

Equal 9 step grey scaling between $L^*_{0aN}=17.9$ and $L^*_{0aW}=95.9$, $Y_{0ref}=3.6$, normalisation grey U

$L^*_{0aN}=17.9$, $L^*_{0aU}=56.9$, $L^*_{0aW}=96.0$, $Y_{0aN}=2.5$, $Y_{0aU}=24.9$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=36.0$

$L^*_{taN}=27.6$, $L^*_{taU}=57.0$, $L^*_{taW}=92.5$, $Y_{taN}=5.3$, $Y_{taU}=24.9$, $Y_{taW}=81.8$, $C_{taY}=Y_{taW}:Y_{taN}=15.3$

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 $Y \geq 0.882$, $Y_n=100$

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	92.5	9.0	1.0	81.8	1.0	92.5	8.0	
8	86.2	0.875	68.5	0.754	83.4	9.0	0.86	62.9	0.877	84.5	8.0	
7	76.5	0.75	50.7	0.55	74.4	8.8	0.722	47.4	0.753	76.4	8.1	
6	66.7	0.625	36.3	0.386	65.6	8.6	0.585	34.8	0.627	68.3	8.2	
5	56.9	0.5	24.9	0.256	57.0	8.3	0.452	24.9	0.5	60.1	8.2	
4	47.2	0.375	16.2	0.156	48.6	7.9	0.323	17.3	0.373	51.9	8.2	
3	37.4	0.25	9.8	0.083	40.7	7.1	0.201	11.7	0.247	43.7	8.0	
2	27.7	0.125	5.3	0.032	33.6	5.9	0.091	7.8	0.124	35.7	8.0	
1	17.9	0.0	2.5	0.0	27.6	0.0	0.0	5.3	0.0	27.6	0.0	

$\Delta L^*_{0a}=9.7$ (i=1,2,...,8) normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eep90-3n

Equal 9 step grey scaling between $L^*_{0aN}=17.9$ and $L^*_{0aW}=95.9$, $Y_{0ref}=0.9$, normalisation grey U

$L^*_{0aN}=17.9$, $L^*_{0aU}=56.9$, $L^*_{0aW}=96.0$, $Y_{0aN}=2.5$, $Y_{0aU}=24.9$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=36.0$

$L^*_{taN}=21.1$, $L^*_{taU}=57.0$, $L^*_{taW}=95.0$, $Y_{taN}=3.3$, $Y_{taU}=24.9$, $Y_{taW}=87.7$, $C_{taY}=Y_{taW}:Y_{taN}=26.7$

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 $Y \geq 0.882$, $Y_n=100$

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}	$(L^*_{tr})^{1/1.05}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	95.0	9.6	1.0	87.7	1.0	95.0	9.2	
8	86.2	0.875	68.5	0.754	85.5	9.5	0.87	66.9	0.876	85.9	9.2	
7	76.5	0.75	50.7	0.55	75.9	9.5	0.741	49.8	0.751	76.7	9.2	
6	66.7	0.625	36.3	0.386	66.4	9.4	0.613	35.9	0.626	67.4	9.3	
5	56.9	0.5	24.9	0.256	57.0	9.4	0.485	24.9	0.5	58.1	9.3	
4	47.2	0.375	16.2	0.156	47.6	9.2	0.358	16.5	0.375	48.8	9.3	
3	37.4	0.25	9.8	0.083	38.4	8.9	0.233	10.3	0.249	39.5	9.2	
2	27.7	0.125	5.3	0.032	29.5	8.3	0.113	6.0	0.124	30.3	9.2	
1	17.9	0.0	2.5	0.0	21.1	0.0	0.0	3.3	0.0	21.1	0.0	

$\Delta L^*_{0a}=9.7$ (i=1,2,...,8) normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eep91-3n

Equal 9 step grey scaling between $L^*_{0aN}=17.9$ and $L^*_{0aW}=95.9$, $Y_{0ref}=0.4$, normalisation grey U

$L^*_{0aN}=17.9$, $L^*_{0aU}=56.9$, $L^*_{0aW}=96.0$, $Y_{0aN}=2.5$, $Y_{0aU}=24.9$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=36.0$

$L^*_{taN}=19.4$, $L^*_{taU}=57.0$, $L^*_{taW}=95.6$, $Y_{taN}=2.8$, $Y_{taU}=24.9$, $Y_{taW}=89.0$, $C_{taY}=Y_{taW}:Y_{taN}=31.2$

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 $Y \geq 0.882$, $Y_n=100$

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}	$(L^*_{tr})^{1/1.02}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	95.6	9.7	1.0	89.0	1.0	95.6	9.5	
8	86.2	0.875	68.5	0.754	85.9	9.7	0.873	67.8	0.875	86.1	9.5	
7	76.5	0.75	50.7	0.55	76.2	9.6	0.746	50.3	0.75	76.6	9.5	
6	66.7	0.625	36.3	0.386	66.6	9.6	0.619	36.1	0.625	67.0	9.5	
5	56.9	0.5	24.9	0.256	57.0	9.6	0.493	24.9	0.5	57.5	9.5	
4	47.2	0.375	16.2	0.156	47.4	9.5	0.367	16.3	0.374	47.9	9.5	
3	37.4	0.25	9.8	0.083	37.9	9.4	0.242	10.0	0.249	38.4	9.5	
2	27.7	0.125	5.3	0.032	28.5	9.0	0.119	5.6	0.124	28.9	9.4	
1	17.9	0.0	2.5	0.0	19.4	0.0	0.0	2.8	0.0	19.4	0.0	

$\Delta L^*_{0a}=9.7$ (i=1,2,...,8) normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eep90-7n

Equal 9 step grey scaling between $L^*_{0aN}=17.9$ and $L^*_{0aW}=95.9$, $Y_{0ref}=1.8$, normalisation grey U

$L^*_{0aN}=17.9$, $L^*_{0aU}=56.9$, $L^*_{0aW}=96.0$, $Y_{0aN}=2.5$, $Y_{0aU}=24.9$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=36.0$

$L^*_{taN}=23.7$, $L^*_{taU}=57.0$, $L^*_{taW}=94.1$, $Y_{taN}=4.0$, $Y_{taU}=24.9$, $Y_{taW}=85.6$, $C_{taY}=Y_{taW}:Y_{taN}=21.3$

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 $Y \geq 0.882$, $Y_n=100$

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}	$(L^*_{tr})^{1/1.08}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	94.1	9.4	1.0	85.6	1.0	94.1	8.7	
8	86.2	0.875	68.5	0.754	84.7	9.3	0.867	65.5	0.876	85.4	8.8	
7	76.5	0.75	50.7	0.55	75.4	9.3	0.734	48.9	0.752	76.7	8.8	
6	66.7	0.625	36.3	0.386	66.1	9.2	0.602	35.5	0.626	67.8	8.9	
5	56.9	0.5	24.9	0.256	57.0	9.0	0.472	24.9	0.5	58.9	8.9	
4	47.2	0.375	16.2	0.156	48.0	8.7	0.344	16.8	0.374	50.0	8.9	
3	37.4	0.25	9.8	0.083	39.2	8.2	0.22	10.8	0.248	41.2	8.7	
2	27.7	0.125	5.3	0.032	31.0	7.3	0.104	6.6	0.124	32.4	8.7	
1	17.9	0.0	2.5	0.0	23.7	0.0	0.0	4.0	0.0	23.7	0.0	

$\Delta L^*_{0a}=9.7$ (i=1,2,...,8) normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eep91-7n

Test chart eep9; Equal 9 step grey scaling for four display reflections $Y_{ref} = 3,6, 0,4, 0,9, 1,8$, and black $L^*_{N,CIELAB}=17.92$, $Y_N=2.5$ and white $L^*_{W,CIELAB}=95.99$, $Y_W=90$, normalisation: grey U

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 application for evaluation and measurement of display or print output
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