,000

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE360-7de: 11062

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:20$ ;  $Y_N$ -range 15 to <30

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

Input: Colorimetric Television Luminous System TLS00a

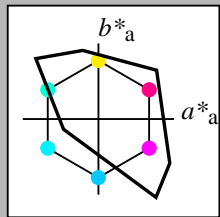
with *rgb* data of the  
four elementary hues

1 0 0 = Red  $R_e$

1 1 0 = Yellow  $Y_e$

0 1 0 = Green  $G_e$

0 0 1 = Blue  $B_e$



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

Output: Colorimetric Television Luminous System TLS00a

with hue number

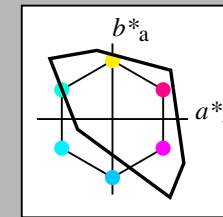
$n=00$  to 19

00 = Red  $R_e$

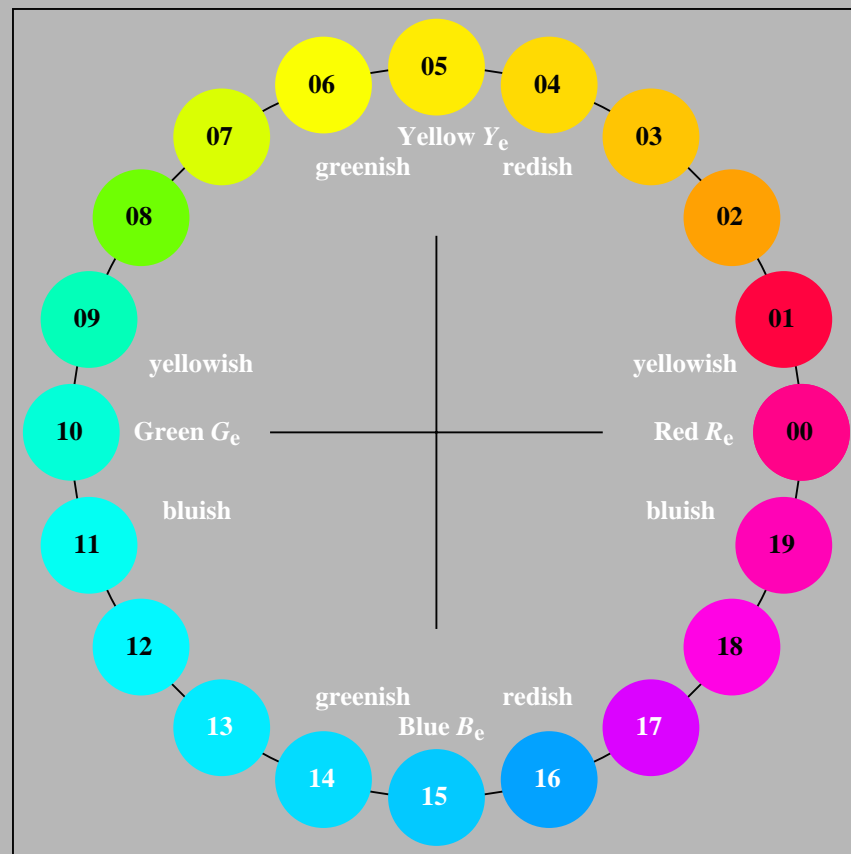
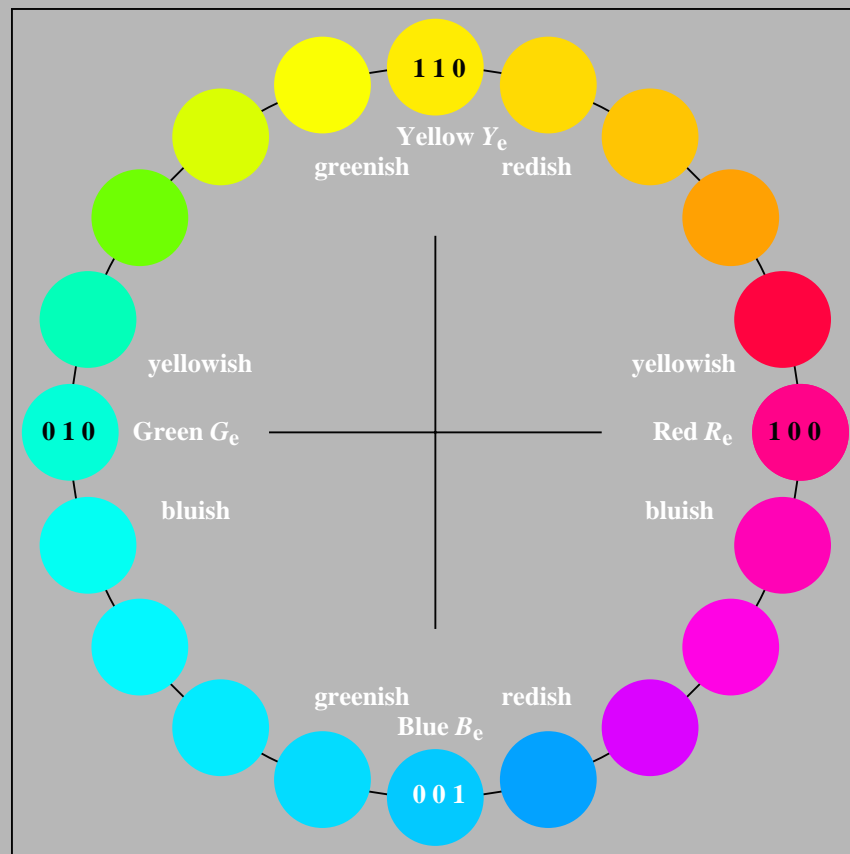
05 = Yellow  $Y_e$

10 = Green  $G_e$

15 = Blue  $B_e$



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



AE360-7N-107-0: 20 step hue circle with 4 elementary colours  $R_e$ ,  $J_e$ ,  $G_e$ ,  $B_e$  (left)

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

Test chart AE36 similar to test chart 1 of DIN 33872-5

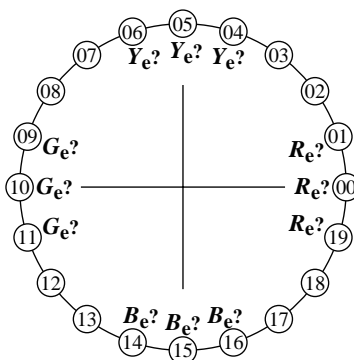
20 step elementary hue circle; Test chart according to DIN 33872-5

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

output: *->rgb<sub>de</sub> setrgbcolor*

### Agreement with elementary hues (Yes/No decision)

Layout example: Agreement with elementary hues.



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

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

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

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

This test uses a hue circle with 20 hues.

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

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

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

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

part 1,

AE360-3de: 11071

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

#### PDF file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY1\\_1.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_1.PDF)

underline: Yes/No

#### PS file:

[http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY1\\_1.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_1.PS)

underline: Yes/No

#### Used computer operating system:

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

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

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

#### output with PDF/PS-file:

underline: PDF/PS file

#### For output with PDF file AE36F0PX\_CY1\_1.PDF

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

#### For output with PS file AE36F0PX\_CY1\_1.PS

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

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

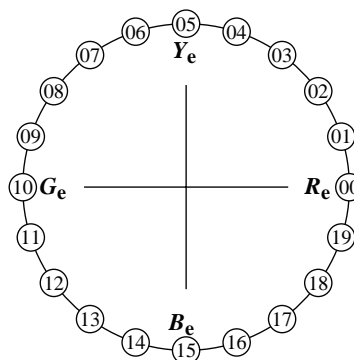
.....  
.....  
.....

part 3,

AE360-7de: 11071

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

Layout example: Discriminability of colours with 20 hues.



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

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

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

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

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

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

Are all 20 colours of the 20 hues distinguishable?

underline: Yes/No

Only in case of "No":

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

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

part 2,

AE361-3de: 11071

### 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/AE36/AE36F0PX\\_CY1\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_3.PDF)

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY1\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_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/AE36/AE36F0PX\\_CY1\\_3.PDF](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_3.PDF)

underline: Yes/No

picture A7de

underline: Yes/No

PS file: [http://farbe.li.tu-berlin.de/AE36/AE36F0PX\\_CY1\\_3.PS](http://farbe.li.tu-berlin.de/AE36/AE36F0PX_CY1_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,

AE361-7de: 11071

Form A: Test chart AE36 similar to test chart 1 of DIN 33872-5  
20 step elementary hue circle; Test chart according to DIN 33872-5

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

see similar files: <http://farbe.li.tu-berlin.de/AE36/AE36L0FA.TXT /.PS>  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE36/AE36L0FA.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	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01
2	71,41 0,00 0,00	0,30	77,45 0,00 0,00	6,04 0,00 0,00	6,04
3	73,12 0,00 0,00	0,41	80,23 0,00 0,00	7,11 0,00 0,00	7,11
4	74,83 0,00 0,00	0,49	82,31 0,00 0,00	7,47 0,00 0,00	7,47
5	76,55 0,00 0,00	0,55	84,02 0,00 0,00	7,47 0,00 0,00	7,47
6	78,26 0,00 0,00	0,61	85,51 0,00 0,00	7,24 0,00 0,00	7,24
7	79,98 0,00 0,00	0,66	86,83 0,00 0,00	6,85 0,00 0,00	6,85
8	81,69 0,00 0,00	0,71	88,04 0,00 0,00	6,35 0,00 0,00	6,35
9	83,41 0,00 0,00	0,75	89,16 0,00 0,00	5,75 0,00 0,00	5,75
10	85,12 0,00 0,00	0,79	90,20 0,00 0,00	5,08 0,00 0,00	5,08
11	86,83 0,00 0,00	0,83	91,18 0,00 0,00	4,34 0,00 0,00	4,34
12	88,55 0,00 0,00	0,87	92,11 0,00 0,00	3,55 0,00 0,00	3,55
13	90,26 0,00 0,00	0,90	92,99 0,00 0,00	2,72 0,00 0,00	2,72
14	91,98 0,00 0,00	0,93	93,83 0,00 0,00	1,85 0,00 0,00	1,85
15	93,69 0,00 0,00	0,96	94,63 0,00 0,00	0,94 0,00 0,00	0,94
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	69,69 0,00 0,00	0,00	69,69 0,00 0,00	0,00 0,00 0,00	0,01
18	76,12 0,00 0,00	0,54	83,62 0,00 0,00	7,49 0,00 0,00	7,49
19	82,55 0,00 0,00	0,73	88,61 0,00 0,00	6,06 0,00 0,00	6,06
20	88,98 0,00 0,00	0,88	92,33 0,00 0,00	3,35 0,00 0,00	3,35
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

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

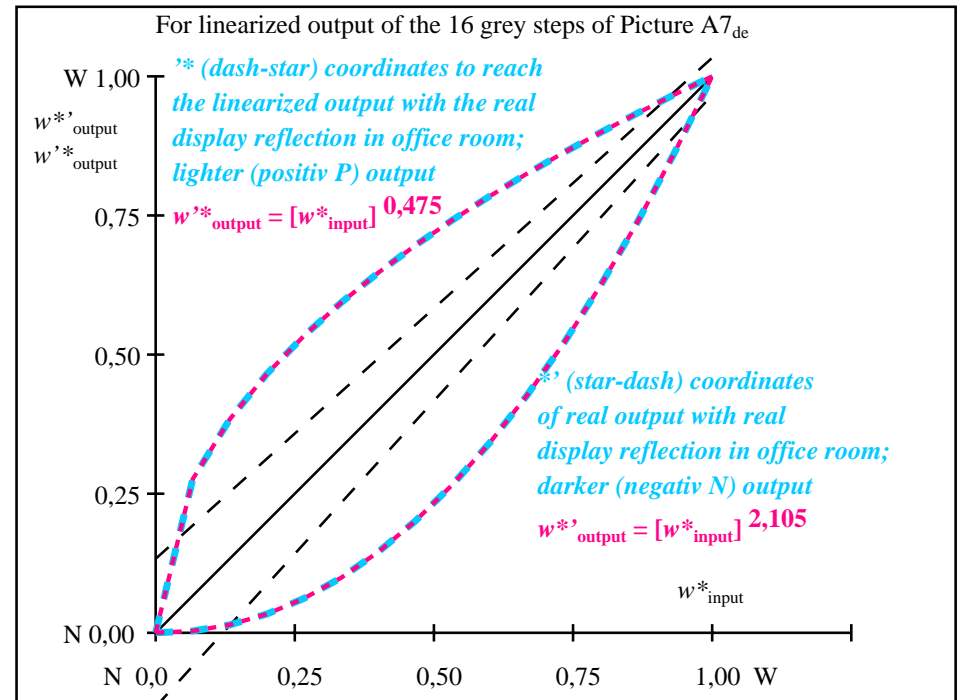
**Mean lightness difference**  
**(16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 4,5$

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

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

part 1,

AE360-3de: 11072



part 2,

AE361-3de: 11072

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

part 3, picture A7<sub>de</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE360-7de: 11072

In-out: Test chart AE36 similar to test chart 1 of DIN 33872-5  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:40$ ;  $Y_N$ -range 30 to <60

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