HERCULUX 恒坤光电 Chengdu HercuLux Photoelectric Technology Co.,Ltd

ZHAGA Regular Member

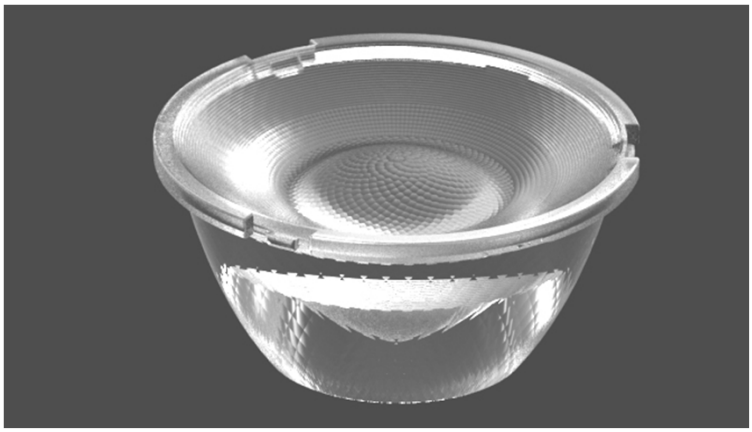
Product Approval

Approval number:

Customer:

Manufacturer: Chengdu HercuLux Photoelectric Technology Co.,Ltd

PN	Code	Product
HK-HG-45@21-24-D9-21-1g-1_PC	1.01.02486_PC	HK Dark 45@21-24° lens (D9) (PC)
HK-HG-45@21-36-D9-21-1g-1_PC	1.01.02485_PC	HK Dark 45@21-36° lens (D9) (PC)
HK-HG-45@21-50-D9-21-1g-1_PC	1.01.02443_PC	HK Dark 45@21-50° lens (D9) (PC)



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified☐		DATE	
Project manager		DATE		Unqualified☐			
Audit		DATE		Audit		DATE	
Approved		DATE		Approved		DATE	
Stamp		DATE		Stamp		DATE	

(Confirmation of acceptance by both parties must be signed and sealed)

Factory: Chengdu Shuangliu District, Iot industrial park 2 road HercuLux Photoelectric Park
Phone: 028-85887727 (801) 028-85887990 (801) Fax: 028-85887730 http://www.herculux.com/
Sales Dept: Shenzhen Nanshan District Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building, 501-505
TEL: 0755-2937 1541 FAX: 0755-2907 5140

*Approval In duplicate, for both supplier and customer.

HERCULUX
恒坤光电

Disclaimer

Please use this product within the permitted range and environment according to the structure and material of the product. If the usage exceeds the recommended value, please test and verify by yourself. If the product is damaged due to out-of-range use, our company will not be responsible for the warranty.

Product material:

Customized products: The specifications and models of materials used are subject to the agreement between the two parties.

Conventional products: As a product that we continuously research and improve, under the premise of ensuring the quality and availability of the product, our company reserves the right to change the material. If the material specification and model change, without prior notice.

product data:

The measurement data and dimensional tolerances of the 2D drawings in the product data sheet of this acknowledgement are for reference only, and the final size shall prevail in kind.

The measurement data presented in this acknowledgment is a performance test of the product based on our company's internal test conditions and quality requirements, and the reported data is a typical value of the average results of multiple measurements. Therefore, in some cases, the actual product may deviate from the data provided. We reserve the right to notify you in advance of this data.

Product changes and improvements:

Changes and improvements of customized products are subject to the agreement between the two parties in the contract or technical documents.

As the conventional products that we continue to research and improve, our company reserves the right to make technical changes to its products, and reserves the right to make changes to data resulting from improvements without prior notice.

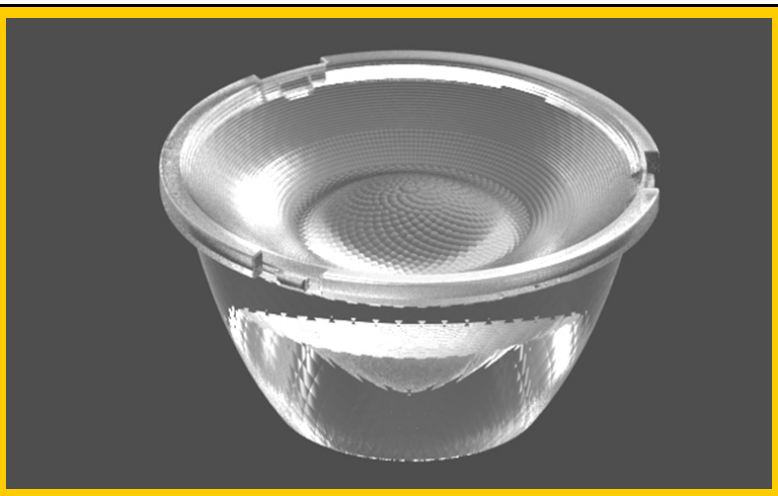
Operation cautions:

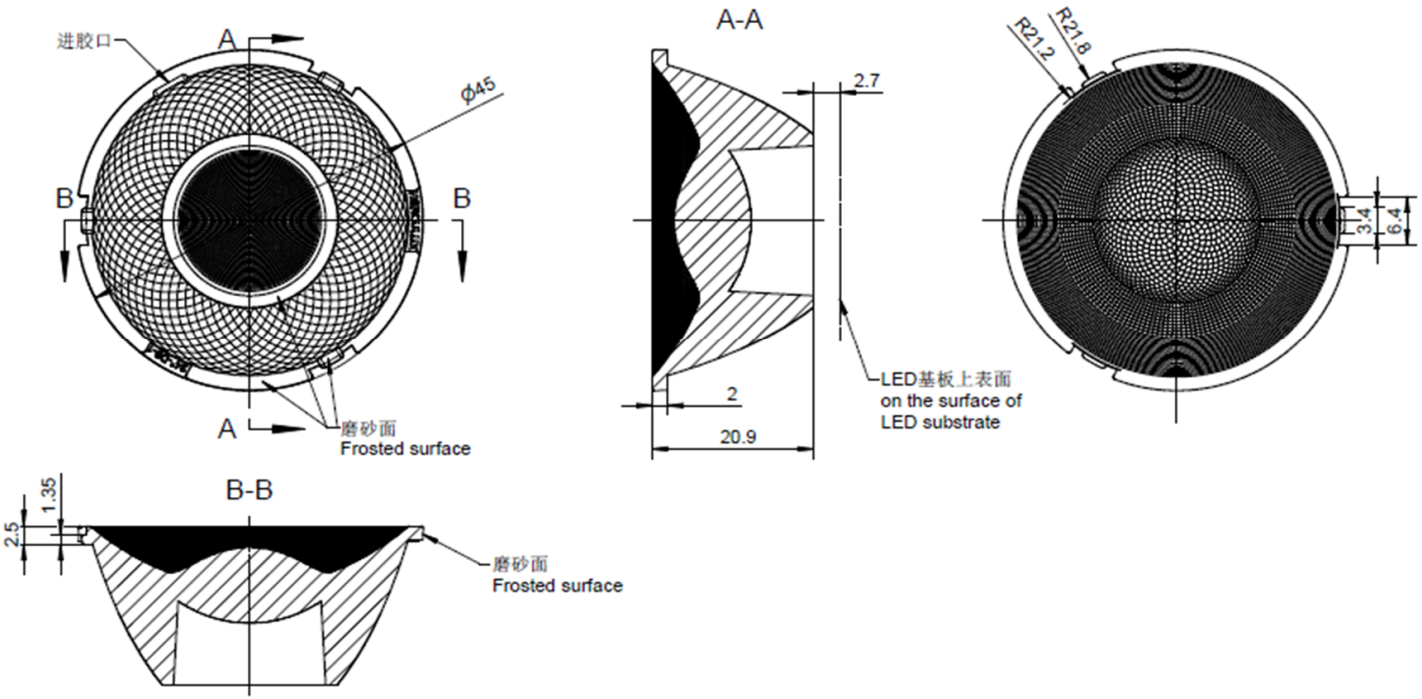
1. Please wear clean gloves during product assembly to prevent product surface contamination.
2. Try to avoid touching the optical surface of the lens when taking the lens.
3. When the surface of the product is polluted, please wipe it gently with a soft cotton cloth dipped in analytically pure neutral solvent. It is forbidden to use industrial solvents (alcohol, isopropanol, acetone, ether, toluene, xylene, carbon tetrachloride, MMA monomerm,etc.) wipe.
4.The lens made of PC should not be exposed to direct sunlight in the storage and use environment. If the lens turns yellow or cracks due to long-term sunlight exposure, our company will not be responsible for the warranty.

HERCULUX 恒坤光电

Basic product information

TEL: 0755-2937 1541 FAX: 0755-2907 5140 http://www.herculux.com/ Date updated: 2024/12/4

Product Picture:	
Size(L*W*H/Φ*H):	Φ:45mm; H:20.9mm
Material:	PC
Effiency:	\
Temperature(Topr):	Material extreme temperature resistance：-40℃ to +120℃ long-term use temperature：-40℃ to +100℃
FWHM:	24°、36°、50°
Matched LES:	光学面为D9
Recommended MAX power:	Not more than 20W

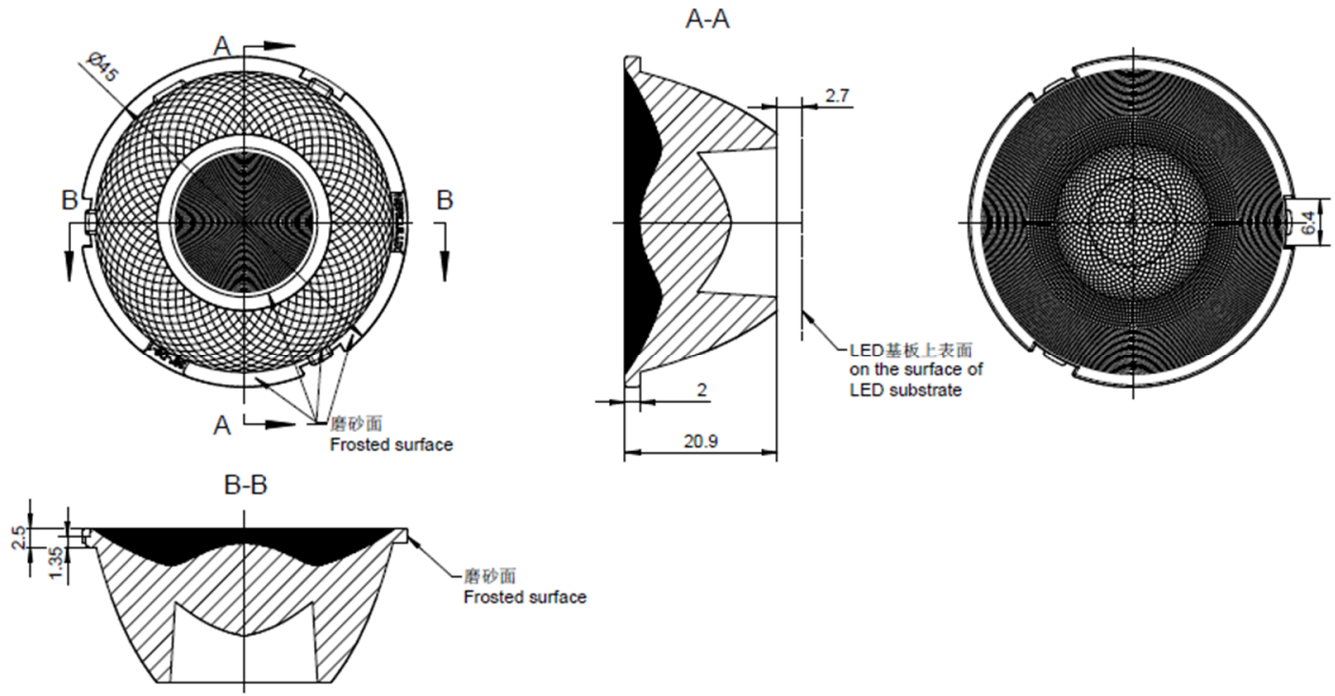


Technical remark:

1. The 3D map is not indicated for rounded corners and draft angle.
2. The dimensional tolerances are not specified according to GB/T 14486 2008 MT5.
3, The surface has no flash, shrinkage, bubbles and other defects.
*4. When the lamp adopts rubber ring for waterproofing: the roughness of the contact surface between the radiator and the rubber ring is required: Ra<3.2μm

Optical design			HK Dark 45@21-24º lens (D9)（PC）		HK-HG-45@21-24-D9-21-1g-1_PC
tructure desig					1.01.02486_PC
Review				umber of drawin	qty / weight
Validation			Material：	PC	CDHK

MT5 Tolerance table（mm）	Basic size	＜3	3～10	10～24	24～65	65～140	140～250	250～450	＞450
	olerance valu	±0.1	±0.15	±0.2	±0.35	±0.50	±0.80	±1.2	±2.0

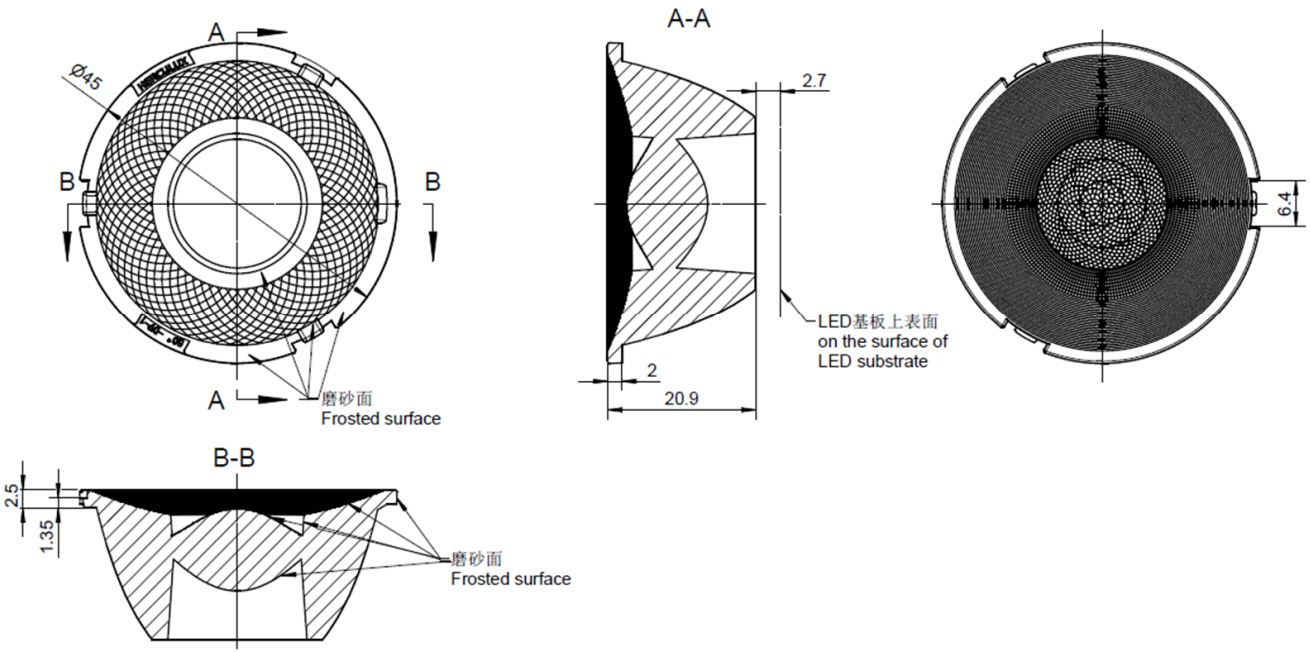


Technical remark:

1. The 3D map is not indicated for rounded corners and draft angle.
2. The dimensional tolerances are not specified according to GB/T 14486 2008 MT5.
3, The surface has no flash, shrinkage, bubbles and other defects.
*4. When the lamp adopts rubber ring for waterproofing: the roughness of the contact surface between the radiator and the rubber ring is required: Ra<3.2μm

Optical design			HK Dark 45@21-36º lens (D9)（PC）		HK-HG-45@21-36-D9-21-1g-1_PC	
Structure desig					1.01.02485_PC	
Review					Number of drawin	qty / weight
Validation			Material:	PC	CDHK	

MT5 Tolerance table（mm）	Basic size	＜3	3～10	10～24	24～65	65～140	140～250	250～450	＞450
	olerance valu	±0.1	±0.15	±0.2	±0.35	±0.50	±0.80	±1.2	±2.0



Technical remark:

1. The 3D map is not indicated for rounded corners and draft angle.

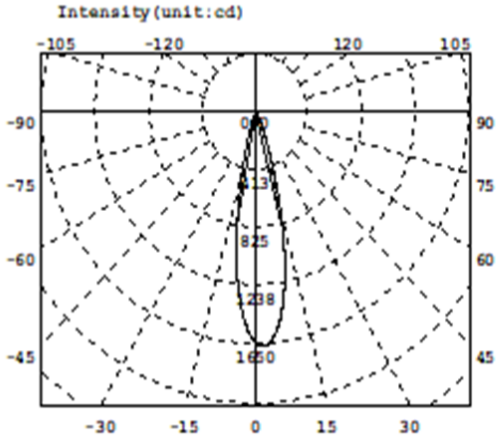
2. The dimensional tolerances are not specified according to GB/T 14486 2008 MT5.

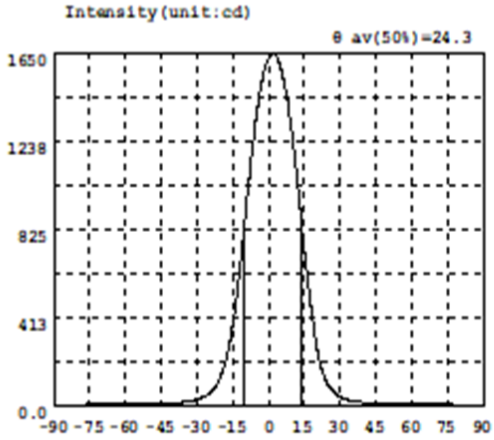
3, The surface has no flash, shrinkage, bubbles and other defects.

***4. When the lamp adopts rubber ring for waterproofing: the roughness of the contact surface between the radiator and the rubber ring is required: Ra<3.2μm**

Optical design			HK Dark 45@21-50º lens (D9)（PC）		HK-HG-45@21-50-D9-21-1g-1_PC
tructure desig					1.01.02443_PC
Review				umber of drawin	qty / weight
Validation			Material：	PC	CDHK

MT5 Tolerance table（mm）	Basic size	＜3	3～10	10～24	24～65	65～140	140～250	250～450	＞450
	olerance valu	±0.1	±0.15	±0.2	±0.35	±0.50	±0.80	±1.2	±2.0





Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.028	-58.5	6.799	-27.0	39.57	4.5	1607	36.0	19.25	67.5	5.083
-88.5	1.106	-57.0	7.082	-25.5	49.58	6.0	1545	37.5	16.71	69.0	4.704
-87.0	1.107	-55.5	7.333	-24.0	63.42	7.5	1456	39.0	14.81	70.5	4.344
-85.5	1.221	-54.0	7.572	-22.5	83.33	9.0	1343	40.5	13.32	72.0	4.003
-84.0	1.380	-52.5	7.817	-21.0	111.3	10.5	1210	42.0	12.16	73.5	3.656
-82.5	1.573	-51.0	8.087	-19.5	151.3	12.0	1059	43.5	11.22	75.0	3.331
-81.0	1.789	-49.5	8.377	-18.0	205.7	13.5	894.1	45.0	10.49	76.5	3.016
-79.5	2.119	-48.0	8.724	-16.5	279.1	15.0	729.5	46.5	9.901	78.0	2.706
-78.0	2.539	-46.5	9.152	-15.0	377.5	16.5	577.2	48.0	9.377	79.5	2.359
-76.5	2.958	-45.0	9.608	-13.5	497.2	18.0	444.3	49.5	8.921	81.0	2.028
-75.0	3.374	-43.5	10.15	-12.0	639.7	19.5	320.7	51.0	8.540	82.5	1.676
-73.5	3.727	-42.0	10.80	-10.5	801.8	21.0	229.1	52.5	8.259	84.0	1.408
-72.0	4.088	-40.5	11.57	-9.0	970.9	22.5	164.2	54.0	7.992	85.5	1.249
-70.5	4.427	-39.0	12.51	-7.5	1131	24.0	118.7	55.5	7.733	87.0	1.119
-69.0	4.722	-37.5	13.60	-6.0	1278	25.5	87.09	57.0	7.483	88.5	0.9966
-67.5	5.031	-36.0	15.07	-4.5	1404	27.0	65.62	58.5	7.203	90.0	0.9276
-66.0	5.349	-34.5	16.93	-3.0	1504	28.5	50.78	60.0	6.897		
-64.5	5.663	-33.0	19.34	-1.5	1580	30.0	40.24	61.5	6.551		
-63.0	5.948	-31.5	22.51	0.0	1628	31.5	32.47	63.0	6.211		
-61.5	6.230	-30.0	26.61	1.5	1648	33.0	26.81	64.5	5.858		
-60.0	6.521	-28.5	32.13	3.0	1642	34.5	22.52	66.0	5.479		

Electricity Parameter:

Current I: 0.1000A Power: 3.279W

Voltage V: 32.79V PF: 0.000

Optical Parameter(Distance=2.410m):

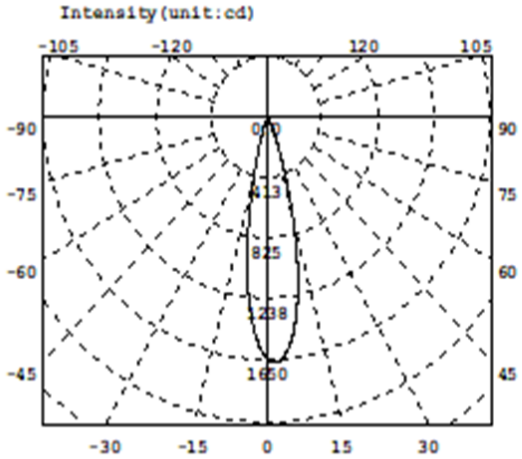
Equivalent Luminous flux: Φ eff= 356.4lm Efficiency: Eff=108.71lm/W

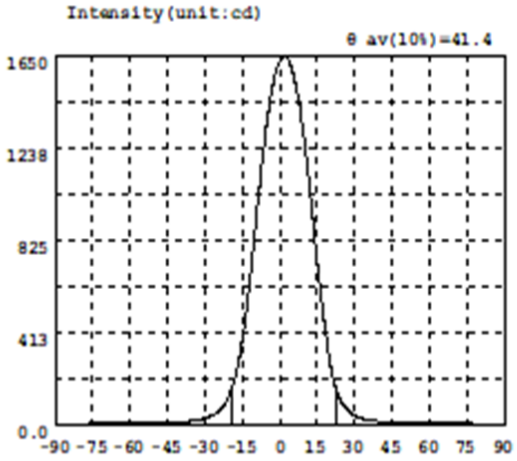
Diffuse angle: @(25%): 32.8deg @(50%): 24.3deg @(75%): 16.6deg @(50%): 24.3deg

Diffuse angle: @(25%): 33.0deg @(50%): 24.5deg @(75%): 16.9deg @(50%): 24.5deg

Imax=1649cd (C=0.0deg,G=2.0deg) C0-180Plane Imax= 1649cd(G=2.0deg)

C0-180Plane I0= 1628cd





Intensity data:(deg , cd)　C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.028	-58.5	6.799	-27.0	39.57	4.5	1607	36.0	19.25	67.5	5.083
-88.5	1.106	-57.0	7.082	-25.5	49.58	6.0	1545	37.5	16.71	69.0	4.704
-87.0	1.107	-55.5	7.333	-24.0	63.42	7.5	1456	39.0	14.81	70.5	4.344
-85.5	1.221	-54.0	7.572	-22.5	83.33	9.0	1343	40.5	13.32	72.0	4.003
-84.0	1.380	-52.5	7.817	-21.0	111.3	10.5	1210	42.0	12.16	73.5	3.656
-82.5	1.573	-51.0	8.087	-19.5	151.3	12.0	1059	43.5	11.22	75.0	3.331
-81.0	1.789	-49.5	8.377	-18.0	205.7	13.5	894.1	45.0	10.49	76.5	3.016
-79.5	2.119	-48.0	8.724	-16.5	279.1	15.0	729.5	46.5	9.901	78.0	2.706
-78.0	2.539	-46.5	9.152	-15.0	377.5	16.5	577.2	48.0	9.377	79.5	2.359
-76.5	2.958	-45.0	9.608	-13.5	497.2	18.0	444.3	49.5	8.921	81.0	2.028
-75.0	3.374	-43.5	10.15	-12.0	639.7	19.5	320.7	51.0	8.540	82.5	1.676
-73.5	3.727	-42.0	10.80	-10.5	801.8	21.0	229.1	52.5	8.259	84.0	1.408
-72.0	4.088	-40.5	11.57	-9.0	970.9	22.5	164.2	54.0	7.992	85.5	1.249
-70.5	4.427	-39.0	12.51	-7.5	1131	24.0	118.7	55.5	7.733	87.0	1.119
-69.0	4.722	-37.5	13.60	-6.0	1278	25.5	87.09	57.0	7.483	88.5	0.9966
-67.5	5.031	-36.0	15.07	-4.5	1404	27.0	65.62	58.5	7.203	90.0	0.9276
-66.0	5.349	-34.5	16.93	-3.0	1504	28.5	50.78	60.0	6.897		
-64.5	5.663	-33.0	19.34	-1.5	1580	30.0	40.24	61.5	6.551		
-63.0	5.948	-31.5	22.51	0.0	1628	31.5	32.47	63.0	6.211		
-61.5	6.230	-30.0	26.61	1.5	1648	33.0	26.81	64.5	5.858		
-60.0	6.521	-28.5	32.13	3.0	1642	34.5	22.52	66.0	5.479		

Electricity Parameter:

Current I:　0.1000A　　Power:　3.279W

Voltage V:　32.79V　　PF:　0.000

Optical Parameter(Distance=2.410m):

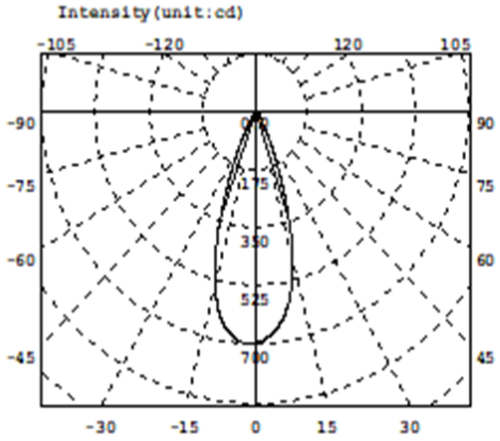
Equivalent Luminous flux: Φ eff= 356.4lm　　Efficiency: Eff=108.71lm/W

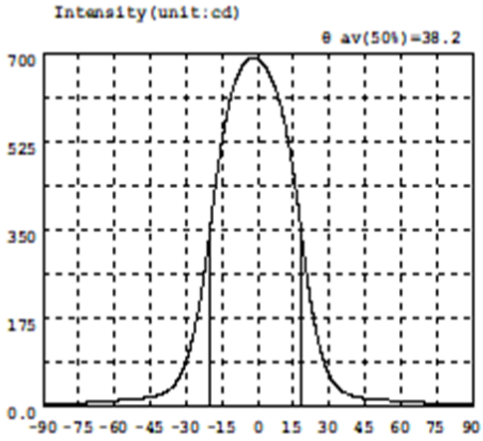
Diffuse angle:　@(25%): 32.8deg @(50%): 24.3deg @(75%): 16.6deg @(10%): 41.4deg

Diffuse angle:　@(25%): 33.0deg @(50%): 24.5deg @(75%): 16.9deg @(10%): 41.6deg

Imax=1649cd (C=0.0deg,G=2.0deg)　　C0-180Plane Imax= 1649cd(G=2.0deg)

C0-180Plane I0= 1628cd





Intensity data:(deg , cd)　C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	2.203	-58.5	10.50	-27.0	141.4	4.5	663.3	36.0	27.57	67.5	7.063
-88.5	2.237	-57.0	10.99	-25.5	176.3	6.0	648.2	37.5	23.93	69.0	6.578
-87.0	2.361	-55.5	11.48	-24.0	214.7	7.5	629.6	39.0	21.10	70.5	6.086
-85.5	2.520	-54.0	11.99	-22.5	262.0	9.0	607.2	40.5	18.86	72.0	5.618
-84.0	2.770	-52.5	12.55	-21.0	313.9	10.5	579.6	42.0	17.05	73.5	5.165
-82.5	3.100	-51.0	13.15	-19.5	368.9	12.0	546.4	43.5	15.60	75.0	4.712
-81.0	3.420	-49.5	13.83	-18.0	424.1	13.5	507.3	45.0	14.44	76.5	4.268
-79.5	3.873	-48.0	14.64	-16.5	477.2	15.0	462.0	46.5	13.50	78.0	3.827
-78.0	4.292	-46.5	15.66	-15.0	524.6	16.5	412.4	48.0	12.76	79.5	3.385
-76.5	4.734	-45.0	16.88	-13.5	565.6	18.0	354.7	49.5	12.14	81.0	2.947
-75.0	5.186	-43.5	18.44	-12.0	600.3	19.5	297.0	51.0	11.63	82.5	2.531
-73.5	5.661	-42.0	20.35	-10.5	628.4	21.0	246.3	52.5	11.20	84.0	2.251
-72.0	6.124	-40.5	22.75	-9.0	650.2	22.5	200.0	54.0	10.82	85.5	2.044
-70.5	6.622	-39.0	25.90	-7.5	666.3	24.0	160.3	55.5	10.45	87.0	1.890
-69.0	7.110	-37.5	30.24	-6.0	678.3	25.5	126.6	57.0	10.10	88.5	1.797
-67.5	7.565	-36.0	36.09	-4.5	687.1	27.0	99.33	58.5	9.711	90.0	1.719
-66.0	8.032	-34.5	44.22	-3.0	692.3	28.5	77.55	60.0	9.343		
-64.5	8.519	-33.0	55.11	-1.5	693.2	30.0	60.61	61.5	8.947		
-63.0	9.029	-31.5	69.54	0.0	690.7	31.5	47.97	63.0	8.482		
-61.5	9.529	-30.0	88.08	1.5	684.6	33.0	38.89	64.5	8.012		
-60.0	10.01	-28.5	112.1	3.0	675.2	34.5	32.35	66.0	7.541		

Electricity Parameter:

Current I:　0.1000A　　Power:　3.500W

Voltage V:　35.00V　　PF:　0.000

Optical Parameter(Distance=2.410m):

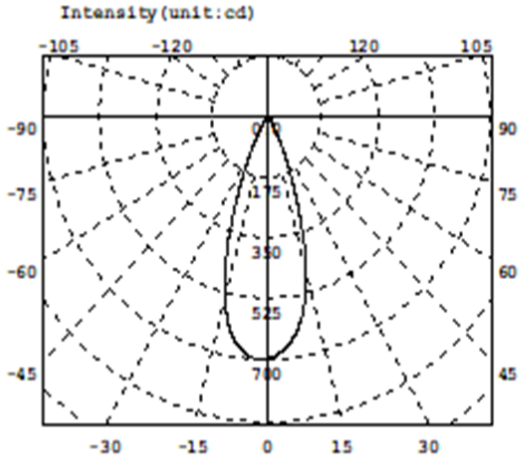
Equivalent Luminous flux: Φ eff= 334.2lm　　Efficiency: Eff=95.49lm/W

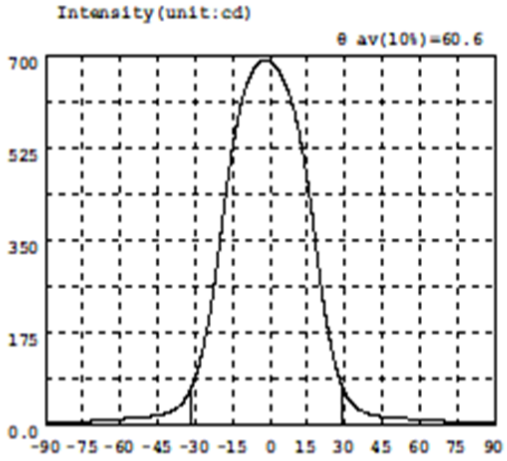
Diffuse angle:　@(25%): 49.0deg @(50%): 38.2deg @(75%): 28.1deg @(50%): 38.2deg

Diffuse angle:　@(25%): 49.1deg @(50%): 38.3deg @(75%): 28.3deg @(50%): 38.3deg

Imax=693.5cd (C=0.0deg,G=-2.0deg)　　C0-180Plane Imax= 693.5cd(G=-2.0deg)

C0-180Plane I0= 690.7cd





Intensity data:(deg , cd)　C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	2.203	-58.5	10.50	-27.0	141.4	4.5	663.3	36.0	27.57	67.5	7.063
-88.5	2.237	-57.0	10.99	-25.5	176.3	6.0	648.2	37.5	23.93	69.0	6.578
-87.0	2.361	-55.5	11.48	-24.0	214.7	7.5	629.6	39.0	21.10	70.5	6.086
-85.5	2.520	-54.0	11.99	-22.5	262.0	9.0	607.2	40.5	18.86	72.0	5.618
-84.0	2.770	-52.5	12.55	-21.0	313.9	10.5	579.6	42.0	17.05	73.5	5.165
-82.5	3.100	-51.0	13.15	-19.5	368.9	12.0	546.4	43.5	15.60	75.0	4.712
-81.0	3.420	-49.5	13.83	-18.0	424.1	13.5	507.3	45.0	14.44	76.5	4.268
-79.5	3.873	-48.0	14.64	-16.5	477.2	15.0	462.0	46.5	13.50	78.0	3.827
-78.0	4.292	-46.5	15.66	-15.0	524.6	16.5	412.4	48.0	12.76	79.5	3.385
-76.5	4.734	-45.0	16.88	-13.5	565.6	18.0	354.7	49.5	12.14	81.0	2.947
-75.0	5.186	-43.5	18.44	-12.0	600.3	19.5	297.0	51.0	11.63	82.5	2.531
-73.5	5.661	-42.0	20.35	-10.5	628.4	21.0	246.3	52.5	11.20	84.0	2.251
-72.0	6.124	-40.5	22.75	-9.0	650.2	22.5	200.0	54.0	10.82	85.5	2.044
-70.5	6.622	-39.0	25.90	-7.5	666.3	24.0	160.3	55.5	10.45	87.0	1.890
-69.0	7.110	-37.5	30.24	-6.0	678.3	25.5	126.6	57.0	10.10	88.5	1.797
-67.5	7.565	-36.0	36.09	-4.5	687.1	27.0	99.33	58.5	9.711	90.0	1.719
-66.0	8.032	-34.5	44.22	-3.0	692.3	28.5	77.55	60.0	9.343		
-64.5	8.519	-33.0	55.11	-1.5	693.2	30.0	60.61	61.5	8.947		
-63.0	9.029	-31.5	69.54	0.0	690.7	31.5	47.97	63.0	8.482		
-61.5	9.529	-30.0	88.08	1.5	684.6	33.0	38.89	64.5	8.012		
-60.0	10.01	-28.5	112.1	3.0	675.2	34.5	32.35	66.0	7.541		

Electricity Parameter:

Current I:　0.1000A　　Power:　3.500W

Voltage V:　35.00V　　PF:　0.000

Optical Parameter(Distance=2.410m):

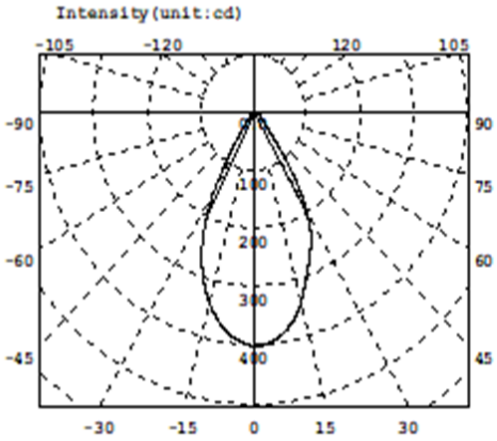
Equivalent Luminous flux: Φ eff= 334.2lm　　Efficiency: Eff=95.49lm/W

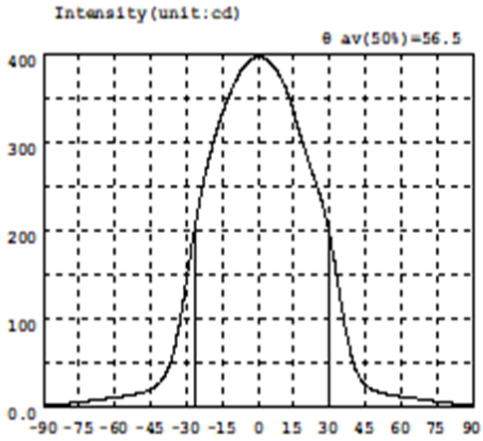
Diffuse angle:　@(25%): 49.0deg @(50%): 38.2deg @(75%): 28.1deg @(10%): 60.6deg

Diffuse angle:　@(25%): 49.1deg @(50%): 38.3deg @(75%): 28.3deg @(10%): 60.6deg

Imax=693.5cd (C=0.0deg,G=-2.0deg)　　C0-180Plane Imax= 693.5cd(G=-2.0deg)

C0-180Plane I0= 690.7cd





Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.830	-58.5	10.53	-27.0	195.9	4.5	392.7	36.0	99.40	67.5	8.229
-88.5	1.898	-57.0	11.11	-25.5	217.4	6.0	388.2	37.5	77.43	69.0	7.651
-87.0	1.977	-55.5	11.71	-24.0	240.4	7.5	382.7	39.0	59.44	70.5	7.108
-85.5	2.125	-54.0	12.37	-22.5	259.6	9.0	376.2	40.5	45.71	72.0	6.584
-84.0	2.374	-52.5	13.10	-21.0	276.0	10.5	368.1	42.0	35.92	73.5	6.075
-82.5	2.647	-51.0	13.91	-19.5	291.5	12.0	358.8	43.5	29.12	75.0	5.554
-81.0	2.975	-49.5	14.86	-18.0	306.0	13.5	348.0	45.0	24.50	76.5	5.035
-79.5	3.350	-48.0	15.99	-16.5	320.0	15.0	335.2	46.5	21.26	78.0	4.546
-78.0	3.771	-46.5	17.43	-15.0	332.7	16.5	318.9	48.0	18.87	79.5	4.079
-76.5	4.212	-45.0	19.26	-13.5	344.0	18.0	306.2	49.5	17.06	81.0	3.638
-75.0	4.657	-43.5	21.65	-12.0	354.0	19.5	293.3	51.0	15.70	82.5	3.233
-73.5	5.167	-42.0	24.75	-10.5	363.7	21.0	280.3	52.5	14.65	84.0	2.805
-72.0	5.675	-40.5	29.08	-9.0	372.0	22.5	267.9	54.0	13.77	85.5	2.465
-70.5	6.184	-39.0	35.06	-7.5	379.2	24.0	255.7	55.5	13.03	87.0	2.165
-69.0	6.695	-37.5	43.62	-6.0	385.2	25.5	243.6	57.0	12.34	88.5	1.906
-67.5	7.217	-36.0	55.69	-4.5	389.9	27.0	230.1	58.5	11.74	90.0	1.764
-66.0	7.748	-34.5	72.28	-3.0	393.7	28.5	214.0	60.0	11.12		
-64.5	8.293	-33.0	92.87	-1.5	396.3	30.0	194.9	61.5	10.53		
-63.0	8.841	-31.5	116.9	0.0	397.5	31.5	172.6	63.0	9.944		
-61.5	9.393	-30.0	143.2	1.5	397.5	33.0	148.6	64.5	9.367		
-60.0	9.960	-28.5	170.3	3.0	395.8	34.5	123.5	66.0	8.798		

Electricity Parameter:

Current I: 0.1000A Power: 3.279W

Voltage V: 32.79V PF: 0.000

Optical Parameter(Distance=2.410m):

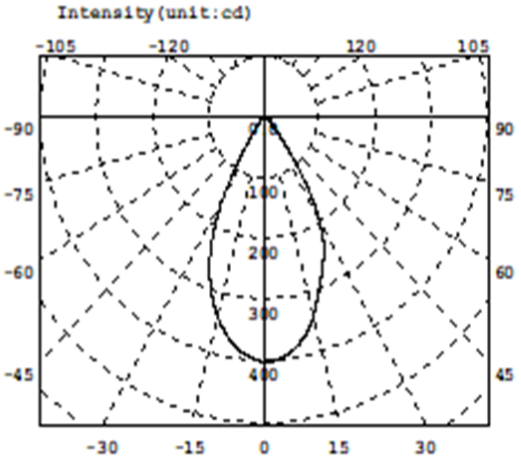
Equivalent Luminous flux: Φ eff= 340.6lm Efficiency: Eff=103.88lm/W

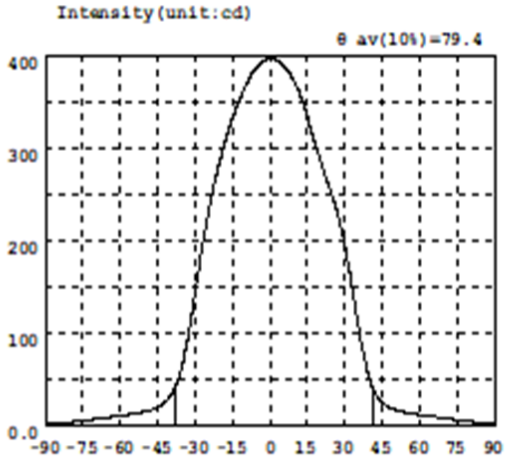
Diffuse angle: @(25%): 68.4deg @(50%): 56.5deg @(75%): 37.7deg @(50%): 56.5deg

Diffuse angle: @(25%): 68.5deg @(50%): 56.5deg @(75%): 37.7deg @(50%): 56.5deg

Imax=397.7cd (C=0.0deg,G=0.5deg) C0-180Plane Imax= 397.7cd(G=0.5deg)

C0-180Plane I0= 397.5cd





Intensity data:(deg , cd)　C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.830	-58.5	10.53	-27.0	195.9	4.5	392.7	36.0	99.40	67.5	8.229
-88.5	1.898	-57.0	11.11	-25.5	217.4	6.0	388.2	37.5	77.43	69.0	7.651
-87.0	1.977	-55.5	11.71	-24.0	240.4	7.5	382.7	39.0	59.44	70.5	7.108
-85.5	2.125	-54.0	12.37	-22.5	259.6	9.0	376.2	40.5	45.71	72.0	6.584
-84.0	2.374	-52.5	13.10	-21.0	276.0	10.5	368.1	42.0	35.92	73.5	6.075
-82.5	2.647	-51.0	13.91	-19.5	291.5	12.0	358.8	43.5	29.12	75.0	5.554
-81.0	2.975	-49.5	14.86	-18.0	306.0	13.5	348.0	45.0	24.50	76.5	5.035
-79.5	3.350	-48.0	15.99	-16.5	320.0	15.0	335.2	46.5	21.26	78.0	4.546
-78.0	3.771	-46.5	17.43	-15.0	332.7	16.5	318.9	48.0	18.87	79.5	4.079
-76.5	4.212	-45.0	19.26	-13.5	344.0	18.0	306.2	49.5	17.06	81.0	3.638
-75.0	4.657	-43.5	21.65	-12.0	354.0	19.5	293.3	51.0	15.70	82.5	3.233
-73.5	5.167	-42.0	24.75	-10.5	363.7	21.0	280.3	52.5	14.65	84.0	2.805
-72.0	5.675	-40.5	29.08	-9.0	372.0	22.5	267.9	54.0	13.77	85.5	2.465
-70.5	6.184	-39.0	35.06	-7.5	379.2	24.0	255.7	55.5	13.03	87.0	2.165
-69.0	6.695	-37.5	43.62	-6.0	385.2	25.5	243.6	57.0	12.34	88.5	1.906
-67.5	7.217	-36.0	55.69	-4.5	389.9	27.0	230.1	58.5	11.74	90.0	1.764
-66.0	7.748	-34.5	72.28	-3.0	393.7	28.5	214.0	60.0	11.12		
-64.5	8.293	-33.0	92.87	-1.5	396.3	30.0	194.9	61.5	10.53		
-63.0	8.841	-31.5	116.9	0.0	397.5	31.5	172.6	63.0	9.944		
-61.5	9.393	-30.0	143.2	1.5	397.5	33.0	148.6	64.5	9.367		
-60.0	9.960	-28.5	170.3	3.0	395.8	34.5	123.5	66.0	8.798		

Electricity Parameter:

Current I:　0.1000A　　Power:　3.279W

Voltage V:　32.79V　　PF:　0.000

Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: Φ eff= 340.6lm　　Efficiency: Eff=103.88lm/W

Diffuse angle:　@(25%): 68.4deg @(50%): 56.5deg @(75%): 37.7deg @(10%): 79.4deg

Diffuse angle:　@(25%): 68.5deg @(50%): 56.5deg @(75%): 37.7deg @(10%): 79.4deg

Imax=397.7cd (C=0.0deg,G=0.5deg)　　C0-180Plane Imax= 397.7cd(G=0.5deg)

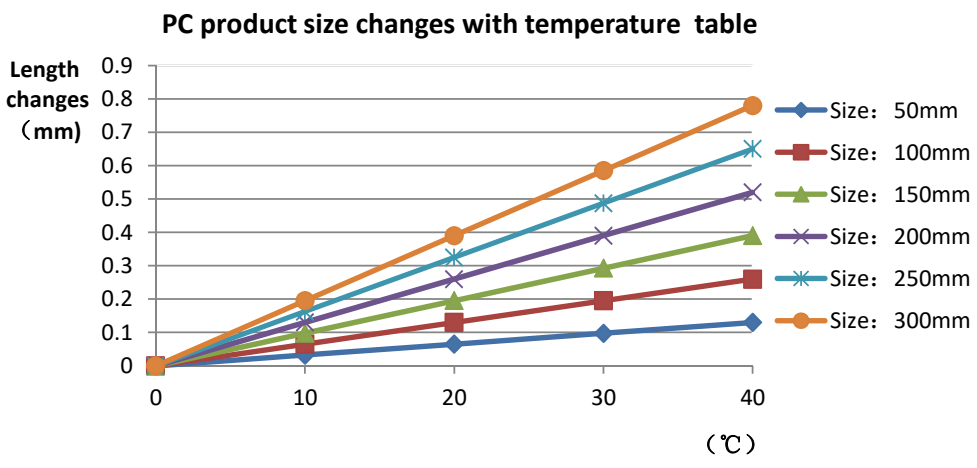
C0-180Plane I0= 397.5cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Test result5	Test result6	Test result7	Test result8	Judgment	Remarks
1.Size	diameter	45			44.86	44.84	44.85	44.87	44.82	44.84	44.83	44.83		Test environment: In 20 ℃ -25 ℃ environment to achieve thermal
	thickness	2			1.98	2.02	1.99	2.06	1.96	2.05	1.99	1.99		
	height	20.9			20.84	20.83	20.82	20.83	20.83	20.86	20.86	20.82		
	Gate shear can not affect the appearance of the lamp													
	See attachment "Appearance Inspection Standards"													

2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	
3.Material	PC		Color	Transparent			OK

4.Optical index	Testing LED	CREE 1512								
	The size and rated power of the light-emitting surface（LES) of the COB recommended by this lens should conform to the parameters in the product basic information table. if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM	See light distribution curve								
	angle（50%		24.3	24.4	24.3	24.3	24.3	24.4	24.3	24.3	
	angle（10%		41.4	41.6	41.6	41.4	41.4	41.6	41.6	41.4	
	K-value		4.63	4.60	4.59	4.62	4.63	4.60	4.59	4.62	
	ficien		89.2%	89.5%	88.0%	88.7%	88.9%	88.1%	89.9%	89.7%	
	acu	See the signature sample								
Comprehensive judgment	Qualified									

Remarks：
1、Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
2、 Ambient temperature on the size of the product refer to the table on the right



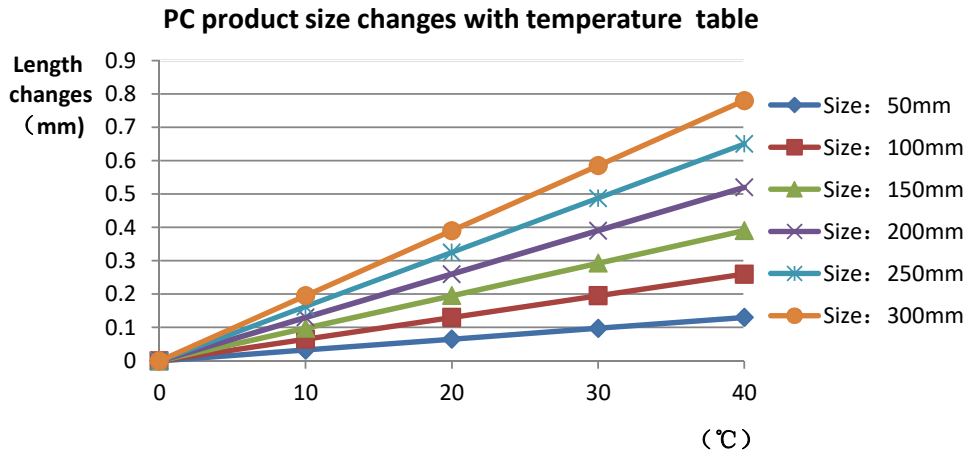
Precautions:
1. Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.
2. Try to avoid touching the total reflection surface when taking the lens.
3. The lens surface is contaminated. Only use a soft cotton cloth dipped in analytically pure neutral solvent to wipe gently. Do not wipe with industrial solvents (alcohol, isopropanol, acetone, ether, toluene, xylene, carbon tetrachloride, MMA Body, etc.).
4. The working temperature of the lens should be within the temperature resistance limit of the lens material. Exceeding the temperature resistance limit will cause the lens to crack or melt and affect the service life of the lens. It is recommended that the upper surface temperature of the LED colloid should be less than 120 degrees.

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Test result5	Test result6	Test result7	Test result8	Judgment	Remarks
1.Size	diameter	45			44.75	44.75	44.75	44.77	44.74	44.75	44.74	44.74		Test environment: In 20 ℃ -25 ℃ environment to achieve thermal
	thickness	2			1.95	2	1.99	1.97	1.96	1.99	1.98	1.97		
	height	20.9			20.86	20.8	20.88	20.84	20.82	20.9	20.86	20.8		
	Gate shear can not affect the appearance of the lamp													
	See attachment "Appearance Inspection Standards"													

2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	
3.Material	PC		Color	Transparent			OK

4.Optical index	Testing LED	CREE 1512								
	The size and rated power of the light-emitting surface（LES) of the COB recommended by this lens should conform to the parameters in the product basic information table. if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM	See light distribution curve								
	angle（50%		38.2	37.4	37.8	38.8	38.1	38.6	38.9	38.7
	angle（10%		60.6	59	58.2	61.8	59.5	59.6	61.7	60.8
	K-value		2.07	2.19	2.20	2.00	2.15	2.11	2.00	2.04
	ficien		89.7%	89.0%	88.9%	89.3%	90.0%	88.5%	88.3%	88.0%
	acu	See the signature sample								
Comprehensive judgment	Qualified									

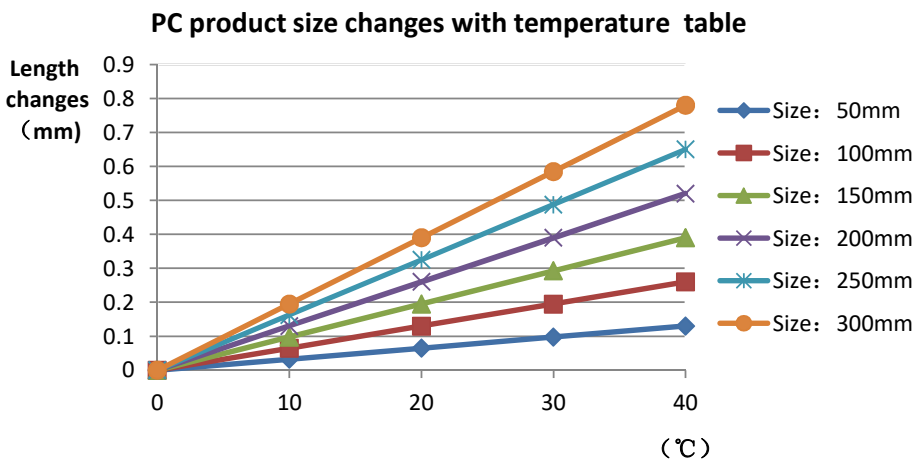
Remarks：
1、Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
2、 Ambient temperature on the size of the product refer to the table on the right



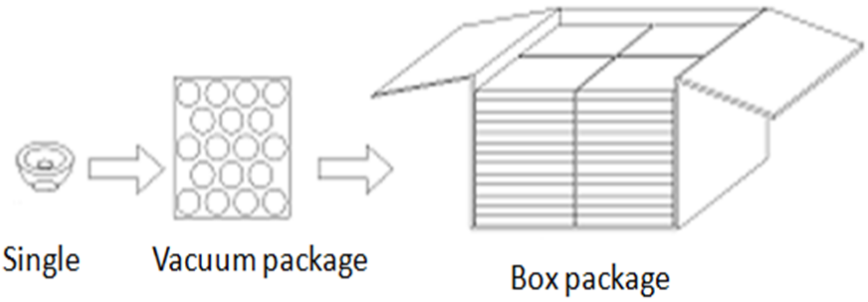
Precautions:
1. Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.
2. Try to avoid touching the total reflection surface when taking the lens.
3. The lens surface is contaminated. Only use a soft cotton cloth dipped in analytically pure neutral solvent to wipe gently. Do not wipe with industrial solvents (alcohol, isopropanol, acetone, ether, toluene, xylene, carbon tetrachloride, MMA Body, etc.).
4. The working temperature of the lens should be within the temperature resistance limit of the lens material. Exceeding the temperature resistance limit will cause the lens to crack or melt and affect the service life of the lens. It is recommended that the upper surface temperature of the LED colloid should be less than 120 degrees.

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	45			S	44.79	44.78	44.78		Test environment: In 20 ℃ -25 ℃ environment to achieve thermal equilibrium after the test.
	thickness	2			2.03	2.06	1.98	2.01		
	height	20.9			20.72	20.71	20.7	20.76		
	Gate shear can not affect the appearance of the lamp									
	See attachment "Appearance Inspection Standards"									
2.Appearance Quality	See attachment "Appearance Inspection Standards"	E			No burr	No burr	No burr	No burr		OK
					No stains	No stains	No stains	No stains		
3.Material	PC				Color	Transparent				OK
4.Optical index	Testing LED	CREE 1512								
	The size and rated power of the light-emitting surface（LES) of the COB recommended by this lens should conform to the parameters in the product basic information table. if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM	See light distribution curve								
	angle（50%）				56.5	58.5	57.3	57.8		
	angle（10%）				79.4	79.2	79.4	78.9		
	K-value (CD/LM)									
	fficienc				85.00%	86.00%	85.50%	85.70%		
	Facul:	See the signature sample								
Comprehensive judgment	Qualified									

Remarks：
1、Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
2、 Ambient temperature on the size of the product refer to the table on the right



Precautions:
1. Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.
2. Try to avoid touching the total reflection surface when taking the lens.
3. The lens surface is contaminated. Only use a soft cotton cloth dipped in analytically pure neutral solvent to wipe gently. Do not wipe with industrial solvents (alcohol, isopropanol, acetone, ether, toluene, xylene, carbon tetrachloride, MMA Body, etc.).
4. The working temperature of the lens should be within the temperature resistance limit of the lens material. Exceeding the temperature resistance limit will cause the lens to crack or melt and affect the service life of the lens. It is recommended that the upper surface temperature of the LED colloid should be less than 120 degrees.

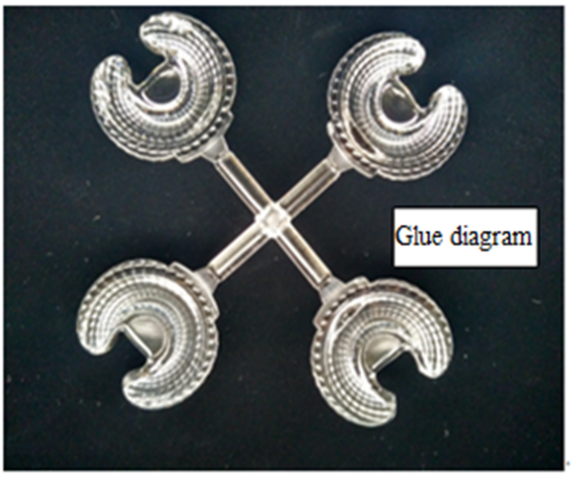
PN	HK-HG-45@21-24-D9-21-1g-1_PC	Product Name	HK Dark 45@21-24° lens (D9)（PC)
Product material	PC		
Package diagram			

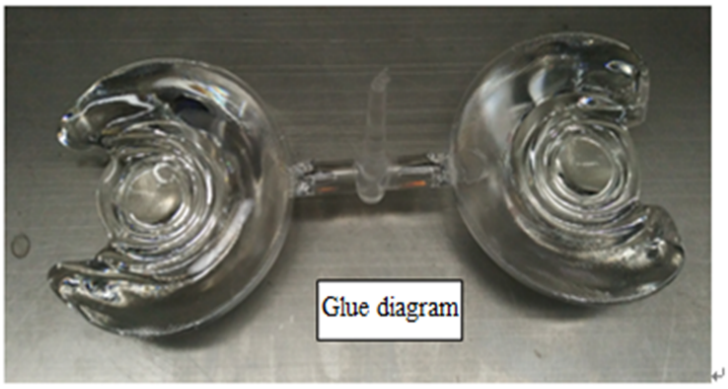
Product packing							
	18	A/ Box	4	pcs/Layer		
	11	Layer/Box	792	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0066	Blister box	23cm*21cm	44	BAG	
	2	2.08.0001	PE film	30cm*30cm	44	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	44	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	12	PCS	
	6	2.06.0015	big flat carton	48cm*44cm*19cm	1	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail						

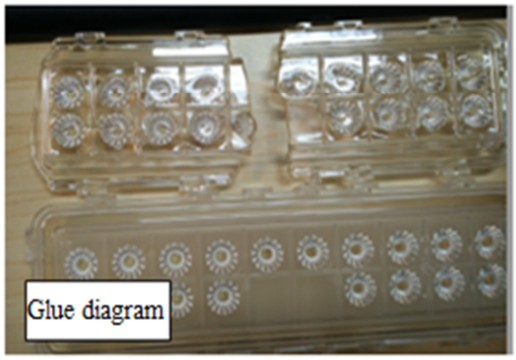
Special notice

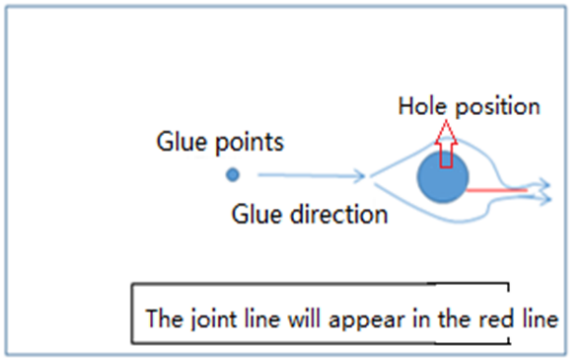
When gule pass through holes, columns and other structures, or part of the thin structure, will form a weld line. The product which uses multi-point injection welding line will appear because of the combination of sol, as shown below:

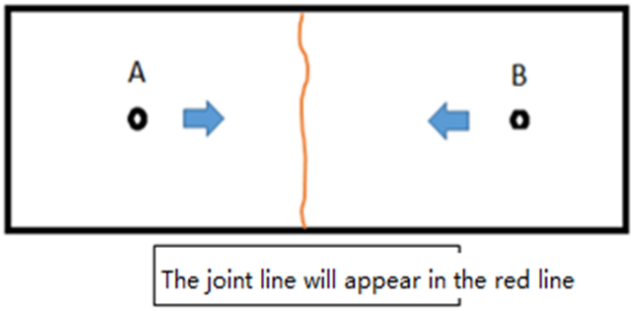
Synthetl











Please note:

The appearance of lines in the structure of the product as well as at the screw hole is a normal phenomenon, will not affect the actual use of the product, and can not be avoided at this stage.

Appearance inspection standards

1 Operating procedures

1.1.1Sampling standards, sampling plan and AQL

Test level：GB/T2828.1-2012The first part is according to the acceptance quality limit (AQL) retrieval batch inspection sampling plan, general inspection level Ⅱ level, CR class defect coefficient 0, MA defect rejection level AQL = 0.65, MI class defect rejection level AQL = 1.0; defect level please see 5.4.

2 Code table

Code	Code description	Unit	Code		Code description	Unit
N	Amount/pcs	pcs	D		Diameter	mm
L	Length	mm	H		Depth	mm
W	Width	mm	DS		Distance	mm
S	Proportion	mm^2	SS		Offset	mm

3 Test conditions

3.1 Sight distance and working hours:Sight distance should be 30-35cm, each side of the inspection time does not exceed 12s, the visual angle of 45-135 degrees;

3.2 Light: 2x40w cool white fluorescent lamp, the light source is 500-550mm away from the lens surface; in order to make the appearance defect can be correctly recognized, the illumination should be 500-1000Lux, and the observation time is 10 seconds.

3.3 Visual inspection staff should be 1.0 (including corrected visual acuity) above, no color blindness, color weakness.

4 Appearance inspection standards

Test items	Judging standard	Inspection equipment	Defect level		
		Testing method	MI	MA	CR
Check the sample	When start the machine and process, all products have to check the appearance of the sample, the appearance of the sample is divided into qualified samples and limited samples. 1: Qualified sample refers to the appearance and structure standard of the product which recognized by the client, the sample size should be confirmed before mass production;	Sample comparison, visual			√

	2: The limited sample refers to the limit of a particular exceptionally developed sample. Limit the sample only for its specific point of exception to confirm; The priority is higher than the other criteria in this table. When there is a limited sample, the limit sample shall prevail.				
Raw edge	Not allowed to affect the size and assembly	Visual, point card		√	
Scratch	1: Non-optical surface and non-exposed surface scratches should be visually insignificant and the length is less than 1/10 of the maximum surface size.	Visual, point card, calipers		√	
Fingerprint	Fingerprints are not allowed on all products	Visual		√	
Foreign objects, black spots, white spots	The product may not be attached to foreign objects, including oil, fiber, dregs of water gap and so on				√
Deformation	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces.	Visual, feeler			√
Poor ejection	Products may not appear bad ejection, including no convex top, thimble printed on the assembly surface shall not be higher than the product surface, non-assembled surface thimble height should not exceed the product size tolerances; thimble printing should be less than the product surface and no more than 0.3; thimble surface treatment should be consistent with the product side.	Visual, point card		√	
	Ejection strain: the optical surface and the appearance of the exposed surface after assembly are not allowed to have a strain, and the structural surface does not allow visual obvious strain.				
Insufficient filling	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces，The signature sample shall prevail.	Visual, point card		√	
Shrink	When the entire surface of the product shrinks, the optical properties and dimensions must meet the requirements, and the visual will not significantly affect the appearance.Part shrink reference point defects	Visual, point card		√	
Flow marks、Welding line	1：Product does not allow the presence of flow marks and welding lines unless the structure can not be avoided;	Visual		√	
	2: The remaining flow marks shall not appear in the optical surface, a single L ≤ 10mm, no more than two				

Bubble	No bubbles are allowed	Visual		√	
Foreign objects, black spots, white spots	Not obvious or D ≤ 0.3mm black spots and foreign bodies in the area of 100x100mm not more than 1; Exceeded foreign matter black spots is judged bad.	Visual, point card	√		
Damaged	No damage is allowed	Visual			√
Cold glue	Optical surface may not have cold glue, non-optical surface cold glue should meet the visual is not obvious.	Visual	√		
Bad incision	1: Do not affect the product size, shall not penetrate the optical surface, the cut should be smooth;	Visual			√
	2: Laser cutting products, the optical surface burns shall not occur after the processing is completed. Beading must not affect product installation				
	3: Three molds and hot runner gate shall not appear residue.				
Scrub	Scrub surface should be uniform, off the scrub phenomenon should not be obvious，A single off scrub imprint requires D ≤ 1 mm and no more than 1 area within a 50x50 mm area	Visual		√	