

**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 _W lightness	TUBLOG _U lightness
Contrast W:N (25:1=90:3,6)	Y ($5^{0,5}=2,24$)	L [cd/m ²]	L_{rU} $=L/L_U$	L_{rW} $=L/L_W$	$L^*_{IECsRGBW}$ $=s_W L_{nW}^{1/2,4}$	$L^*_{TUBLOGU}$ $=t_U \log(L_{nU})+52$
White P1 (light)	180 $=18*10$	400 $=40*10$	10	2,24	127=50+77 $=s(2,00)^{1/2,4}$	120=50+70 $=t \log(10,00)+52$
White W (fluorescent paper)	90 $=18*5$	200 $=40*5$	5	1,00	95=50+45 $=s(1,00)^{1/2,4}$	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 $=s(0,45)^{1/2,4}$	73=50+23 $=t \log(2,24)+52$
Grey U (paper)	18	40 40*1	1	0,20	48=50-1 $=s(0,20)^{1/2,4}$	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 $=s(0,09)^{1/2,4}$	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 $=s(0,04)^{1/2,4}$	-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 $=s(0,02)^{1/2,4}$	-22=50-72 $=t \log(0,10)+52$

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