

Equal 9 step grey scaling between $L^*_{0aN}=8.1$ and $L^*_{0aW}=95.9$, $Y_{0ref}=3.6$, normalisation white W

$L^*_{0aN}=8.1, L^*_{0aU}=52.1, L^*_{0aW}=96.0, Y_{0aN}=0.9, Y_{0aU}=20.2, Y_{0aW}=90.0, C_{0aY}=Y_{0aW}:Y_{0aN}=99.9$
 $L^*_{taN}=24.7, L^*_{taU}=54.9, L^*_{taW}=96.0, Y_{taN}=4.3, Y_{taU}=22.9, Y_{taW}=90.0, C_{taY}=Y_{taW}:Y_{taN}=20.8$
Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps
 $g^* = 100 [\Delta L^*_{min}] / [\Delta L^*_{max}], L^*_{CIELAB} = 116 [Y/Y_N]^{1/3} - 16$ with $Y \geq 0.882, Y_N=100$
 $g^*_5 = 99, g^*_9 = 99$ $g^*_5 = 58, g^*_9 = 47$ $g^*_5 = 93, g^*_9 = 91$

L* _{CIELAB} n0.i	intended output				real output				linearized output			
	L* _{0a}	L* _{0r}	Y _{0a}	Y _{0r}	L* _{ta}	ΔL^*_{ta}	L* _{tr}	Y _{ta}	$(L^*_{tr})^{1/1.25}$	L* _{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	96.0	10.5	1.0	90.0	1.0	96.0	8.6	
8	85.0	0.875	66.0	0.731	85.5	10.4	0.852	66.9	0.88	87.4	8.8	
7	74.0	0.75	46.7	0.515	75.1	10.2	0.707	48.4	0.757	78.7	9.0	
6	63.0	0.625	31.6	0.345	64.9	9.9	0.563	33.9	0.631	69.7	9.1	
5	52.1	0.5	20.2	0.217	54.9	9.4	0.424	22.9	0.502	60.5	9.3	
4	41.1	0.375	11.9	0.124	45.5	8.6	0.292	14.9	0.372	51.3	9.2	
3	30.1	0.25	6.3	0.06	36.9	7.2	0.171	9.5	0.243	42.0	8.8	
2	19.1	0.125	2.8	0.021	29.7	5.0	0.07	6.1	0.119	33.2	8.5	
1	8.1	0.0	0.9	0.0	24.7	0.0	0.0	4.3	0.0	24.7	0.0	

$\Delta L^*_{0a}=11.0$ (i=1,2,...,8) normalisation: $Y_{taiW}=Y_{0aW} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aW}+Y_{0ref}}$

eep40-3n

Equal 9 step grey scaling between $L^*_{0aN}=8.1$ and $L^*_{0aW}=95.9$, $Y_{0ref}=0.4$, normalisation white W

$L^*_{0aN}=8.1, L^*_{0aU}=52.1, L^*_{0aW}=96.0, Y_{0aN}=0.9, Y_{0aU}=20.2, Y_{0aW}=90.0, C_{0aY}=Y_{0aW}:Y_{0aN}=99.9$
 $L^*_{taN}=11.2, L^*_{taU}=52.4, L^*_{taW}=96.0, Y_{taN}=1.3, Y_{taU}=20.5, Y_{taW}=90.0, C_{taY}=Y_{taW}:Y_{taN}=69.5$
Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps
 $g^* = 100 [\Delta L^*_{min}] / [\Delta L^*_{max}], L^*_{CIELAB} = 116 [Y/Y_N]^{1/3} - 16$ with $Y \geq 0.882, Y_N=100$
 $g^*_5 = 99, g^*_9 = 99$ $g^*_5 = 90, g^*_9 = 86$ $g^*_5 = 97, g^*_9 = 96$

L* _{CIELAB} n0.i	intended output				real output				linearized output			
	L* _{0a}	L* _{0r}	Y _{0a}	Y _{0r}	L* _{ta}	ΔL^*_{ta}	L* _{tr}	Y _{ta}	$(L^*_{tr})^{1/1.04}$	L* _{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	96.0	10.9	1.0	90.0	1.0	96.0	10.5	
8	85.0	0.875	66.0	0.731	85.1	10.9	0.871	66.1	0.876	85.5	10.5	
7	74.0	0.75	46.7	0.515	74.1	10.9	0.742	46.9	0.752	74.9	10.6	
6	63.0	0.625	31.6	0.345	63.3	10.8	0.614	31.9	0.627	64.3	10.7	
5	52.1	0.5	20.2	0.217	52.4	10.8	0.486	20.5	0.501	53.7	10.7	
4	41.1	0.375	11.9	0.124	41.6	10.6	0.358	12.3	0.374	43.0	10.7	
3	30.1	0.25	6.3	0.06	31.0	10.3	0.233	6.6	0.248	32.2	10.6	
2	19.1	0.125	2.8	0.021	20.7	9.4	0.111	3.2	0.122	21.6	10.3	
1	8.1	0.0	0.9	0.0	11.2	0.0	0.0	1.3	0.0	11.2	0.0	

$\Delta L^*_{0a}=11.0$ (i=1,2,...,8) normalisation: $Y_{taiW}=Y_{0aW} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aW}+Y_{0ref}}$

eep40-7n

Equal 9 step grey scaling between $L^*_{0aN}=8.1$ and $L^*_{0aW}=95.9$, $Y_{0ref}=0.9$, normalisation white W

$L^*_{0aN}=8.1, L^*_{0aU}=52.1, L^*_{0aW}=96.0, Y_{0aN}=0.9, Y_{0aU}=20.2, Y_{0aW}=90.0, C_{0aY}=Y_{0aW}:Y_{0aN}=99.9$
 $L^*_{taN}=14.3, L^*_{taU}=52.8, L^*_{taW}=96.0, Y_{taN}=1.8, Y_{taU}=20.9, Y_{taW}=90.0, C_{taY}=Y_{taW}:Y_{taN}=50.5$
Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps
 $g^* = 100 [\Delta L^*_{min}] / [\Delta L^*_{max}], L^*_{CIELAB} = 116 [Y/Y_N]^{1/3} - 16$ with $Y \geq 0.882, Y_N=100$
 $g^*_5 = 99, g^*_9 = 99$ $g^*_5 = 81, g^*_9 = 74$ $g^*_5 = 96, g^*_9 = 94$

L* _{CIELAB} n0.i	intended output				real output				linearized output			
	L* _{0a}	L* _{0r}	Y _{0a}	Y _{0r}	L* _{ta}	ΔL^*_{ta}	L* _{tr}	Y _{ta}	$(L^*_{tr})^{1/1.09}$	L* _{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	96.0	10.9	1.0	90.0	1.0	96.0	10.0	
8	85.0	0.875	66.0	0.731	85.1	10.8	0.867	66.3	0.877	86.0	10.1	
7	74.0	0.75	46.7	0.515	74.3	10.8	0.734	47.2	0.753	75.8	10.2	
6	63.0	0.625	31.6	0.345	63.5	10.7	0.602	32.2	0.628	65.6	10.3	
5	52.1	0.5	20.2	0.217	52.8	10.5	0.472	20.9	0.502	55.3	10.3	
4	41.1	0.375	11.9	0.124	42.3	10.2	0.343	12.7	0.374	44.9	10.4	
3	30.1	0.25	6.3	0.06	32.0	9.6	0.217	7.1	0.246	34.4	10.3	
2	19.1	0.125	2.8	0.021	22.4	8.1	0.099	3.6	0.12	24.1	9.8	
1	8.1	0.0	0.9	0.0	14.3	0.0	0.0	1.8	0.0	14.3	0.0	

$\Delta L^*_{0a}=11.0$ (i=1,2,...,8) normalisation: $Y_{taiW}=Y_{0aW} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aW}+Y_{0ref}}$

eep41-3n

Equal 9 step grey scaling between $L^*_{0aN}=8.1$ and $L^*_{0aW}=95.9$, $Y_{0ref}=1.8$, normalisation white W

$L^*_{0aN}=8.1, L^*_{0aU}=52.1, L^*_{0aW}=96.0, Y_{0aN}=0.9, Y_{0aU}=20.2, Y_{0aW}=90.0, C_{0aY}=Y_{0aW}:Y_{0aN}=99.9$
 $L^*_{taN}=18.6, L^*_{taU}=53.6, L^*_{taW}=96.0, Y_{taN}=2.6, Y_{taU}=21.6, Y_{taW}=90.0, C_{taY}=Y_{taW}:Y_{taN}=34.0$
Regularity index according to ISO/IEC 15775:2022, annex G for 5 and 9 steps
 $g^* = 100 [\Delta L^*_{min}] / [\Delta L^*_{max}], L^*_{CIELAB} = 116 [Y/Y_N]^{1/3} - 16$ with $Y \geq 0.882, Y_N=100$
 $g^*_5 = 99, g^*_9 = 99$ $g^*_5 = 71, g^*_9 = 61$ $g^*_5 = 94, g^*_9 = 91$

L* _{CIELAB} n0.i	intended output				real output				linearized output			
	L* _{0a}	L* _{0r}	Y _{0a}	Y _{0r}	L* _{ta}	ΔL^*_{ta}	L* _{tr}	Y _{ta}	$(L^*_{tr})^{1/1.15}$	L* _{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	96.0	10.7	1.0	90.0	1.0	96.0	9.4	
8	85.0	0.875	66.0	0.731	85.2	10.7	0.861	66.5	0.878	86.6	9.5	
7	74.0	0.75	46.7	0.515	74.6	10.6	0.723	47.6	0.755	77.0	9.7	
6	63.0	0.625	31.6	0.345	64.0	10.4	0.587	32.8	0.629	67.3	9.9	
5	52.1	0.5	20.2	0.217	53.6	10.1	0.452	21.6	0.502	57.4	10.0	
4	41.1	0.375	11.9	0.124	43.4	9.6	0.321	13.4	0.373	47.5	10.0	
3	30.1	0.25	6.3	0.06	33.8	8.6	0.197	7.9	0.244	37.5	9.7	
2	19.1	0.125	2.8	0.021	25.2	6.6	0.086	4.5	0.119	27.8	9.2	
1	8.1	0.0	0.9	0.0	18.6	0.0	0.0	2.6	0.0	18.6	0.0	

$\Delta L^*_{0a}=11.0$ (i=1,2,...,8) normalisation: $Y_{taiW}=Y_{0aW} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aW}+Y_{0ref}}$

eep41-7n

Test chart eep4; Equal 9 step grey scaling for four display reflections $Y_{ref} = 3,6, 0,4, 0,9, 1,8$, and black $L^*_{N,CIELAB}=8.13, Y_N=0.9$ and white $L^*_{W,CIELAB}=95.99, Y_W=90$, normalisation: white W

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 application for evaluation and measurement of display or print output
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