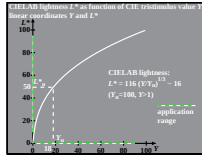


CIELAB lightness L^* , CIE tristimulus value discrimination dY and CIE contrast sensitivity $(Y/Y_0)^{1/3}$

CIELAB lightness for all colours $L^*=100$:
 $L^* = 116 (Y/Y_0)^{1/3} - 16$ ($Y_0=100, Y>1$)
 For the grey discrimination we get:
 $dL^*/dY = (116/Y_0^{1/3}) (1/3) (Y/Y_0)^{-2/3}$
 and for $dL^*=1$ (about 5 thresholds) we can write:
 $dY = 3 (Y_0/116) (Y/Y_0)^{2/3}$
 or $\log(dY) = \log(3 (Y_0/116)) + (2/3) \log(Y/Y_0)$
 therefore in a log-log diagram the slope is (2/3),
 for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:
 $Y/Y_0 = (1/3) (116/Y_0) (Y/Y_0)^{2/3}$
 or $\log(Y/Y_0) = \log(1/3) (116/Y_0) + (1/3) \log(Y/Y_0)$

VE240-1N

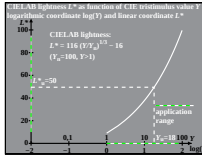


VE240-2N

CIELAB lightness L^* , CIE tristimulus value discrimination dY and CIE contrast sensitivity $(Y/Y_0)^{1/3}$

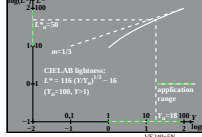
CIELAB lightness for all colours $L^*=100$:
 $L^* = 116 (Y/Y_0)^{1/3} - 16$ ($Y_0=100, Y>1$)
 For the grey discrimination we get:
 $dL^*/dY = (116/Y_0^{1/3}) (1/3) (Y/Y_0)^{-2/3}$
 and for $dL^*=1$ (about 5 thresholds) we can write:
 $dY = 3 (Y_0/116) (Y/Y_0)^{2/3}$
 or $\log(dY) = \log(3 (Y_0/116)) + (2/3) \log(Y/Y_0)$
 therefore in a log-log diagram the slope is (2/3),
 for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:
 $Y/Y_0 = (1/3) (116/Y_0) (Y/Y_0)^{2/3}$
 or $\log(Y/Y_0) = \log(1/3) (116/Y_0) + (1/3) \log(Y/Y_0)$

VE240-2N



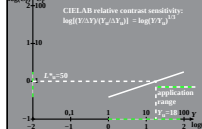
VE240-4N

CIELAB lightness L^* as function of CIE tristimulus value Y logarithmic coordinates $\log(Y)$ and $\log(Y_0)$



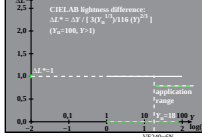
VE240-5N

CIELAB lightness difference ΔL^* as function of CIE tristimulus value Y logarithmic coordinates $\log(Y)$



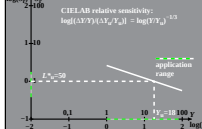
VE240-7N

CIELAB lightness difference ΔL^* as function of CIE tristimulus value Y logarithmic coordinates $\log(Y)$



VE240-6N

CIELAB relative sensitivity: $\log((\Delta Y/Y)/(\Delta Y_0/Y_0)) = \log(Y/Y_0)^{1/3}$

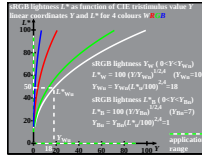


VE240-8N

sRGB lightness L^* , CIE tristimulus value discrimination dY and CIE contrast sensitivity $(Y/Y_0)^{1/3}$

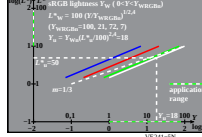
sRGB lightness (times 100) for achromatic colours: W
 $L^*_{sRGB,100} = 100 (Y/Y_0)^{1/2.4}$ ($Y_0=100$)
 For the grey discrimination we get:
 $dL^*/dY = (100/Y_0^{1/2.4}) (1/2.4) (Y/Y_0)^{-1.4/2.4}$
 and for $dL^*=1$ (about 5 thresholds) we can write:
 $dY = 2.4 (Y_0^{1.4/2.4}) (Y/Y_0)^{1.4/2.4}$
 or $\log(dY) = \log(2.4) + (1.4/2.4) \log(Y/Y_0)$
 therefore in a log-log diagram the slope is 1.4/2.4,
 for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:
 $Y/Y_0 = (Y_0^{1.4/2.4}) (2.4) (Y/Y_0)^{1.4/2.4}$
 or $\log(Y/Y_0) = \log(Y_0^{1.4/2.4}) + (1/2.4) \log(Y/Y_0)$

VE241-1N



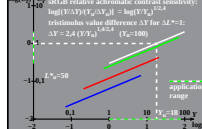
VE241-2N

sRGB lightness L^* as function of the CIE tristimulus value Y logarithmic coordinates $\log(Y)$ and for 4 colours WRGB



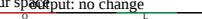
VE241-3N

sRGB lightness difference ΔL^* as function of the CIE tristimulus value Y logarithmic coordinates $\log(Y)$



VE241-4N

sRGB relative achromatic contrast sensitivity: $\log((\Delta Y/Y)/(\Delta Y_0/Y_0)) = \log(Y/Y_0)^{1/2.4}$

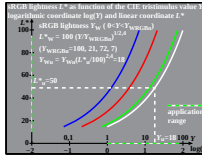


VE241-5N

sRGB lightness L^* , CIE tristimulus value discrimination dY and CIE contrast sensitivity $(Y/Y_0)^{1/3}$

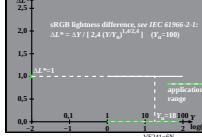
sRGB lightness (times 100) for chromatic colours: RGB
 $L^*_{sRGB,100} = 100 (Y/Y_0)^{1/2.4}$ ($Y_0=100$)
 For the discrimination we get:
 $dL^*/dY = (100/Y_0^{1/2.4}) (1/2.4) (Y/Y_0)^{-1.4/2.4}$
 and for $dL^*=1$ (about 5 thresholds) we can write:
 $dY = 2.4 (Y_0^{1.4/2.4}) (Y/Y_0)^{1.4/2.4}$
 or $\log(dY) = \log(2.4) + (1.4/2.4) \log(Y/Y_0)$
 therefore in a log-log diagram the slope is 1.4/2.4,
 for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:
 $Y/Y_0 = (Y_0^{1.4/2.4}) (2.4) (Y/Y_0)^{1.4/2.4}$
 or $\log(Y/Y_0) = \log(Y_0^{1.4/2.4}) + (1/2.4) \log(Y/Y_0)$

VE241-1N



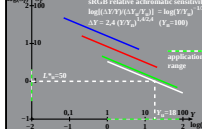
VE241-2N

sRGB lightness difference ΔL^* as function of the CIE tristimulus value Y logarithmic coordinates $\log(Y)$



VE241-3N

sRGB relative achromatic contrast sensitivity: $\log((\Delta Y/Y)/(\Delta Y_0/Y_0)) = \log(Y/Y_0)^{1/2.4}$



VE241-4N

TUB-test chart VE24; Colour and colour vision
 lightness and discrimination in CIELAB and sRGB colour space

input: w/rgb/cmyk -> w/rgb/cmyk-
 output: no change