

CIELAB 1976 $L^*a^*b^*$ -color space definition and reversal

$$L^* = 116 (Y/Y_n)^{1/3} - 16$$
$$a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}]$$
$$b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}]$$
$$X = X_n [(L^* + 16) / 116 + a^*/500]^3$$
$$Y = Y_n [(L^* + 16) / 116]^3$$
$$Z = Z_n [(L^* + 16) / 116 - b^*/200]^3$$

AN790-1N

Q -function changes; transition from light- to color metrics

scaling function of **light metrics**:

$$Q[k(x - u)] = Q[k(\log L - \log L_u)]$$

$\log L \rightarrow \log P$ for **color metrics**:

$$Q[k(\log P - \log L_u)] = Q[k(\log L - \log L_u + \log P - \log L)]$$

with saturation $p = \log P - \log L$

for **color metrics**: $Q[k(x - u + p)]$

AN790-2N

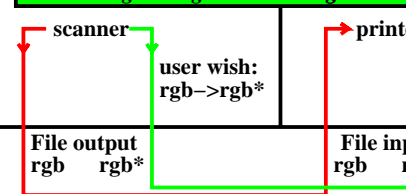
Multifunctional device

with the following modes:

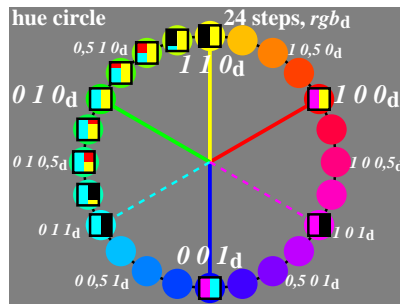
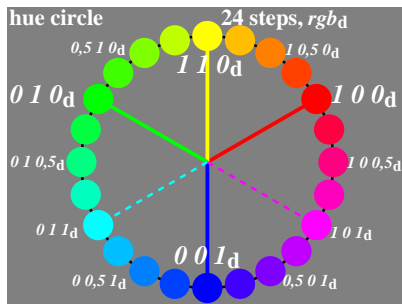
- copier
- scanner
- printer

high colour fidelity in copier mode

$LCh^* \rightarrow rgb \rightarrow rgb^* \rightarrow LCh^*$



AN790-3N

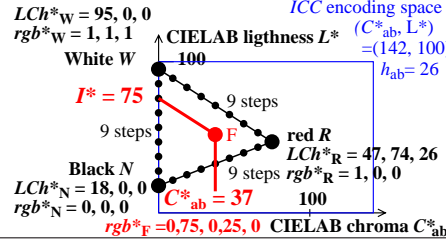


Offset rgb^* input data and LCh^* output data

Color	rgb^*	LCh^*
R_e elementary red	1 0 0	47, 74, 26
Y_e elementary yellow	1 1 0	86, 88, 92
G_e elementary green	0 1 0	53, 57, 164
B_e elementary blue	0 0 1	42, 45, 271
N black	0 0 0	18, 0, 0
W white	1 1 1	95, 0, 0

(data according to test chart DIN 33872-2, p. 9-12)
(CIELAB hue angles according to CIE R1-47)

9 step offset colours in CIELAB colour space



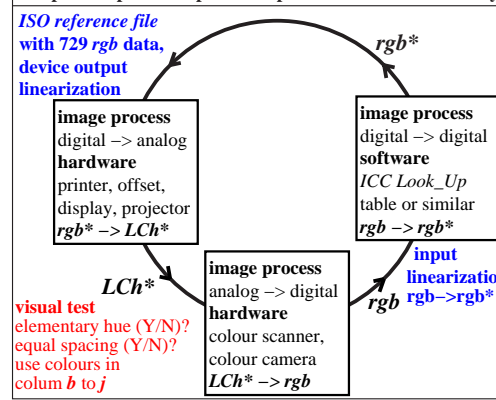
Agreement (Y/N) of CIELAB h_{ab} with IEC 61966-2-1 and CIE R1-47

	reference: device colours				NOTES
	$R_{d,sRGB}$	$Y_{d,sRGB}$	$G_{d,sRGB}$	$B_{d,sRGB}$	visual standard deviation v_{SD}
definition for display output in IEC 61966-2-1	40 +/- 4 40 +/- 8	103 +/- 4 103 +/- 8	136 +/- 4 136 +/- 8	306 +/- 8 306 +/- 16	1 x v_{SD} 2 x v_{SD} data see [1], Tab. B.2
measurement of printer output rgb in file	34 N(-2) 34 Y	100 Y 100 Y	146 N(+8) 146 N(+2)	264 N(-34) 264 N(-26)	1 x v_{SD} ; 1 x Y 2 x v_{SD} ; 2 x Y data see [1], Fig. 32
measurement of printer output $cmY0$ in file	34 N(-2) 34 Y	100 Y 100 Y	153 N(+15) 153 N(+9)	300 Y 300 Y	1 x v_{SD} ; 2 x Y 2 x v_{SD} ; 3 x Y data see [1], Fig. 33
	reference: elementary colours				NOTES
	R_e	Y_e	G_e	B_e	visual standard deviation v_{SD}
definition for any output in CIE R1-47	26 +/- 4 26 +/- 8	92 +/- 4 92 +/- 8	162 +/- 4 162 +/- 8	272 +/- 8 272 +/- 16	1 x v_{SD} 2 x v_{SD} data see CIE R1-47
measurement of printer output rgb in file	34 N(+4) 34 Y	100 N(+4) 100 Y	146 N(-12) 146 N(-8)	264 N(-4) 264 Y	1 x v_{SD} ; 0 x Y 2 x v_{SD} ; 3 x Y data see [1], Fig. 32
measurement of printer output $cmY0$ in file	34 N(+4) 34 Y	100 N(+4) 100 Y	153 N(-5) 153 N(-1)	300 N(+20) 300 N(+12)	1 x v_{SD} ; 0 x Y 2 x v_{SD} ; 2 x Y data see [1], Fig. 33

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AN791-3N

Output - Input - Output: A loop for relative colour fidelity



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

TUB-test chart AN79; Examples of colour metric
User coordinates and device calibration