

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab^*h = 30/360 = 0.083$

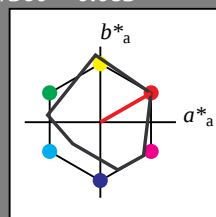
$lab^*tch$  and  $lab^*nch$

D65: hue R

LCH\*Ma: 50 77 30

rgb\*Ma: 1.0 0.0 0.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

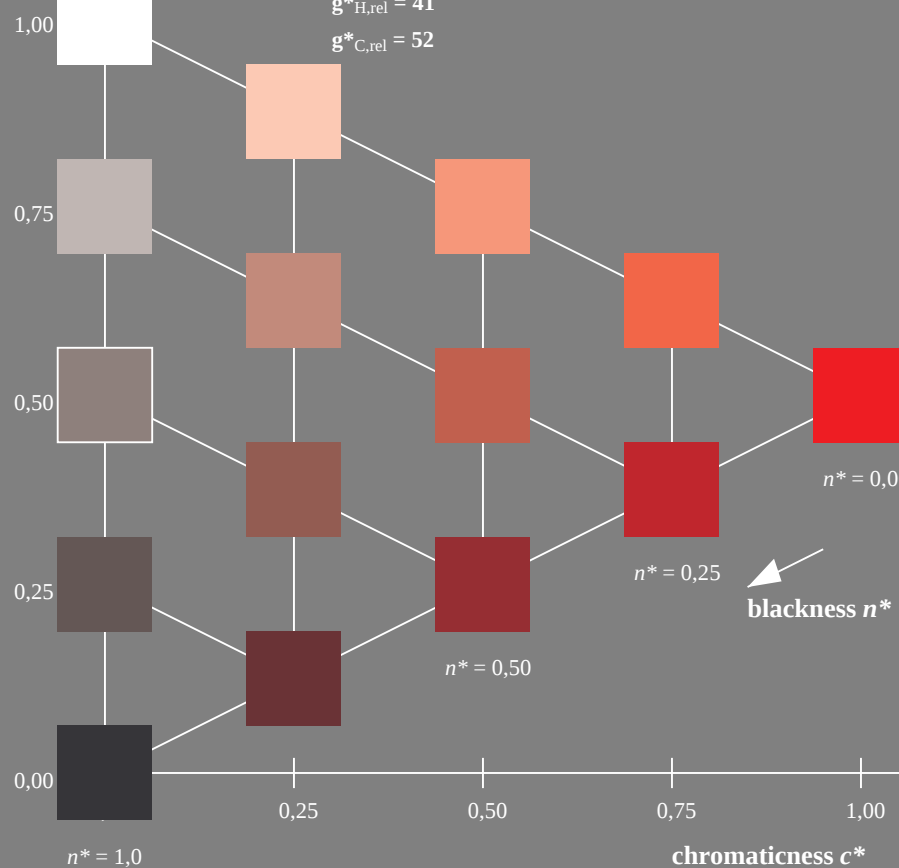
% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 30/360 = 0.083 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab^*h = 24/360 = 0.066$

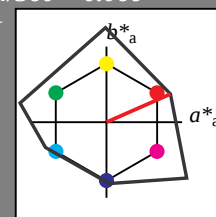
$LAB^*LCH$ ,  $LAB^*NCH$

D65: hue R

LCH\*Ma: 47 92 24

rgb\*Ma: 1.0 0.0 0.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

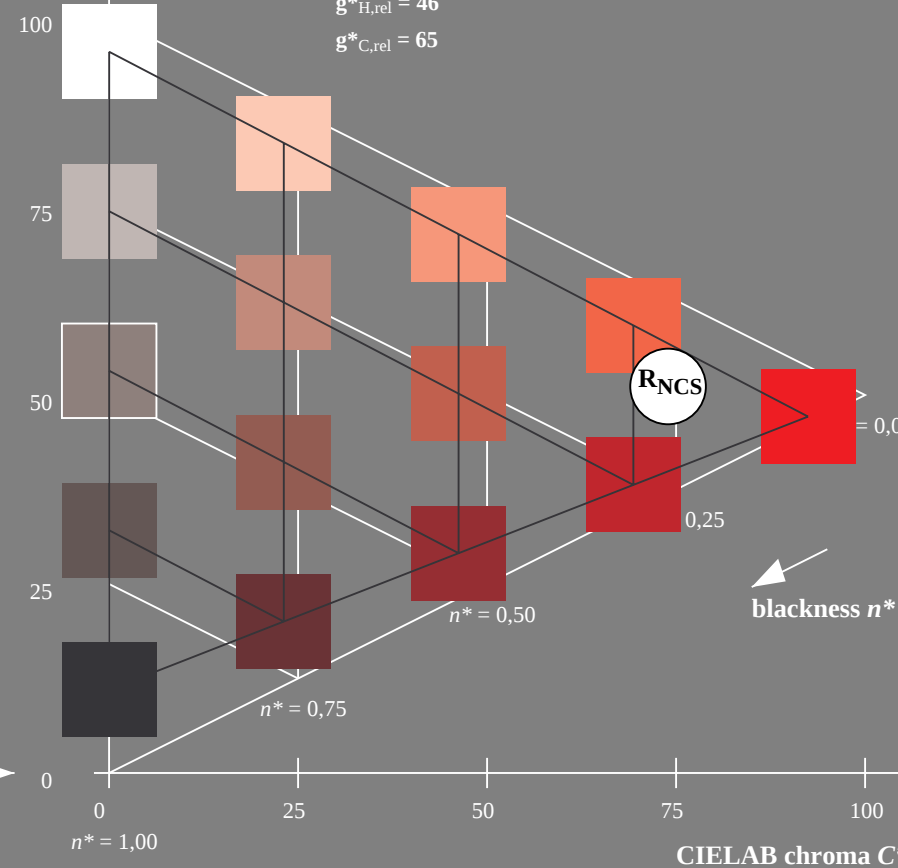
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 24/360 = 0.066 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 94/360 = 0.261$

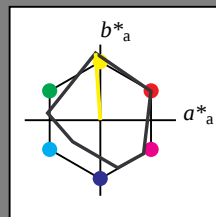
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue J

LCH\*Ma: 91 89 94

rgb\*Ma: 1.0 1.0 0.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

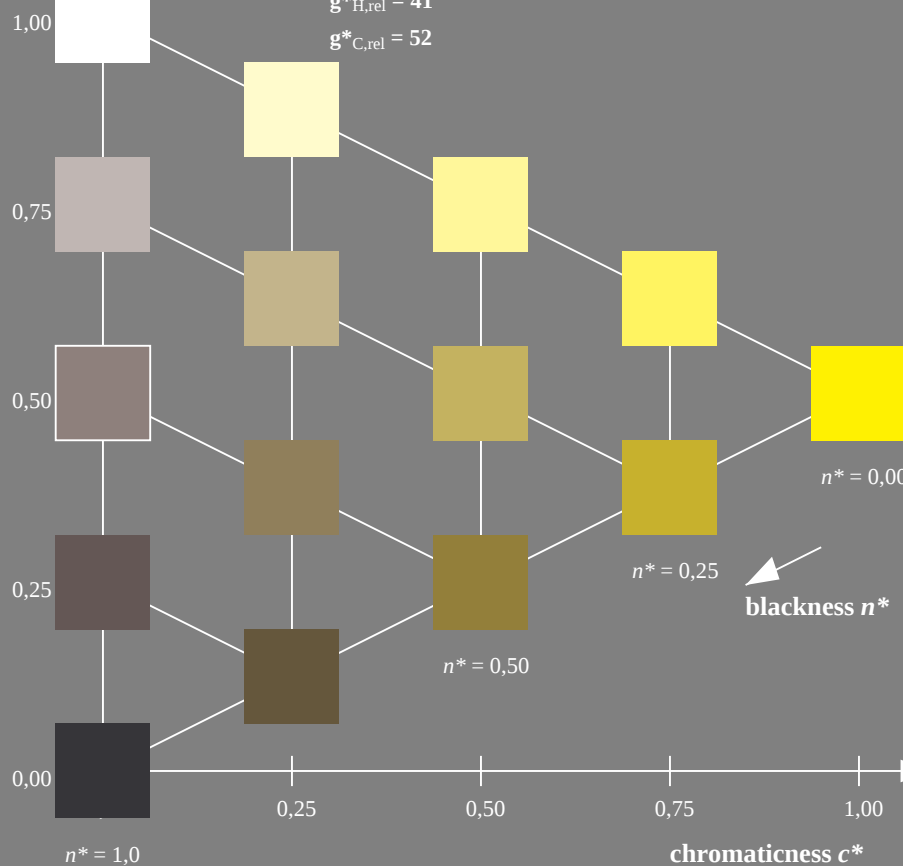
% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 94/360 = 0.261 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 91/360 = 0.252$

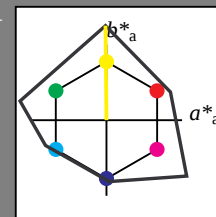
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue J

LCH\*Ma: 91 125 91

rgb\*Ma: 1.0 1.0 0.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

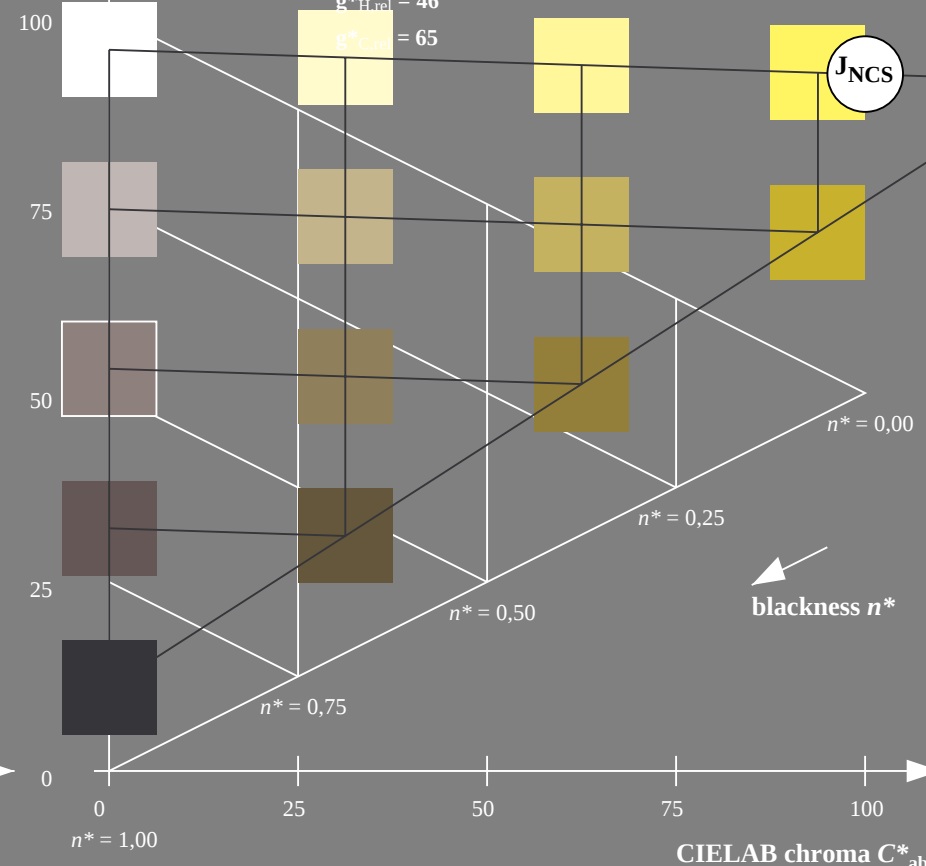
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 91/360 = 0.252 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input: *cmY0\* setcmykcolor*

D65: Coordinate systems of 5 step colour scales for 10 hues

output: *no change compared to input*

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 172/360 = 0.479$

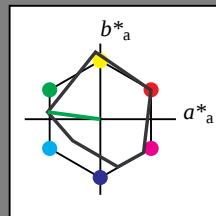
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue G

LCH\*Ma: 52 70 172

rgb\*Ma: 0.0 1.0 0.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

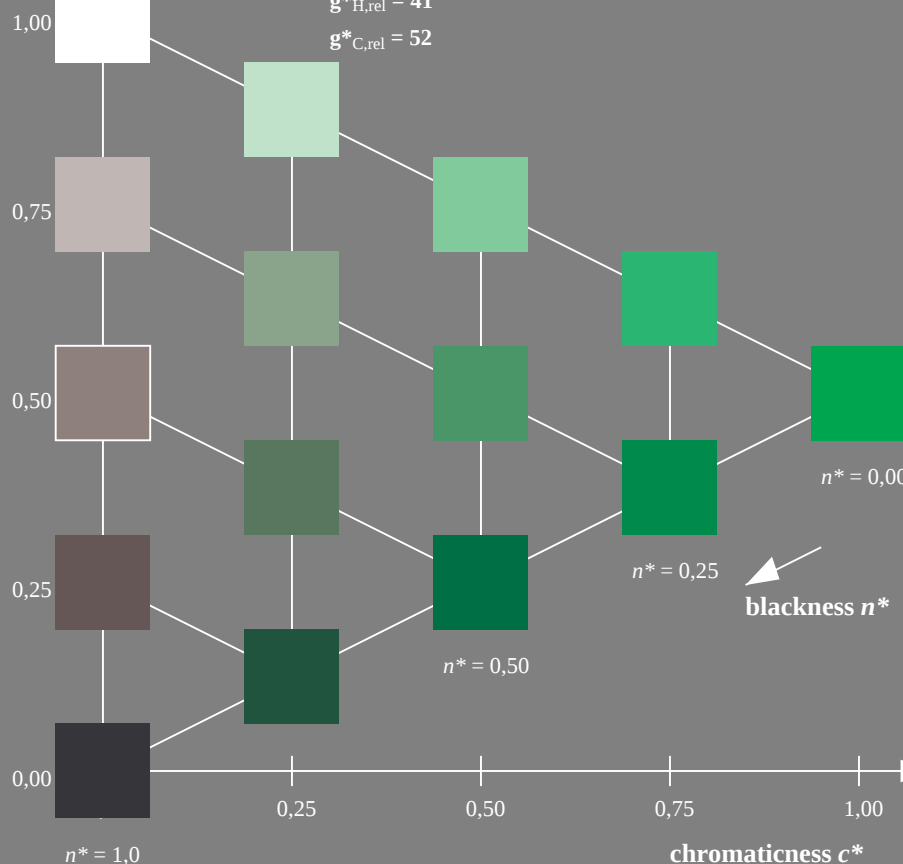
% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 172/360 = 0.479 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 167/360 = 0.465$

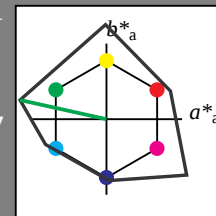
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue G

LCH\*Ma: 63 117 167

rgb\*Ma: 0.0 1.0 0.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

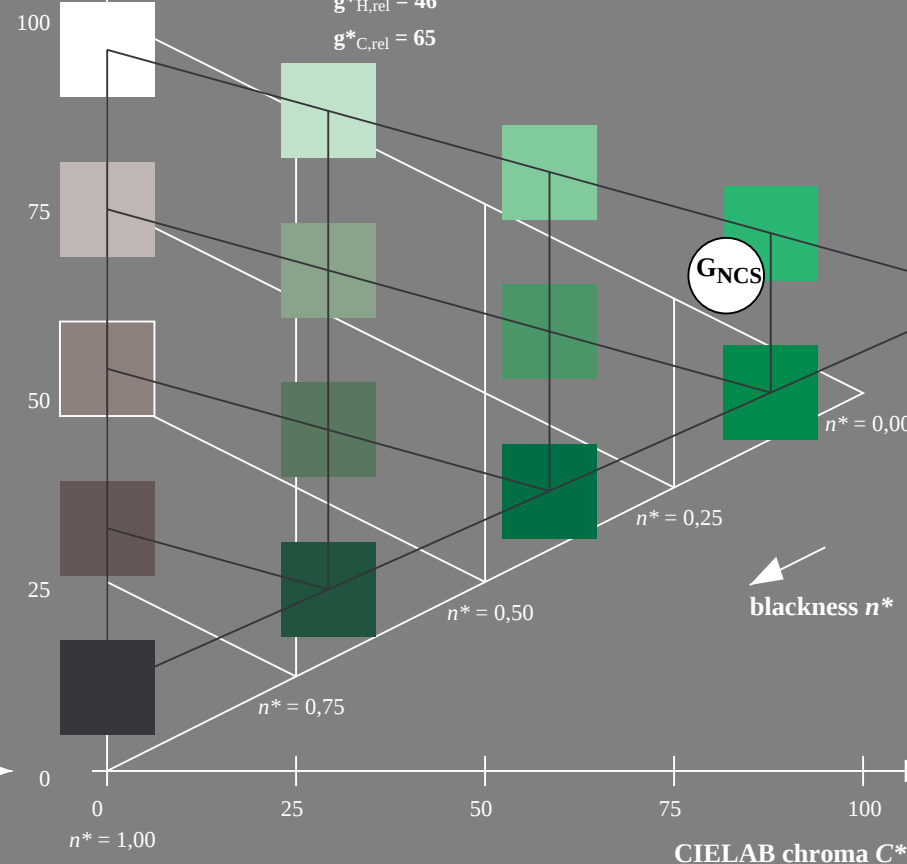
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 167/360 = 0.465 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input

### Input: Colorimetric Reflective System MRS18

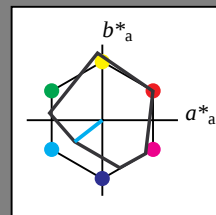
**for hue  $h^* = lab^*h = 218/360 = 0.605$**

*lab\*tch* and *lab\*nch*

**D65: hue G50B**

LCH\*Ma: 45 46 218

rgb\*Ma: 0.0 1.0 1.0

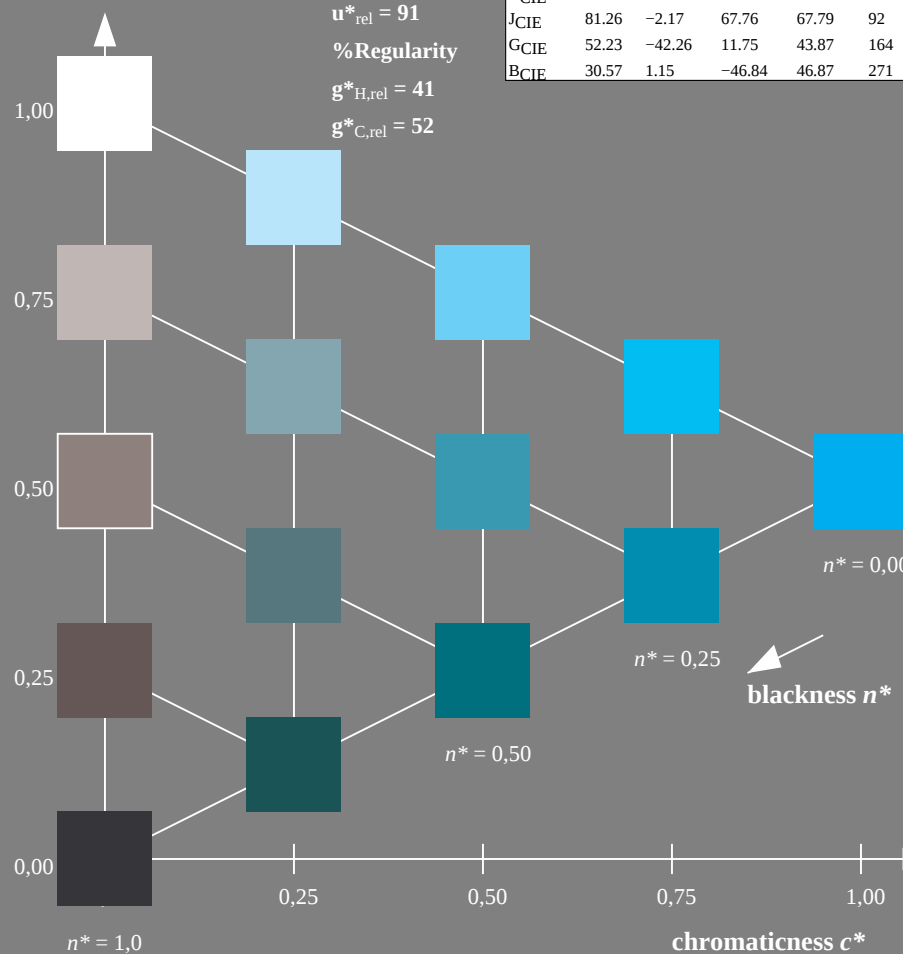


triangle lightness  $t^*$

%Gamut

$$\mathbf{u}_{rel}^* = \mathbf{91}$$

### %Regularity

$$g^*_{H,rel} = 41$$
$$g^*_{C,rel} = 52$$


UE230-7, 5 step scales for constant CIELAB hue 218/360 = 0.605 (left)

### Output: Colorimetric Reflective System NCS11

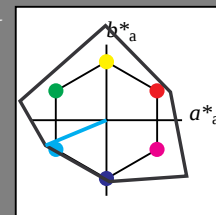
for hue  $h^* = lab^*h = 203/360 = 0.563$

*LAB\*LCH, LAB\*NCH*

D65: hue G50B

LCH\*Ma: 59 87 203

rgb\*Ma: 0.0 1.0 1.0

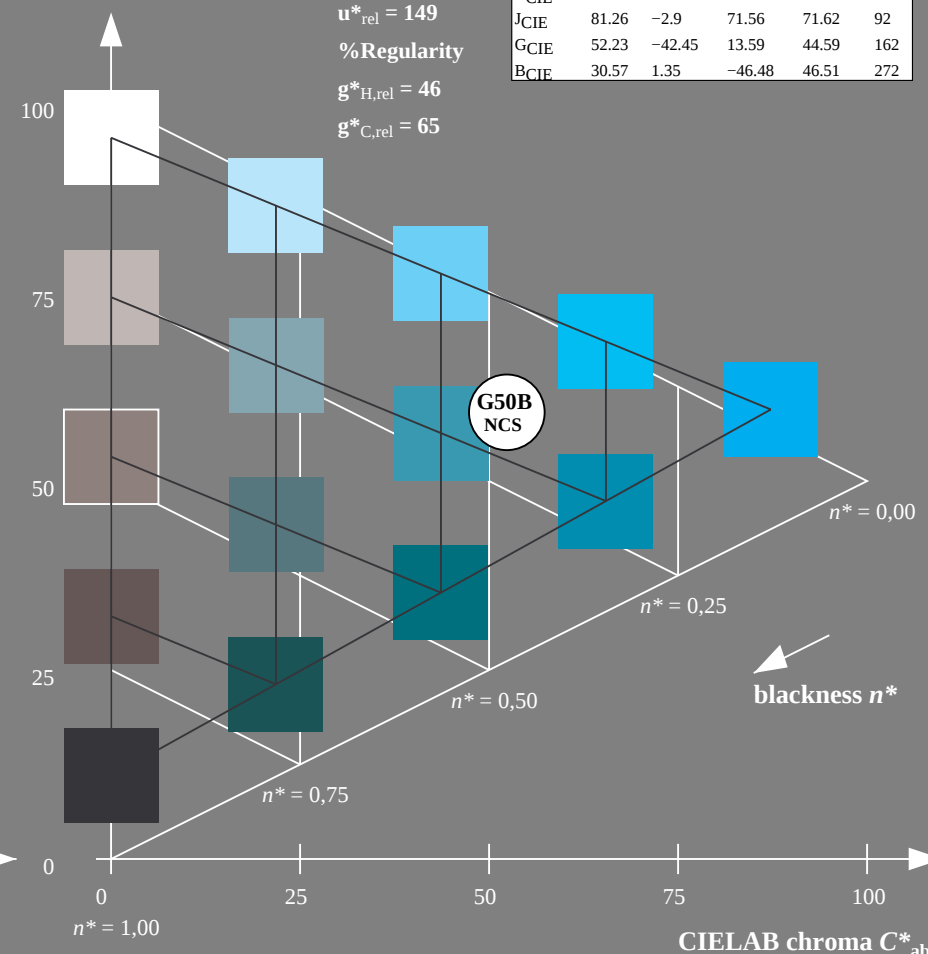


CIELAB lightness  $L^*$

% Gamut

$$\mathbf{u}_{rel}^* = 149$$

### %Regularity

$$g^*_{H,rel} = 40$$
$$g^*_{C,rel} = 65$$


5 step scales for constant CIELAB hue 203/360 = 0.563 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input: *cmy0\* setcmykcolor*

### D65: Coordinate systems of 5 step colour scales for 10 hues

output: *no change compared to input*

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab^*h = 290/360 = 0.806$

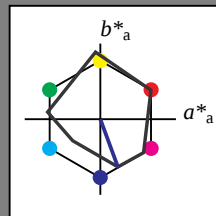
$lab^*tch$  and  $lab^*nch$

D65: hue B

$LCH^*Ma$ : 37 67 290

$rgb^*Ma$ : 0.0 0.0 1.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| R <sub>Ma</sub>    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| J <sub>Ma</sub>    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| G <sub>Ma</sub>    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| R <sub>CIE</sub>   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| J <sub>CIE</sub>   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| G <sub>CIE</sub>   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| B <sub>CIE</sub>   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab^*h = 273/360 = 0.757$

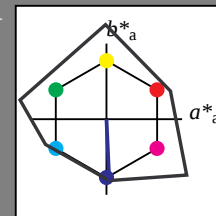
$LAB^*LCH$ ,  $LAB^*NCH$

D65: hue B

$LCH^*Ma$ : 49 81 273

$rgb^*Ma$ : 0.0 0.0 1.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

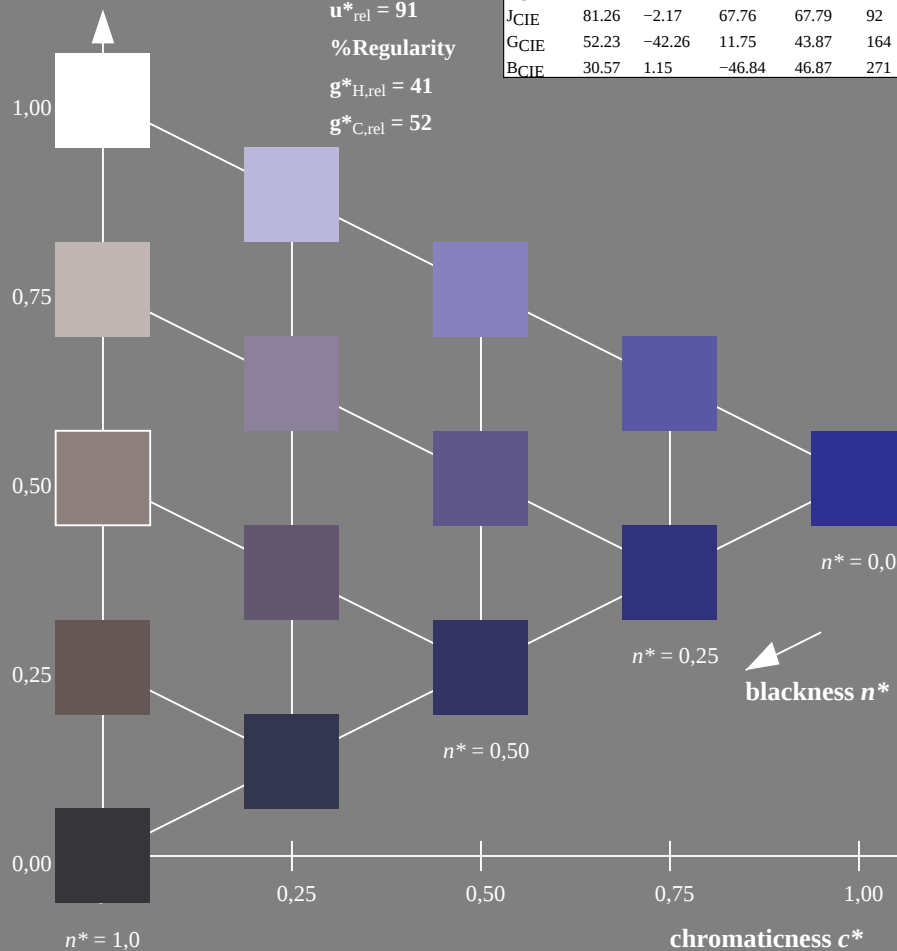
% Regularity

$g^*_{H,rel} = 46$

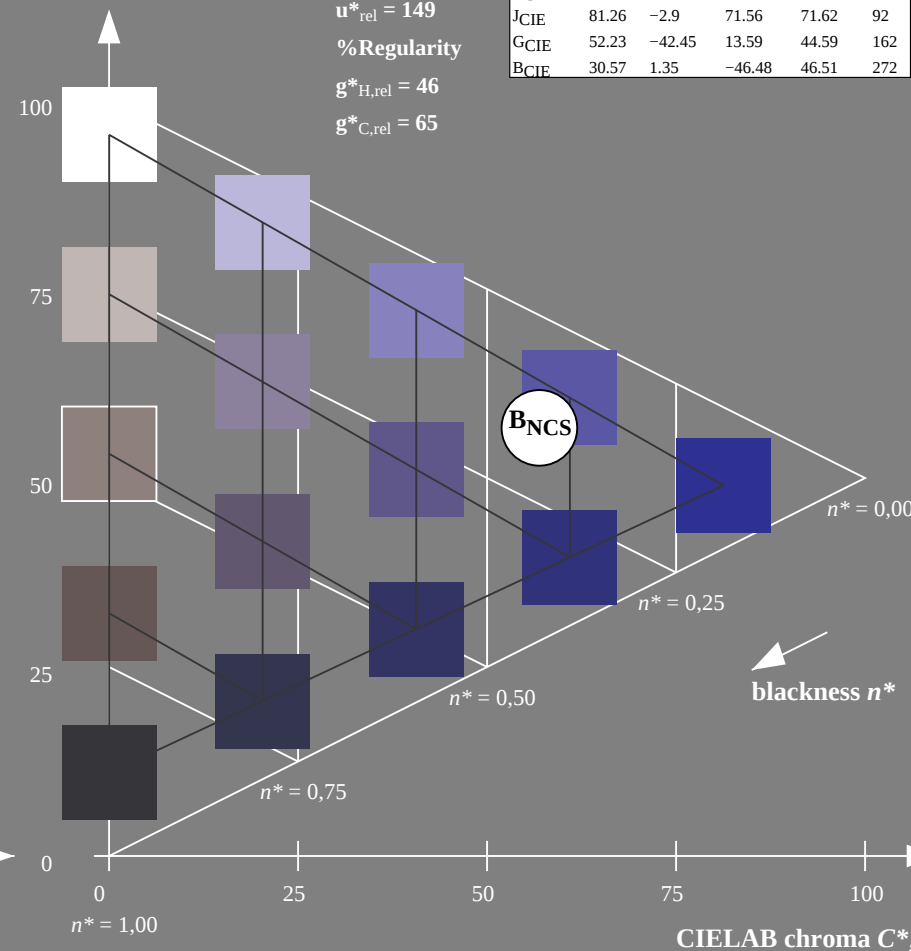
$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| R <sub>Ma</sub>    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| J <sub>Ma</sub>    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| G <sub>Ma</sub>    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| R <sub>CIE</sub>   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| J <sub>CIE</sub>   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| G <sub>CIE</sub>   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| B <sub>CIE</sub>   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



UE230-7, 5 step scales for constant CIELAB hue 290/360 = 0.806 (left)



5 step scales for constant CIELAB hue 273/360 = 0.757 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 322/360 = 0.895$

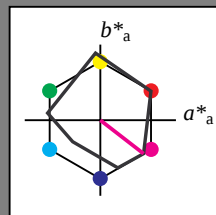
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue B50R

LCH\*Ma: 35 72 322

rgb\*Ma: 1.0 0.0 1.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

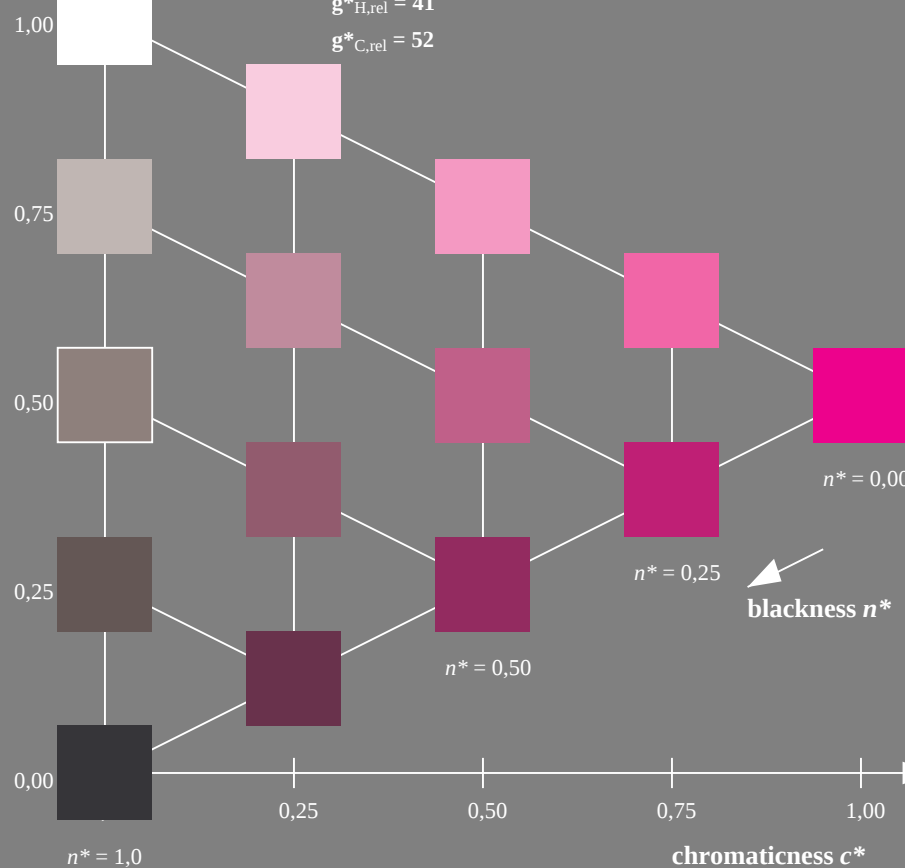
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 322/360 = 0.895 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 325/360 = 0.903$

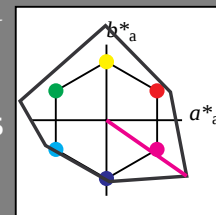
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue B50R

LCH\*Ma: 44 129 325

rgb\*Ma: 1.0 0.0 1.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

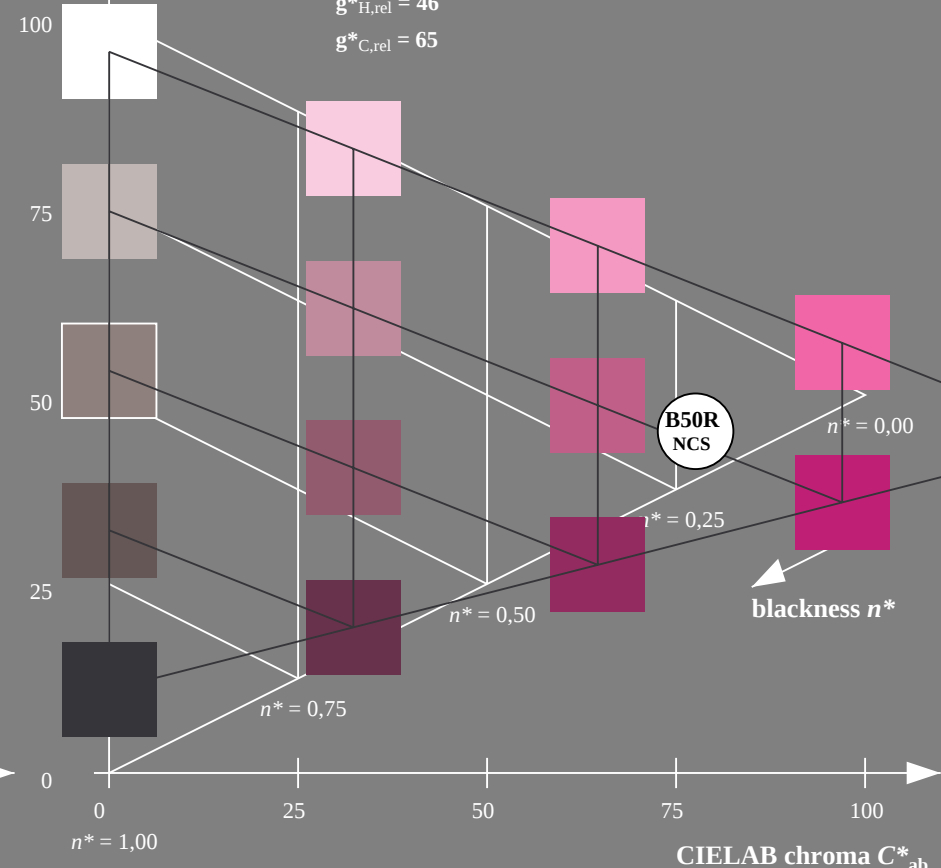
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 325/360 = 0.903 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input

-See for similar files: [http://www.ps.bam.de/UE23/Technical information](http://www.ps.bam.de/UE23/Technical%20information): <http://www.ps.bam.de> Version 2.1, io=0,0

BAM registration: 20060101-UE23/10Q/Q23E06NP.PS.PDF BAM material: code=rha4ta  
application for evaluation and measurement of printer or monitor systems

/UE23/ Form 7/10, Serie: 1/1, Page: 7 Page: count: 7

**Input: Colorimetric Reflective System MRS18**

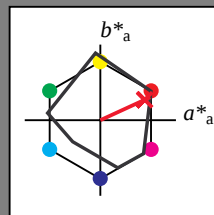
for hue  $h^* = lab^*h = 25/360 = 0.069$

**lab\*tch and lab\*nch**

D65: hue R

LCH\*Ma: 48 73 25

rgb\*Ma: 1.0 0.0 0.1



MRS18; adapted (a) CIELAB data

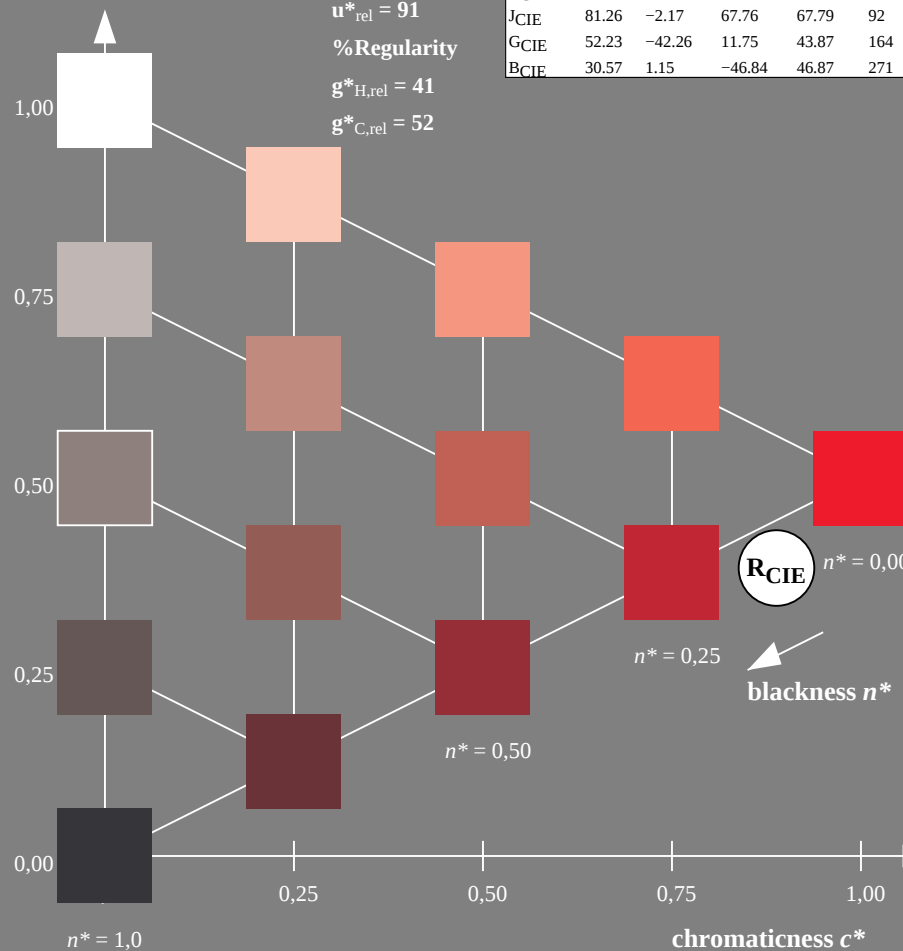
|                    | $L^*=L_a^* a_a^*$ | $b_a^*$ | $C_{ab,a}^*$ | $h_{ab}^*$ |     |
|--------------------|-------------------|---------|--------------|------------|-----|
| RMa                | 49.63             | 66.96   | 38.37        | 77.18      | 30  |
| JMa                | 90.7              | -6.36   | 88.75        | 88.98      | 94  |
| GMa                | 52.11             | -69.73  | 9.44         | 70.37      | 172 |
| G50B <sub>Ma</sub> | 45.03             | -36.57  | -28.47       | 46.36      | 218 |
| B <sub>Ma</sub>    | 36.65             | 23.19   | -63.05       | 67.18      | 290 |
| B50R <sub>Ma</sub> | 34.94             | 57.17   | -44.26       | 72.31      | 322 |
| N <sub>Ma</sub>    | 18.01             | 0.0     | 0.0          | 0.0        | 0   |
| W <sub>Ma</sub>    | 95.41             | 0.0     | 0.0          | 0.0        | 0   |
| RCIE               | 39.92             | 58.66   | 26.98        | 64.56      | 25  |
| JCIE               | 81.26             | -2.17   | 67.76        | 67.79      | 92  |
| GCIE               | 52.23             | -42.26  | 11.75        | 43.87      | 164 |
| BCIE               | 30.57             | 1.15    | -46.84       | 46.87      | 271 |

triangle lightness  $t^*$ 

%Gamut

$$\mathbf{u}_{\text{rel}}^* = 91$$

### %Regularity

$$g^*_{H,rel} = 41$$
$$g^*_{C,rel} = 52$$


UE230-7, 5 step scales for constant CIELAB hue 25/360 = 0.069 (left

### Output: Colorimetric Reflective System NCS11

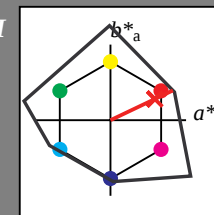
for hue  $h^* = lab^*h = 25/360 = 0.071$

**LAB\*LCH, LAB\*NCH**

### D65: hue R

LCH\*Ma: 48 91 25

rgb\*Ma: 1.0 0.02 0.0



NCS11; adapted (a) CIELAB data

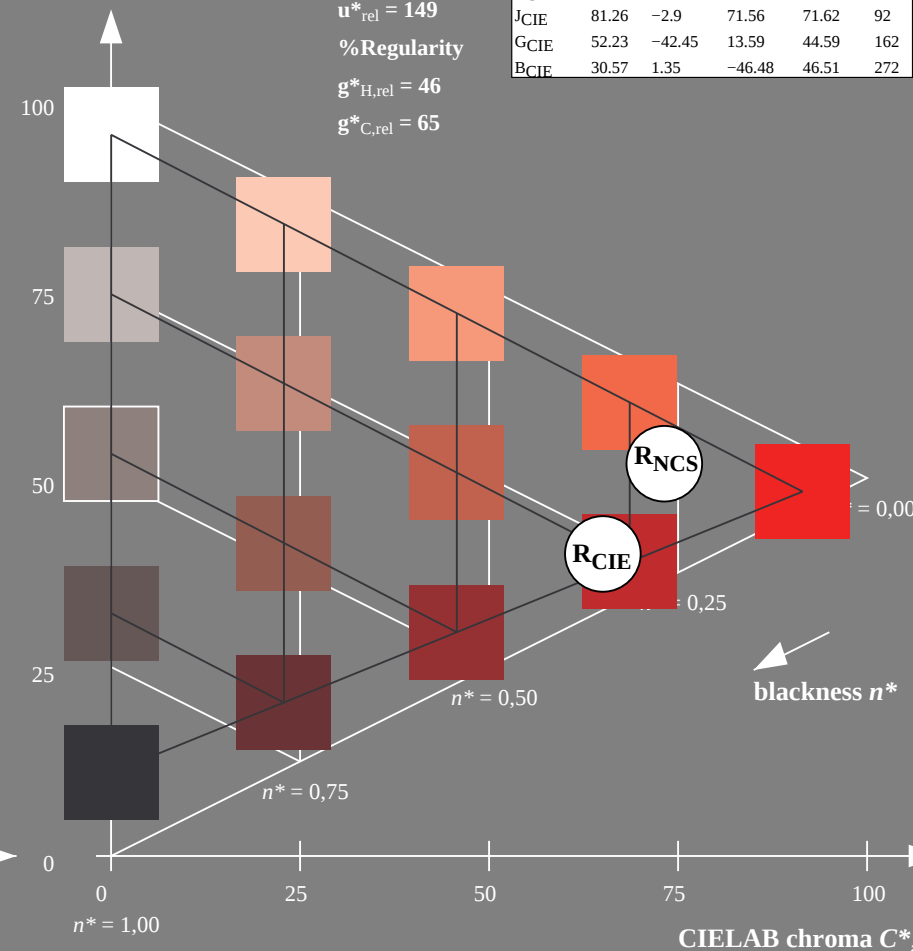
|                    | $L^* = L_a^*$ | $a_a^*$ | $b_a^*$ | $C_{ab,a}^*$ | $h_{ab}^*$ |
|--------------------|---------------|---------|---------|--------------|------------|
| R <sub>Ma</sub>    | 47.15         | 84.64   | 37.25   | 92.48        | 24         |
| J <sub>Ma</sub>    | 91.37         | -1.27   | 125.03  | 125.03       | 91         |
| G <sub>Ma</sub>    | 63.07         | -114.28 | 25.35   | 117.06       | 167        |
| G50B <sub>Ma</sub> | 59.47         | -80.6   | -33.45  | 87.28        | 203        |
| B <sub>Ma</sub>    | 49.01         | 3.65    | -81.19  | 81.28        | 273        |
| B50R <sub>Ma</sub> | 44.06         | 106.09  | -73.93  | 129.32       | 325        |
| N <sub>Ma</sub>    | 10.99         | 0.0     | 0.0     | 0.0          | 0          |
| W <sub>Ma</sub>    | 95.41         | 0.0     | 0.0     | 0.0          | 0          |
| R <sub>CIE</sub>   | 39.92         | 58.69   | 27.98   | 65.01        | 25         |
| J <sub>CIE</sub>   | 81.26         | -2.9    | 71.56   | 71.62        | 92         |
| G <sub>CIE</sub>   | 52.23         | -42.45  | 13.59   | 44.59        | 162        |
| B <sub>CIE</sub>   | 30.57         | 1.35    | -46.48  | 46.51        | 272        |

CIELAB lightness  $L^*$ 

%Gamut

$$\mathbf{u}_{\text{rel}}^* = 14$$

### %Regularity

$$g^*_{H,rel} = 4$$
$$g^*_{C,rel} = 6$$


5 step scales for constant CIELAB hue 25/360 = 0.071 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input: *cmy0\* setcmykcolor*

### D65: Coordinate systems of 5 step colour scales for 10 hues

output: *no change compared to input*

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 92/360 = 0.255$

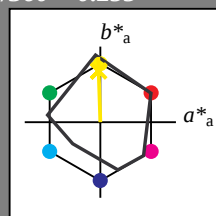
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue J

LCH\*Ma: 89 86 92

rgb\*Ma: 1.0 0.95 0.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

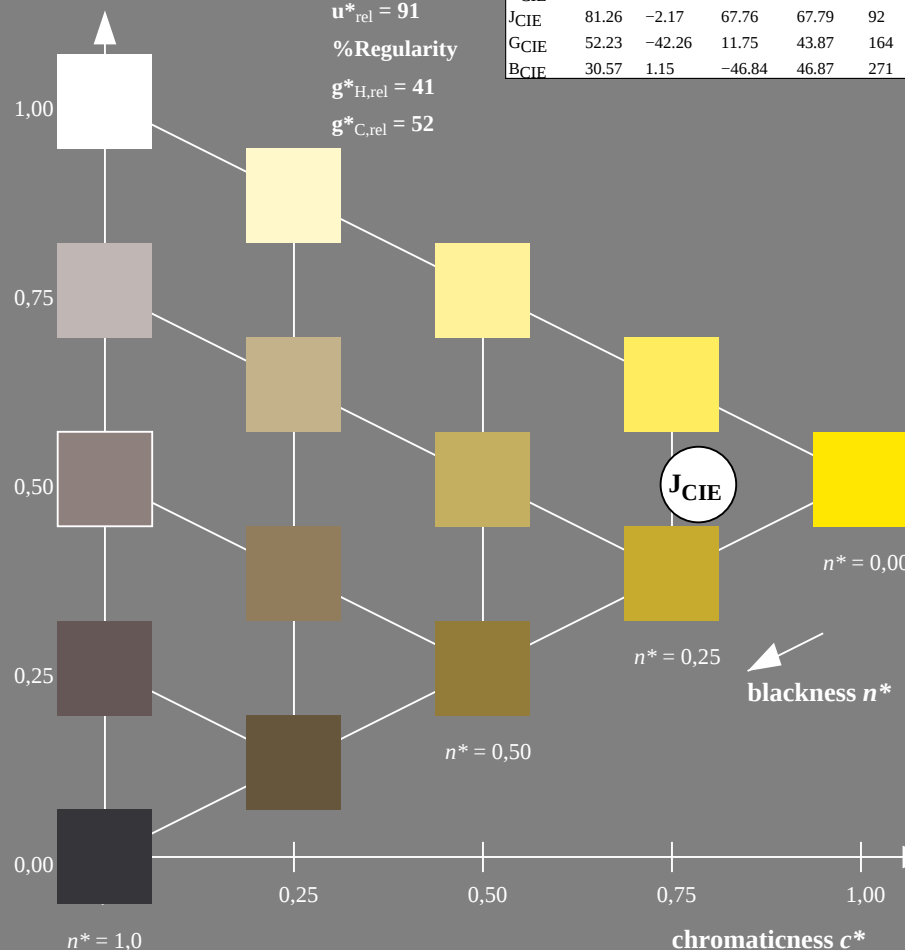
% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 92/360 = 0.255 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 92/360 = 0.256$

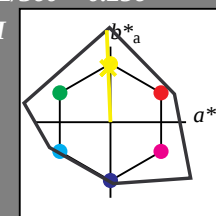
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue J

LCH\*Ma: 90 122 92

rgb\*Ma: 0.97 1.0 0.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

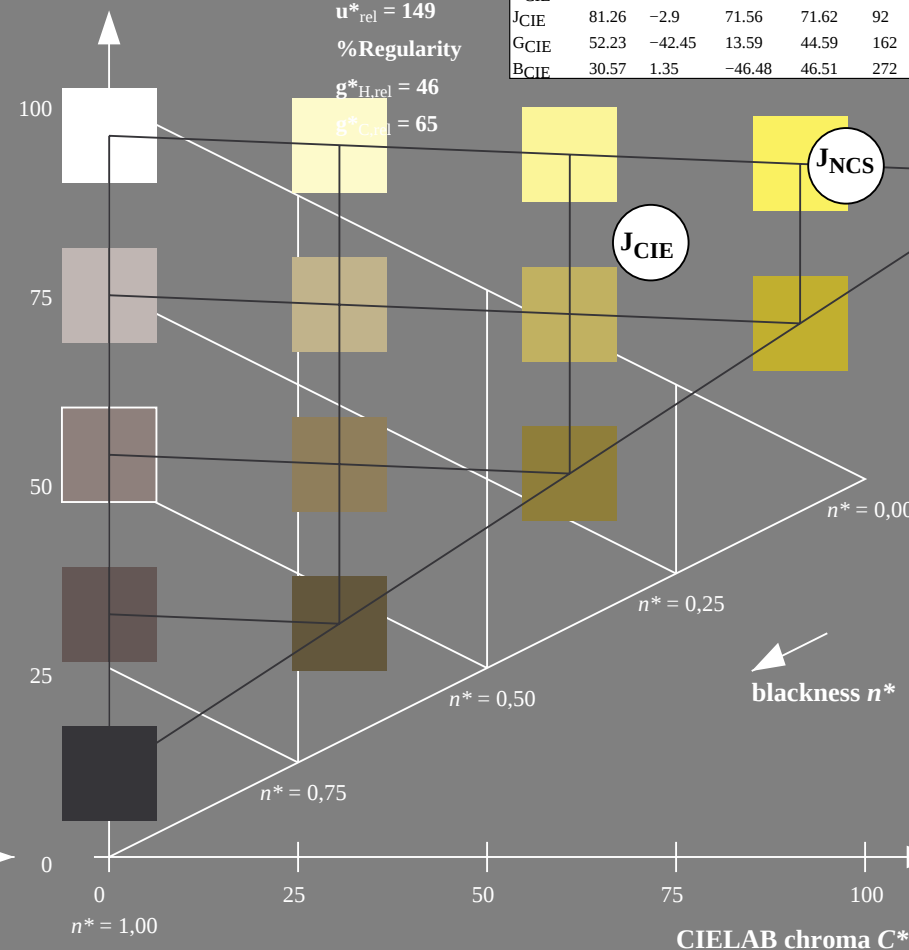
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 92/360 = 0.256 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input: *cmY0\* setcmykcolor*

D65: Coordinate systems of 5 step colour scales for 10 hues

output: *no change compared to input*

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 164/360 = 0.457$

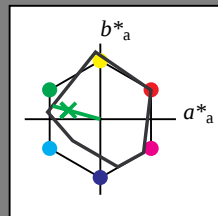
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue G

LCH\*Ma: 56 66 164

rgb\*Ma: 0.1 1.0 0.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

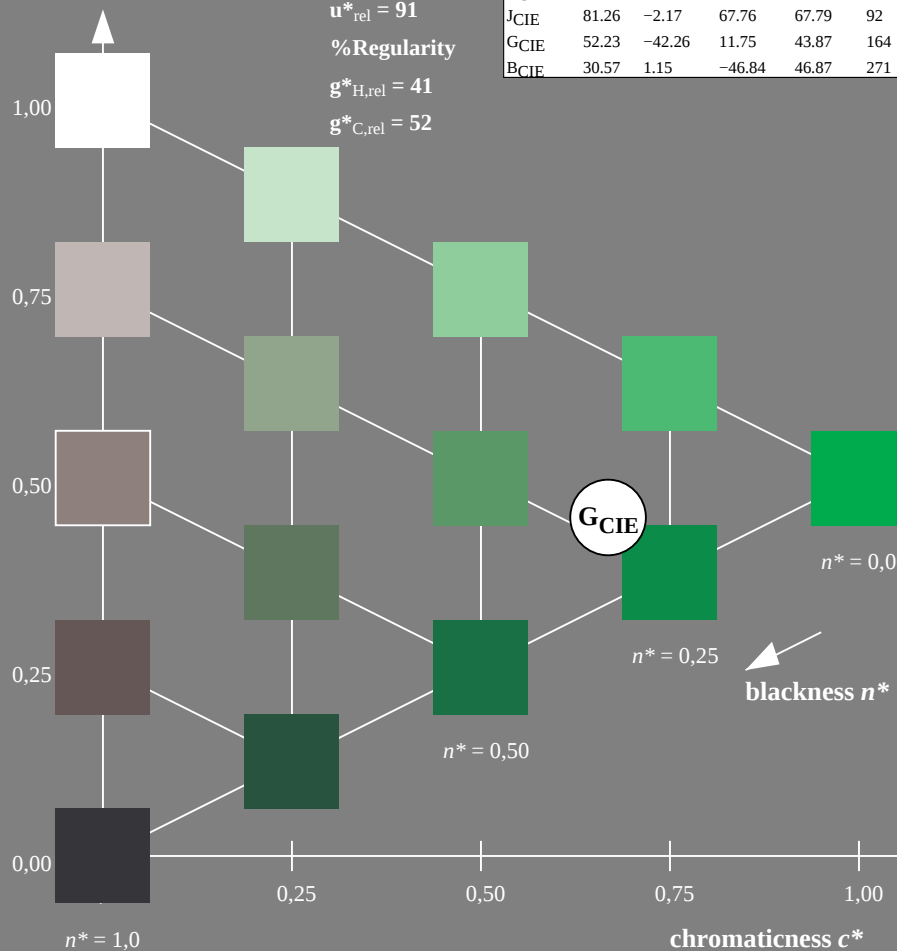
% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|        | $L^* = L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|---------------|---------|---------|--------------|--------------|
| RMa    | 49.63         | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7          | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11         | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03         | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65         | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94         | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01         | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41         | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92         | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26         | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23         | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57         | 1.15    | -46.84  | 46.87        | 271          |



UE230-7, 5 step scales for constant CIELAB hue 164/360 = 0.457 (left)

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 162/360 = 0.451$

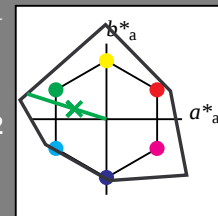
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue G

LCH\*Ma: 65 110 162

rgb\*Ma: 0.08 1.0 0.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

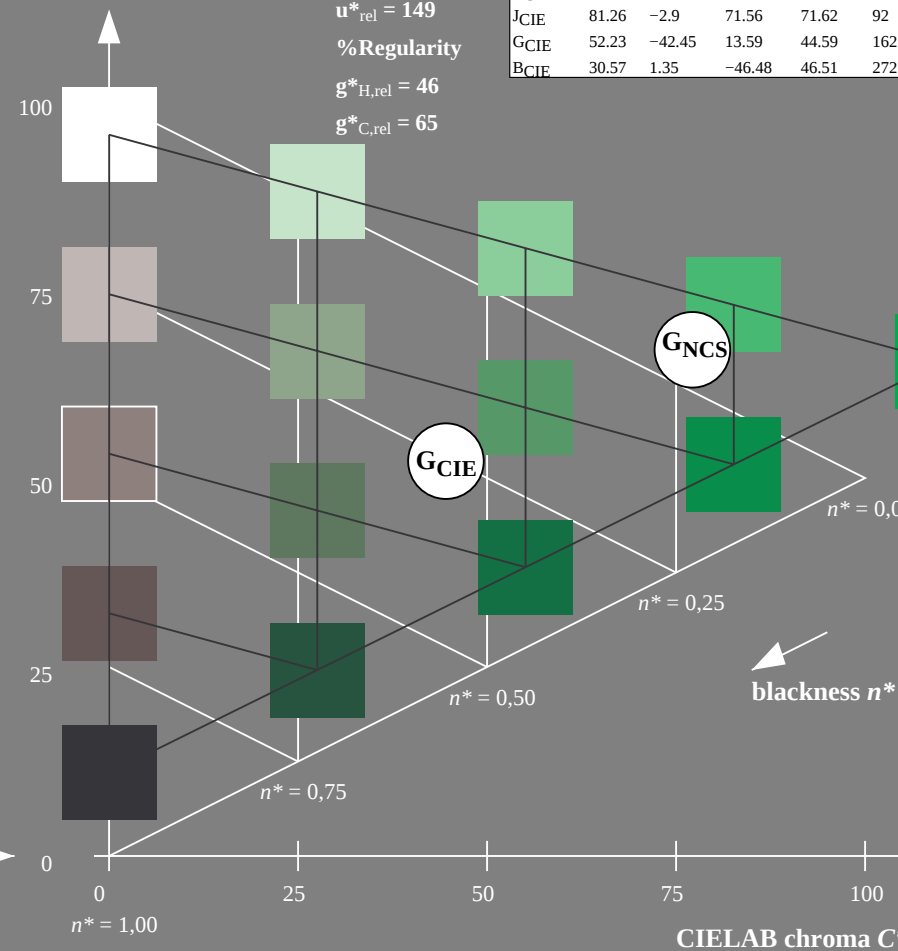
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|        | $L^* = L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|---------------|---------|---------|--------------|--------------|
| RMa    | 47.15         | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37         | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07         | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47         | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01         | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06         | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99         | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41         | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92         | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26         | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23         | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57         | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 162/360 = 0.451 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input

Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab^*h = 271/360 = 0.754$

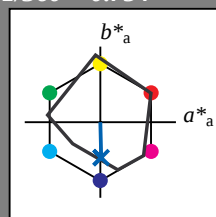
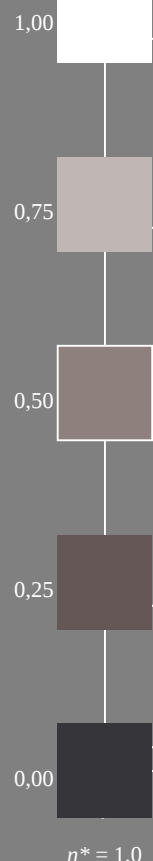
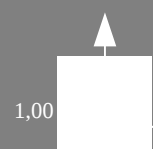
$lab^*tch$  and  $lab^*nch$

D65: hue B

LCH\*Ma: 40 50 271

rgb\*Ma: 0.0 0.37 1.0

triangle lightness  $t^*$



% Gamut

$u^*_{rel} = 91$

% Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |

Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab^*h = 272/360 = 0.755$

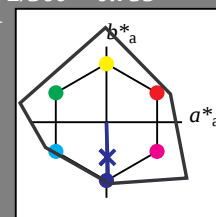
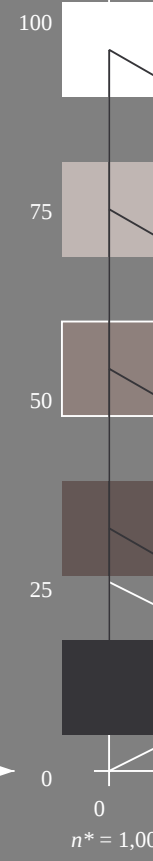
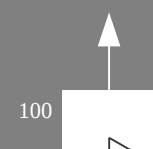
$LAB^*LCH$ ,  $LAB^*NCH$

D65: hue B

LCH\*Ma: 49 80 272

rgb\*Ma: 0.0 0.02 1.0

CIELAB lightness  $L^*$



% Gamut

$u^*_{rel} = 149$

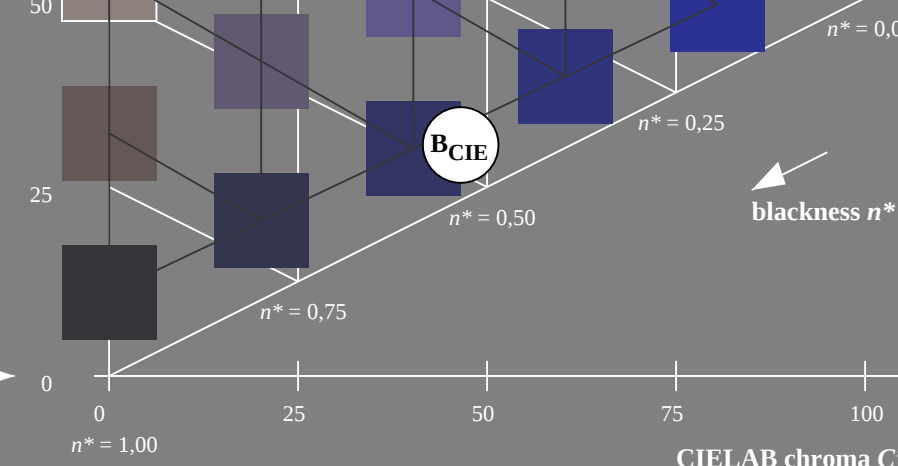
% Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



UE230-7, 5 step scales for constant CIELAB hue 271/360 = 0.754 (left)

5 step scales for constant CIELAB hue 272/360 = 0.755 (right)

BAM-test chart UE23; Colorimetric systems MRS18 & NCS11a input:  $cmY0^* setcmykcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output: no change compared to input