

Measurement of photoluminescence according to DIN 67510-1:2009 (2 appendices)

Identification

Object	Four photoluminescent samples, marked Sample 1 – 4. See pictures in appendix 1. (Eli-Glow PhotoLuminescent Pigment)
Object state	Upon arrival the object had no visual damages.
Arrival date	June 22, 2016
Location	Borås, Sweden
Measurement date	Sept, 2016

Measurement methods and procedures

The samples were exposed during a time of 5 minutes at 1000 lux from an unfiltered 150 W xenon lamp. The illuminance at the measuring plane was measured with a luxmeter, Hagner, Model S4. After 5 minutes the xenon lamp was turned off and a luminance meter, Photo Research Model 1980A, connected to a computer, was recording the luminance every minute for at least 120 min. A measuring spot of about \varnothing 50 mm was used. The samples were kept under dark conditions for at least 48 h prior to excitation.

The colour during excitation and attenuation was measured with a spectrometer, Spectrascan PR-735. The excitation was done with the above light source at 1000 lux for 5 minutes and the attenuation colour measurement started about 15 seconds after the lamp was switched off.

In accordance with section 4.5 in DIN 67510-1, a logarithmic parabolic extrapolation of the results was made in order to determine the time when the luminance is $0,3 \text{ mcd/m}^2$, the decay time.

Measurement conditions

Room temperature	$(23 \pm 1) \text{ }^\circ\text{C}$
Relative humidity	$(45 \pm 5) \%$
Illumination	1000 lx perpendicular to the sample, Xenon lamp

Results

The results only refer to the object specified in this document.

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Table 1: Compilation of the results for luminance and calculated decay time.

Sample ID	Luminance (mcd/m ²)					Decay time (min)
	2 min	10 min	30 min	60 min	120 min	
Sample 1	1141	311	100	45,3	19,5	2610
Sample 2	11,0	3,11	1,03	0,47	0,19	86
Sample 3	105,9	22,2	7,03	3,27	1,45	430
Sample 4	167,4	34,7	10,8	4,98	2,21	620

Table 2: CIE 1931 chromaticity coordinates for 2° standard observer.

Sample ID	During excitation		During attenuation	
	x	y	x	y
Sample 1	0,353	0,378	0,145	0,376
Sample 2	0,394	0,378	0,152	0,390
Sample 3	0,486	0,458	0,331	0,565
Sample 4	0,347	0,362	0,265	0,541

Measuring uncertainty

The measuring uncertainty is $\pm 5\%$ of the measured luminance values, but not less than $\pm 0,03$ mcd/m². The uncertainty of the given values for x and y is $\pm 0,006$.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with EA Publication EA-4/02 (formerly EAL-R2). The long term stability of the calibrated object is not included in the reported expanded uncertainty of measurement.

Equipment

Xenon-lamp 150 W, SP inv.no. 502959
 Luminance meter Pritchard PR 1980, SP inv.no. 500721
 Luxmeter Hagner S4, SP inv.no. 901737
 Spectrometer Spectrascan PR-735, SP inv.no. 901491

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Performed by

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Appendices

Pictures of the test objects
 Measured luminance, table and diagram

Appendix 1

Pictures of the test objects

Sample 1 (100 × 150 mm)



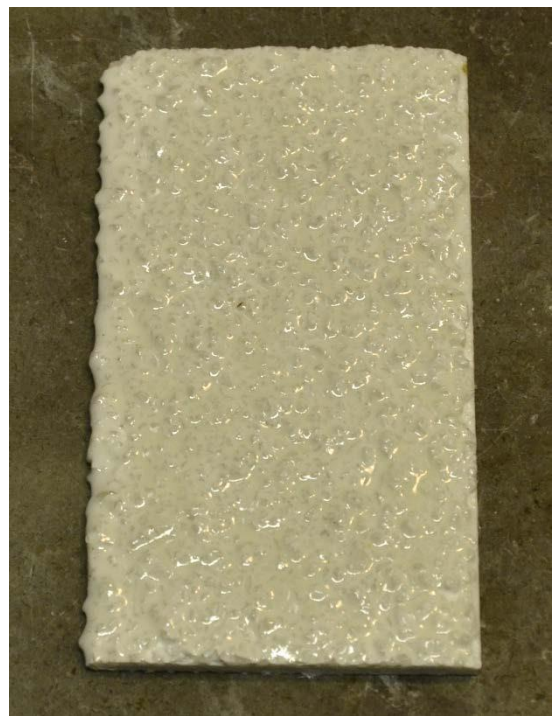
Sample 2 (100 × 150 mm)



Sample 3 (58 × 105 mm)



Sample 4 (58 × 105 mm)



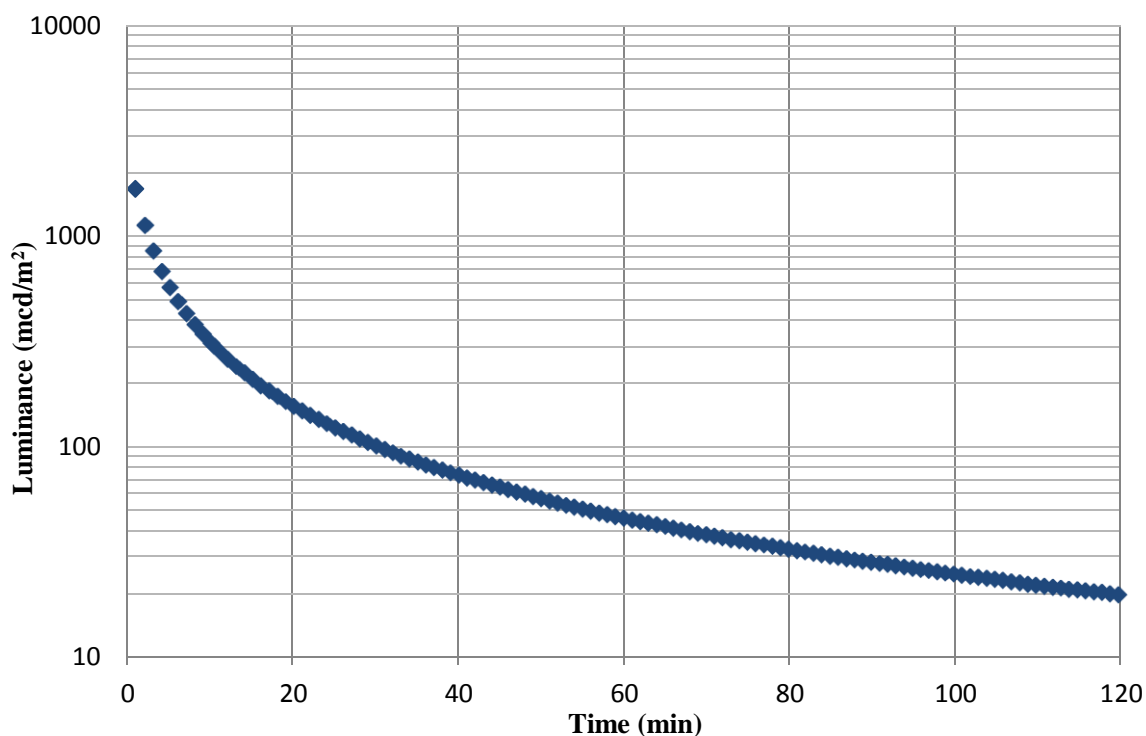
Appendix 2

Measured luminance, table and diagram

Table 1. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 1).

Time (min)	Luminance (mcd/m ²)	Time (min)	Luminance (mcd/m ²)
5	574	65	41,3
10	311	70	37,7
15	209	75	34,8
20	155	80	32,1
25	123	85	29,8
30	100	90	27,9
35	84,1	95	26,1
40	72,7	100	24,5
45	63,6	105	23,1
50	56,2	110	21,6
55	50,0	115	20,6
60	45,3	120	19,5

Diagram 1. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 1).

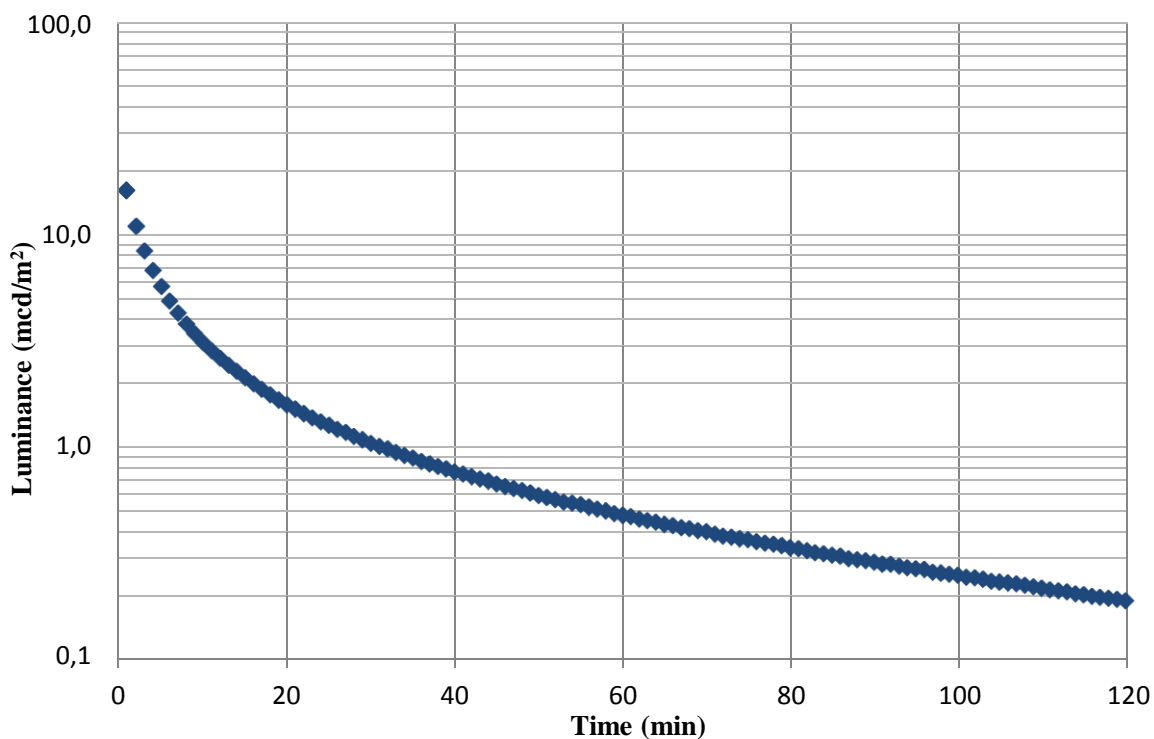


Appendix 2

Table 2. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 2).

Time (min)	Luminance (mcd/m ²)	Time (min)	Luminance (mcd/m ²)
5	5,73	65	0,43
10	3,11	70	0,39
15	2,11	75	0,36
20	1,57	80	0,33
25	1,26	85	0,31
30	1,03	90	0,28
35	0,88	95	0,26
40	0,76	100	0,24
45	0,66	105	0,23
50	0,59	110	0,21
55	0,53	115	0,20
60	0,47	120	0,19

Diagram 2. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 2).

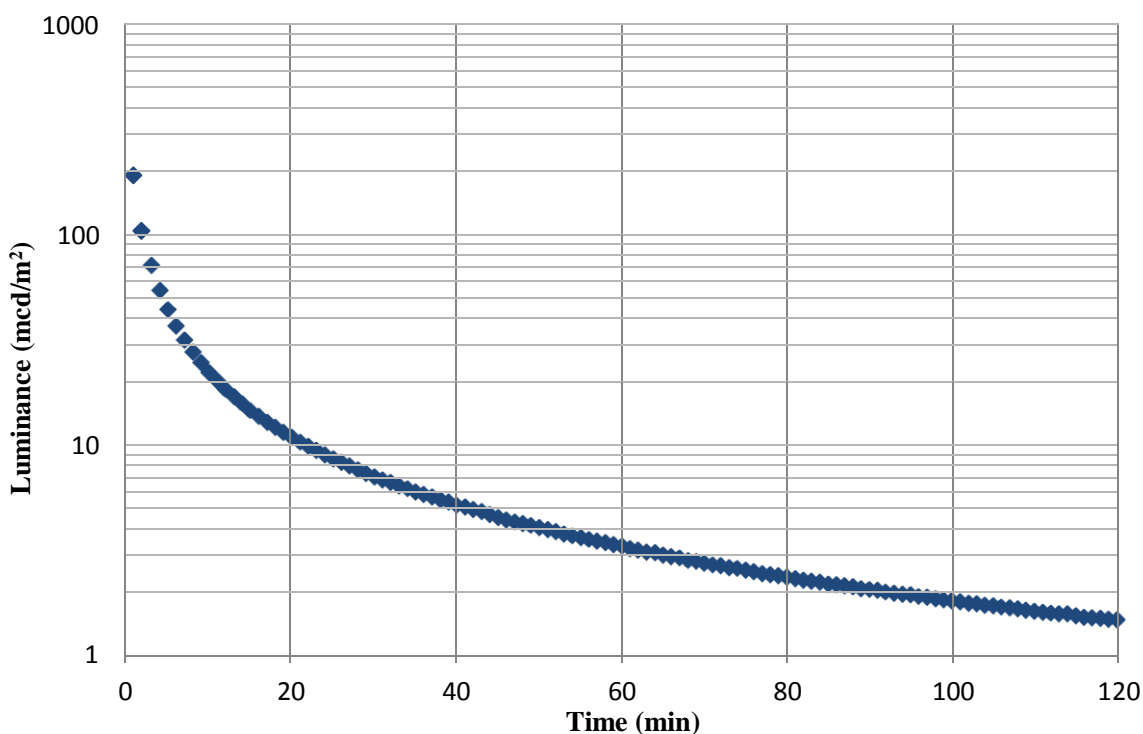


Appendix 2

Table 3. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 3).

Time (min)	Luminance (mcd/m ²)	Time (min)	Luminance (mcd/m ²)
5	44,4	65	2,97
10	22,2	70	2,71
15	14,6	75	2,52
20	10,9	80	2,32
25	8,59	85	2,16
30	7,03	90	2,03
35	5,96	95	1,92
40	5,14	100	1,79
45	4,49	105	1,69
50	4,02	110	1,59
55	3,60	115	1,51
60	3,27	120	1,45

Diagram 3. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 3).



Appendix 2

Table 4. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 4).

Time (min)	Luminance (mcd/m ²)	Time (min)	Luminance (mcd/m ²)
5	69,4	65	4,55
10	34,7	70	4,17
15	22,7	75	3,84
20	16,7	80	3,59
25	13,2	85	3,32
30	10,8	90	3,14
35	9,18	95	2,92
40	7,88	100	2,75
45	6,90	105	2,60
50	6,14	110	2,46
55	5,51	115	2,33
60	4,98	120	2,21

Diagram 4. Luminance during attenuation (after 5 min exposure at 1000 lux, sample 4).

