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TUB registration: 20240201-feo1/feo110na.txt /ps  
 application for evaluation and measurement of display or print output  
 TUB material: code=rhata4ta

**Colourimetric scaling of achromatic colours between peak white and black.**  
**Relations between tristimulus value Y, luminance L, and lightness L\* of ISO-standards**

Colour (light or paper)	tristimulus values	IECsRGB <sub>W</sub> lightness	relative luminance		CIELAB <sub>W</sub> lightness	TUBLOG <sub>U</sub> lightness
			L <sub>rU</sub> = L/L <sub>U</sub>	L <sub>rW</sub> = L/L <sub>W</sub>		
<b>Contrast W:N (25:1=90:3,6)</b>	<b>Y</b> (5 <sup>0,5</sup> =2,24)	<b>L*</b> <sub>IECsRGB<sub>W</sub></sub> =s <sub>W</sub> L <sub>NW</sub> <sup>1/2,4</sup>			<b>L*</b> <sub>CIELAB<sub>W</sub></sub> =c <sub>W</sub> L <sub>NW</sub> <sup>1/3</sup> -16	<b>L*</b> <sub>TUBLOG<sub>U</sub></sub> =t <sub>U</sub> log(L <sub>NU</sub> )+52
White P1 (light)	180 =18*10	127=50+77 =s(2,00) <sup>1/2,4</sup>	10	2,24	125=50+75 =c(2,00) <sup>1/3</sup> -16	120=50+70 =t log(10,00)+52
White W (fluorescent paper)	90 =18*5	95=50+45 =s(1,00) <sup>1/2,4</sup>	5	1,00	95=50+45 =c(1,00) <sup>1/3</sup> -16	98=50+48 =t log(5,00)+52
light Grey H (paper)	40 =18*2,24	68=50+18 =s(0,45) <sup>1/2,4</sup>	2,24	0,45	69=50+19 =c(0,45) <sup>1/3</sup> -16	73=50+23 =t log(2,24)+52
Grey U (paper)	18	48=50-1 =s(0,20) <sup>1/2,4</sup>	1	0,20	49=50-0 =c(0,20) <sup>1/3</sup> -16	48=50-1 =t log(1,00)+52
dark Grey D (paper)	8,0 =18/2,24	35=50-14 =s(0,09) <sup>1/2,4</sup>	0,45	0,09	34=50-15 =c(0,09) <sup>1/3</sup> -16	23=50-26 =t log(0,45)+52
Black N (paper)	3,6 =18/5	25=50-24 =s(0,04) <sup>1/2,4</sup>	0,20	0,04	22=50-27 =c(0,04) <sup>1/3</sup> -16	-1=50-51 =t log(0,20)+52
Black p1 (glossy paper)	1,8 =18/10	18=50-31 =s(0,02) <sup>1/2,4</sup>	0,10	0,022	14=50-35 =c(0,02) <sup>1/3</sup> -16	-22=50-72 =t log(0,10)+52

It is valid: CIELAB<sub>W</sub>: c<sub>W</sub>=c=116, IECsRGB<sub>W</sub>: s<sub>W</sub>=s=100, TUBLOG<sub>U</sub>: t<sub>U</sub>=t=50/log(5)=72

feo10-3n

**Colourimetric scaling of achromatic colours between peak white and black.**  
**Relations between tristimulus value Y, luminance L, and lightness L\* of ISO-standards**

Colour (light or paper)	tristimulus values	HDR display luminance	relative luminance		CIELAB <sub>U</sub> lightness	TUBLOG <sub>U</sub> lightness
			L <sub>rU</sub> = L/L <sub>U</sub>	L <sub>rW</sub> = L/L <sub>W</sub>		
<b>Contrast W:N (25:1=90:3,6)</b>	<b>Y</b> (5 <sup>0,5</sup> =2,24)	<b>L</b> [cd/m <sup>2</sup> ]			<b>L*</b> <sub>CIELAB<sub>U</sub></sub> =d <sub>U</sub> L <sub>NU</sub> <sup>1/3</sup> -16	<b>L*</b> <sub>TUBLOG<sub>U</sub></sub> =t <sub>U</sub> log(L <sub>NU</sub> )+52
White P1 (light)	180 =18*10	400 =40*10	10	2,24	125=50+75 =c(10,00) <sup>1/3</sup> -16	120=50+70 =t log(10,00)+52
White W (fluorescent paper)	90 =18*5	200 =40*5	5	1,00	95=50+45 =c(5,00) <sup>1/3</sup> -16	98=50+48 =t log(5,00)+52
light Grey H (paper)	40 =18*2,24	89,6 =40*2,24	2,24	0,45	69=50+19 =c(2,24) <sup>1/3</sup> -16	73=50+23 =t log(2,24)+52
Grey U (paper)	18	40 40*1	1	0,20	49=50-0 =c(1,00) <sup>1/3</sup> -16	48=50-1 =t log(1,00)+52
dark Grey D (paper)	8,0 =18/2,24	17,9	0,45	0,09	34=50-15 =c(0,45) <sup>1/3</sup> -16	23=50-26 =t log(0,45)+52
Black N (paper)	3,6 =18/5	8 28,2/5	0,20	0,04	22=50-27 =c(0,20) <sup>1/3</sup> -16	-1=50-51 =t log(0,20)+52
Black p1 (glossy paper)	1,8 =18/10	4 28,2/11,2	0,10	0,022	14=50-35 =c(0,10) <sup>1/3</sup> -16	-22=50-72 =t log(0,10)+52

It is valid: CIELAB<sub>U</sub>: d<sub>U</sub>=d=66, TUBLOG<sub>U</sub>: t<sub>U</sub>=t=50/log(5)=72

feo11-3n

**Colourimetric scaling of achromatic colours between peak white and black.**  
**Relations between tristimulus value Y, luminance L, and lightness L\* of ISO-standards**

Colour (light or paper)	tristimulus values	HDR display luminance	relative luminance		CIELAB <sub>W</sub> lightness	TUBLOG <sub>U</sub> lightness
			L <sub>rU</sub> = L/L <sub>U</sub>	L <sub>rW</sub> = L/L <sub>W</sub>		
<b>Contrast W:N (25:1=90:3,6)</b>	<b>Y</b> (5 <sup>0,5</sup> =2,24)	<b>L</b> [cd/m <sup>2</sup> ]			<b>L*</b> <sub>CIELAB<sub>W</sub></sub> =c <sub>W</sub> L <sub>NW</sub> <sup>1/3</sup> -16	<b>L*</b> <sub>TUBLOG<sub>U</sub></sub> =t <sub>U</sub> log(L <sub>NU</sub> )+52
White P1 (light)	180 =18*10	400 =40*10	10	2,24	125=50+75 =c(2,00) <sup>1/3</sup> -16	120=50+70 =t log(10,00)+52
White W (fluorescent paper)	90 =18*5	200 =40*5	5	1,00	95=50+45 =c(1,00) <sup>1/3</sup> -16	98=50+48 =t log(5,00)+52
light Grey H (paper)	40 =18*2,24	89,6 =40*2,24	2,24	0,45	69=50+19 =c(0,45) <sup>1/3</sup> -16	73=50+23 =t log(2,24)+52
Grey U (paper)	18	40 40*1	1	0,20	49=50-0 =c(0,20) <sup>1/3</sup> -16	48=50-1 =t log(1,00)+52
dark Grey D (paper)	8,0 =18/2,24	17,9	0,45	0,09	34=50-15 =c(0,09) <sup>1/3</sup> -16	23=50-26 =t log(0,45)+52
Black N (paper)	3,6 =18/5	8 28,2/5	0,20	0,04	22=50-27 =c(0,04) <sup>1/3</sup> -16	-1=50-51 =t log(0,20)+52
Black p1 (glossy paper)	1,8 =18/10	4 28,2/11,2	0,10	0,022	14=50-35 =c(0,02) <sup>1/3</sup> -16	-22=50-72 =t log(0,10)+52

It is valid: CIELAB<sub>W</sub>: c<sub>W</sub>=c=116, TUBLOG<sub>U</sub>: t<sub>U</sub>=t=50/log(5)=72

feo10-7n

**Colourimetric scaling of achromatic colours between peak white and black.**  
**Relations between tristimulus value Y, luminance L, and lightness L\* of ISO-standards**

Colour (light or paper)	tristimulus values	HDR display luminance	relative luminance		IECsRGB <sub>W</sub> lightness	TUBLOG <sub>U</sub> lightness
			L <sub>rU</sub> = L/L <sub>U</sub>	L <sub>rW</sub> = L/L <sub>W</sub>		
<b>Contrast W:N (25:1=90:3,6)</b>	<b>Y</b> (5 <sup>0,5</sup> =2,24)	<b>L</b> [cd/m <sup>2</sup> ]			<b>L*</b> <sub>IECsRGB<sub>W</sub></sub> =s <sub>W</sub> L <sub>NW</sub> <sup>1/2,4</sup>	<b>L*</b> <sub>TUBLOG<sub>U</sub></sub> =t <sub>U</sub> log(L <sub>NU</sub> )+52
White P1 (light)	180 =18*10	400 =40*10	10	2,24	127=50+77 =s(2,00) <sup>1/2,4</sup>	120=50+70 =t log(10,00)+52
White W (fluorescent paper)	90 =18*5	200 =40*5	5	1,00	95=50+45 =s(1,00) <sup>1/2,4</sup>	98=50+48 =t log(5,00)+52
light Grey H (paper)	40 =18*2,24	89,6 =40*2,24	2,24	0,45	68=50+18 =s(0,45) <sup>1/2,4</sup>	73=50+23 =t log(2,24)+52
Grey U (paper)	18	40 40*1	1	0,20	48=50-1 =s(0,20) <sup>1/2,4</sup>	48=50-1 =t log(1,00)+52
dark Grey D (paper)	8,0 =18/2,24	17,9	0,45	0,09	35=50-14 =s(0,09) <sup>1/2,4</sup>	23=50-26 =t log(0,45)+52
Black N (paper)	3,6 =18/5	8 28,2/5	0,20	0,04	25=50-24 =s(0,04) <sup>1/2,4</sup>	-1=50-51 =t log(0,20)+52
Black p1 (glossy paper)	1,8 =18/10	4 28,2/11,2	0,10	0,022	18=50-31 =s(0,02) <sup>1/2,4</sup>	-22=50-72 =t log(0,10)+52

It is valid: IECsRGB<sub>W</sub>: s<sub>W</sub>=s=100, TUBLOG<sub>U</sub>: t<sub>U</sub>=t=50/log(5)=72

feo11-7n