

Equal 9 step grey scaling between $L^*_{0aN}=14.4$ and $L^*_{0aW}=95.9$, $Y_{0ref}=2.5$, normalisation grey U

$L^*_{0aN}=14.4$, $L^*_{0aU}=55.2$, $L^*_{0aW}=96.0$, $Y_{0aN}=1.8$, $Y_{0aU}=23.1$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=50.0$
 $L^*_{taN}=23.3$, $L^*_{taU}=55.2$, $L^*_{taW}=93.2$, $Y_{taN}=3.9$, $Y_{taU}=23.1$, $Y_{taW}=83.5$, $C_{taY}=Y_{taW}:Y_{taN}=21.5$

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

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}	$(L^*_{tr})^{1/1.13}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	93.2	9.6	1.0	83.5	1.0	93.2	8.6	
8	85.8	0.875	67.6	0.746	83.6	9.6	0.862	63.2	0.877	84.6	8.7	
7	75.6	0.75	49.2	0.538	74.0	9.5	0.725	46.7	0.753	76.0	8.8	
6	65.4	0.625	34.5	0.371	64.5	9.3	0.589	33.4	0.628	67.2	8.9	
5	55.2	0.5	23.1	0.242	55.2	9.0	0.456	23.1	0.501	58.3	8.9	
4	45.0	0.375	14.5	0.144	46.1	8.6	0.327	15.4	0.373	49.4	8.9	
3	34.8	0.25	8.4	0.075	37.5	7.8	0.204	9.8	0.246	40.5	8.7	
2	24.6	0.125	4.3	0.028	29.7	6.4	0.092	6.1	0.122	31.8	8.6	
1	14.4	0.0	1.8	0.0	23.3		0.0	3.9	0.0	23.3		

$\Delta L^*_{0a}=10.2$ (i=1,2,...,8)

normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eeq70-3n

Equal 9 step grey scaling between $L^*_{0aN}=14.4$ and $L^*_{0aW}=95.9$, $Y_{0ref}=20.0$, normalisation grey U

$L^*_{0aN}=14.4$, $L^*_{0aU}=55.2$, $L^*_{0aW}=96.0$, $Y_{0aN}=1.8$, $Y_{0aU}=23.1$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=50.0$
 $L^*_{taN}=40.7$, $L^*_{taU}=55.2$, $L^*_{taW}=81.3$, $Y_{taN}=11.7$, $Y_{taU}=23.1$, $Y_{taW}=59.0$, $C_{taY}=Y_{taW}:Y_{taN}=5.0$

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

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}	$(L^*_{tr})^{1/1.47}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	81.3	7.1	1.0	59.0	1.0	81.3	5.0	
8	85.8	0.875	67.6	0.746	74.2	6.8	0.824	47.0	0.877	76.3	5.1	
7	75.6	0.75	49.2	0.538	67.4	6.4	0.657	37.1	0.752	71.2	5.2	
6	65.4	0.625	34.5	0.371	61.0	5.8	0.5	29.2	0.624	66.0	5.2	
5	55.2	0.5	23.1	0.242	55.2	5.1	0.357	23.1	0.497	60.9	5.1	
4	45.0	0.375	14.5	0.144	50.1	4.2	0.232	18.5	0.37	55.7	4.9	
3	34.8	0.25	8.4	0.075	45.9	3.1	0.129	15.2	0.248	50.8	4.7	
2	24.6	0.125	4.3	0.028	42.8	2.1	0.051	13.0	0.133	46.1	5.4	
1	14.4	0.0	1.8	0.0	40.7		0.0	11.7	0.0	40.7		

$\Delta L^*_{0a}=10.2$ (i=1,2,...,8)

normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eeq71-3n

Equal 9 step grey scaling between $L^*_{0aN}=14.4$ and $L^*_{0aW}=95.9$, $Y_{0ref}=10.0$, normalisation grey U

$L^*_{0aN}=14.4$, $L^*_{0aU}=55.2$, $L^*_{0aW}=96.0$, $Y_{0aN}=1.8$, $Y_{0aU}=23.1$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=50.0$
 $L^*_{taN}=34.5$, $L^*_{taU}=55.2$, $L^*_{taW}=86.9$, $Y_{taN}=8.2$, $Y_{taU}=23.1$, $Y_{taW}=69.8$, $C_{taY}=Y_{taW}:Y_{taN}=8.5$

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

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}	$(L^*_{tr})^{1/1.33}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	86.9	8.3	1.0	69.8	1.0	86.9	6.4	
8	85.8	0.875	67.6	0.746	78.5	8.1	0.841	54.2	0.878	80.5	6.5	
7	75.6	0.75	49.2	0.538	70.4	7.8	0.686	41.3	0.754	74.0	6.6	
6	65.4	0.625	34.5	0.371	62.6	7.4	0.536	31.1	0.627	67.4	6.7	
5	55.2	0.5	23.1	0.242	55.2	6.8	0.395	23.1	0.499	60.6	6.7	
4	45.0	0.375	14.5	0.144	48.4	5.9	0.266	17.1	0.371	53.9	6.6	
3	34.8	0.25	8.4	0.075	42.5	4.7	0.154	12.8	0.246	47.4	6.2	
2	24.6	0.125	4.3	0.028	37.8	3.3	0.063	10.0	0.127	41.1	6.6	
1	14.4	0.0	1.8	0.0	34.5		0.0	8.2	0.0	34.5		

$\Delta L^*_{0a}=10.2$ (i=1,2,...,8)

normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eeq70-7n

Equal 9 step grey scaling between $L^*_{0aN}=14.4$ and $L^*_{0aW}=95.9$, $Y_{0ref}=90.0$, normalisation grey U

$L^*_{0aN}=14.4$, $L^*_{0aU}=55.2$, $L^*_{0aW}=96.0$, $Y_{0aN}=1.8$, $Y_{0aU}=23.1$, $Y_{0aW}=90.0$, $C_{0aY}=Y_{0aW}:Y_{0aN}=50.0$
 $L^*_{taN}=50.4$, $L^*_{taU}=55.2$, $L^*_{taW}=67.1$, $Y_{taN}=18.8$, $Y_{taU}=23.1$, $Y_{taW}=36.8$, $C_{taY}=Y_{taW}:Y_{taN}=2.0$

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

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}	$(L^*_{tr})^{1/1.75}$	L^*_{la}	ΔL^*_{la}	
9	96.0	1.0	90.0	1.0	67.1	3.6	1.0	36.8	1.0	67.1	2.2	
8	85.8	0.875	67.6	0.746	63.5	3.2	0.784	32.2	0.871	65.0	2.1	
7	75.6	0.75	49.2	0.538	60.3	2.8	0.592	28.5	0.742	62.8	2.1	
6	65.4	0.625	34.5	0.371	57.5	2.3	0.425	25.5	0.614	60.7	2.1	
5	55.2	0.5	23.1	0.242	55.2	1.8	0.286	23.1	0.49	58.6	2.0	
4	45.0	0.375	14.5	0.144	53.3	1.4	0.176	21.4	0.371	56.6	1.9	
3	34.8	0.25	8.4	0.075	52.0	1.0	0.093	20.1	0.258	54.7	1.8	
2	24.6	0.125	4.3	0.028	51.0	0.6	0.035	19.3	0.149	52.9	2.5	
1	14.4	0.0	1.8	0.0	50.4		0.0	18.8	0.0	50.4		

$\Delta L^*_{0a}=10.2$ (i=1,2,...,8)

normalisation: $Y_{taiU}=Y_{0aU} \frac{Y_{0ai}+Y_{0ref}}{Y_{0aU}+Y_{0ref}}$

eeq71-7n

Test chart eq7; Equal 9 step grey scaling for four display reflections $Y_{ref} = 2.5, 10, 20, 90$, and black $L^*_{N,CIELAB}=14.4$, $Y_N=1.8$ and white $L^*_{W,CIELAB}=95.99$, $Y_W=90$, normalisation: grey U

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