

**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=100:4)	Y ($5^{0,5}=2,24$)	L [cd/m ²]	L_{rU} $=L/L_U$	L_{rW} $=L/L_W$	$L^*_{CIELABW}$ $=c_W L_{rW}^{1/3} - 16$	$L^*_{TUBLOGU}$ $=t_U \log(L_{rU}) + 50$
White P1 (light)	224 $=20 \cdot 11,2$	448 $=40 \cdot 11,2$	11,2	2,24	135=50+85 $=c(2,24)^{1/3} - 16$	125=50+77 $=t \log(11,20) + 50$
White W (fluorescent paper)	100 $=20 \cdot 5$	200 $=40 \cdot 5$	5	1,00	100=50+50 $=c(1,00)^{1/3} - 16$	100=50+52 $=t \log(5,00) + 50$
light Grey H (paper)	44,8 $=20 \cdot 2,24$	89,6 $=40 \cdot 2,24$	2,24	0,45	72=50+22 $=c(0,45)^{1/3} - 16$	75=50+27 $=t \log(2,24) + 50$
Grey U (paper)	20	40 $40 \cdot 1$	1	0,20	51=50+1 $=c(0,20)^{1/3} - 16$	50=50+2 $=t \log(1,00) + 50$
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 $=t \log(0,45) + 50$
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 $=t \log(0,20) + 50$
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 $=t \log(0,09) + 50$

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