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

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

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

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

scaling function of **light metrics:**
$\boldsymbol{Q\,[k(x-u]} = Q[k(\log L - \log L_u)]$

$\log L \rightarrow \log P$ **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: $\boldsymbol{Q\,[k(\,x - u + p)]}$

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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 *cmyO* 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 *cmyO* 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

AE871−3N

Multifunctional device
with the following modes:
− **copier**
− **scanner**
− **printer**

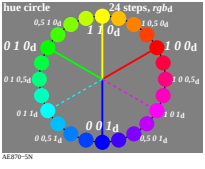
high colour fidelity with function copier
LCh* −> rgb −> rgb* −> rgb* −> LCh*

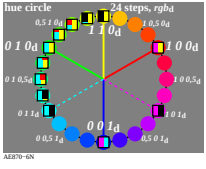
scanner → user wish: ***rgb−> rgb**** → printer → user wish: ***rgb* −> LCh****

lower colour fidelity
high colour fidelity

File output ***rgb*** **>=rgb* ?**
File input ***rgb*** **>=rgb* ?**

AE870−3N





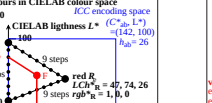
AE870−5N AE870−6N

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

Color	*rgb**	*LCh**
R elementary red	**1 0 0**	47, 74, **26**
Y elementary yellow	**1 1 0**	86, 88, **92**
G elementary green	**0 1 0**	53, 57, **164**
B elementary blue	**0 0 1**	42, 45, **271**
N black	**0 0 0**	18, **0, 0**
W white	**1 1 1**	95, **0, 0**

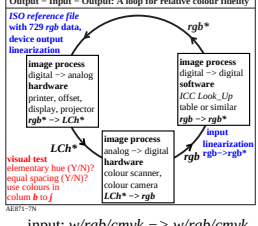
Data according to test chart DIN 33872-2, p.9-12
http://farbe.li.tu-berlin.de/A/33872E.html
Elementary-hue angles of CIE R1-47, see
http://web.archive.org/web/20160304130704/http://files.cie.co.at/526.pdf

9 step offset colours in CIELAB colour space



AE870−7N

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



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input: *w/rgb/cmyk −> w/rgb/cmyk*
output: no change