

**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 _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=90:3,6)	Y	L [cd/m ²]	L_{rU} $=L/L_U$	L_{rW} $=L/L_W$	$L^*_{CIELABW}$ $=c_W L_{nW}^{1/3} - 16$	$L^*_{TUBLOGU}$ $=t_U \log(L_{nU}) + 52$
White P2 (light)	360 =18*20	800 =40*20	25	2,24	161=50+111 =c(4,00) ^{1/3} -16	141=50+91 =t log(20,00)+52
White P1 (light)	180 =18*10	400 =40*10	20	1,00	125=50+75 =c(2,00) ^{1/3} -16	120=50+70 =t log(10,00)+52
White W (fluorescent paper)	90 =18*5	200 =40*5	5	0,45	95=50+45 =c(1,00) ^{1/3} -16	98=50+48 =t log(5,00)+52
Grey U (paper)	18 =18*1	40 40*1	1	0,20	49=50-0 =c(0,20) ^{1/3} -16	48=50-1 =t log(1,00)+52
Black N (paper)	3,6 =18/5	8 40/5	0,20	0,09	22=50-27 =c(0,04) ^{1/3} -16	-1=50-51 =t log(0,20)+52
Black p1 (glossy paper)	2,5 =18/7	5,7 40/7	0,14	0,04	17=50-32 =c(0,03) ^{1/3} -16	-12=50-62 =t log(0,14)+52
Black p2 (glossy paper)	1,8 =18/10	4 40/10	0,10	0,022	14=50-35 =c(0,02) ^{1/3} -16	-22=50-72 =t log(0,10)+52

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