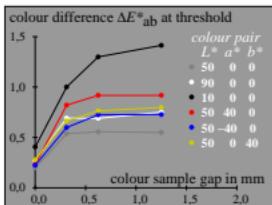
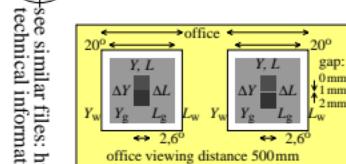
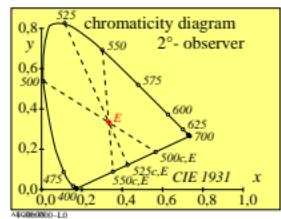


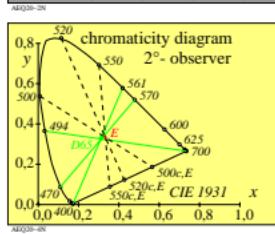
<http://farbe.li.tu-berlin.de/AEQ2/AEQ2L0N1.TXT/PS>; only vector graphic VG; start output  
 N: no 3D-linearization (OL) in file (F) or PS-startup (S)



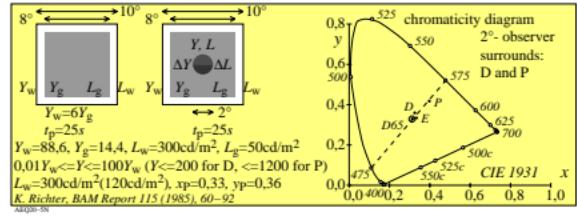
AEQ2-UN



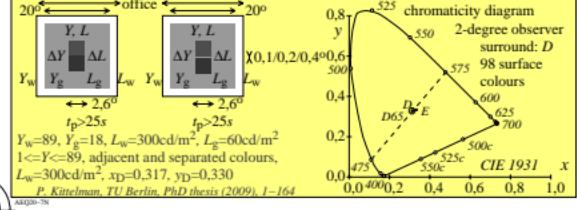
AEQ2-UN



AEQ2-UN



AEQ2-UN



AEQ2-UN

TUB-test chart AEQ2; Colour threshold experiments  
 Viewing situations for separate and adjacent colours chromaticity (x,y), LABJND formula and line elements

input:  $rgb/cm^2/000k/n$   
 o: 0 i: 1 v: 2

### Colour-difference formula LABJND 1985 (JND=just noticeable difference)

$$\Delta E_{JND}^* = \Delta E_{85}^* = A_0 [ (\Delta Y)^2 + (A_3 \Delta a^* Y)^2 + (A_4 \Delta b^* Y)^2 ]^{1/2} / (A_1 + A_2 \cdot Y)$$

$$a = x/y \quad a_n = x_n/y_n \quad b = -0.4 z/Y \quad b_n = -0.4 z_n/y_n$$

$$a'' = a_n + (a - a_n) / (1 + 0.5 |a - a_n|) \quad n = D65 \text{ or } A \text{ (background)}$$

$$b'' = b_n + (b - b_n) / (1 + 0.5 |b - b_n|) \quad n = D65 \text{ or } A \text{ (background)}$$

$$Y = (Y_1 + Y_2)/2 \quad \Delta Y = Y_1 - Y_2 \quad \Delta a'' = a_1'' - a_2'' \quad \Delta b'' = b_1'' - b_2''$$

$$A_1 = 0.0170 \quad A_2 = 0.0058$$

$$A_3 = 1.0 \quad A_4 = 1.8 \quad A_0 = 1.5 \quad \text{background D65}$$

$$A_3 = 1.0 \quad A_4 = 1.7 \quad A_0 = 1.0 \quad \text{background A}$$

### Just noticeable difference (JND) in four colour directions

$$\Delta Y = \text{const} (A_1 + A_2 \cdot Y) / A_0 \quad \text{in luminance direction WN}$$

$$\Delta a'' \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot A_3) \quad \text{in chromaticity direction RG}$$

$$\Delta b'' \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot A_4) \quad \text{in chromaticity direction YB}$$

$$\Delta c_{ab}^* \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot [A_3^2 + A_4^2]^{1/2}) \quad \text{in any chromaticity direction } c_{ab}$$

### Colour-difference formula LABJND 1985 only for achromatic colours

$$\Delta E_{JND}^* = \Delta E_{85}^* = A_0 [ (\Delta Y)^2 + (A_3 \Delta a \cdot Y)^2 + (A_4 \Delta b \cdot Y)^2 ]^{1/2} / (A_1 + A_2 \cdot Y)$$

$$a = x/y \quad b = -0.4 z/y$$

$$Y = (Y_1 + Y_2)/2 \quad \Delta Y = Y_1 - Y_2 \quad \Delta a = a_1 - a_2 \quad \Delta b = b_1 - b_2$$

$$A_1 = 0.0170 \quad A_2 = 0.0058$$

$$A_3 = 1.0 \quad A_4 = 1.8 \quad A_0 = 1.5 \quad \text{background D65}$$

$$A_3 = 1.0 \quad A_4 = 1.7 \quad A_0 = 1.0 \quad \text{background A}$$

### Just noticeable difference (JND) in three colour directions and line elements

$$A_0 \cdot \Delta Y = (A_1 + A_2 \cdot Y) \quad \text{in luminance direction WN}$$

$$A_0 \cdot \Delta a \cdot A_3 \cdot Y = (A_1 + A_2 \cdot Y) \quad \text{in chromaticity direction RG}$$

$$A_0 \cdot \Delta b \cdot A_4 \cdot Y = (A_1 + A_2 \cdot Y) \quad \text{in chromaticity direction YB}$$

$$dE_{85}^* = \frac{\partial}{\partial Y} L_{85}^* = \frac{\partial}{\partial Y} [(A_0 / A_2) \ln (A_1 + A_2 \cdot Y)] = A_0 \cdot dY / (A_1 + A_2 \cdot Y)$$

$$dE_{85}^* = \frac{\partial}{\partial a} a_{85}^* = \frac{\partial}{\partial a} [(A_0 \cdot A_3 \cdot Y \cdot a) / (A_1 + A_2 \cdot Y)] = A_0 \cdot da \cdot A_3 \cdot Y / (A_1 + A_2 \cdot Y)$$

$$dE_{85}^* = \frac{\partial}{\partial b} b_{85}^* = \frac{\partial}{\partial b} [(A_0 \cdot A_4 \cdot Y \cdot b) / (A_1 + A_2 \cdot Y)] = A_0 \cdot db \cdot A_4 \cdot Y / (A_1 + A_2 \cdot Y)$$

$$dE_{85}^* = \frac{\partial}{\partial b} b_{85}^* = \frac{\partial}{\partial b} [(A_0 \cdot A_4 \cdot Y \cdot b) / (A_1 + A_2 \cdot Y)] = A_0 \cdot db \cdot A_4 \cdot Y / (A_1 + A_2 \cdot Y)$$

$$dE_{85}^* = \frac{\partial}{\partial b} b_{85}^* = \frac{\partial}{\partial b} [(A_0 \cdot A_4 \cdot Y \cdot b) / (A_1 + A_2 \cdot Y)] = A_0 \cdot db \cdot A_4 \cdot Y / (A_1 + A_2 \cdot Y)$$