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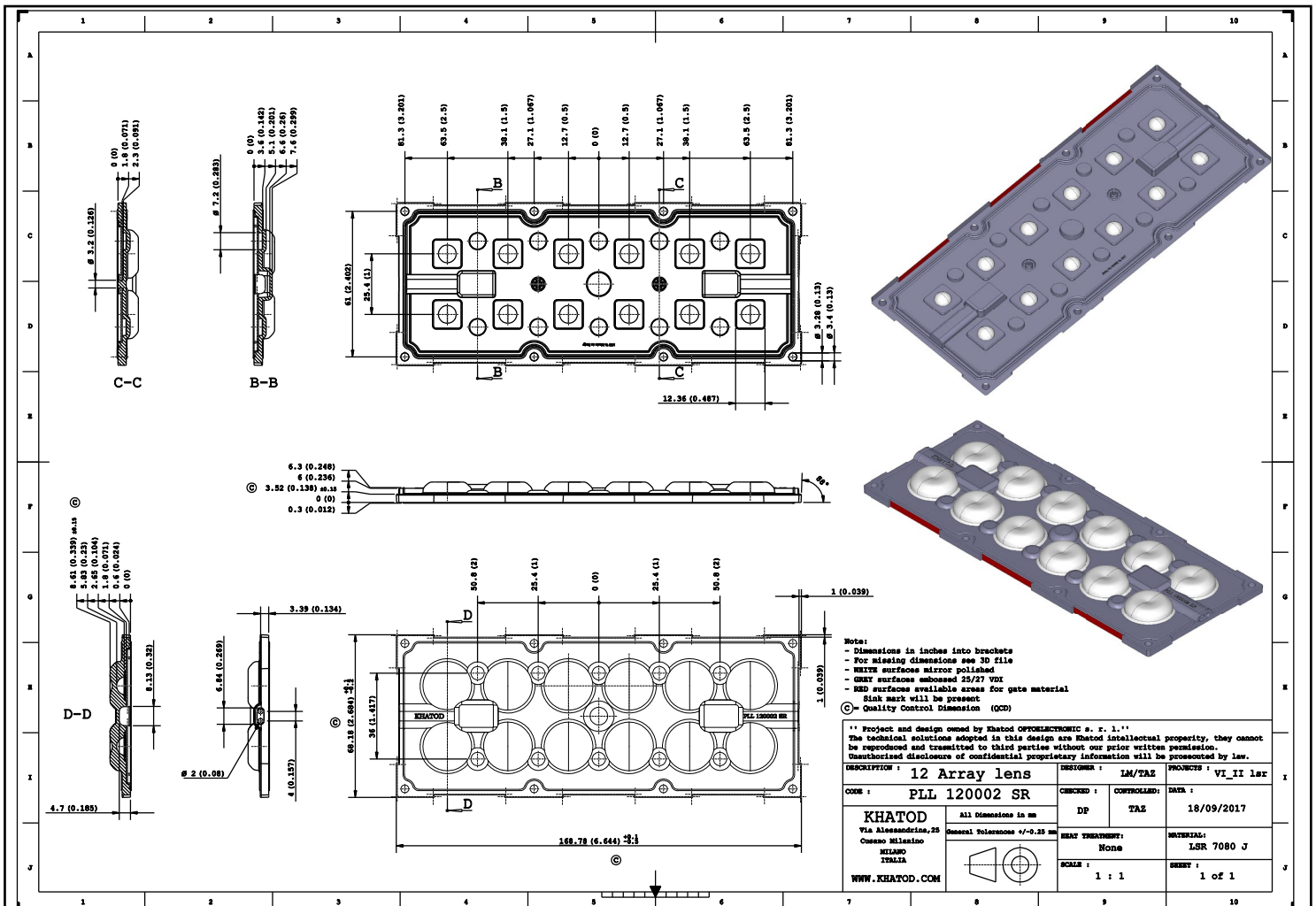
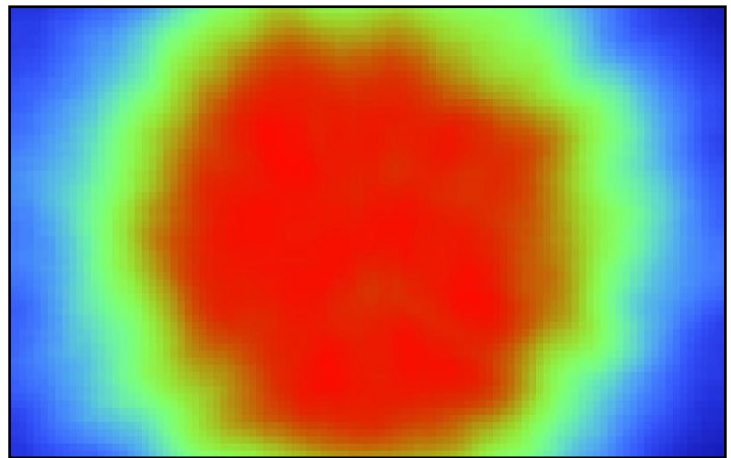
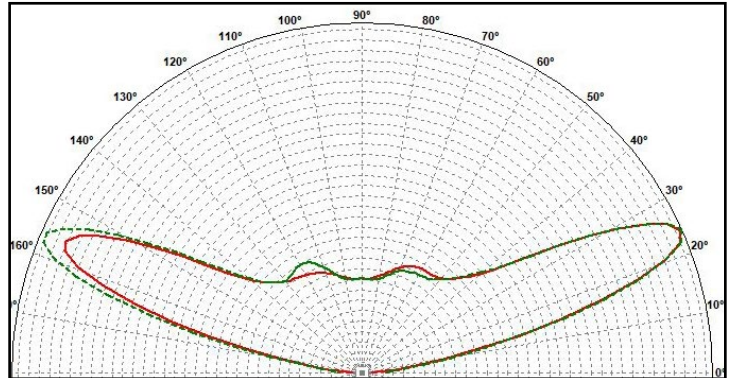
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**Note:** \* With LEDs with 3mm DOM and 2mm<sup>2</sup> LES

## PLL120002SR - IESNA Type V



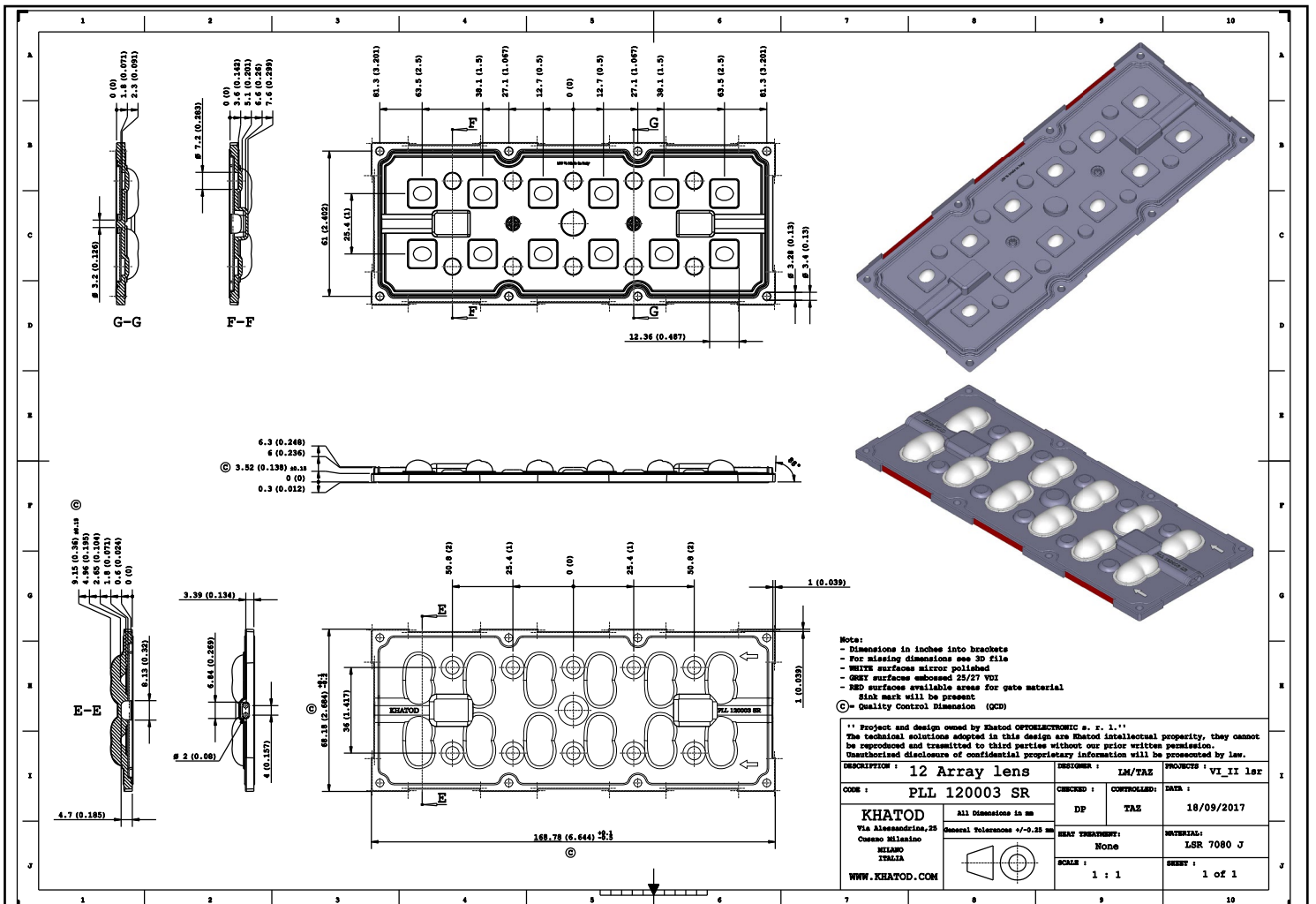
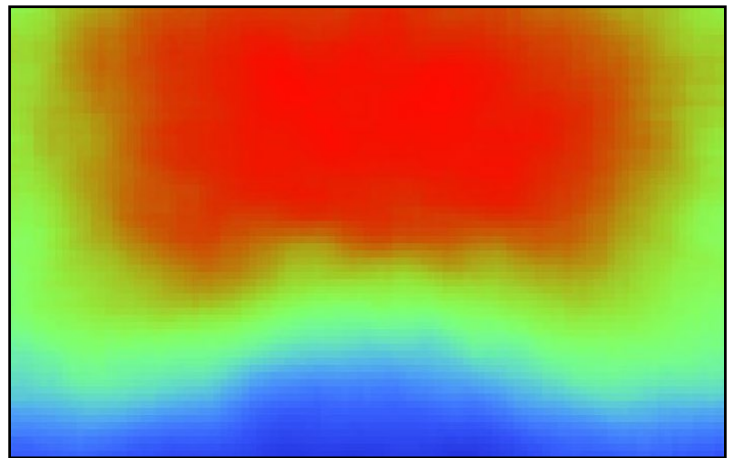
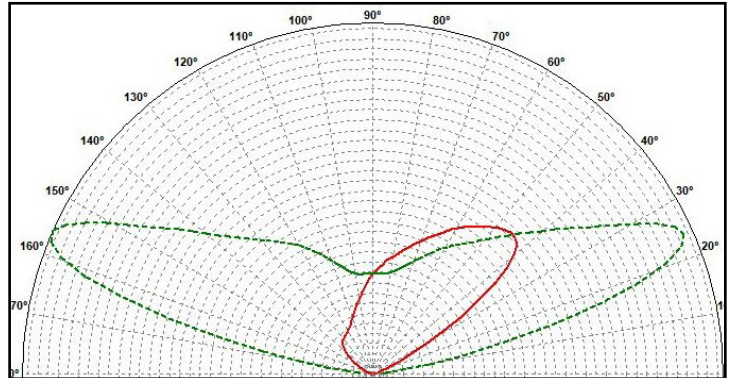
- Material = **SILICONE** for the Lens, PPS black for box
- Full angle at 50% from maximum:  $\sim 150^\circ$
- Full angle at 10% from maximum:  $\sim 165^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm<sup>2</sup> LES,  $\sim 260\text{lm@LED}$



## PLL120003SR - IESNA Type II



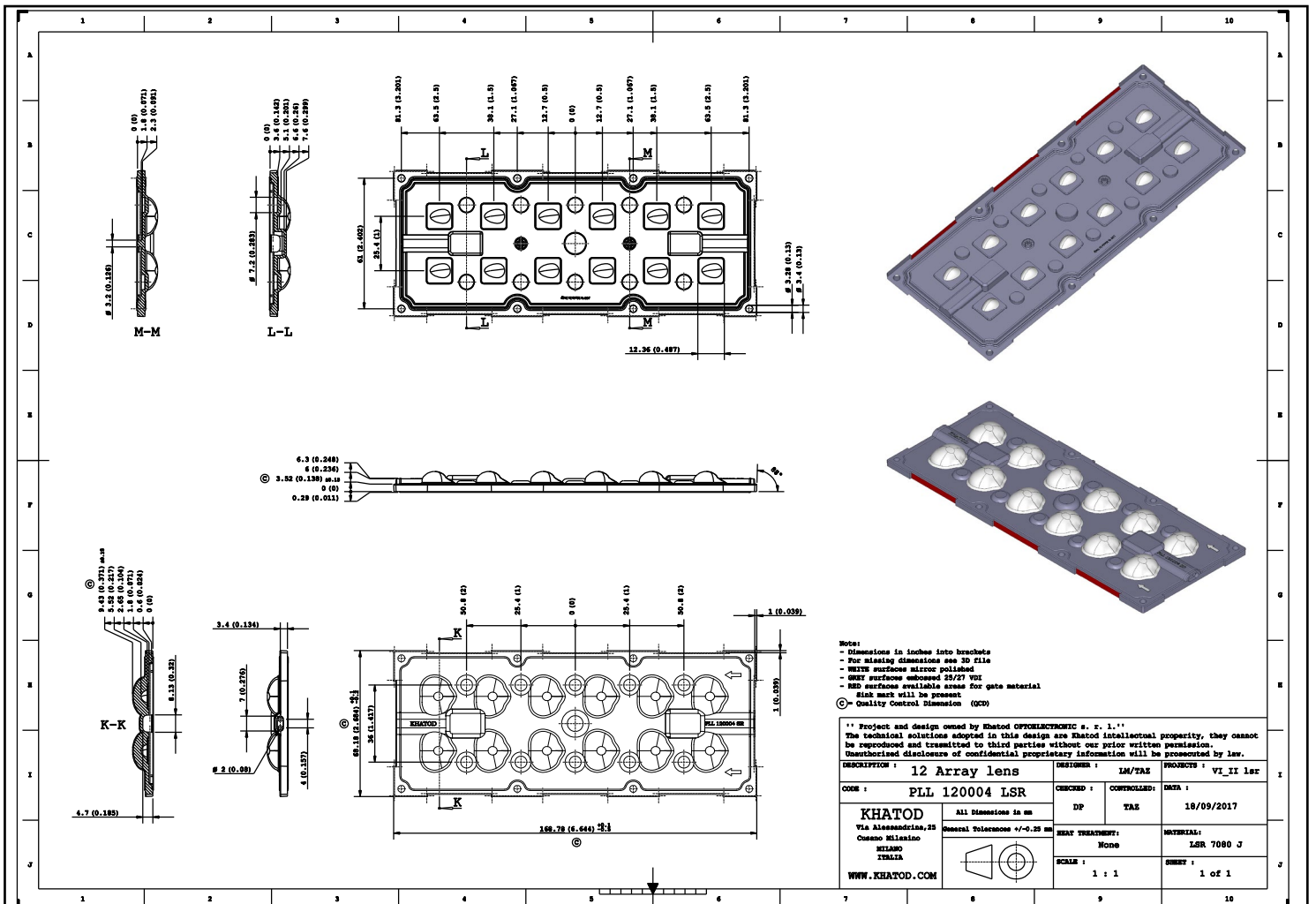
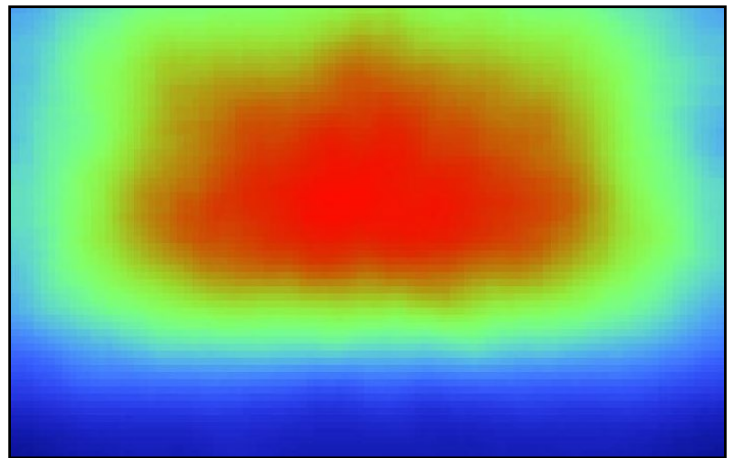
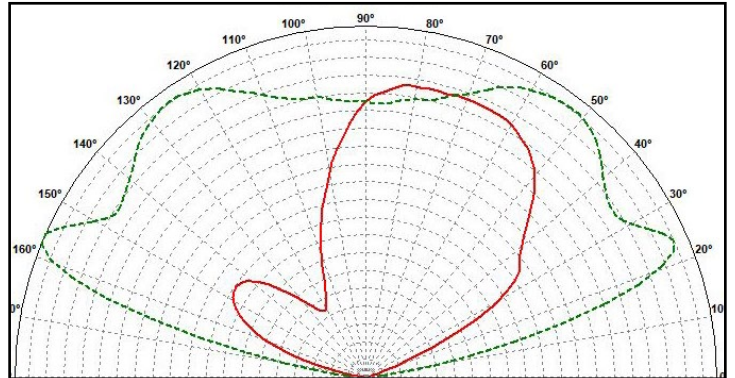
- Material = **SILICONE** for the Lens, PPS black for box
- Full angle at 50% from maximum:  $\sim 80^\circ \times 150^\circ$
- Full angle at 10% from maximum:  $\sim 130^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm<sup>2</sup> LES,  $\sim 260\text{lm}/\text{LED}$



## PLL120004SR - IESNA Type III - ME3a



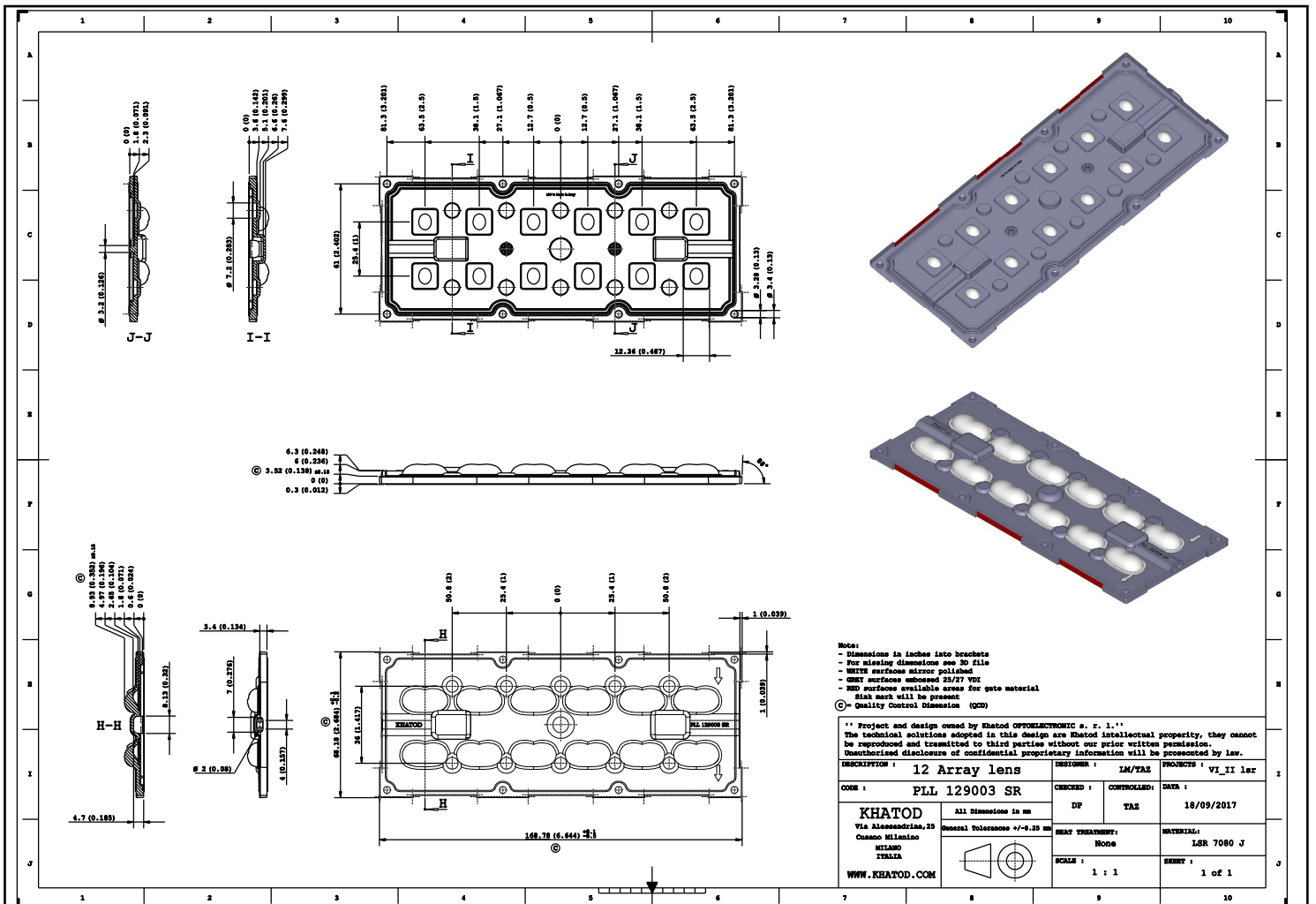
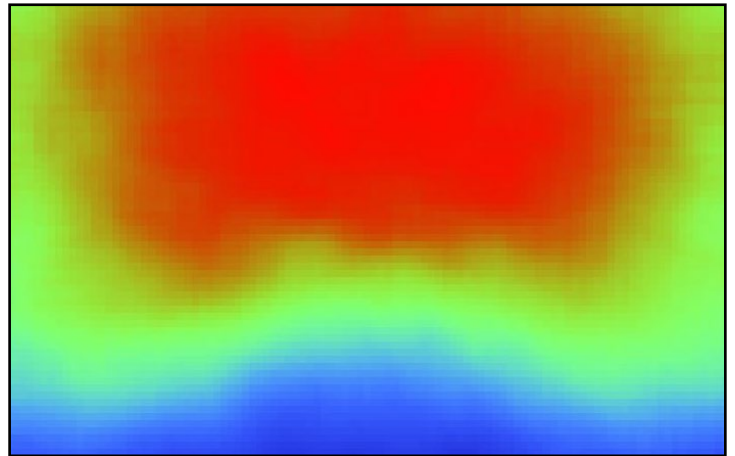
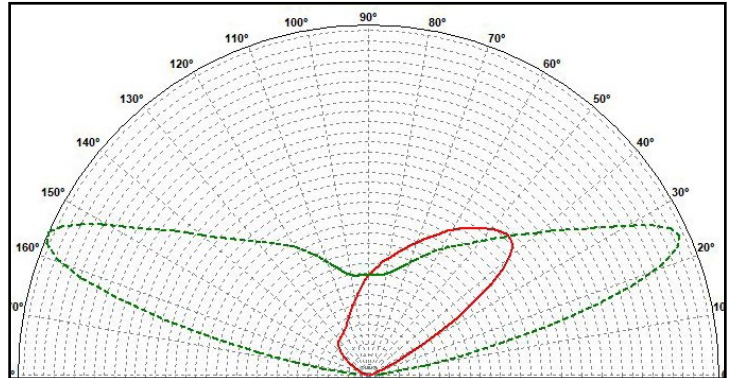
- Material = **SILICONE** for the Lens, PPS black for box
- Full angle at 50% from maximum:  $\sim 130^\circ \times 150^\circ$
- Full angle at 10% from maximum:  $\sim 145^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm<sup>2</sup> LES,  $\sim 260\text{lm}@LED$



## PLL129003 - IESNA Type II



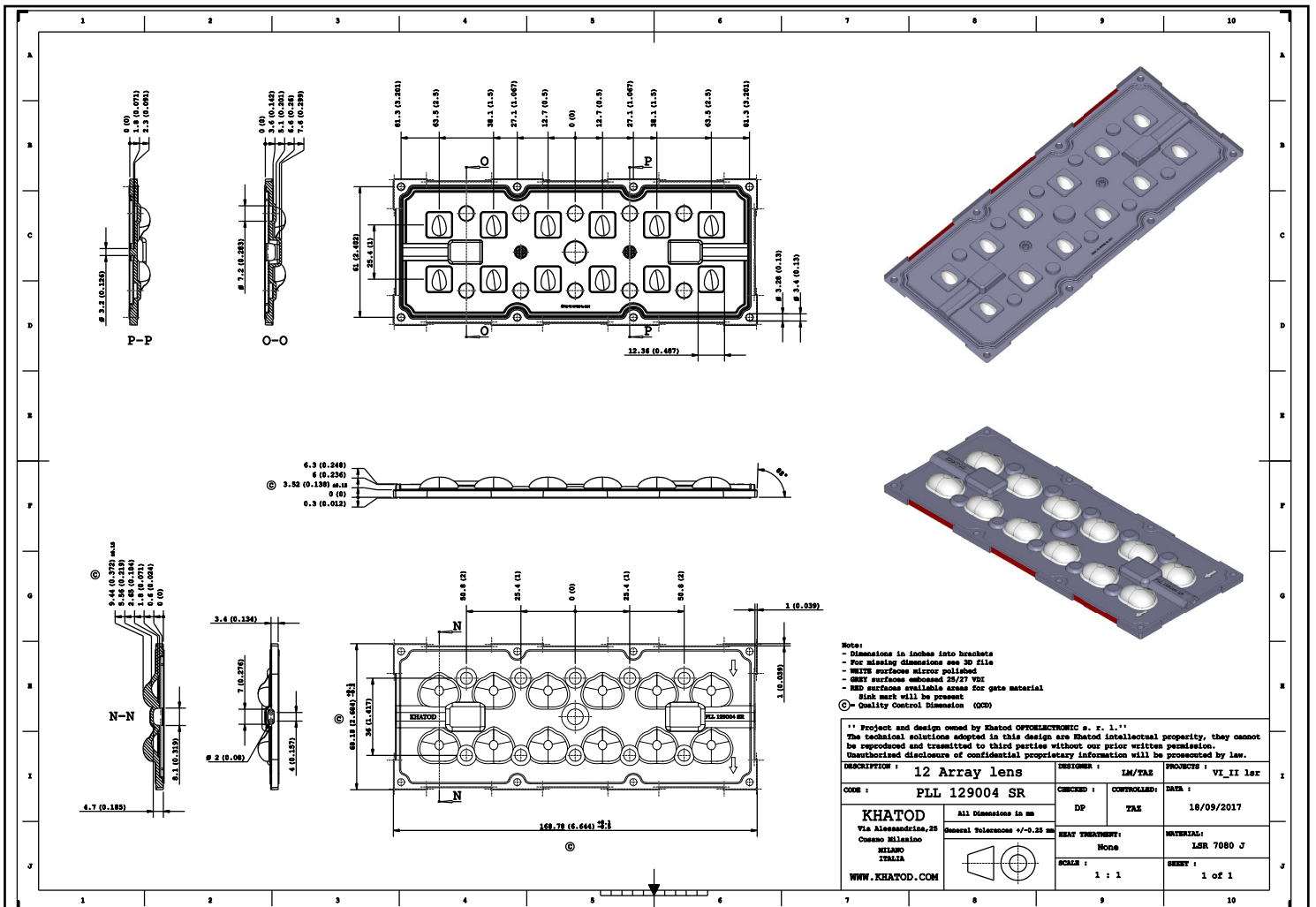
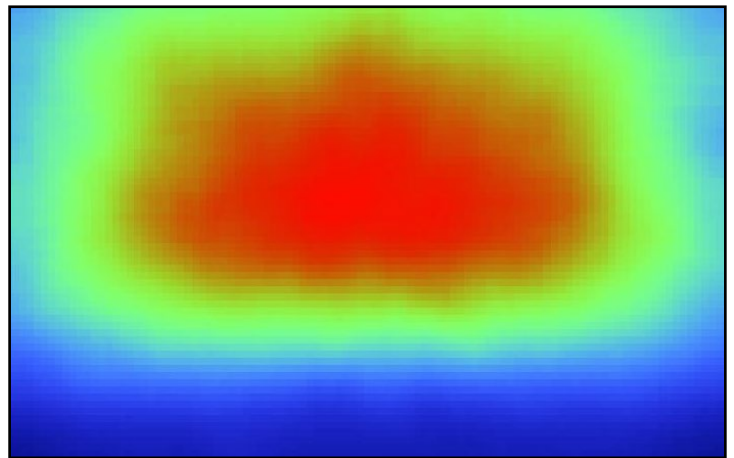
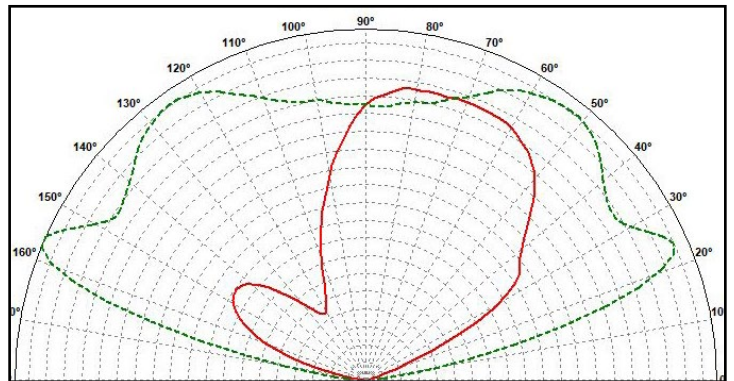
- Material = **SILICONE** for the Lens, PPS black for box
- Full angle at 50% from maximum:  $\sim 80^\circ \times 150^\circ$
- Full angle at 10% from maximum:  $\sim 130^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm<sup>2</sup> LES,  $\sim 260\text{lm}@LED$



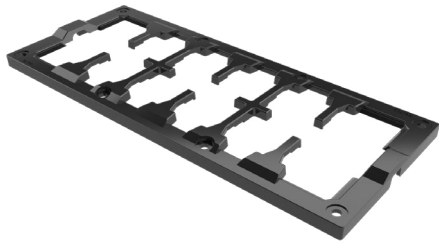
## PLL129004SR - IESNA Type III



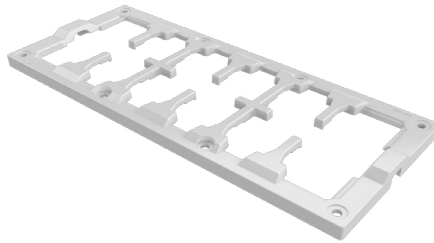
- Material = **SILICONE** for the Lens, PPS black for box
- Full angle at 50% from maximum:  $\sim 130^\circ \times 150^\circ$
- Full angle at 10% from maximum:  $\sim 145^\circ \times 160^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm<sup>2</sup> LES,  $\sim 260\text{lm}@LED$



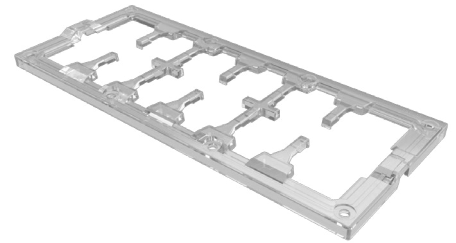
## KEL12



KEL12/01 - PPS BLACK  
STANDARD

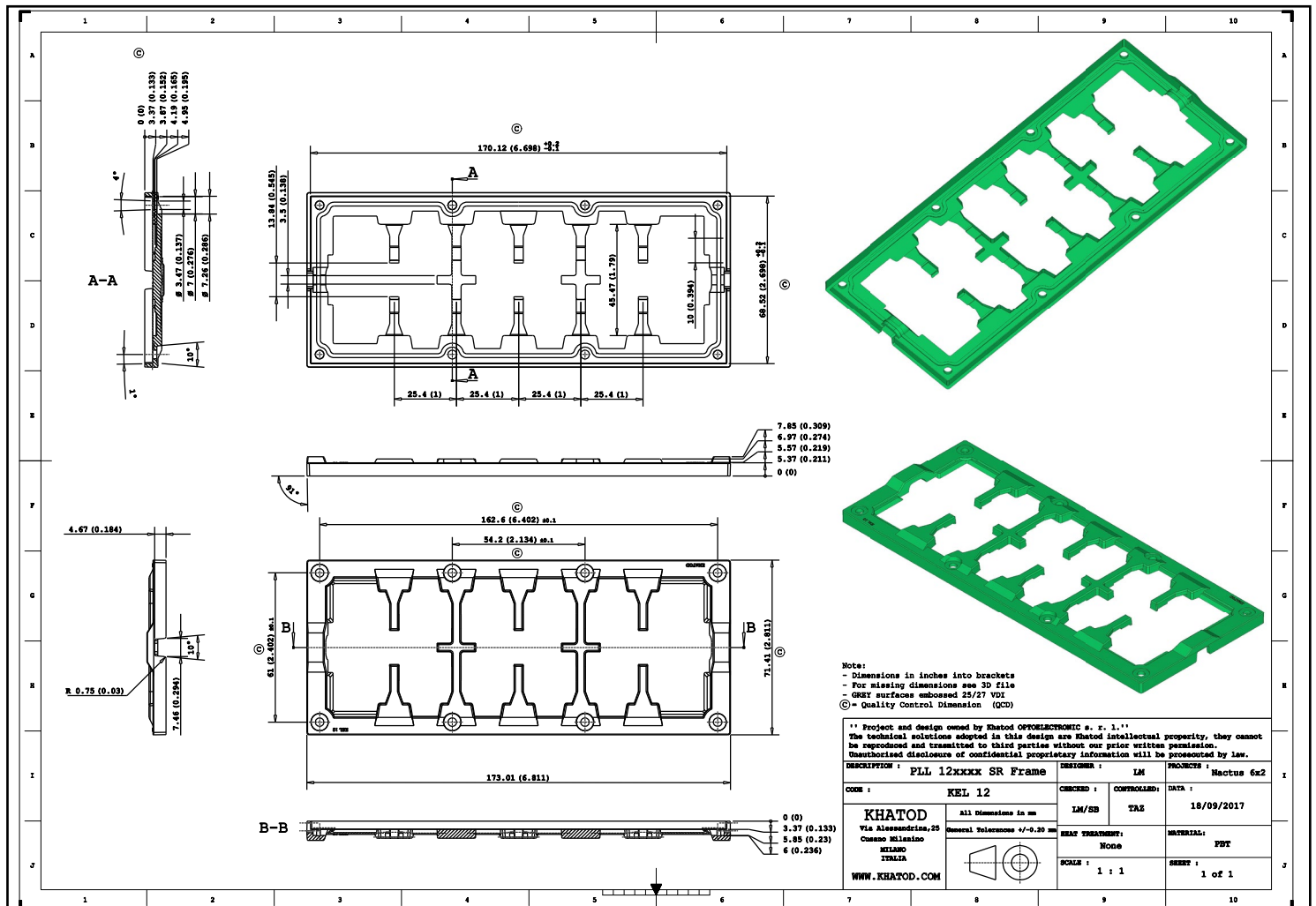


KEL12 - PPS NATURAL  
On Request



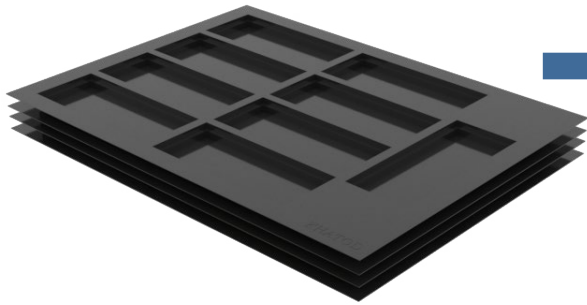
KEL12ALU - ALUMINIUM  
On Request

## KEL12 Drawing



## Packaging

Item	Quantity	Total Parts	Size (L*W*H)	G.W.
Tray	9 pcs per Tray	9 pcs	50*32 cm	0.52 Kg
Outer Box	20 Trays per Outer Box	180 pcs	50*32*38 cm	10.5 Kg



20 Trays / 9 Modules each



20 Trays / Outer Box

## Determination of thermal shock resistance degree LEDs ON @ 1A - Temperature set in the climatic chamber 40°C

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### Initial Visual Inspection

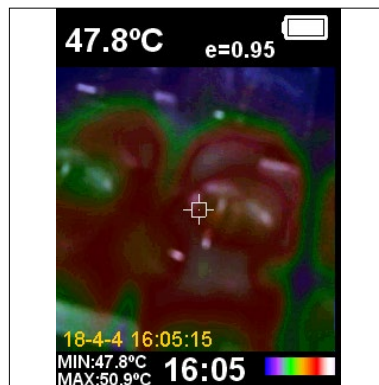
Before starting with testing, a visual inspection was performed in order to check the integrity of the part under test.

The part resulted physically intact.

Photo: the part in the climatic chamber.



Temperature set in the climatic chamber



Temperature detected on the part by IR thermal camera



### Final Visual Inspection

After testing, a final visual inspection was performed. The result was positive. (view photo)

Photo: the part in the climatic chamber after testing.

The PLL12xxxSR test specimen, with 1A LEDs on, proved to overcome the thermal stress test up to 40°C, that is the temperature set in the climatic chamber.

Based on the testing results, no physical deterioration of the material occurred.

## Determination of mechanical impact resistance degree (IK tests)

### Note

The present document is an internal document showing the tests carried out by Khatod in its laboratory. The tests, photos and videos presented in this document are made available for demonstration purposes only. Khatod, with its laboratory, is not a certification body. If customers need IK accredited certifications, they have to apply to the appointed Certification Bodies, under their sole care and responsibility.

### Initial Visual Inspection

- Before starting with testing, a visual inspection was performed in order to check the integrity of the part under test. The part resulted physically intact.

### Tests Execution

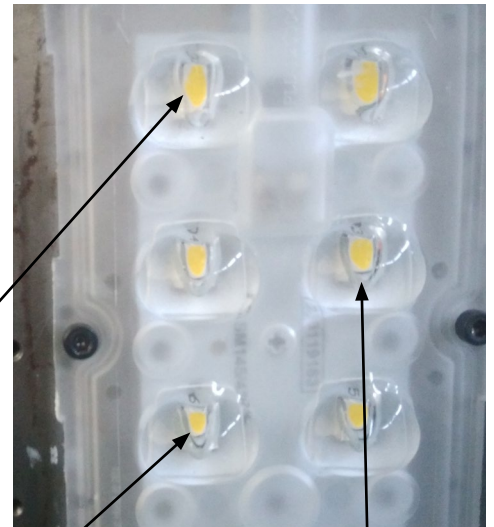
Tests were carried out on the part under test according to IK06 (1 Joule)  
Test parameters are as follows:

- Impact energy: 1 Joule
- Impacting element: 500 grams
- Distance between impacting element and the part under test: 20 cm
- Number of impacts: 5

1st impact test

2nd impact test

3rd impact test



1<sup>st</sup> TEST



2<sup>nd</sup> TEST



3<sup>rd</sup> TEST



Final Visual Inspection:  
After testing, a final visual inspection was performed.  
The result was positive. (view photo)

## IP X5 Test

### Note

The present document is an internal document showing the tests carried out by Khatod in its laboratory. The tests, photos and videos presented in this document are made available for demonstration purposes only. Khatod, with its laboratory, is not a certification body.

If customers need IP accredited certifications, they have to apply to the appointed Certification Bodies, under their sole care and responsibility.

### Data and Analysis

The sample has been subjected to the water-penetration resistance test as follows:

- Assembly of the components to test :  
A moisture indicator paper sheet has been interposed between the lens and the clamping base
- Positioning of the assembled sample under the device of watering with nozzle Ø 6.3 millimeters
- Water flow: 12.5 l/min  $\pm$  5%
- Water pressure: 30 kPa @ distance of 3m
- Duration of water spraying test on the wrap surface per m<sup>2</sup> : 1 min
- Minimum duration of the test: 3 min
- Distance between the nozzle and the wrap surface: 2.5 Meters



Testing under water jet



Testing under water jet

### Conclusion



The test paper sheet is dry

As shown in the photo, the test paper sheet is completely dry after disassembling the system.

The product has passed the Khatod test.

## Materials

Material	Top
SILICONE for Lens	-40°...130°C
PPS for Box KEL12	-40°...130°C

## Notes:

- Intensity (I) and illuminance (E) data are normalized by 1000 lm
- The optical values shown are the result of optical simulations carried out with ASAP and ZEMAX software systems. The optical simulations are carried out on the basis of the typical values provided in the LED manufacturers' official datasheets. The photometric analysis has been carried out on physical samples. On request, by supplying your PCB, we can provide the measurement photometric file.

## Use and Maintenance

- DO NOT HANDLE OR INSTALL LENSES WITHOUT WEARING GLOVES, SKIN OILS MAY DAMAGE LENS OR LIGHT TRANSMISSION;
- CLEAN LENSES WITH MILD SOAP AND WATER AND A SOFT CLOTH;
- DO NOT USE ANY COMMERCIAL CLEANING SOLVENTS ON LENSES.

## Disclaimer

Please note that flow lines and weld lines on the external surfaces of the lenses are acceptable if the optical performance of the lens is within the specifications.

Should you require further information, please contact Khatod for advice. All lens testing must be subject to identical conditions as Khatod test condition. Khatod Optoelectronic, Milan, Italy, manufactures lenses for LEDs. Any other use of the lens shall void our liability and warranty. The lenses are an inert component to be used in the manufacture of various products. Our warranty and liability are limited only to the manufacture of the lens. You may not modify, copy, distribute reproduce, license or alter the lens and related materials of Khatod. Khatod does not warrant against damages or defects arising out of the use or misuse of the products; against defects or damage arising from improper installation, or against defects in the product or in its components. No warranty of any kind, expressed or implied, is made regarding the safety of the products. The entire risk as to the quality or performance of the product is with the buyer. In no event shall Khatod be liable for any direct, indirect, punitive, incidental, special, consequential damages, or any damages whatsoever arising out of or connected with the use or misuse of the product. Khatod shall not have any obligation with respect to the product or any part thereof, whether based on contract, tort, strict liability or otherwise. Buyer assumes all risks and liability from use of the product. The laws of Milan, Italy govern this product warranty and liability and you hereby consent to the exclusive jurisdiction and venue of courts in Milan, Italy in all disputes arising out of or relating to the use of this product. Production, marketing, distribution, sale of these products as well as their possible modifications and variations are only exclusive right of Khatod Optoelectronic. No company can perform any of these actions without written permission released by Khatod Optoelectronic. The information contained in this document is proprietary of Khatod Optoelectronic and may change without notice.

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