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Lens for visual alarm/warning device, made of optical grade polycarbonate, designed for applications used for emergency or danger signaling. Suitable also for general signaling. It works with many different LED sources, such as COB LEDs and Power LED arrays. A proper gasket made of silicone, enabling some IP protection, is available by request.

PLL2112 is high resistant and the IK tests carried out in Khatod labs have shown it is able to withstand impacts up to IK10 rating.

The optical characteristics and the matt finish of the lens surface allow a homogeneous beam from the LED source and ensure a uniform light distribution.

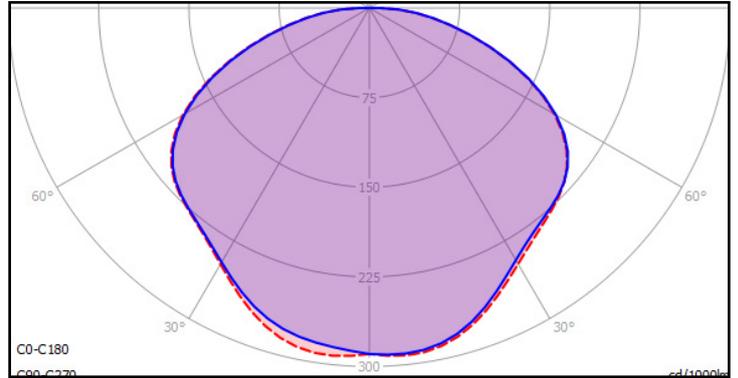
PLL2112 lens is available as standard in clear polycarbonate with matt finish.

Other transparent colours and opal white colour are available by request, on MOQ requirement.

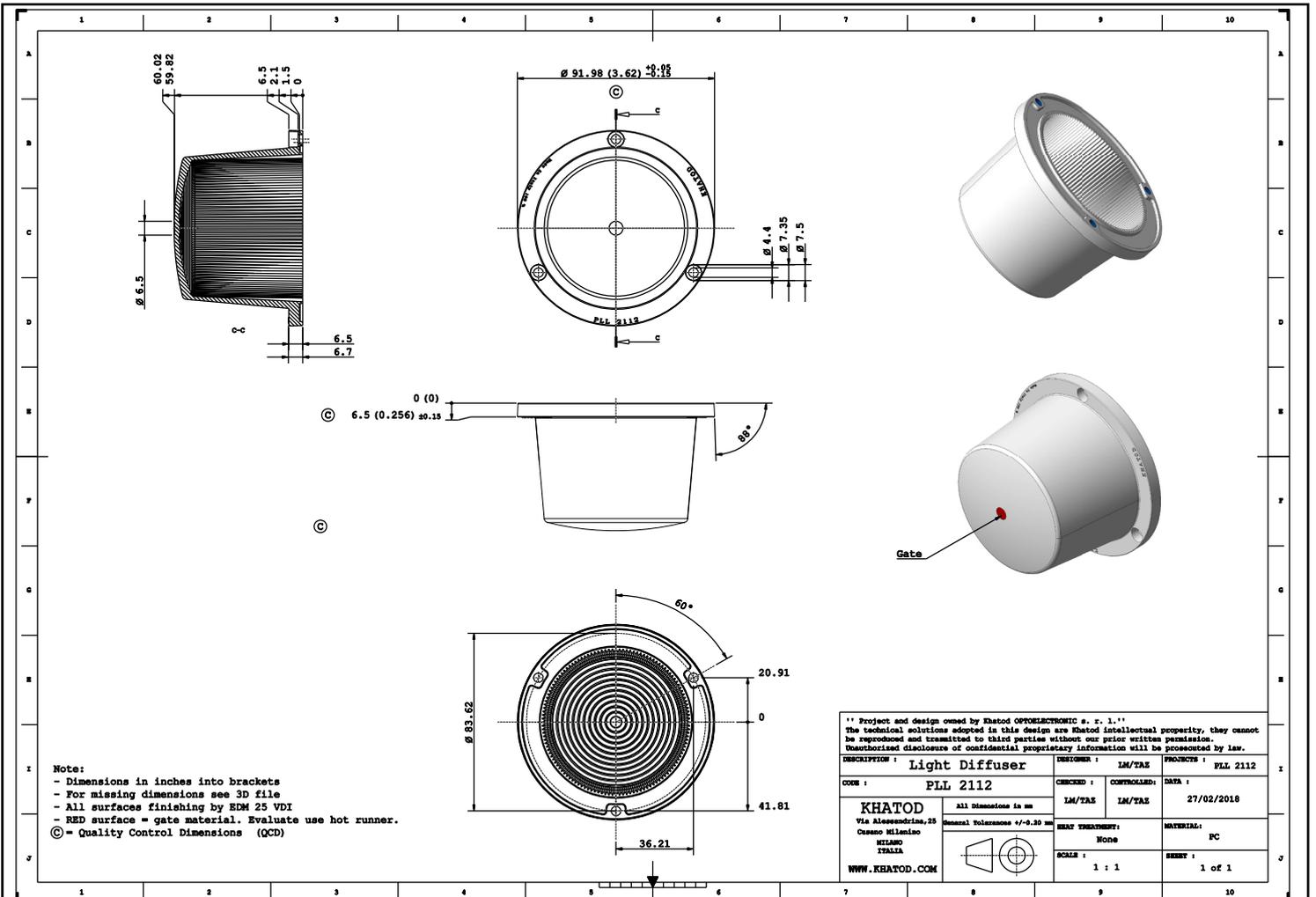
You can test PLL2112 lens by using our KHS111 heat sink which is compatible for the purpose. However, we recommend you design your own heat sink since KHS111 has a too high housing compared to the lens base.

The following pages show the results achieved by using different LED sources: COB LEDs with 13 mm LES; COB LEDs with 19 mm LES; Acriche module; array of 8 Power LEDs mounted on a cylindrical support.

PLL2112 - Visual alarm/Warning device for CoB LEDs or Power LEDs Array

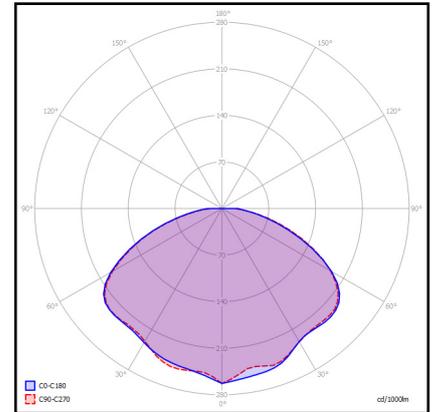


- Material = **Clear PC, matt finish**
- Full angle C0-C180 at 50% from maximum: ~ 130°
- Full angle C0-C180 at 10% from maximum: ~ 170°
- The light spots here represented refer to tests carried out with 1 CoB LED with 13mm LES, ~4270lm@LED

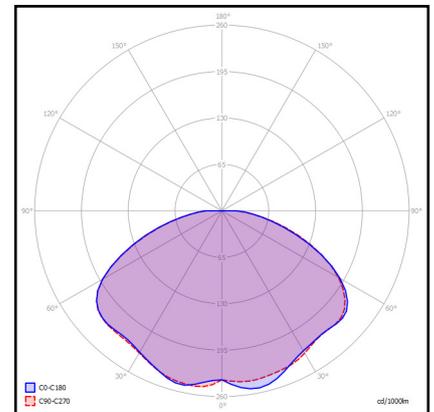
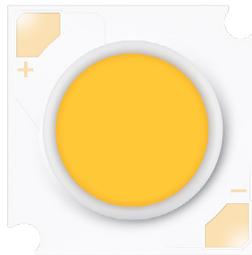


PLL2112 - Spots attained with different LED sources

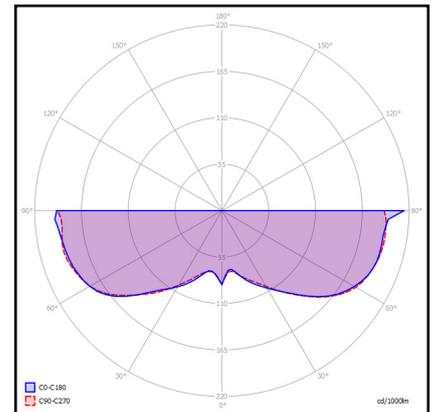
CoB LED 13mm LES



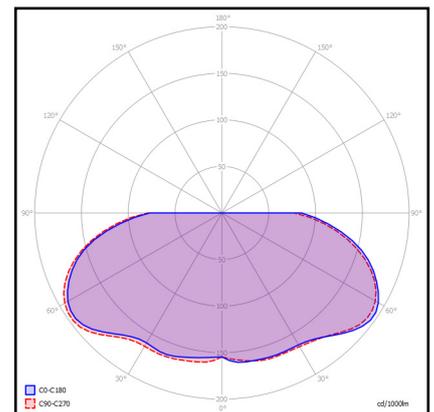
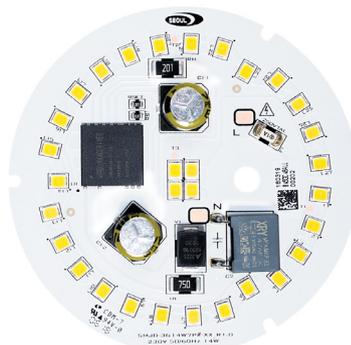
CoB LED 19mm LES



8 High Power LEDs mounted onto a cylindrical support



Seoul® Acriche® Module
~110-220V ac



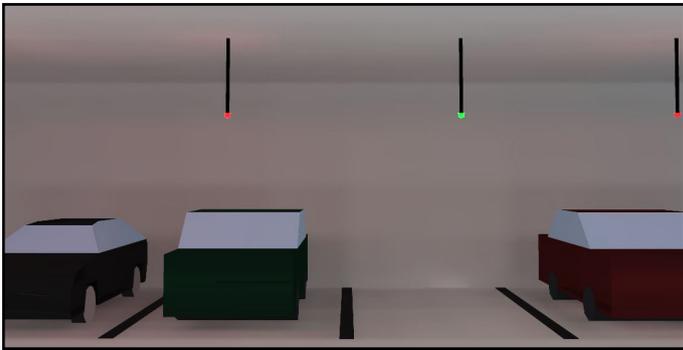
Simulations performed with DIALux® - Examples



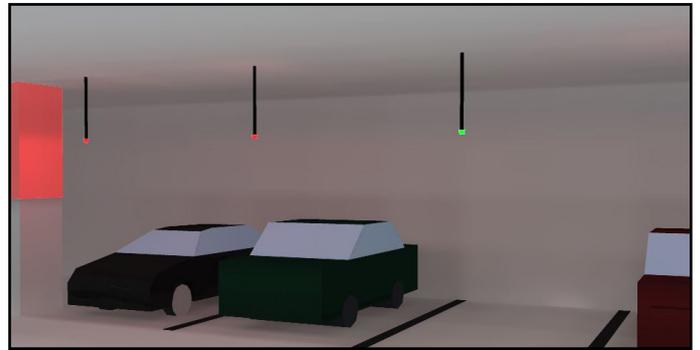
Garage door warning light



Laser lab warning light



Parking lot warning light



Parking lot warning light

Assembly Specifications

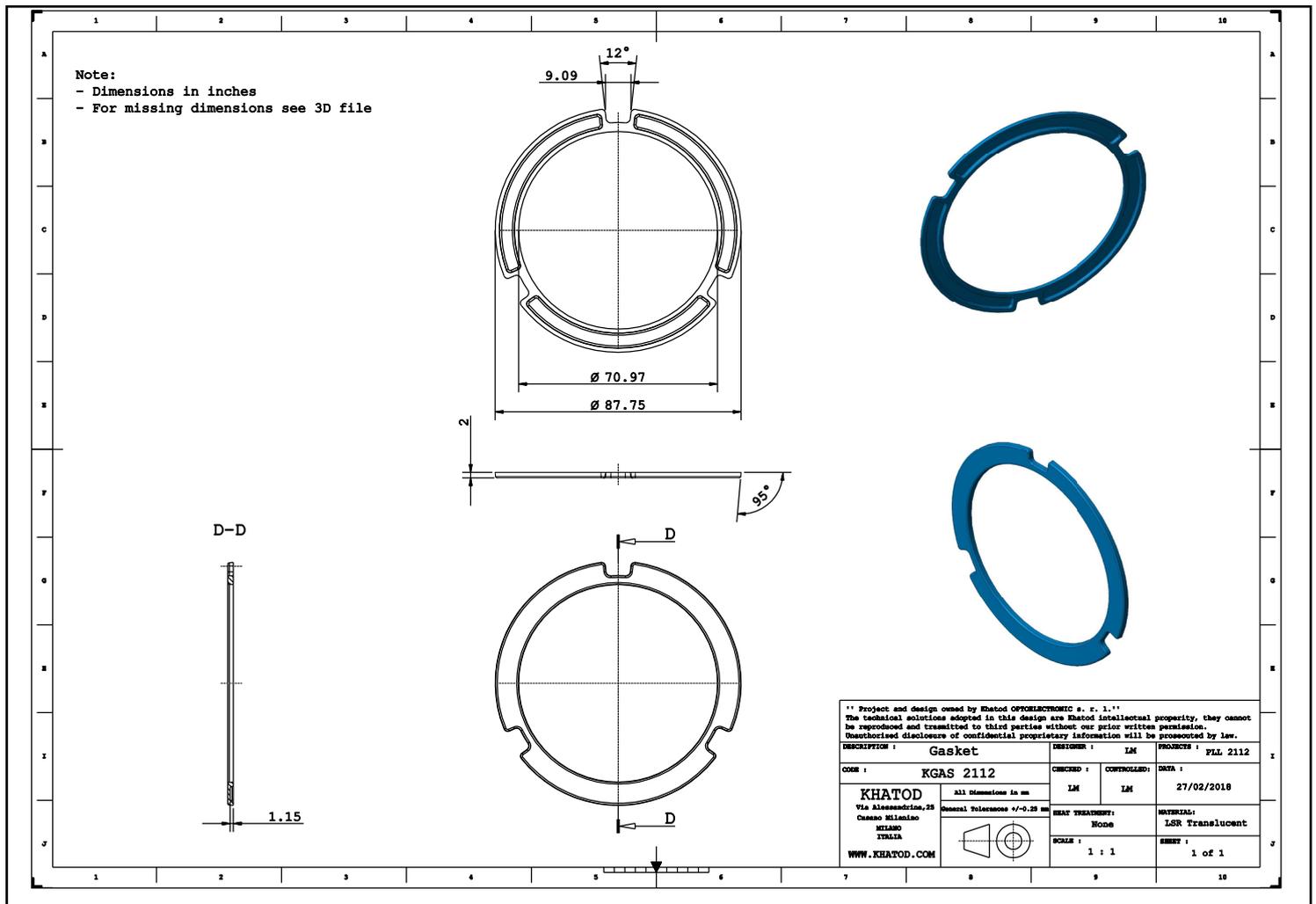
Example



Assembly

- Use TCEI M4 screws
- Maximum recommended tightening torque: 0.6/0.7 Nm

KGAS2112 - Gasket for PLL2112, made of silicone



KGAS2112 - 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 Measurement	Detected Values	Test Method
Hardness	Shore A	65	ASTM D 2240
Hardness	IRHD		
100% Modulus	MPa		ASTM D 412
100% Modulus	N/mm ²		

Tensile Strength	MPa	9	ASTM D 412
Elongation	%	620	ASTM D 412
Tear resistance	N/mm	30	ASTM D 624/B
Specific Gravity	g/cm ³	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

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.

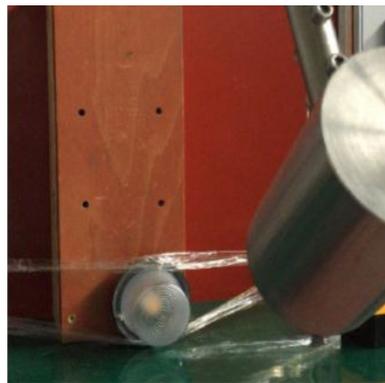
Initial Visual Inspection

- 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.

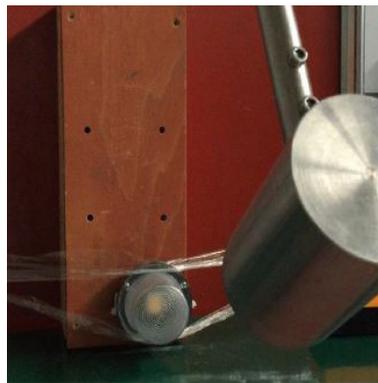
Tests Execution

Tests were carried out on the part under test according to IK10 (20 Joule)
Test parameters are as follows:

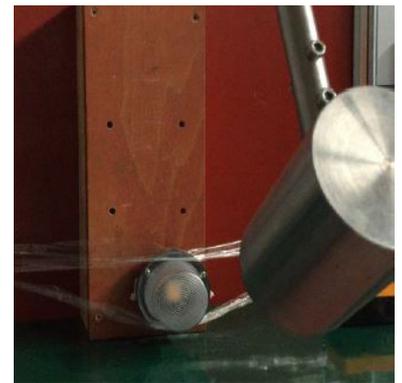
- Impact energy: 20 Joule
- Impacting element: 5 Kg
- Distance between impacting element and the part under test: 40 cm
- Number of impacts: 5



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 for the lens PLE2112, is positive. (See photo 5)



Photo 5

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



Video of impact Test - click to view

Packaging

Item	Quantity	Total Parts	Size (L*W*H)	G.W.
Package box	30 pcs per box	30 pcs	48*28*18 cm	4.65 Kg
Outer Box	2 package boxes per Outer Box	60 pcs	50*32*38 cm	9.50 Kg



30 Lenses / 1 Package box



2 Package boxes / 1 Outer Box



60 Lenses per Outer Box

Materials

Material	Top
PC Clear	-40°120°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 LIGHTTOOLS, 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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