

REPORI issued by an Accredited Testing Laboratory

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Date 2019-11-14 Reference MTt9P08069 Page 1 (2) Kay Premium Marking Films LTD Unit 2, Oakwood Close Pen-y-fan Industrial Estate, Oakdale Newport NP11 3HY United Kingdom

Measurement of phosphorescence according to DIN 67510-1:2009

(2 appendices)

Identification

Object	One sample of phosphorescent film, A4 size, marked K74111, ba		
	w N002055. See also pictures in appendix 1.		
Object state	Upon arrival the object had no visual damages. Measurements		
	were performed on 150×150mm ² sample that was cut from the		
	original sample and applied to a black substrate.		
Location	Borås, Sweden		
Measurement dates	2019-11-08-2019-11-11		

Measurement methods and procedures

The measurements were performed in accordance with DIN 67510-1:2009 and followed RISEmethod 2515 in applicable parts. 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 lux-meter, 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 14 hours corresponding to at least 10% of the decay time. A measuring spot of about \emptyset 50 mm was used. The samples were kept under dark conditions for at least 48 h prior to excitation.

According to section 4.5 of DIN 67510-1, a logarithmic parabolic extrapolation of the results was used to estimate decay time, which is the time for the luminance to reach $0,3 \text{ mcd/m}^2$. The colour during excitation and attenuation was measured with a spectrometer.

Measurement conditions

Room temperatue	(23 ± 2) °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:

Sample	Luminance (mcd/m ²)				Decay time	
_	2 min	10 min	30 min	60 min	120 min	(min)
K74111						
batch WN002655	384	76,7	23,3	10,6	4,7	1050

Table 2: CIE 1931 chromaticity coordinates x and y, 2° standard observer.

Sample	During excitation		During attenuation	
	Х	У	х	У
K74111				
batch WN002655	0,339	0,356	0,272	0,566

Measuring uncertainty

The measuring uncertainty is ± 6 % of the measured luminance values but not less than $\pm 0,10$ mcd/m², and $\pm 0,008$ of the given values for x and y.

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.

Equipment

Xenon-lamp 150 W, inv.no. 502959 Luminance meter Pritchard PR 1980, inv.no. 500721 Luxmeter Hagner S4, inv.no. 901737 Spectrometer Ocean Optics QE65000, id no 901736

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Performed by

Maria Nilsson Tengelin

Appendices Picture of the tested sample Measured luminance, table and diagrams REPORT

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Appendix 1

Photos of the tested object



KAY PREM	IUM MARKING FILMS LTD. ATERIAL SAMPLE
MATERIAL BATCH No.: GRN: DATE	K74111 W1002055

Fig. 1. *Left:* A4 size sample of K74111, Batch WN002655, with a smaller piece $(150 \times 150 \text{ mm}^2)$ cut out and applied to a black substrate. *Right:* Marking on the back of the sample.

Appendix 2

Measured luminance, table and diagram

Table 1. Luminance during attenuation after 5 min exposure at 1000 lux, K74111, Batch WN002655.

Time	Luminance	Time	Luminance
(min)	(mcd/m^2)	(min)	(mcd/m^2)
5	157	65	9,6
10	76,7	70	8,9
15	50,3	75	8,2
20	36,6	80	7,6
25	28,6	85	7,1
30	23,3	90	6,6
35	19,7	95	6,2
40	16,9	100	5,8
45	14,8	105	5,5
50	13,1	110	5,2
55	11,7	115	4,9
60	10,6	120	4,7



Diagram 1. Luminance during attenuation after 5 min exposure at 1000 lux, K74111, Batch WN002655.

Reference

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