http://farbe.li.tu-berlin.de/hes2/hes2l0n1.txt /.ps; only vector graphic VG; start output see separate images of this page: http://farbe.li.tu-berlin.de/hes2/hes2.htm

see similar files of the whole series: http://farbe.li.tu-berlin.de/hes.htm technical context: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

TUB register: 20241201-hes2/hes2l0n1.txt /.ps application for evaluation and measurement of display or print output

TUB material: code=rha4da

TUB-stet chart hes2; HAULAB, scaling of achromatic colours in white surround of 180 degree, *Haubner* (1980), Adaptations L_{wa}=1500, 300, 30 & 3cd/m²; 7 test luminances for 120'

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=1500 cd/m²

$BT_{1y}(L_T, L_a, y) = C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

L_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
8372	120'	22,9669	0,0718	0,2448	58,92	308,83	34,63	86,60
5219	120'	22,9669	0,0718	0,2448	68,92	257,36	34,63	86,60
3000	120'	22,9669	0,0718	0,2448	68,92	205,89	34,63	86,60
1536	120'	22,9669	0,0718	0,2448	68,92	154,41	34,63	86,60
660	120'	22,9669	0,0718	0,2448	68,92	102,94	34,63	86,60
209	120'	22,9669	0,0718	0,2448	68,92	51,47	34,63	86,60
34,63	120'	22,9669	0,0718	0,2448	68,92	0,00	34,63	86,60
660	120'	22,9669	0,0718	0,2448	70,75	102,94	34,63	86,60

hes20-1a [=0, L_{wa}=300, L_d=3000, φ=120', B_d=68,92, BT_{1y}=205,89

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=1500 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
4066	120'	22,9669	0,0718	0,2448	34,60	149,99	16,82	86,60
2535	120'	22,9669	0,0718	0,2448	34,60	124,99	16,82	86,60
1457	120'	22,9669	0,0718	0,2448	34,60	99,99	16,82	86,60
746	120'	22,9669	0,0718	0,2448	34,60	74,99	16,82	86,60
320	120'	22,9669	0,0718	0,2448	34,60	49,99	16,82	86,60
101	120'	22,9669	0,0718	0,2448	34,60	24,99	16,82	86,60
34,63	120'	22,9669	0,0718	0,2448	34,60	0,00	16,82	86,60
320	120'	22,9669	0,0718	0,2448	35,53	49,99	16,82	86,60

hes20-3a [=0, L_{wa}=300, L_d=3000, φ=120', B_d=34,60, BT_{1y}=149,99

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=300 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(L_a, y)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31) [2]
$s_y(e) = C_T(e)$ [3] $d_{ay}(e) = B_d(L_a, y)$ [4] (s=scaling factor)

L_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
831	120'	22,9669	0,0718	0,2448	34,60	149,99	25,96	360,61
519	120'	22,9669	0,0718	0,2448	34,60	124,99	25,96	360,61
300	120'	22,9669	0,0718	0,2448	34,60	99,99	25,96	360,61
154	120'	22,9669	0,0718	0,2448	34,60	74,99	25,96	360,61
67	120'	22,9669	0,0718	0,2448	34,60	49,99	25,96	360,61
21	120'	22,9669	0,0718	0,2448	34,60	24,99	25,96	360,61
3,75	120'	22,9669	0,0718	0,2448	34,60	0,00	25,96	360,61
67	120'	22,9669	0,0718	0,2448	35,53	49,99	25,96	360,61

hes20-5a [=1, L_{wa}=300, L_d=300, φ=120', B_d=34,60, BT_{1y}=99,99

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=300 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
831	120'	22,9669	0,0718	0,2448	34,60	149,99	25,96	360,61
519	120'	22,9669	0,0718	0,2448	34,60	124,99	25,96	360,61
300	120'	22,9669	0,0718	0,2448	34,60	99,99	25,96	360,61
154	120'	22,9669	0,0718	0,2448	34,60	74,99	25,96	360,61
67	120'	22,9669	0,0718	0,2448	34,60	49,99	25,96	360,61
21	120'	22,9669	0,0718	0,2448	34,60	24,99	25,96	360,61
3,75	120'	22,9669	0,0718	0,2448	34,60	0,00	25,96	360,61
67	120'	22,9669	0,0718	0,2448	35,53	49,99	25,96	360,61

hes20-5b [=1, L_{wa}=300, L_d=300, φ=120', B_d=34,60, BT_{1y}=99,99

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(e)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31) [2]
$s_y(e) = C_T(e)$ [3] $d_{ay}(e) = B_d(L_a, y)$ [4] (s=scaling factor)

L_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
831	120'	22,9669	0,0718	0,2448	34,60	149,99	22,96	3,61
519	120'	22,9669	0,0718	0,2448	34,60	124,99	22,96	3,61
300	120'	22,9669	0,0718	0,2448	34,60	99,99	22,96	3,61
154	120'	22,9669	0,0718	0,2448	34,60	74,99	22,96	3,61
67	120'	22,9669	0,0718	0,2448	34,60	49,99	22,96	3,61
21	120'	22,9669	0,0718	0,2448	34,60	24,99	22,96	3,61
3,75	120'	22,9669	0,0718	0,2448	34,60	0,00	22,96	3,61
67	120'	22,9669	0,0718	0,2448	35,53	49,99	22,96	3,61

hes20-5c [=1, L_{wa}=300, L_d=3, φ=120', B_d=34,60, BT_{1y}=99,99, s_{yT}=22,96, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
831	120'	22,9669	0,0718	0,2448	34,60	149,99	22,96	3,61
519	120'	22,9669	0,0718	0,2448	34,60	124,99	22,96	3,61
300	120'	22,9669	0,0718	0,2448	34,60	99,99	22,96	3,61
154	120'	22,9669	0,0718	0,2448	34,60	74,99	22,96	3,61
67	120'	22,9669	0,0718	0,2448	34,60	49,99	22,96	3,61
21	120'	22,9669	0,0718	0,2448	34,60	24,99	22,96	3,61
3,75	120'	22,9669	0,0718	0,2448	34,60	0,00	22,96	3,61
67	120'	22,9669	0,0718	0,2448	35,53	49,99	22,96	3,61

hes20-5d [=1, L_{wa}=300, L_d=3, φ=120', B_d=34,60, BT_{1y}=99,99, s_{yT}=22,96, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=30 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
170	120'	22,9669	0,0718	0,2448	34,60	149,99	0,91	68,40
107	120'	22,9669	0,0718	0,2448	34,60	124,99	0,91	68,40
62	120'	22,9669	0,0718	0,2448	34,60	99,99	0,91	68,40
32	120'	22,9669	0,0718	0,2448	34,60	74,99	0,91	68,40
14	120'	22,9669	0,0718	0,2448	34,60	49,99	0,91	68,40
4,3	120'	22,9669	0,0718	0,2448	34,60	24,99	0,91	68,40
0,43	120'	22,9669	0,0718	0,2448	34,60	0,00	0,91	68,40
14	120'	22,9669	0,0718	0,2448	35,53	49,99	0,91	68,40

hes21-3a [=2, L_{wa}=300, L_d=30, φ=120', B_d=34,60, BT_{1y}=149,99

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=300 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(e)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$s_y(e) = C_T(e)$ [3] $d_{ay}(e) = B_d(L_a, y)$ [4] (s=scaling factor)

L_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
170	120'	22,9669	0,0718	0,2448	34,60	149,99	25,96	1766,01
107	120'	22,9669	0,0718	0,2448	34,60	124,99	25,96	1766,01
62	120'	22,9669	0,0718	0,2448	34,60	99,99	25,96	1766,01
32	120'	22,9669	0,0718	0,2448	34,60	74,99	25,96	1766,01
14	120'	22,9669	0,0718	0,2448	34,60	49,99	25,96	1766,01
4,3	120'	22,9669	0,0718	0,2448	34,60	24,99	25,96	1766,01
0,43	120'	22,9669	0,0718	0,2448	34,60	0,00	25,96	1766,01
14	120'	22,9669	0,0718	0,2448	35,53	49,99	25,96	1766,01

hes21-3b [=2, L_{wa}=300, L_d=300, φ=120', B_d=34,60, BT_{1y}=149,99, s_{yT}=115,67, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(e)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$s_y(e) = C_T(e)$ [3] $d_{ay}(e) = B_d(L_a, y)$ [4] (s=scaling factor)

L_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
170	120'	22,9669	0,0718	0,2448	34,60	149,99	22,96	17,66
107	120'	22,9669	0,0718	0,2448	34,60	124,99	22,96	17,66
62	120'	22,9669	0,0718	0,2448	34,60	99,99	22,96	17,66
32	120'	22,9669	0,0718	0,2448	34,60	74,99	22,96	17,66
14	120'	22,9669	0,0718	0,2448	34,60	49,99	22,96	17,66
4,3	120'	22,9669	0,0718	0,2448	34,60	24,99	22,96	17,66
0,43	120'	22,9669	0,0718	0,2448	34,60	0,00	22,96	17,66
14	120'	22,9669	0,0718	0,2448	35,53	49,99	22,96	17,66

hes21-3c [=2, L_{wa}=3, L_d=30, φ=120', B_d=34,60, BT_{1y}=149,99, s_{yT}=22,96, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
34	120'	22,9669	0,0718	0,2448	34,60	149,99	0,25	70,79
22	120'	22,9669	0,0718	0,2448	34,60	124,99	0,25	70,79
13	120'	22,9669	0,0718	0,2448	34,60	99,99	0,25	70,79
7	120'	22,9669	0,0718	0,2448	34,60	74,99	0,25	70,79
3	120'	22,9669	0,0718	0,2448	34,60	49,99	0,25	70,79
1	120'	22,9669	0,0718	0,2448	34,60	24,99	0,25	70,79
0,25	120'	22,9669	0,0718	0,2448	34,60	0,00	0,25	70,79
3	120'	22,9669	0,0718	0,2448	35,53	49,99	0,25	70,79

hes21-5a [=2, L_{wa}=3, L_d=3, φ=120', B_d=34,60, BT_{1y}=149,99

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(e)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$s_{yT}(e) = C_T(e)BT_{1n}$ [3] $d_{ayT}(e) = B_d(L_a, e)BT_{1n}$ [4] (s=scaling factor)

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
34	120'	22,9669	0,0718	0,2448	34,60	149,99	0,25	70,79
22	120'	22,9669	0,0718	0,2448	34,60	124,99	0,25	70,79
13	120'	22,9669	0,0718	0,2448	34,60	99,99	0,25	70,79
7	120'	22,9669	0,0718	0,2448	34,60	74,99	0,25	70,79
3	120'	22,9669	0,0718	0,2448	34,60	49,99	0,25	70,79
1	120'	22,9669	0,0718	0,2448	34,60	24,99	0,25	70,79
0,25	120'	22,9669	0,0718	0,2448	34,60	0,00	0,25	70,79
3	120'	22,9669	0,0718	0,2448	35,53	49,99	0,25	70,79

hes21-5b [=2, L_{wa}=3, L_d=3, φ=120', B_d=34,60, BT_{1y}=99,99, s_{yT}=22,96, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, L_n, y) = [C_T(e)(L_T^{\varepsilon} - B_d(L_a, y))BT_{1n}$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$L_T(L_a, y) = [|S_d(e) + S_T(e)L_a^{\varepsilon}|]^{1/\varepsilon}$ (=black threshold) [3]

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
34	120'	22,9669	0,0718	0,2448	34,60	149,99	0,25	70,79
22	120'	22,9669	0,0718	0,2448	34,60	124,99	0,25	70,79
13	120'	22,9669	0,0718	0,2448	34,60	99,99	0,25	70,79
7	120'	22,9669	0,0718	0,2448	34,60	74,99	0,25	70,79
3	120'	22,9669	0,0718	0,2448	34,60	49,99	0,25	70,79
1	120'	22,9669	0,0718	0,2448	34,60	24,99	0,25	70,79
0,25	120'	22,9669	0,0718	0,2448	34,60	0,00	0,25	70,79
3	120'	22,9669	0,0718	0,2448	35,53	49,99	0,25	70,79

hes21-5c [=2, L_{wa}=3, L_d=3, φ=120', B_d=34,60, BT_{1y}=99,99, s_{yT}=22,96, d_{ay}=34,60

Relationship brightness BT_{1y} and luminance L_T as function of tristimulus value Y_T for the adaptation luminance L_a=3 cd/m²

$BT_{1y}(L_T, L_a, y) = s_y(e)L_T^{\varepsilon} - d_{ay}(e)$ brightness BT_{1y} [1]
$B_d(L_a, y) = C_T(e)[S_d(e) + S_T(e)L_a^{\varepsilon}]$ (a=0,31, BT_{1n}=BT_{1y}/BT_{1y}) [2]
$s_{yT}(e) = C_T(e)BT_{1n}$ [3] $d_{ayT}(e) = B_d(L_a, e)BT_{1n}$ [4] (s=scaling factor)

Y_T	φ	$C_T(e)$	$S_d(e)$	$S_T(e)$	$B_d(L_a,e)$	BT_{1y}	L_{1y}	L_a/L_T
34	120'	22,9669	0,0718	0,2448	34,60	149,99	22,96	101,03
22	120'	22,9669	0,0718	0,2448	34,60	124,99	22,96	101,03
13	120'	22,9669	0,0718	0,2448	34,60	99,99	22,96	101,03
7	120'	22,9669	0,0718	0,2448	34,60	74,99	22,96	101,03
3	120'	22,9669	0,0718	0,2448	34,60	49,99	22,96	101,03
1	120'	22,9669	0,0718	0,2448	34,60	24,99	22,96	101,03
0,25	120'	22,9669	0,0718	0,2448	34,60	0,00	22,96	101,03
3	120'	22,9669	0,0718	0,2448	35,53	49,99	22,96	101,03

hes21-5d [=2, L_{wa}=3, L_d=3, φ=120', B_d=34,60, BT_{1y}=99,99, s_{yT}=22,96, d_{ay}=34,60