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TUB registration: 20240201-feo2/feo210np.pdf / .ps
 application for evaluation and measurement of display or print output
 TUB material: code=rhata4

**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 | IECsRGB _W lightness | relative luminance | | CIELAB _W lightness | TUBLOG _U lightness |
|----------------------------------|--------------------------------------|--|--|--|---|---|
| | | | L _{rU} = L/L _U | L _{rW} = L/L _W | | |
| Contrast W:N (25:1=100:4) | Y (5 ^{0.5} =2,24) | L* _{IECsRGB_W} =s _W L _{NW} ^{1/2,4} | L_{rU} =L/L _U | L_{rW} =L/L _W | L* _{CIELAB_W} =c _W L _{NW} ^{1/3} -16 | L* _{TUBLOG_U} =t _U log(L _{NU})+50 |
| White P2 (light) | 450 =18*25 | 195=50+145 =s(5,00) ^{1/2,4} | 25 | 2,24 | 182=50+132 =c(5,00) ^{1/3} -16 | 150=50+102 =t log(25,00)+50 |
| White P1 (light) | 224 =18*11,2 | 139=50+89 =s(2,24) ^{1/2,4} | 11,2 | 1,00 | 135=50+85 =c(2,24) ^{1/3} -16 | 125=50+77 =t log(11,20)+50 |
| White W (fluorescent paper) | 90 =18*5 | 100=50+50 =s(1,00) ^{1/2,4} | 5 | 0,45 | 100=50+50 =c(1,00) ^{1/3} -16 | 100=50+52 =t log(5,00)+50 |
| Grey U (paper) | 18 =18*1 | 51=50+1 =s(0,20) ^{1/2,4} | 1 | 0,20 | 51=50+1 =c(0,20) ^{1/3} -16 | 50=50+2 =t log(1,00)+50 |
| Black N (paper) | 3,6 =18/5 | 26=50-23 =s(0,04) ^{1/2,4} | 0,20 | 0,09 | 23=50-26 =c(0,04) ^{1/3} -16 | 0=50-48 =t log(0,20)+50 |
| Black p1 (glossy paper) | 2,5 =18/7 | 21=50-28 =s(0,03) ^{1/2,4} | 0,14 | 0,04 | 17=50-32 =c(0,03) ^{1/3} -16 | -14=50-62 =t log(0,13)+50 |
| Black p2 (glossy paper) | 1,8 =18/10 | 18=50-31 =s(0,02) ^{1/2,4} | 0,10 | 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, IECsRGB_W: s_W=s=100, TUBLOG_U: t_U=t=50/log(5)=72

feo20-3n

**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 |
|----------------------------------|--------------------------------------|----------------------------------|--|--|---|---|
| | | | L _{rU} = L/L _U | L _{rW} = L/L _W | | |
| 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* _{CIELAB_W} =c _W L _{NW} ^{1/3} -16 | L* _{TUBLOG_U} =t _U log(L _{NU})+50 |
| White P2 (light) | 450 =18*25 | 1000 =40*25 | 25 | 2,24 | 182=50+132 =c(5,00) ^{1/3} -16 | 150=50+102 =t log(25,00)+50 |
| White P1 (light) | 224 =18*11,2 | 448 =40*11,2 | 11,2 | 1,00 | 135=50+85 =c(2,24) ^{1/3} -16 | 125=50+77 =t log(11,20)+50 |
| White W (fluorescent paper) | 90 =18*5 | 200 =40*5 | 5 | 0,45 | 100=50+50 =c(1,00) ^{1/3} -16 | 100=50+52 =t log(5,00)+50 |
| Grey U (paper) | 18 =18*1 | 40 =40*1 | 1 | 0,20 | 51=50+1 =c(0,20) ^{1/3} -16 | 50=50+2 =t log(1,00)+50 |
| Black N (paper) | 3,6 =18/5 | 8 =40/5 | 0,20 | 0,09 | 23=50-26 =c(0,04) ^{1/3} -16 | 0=50-48 =t log(0,20)+50 |
| 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 | -14=50-62 =t log(0,13)+50 |
| Black p2 (glossy paper) | 1,8 =18/10 | 4 =40/10 | 0,10 | 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

feo20-7n

**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 _U lightness | TUBLOG _U lightness |
|----------------------------------|--------------------------------------|----------------------------------|--|--|---|---|
| | | | L _{rU} = L/L _U | L _{rW} = L/L _W | | |
| 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* _{CIELAB_U} =d _U L _{NU} ^{1/3} -16 | L* _{TUBLOG_U} =t _U log(L _{NU})+50 |
| White P2 (light) | 450 =18*25 | 1000 =40*25 | 25 | 2,24 | 182=50+132 =c(25,00) ^{1/3} -16 | 150=50+102 =t log(25,00)+50 |
| White P1 (light) | 224 =18*11,2 | 448 =40*11,2 | 11,2 | 1,00 | 135=50+85 =c(11,20) ^{1/3} -16 | 125=50+77 =t log(11,20)+50 |
| White W (fluorescent paper) | 90 =18*5 | 200 =40*5 | 5 | 0,45 | 100=50+50 =c(5,00) ^{1/3} -16 | 100=50+52 =t log(5,00)+50 |
| Grey U (paper) | 18 =18*1 | 40 =40*1 | 1 | 0,20 | 51=50+1 =c(1,00) ^{1/3} -16 | 50=50+2 =t log(1,00)+50 |
| Black N (paper) | 3,6 =18/5 | 8 =40/5 | 0,20 | 0,09 | 23=50-26 =c(0,20) ^{1/3} -16 | 0=50-48 =t log(0,20)+50 |
| Black p1 (glossy paper) | 2,5 =18/7 | 5,7 =40/7 | 0,14 | 0,04 | 17=50-32 =c(0,13) ^{1/3} -16 | -14=50-62 =t log(0,13)+50 |
| Black p2 (glossy paper) | 1,8 =18/10 | 4 =40/10 | 0,10 | 0,022 | 14=50-35 =c(0,09) ^{1/3} -16 | -24=50-72 =t log(0,09)+50 |

It is valid: CIELAB_U: d_U=d=66, TUBLOG_U: t_U=t=50/log(5)=72

feo21-3n

**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 |
|----------------------------------|--------------------------------------|----------------------------------|--|--|--|---|
| | | | L _{rU} = L/L _U | L _{rW} = L/L _W | | |
| 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* _{IECsRGB_W} =s _W L _{NW} ^{1/2,4} | L* _{TUBLOG_U} =t _U log(L _{NU})+50 |
| White P2 (light) | 450 =18*25 | 1000 =40*25 | 25 | 2,24 | 195=50+145 =s(5,00) ^{1/2,4} | 150=50+102 =t log(25,00)+50 |
| White P1 (light) | 224 =18*11,2 | 448 =40*11,2 | 11,2 | 1,00 | 139=50+89 =s(2,24) ^{1/2,4} | 125=50+77 =t log(11,20)+50 |
| White W (fluorescent paper) | 90 =18*5 | 200 =40*5 | 5 | 0,45 | 100=50+50 =s(1,00) ^{1/2,4} | 100=50+52 =t log(5,00)+50 |
| Grey U (paper) | 18 =18*1 | 40 =40*1 | 1 | 0,20 | 51=50+1 =s(0,20) ^{1/2,4} | 50=50+2 =t log(1,00)+50 |
| Black N (paper) | 3,6 =18/5 | 8 =40/5 | 0,20 | 0,09 | 26=50-23 =s(0,04) ^{1/2,4} | 0=50-48 =t log(0,20)+50 |
| Black p1 (glossy paper) | 2,5 =18/7 | 5,7 =40/7 | 0,14 | 0,04 | 21=50-28 =s(0,03) ^{1/2,4} | -14=50-62 =t log(0,13)+50 |
| Black p2 (glossy paper) | 1,8 =18/10 | 4 =40/10 | 0,10 | 0,022 | 18=50-31 =s(0,02) ^{1/2,4} | -24=50-72 =t log(0,09)+50 |

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

feo21-7n

TUB-test chart feo2; Colourimetric scaling of achromatic colours between white and black.
 Contrast W:N=90:3,6, P2:p2=1000:4 with Y_{nW}, Y_{nU}. See ISO 22028-5, ISO/CIE 11664-4, CIE 230