see similar files of the whole serie: http://farbe.li.tu-berlin.de/eeqs.htm
technical information: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

TUB registration: 20230701-eeq3/eeq3l0na.txt /.ps
application for evaluation and measurement of display or print output
TUB material: code=rha4ta

**Equal 9 step grey scaling between $L^*_{0aN}$=3.6 and $L^*_{0aW}$=95.9, $Y_{0ref}$=2.5, normalisation grey *U***

$L^*_{0aN}$=3.6, $L^*_{0aU}$=49.8, $L^*_{0aW}$=96.0, $Y_{0aN}$=0.4, $Y_{0aU}$=18.2, $Y_{0aW}$=90.0, $C_{0aY}$=$Y_{0aW}$:$Y_{0aN}$=225.0
$L^*_{taN}$=18.1, $L^*_{taU}$=49.8, $L^*_{taW}$=92.3, $Y_{taN}$=2.5, $Y_{taU}$=18.2, $Y_{taW}$=81.3, $C_{taY}$=$Y_{taW}$:$Y_{taN}$=31.9

**Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps**
**$g^*$ = 100 [$\Delta L^*_{min}$] / [$\Delta L^*_{max}$], $L^*_{CIELAB}$ = 116 [$Y/Y_n$]$^{1/3}$ − 16 with $Y$ >= 0,882, $Y_n$=100**

| $L^*_{CIELAB}$ | | | | | | **$g^*_5$= 99, $g^*_9$= 99** | | **$g^*_5$= 58, $g^*_9$= 48** | | | **$g^*_5$= 91, $g^*_9$= 89** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **intended output** | | | | | **real output** | | | | | **linearized output** | |
| | **n0. i** | **L*0a** | **L*0r** | **Y0a** | **Y0r** | **L*ta** | **ΔL*ta** | **L*tr** | **Yta** | **(L*tr)$^{1/1.24}$** | **L*la** | **ΔL*la** |
| 100 | 9 | 96.0 | 1.0 | 90.0 | 1.0 | 92.3 | | 1.0 | 81.3 | 1.0 | 92.3 | |
| | | | | | | | 10.8 | | | | | 8.8 |
| | 8 | 84.4 | 0.875 | 64.9 | 0.72 | 81.5 | | 0.854 | 59.3 | 0.88 | 83.4 | |
| | | | | | | | 10.7 | | | | | 9.1 |
| 75 | 7 | 72.9 | 0.75 | 45.0 | 0.498 | 70.7 | | 0.709 | 41.8 | 0.758 | 74.3 | |
| | | | | | | | 10.6 | | | | | 9.3 |
| | 6 | 61.3 | 0.625 | 29.6 | 0.326 | 60.1 | | 0.566 | 28.3 | 0.632 | 65.0 | |
| | | | | | | | 10.3 | | | | | 9.5 |
| 50 | 5 | 49.8 | 0.5 | 18.2 | 0.199 | 49.8 | | 0.427 | 18.2 | 0.504 | 55.5 | |
| | | | | | | | 9.9 | | | | | 9.7 |
| | 4 | 38.2 | 0.375 | 10.2 | 0.11 | 39.9 | | 0.293 | 11.2 | 0.372 | 45.7 | |
| | | | | | | | 9.1 | | | | | 9.7 |
| 25 | 3 | 26.7 | 0.25 | 5.0 | 0.051 | 30.8 | | 0.171 | 6.6 | 0.241 | 36.0 | |
| | | | | | | | 7.5 | | | | | 9.2 |
| | 2 | 15.2 | 0.125 | 1.9 | 0.017 | 23.3 | | 0.07 | 3.9 | 0.117 | 26.9 | |
| | | | | | | | 5.2 | | | | | 8.7 |
| 0 | 1 | 3.6 | 0.0 | 0.4 | 0.0 | 18.1 | | 0.0 | 2.5 | 0.0 | 18.1 | |

**$\Delta L^*_{0a}$=11.5** **(i=1,2,...,8)** **normalisation: $Y_{taiU}$=$Y_{0aU}$ $\frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$**

eeq30−3n

**Equal 9 step grey scaling between $L^*_{0aN}$=3.6 and $L^*_{0aW}$=95.9, $Y_{0ref}$=20.0, normalisation grey *U***

$L^*_{0aN}$=3.6, $L^*_{0aU}$=49.8, $L^*_{0aW}$=96.0, $Y_{0aN}$=0.4, $Y_{0aU}$=18.2, $Y_{0aW}$=90.0, $C_{0aY}$=$Y_{0aW}$:$Y_{0aN}$=225.0
$L^*_{taN}$=37.4, $L^*_{taU}$=49.8, $L^*_{taW}$=77.6, $Y_{taN}$=9.7, $Y_{taU}$=18.2, $Y_{taW}$=52.5, $C_{taY}$=$Y_{taW}$:$Y_{taN}$=5.4

**Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps**
**$g^*$ = 100 [$\Delta L^*_{min}$] / [$\Delta L^*_{max}$], $L^*_{CIELAB}$ = 116 [$Y/Y_n$]$^{1/3}$ − 16 with $Y$ >= 0,882, $Y_n$=100**

| $L^*_{CIELAB}$ | | | | | | **$g^*_5$= 99, $g^*_9$= 99** | | **$g^*_5$= 24, $g^*_9$= 16** | | | **$g^*_5$= 93, $g^*_9$= 86** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **intended output** | | | | | **real output** | | | | | **linearized output** | |
| | **n0. i** | **L*0a** | **L*0r** | **Y0a** | **Y0r** | **L*ta** | **ΔL*ta** | **L*tr** | **Yta** | **(L*tr)$^{1/1.68}$** | **L*la** | **ΔL*la** |
| 100 | 9 | 96.0 | 1.0 | 90.0 | 1.0 | 77.6 | | 1.0 | 52.5 | 1.0 | 77.6 | |
| | | | | | | | 7.7 | | | | | 4.8 |
| | 8 | 84.4 | 0.875 | 64.9 | 0.72 | 69.8 | | 0.808 | 40.5 | 0.881 | 72.8 | |
| | | | | | | | 7.3 | | | | | 5.0 |
| 75 | 7 | 72.9 | 0.75 | 45.0 | 0.498 | 62.5 | | 0.626 | 31.0 | 0.757 | 67.8 | |
| | | | | | | | 6.7 | | | | | 5.1 |
| | 6 | 61.3 | 0.625 | 29.6 | 0.326 | 55.8 | | 0.458 | 23.7 | 0.629 | 62.6 | |
| | | | | | | | 6.0 | | | | | 5.2 |
| 50 | 5 | 49.8 | 0.5 | 18.2 | 0.199 | 49.8 | | 0.309 | 18.2 | 0.498 | 57.4 | |
| | | | | | | | 5.0 | | | | | 5.2 |
| | 4 | 38.2 | 0.375 | 10.2 | 0.11 | 44.8 | | 0.186 | 14.4 | 0.368 | 52.2 | |
| | | | | | | | 3.7 | | | | | 5.0 |
| 25 | 3 | 26.7 | 0.25 | 5.0 | 0.051 | 41.1 | | 0.093 | 11.9 | 0.244 | 47.2 | |
| | | | | | | | 2.4 | | | | | 4.5 |
| | 2 | 15.2 | 0.125 | 1.9 | 0.017 | 38.7 | | 0.032 | 10.5 | 0.131 | 42.6 | |
| | | | | | | | 1.3 | | | | | 5.2 |
| 0 | 1 | 3.6 | 0.0 | 0.4 | 0.0 | 37.4 | | 0.0 | 9.7 | 0.0 | 37.4 | |

**$\Delta L^*_{0a}$=11.5** **(i=1,2,...,8)** **normalisation: $Y_{taiU}$=$Y_{0aU}$ $\frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$**

eeq31−3n

**Equal 9 step grey scaling between $L^*_{0aN}$=3.6 and $L^*_{0aW}$=95.9, $Y_{0ref}$=10.0, normalisation grey *U***

$L^*_{0aN}$=3.6, $L^*_{0aU}$=49.8, $L^*_{0aW}$=96.0, $Y_{0aN}$=0.4, $Y_{0aU}$=18.2, $Y_{0aW}$=90.0, $C_{0aY}$=$Y_{0aW}$:$Y_{0aN}$=225.0
$L^*_{taN}$=31.2, $L^*_{taU}$=49.8, $L^*_{taW}$=84.3, $Y_{taN}$=6.7, $Y_{taU}$=18.2, $Y_{taW}$=64.6, $C_{taY}$=$Y_{taW}$:$Y_{taN}$=9.6

**Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps**
**$g^*$ = 100 [$\Delta L^*_{min}$] / [$\Delta L^*_{max}$], $L^*_{CIELAB}$ = 116 [$Y/Y_n$]$^{1/3}$ − 16 with $Y$ >= 0,882, $Y_n$=100**

| $L^*_{CIELAB}$ | | | | | | **$g^*_5$= 99, $g^*_9$= 99** | | **$g^*_5$= 33, $g^*_9$= 24** | | | **$g^*_5$= 92, $g^*_9$= 88** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **intended output** | | | | | **real output** | | | | | **linearized output** | |
| | **n0. i** | **L*0a** | **L*0r** | **Y0a** | **Y0r** | **L*ta** | **ΔL*ta** | **L*tr** | **Yta** | **(L*tr)$^{1/1.52}$** | **L*la** | **ΔL*la** |
| 100 | 9 | 96.0 | 1.0 | 90.0 | 1.0 | 84.3 | | 1.0 | 64.6 | 1.0 | 84.3 | |
| | | | | | | | 9.2 | | | | | 6.3 |
| | 8 | 84.4 | 0.875 | 64.9 | 0.72 | 75.1 | | 0.827 | 48.4 | 0.882 | 78.0 | |
| | | | | | | | 8.9 | | | | | 6.5 |
| 75 | 7 | 72.9 | 0.75 | 45.0 | 0.498 | 66.2 | | 0.659 | 35.5 | 0.759 | 71.5 | |
| | | | | | | | 8.5 | | | | | 6.7 |
| | 6 | 61.3 | 0.625 | 29.6 | 0.326 | 57.7 | | 0.499 | 25.6 | 0.632 | 64.7 | |
| | | | | | | | 7.9 | | | | | 7.0 |
| 50 | 5 | 49.8 | 0.5 | 18.2 | 0.199 | 49.8 | | 0.351 | 18.2 | 0.501 | 57.8 | |
| | | | | | | | 6.9 | | | | | 7.0 |
| | 4 | 38.2 | 0.375 | 10.2 | 0.11 | 42.9 | | 0.22 | 13.1 | 0.369 | 50.7 | |
| | | | | | | | 5.6 | | | | | 6.8 |
| 25 | 3 | 26.7 | 0.25 | 5.0 | 0.051 | 37.3 | | 0.115 | 9.7 | 0.24 | 43.9 | |
| | | | | | | | 3.9 | | | | | 6.2 |
| | 2 | 15.2 | 0.125 | 1.9 | 0.017 | 33.4 | | 0.042 | 7.7 | 0.123 | 37.7 | |
| | | | | | | | 2.2 | | | | | 6.5 |
| 0 | 1 | 3.6 | 0.0 | 0.4 | 0.0 | 31.2 | | 0.0 | 6.7 | 0.0 | 31.2 | |

**$\Delta L^*_{0a}$=11.5** **(i=1,2,...,8)** **normalisation: $Y_{taiU}$=$Y_{0aU}$ $\frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$**

eeq30−7n

**Equal 9 step grey scaling between $L^*_{0aN}$=3.6 and $L^*_{0aW}$=95.9, $Y_{0ref}$=90.0, normalisation grey *U***

$L^*_{0aN}$=3.6, $L^*_{0aU}$=49.8, $L^*_{0aW}$=96.0, $Y_{0aN}$=0.4, $Y_{0aU}$=18.2, $Y_{0aW}$=90.0, $C_{0aY}$=$Y_{0aW}$:$Y_{0aN}$=225.0
$L^*_{taN}$=46.0, $L^*_{taU}$=49.8, $L^*_{taW}$=62.0, $Y_{taN}$=15.2, $Y_{taU}$=18.2, $Y_{taW}$=30.3, $C_{taY}$=$Y_{taW}$:$Y_{taN}$=2.0

**Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps**
**$g^*$ = 100 [$\Delta L^*_{min}$] / [$\Delta L^*_{max}$], $L^*_{CIELAB}$ = 116 [$Y/Y_n$]$^{1/3}$ − 16 with $Y$ >= 0,882, $Y_n$=100**

| $L^*_{CIELAB}$ | | | | | | **$g^*_5$= 99, $g^*_9$= 99** | | **$g^*_5$= 14, $g^*_9$= 9** | | | **$g^*_5$= 92, $g^*_9$= 71** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **intended output** | | | | | **real output** | | | | | **linearized output** | |
| | **n0. i** | **L*0a** | **L*0r** | **Y0a** | **Y0r** | **L*ta** | **ΔL*ta** | **L*tr** | **Yta** | **(L*tr)$^{1/2.0}$** | **L*la** | **ΔL*la** |
| 100 | 9 | 96.0 | 1.0 | 90.0 | 1.0 | 62.0 | | 1.0 | 30.3 | 1.0 | 62.0 | |
| | | | | | | | 3.8 | | | | | 2.0 |
| | 8 | 84.4 | 0.875 | 64.9 | 0.72 | 58.2 | | 0.762 | 26.1 | 0.873 | 59.9 | |
| | | | | | | | 3.3 | | | | | 2.0 |
| 75 | 7 | 72.9 | 0.75 | 45.0 | 0.498 | 54.8 | | 0.554 | 22.8 | 0.745 | 57.9 | |
| | | | | | | | 2.8 | | | | | 2.0 |
| | 6 | 61.3 | 0.625 | 29.6 | 0.326 | 52.0 | | 0.379 | 20.2 | 0.616 | 55.8 | |
| | | | | | | | 2.2 | | | | | 2.0 |
| 50 | 5 | 49.8 | 0.5 | 18.2 | 0.199 | 49.8 | | 0.24 | 18.2 | 0.49 | 53.8 | |
| | | | | | | | 1.7 | | | | | 1.9 |
| | 4 | 38.2 | 0.375 | 10.2 | 0.11 | 48.1 | | 0.136 | 16.9 | 0.369 | 51.9 | |
| | | | | | | | 1.1 | | | | | 1.8 |
| 25 | 3 | 26.7 | 0.25 | 5.0 | 0.051 | 47.0 | | 0.064 | 16.0 | 0.254 | 50.0 | |
| | | | | | | | 0.7 | | | | | 1.7 |
| | 2 | 15.2 | 0.125 | 1.9 | 0.017 | 46.3 | | 0.022 | 15.5 | 0.148 | 48.3 | |
| | | | | | | | 0.3 | | | | | 2.4 |
| 0 | 1 | 3.6 | 0.0 | 0.4 | 0.0 | 46.0 | | 0.0 | 15.2 | 0.0 | 46.0 | |

**$\Delta L^*_{0a}$=11.5** **(i=1,2,...,8)** **normalisation: $Y_{taiU}$=$Y_{0aU}$ $\frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$**

eeq31−7n

Test chart eeq3; Equal 9 step grey scaling for four display reflections $Y_{ref}$= 2,5, 10, 20, 90, and black $L^*_{N,CIELAB}$=3.61, $Y_N$=0.4 and white $L^*_{W,CIELAB}$=95.99, $Y_W$=90, normalisation: grey *U*