

**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 <sub>W</sub> lightness	TUBLOG <sub>U</sub> lightness
Contrast W:N (25:1=100:4)	$Y$ ( $5^{0,5}=2,24$ )	$L$ [cd/m <sup>2</sup> ]	$L_{rU}$ $=L/L_U$	$L_{rW}$ $=L/L_W$	$L^*_{IECsRGBW}$ $=s_W L_{nW}^{1/2,4}$	$L^*_{TUBLOGU}$ $=t_U \log(L_{nU})+50$
White P1 (light)	224 $=20*11,2$	448 $=40*11,2$	11,2	2,24	139=89+50 $=s(2,24)^{1/2,4}$	125=75+50 $=t \log(11,2)+50$
White W (fluorescent paper)	100 $=20*5$	200 $=40*5$	5	1,00	100=50+50 $=s(1,00)^{1/2,4}$	100=50+50 $=t \log(5,00)+50$
light Grey H (paper)	44,8 $=20*2,24$	89,6 $=40*2,24$	2,24	0,45	71=21+50 $=s(0,45)^{1/2,4}$	75=25+50 $=t \log(2,24)+50$
Grey U (paper)	20	40 $40*1$	1	0,20	51=1+50 $=s(0,20)^{1/2,4}$	50=0+50 $=t \log(1,00)+50$
dark Grey D (paper)	8,9 $=20/2,24$	17,8 $40/2,24$	0,45	0,09	36=-13+50 $=s(0,09)^{1/2,4}$	24=-25+50 $=t \log(0,45)+50$
Black N (paper)	4 $=20/5$	8 $40/5$	0,20	0,04	26=-23+50 $=s(0,04)^{1/2,4}$	0=-50+50 $=t \log(0,20)+50$
Black p1 (glossy paper)	1,9 $=20/11,2$	3,6 $40/11,2$	0,09	0,022	19=-30+50 $=s(0,02)^{1/2,4}$	-23=-73+50 $=t \log(0,10)+50$

Valid: IECsRGB<sub>W</sub>:  $s_W=s=100$ , TUBLOG<sub>U</sub>:  $t_U=t=50/\log(5)=71,533$ ,  $Y_{nW}=Y/100$ ,  $Y_{nU}=Y/20$