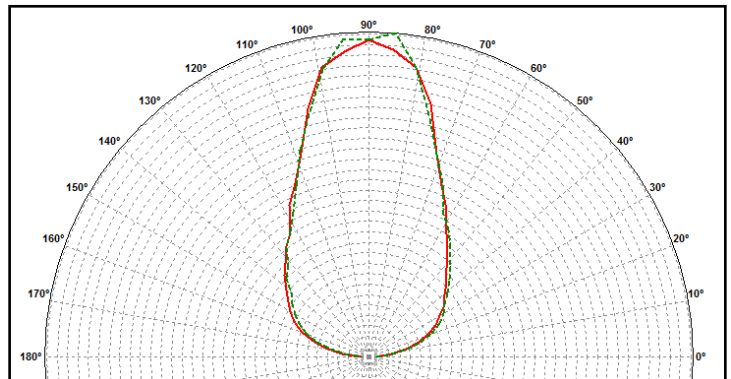


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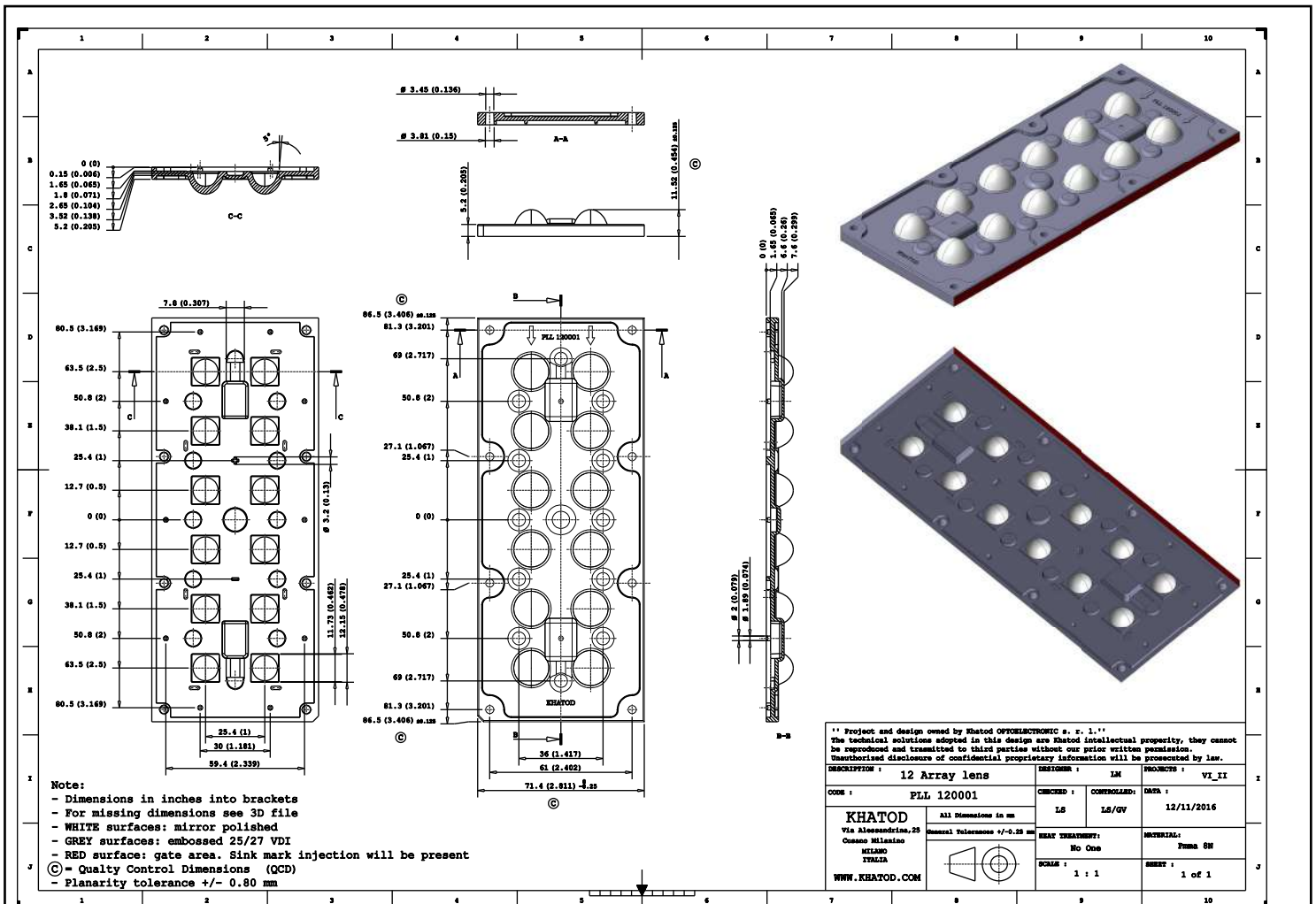
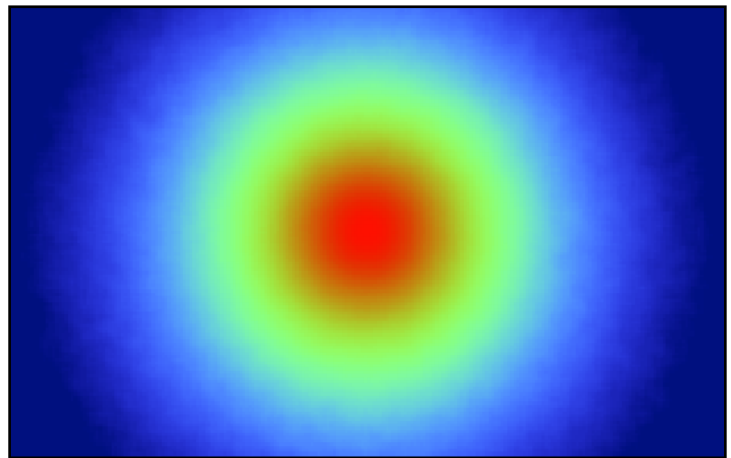
Note: The SPOT depends on the LED models you will use

PLL120001 - 60° FWHM



It works also with 5050 LEDs

- Material = PMMA Clear, Non-yellowing, 10-year guarantee**
- Full angle at 50% from maximum: ~ 60°
- Full angle at 10% from maximum: ~ 160°
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, ~260lm@LED

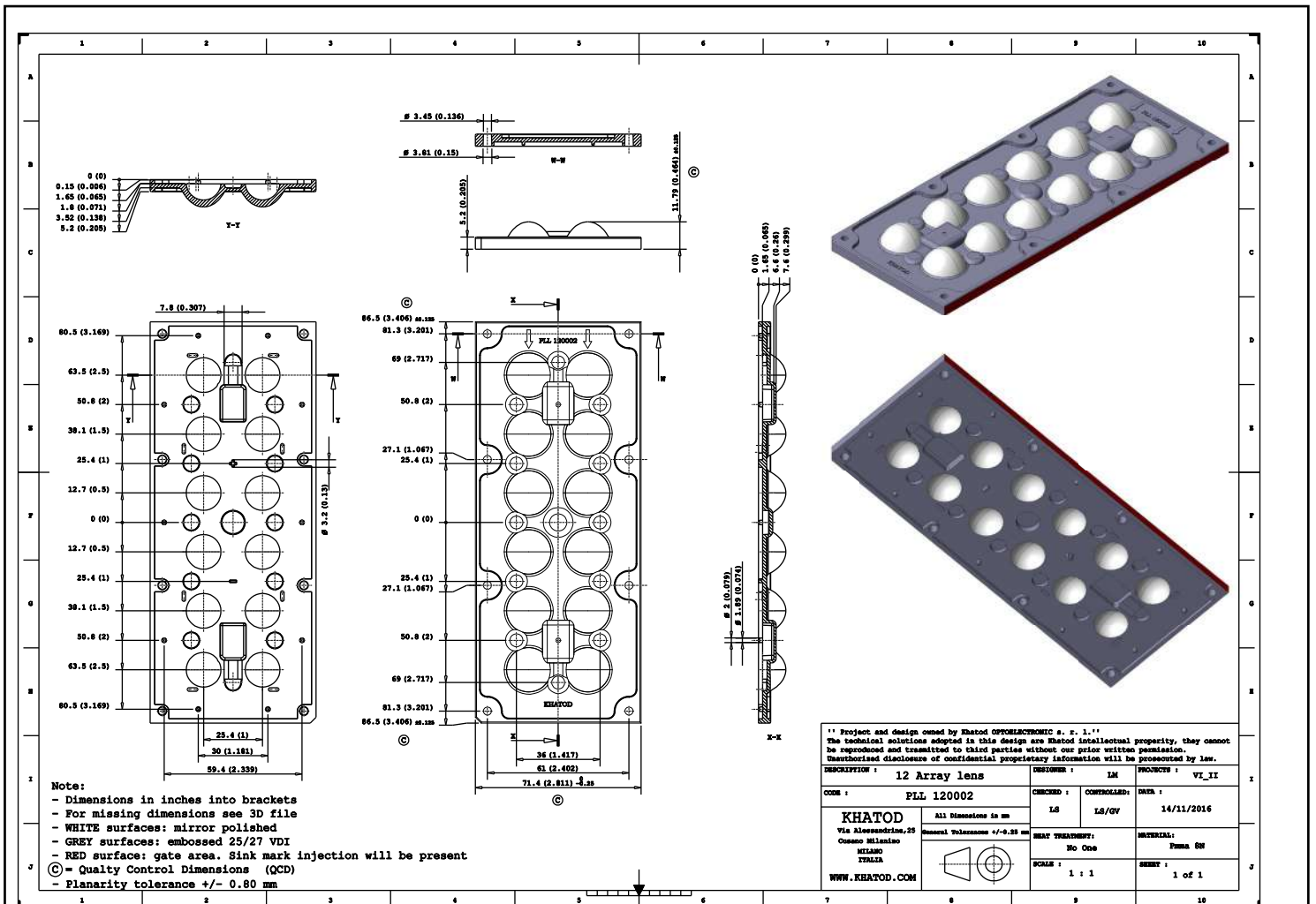
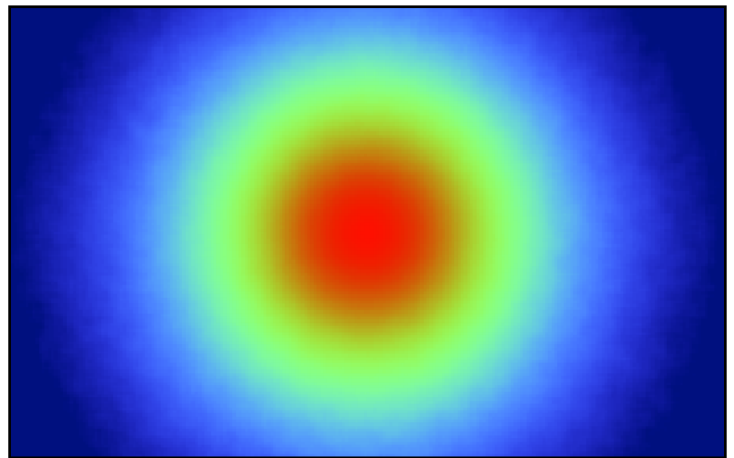
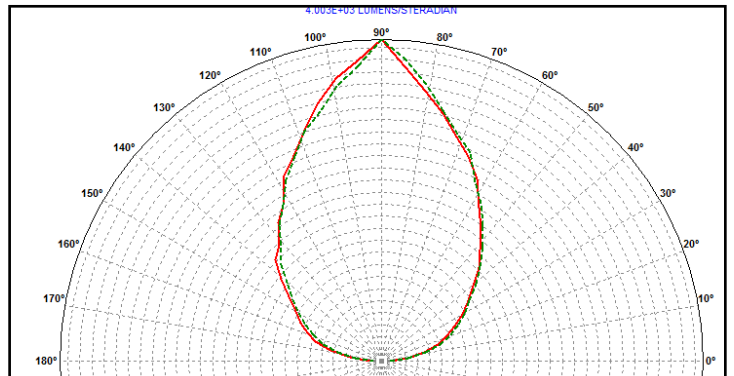


PLL120002 - 90° FWHM

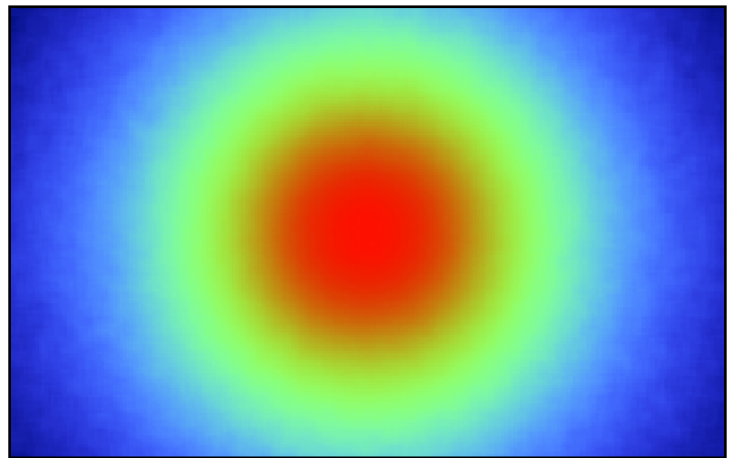
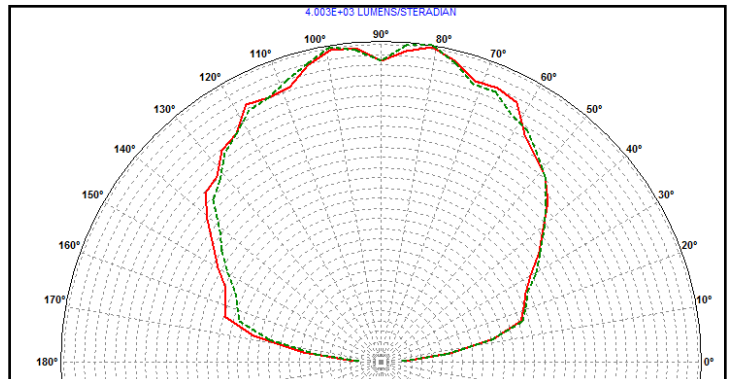


It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: ~ 85°
- Full angle at 10% from maximum: ~ 165°
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, ~260lm@LED

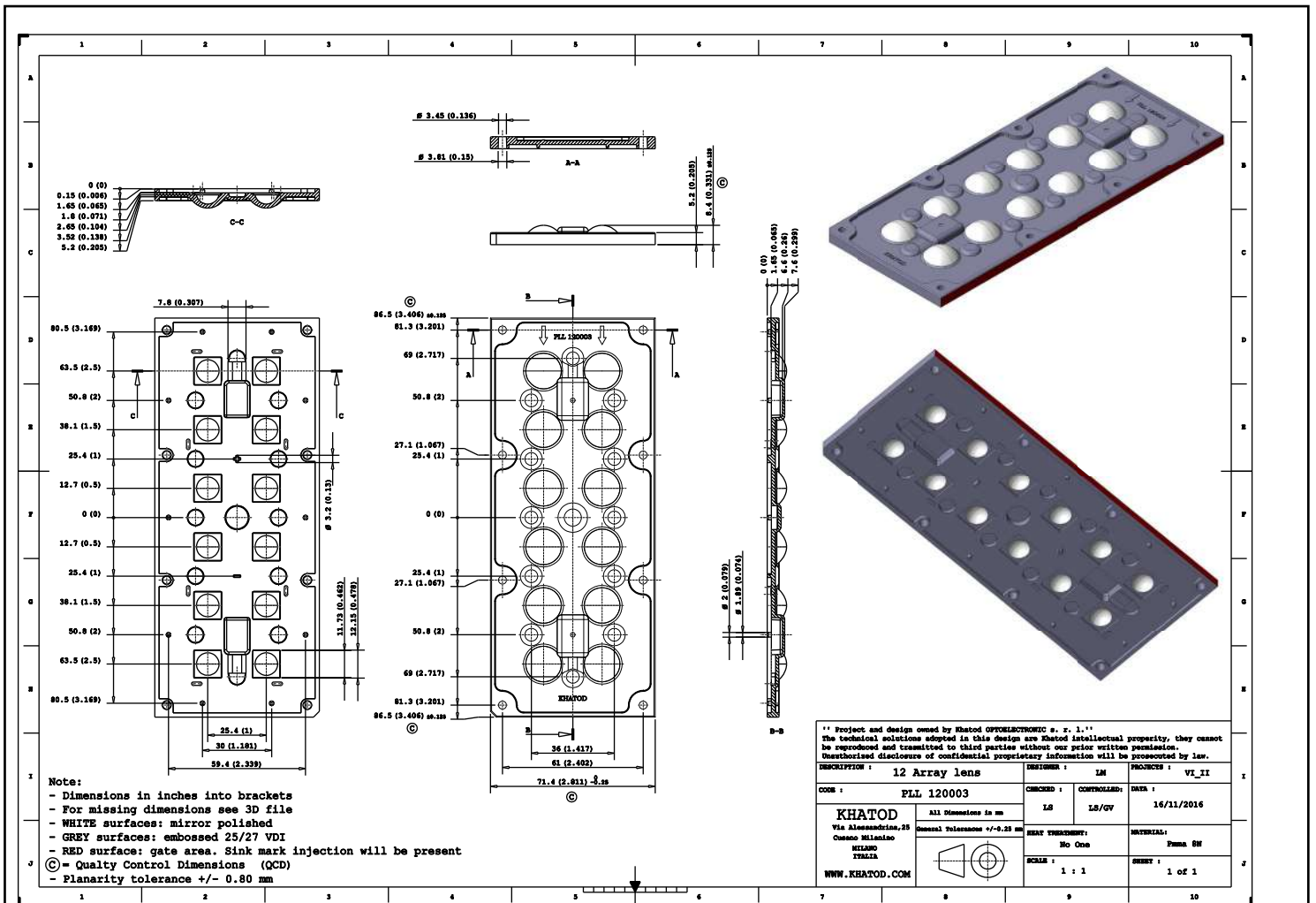


PLL120003 - 120° FWHM

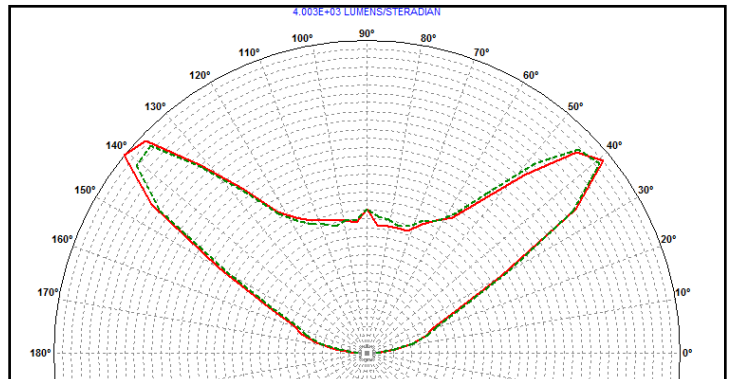


It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: ~ 130°
- Full angle at 10% from maximum: ~ 165°
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, ~260lm@LED

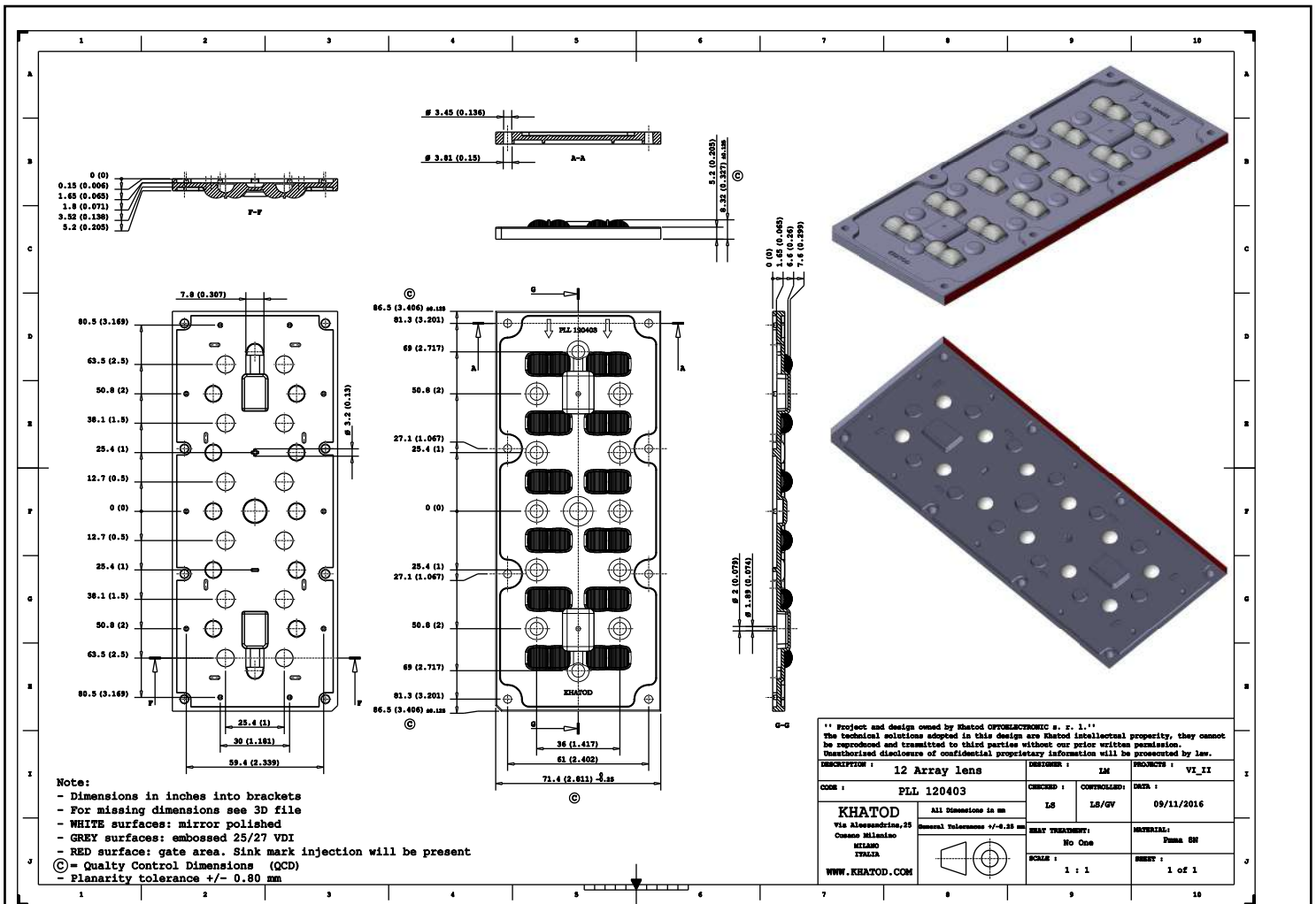
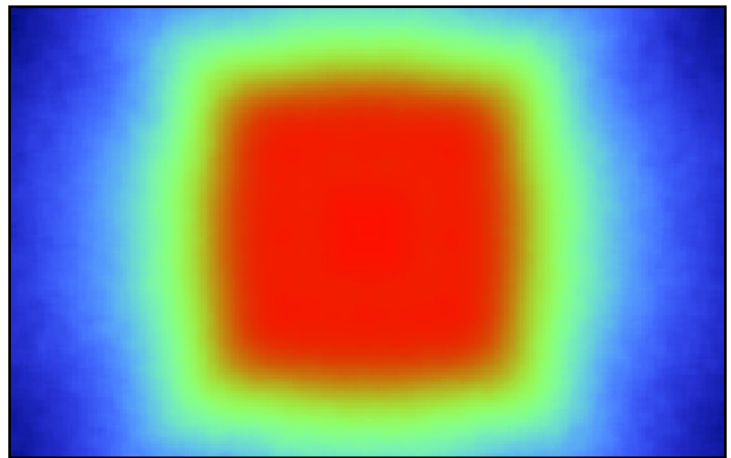


PLL120004 - 130° FWHM Square



It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 120^\circ \times 120^\circ$
- Full angle at 10% from maximum: $\sim 165^\circ \times 165^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$

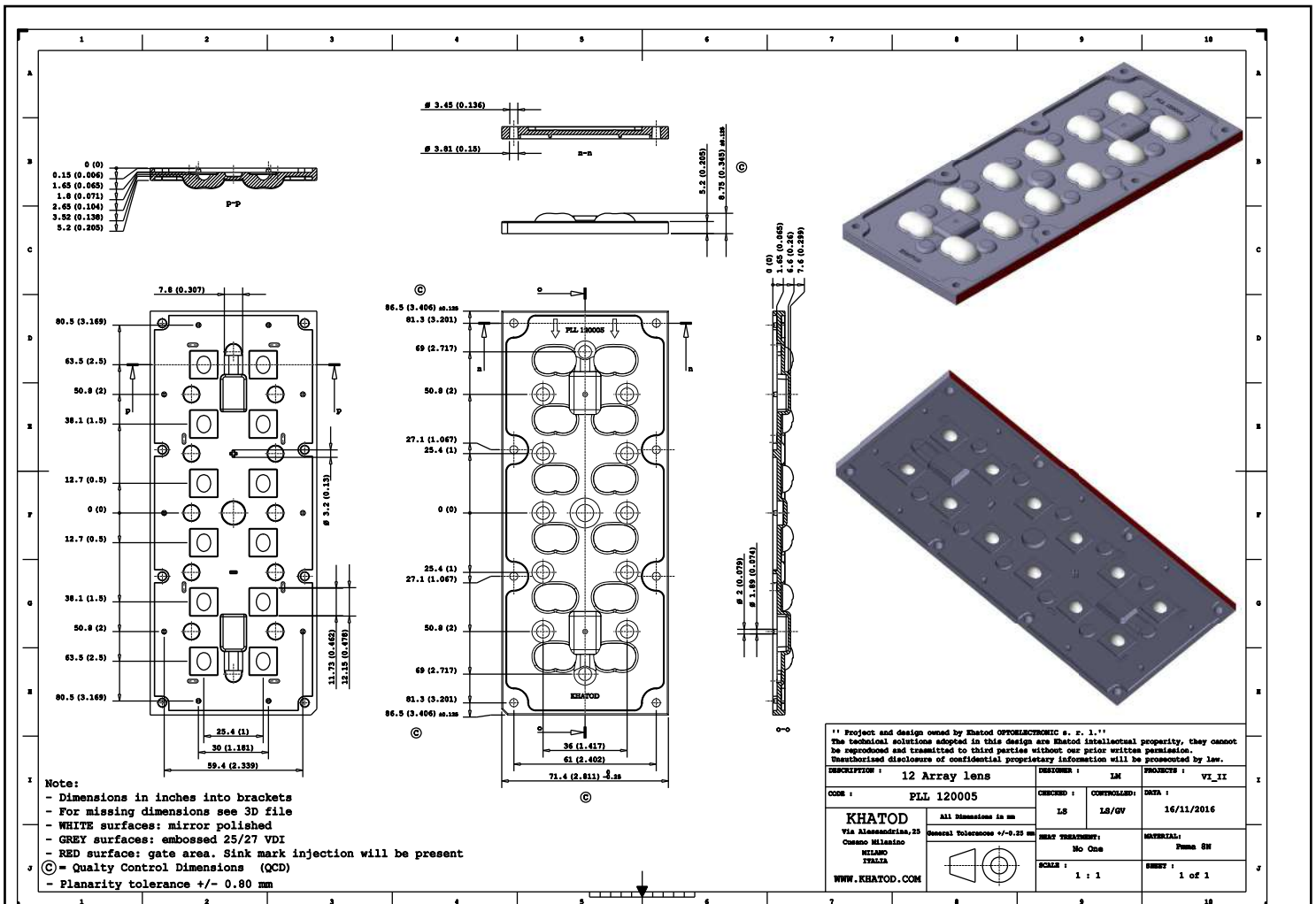
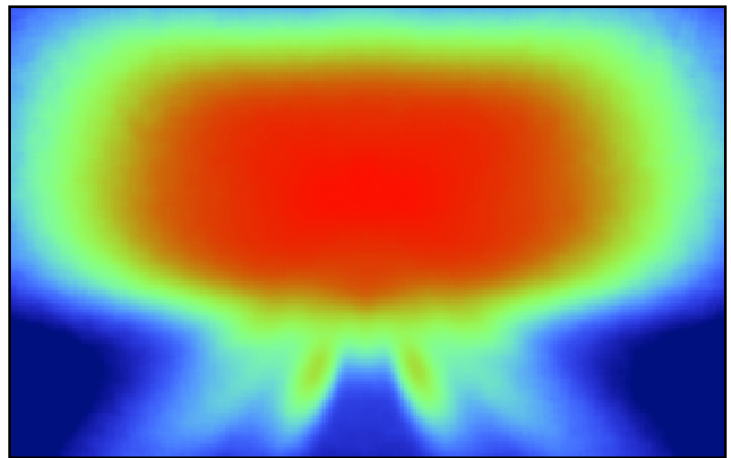
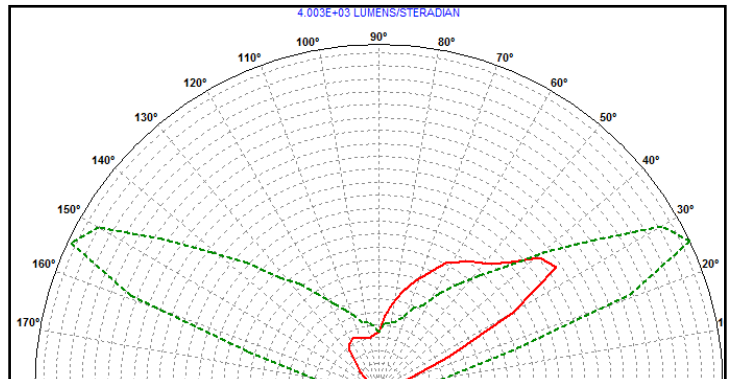


PLL120005 - IESNA Type III

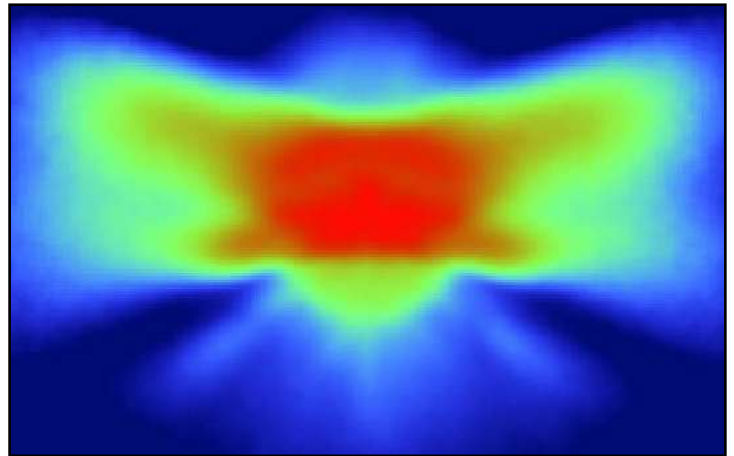
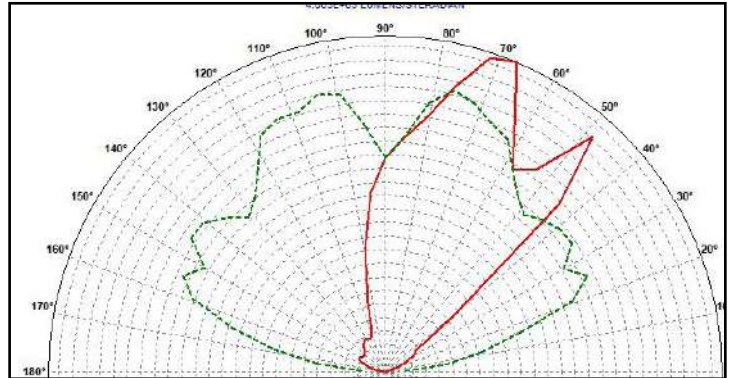


It works also with 5050 LEDs

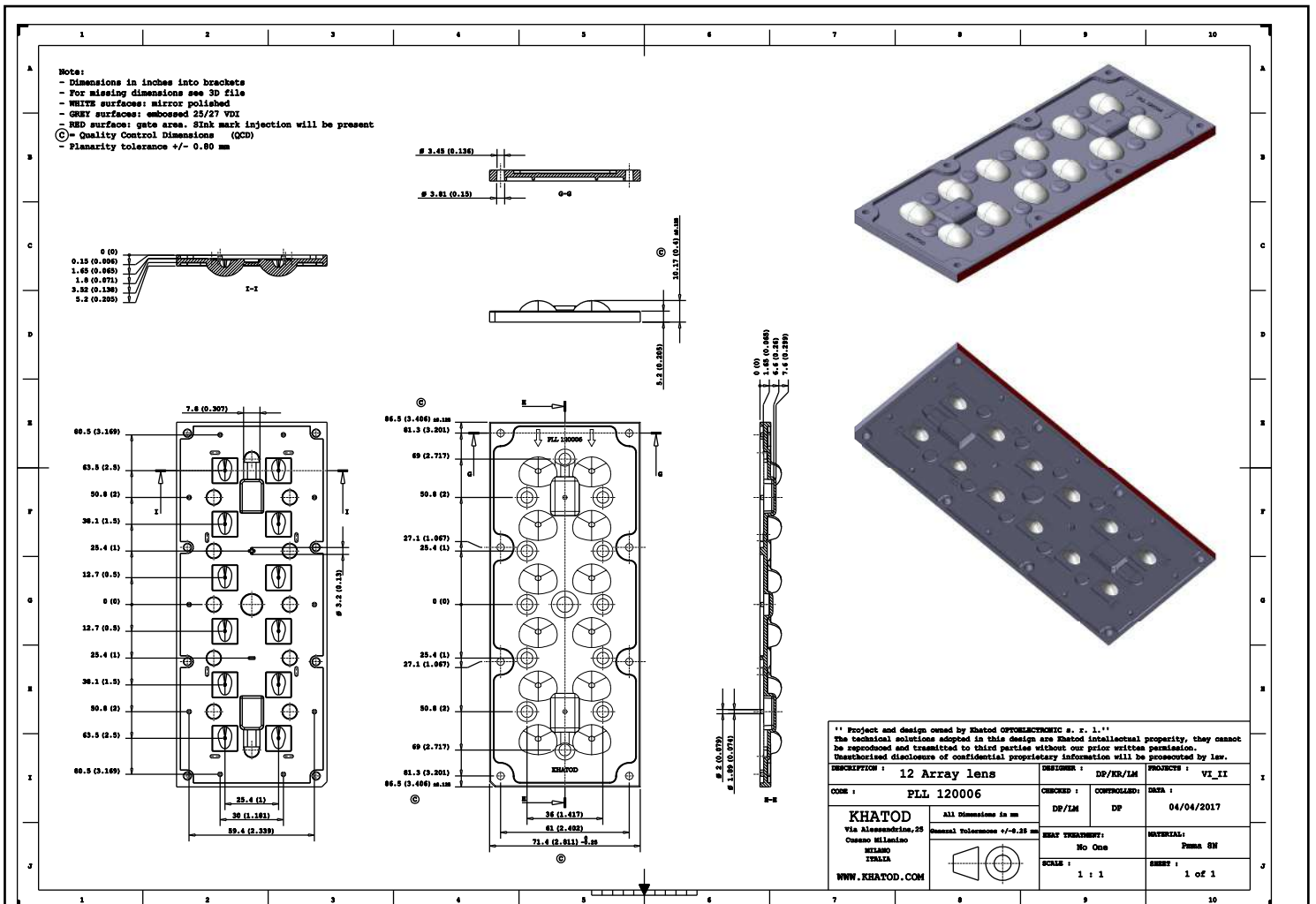
- Material = PMMA Clear, **Non-yellowing**, **10-year guarantee****
- Full angle at 50% from maximum: $\sim 146^\circ \times 106^\circ$
- Full angle at 10% from maximum: $\sim 157^\circ \times 152^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$



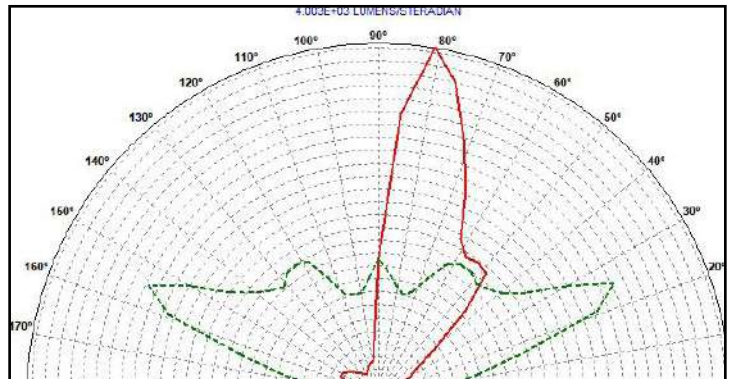
PLL120006 - IESNA Type III



- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 150^\circ \times 58^\circ$
- Full angle at 10% from maximum: $\sim 160^\circ \times 135^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$

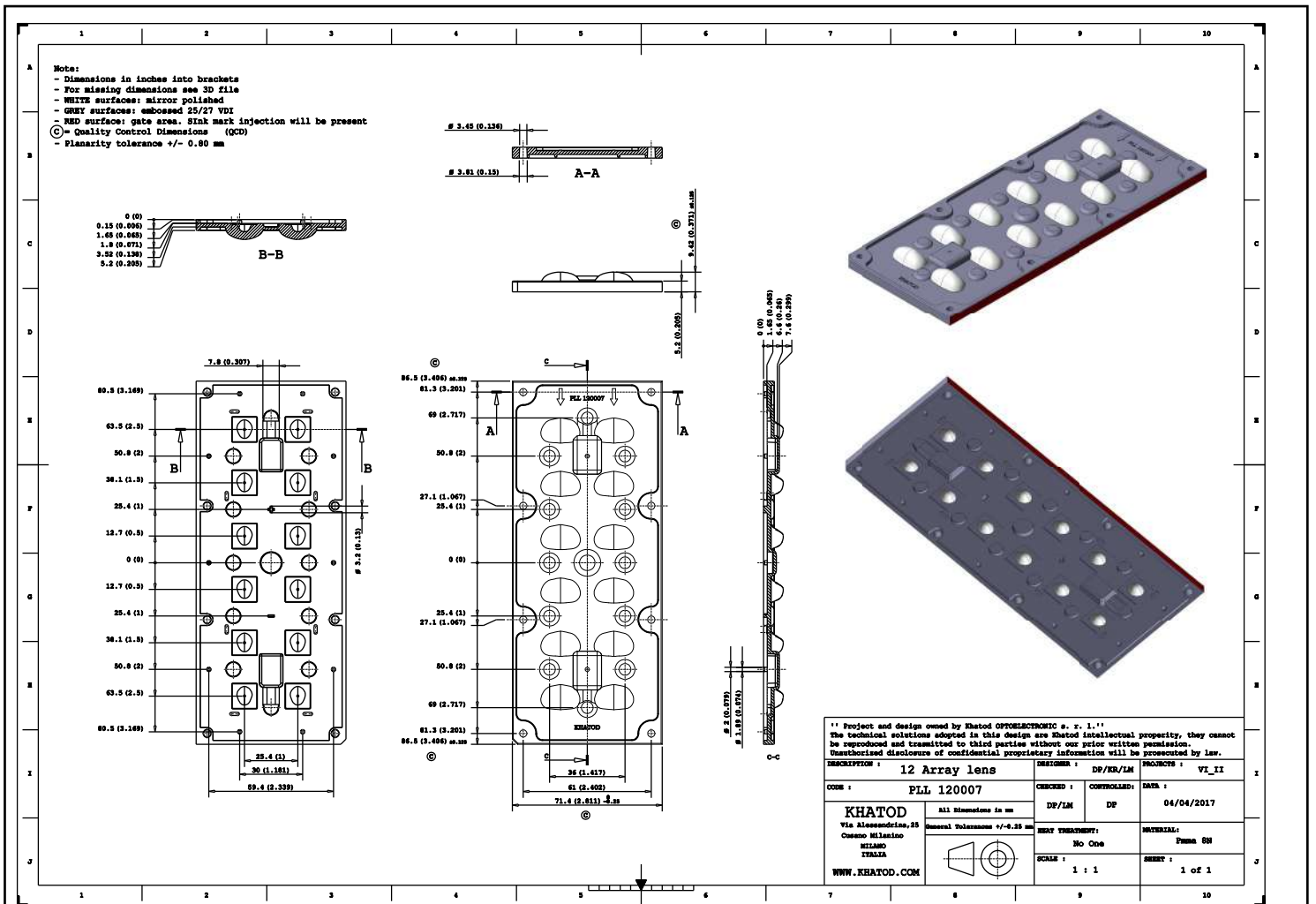
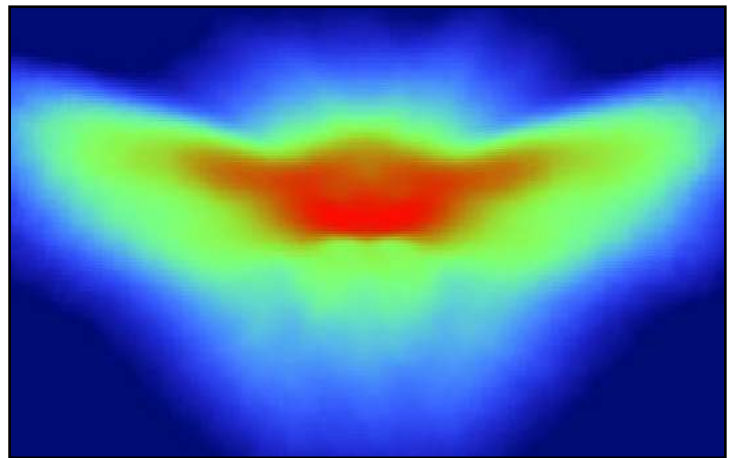


PLL120007 - IESNA Type II

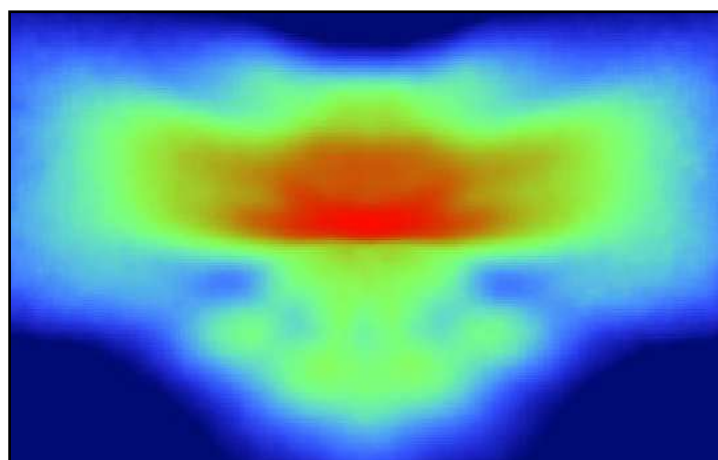
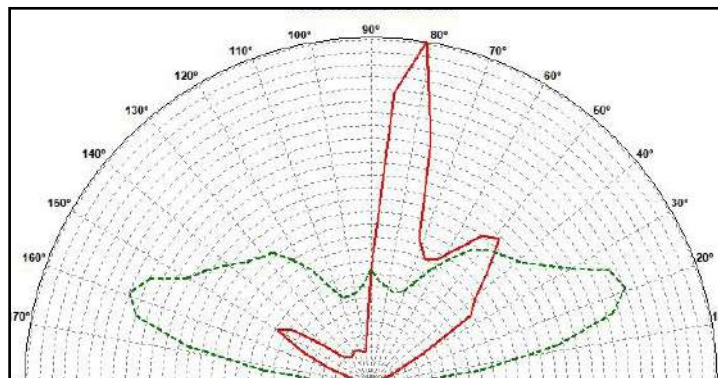


It works also with 5050 LEDs

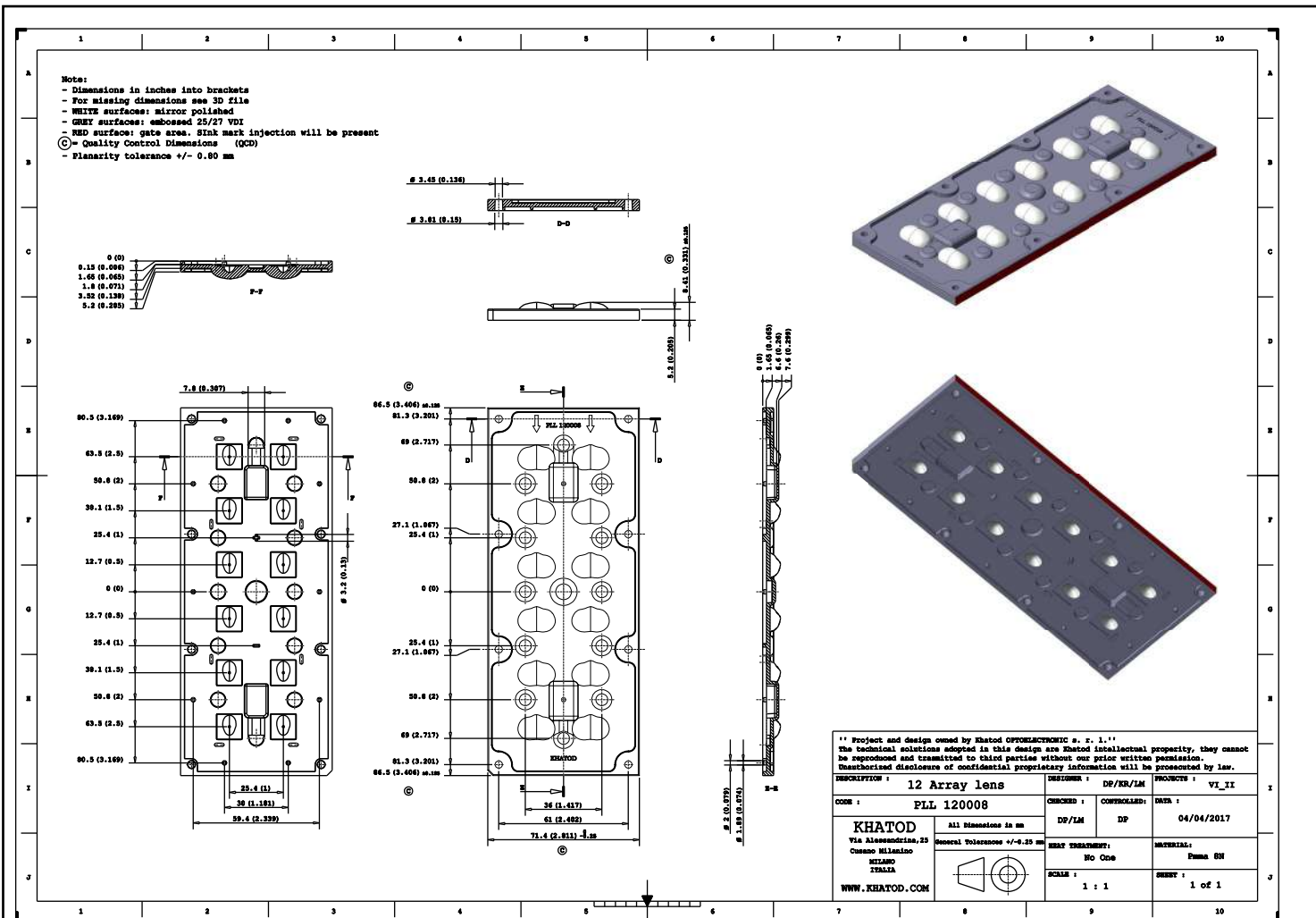
- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 150^\circ \times 30^\circ$
- Full angle at 10% from maximum: $\sim 160^\circ \times 130^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$



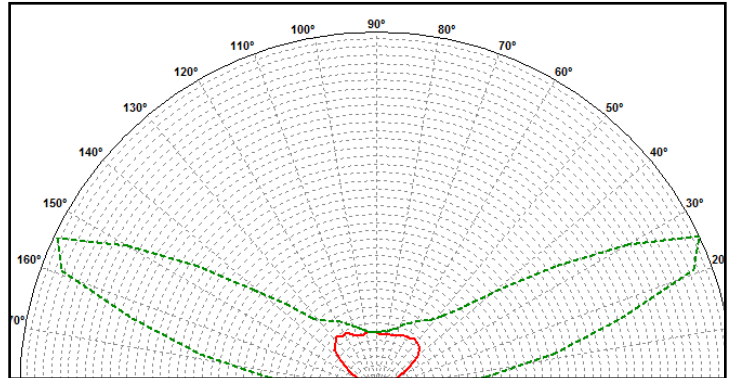
PLL120008 - IESNA Type III



- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 160^\circ \times 110^\circ$
- Full angle at 10% from maximum: $\sim 165^\circ \times 140^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm@LED}$

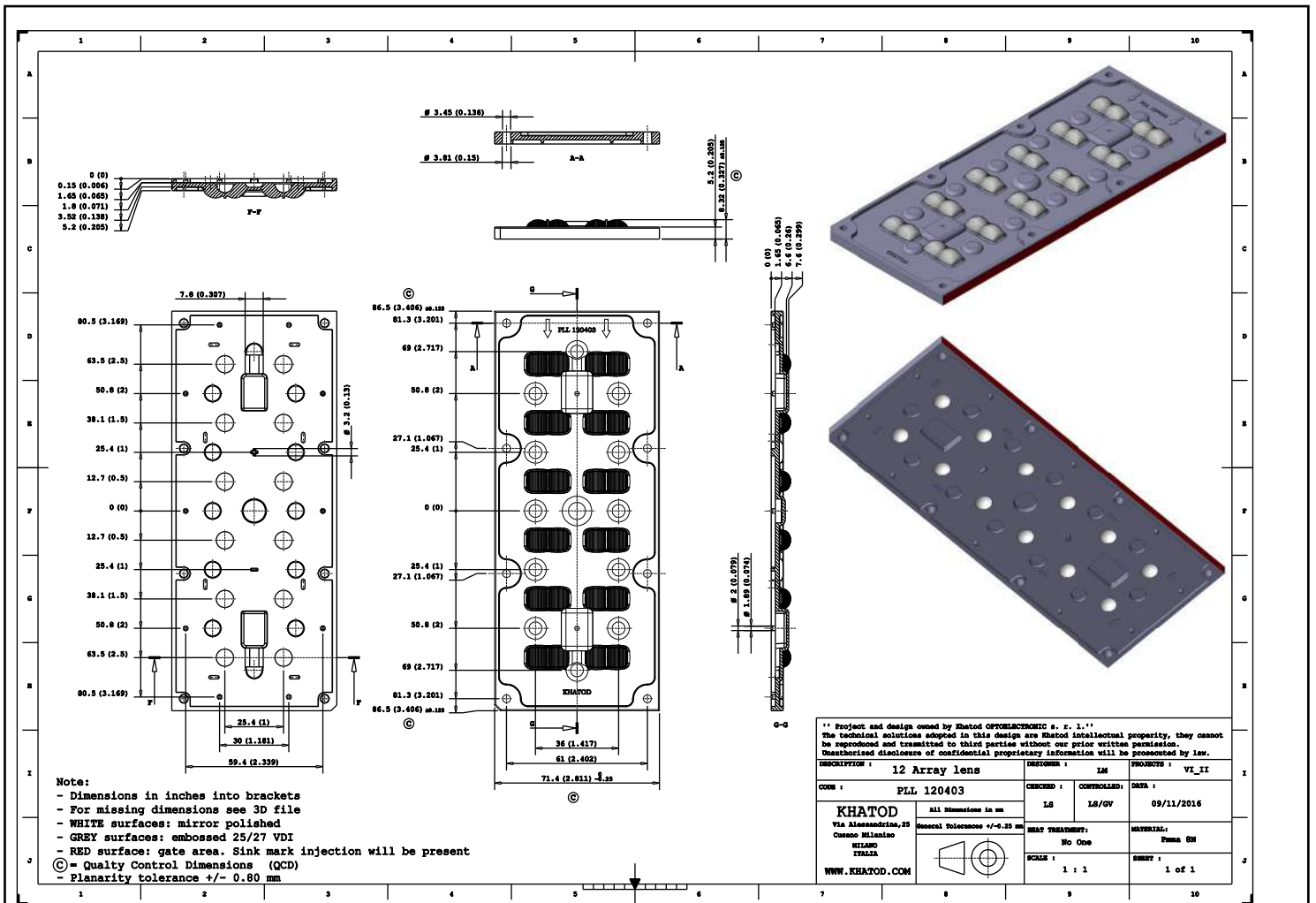
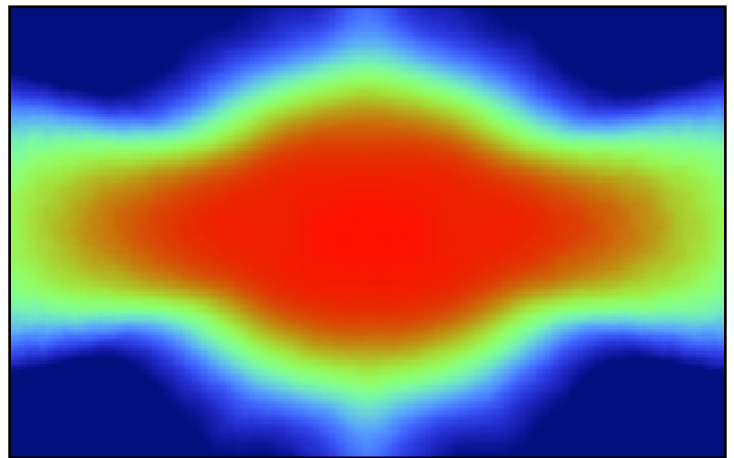


PLL120403 - IESNA Type I



It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 155^\circ \times 110^\circ$
- Full angle at 10% from maximum: $\sim 170^\circ \times 150^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$

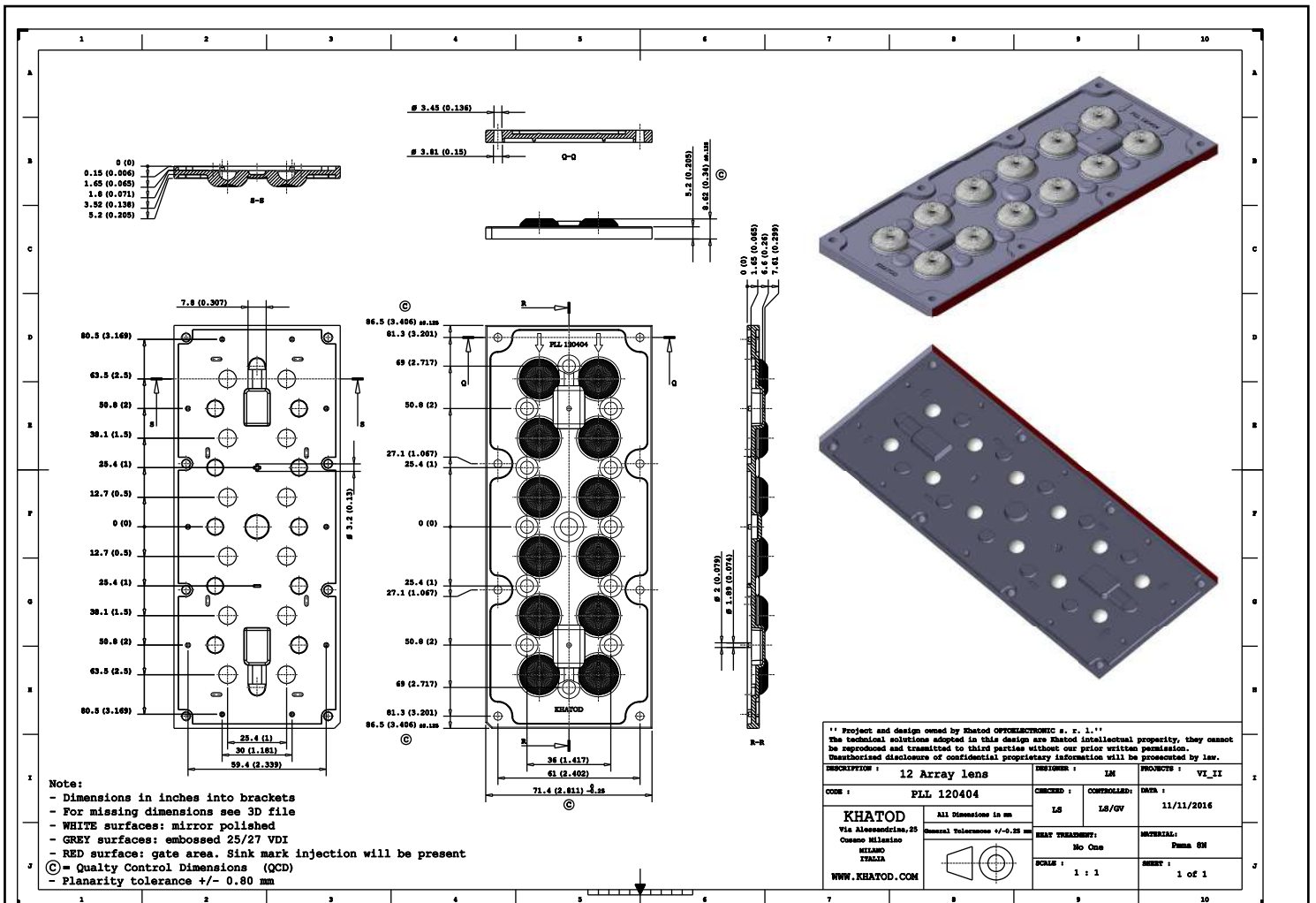
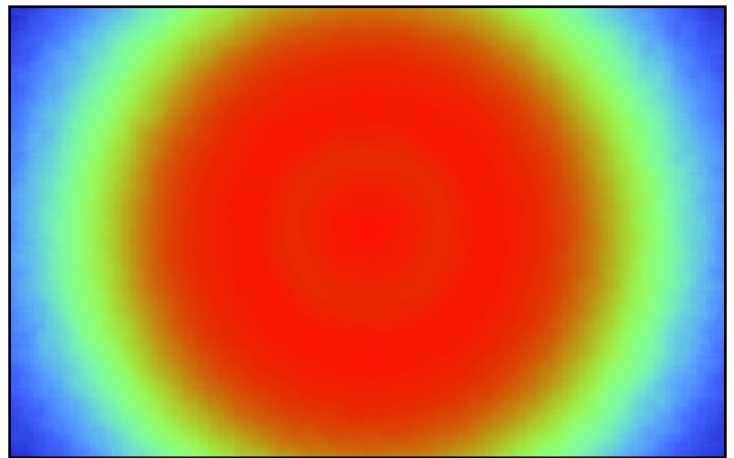
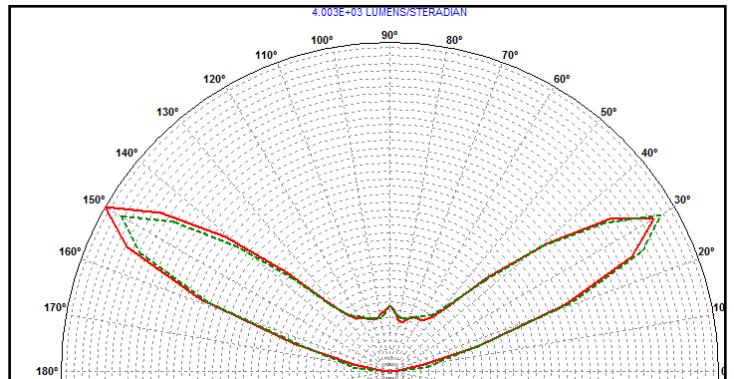


PLL120404 - IESNA Type V - 120° FWHM



It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: ~ 140°
- Full angle at 10% from maximum: ~ 155°
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, ~260lm@LED

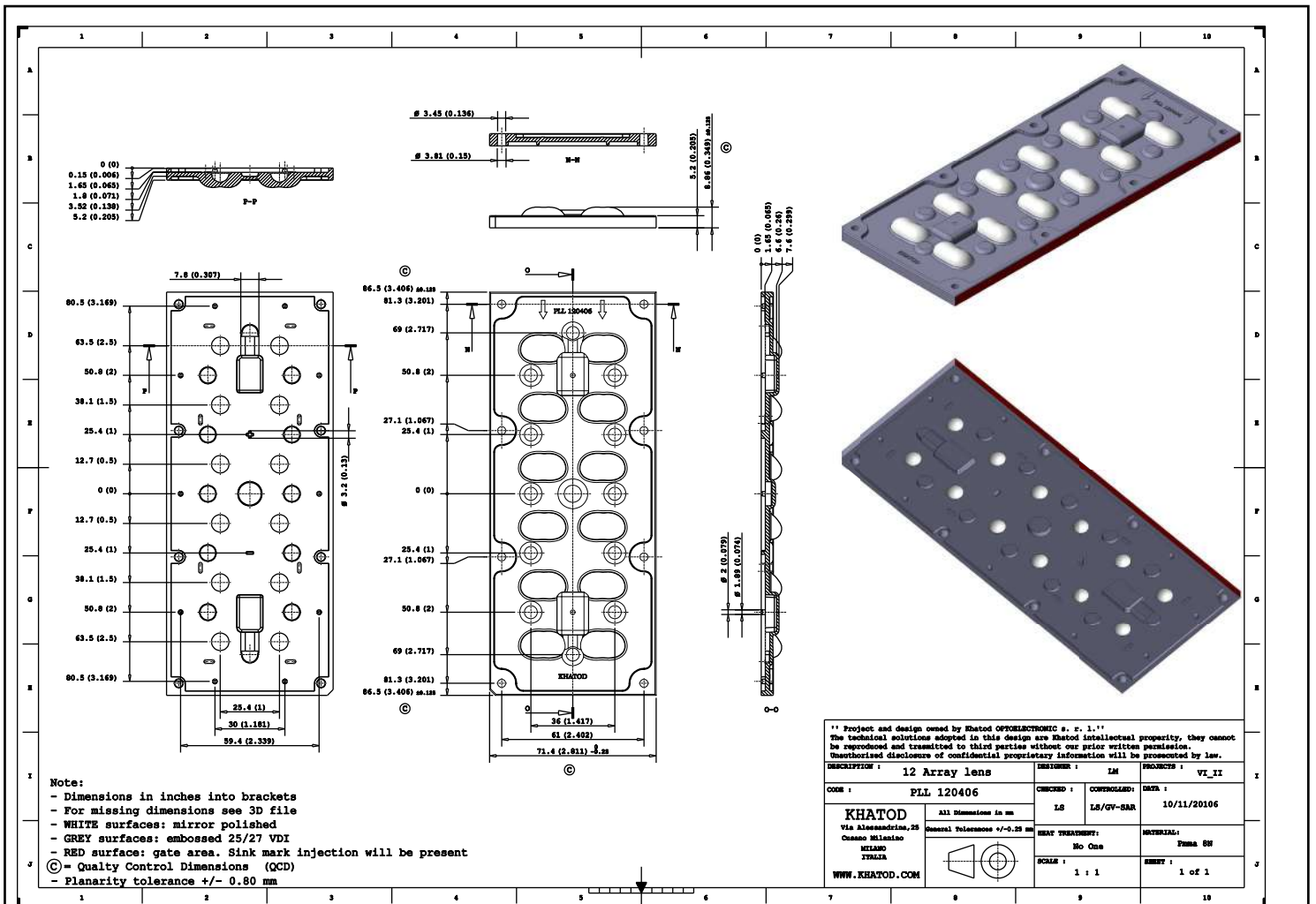
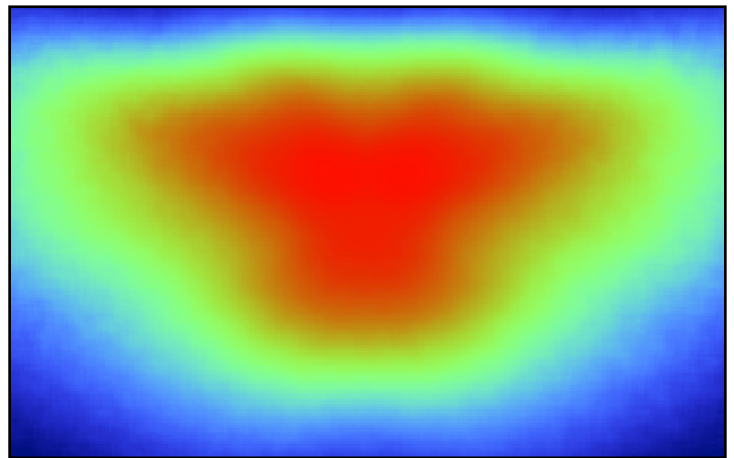
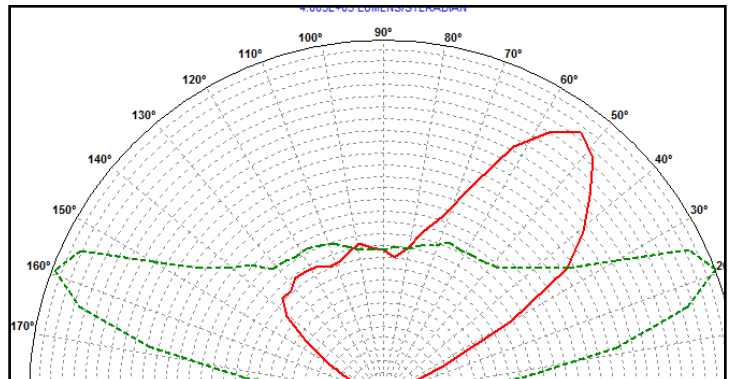


PLL120406 - IESNA Type II - ME3A

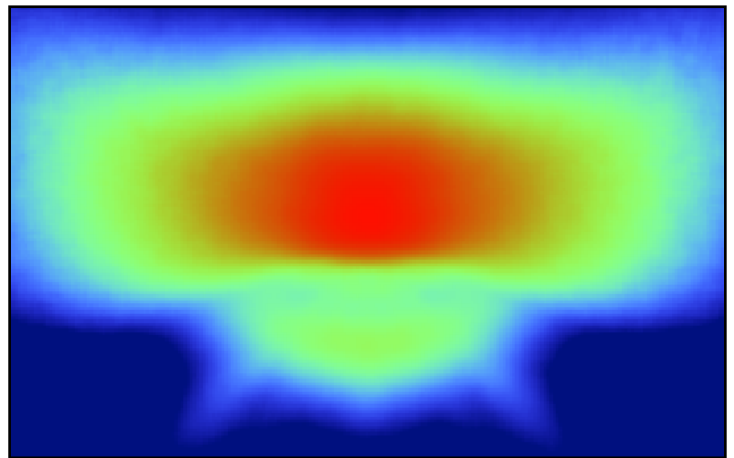
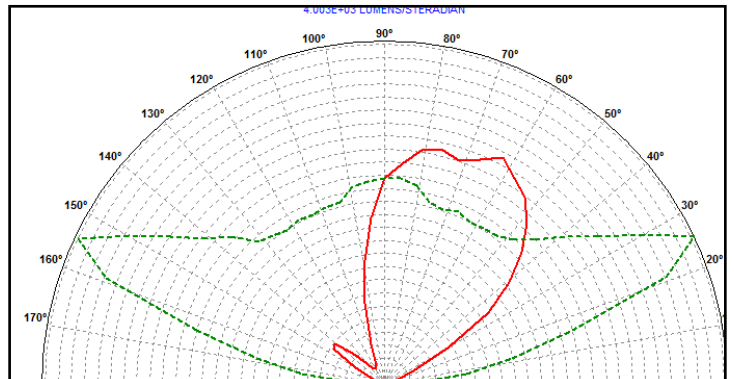


It works also with 5050 LEDs

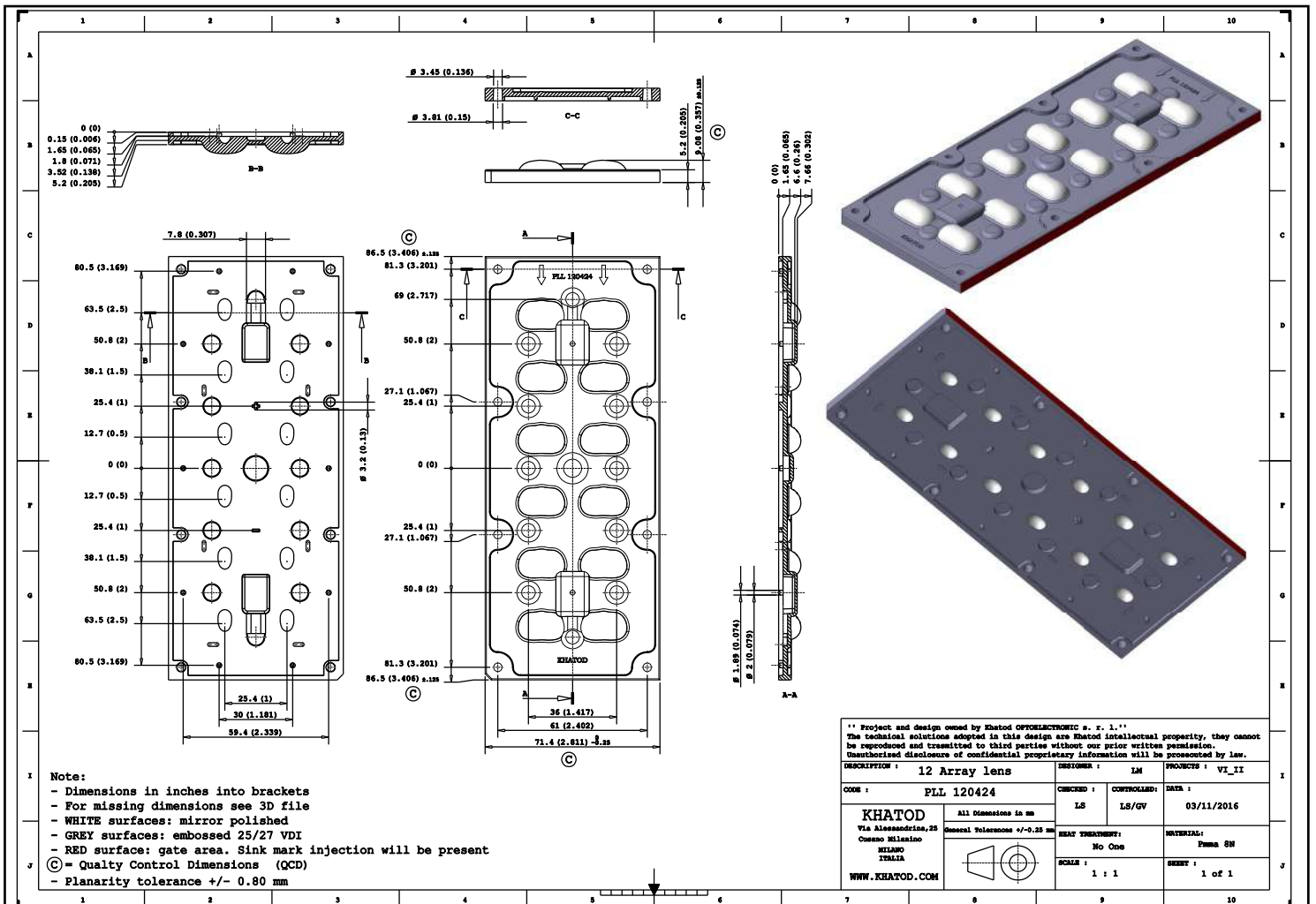
- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 160^\circ \times 115^\circ$
- Full angle at 10% from maximum: $\sim 170^\circ \times 140^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$



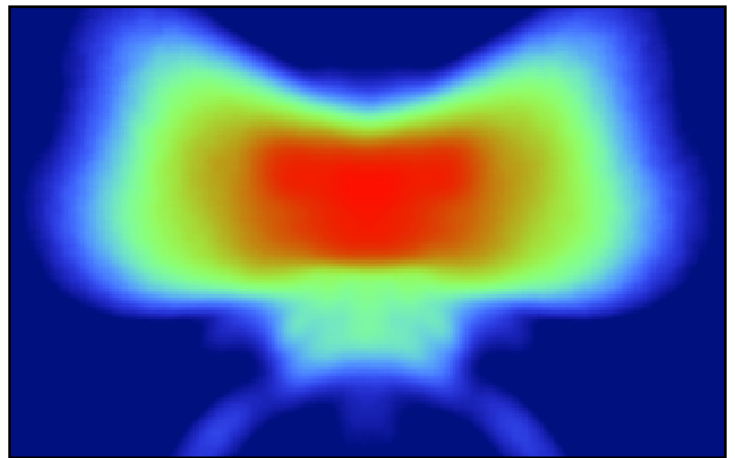
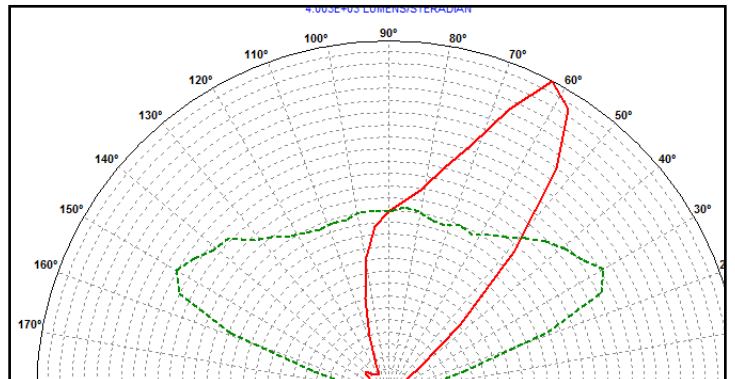
PLL120424 - IESNA Type III



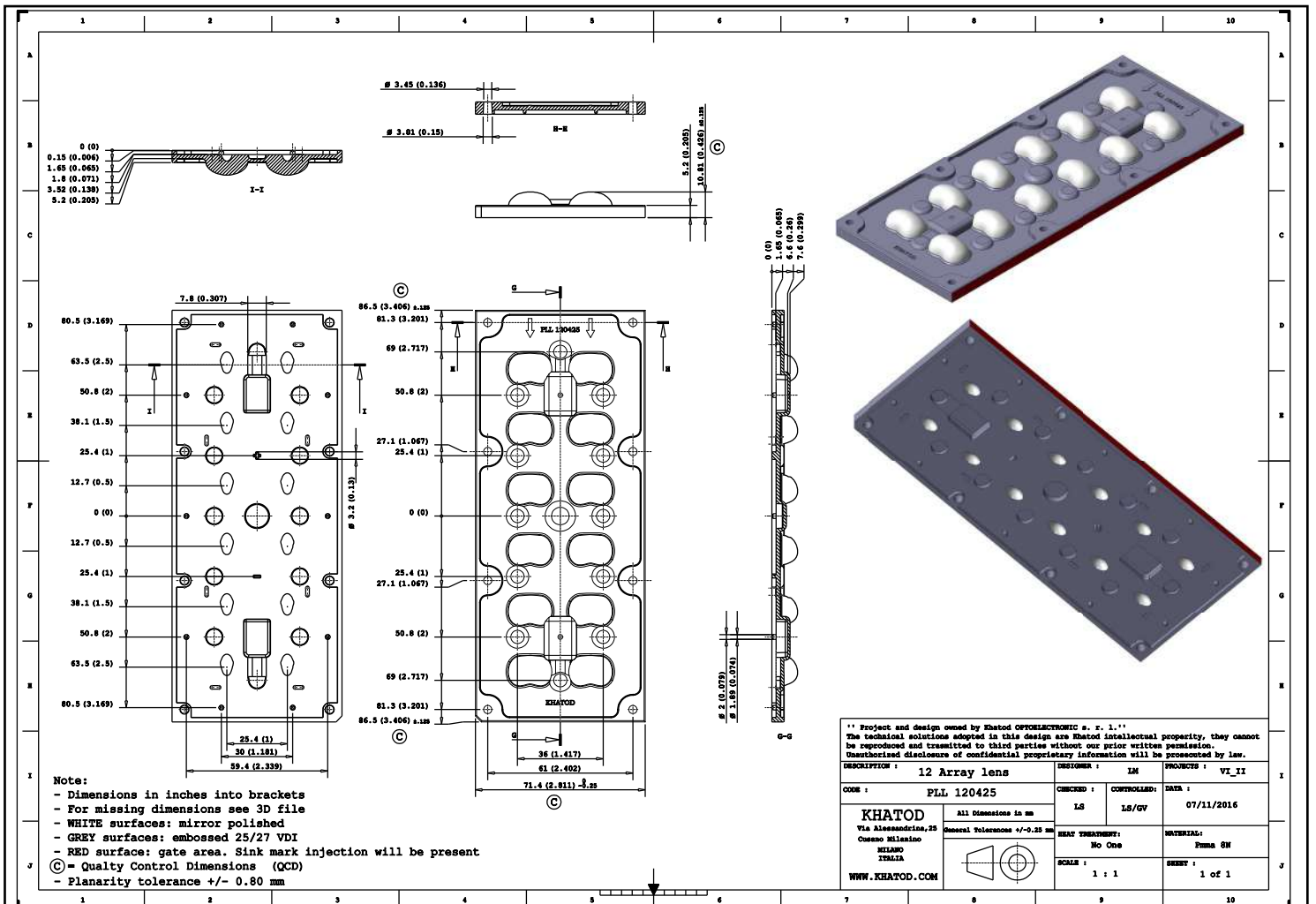
- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 150^\circ \times 68^\circ$
- Full angle at 10% from maximum: $\sim 165^\circ \times 130^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}/\text{LED}$



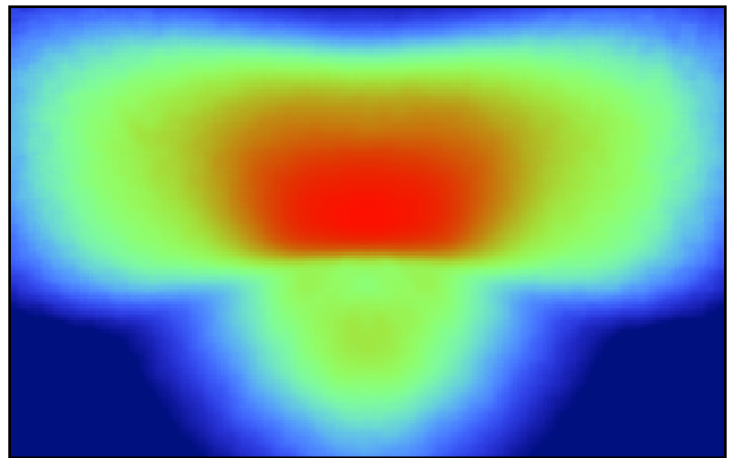
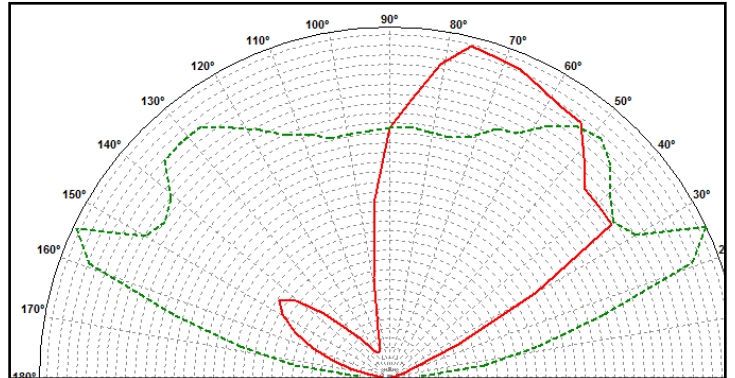
PLL120425 - IESNA Type II



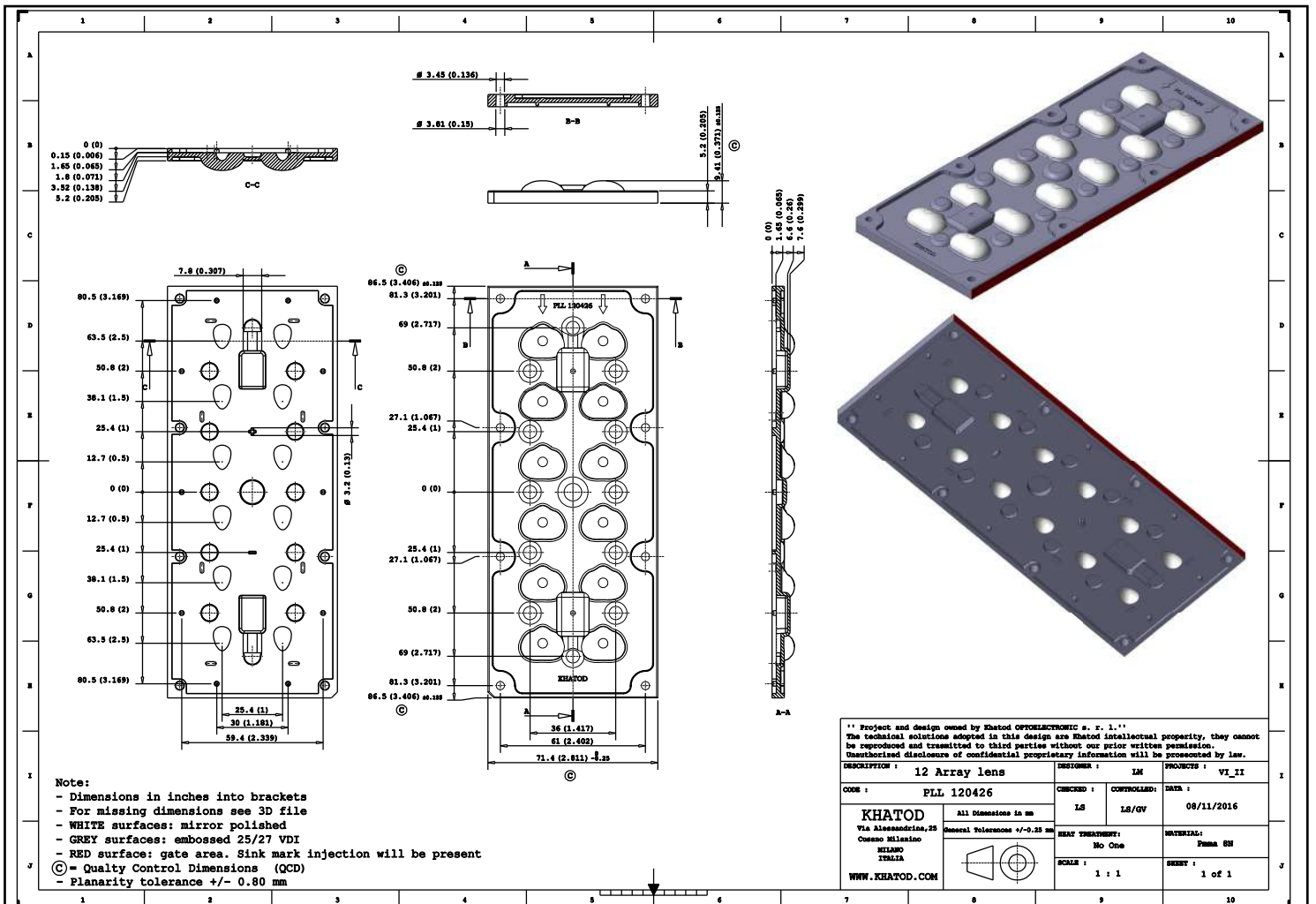
- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 140^\circ \times 58^\circ$
- Full angle at 10% from maximum: $\sim 150^\circ \times 105^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}@LED$



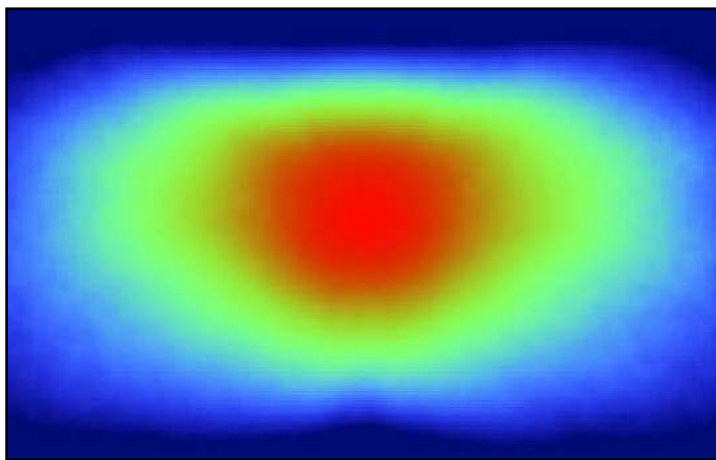
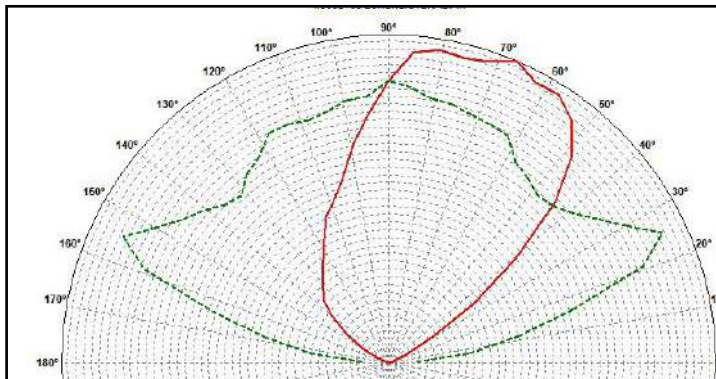
PLL120426 - IESNA Type III



- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 150^\circ \times 120^\circ$
- Full angle at 10% from maximum: $\sim 165^\circ \times 145^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm}@LED$

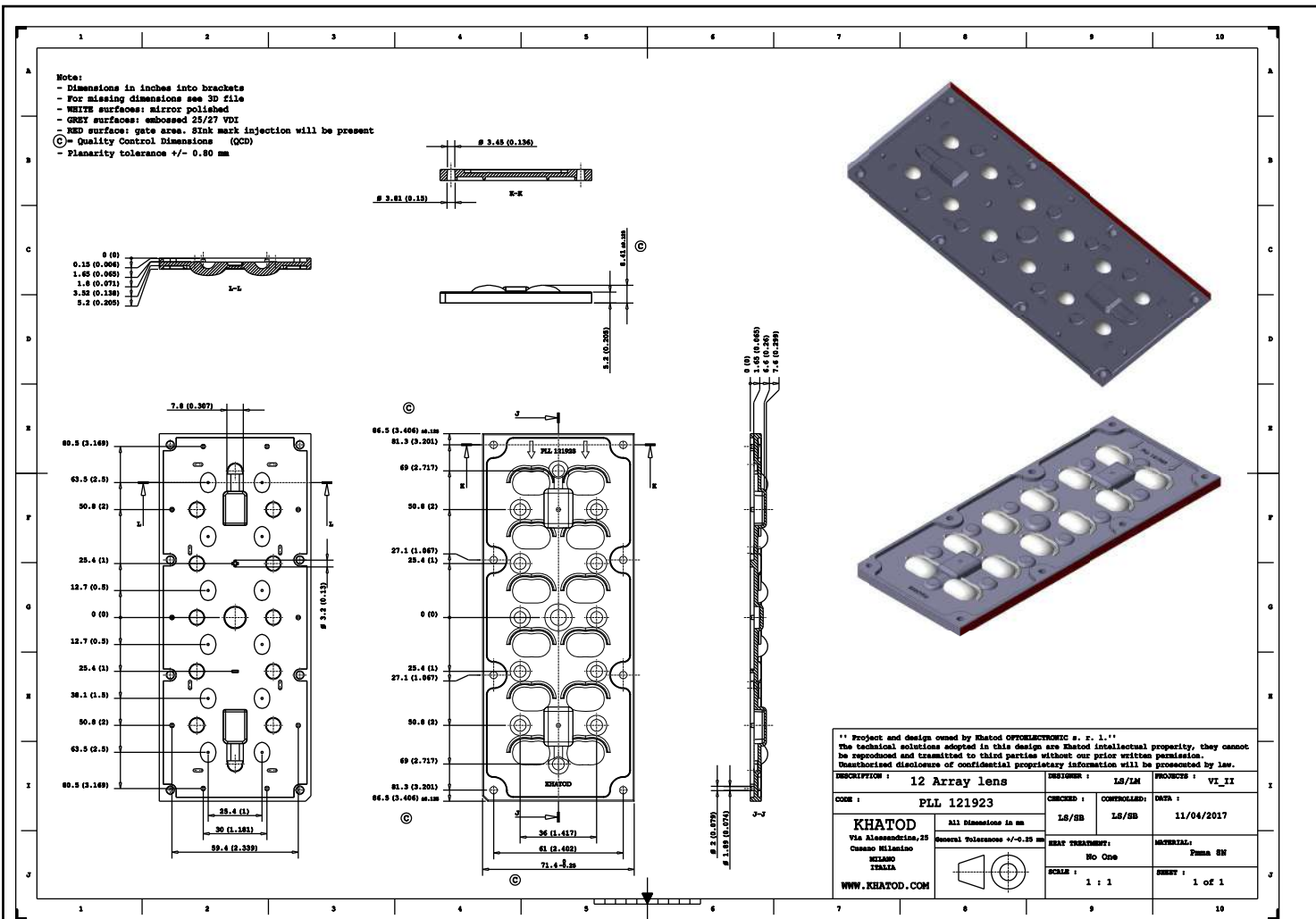


PLL121923 - IESNA Type II

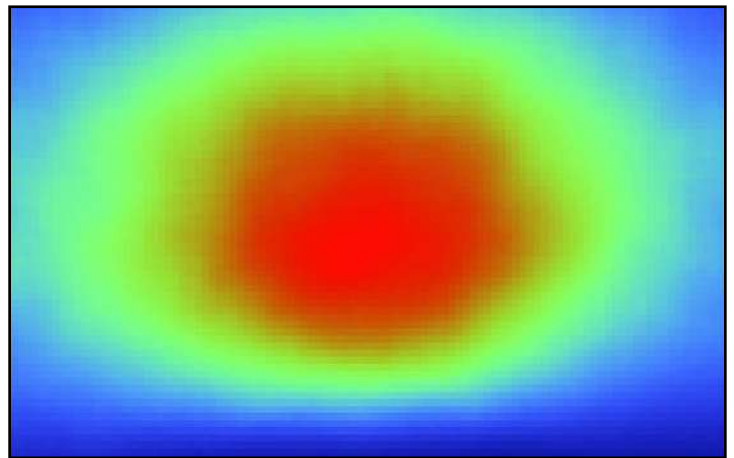
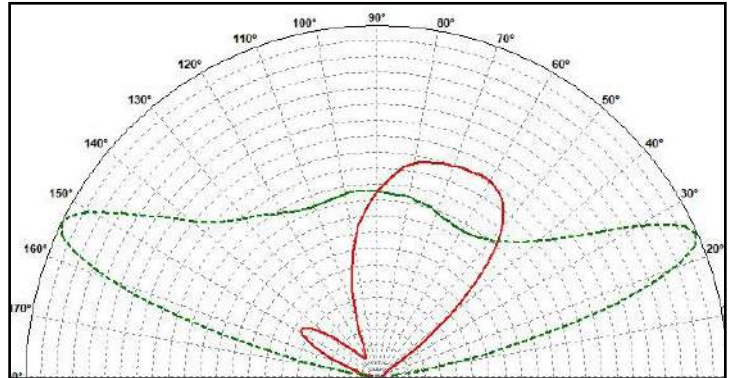


It works also with 5050 LEDs

- Material = PMMA Clear, **Non-yellowing, 10-year guarantee****
- Full angle at 50% from maximum: $\sim 155^\circ \times 80^\circ$
- Full angle at 10% from maximum: $\sim 160^\circ \times 120^\circ$
- The light spots here represented refer to tests carried out with LEDs with 3mm DOM and 2mm² LES, $\sim 260\text{lm@LED}$

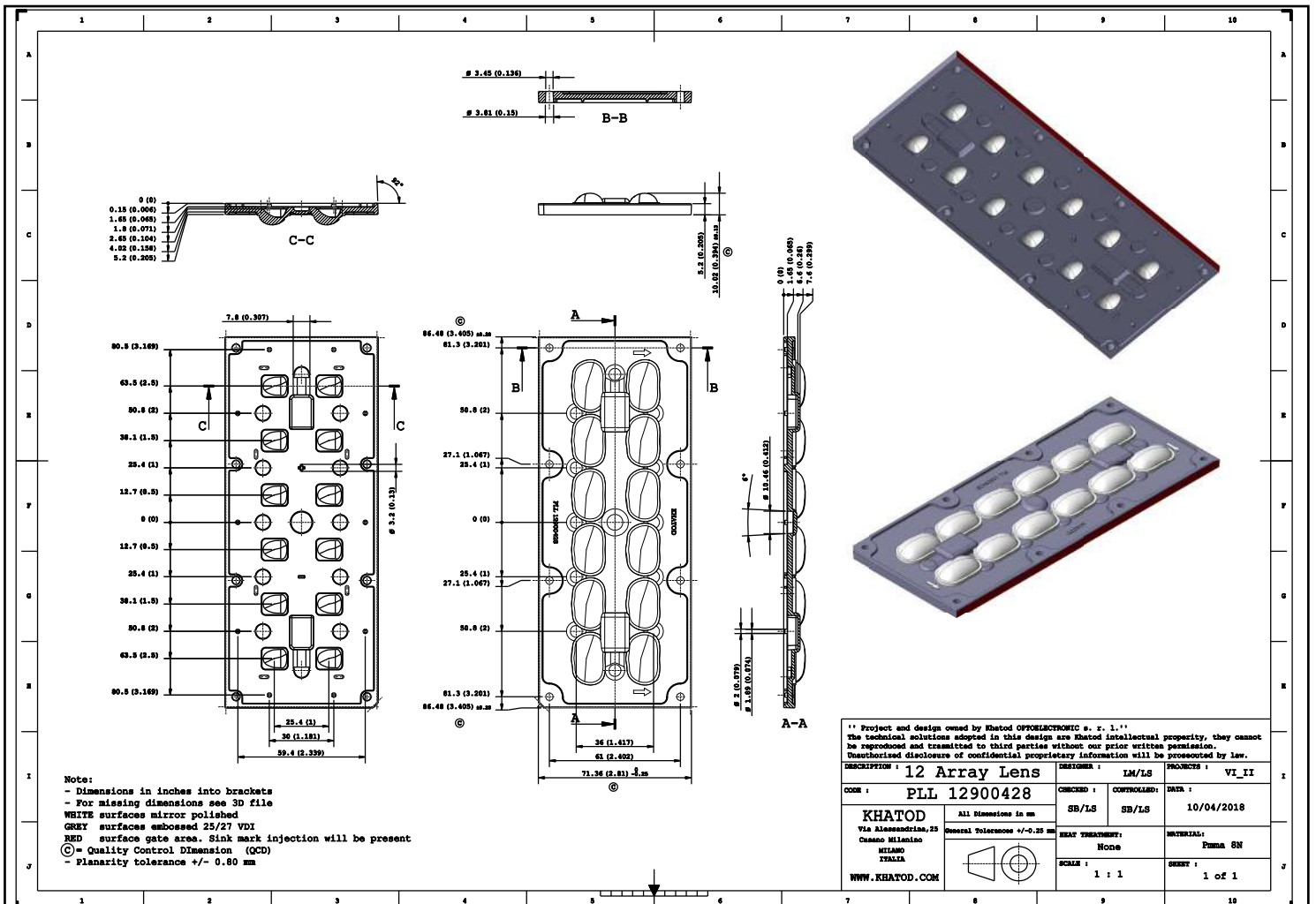


PLL12900428 - Type II Medium, for 5x5mm LEDs

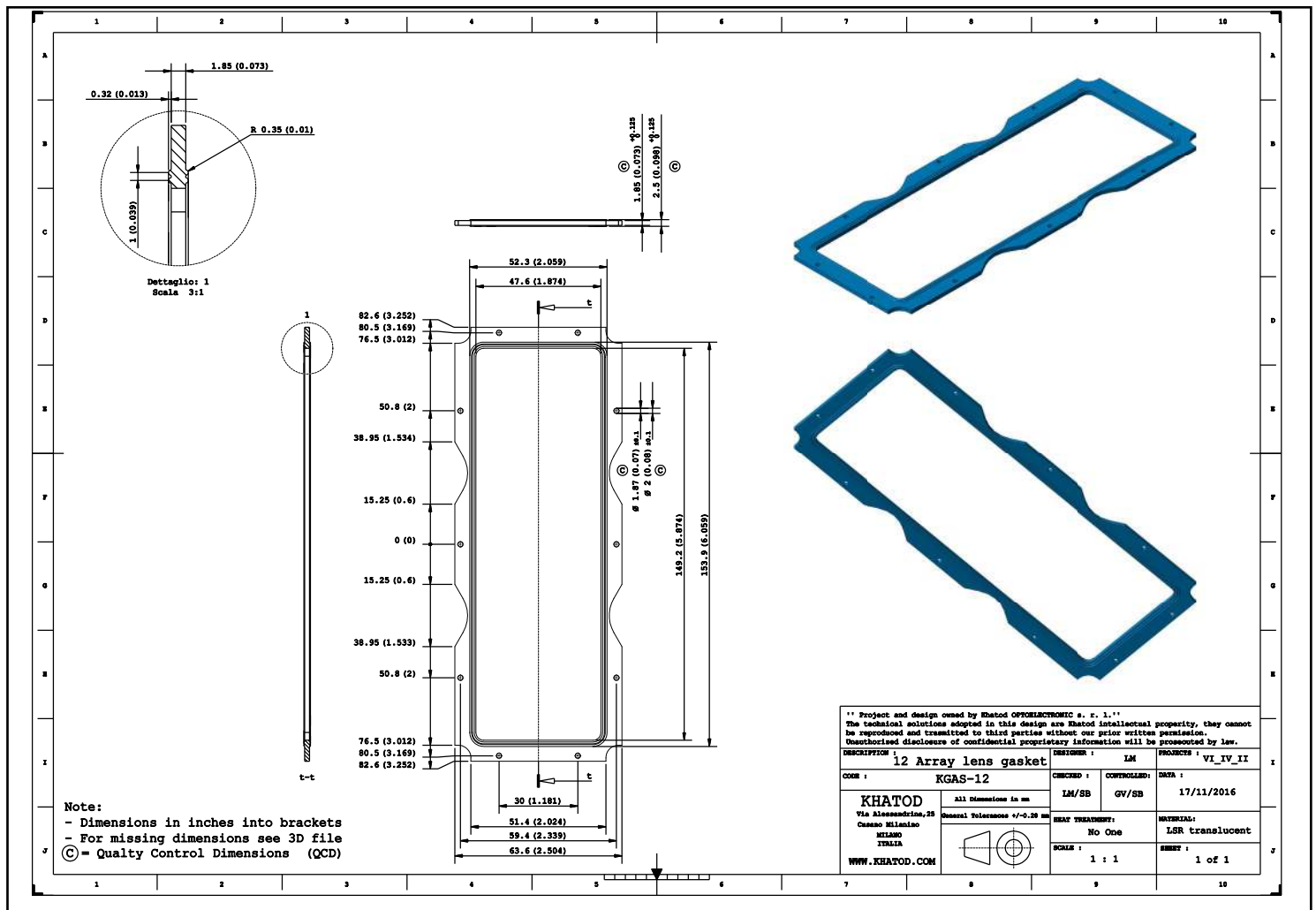


For 5050 LEDs

- Material = PMMA Clear, Non-yellowing, 10-year guarantee**
- Full angle at 50% from maximum: $\sim 80^\circ \times 145^\circ$
- Full angle at 10% from maximum: $\sim 110^\circ \times 155^\circ$
- The light spots here represented refer to tests carried out with
- LEDs Size 5x5mm, and $\sim 510\text{lm}@LED$



KGAS12 - Gasket for PLL12xxx

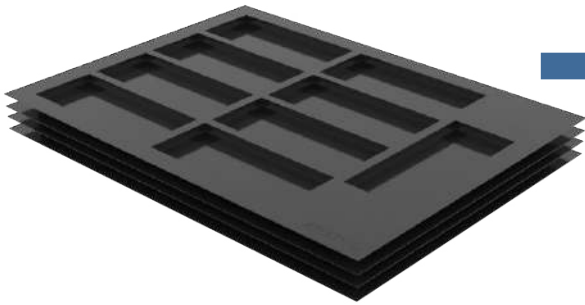


KGAS12 - Physical Characteristics

Hardness sh A : 65 +/-5		Color : Transparent	Abbrev. : SIL 65H TRASP
Basic Element : VMQ		Vulcanization: 10min @ 150°C	Annealing : 4 hours@200°C
Original Parameters	Unit of Measure	Detected Values	Test Method
Hardness	Shore A	65	ASTM D 2240
Hardness	IRHD		
100% Modulus	MPa		ASTM D 412
100% Modulus	N/mm²		
Tensile strenght	MPa	9	ASTM D 412
Elongation	%	620	ASTM D 412
Tear resistance	N/mm	30	ASTM D 624/B
Specific Gravity	g/cm³	1.16	ASTM D 297
Brittleness Point	°C		
TR-TEST TR10	°C		ASTM D 1329
TR TEST TR-30	°C		
Compression Set 25%			
Temperature: 175°C @ 22h	%	27	ASTM D 395/B

Packaging

Item	Quantity	Total Lens	Size (L*W*H)	G.W.
Trays	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



180 Lenses / Trays



20 Trays / Outer Box

Determination of thermal shock resistance degree



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.

Based on the testing result, PLL12xxx test specimen proved to overcome the thermal stress test up to 85°C, without any physical deterioration of the material.

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



1st TEST



2nd TEST



3rd TEST

Final Visual Inspection

Final Visual Inspection:
At the conclusion of the tests, a final visual inspection has been carried out and the result is positive (See photo 5)



Photo 5

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

IP X5 Test

Note

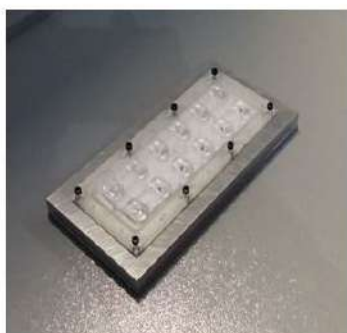
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If customers need IP accredited certifications, they have to apply to the appointed Certification Bodies, under their sole care and responsibility.

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 m² : 1 min
- Minimum duration of the test: 3 min
- Distance between the nozzle and the wrap surface: 2.5 Meters



PLL12xxxx assembled with KGAS12

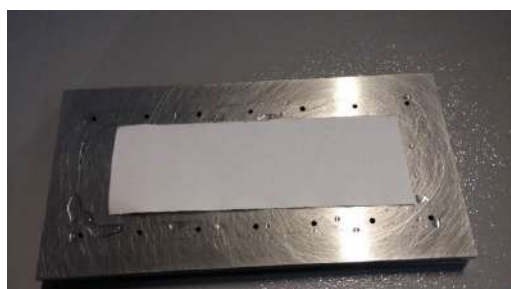


Testing under water jet



Testing under water jet

Conclusion



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

Based on the water penetration resistance test, KGAS12 gasket proved to be fit for purpose.

The product has passed the Khatod test.

The test paper sheet is dry

Materials

Material	Top
PMMA 8N **	-40°...90°C
For further information please visit Evonik website	

**

PLL120XXX series is made of the same material used to produce PLEXIGLAS® Solar which guarantees it will show no yellowing for 10 years.

Yellowness Index (YI) according to the test standards for Arizona/Florida outdoor exposure testing:

- YI 6 under hot/dry conditions
- YI 8 under hot/wet conditions

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.

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