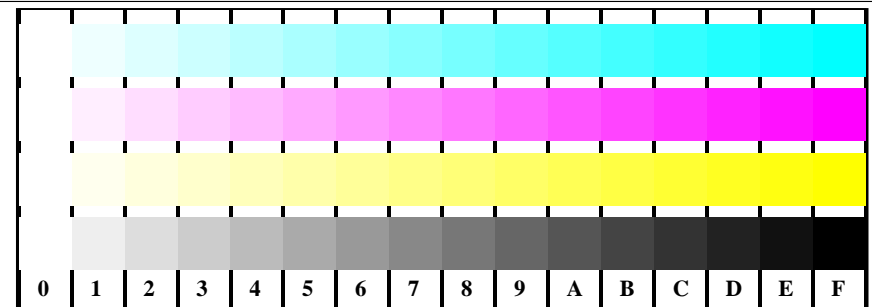
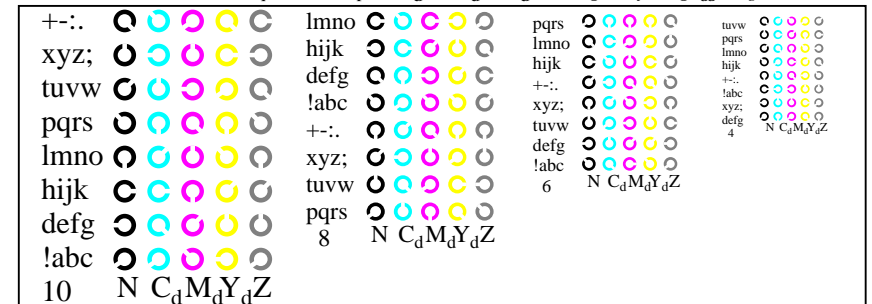


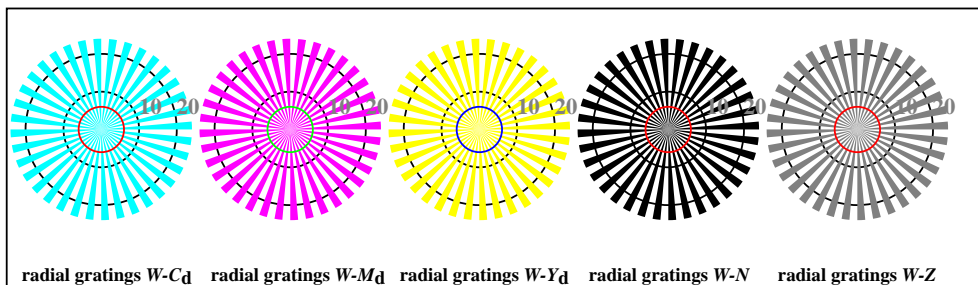
see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS;  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>



AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



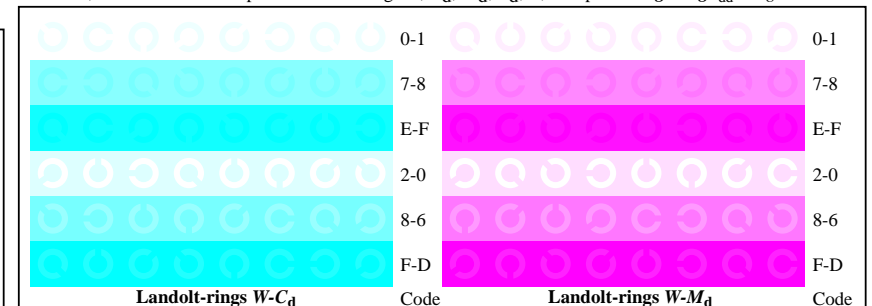
AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; *PS operator: rgb->rgb<sub>dd</sub> setrgbcolor*



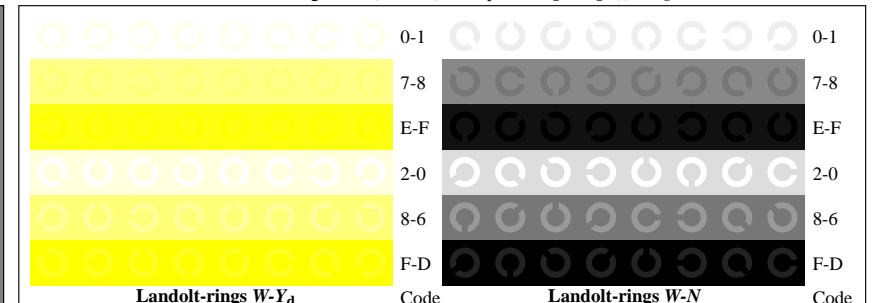
AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *PS operator: rgb->rgb<sub>dd</sub> setrgbcolor*



AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; *PS operator: rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; *PS operator: rgb->rgb<sub>dd</sub> setrgbcolor*

Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart CMYK

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

TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta

Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01001

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY8\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01001

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?  

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01001

#### 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/AE29/AE29F0PX\_CY8\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY8\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY8\_3.PDF

picture A7<sub>dd</sub> underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY8\_3.PS

picture A7<sub>dd</sub> 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,

AE291-7dd: 01001

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 3/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE29/AE29L0FA.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	6,36	0,00	ISO/IEC 15775 Annex G
3	12,72	0,00	0,13	12,72	0,00	and DIN 33866-1 Annex G
4	19,08	0,00	0,20	19,08	0,00	
5	25,44	0,00	0,26	25,44	0,00	
6	31,80	0,00	0,33	31,80	0,00	
7	38,16	0,00	0,40	38,16	0,00	
8	44,52	0,00	0,46	44,52	0,00	
9	50,88	0,00	0,53	50,88	0,00	
10	57,24	0,00	0,60	57,24	0,00	
11	63,60	0,00	0,66	63,60	0,00	
12	69,96	0,00	0,73	69,96	0,00	
13	76,32	0,00	0,80	76,32	0,00	
14	82,68	0,00	0,86	82,68	0,00	
15	89,04	0,00	0,93	89,04	0,00	
16	95,41	0,00	1,00	95,41	0,00	
17	0,00	0,00	0,00	0,00	0,00	
18	23,85	0,00	0,25	23,85	0,00	
19	47,70	0,00	0,50	47,70	0,00	
20	71,55	0,00	0,75	71,55	0,00	
21	95,41	0,00	1,00	95,41	0,00	

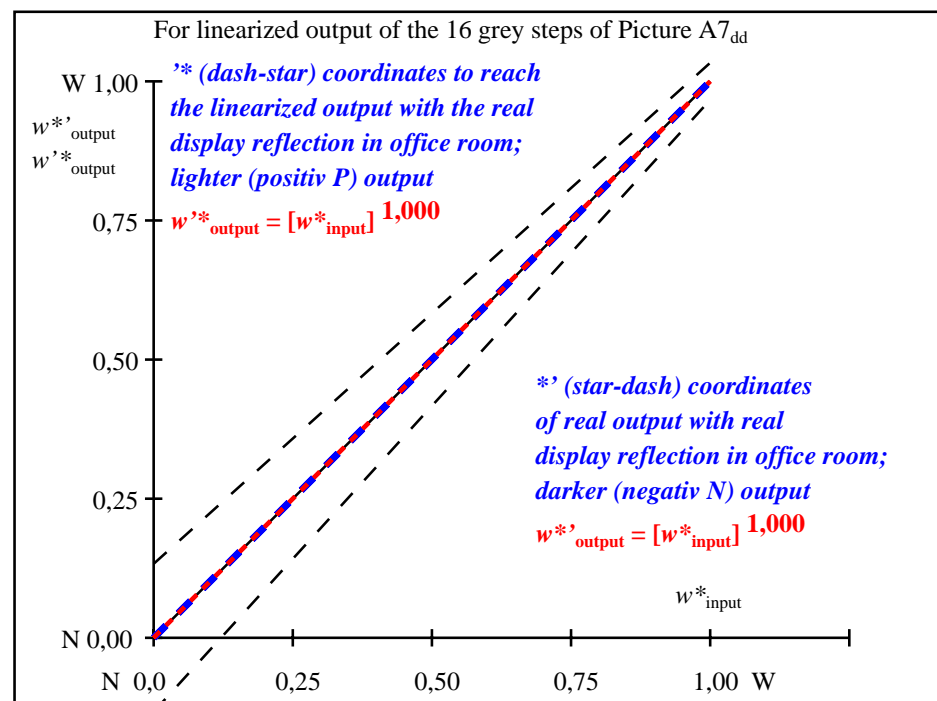
Mean lightness difference (16 steps)  
ΔE<sup>\*</sup><sub>CIELAB</sub> = 0,0

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,

AE290-3dd: 01002



part 2,

AE291-3dd: 01002

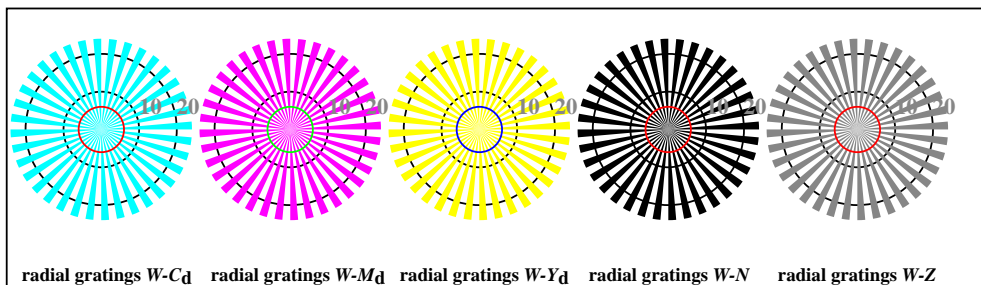
L <sup>*</sup> /Y <sub>intended</sub> (absolute)	0,0/0,0	6,3/0,7	12,7/1,5	19,0/2,7	25,4/4,5	31,8/6,9	38,1/10,1	44,5/14,2	50,8/19,1	57,2/25,1	63,6/32,3	69,9/40,7	76,3/50,4	82,6/61,5	89,0/74,2	95,4/88,5
0 0 0 n <sup>*</sup> setcmyk																
gp=1,000																
No. and Hex code	00;F	01;E	02;D	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>dd</sub>: 16 visual equidistant L<sup>\*</sup>-grey steps; PS operator: 0 0 0 n<sup>\*</sup> setcmykcolor

AE290-7dd: 01002

In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
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>dd</sub> setrgbcolor

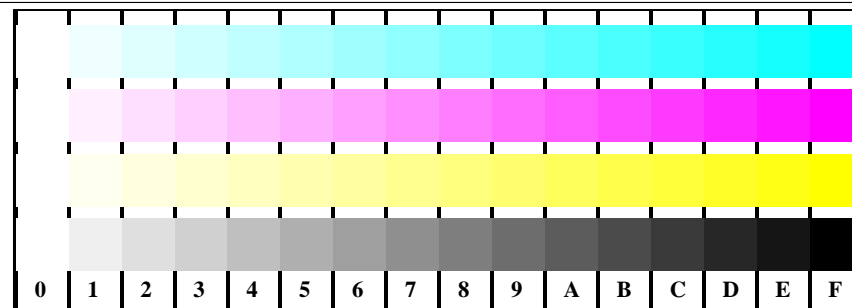


radial gratings W-C<sub>d</sub> radial gratings W-M<sub>d</sub> radial gratings W-Y<sub>d</sub> radial gratings W-N radial gratings W-Z  
AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

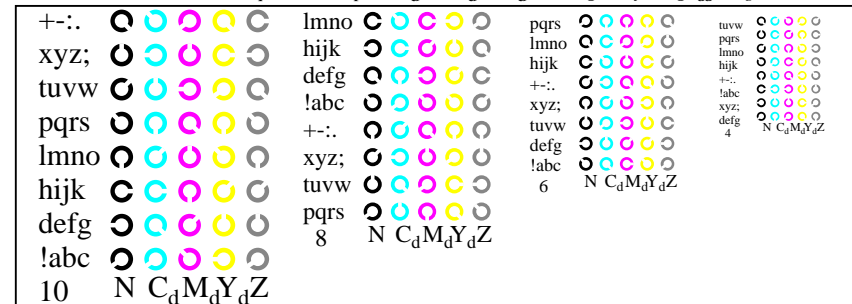


AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*

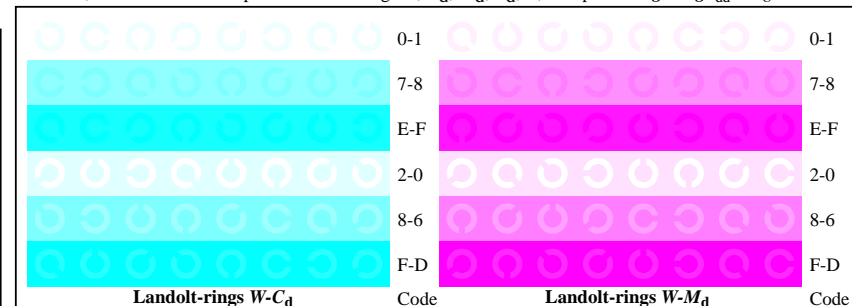
Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart CMYK



AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

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



Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01011

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY7\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01011

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01011

#### 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/AE29/AE29F0PX\_CY7\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY7\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY7\_3.PDF underline: Yes/No

picture A7<sub>dd</sub> underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY7\_3.PS or underline: Yes/No

picture A7<sub>dd</sub> or underline: Yes/No

colour measurement and specification for: underline: Yes/No

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, AE291-7dd: 01011

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 6/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

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

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

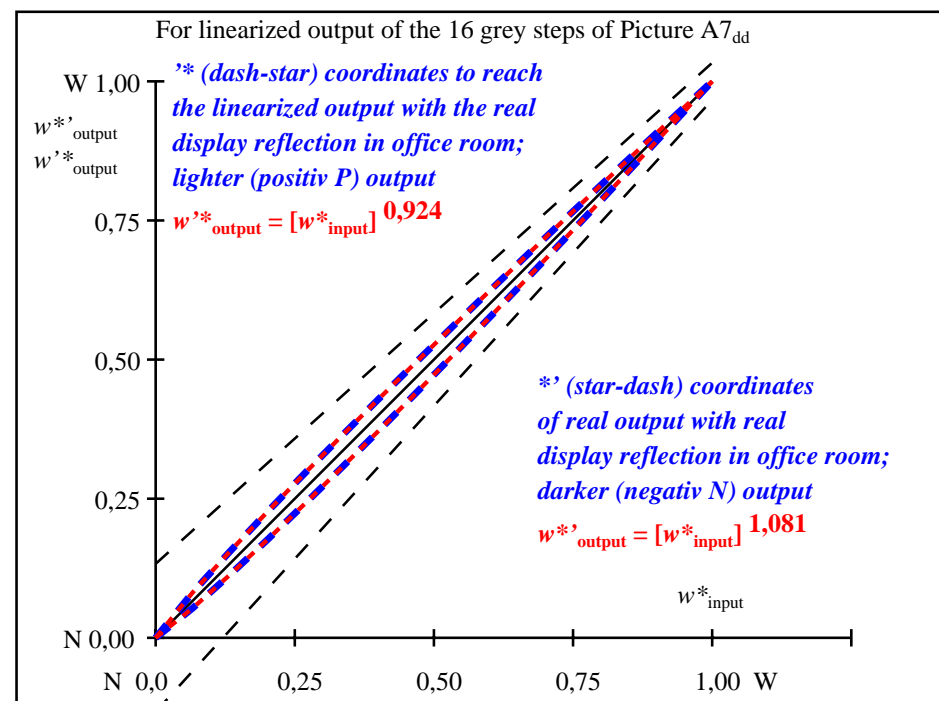
**Mean lightness difference**  
**(16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 3,4$

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

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

part 1,

AE290-3dd: 01012



part 2,

AE291-3dd: 01012

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

AE290-7dd: 01012

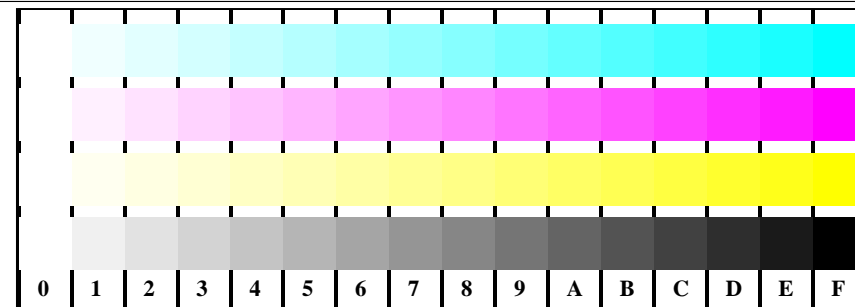
In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:0,62$ ;  $Y_N$ -range 0,46 to <0,93

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

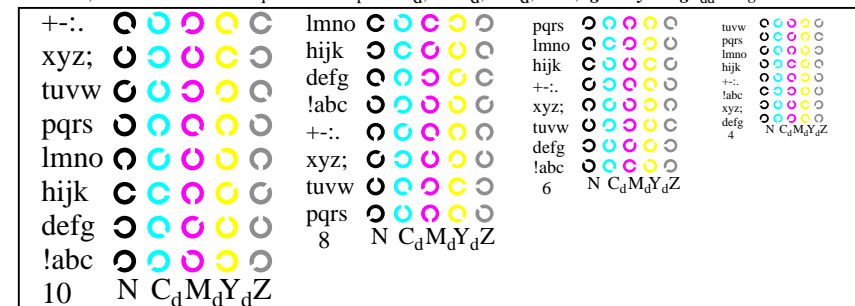
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 7/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

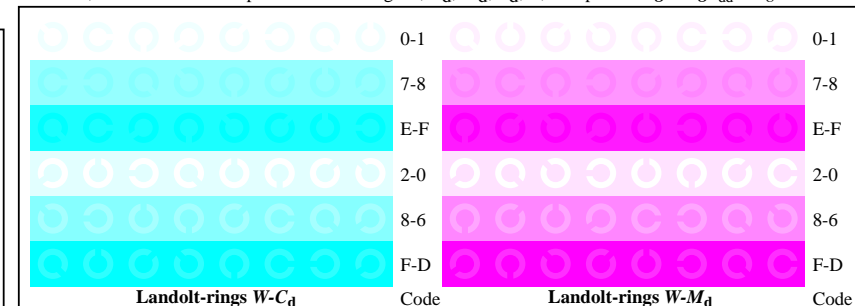
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta



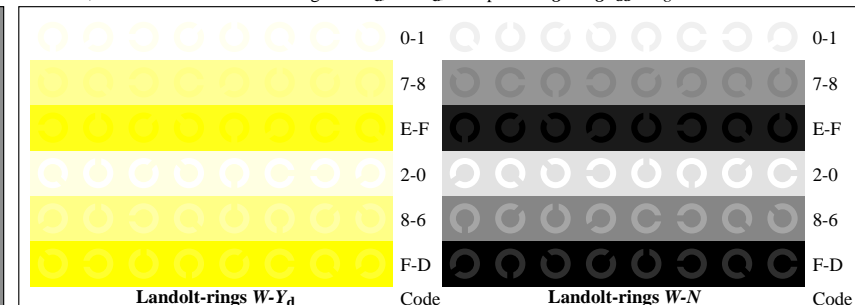
AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



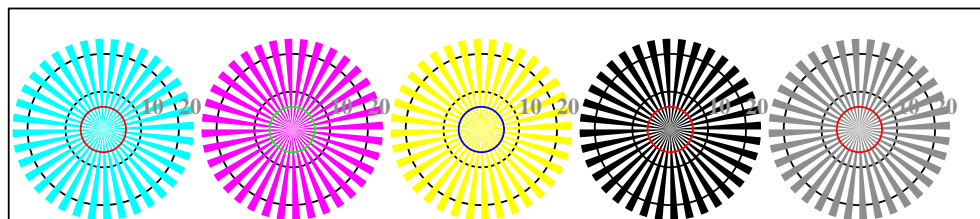
AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

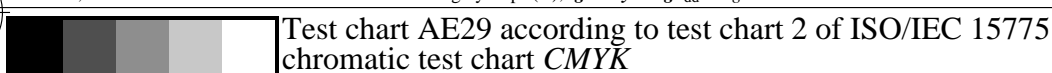


radial gratings W-C<sub>d</sub> radial gratings W-M<sub>d</sub> radial gratings W-Y<sub>d</sub> radial gratings W-N radial gratings W-Z

AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



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

Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? Yes/No  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01021

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY6\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01021

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?  

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01021

#### 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/AE29/AE29F0PX\_CY6\_3.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY6\_3.PS underline: Yes/No  
picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY6\_3.PDF underline: Yes/No  
picture A7<sub>dd</sub> underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY6\_3.PS or underline: Yes/No  
picture A7<sub>dd</sub> 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, AE291-7dd: 01021



see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 9/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE29/AE29L0FA.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	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01
2	16,62 0,00 0,00	0,13	22,51 0,00 0,00	5,89 0,00 0,00	5,89
3	22,24 0,00 0,00	0,22	30,17 0,00 0,00	7,93 0,00 0,00	7,93
4	27,87 0,00 0,00	0,30	36,84 0,00 0,00	8,96 0,00 0,00	8,96
5	33,50 0,00 0,00	0,37	42,93 0,00 0,00	9,42 0,00 0,00	9,42
6	39,13 0,00 0,00	0,44	48,62 0,00 0,00	9,49 0,00 0,00	9,49
7	44,75 0,00 0,00	0,50	54,02 0,00 0,00	9,26 0,00 0,00	9,26
8	50,38 0,00 0,00	0,57	59,19 0,00 0,00	8,80 0,00 0,00	8,80
9	56,01 0,00 0,00	0,62	64,16 0,00 0,00	8,15 0,00 0,00	8,15
10	61,64 0,00 0,00	0,68	68,97 0,00 0,00	7,33 0,00 0,00	7,33
11	67,27 0,00 0,00	0,74	73,64 0,00 0,00	6,37 0,00 0,00	6,37
12	72,89 0,00 0,00	0,79	78,19 0,00 0,00	5,29 0,00 0,00	5,29
13	78,52 0,00 0,00	0,84	82,63 0,00 0,00	4,10 0,00 0,00	4,10
14	84,15 0,00 0,00	0,90	86,97 0,00 0,00	2,82 0,00 0,00	2,82
15	89,78 0,00 0,00	0,95	91,23 0,00 0,00	1,45 0,00 0,00	1,45
16	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01
17	10,99 0,00 0,00	0,00	10,99 0,00 0,00	0,00 0,00 0,00	0,01
18	32,09 0,00 0,00	0,36	41,45 0,00 0,00	9,35 0,00 0,00	9,35
19	53,20 0,00 0,00	0,60	61,70 0,00 0,00	8,50 0,00 0,00	8,50
20	74,30 0,00 0,00	0,80	79,31 0,00 0,00	5,00 0,00 0,00	5,00
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01

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

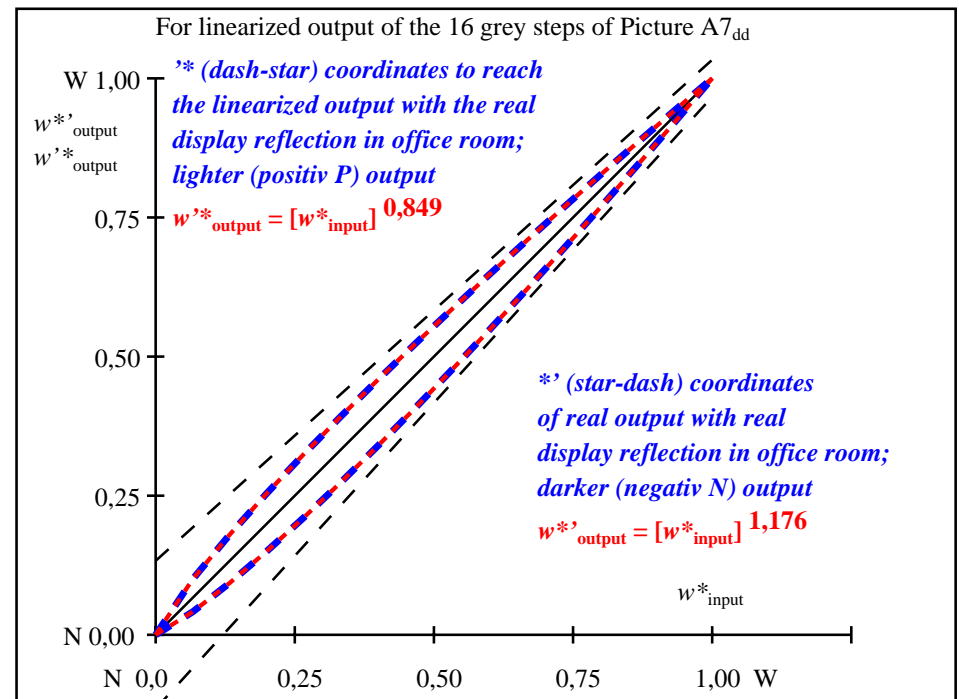
**Mean lightness difference (16 steps)**  
 $\Delta E^*_{CIELAB} = 5,9$

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

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

part 1,

AE290-3dd: 01022



AE291-3dd: 01022

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

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

AE290-7dd: 01022

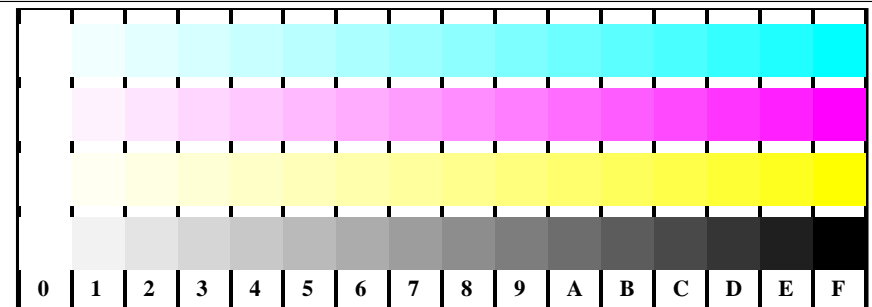
In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:1,25$ ;  $Y_N$ -range 0,93 to <1,87

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

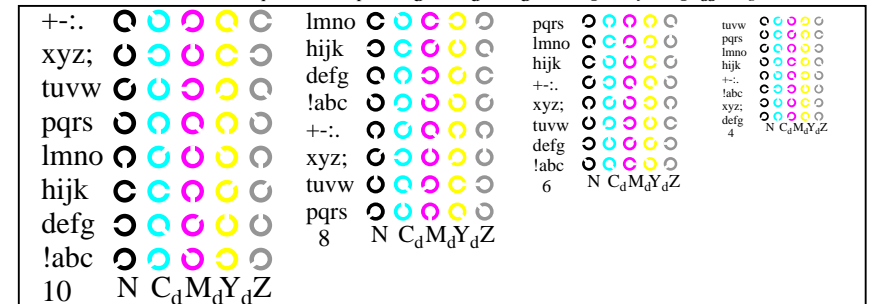
see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS;  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>



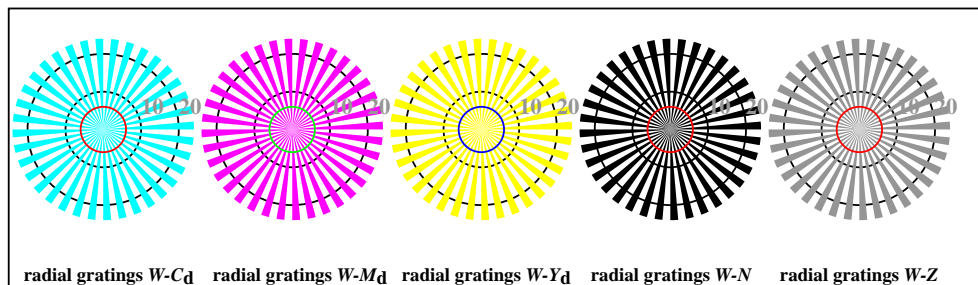
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta



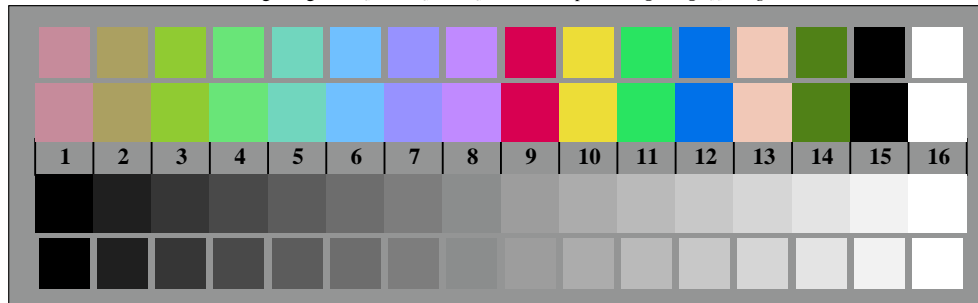
AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



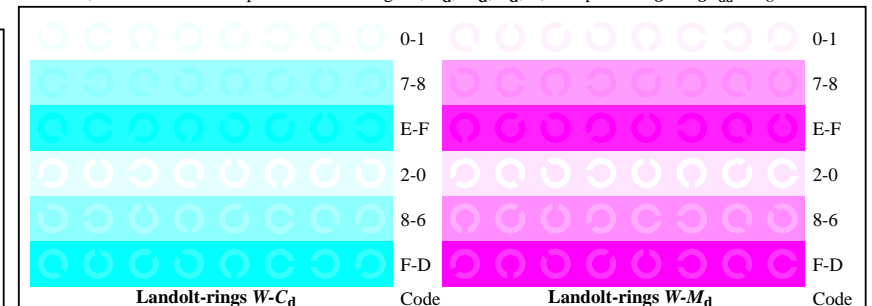
radial gratings W-C<sub>d</sub> radial gratings W-M<sub>d</sub> radial gratings W-Y<sub>d</sub> radial gratings W-N radial gratings W-Z  
AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



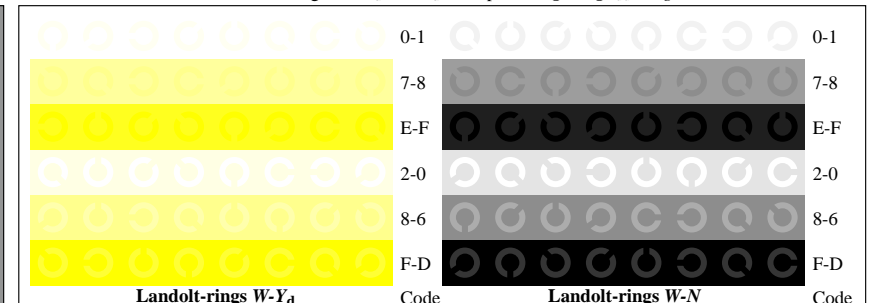
AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart CMYK



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

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



Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01031

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY5\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01031

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: *rgb/cmy0/000n/w set...*  
chromatic test chart CMYK output: *->rgb<sub>dd</sub> setrgbcolor*

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?  

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01031

#### 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/AE29/AE29F0PX\_CY5\_3.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY5\_3.PS underline: Yes/No  
picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY5\_3.PDF underline: Yes/No  
picture A7<sub>dd</sub> underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY5\_3.PS or underline: Yes/No  
picture A7<sub>dd</sub> 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, AE291-7dd: 01031

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 12/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE29.HTM>

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**

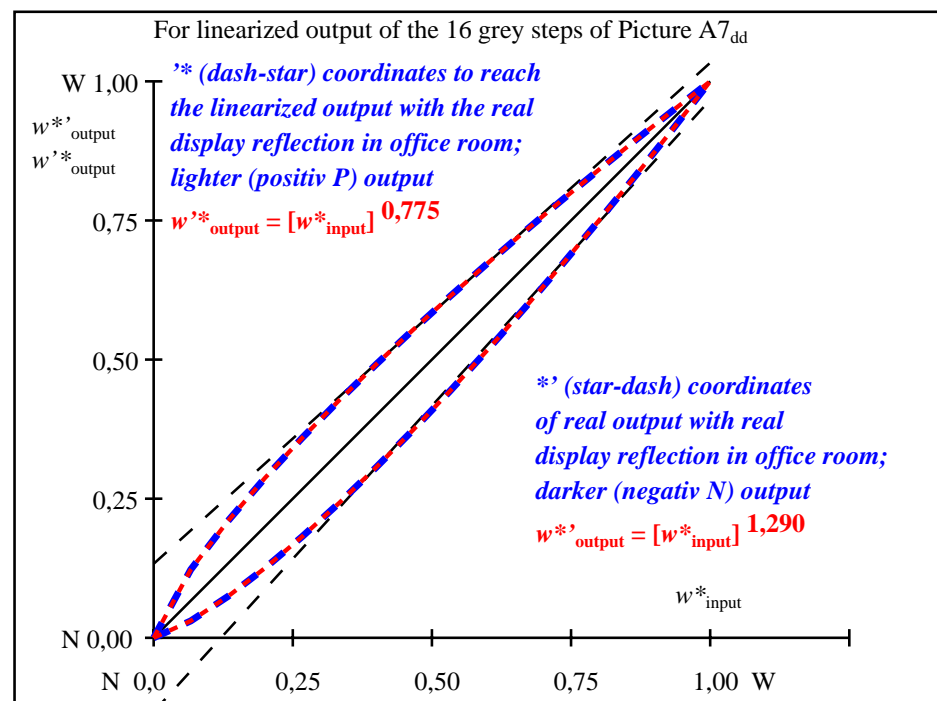
Mean lightness difference (16 steps)  
 $\Delta E^*_{\text{CIELAB}} = 7,5$

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

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

part 1,

AE290-3dd: 01032



part 2,

AE291-3dd: 01032

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

AE290-7dd: 01032

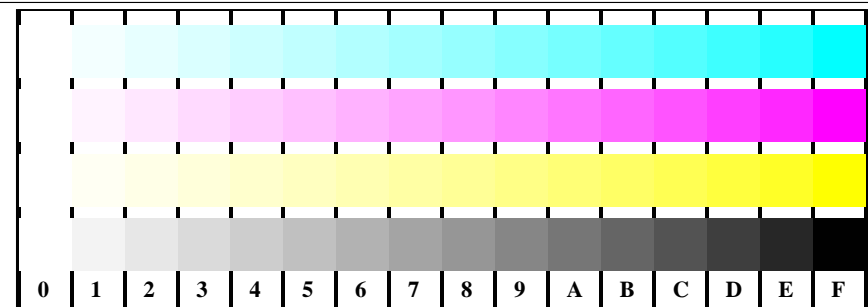
In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:2,5$ ;  $Y_N$ -range 1,87 to <3,75

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

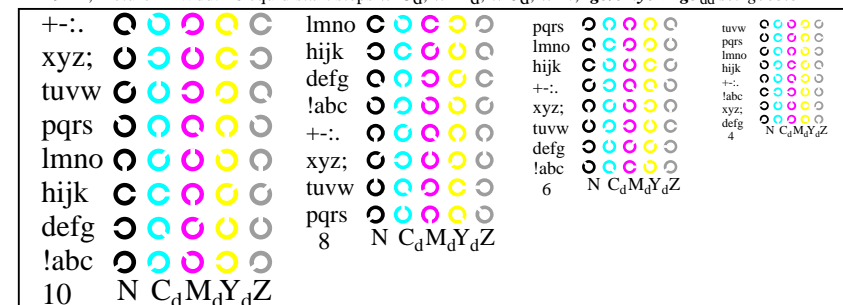
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta



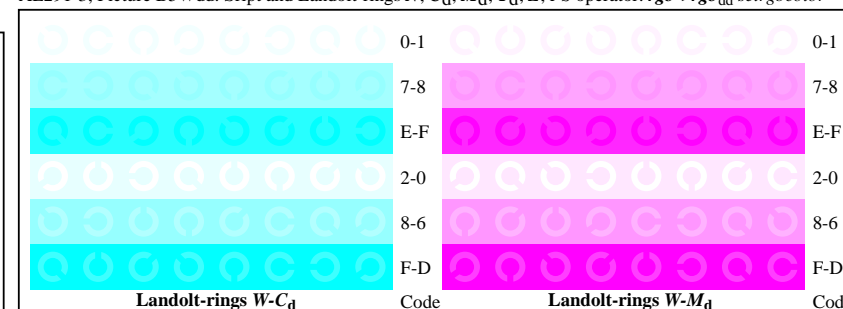
see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS;  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>



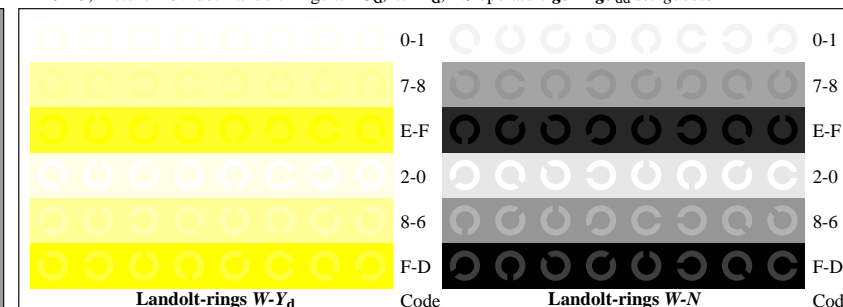
AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



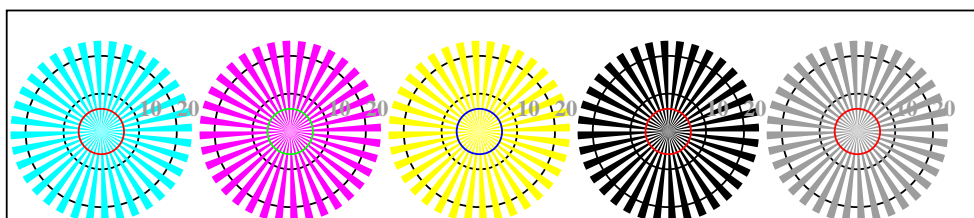
AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



radial gratings W-C<sub>d</sub> radial gratings W-M<sub>d</sub> radial gratings W-Y<sub>d</sub> radial gratings W-N radial gratings W-Z

AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



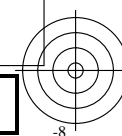
Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart CMYK

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



TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta



Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01041

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY4\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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)

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

part 3, AE290-7dd: 01041

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01041

#### 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/AE29/AE29F0PX\_CY4\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY4\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY4\_3.PDF

picture A7<sub>dd</sub> underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY4\_3.PS

picture A7<sub>dd</sub> 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,

AE291-7dd: 01041

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 15/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

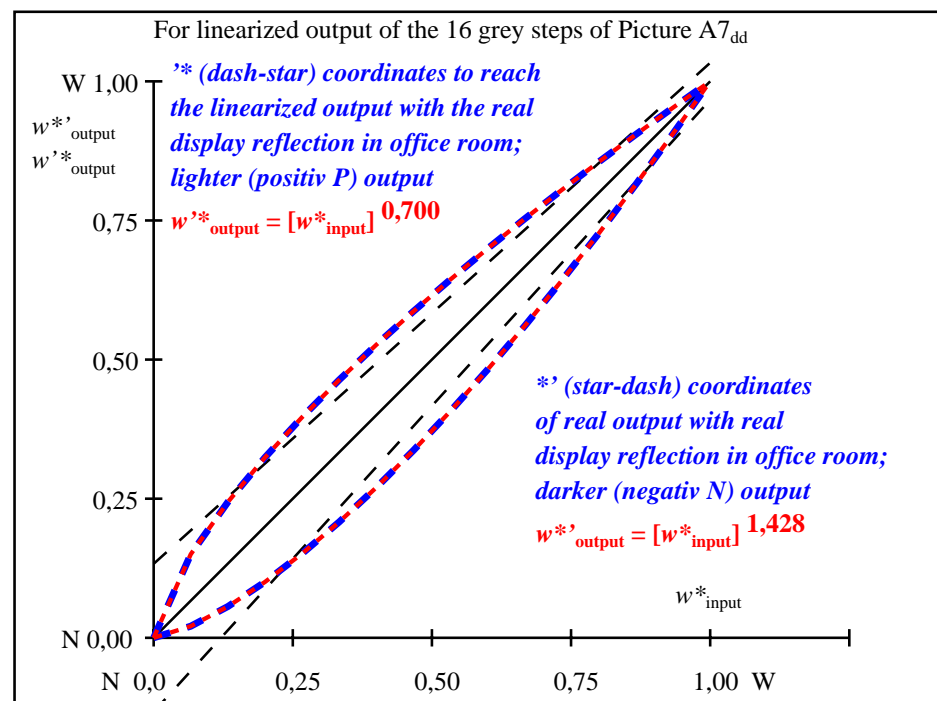
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=rh4ta

i	LAB* <sub>ref</sub>	L* <sub>out</sub>	LAB* <sub>out</sub>	LAB* <sub>out-ref</sub>	ΔE*	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* <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* <sub>CIELAB</sub> = 6,3

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

part 1,

AE290-3dd: 01042



part 2,

AE291-3dd: 01042

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

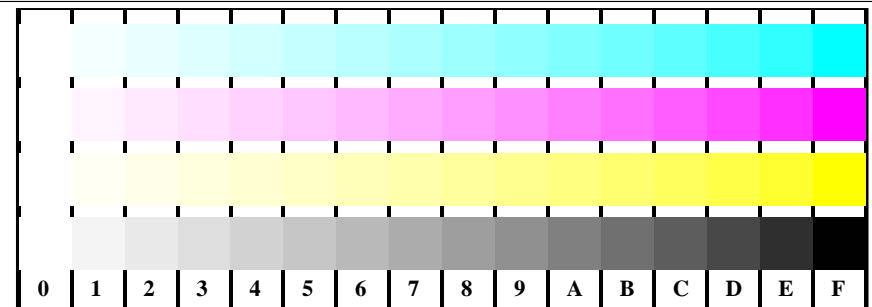
part 3, picture A7<sub>dd</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE290-7dd: 01042

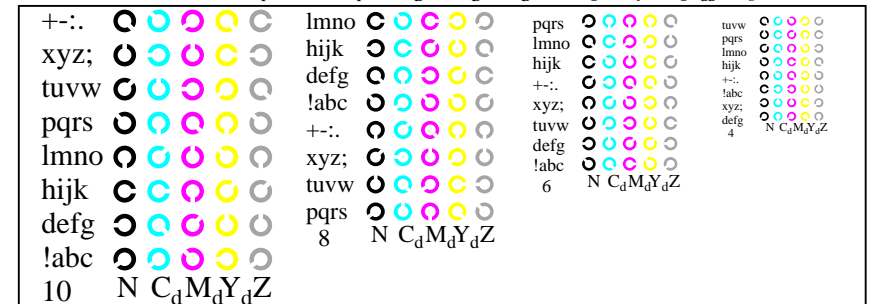
In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:5$ ;  $Y_N$ -range 3,75 to <7,5

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

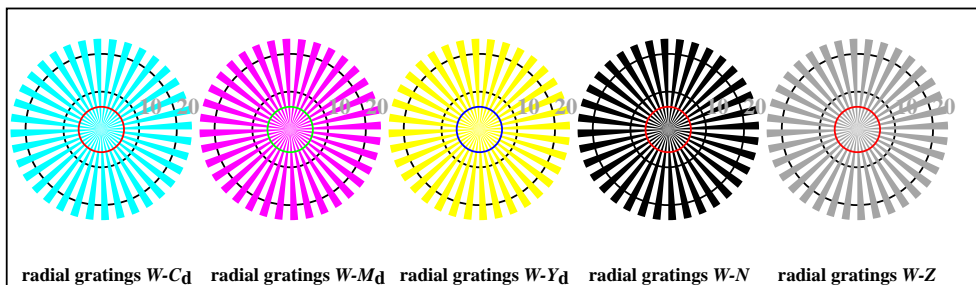
see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS;  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>



AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



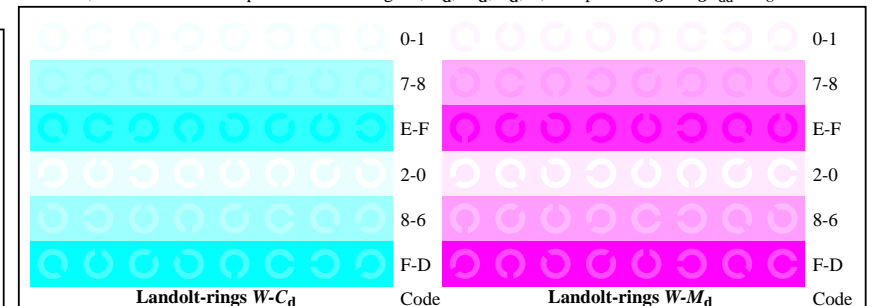
AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



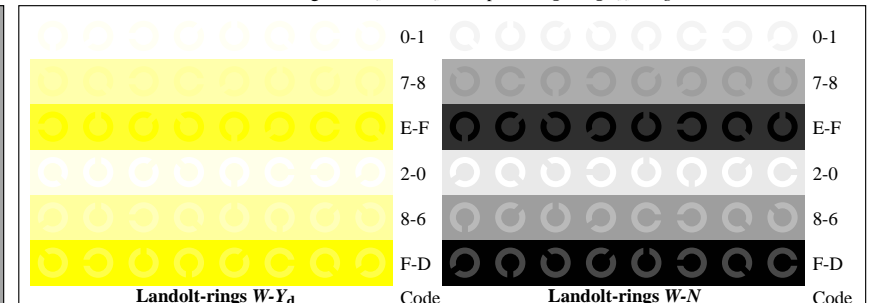
AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart *CMYK*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

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



TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output

TUB material: code=th4ta



Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
 Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
 Is the resolution diameter < 6 mm? Yes/No  
 Test with magnifying glass (e.g. 6x) resolution diameter ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
 Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
 If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
 Are the 16 steps on the upper rows distinguishable? Yes/No  
 If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01051

Documentation of file format, hardware and software for this test:  
**PDF file:** [http://farbe.li.tu-berlin.de/AE29/AE29F0PX\\_CY3\\_1.PDF](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_CY3_1.PDF) underline: Yes/No  
**PS file:** [http://farbe.li.tu-berlin.de/AE29/AE29F0PX\\_CY3\\_1.PS](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01051

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: *rgb/cmy0/000n/w set...*  
 chromatic test chart CMYK output: *->rgb<sub>dd</sub> setrgbcolor*

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
 W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
 White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
 W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
 White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
 W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
 White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
 W-N Are all the 16 steps distinguishable? Yes/No  
 White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
 Is the recognition > 50% for letters (17 of 32 at least)?, and for Landolt-rings (minimum 5 of 8)?  

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
 Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?  

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01051

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/AE29/AE29F0PX\\_CY3\\_3.PDF](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_CY3_3.PDF) underline: Yes/No  
**PS file:** [http://farbe.li.tu-berlin.de/AE29/AE29F0PX\\_CY3\\_3.PS](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_CY3_3.PS) underline: Yes/No  
**picture A7<sub>dd</sub> 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/AE29/AE29F0PX\\_CY3\\_3.PDF](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_CY3_3.PDF) underline: Yes/No  
**PS file:** [http://farbe.li.tu-berlin.de/AE29/AE29F0PX\\_CY3\\_3.PS](http://farbe.li.tu-berlin.de/AE29/AE29F0PX_CY3_3.PS) or underline: Yes/No  
**picture A7<sub>dd</sub>**  
**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, AE291-7dd: 01051

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 18/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE29.HTM>

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

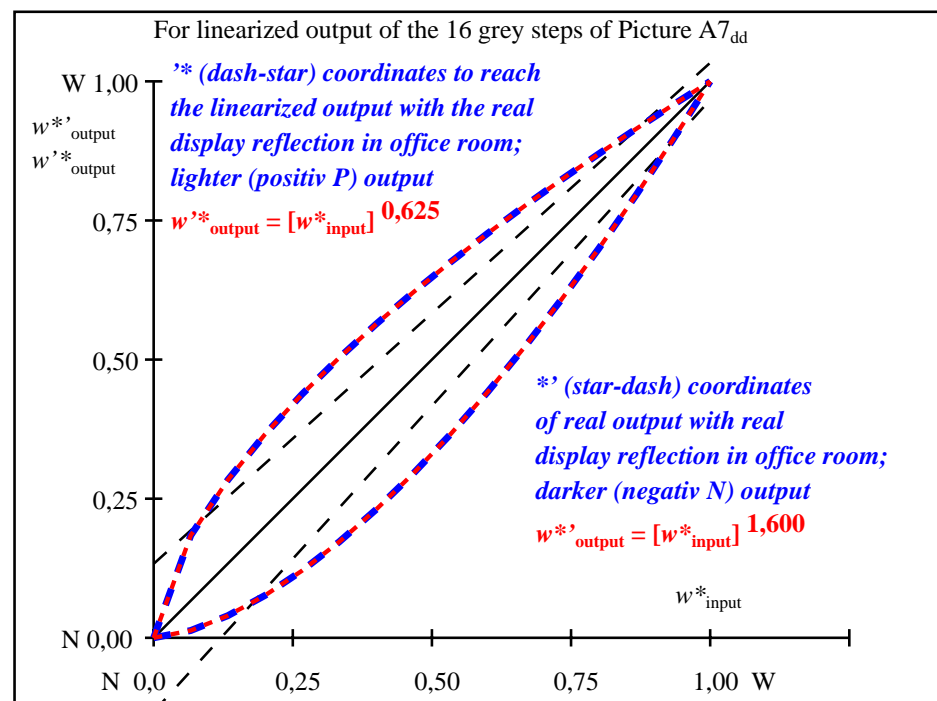
Mean lightness difference (16 steps)  
 $\Delta E^*_{\text{CIELAB}} = 8,1$

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

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

part 1,

AE290-3dd: 01052



part 2,

AE291-3dd: 01052

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

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

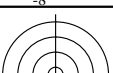
AE290-7dd: 01052

In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:10$ ;  $Y_N$ -range 7,5 to <15

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

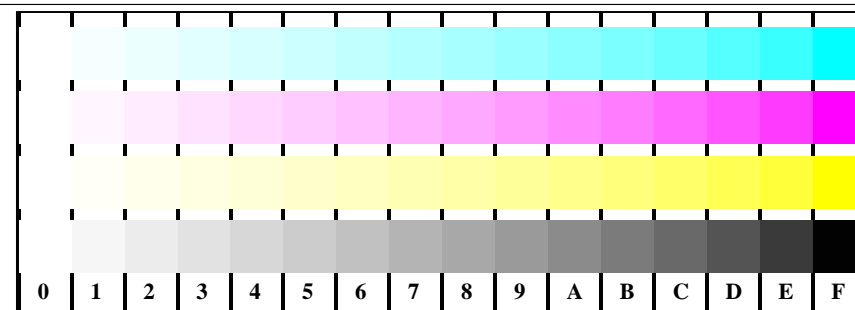
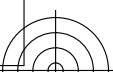
TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS;  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

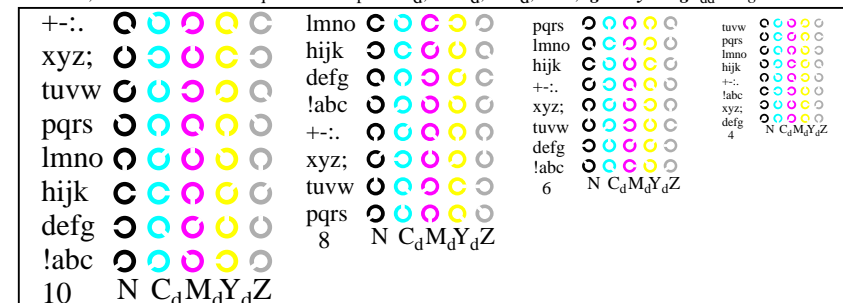


TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output

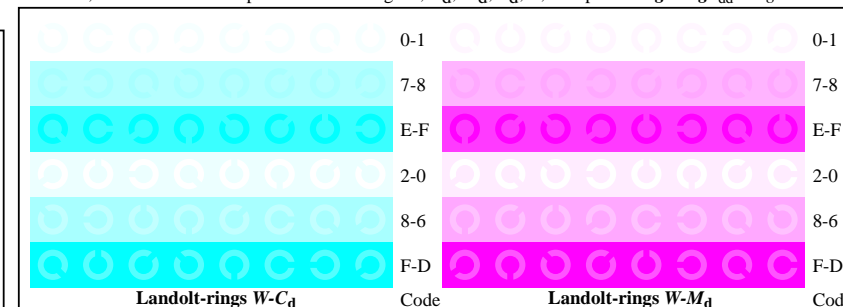
TUB material: code=th4ta



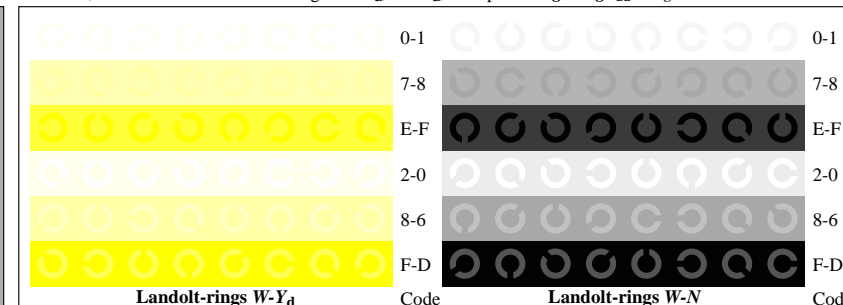
AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



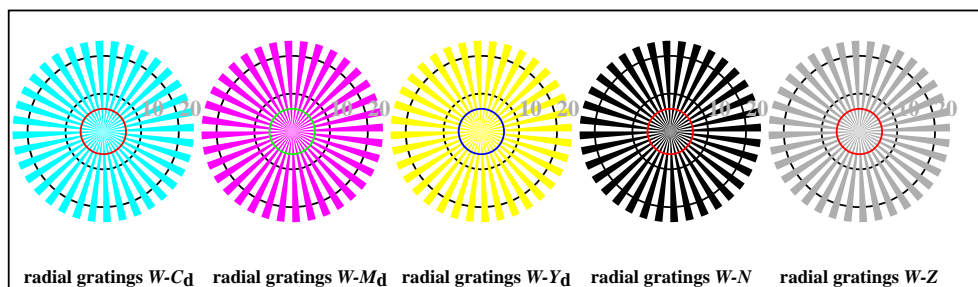
AE291-3, Picture B5Wdd: Sript and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



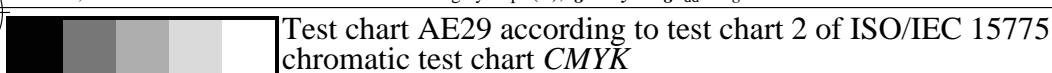
AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



Test chart AE29 according to test chart 2 of ISO/IEC 15775  
chromatic test chart CMYK

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



Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>

Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter Yes/No Yes/No Yes/No Yes/No Yes/No  
..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>

Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>

Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01061

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY2\_1.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01061

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>

W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>

Is the recognition > 50% for letters (17 of 32 at least)?, and for Landolt-rings (minimum 5 of 8)?

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>

Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01061

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/AE29/AE29F0PX\_CY2\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY2\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY2\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY2\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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, AE291-7dd: 01061

see similar files: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY2\_1.PDF  
technical information: http://farbe.li.tu-berlin.de/ or http://farbe.li.tu-berlin.de/AE.HTM

TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta



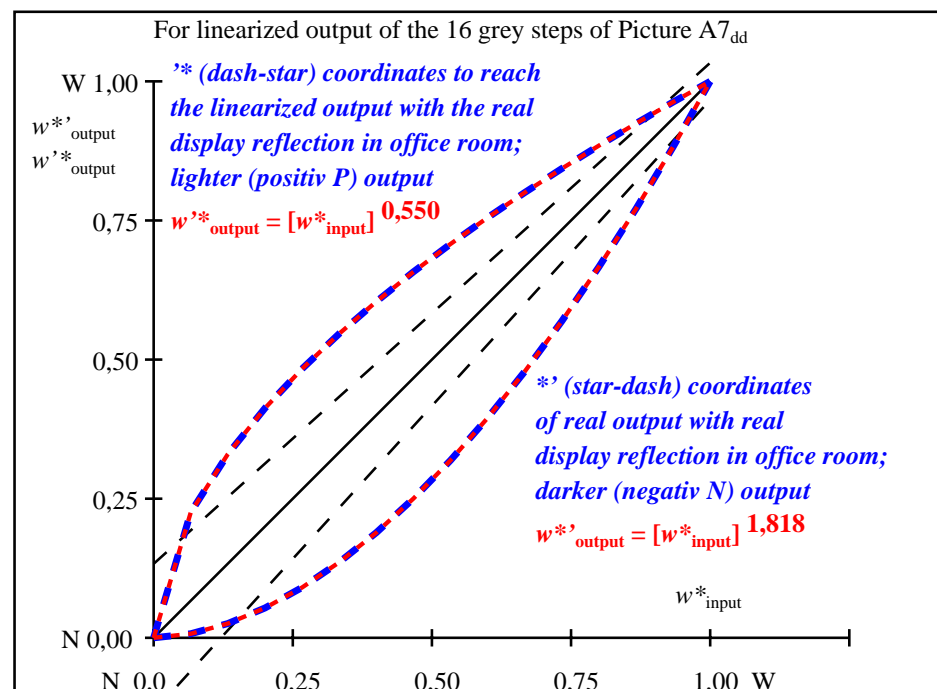
see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 21/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE29/AE29L0FA.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*	Start output S1
1	52,01 0,00 0,00	0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01	Specification according to
2	54,91 0,00 0,00	0,27	63,82 0,00 0,00	8,90 0,00 0,00	8,90	ISO/IEC 15775 Annex G
3	57,80 0,00 0,00	0,37	68,48 0,00 0,00	10,68 0,00 0,00	10,68	and DIN 33866-1 Annex G
4	60,69 0,00 0,00	0,46	72,03 0,00 0,00	11,33 0,00 0,00	11,33	
5	63,58 0,00 0,00	0,52	75,00 0,00 0,00	11,41 0,00 0,00	11,41	
6	66,48 0,00 0,00	0,58	77,60 0,00 0,00	11,12 0,00 0,00	11,12	
7	69,37 0,00 0,00	0,64	79,94 0,00 0,00	10,57 0,00 0,00	10,57	
8	72,26 0,00 0,00	0,69	82,09 0,00 0,00	9,83 0,00 0,00	9,83	
9	75,16 0,00 0,00	0,73	84,09 0,00 0,00	8,93 0,00 0,00	8,93	
10	78,05 0,00 0,00	0,78	85,96 0,00 0,00	7,90 0,00 0,00	7,90	
11	80,94 0,00 0,00	0,82	87,72 0,00 0,00	6,77 0,00 0,00	6,77	
12	83,83 0,00 0,00	0,86	89,39 0,00 0,00	5,56 0,00 0,00	5,56	
13	86,73 0,00 0,00	0,89	90,99 0,00 0,00	4,26 0,00 0,00	4,26	
14	89,62 0,00 0,00	0,93	92,52 0,00 0,00	2,90 0,00 0,00	2,90	Mean lightness difference
15	92,51 0,00 0,00	0,96	93,99 0,00 0,00	1,47 0,00 0,00	1,47	(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* <sub>CIELAB</sub> = 6,9
17	52,01 0,00 0,00	0,00	52,01 0,00 0,00	0,00 0,00 0,00	0,01	
18	62,86 0,00 0,00	0,51	74,30 0,00 0,00	11,43 0,00 0,00	11,43	Mean lightness difference
19	73,71 0,00 0,00	0,71	83,11 0,00 0,00	9,39 0,00 0,00	9,39	(5 steps)
20	84,56 0,00 0,00	0,87	89,80 0,00 0,00	5,24 0,00 0,00	5,24	ΔL* <sub>CIELAB</sub> = 5,2
21	95,41 0,00 0,00	1,00	95,41 0,00 0,00	0,00 0,00 0,00	0,01	Mean colour reproduction index: R* <sub>ab,m</sub> = 69,8

part 1,

AE290-3dd: 01062



part 2,

AE291-3dd: 01062

L*/Y <sub>intended</sub> (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* 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* <sub>intended</sub>	0,000	0,067	0,133	0,200	0,267	0,333	0,400	0,467	0,533	0,600	0,667	0,733	0,800	0,867	0,933	1,000
w* <sub>output</sub>	0,000	0,226	0,329	0,412	0,483	0,546	0,604	0,657	0,707	0,755	0,800	0,842	0,884	0,924	0,962	1,000

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

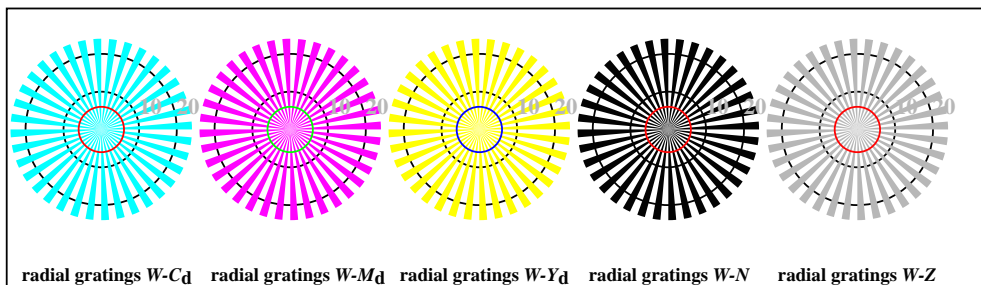
AE290-7dd: 01062

In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing Y contrast  $Y_W:Y_N=88,9:20$ ;  $Y_N$ -range 15 to <30

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

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 22/24  
technical information: <http://farbe.li.tu-berlin.de/> or <http://farbe.li.tu-berlin.de/AE.HTM>

TUB Registration: 20190301-AE29/AE29L0FA.TXT /.PS  
application for measurement or viewing of display and print output  
TUB material: code=th4ta

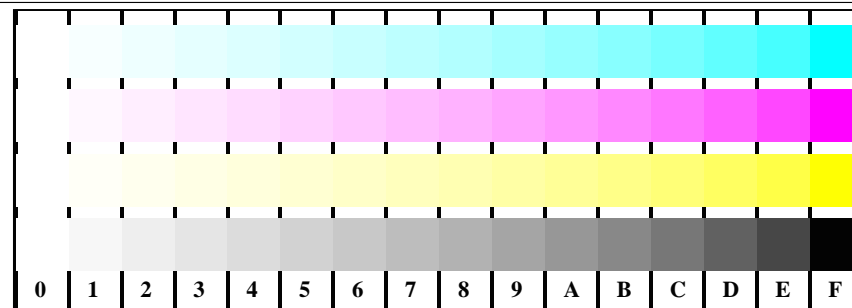
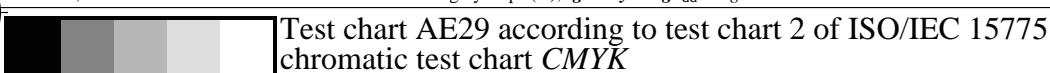


radial gratings W-C<sub>d</sub> radial gratings W-M<sub>d</sub> radial gratings W-Y<sub>d</sub> radial gratings W-N radial gratings W-Z

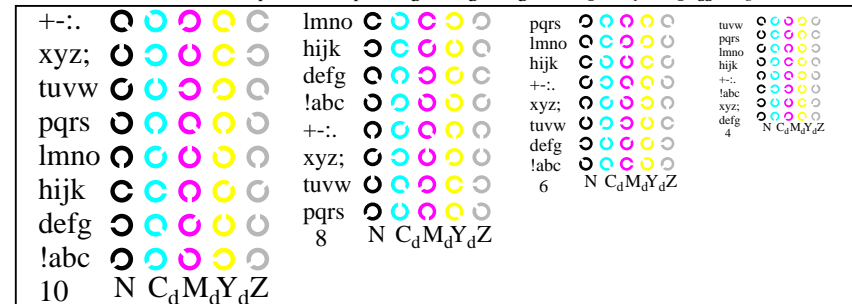
AE290-5, Picture B2Wdd: radial gratings W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



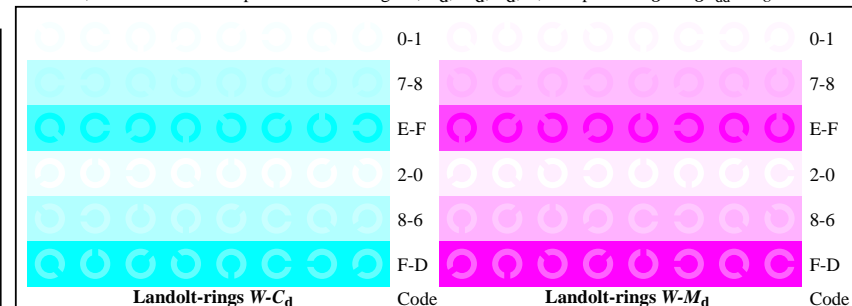
AE290-7, Picture B3Wdd: 14 CIE-test colours and 2 + 16 grey steps (sf); *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



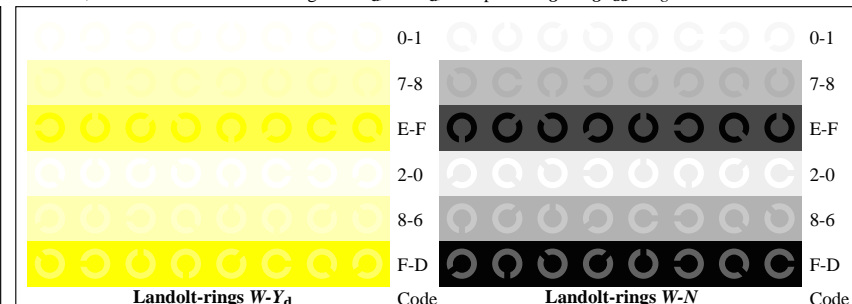
AE291-1, Picture B4Wdd: 16 equidistant steps W-C<sub>d</sub>; W-M<sub>d</sub>; W-Y<sub>d</sub>; W-N; *rgb/cmy0->rgb<sub>dd</sub> setrgbcolor*



AE291-3, Picture B5Wdd: Script and Landolt-rings N; C<sub>d</sub>; M<sub>d</sub>; Y<sub>d</sub>; Z; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-5, Picture B6Wdd: Landolt-rings W-C<sub>d</sub>; W-M<sub>d</sub>; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*



AE291-7, Picture B7Wdd: Landolt-rings W-Y<sub>d</sub>; W-N; PS operator: *rgb->rgb<sub>dd</sub> setrgbcolor*

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

Test of visual linearized output of pictures B2W<sub>dd</sub> to B3W<sub>dd</sub> please underline Yes/No  
Output test with computer display ( ) or the external display ( ) please mark by (x)!

Test of the resolution of radial gratings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub> according to picture B2W<sub>dd</sub>  
Is the resolution diameter < 6 mm? W-C<sub>d</sub> W-M<sub>d</sub> W-Y<sub>d</sub> W-N W-Z  
Test with magnifying glass (e.g. 6x) resolution diameter ..... mm ..... mm ..... mm ..... mm ..... mm

Test of the 14 CIE-test colours according to picture B3W<sub>dd</sub>  
Are clear (immediately conspicuous) differences recognized between reproduction and test chart? Yes/No  
If Yes: How many colours have clear differences? of the given 14 steps: ..... Steps

Test of 16 visual equidistant L\*-grey steps according to picture B3W<sub>dd</sub>  
Are the 16 steps on the upper rows distinguishable? Yes/No  
If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

part 1, AE290-3dd: 01071

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

PDF file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY1\_1.PDF underline: Yes/No  
PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_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 AE29F0PX\_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 AE29F0PX\_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, AE290-7dd: 01071

Form A: Test chart AE29 according to test chart 2 of ISO/IEC 15775 input: rgb/cmy0/000n/w set...  
chromatic test chart CMYK output: ->rgb<sub>dd</sub> setrgbcolor

Test of 16 visually equally spaced steps of the colour rows W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B4W<sub>dd</sub>  
W-C<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Cyanblue: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-M<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Magentared: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-Y<sub>d</sub> Are all the 16 steps distinguishable? Yes/No  
White - Yellow: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps  
W-N Are all the 16 steps distinguishable? Yes/No  
White - Black: If No: How many steps can be distinguished? of the given 16 steps: ..... Steps

Test of characters and Landolt-rings in four sizes according to picture B5W<sub>dd</sub>  
Is the recognition > 50% for letters (17 of 32 at least)? , and for Landolt-rings (minimum 5 of 8)?

Relative size	Letters	Rings N	Rings C <sub>d</sub>	Rings M <sub>d</sub>	Rings Y <sub>d</sub>
10	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Test of the recognition frequency of the Landolt rings W-C<sub>d</sub>, W-M<sub>d</sub>, W-Y<sub>d</sub>, and W-N according to picture B6W<sub>dd</sub>, and B7W<sub>dd</sub>  
Is the recognition frequency of the Landolt rings > 50% (5 of 8 at least)?

Colour row W-C <sub>d</sub> background - ring	Colour row W-M <sub>d</sub> background - ring	Colour row W-Y <sub>d</sub> background - ring	Colour row W-N background - ring
0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No	0 - 1 Yes/No
7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No	7 - 8 Yes/No
E - F Yes/No	E - F Yes/No	E - F Yes/No	E - F Yes/No
2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No	2 - 0 Yes/No
8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No	8 - 6 Yes/No
F - D Yes/No	F - D Yes/No	F - D Yes/No	F - D Yes/No

part 2, AE291-3Ndd: 01071

#### 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/AE29/AE29F0PX\_CY1\_3.PDF underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY1\_3.PS underline: Yes/No

picture A7<sub>dd</sub> 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/AE29/AE29F0PX\_CY1\_3.PDF underline: Yes/No

picture A7<sub>dd</sub> underline: Yes/No

PS file: http://farbe.li.tu-berlin.de/AE29/AE29F0PX\_CY1\_3.PS or underline: Yes/No

picture A7<sub>dd</sub> or underline: Yes/No

colour measurement and specification for: underline: Yes/No

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, AE291-7dd: 01071

see similar files: <http://farbe.li.tu-berlin.de/AE29/AE29F0PX.PDF> / .PS; 3D-linearization, page 24/24  
technical information: <http://farbe.li.tu-berlin.de/AE29/AE29LF0PX.PDF> / .PS in file (F)

TUB Registration: 20190301-AE29/AE29L0FA.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**

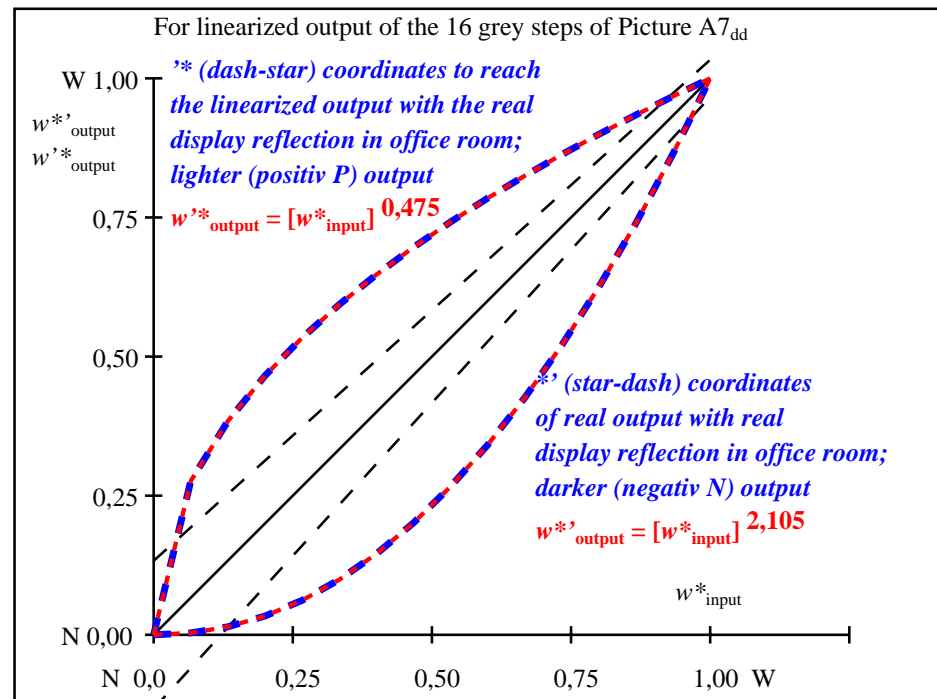
**Mean lightness difference**  
**(16 steps)**  
 $\Delta E^*_{\text{CIELAB}} = 4,5$

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

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

part 1,

AE290-3dd: 01072



part 2,

AE291-3dd: 01072

$L^*/Y_{\text{intended}}$ (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																
$w^* = l^*$																
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>dd</sub>: 16 visual equidistant  $L^*$ -grey steps; PS operator: 0 0 0 n\* setcmykcolor

AE290-7dd: 01072

In-out: Test chart AE29 according to test chart 2 of ISO/IEC 15775  
Viewing  $Y$  contrast  $Y_W:Y_N=88,9:40$ ;  $Y_N$ -range 30 to <60

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