

**Content of a file with the example SCD data set: WI\_0418**

see the following PostScript file  
<http://130.149.60.45/~farbmetrik/WE94/WE940-7R.PS>

one can study the output of the corresponding PDF file  
<http://130.149.60.45/~farbmetrik/WE94/WE940-7R.PDF>

the ASCII text output of the above PS and/or PDF file is in the file:  
<http://130.149.60.45/~farbmetrik/WE94/WE940-7T.TXT>

This output includes the following text and numerical data:  
 %1000\*CIEXYZ & 100\*dE\* data for all colours (a) of 418 colour difference data pairs

%XS	YS	ZS	X0	Y0	Z0	X1	Y1	Z1	DV
0094810	0100000	0107330	0062894	0069530	0030219	0062792	0069510	0029574	0000573
0094810	0100000	0107330	0062894	0069530	0030219	0062921	0069620	0028877	0000866

  

%dE*ab	dE*CH	dE*94	dE*CM	dE*00	dE*85	NR	Code	L*	a*	b*
00094	00094	00030	00037	00030	00131	14000000	(14000_WI)	87	-6	46 %
00204	00204	00066	00082	00066	00280	14000001	(14000_WI)	87	-6	47 %

If the decimal comma for the CIEXYZ and CIELAB data is considered, then for example  
 X0=62,894 and dE\*ab=0,94.

**Color threshold formula LABJND 1985 only for achromatic colours**

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

$$a = x/y \quad a_n = x_n/y_n \quad b = -0,4 z/y \quad b_n = -0,4 z_n/y_n$$

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

$$A_1 = 0,0170 \quad A_2 = 0,0058$$

$$A_3 = 1,0 \quad A_4 = 1,8 \quad A_0 = 1,0 \quad \text{surround D65}$$

$$A_3 = 1,0 \quad A_4 = 1,7 \quad A_0 = 1,0 \quad \text{surround A}$$

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

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

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

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

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

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

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

**Color threshold formula LABJND 1985 (JND=just noticeable difference)**

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

$$a = x/y \quad a_n = x_n/y_n \quad b = -0,4 z/y \quad b_n = -0,4 z_n/y_n$$

$$a'' = a_n + (a - a_n) / (1 + 0,5 |a - a_n|) \quad n = D65 \text{ or } A \text{ (surround)}$$

$$b'' = b_n + (b - b_n) / (1 + 0,5 |b - b_n|)$$

$$Y = (Y_1 + Y_2) / 2 \quad \Delta Y = Y_1 - Y_2 \quad \Delta a'' = a''_1 - a''_2 \quad \Delta b'' = b''_1 - b''_2$$

$$A_1 = 0,0170 \quad A_2 = 0,0058$$

$$A_3 = 1,0 \quad A_4 = 1,8 \quad A_0 = 1,5 \quad \text{surround D65}$$

$$A_3 = 1,0 \quad A_4 = 1,7 \quad A_0 = 1,0 \quad \text{surround A}$$

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

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

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

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

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

**Color threshold formula LABJND 1985 only for achromatic colours**

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

$$a = x/y \quad a_n = x_n/y_n \quad b = -0,4 z/y \quad b_n = -0,4 z_n/y_n$$

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

$$A_1 = 0,0170 \quad A_2 = 0,0058$$

$$A_3 = 1,0 \quad A_4 = 1,8 \quad A_0 = 1,5 \quad \text{surround D65}$$

$$A_3 = 1,0 \quad A_4 = 1,7 \quad A_0 = 1,0 \quad \text{surround A}$$

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

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

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

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

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

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

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

see similar files: <http://130.149.60.45/~farbmetrik/WE56/WE56L0NA.TXT>  
 technical information: <http://www.ps.bam.de> or <http://130.149.60.45/~farbmetrik>