

5 steps of grey series black – white (N – W)

Linear mixture between black and white in CIELAB colour space

| |
|---------------------------|
| 1,00 N + 0,00 W (black N) |
| 0,75 N + 0,25 W |
| 0,50 N + 0,50 W |
| 0,25 N + 0,75 W |
| 0,00 N + 1,00 W (white W) |

Part 1

Colour space, colour space coordinates and PostScript operator calculations according to ISO/IEC 15775:1999-12

| relative CIELAB | | | | | | | | | | | |
|-----------------------|---|---|---|--|--|--|--|--|--|--|--|
| lab^*w^* setgray | $lab^*000n^* = 000n^*$ 000n^* setcmykcolor | $lab^*cmy0^* = cmy0^*$ cmy0^* setcmykcolor | $lab^*olv^* = olv^*$ olv^* setrgbcolor | | | | | | | | |
| 0,00 | 0,00 0,00 0,00 1,00 | 1,00 1,00 1,00 0,00 | 0,00 0,00 0,00 | | | | | | | | |
| 0,25 | 0,00 0,00 0,00 0,75 | 0,75 0,75 0,75 0,00 | 0,25 0,25 0,25 | | | | | | | | |
| 0,50 | 0,00 0,00 0,00 0,50 | 0,50 0,50 0,50 0,00 | 0,50 0,50 0,50 | | | | | | | | |
| 0,75 | 0,00 0,00 0,00 0,25 | 0,25 0,25 0,25 0,00 | 0,75 0,75 0,75 | | | | | | | | |
| 1,00 | 0,00 0,00 0,00 0,00 | 0,00 0,00 0,00 0,00 | 1,00 1,00 1,00 | | | | | | | | |

YE920-1

5 steps of colour series black – white (N – W)

Linear mixture between black and white in CIELAB colour space

| |
|---------------------------|
| 1,00 N + 0,00 W (black N) |
| 0,75 N + 0,25 W |
| 0,50 N + 0,50 W |
| 0,25 N + 0,75 W |
| 0,00 N + 1,00 W (white W) |

Part 2

Colour space, colour space coordinates and PostScript operator calculations according to ISO/IEC 15775:1999-12

| Standard CIELAB $LAB^*LAB^* = LAB^*$ LAB^* setcolor | | | | adapted CIELAB $LAB^*LAB^*_a = LAB^*_a$ LAB^*_a setcolor | | | | relative CIELAB $lab^*ncu^* = ncu^*$ ncu^* setcolor | | | |
|---|-------|-------|--|--|------|------|--|---|------|------|--|
| 18,01 | 0,50 | -0,40 | | 18,01 | 0,00 | 0,00 | | 1,00 | 0,00 | r00j | |
| 37,35 | 0,10 | 0,80 | | 37,35 | 0,00 | 0,00 | | 0,75 | 0,00 | r00j | |
| 56,70 | -0,10 | 2,10 | | 56,70 | 0,00 | 0,00 | | 0,50 | 0,00 | r00j | |
| 76,05 | -0,50 | -3,40 | | 76,05 | 0,00 | 0,00 | | 0,25 | 0,00 | r00j | |
| 95,41 | -0,98 | 4,76 | | 95,41 | 0,00 | 0,00 | | 0,00 | 0,00 | r00j | |

YE920-3

5 steps of colour series cyan blue – white (C – W)

Linear mixture between cyan blue and white in CIELAB colour space

| |
|-------------------------------|
| 1,00 C + 0,00 W (cyan blue C) |
| 0,75 C + 0,25 W |
| 0,50 C + 0,50 W |
| 0,25 C + 0,75 W |
| 0,00 C + 1,00 W (white W) |

Part 1

Colour space, colour space coordinates and PostScript operator calculations according to ISO/IEC 15775:1999-12

| Standard CIELAB $LAB^*LAB^* = LAB^*$ LAB^* setcolor | | | | relative CIELAB $lab^*cmy0^* = cmy0^*$ $cmy0^*$ setcmykcolor | | | | relative CIELAB $lab^*olv^* = olv^*$ olv^* setrgbcolor | | | |
|---|--------|--------|--|--|------|------|------|--|------|------|--|
| 58,62 | -30,62 | -42,74 | | 1,00 | 0,00 | 0,00 | 0,00 | 0,00 | 1,00 | 1,00 | |
| 67,82 | -23,21 | -30,86 | | 0,75 | 0,00 | 0,00 | 0,00 | 0,25 | 1,00 | 1,00 | |
| 77,02 | -15,80 | -18,98 | | 0,50 | 0,00 | 0,00 | 0,00 | 0,50 | 1,00 | 1,00 | |
| 86,21 | -8,39 | -7,11 | | 0,25 | 0,00 | 0,00 | 0,00 | 0,75 | 1,00 | 1,00 | |
| 95,41 | -0,98 | 4,76 | | 0,00 | 0,00 | 0,00 | 0,00 | 1,00 | 1,00 | 1,00 | |

YE920-5

5 steps of colour series cyan blue – white (C – W)

Linear mixture between cyan blue and white in CIELAB colour space

| |
|-------------------------------|
| 1,00 C + 0,00 W (cyan blue C) |
| 0,75 C + 0,25 W |
| 0,50 C + 0,50 W |
| 0,25 C + 0,75 W |
| 0,00 C + 1,00 W (white W) |

Part 2

Colour space, colour space coordinates and PostScript operator calculations according to ISO/IEC 15775:1999-12

| adapted CIELAB $LAB^*LAB^*_a = LAB^*_a$ LAB^*_a setcolor | | | | relative CIELAB $lab^*tch^* = tch^*$ tch^* setcolor | | | | relative CIELAB $lab^*ncu^* = ncu^*$ ncu^* setcolor | | | |
|--|--------|--------|--|---|-------|-------|--|---|-------|------|--|
| 58,62 | -30,34 | -45,01 | | 0,500 | 1,000 | 0,656 | | 0,000 | 1,000 | g21b | |
| 67,82 | -22,75 | -33,75 | | 0,625 | 0,750 | 0,656 | | 0,000 | 0,750 | g21b | |
| 77,02 | -15,17 | -22,50 | | 0,750 | 0,500 | 0,656 | | 0,000 | 0,500 | g21b | |
| 86,21 | -7,58 | -11,25 | | 0,875 | 0,250 | 0,656 | | 0,000 | 0,250 | g21b | |
| 95,41 | 0,00 | 0,00 | | 1,000 | 0,000 | 0,000 | | 0,000 | 0,000 | r00j | |

YE920-7

Application of colour in daily life or in Colour Information Technology (IT)

Design, architecture, art, industrial products Measured for CIE standard illuminant D65

colour order system; name and coordinates:

RAL Design System (CIELAB)

$L^*C^*_{ab}h^*$, lightness, chroma, hue angle

Munsell Colour System

VCH, lightness (Value), Chroma, Hue text

Natural Colour System (NCS)

*ncu^**: relative blackness, relative chroma

relative elementary hue text

Colour Information Technology Measured for CIE illuminants D65 and D50

Device system name and coordinates:

Printer system (illuminants D50 or D65):
cmy, content of "cyan", "magenta", "yellow"

Display system (standard illuminant D65):
rgb/sRGB, content of "red", "green", "blue"

No user friendly colour coordinates

Nearly no connection to colour order systems

Aim: define user friendly connection

New: Interpretation of the *rgb* colour data in the range 0 to 1 as elementary colour data rgb^*_3

Linear relations between *relative* and *absolute* coordinates $lab^* - LAB^*$

$rgb^*_3 - L^*a^*b^*C^*_{ab}h^*$ (CIELAB)

$rgb - cmy$, $rgb^*_3 - cmy^*_3$ ("1-minus"-relation)

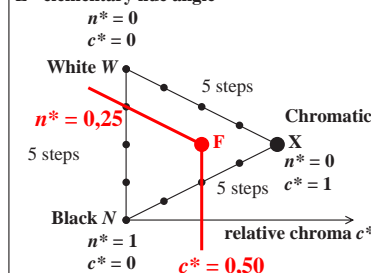
$rgb^*_3 - nce^*$, $rgb^*_3 - ncu^*$

relative coordinates lab^* : elementary redness r^*_3 , greenness g^*_3 , blueness b^*_3 , blackness n^*
chroma c^* , elementary hue e^* , elementary hue text u^*

YE921-3

User friendly colorimetric colour notation ncu^* or nce^* and linear relation to three rgb^*_3 data

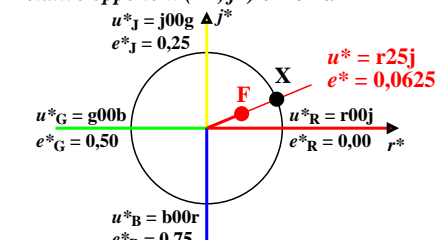
n^* relative blackness
 c^* relative chroma
 u^* elementary (unique) hue text
 e^* elementary hue number
 E^* elementary hue angle



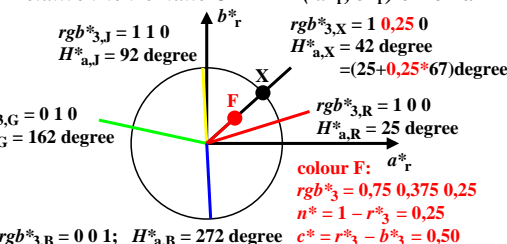
example for colour notation:

$ncu^* = 0,25 \ 0,50 \ r25j$
or
 $nce^* = 0,25 \ 0,50 \ 0,0625 (=0,25/4)$

relative opponent (r^*, j^*) chroma



relative trichromatic CIELAB (a^*, b^*) chroma



YE921-7