

## Crash Test Lighting – what is brighter – HMI or LED?

Illuminance measurements

ACTS, Sailauf, Germany, October 2013

	LED	SYNC LAMP	<a href="http://www.ies-elektronikentwicklung.de">www.ies-elektronikentwicklung.de</a>
versus			
	HMI	M40 / EB4000	<a href="http://www.arri.com">www.arri.com</a> / <a href="http://www.bs-ballasts.com">www.bs-ballasts.com</a>
versus			
	LED	POWRAY	<a href="http://www.visol.co.kr">www.visol.co.kr</a>

### 1 x SYNC LAMP illuminance

2m	700	800	830	785	660
1,5m	790	930	950	945	810
1m	860	950	980	950	830
0,5m	840	975	995	950	810
0m	740	850	880	800	670
[lx]	0m	0,5m	1m	1,5m	2m

$\max \Delta = E_{\text{MIN}}/E_{\text{C1}} - 1 =$ 
-33%
    
 average illumin =  $E_{\text{AV}} =$ 
851

center illuminance =  $E_{\text{C1}} =$ 
980

distance = 4m, height of grid = 1,25m, height of lamp = 1,25m, 100Hz, 250µs, dimmed to 5%

Annotation:

The IES / SYNC LAMP is flashing with 100Hz and 250µs.

The light of the LEDs are dimmed down to ~5%.

At this light level there is no danger to overheat the LEDs. IES uses the mode to focus the lamps. Therefore we could measure all 25 points of the 2x2m testgrid.

Please note that the evenness within the light field ( $\max \Delta$ ) is excellent. From Center C1 to the Minimum (point 2m/2m) we have just 33% decrease.

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### 1 x SYNC LAMP illuminance

2m	5.030				5.600
1,5m					
1m			7.450 C1		
0,5m					
0m	5.620				5.950
[lx]	0m	0,5m	1m	1,5m	2m

$$\max \Delta = E_{\text{MIN}}/E_{\text{C1}} - 1 =$$

-32%

$$\text{average illumin} = E_{\text{AV}} =$$

5.930

$$\text{center illuminance} = E_{\text{C1}} =$$

7.450

distance = 4m, height of grid = 1,25m, height of lamp = 1,25m, 1.000Hz, 500 $\mu$ s, dimmed to 20%

Annotation:

The IES / SYNC LED LAMP is flashing with a higher frequency of 1.000Hz and with a longer tFlash of 500 $\mu$ s.

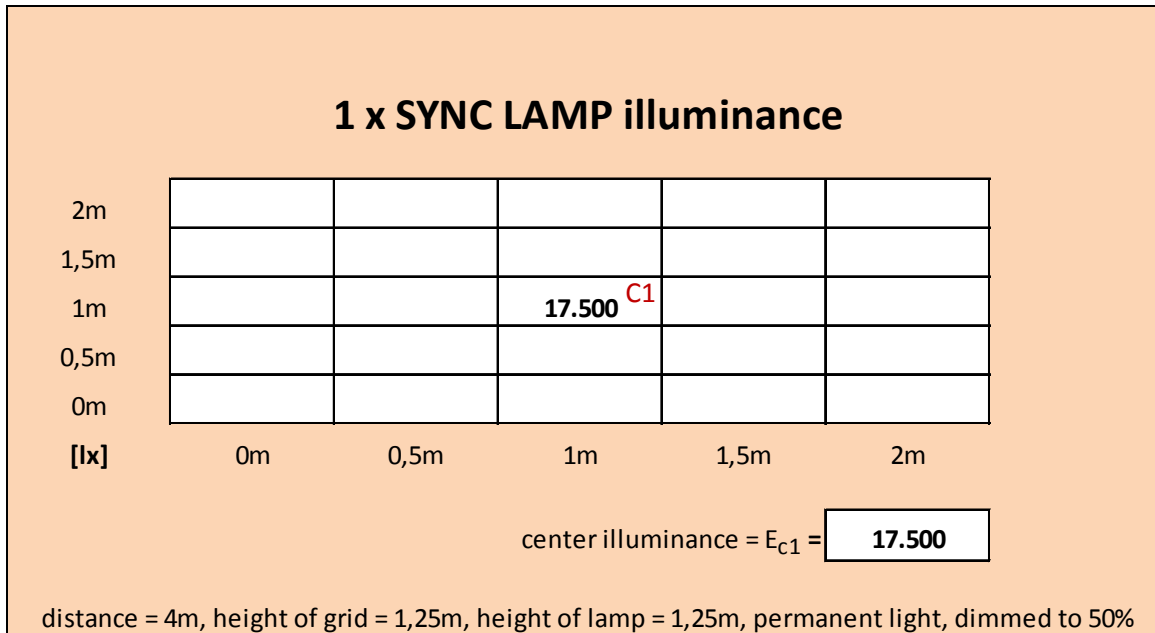
The light level is equivalent to a dimming down to ~20%.

To prevent the LEDs from overheating we did measure the illuminance just in the four edge points and in the center point C1. Please note that the evenness within the light field (max  $\Delta$ ) is even better in this measurement. From Center C1 to the Minimum we have just 32% decrease.

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Annotation:

The IES / SYNC LED LAMP is not flashing in this measurement. The light is emitted permanently.

The SYNC LAMP is dimmed down to a level of 50% (info of IES).

Due to the danger of overheating the LEDs at 50% dimming we did measure the illuminance just in the center.

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### 1 x M40 illuminance

2m	10.390	16.050	19.240	18.430	13.450
1,5m	12.550	18.990	22.890	23.910	18.620
1m	13.720	21.090	<b>23.500</b> <sup>C1</sup>	23.830	19.630
0,5m	13.430	19.180	22.630	21.940	16.980
0m	11.780	16.060	17.700	15.600	11.820
<b>[lx]</b>	2m	2,5m	3m	3,5m	4m

$$\max \Delta = E_{\text{MIN}}/E_{\text{C1}} - 1 = \boxed{-56\%}$$

$$\text{average illuminance} = E_{\text{AV}} = \boxed{17.736}$$

$$\text{center illuminance} = E_{\text{C1}} = \boxed{23.500}$$

distance = 4m, height of grid = 1,25m, height of lamp = 1,25m, permanent light, 100%

Annotation:

The ARRI / M40 is an HMI lamp that does not flash.

The light is emitted permanently.

The light level is 100%.

There is no problem with overheating with HMIs.

Please note that the evenness within the light field (max  $\Delta$ ) is not good. From Center D1 to the Min we have 56% decrease.

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### 1 x POWRAY illuminance

2m	1.740	2.430	2.710	2.350	1.590
1,5m	2.815	3.745	3.970	3.690	2.560
1m	3.450	4.180	<b>4.300</b> <sup>C1</sup>	4.080	3.100
0,5m	3.360	4.040	4.070	3.980	2.990
0m	2.910	3.740	3.830	3.450	2.430
<b>[lx]</b>	0m	0,5m	1m	1,5m	2m

$$\max \Delta = E_{\text{MIN}}/E_{\text{C1}} - 1 =$$

-63%

$$\text{average illumin} = E_{\text{AV}} =$$

3.260

$$\text{center illuminance} = E_{\text{C1}} =$$

**4.300**

distance = 4m, height of grid = 1,25m, height of lamp = 1,25m, 1.000Hz, dimmed to 20%

Annotation:

The VISOL / POWRAY LED lamp was flashing with a frequency of 1.000Hz.

The light was dimmed down to 20% (info from AS VISION) due to the overheating of the LEDs. Please note that the evenness within the light field (max  $\Delta$ ) is not good. From Center C1 to the Min we have 63% decrease.

Stefan Schmidt, 20.1.2014