

Colorimetric 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 _W lightness	relative luminance	CIELAB _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (^{50,5} s=2,24	L* ² _{IECsRGB_W} =s _W L _{rW} ^{1/2,4}	L_{rU} / L_{rW} =L/L _W	L* ² _{CIELAB_W} =c _W L _{rW} ^{1/3,16}	L* ² _{TUBLOG_U} =t _U log(L _{rU})+50
White P1 (light)	224 =20*11,2	139=50+89 =s(2,24) ^{1/2,4}	11,2 2,24	135=50+85 =c(2,24) ^{1/3,16}	125=50+77 =tlog(11,20)+50
White W (fluorescent paper)	100 =20*5	100=50+50 =s(1,00) ^{1/2,4}	5 1,00	100=50+50 =c(1,00) ^{1/3,16}	100=50+52 =tlog(5,00)+50
light Grey H (paper)	44,8 =20*2,24	71=50+21 =s(0,45) ^{1/2,4}	2,24 0,45	72=50+22 =c(0,45) ^{1/3,16}	75=50+27 =tlog(2,24)+50
Grey U (paper)	20	51=50+1 =s(0,20) ^{1/2,4}	1 0,20	51=50+1 =c(0,20) ^{1/3,16}	50=50+2 =tlog(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	36=50-13 =s(0,09) ^{1/2,4}	0,45 0,09	35=50-14 =c(0,09) ^{1/3,16}	24=50-23 =tlog(0,45)+50
Black N (paper)	4 =20/5	26=50-23 =s(0,04) ^{1/2,4}	0,20 0,04	23=50-26 =c(0,04) ^{1/3,16}	0=50-48 =tlog(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	18=50-31 =s(0,02) ^{1/2,4}	0,09 0,022	14=50-35 =c(0,02) ^{1/3,16}	24=50-72 =tlog(0,09)+50

It is valid: CIELAB_W: c_W=c=116, IECsRGB_W: s_W=s=100, TUBLOG_U: t_U=t=50/log(5)=72

feo70-3n

Colorimetric 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 _U lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (^{50,5} s=2,24	L [cd/m ²]	L_{rU} / L_{rW} =L/L _W	L* ² _{CIELAB_U} =d _U L _{rU} ^{1/3,16}	L* ² _{TUBLOG_U} =t _U log(L _{rU})+50
White P1 (light)	224 =20*11,2	448 =40*11,2	11,2 2,24	135=50+85 =c(11,20) ^{1/3,16}	125=50+77 =tlog(11,20)+50
White W (fluorescent paper)	100 =20*5	200 =40*5	5 1,00	100=50+50 =c(5,00) ^{1/3,16}	100=50+52 =tlog(5,00)+50
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24 0,45	72=50+22 =c(2,24) ^{1/3,16}	75=50+27 =tlog(2,24)+50
Grey U (paper)	20	40 40*1	1 0,20	51=50+1 =c(1,00) ^{1/3,16}	50=50+2 =tlog(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45 0,09	35=50-14 =c(0,45) ^{1/3,16}	24=50-23 =tlog(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20 0,04	23=50-26 =c(0,20) ^{1/3,16}	0=50-48 =tlog(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09 0,022	14=50-35 =c(0,09) ^{1/3,16}	24=50-72 =tlog(0,09)+50

It is valid: CIELAB_U: d_U=d=66, TUBLOG_U: t_U=t=50/log(5)=72

feo71-3n

Colorimetric 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 _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (^{50,5} s=2,24	L [cd/m ²]	L_{rU} / L_{rW} =L/L _W	L* ² _{CIELAB_W} =c _W L _{rW} ^{1/3,16}	L* ² _{TUBLOG_U} =t _U log(L _{rU})+50
White P1 (light)	224 =20*11,2	448 =40*11,2	11,2 2,24	135=50+85 =c(2,24) ^{1/3,16}	125=50+77 =tlog(11,20)+50
White W (fluorescent paper)	100 =20*5	200 =40*5	5 1,00	100=50+50 =c(1,00) ^{1/3,16}	100=50+52 =tlog(5,00)+50
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24 0,45	72=50+22 =c(0,45) ^{1/3,16}	75=50+27 =tlog(2,24)+50
Grey U (paper)	20	40 40*1	1 0,20	51=50+1 =c(0,20) ^{1/3,16}	50=50+2 =tlog(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45 0,09	35=50-14 =c(0,09) ^{1/3,16}	24=50-23 =tlog(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20 0,04	23=50-26 =c(0,04) ^{1/3,16}	0=50-48 =tlog(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09 0,022	14=50-35 =c(0,02) ^{1/3,16}	24=50-72 =tlog(0,09)+50

It is valid: CIELAB_W: c_W=c=116, TUBLOG_U: t_U=t=50/log(5)=72

feo70-7n

Colorimetric 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 _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (^{50,5} s=2,24	L [cd/m ²]	L_{rU} / L_{rW} =L/L _W	L* ² _{IECsRGB_W} =s _W L _{rW} ^{1/2,4}	L* ² _{TUBLOG_U} =t _U log(L _{rU})+50
White P1 (light)	224 =20*11,2	448 =40*11,2	11,2 2,24	139=50+89 =s(2,24) ^{1/2,4}	125=50+77 =tlog(11,20)+50
White W (fluorescent paper)	100 =20*5	200 =40*5	5 1,00	100=50+50 =s(1,00) ^{1/2,4}	100=50+52 =tlog(5,00)+50
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24 0,45	71=50+21 =s(0,45) ^{1/2,4}	75=50+27 =tlog(2,24)+50
Grey U (paper)	20	40 40*1	1 0,20	51=50+1 =s(0,20) ^{1/2,4}	50=50+2 =tlog(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45 0,09	36=50-13 =s(0,09) ^{1/2,4}	24=50-23 =tlog(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20 0,04	26=50-23 =s(0,04) ^{1/2,4}	0=50-48 =tlog(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09 0,022	18=50-31 =s(0,02) ^{1/2,4}	24=50-72 =tlog(0,09)+50

It is valid: IECsRGB_W: s_W=s=100, TUBLOG_U: t_U=t=50/log(5)=72

feo71-7n

TUB-test chart feo7; Colorimetric scaling of achromatic colours between white and black.

Contrast W:N=100:4, P1:p1=448:3,6 with LrW, LrU. See ISO 22028-5, ISO/CIE 11664-4, CIE 230