

**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		ITU <sub>s</sub> RGB <sub>P2</sub> lightness	TUBLOG <sub>U</sub> lightness
<b>Contrast W:N (25:1=100:4)</b>	$Y$ ( $5^{0,5}=2,24$ )	$L$ [cd/m <sup>2</sup> ]	$L_{rU}$ $=L/L_U$	$L_{rW}$ $=L/L_W$	$L^*_{ITU_sRGBP2}$ $=j_W L_{rW}^{0,45} - 10$	$L^*_{TUBLOG_U}$ $=t_U \log(L_{rU}) + 50$
White P2 (light)	500 $=20*25$	1000 $=40*25$	25	5,00	161=50+111 $=j(1,00)^{0,45} - 10$	150=50+102 $=t \log(25,00) + 50$
White W (fluorescent paper)	100 $=20*5$	200 $=40*5$	5	1,00	73=50+23 $=j(0,20)^{0,45} - 10$	100=50+52 $=t \log(5,00) + 50$
light Grey H (paper)	44,8 $=20*2,24$	89,6 $=40*2,24$	2,24	0,45	48=50-1 $=j(0,09)^{0,45} - 10$	75=50+27 $=t \log(2,24) + 50$
Grey U (paper)	20	40 $40*1$	1	0,20	30=50-19 $=j(0,04)^{0,45} - 10$	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	18=50-31 $=j(0,02)^{0,45} - 10$	24=50-23 $=t \log(0,45) + 50$
Black N (paper)	4 $=20/5$	8 $40/5$	0,20	0,04	9=50-40 $=j(0,01)^{0,45} - 10$	0=50-48 $=t \log(0,20) + 50$
Black P2 (glossy paper)	1,9 $=20/11,2$	3,6 $40/11,2$	0,09	0,022	4=50-45 $=j(0,00)^{0,45} - 10$	-24=50-72 $=t \log(0,09) + 50$

It is valid: ITUsRGB<sub>W</sub>:  $j_W=j=110$ , TUBLOG<sub>U</sub>:  $t_U=t=50/\log(5)=72$