

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	IEC sRGB _W lightness	relative luminance	CIELAB _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (5 ^{0.5} ;-2,24	$L^*_{IEC sRGB_W} = s_W L^*_{rW} / L^*_{rW}$	$L_{rU} / L_{rW} = L / L_{rW}$	$L^*_{CIELAB_W} = c_W L_{rW}^{1/3} - 16$	$L^*_{TUBLOG_U} = t_U \log(L_{rU}) + 50$
White P2 (light)	500 =20*25	195-50+145 =s(5,00) ^{1/2,4}	25	5,00 =c(5,00) ^{1/3} -16	182-50+132 =c(5,00) ^{1/3} -16
White W (fluorescent paper)	100 =20*5	100-50+50 =s(1,00) ^{1/2,4}	5	1,00 =c(1,00) ^{1/3} -16	100-50+52 =c(1,00) ^{1/3} -16
light Grey H (paper)	44,8 =20*2,24	71-50+21 =s(0,45) ^{1/2,4}	2,24	0,45 =c(0,45) ^{1/3} -16	75-50+22 =t(50/2,24)+50
Grey U (paper)	20	51-50+1 =s(0,20) ^{1/2,4}	1	0,20 =c(0,20) ^{1/3} -16	50-50+2 =t(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 =c(0,09) ^{1/3} -16	24-50-23 =t(0,45)+50
Black N (paper)	4 =20/5	26-50-23 =s(0,04) ^{1/2,4}	0,20	0,04 =c(0,04) ^{1/3} -16	0-50-48 =t(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 =c(0,02) ^{1/3} -16	14-50-35 =t(0,09)+50

It is valid: CIELAB_W: c_W=c=116, IEC sRGB_W: s_W=s=100, TUBLOG_U: t_U=t=50/log(5)=72
feo80-3n

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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 (5 ^{0.5} ;-2,24	L [cd/m ²]	$L_{rU} / L_{rW} = L / L_{rW}$	$L^*_{CIELAB_U} = d_U L_{rU}^{1/3} - 16$	$L^*_{TUBLOG_U} = t_U \log(L_{rU}) + 50$
White P2 (light)	500 =20*25	1000 =40*25	25	5,00 =d(5,00) ^{1/3} -16	182-50+132 =t(50/2,24)+50
White W (fluorescent paper)	100 =20*5	200 =40*5	5	1,00 =d(5,00) ^{1/3} -16	100-50+52 =t(5,00)+50
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24	0,45 =d(2,24) ^{1/3} -16	75-50+22 =t(50/2,24)+50
Grey U (paper)	20	40 40*1	1	0,20 =d(1,00) ^{1/3} -16	50-50+2 =t(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45	0,09 =d(0,45) ^{1/3} -16	24-50-23 =t(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20	0,04 =d(0,20) ^{1/3} -16	0-50-48 =t(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09	0,022 =d(0,09) ^{1/3} -16	14-50-35 =t(0,09)+50

It is valid: CIELAB_U: d_U=d=66, TUBLOG_U: t_U=t=50/log(5)=72
feo81-3n

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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 (5 ^{0.5} ;-2,24	L [cd/m ²]	$L_{rU} / L_{rW} = L / L_{rW}$	$L^*_{CIELAB_W} = c_W L_{rW}^{1/3} - 16$	$L^*_{TUBLOG_U} = t_U \log(L_{rU}) + 50$
White P2 (light)	500 =20*25	1000 =40*25	25	5,00 =c(5,00) ^{1/3} -16	182-50+132 =c(5,00) ^{1/3} -16
White W (fluorescent paper)	100 =20*5	200 =40*5	5	1,00 =c(1,00) ^{1/3} -16	100-50+52 =c(1,00) ^{1/3} -16
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24	0,45 =c(0,45) ^{1/3} -16	75-50+22 =t(50/2,24)+50
Grey U (paper)	20	40 40*1	1	0,20 =c(0,20) ^{1/3} -16	50-50+2 =t(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45	0,09 =c(0,09) ^{1/3} -16	24-50-23 =t(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20	0,04 =c(0,04) ^{1/3} -16	0-50-48 =t(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09	0,022 =c(0,02) ^{1/3} -16	14-50-35 =t(0,09)+50

It is valid: CIELAB_W: c_W=c=116, TUBLOG_U: t_U=t=50/log(5)=72
feo80-7n

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	ITU sRGB _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=100:4)	Y (5 ^{0.5} ;-2,24	L [cd/m ²]	$L_{rU} / L_{rW} = L / L_{rW}$	$L^*_{ITU sRGB_W} = i_W L_{rW}^{0,45} - 10$	$L^*_{TUBLOG_U} = t_U \log(L_{rU}) + 50$
White P2 (light)	500 =20*25	1000 =40*25	25	5,00 =i(5,00) ^{0,45} -10	182-50+132 =t(50/2,24)+50
White W (fluorescent paper)	100 =20*5	200 =40*5	5	1,00 =i(1,00) ^{0,45} -10	100-50+52 =t(5,00)+50
light Grey H (paper)	44,8 =20*2,24	89,6 =40*2,24	2,24	0,45 =i(0,45) ^{0,45} -10	75-50+22 =t(50/2,24)+50
Grey U (paper)	20	40 40*1	1	0,20 =i(0,20) ^{0,45} -10	50-50+2 =t(1,00)+50
dark Grey D (paper)	8,9 =20/2,24	17,8 40/2,24	0,45	0,09 =i(0,09) ^{0,45} -10	24-50-23 =t(0,45)+50
Black N (paper)	4 =20/5	8 40/5	0,20	0,04 =i(0,04) ^{0,45} -10	0-50-48 =t(0,20)+50
Black p1 (glossy paper)	1,9 =20/11,2	3,6 40/11,2	0,09	0,022 =i(0,02) ^{0,45} -10	14-50-35 =t(0,09)+50

It is valid: ITU sRGB_W: i_W=i=110, TUBLOG_U: t_U=t=50/log(5)=72
feo81-7n

see similar files of the whole serie: <http://farbe.li.tu-berlin.de/feo8.htm>
technical information: <http://farbe.li.tu-berlin.de> or <http://color.li.tu-berlin.de>

TUB registration: 20240201-feo8/feo8l0n1.txt /ps
application for evaluation and measurement of display or print output
TUB material: code=thata