



HERCULUX
恒坤光电

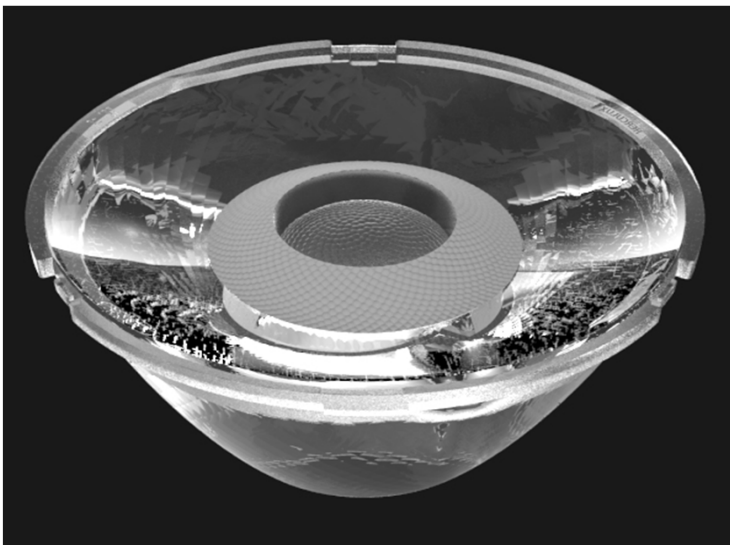
Chengdu HercuLux Photoelectric
Technology Co.,Ltd
Product Approval

Approval number :

Customer :

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd

PN	Code	Product
HK-HG-75@35-15-D12-20-1g-1	1. 01. 92024	HK Dark 75@35-15° lens
HK-HG-75@35-24-D14-21-1g-1	1. 01. 92025	HK Dark 75@35-24° lens
HK-HG-75@35-36-D14-21-1g-1	1. 01. 92068	HK Dark 75@35-36° lens
HK-HG-75@35-50-D14-21-1g-1	1. 01. 92080	HK Dark 75@35-50° lens



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified <input type="checkbox"/>		DATE	
Project manager		DATE		Unqualified <input type="checkbox"/>		DATE	
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

www.hkoptics.com

Sales Dept: Shenzhen Nanshan District Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building, 501-

TEL: 0755-2937 1541

FAX: 0755-2907 5140

*Approval In duplicate , for both supplier and customer.



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Product Approval

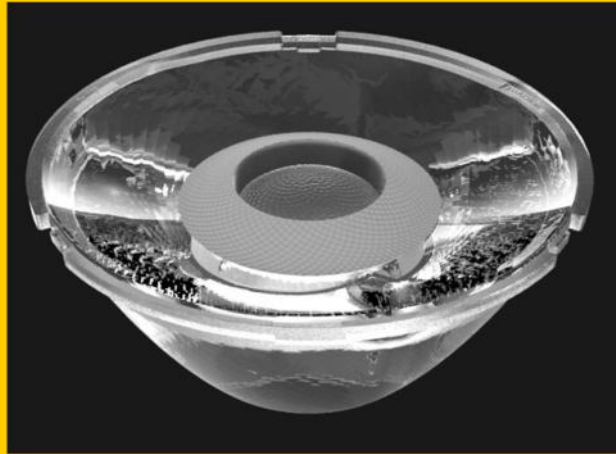
TEL: 0755-2937 1541

FAX: 0755-2907 5140

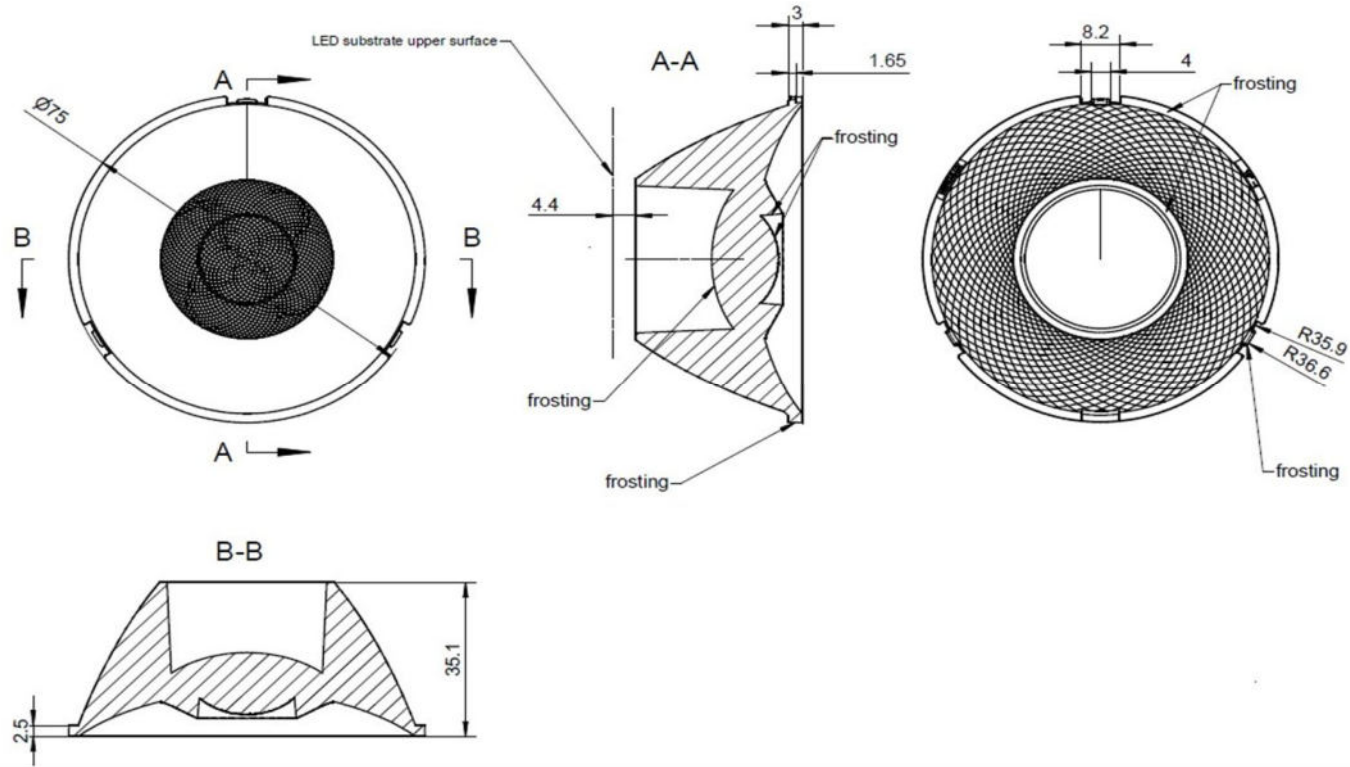
www.hkoptics.com

Date updated: 2020/10/20

Product Picture:



PN:	HK-HG-75@35-xx-Dxx-21-1g-1
Size(L*W*H/ Φ *H):	Φ 75mm*H35.1mm
Material:	PMMA
Efficiency:	\
Temperature(Topr):	-40°C to +80°C
FWHM:	15°、24°、36°、50°
Matched LES:	D12、D14

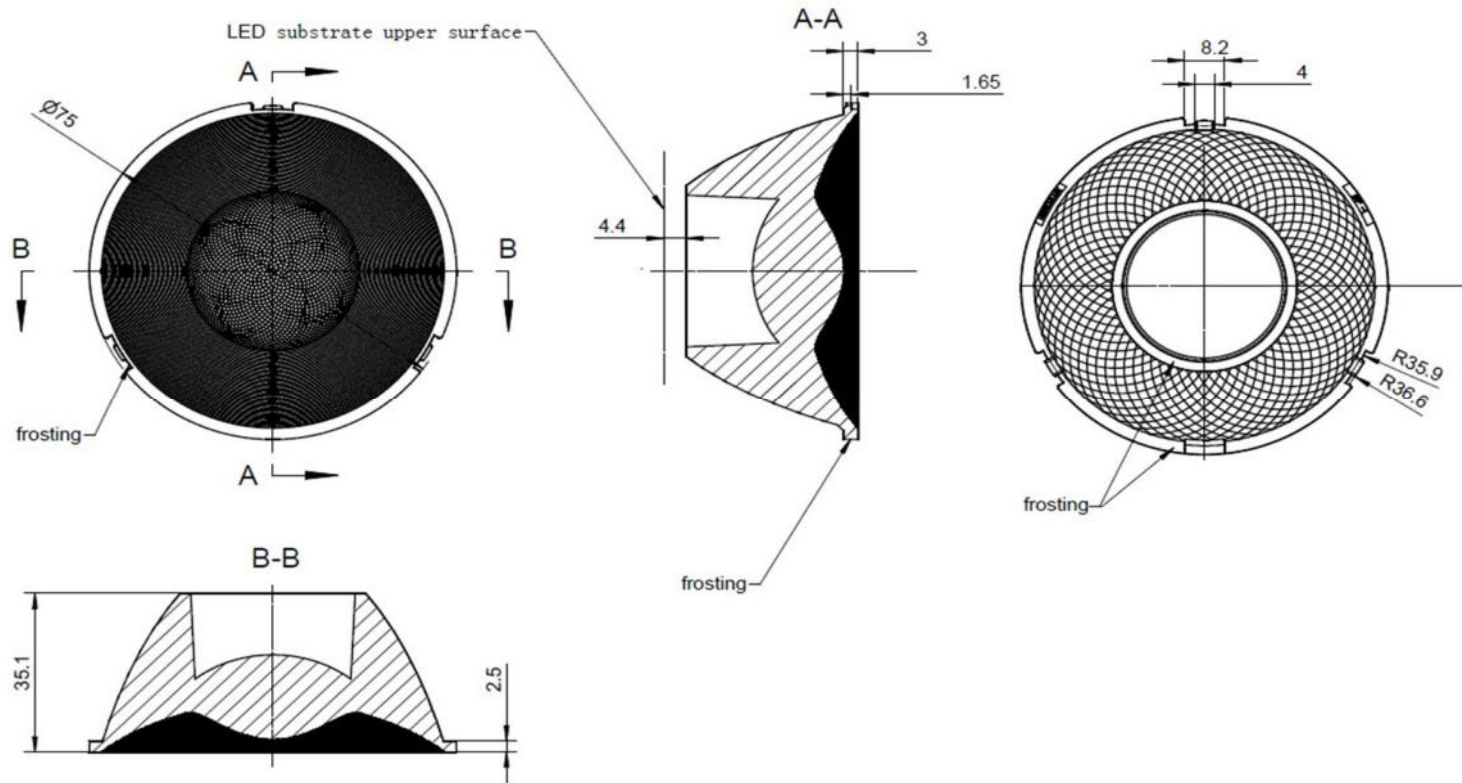


Technical remark:

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.

Optical design			HK Dark 75@35-15°lens	HK-HG-75@35-15-D12-20-1g-1		
Structure design				1.01.92024		
Review				number of drawing	qty	weight
Validation				CDHK		
			Material:	PMMA		

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

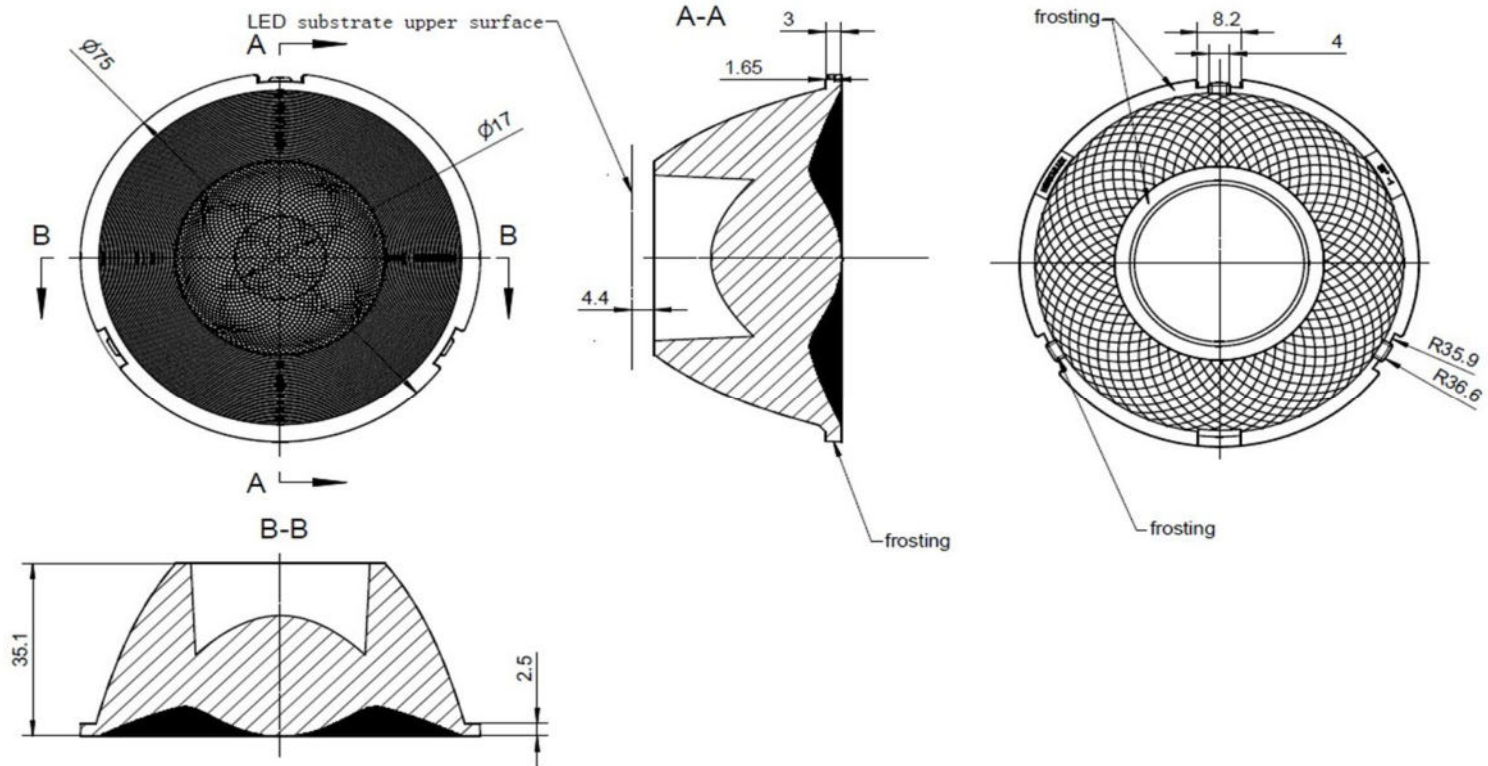


Technical remark:

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.

Optical design			HK Dark 75@35-24°lens		HK-HG-75@35-24-D14-21-1g-1		
Structure design					1.01.92025		
Review					number of drawing	qty	weight
Validation					CDHK		
			Material:	PMMA			

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

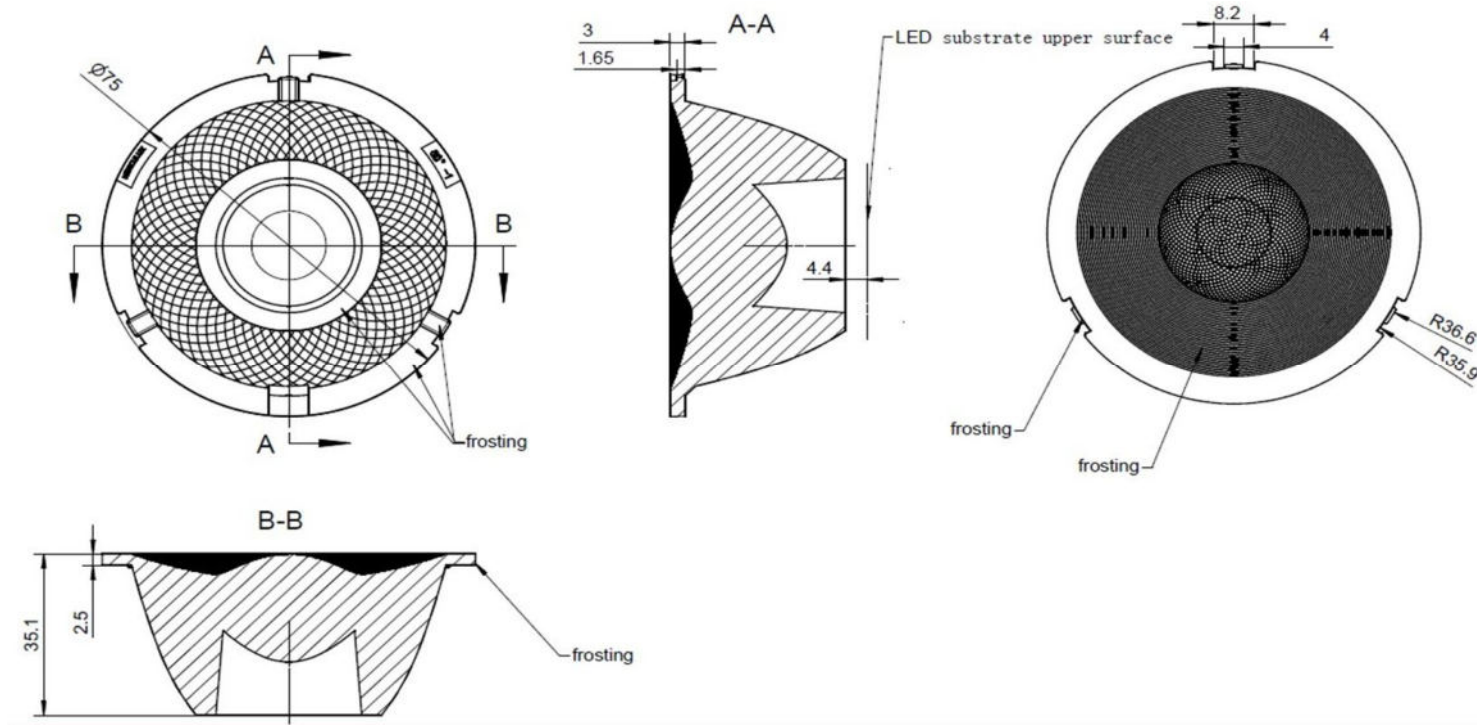


Technical remark:

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.

Optical design			HK Dark 75@35-36°lens	HK-HG-75@35-36-D14-21-1g-1		
Structure design				1.01.92068		
Review				number of drawing	qty	weight
Validation				CDHK		
			Material:	PMMA		

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

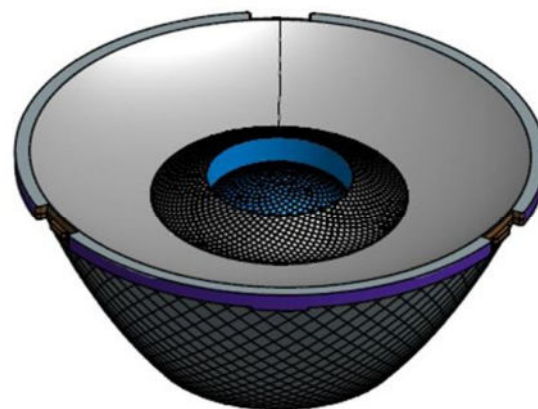
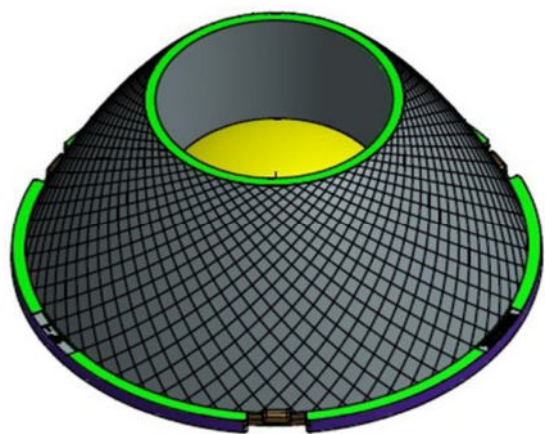


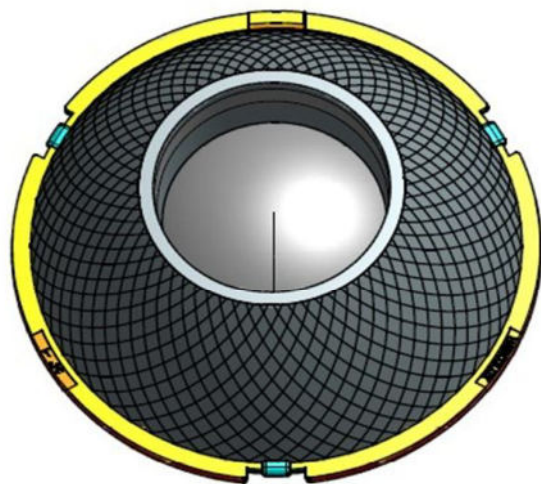
Technical remark:

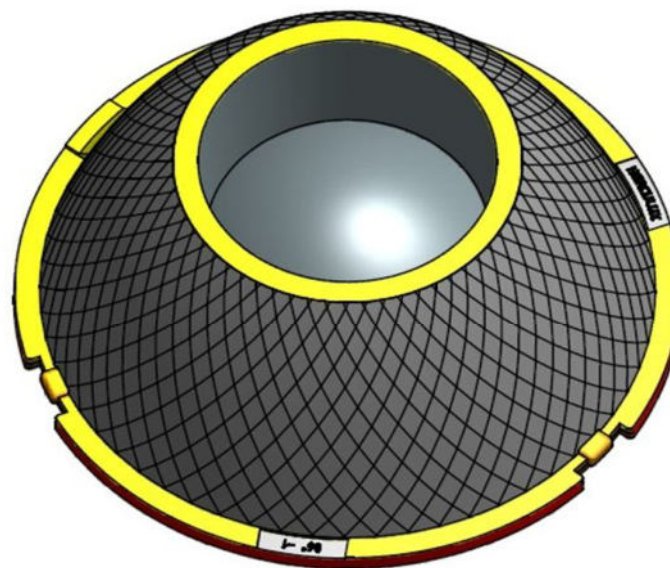
1. The 3D map is not indicated for rounded corners and draft angle.
2. The dimensional tolerances are not specified according to GB/T 14486 2008 MT5.
3. The surface has no flash, shrinkage, bubbles and other defects.

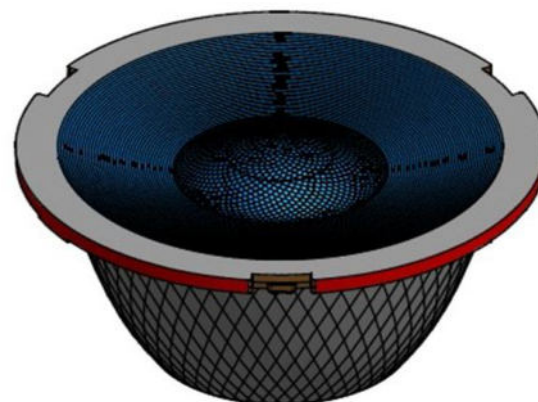
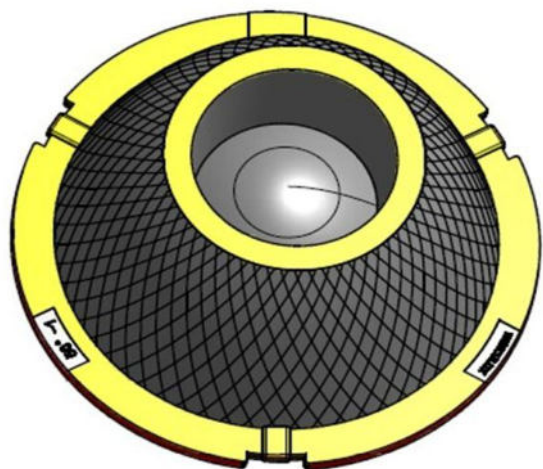
Optical design			HK Dark 75@35-50°lens		HK-HG-75@35-50-D14-21-1g-1		
Structure design					1.01.92080		
Review					number of drawing	qty	weight
Validation					CDHK		
			Material:		PMMA		

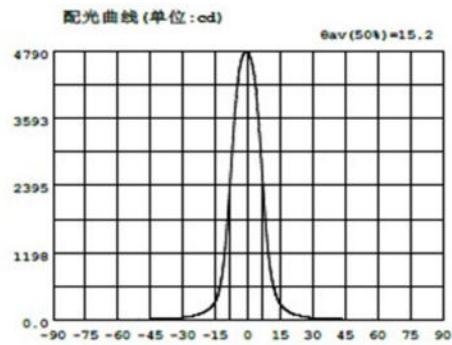
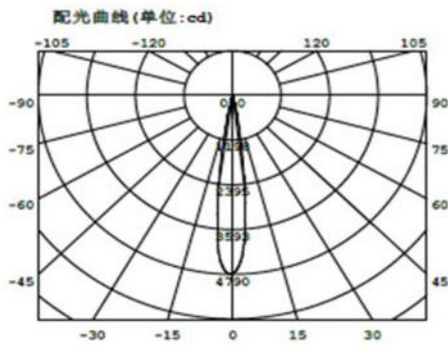
MT5 Tolerance table (mm)	Basic size	<3	3~10	24~65	65~140	140~250	250~450	>450
	tolerance value	±0.1	±0.15	±0.35	±0.50	±0.80	±1.2	±2.0











光强分布数据:(角度°, 光强cd) C0-180

角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	2.076	-88.5	2.126	-87.0	2.205	-85.5	2.422	-84.0	2.591	-82.5	3.022
-81.0	3.422	-79.5	4.054	-78.0	4.697	-76.5	5.292	-75.0	5.828	-73.5	6.476
-72.0	7.095	-70.5	7.750	-69.0	8.242	-67.5	8.895	-66.0	9.522	-64.5	10.20
-63.0	10.80	-61.5	11.61	-60.0	12.09	-58.5	12.68	-57.0	13.02	-55.5	13.66
-54.0	14.32	-52.5	15.04	-51.0	15.84	-49.5	16.77	-48.0	17.86	-46.5	18.94
-45.0	20.20	-43.5	21.65	-42.0	22.29	-40.5	23.26	-39.0	24.15	-37.5	24.66
-36.0	25.26	-34.5	26.15	-33.0	26.29	-31.5	26.29	-30.0	26.15	-28.5	25.84
-27.0	25.26	-25.5	24.66	-24.0	22.29	-22.5	18.94	-21.0	15.84	-19.5	12.68
-18.0	10.80	-16.5	8.242	-15.0	6.476	-13.5	5.292	-12.0	4.697	-10.5	4.054
-9.0	3.422	-7.5	2.422	-6.0	2.076	-4.5	2.126	-3.0	2.076	-1.5	2.076
0.0	4790	1.5	2.076	3.0	2.076	4.5	2.126	6.0	2.076	7.5	2.422
9.0	3.422	10.5	4.054	12.0	4.697	13.5	5.292	15.0	6.476	16.5	8.242
18.0	10.80	19.5	12.68	21.0	15.84	22.5	19.92	24.0	26.15	25.5	33.95
27.0	25.26	28.5	42.38	30.0	66.24	31.5	108.2	33.0	178.6	34.5	289.1
36.0	58.28	37.5	94.39	39.0	139.2	40.5	202.9	42.0	289.1	43.5	460.8
45.0	158.4	46.5	302.9	48.0	409.4	49.5	529.2	51.0	662.4	52.5	880.0
54.0	302.9	55.5	662.4	57.0	1082.0	58.5	1584.0	60.0	2029.0	61.5	2891.0
63.0	3029.0	64.5	3395.0	66.0	3553.0	67.5	3395.0	69.0	2891.0	70.5	2029.0
72.0	1584.0	73.5	1082.0	75.0	662.4	76.5	409.4	78.0	289.1	79.5	158.4
81.0	108.2	82.5	66.24	84.0	40.94	85.5	28.92	87.0	20.29	88.5	15.84
87.0	10.82	88.5	8.242	90.0	4.697						

电学参数:

电流: 0.1000A 功率: 1.940W
电压: 19.39V 功率因数: 1.000

光学参数(测试距离2.559m):

等效光通量: $\Phi_{eff} = 482.01lm$ 光效: $Eff=248.47lm/W$

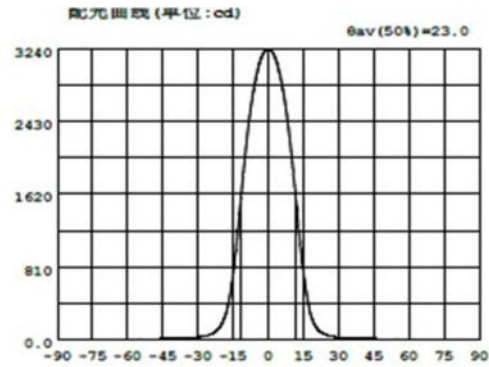
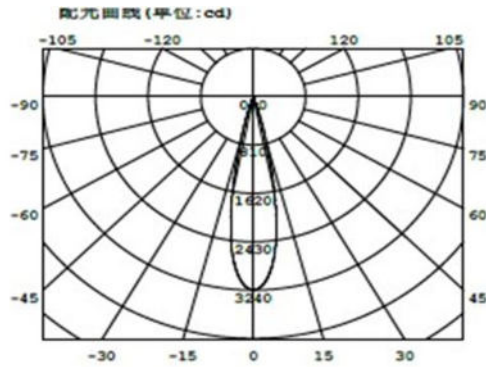
最大光强扩散角: $\theta(25\%): 20.0^\circ$ $\theta(50\%): 15.2^\circ$ $\theta(75\%): 11.0^\circ$ $\theta(50\%): 15.2^\circ$

中心光强扩散角: $\theta(25\%): 20.1^\circ$ $\theta(50\%): 15.2^\circ$ $\theta(75\%): 11.0^\circ$ $\theta(50\%): 15.2^\circ$

最大光强 $I_{max} = 4780cd$ ($C=0.0^\circ, G=-0.5^\circ$)

C0-180平面 $I_{max} = 4780cd$ ($G=-0.5^\circ$)

C0-180平面 $I_0 = 4769cd$



光强分布数据:(角度°, 光强cd) C0-180

角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	1.464	-58.5	9.548	-27.0	42.55	4.5	3008	36.0	18.51	67.5	6.274
-88.5	1.502	-57.0	10.14	-25.5	52.80	6.0	2830	37.5	17.11	69.0	5.743
-87.0	1.590	-55.5	10.92	-24.0	67.84	7.5	2591	39.0	15.91	70.5	5.252
-85.5	1.744	-54.0	11.91	-22.5	91.02	9.0	2284	40.5	15.16	72.0	4.823
-84.0	1.911	-52.5	11.88	-21.0	129.0	10.5	1917	42.0	14.70	73.5	4.430
-82.5	2.155	-51.0	12.40	-19.5	191.2	12.0	1515	43.5	14.32	75.0	4.028
-81.0	2.427	-49.5	12.85	-18.0	290.8	13.5	1115	45.0	14.00	76.5	3.641
-79.5	2.787	-48.0	13.28	-16.5	466.2	15.0	768.0	46.5	13.67	78.0	3.245
-78.0	3.161	-46.5	13.68	-15.0	724.7	16.5	500.3	48.0	13.32	79.5	2.866
-76.5	3.619	-45.0	14.05	-13.5	1064	18.0	295.0	49.5	12.92	81.0	2.489
-75.0	4.035	-43.5	14.41	-12.0	1460	19.5	185.0	51.0	12.45	82.5	2.139
-73.5	4.442	-42.0	14.81	-10.5	1872	21.0	122.8	52.5	11.94	84.0	1.866
-72.0	4.859	-40.5	15.37	-9.0	2249	22.5	86.46	54.0	11.35	85.5	1.627
-70.5	5.204	-39.0	16.10	-7.5	2565	24.0	64.72	55.5	10.72	87.0	1.421
-69.0	5.755	-37.5	17.15	-6.0	2810	25.5	50.65	57.0	10.11	88.5	1.428
-67.5	6.222	-36.0	18.46	-4.5	2997	27.0	40.92	58.5	9.574	90.0	1.232
-66.0	6.669	-34.5	20.12	-3.0	3128	28.5	34.08	60.0	9.015		
-64.5	7.252	-33.0	22.46	-1.5	3206	30.0	28.96	61.5	8.447		
-63.0	7.794	-31.5	25.58	0.0	3224	31.5	25.13	63.0	7.886		
-61.5	8.369	-30.0	29.70	1.5	3210	33.0	22.26	64.5	7.353		
-60.0	8.962	-28.5	35.22	3.0	3125	34.5	20.18	66.0	6.823		

电学参数:

电流: 0.1000A 功率: 3.358W
 电压: 33.59V 功率因数: 1.000

光学参数(测试距离2.559m):

等效光通量: $\Phi_{eff} = 547.11\text{lm}$ 光效: $Eff = 162.93\text{lm/W}$

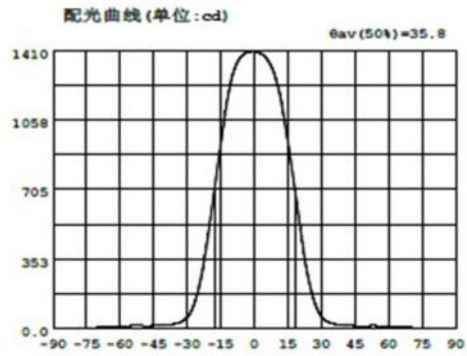
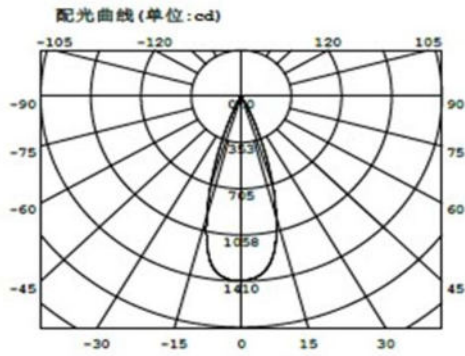
最大光强扩散角: $\theta(25\%) : 29.4^\circ$ $\theta(50\%) : 23.0^\circ$ $\theta(75\%) : 16.5^\circ$ $\theta(50\%) : 23.0^\circ$

中心光强扩散角: $\theta(25\%) : 29.4^\circ$ $\theta(50\%) : 23.0^\circ$ $\theta(75\%) : 16.5^\circ$ $\theta(50\%) : 23.0^\circ$

最大光强 $I_{max} = 3234\text{cd}$ ($C=0.0^\circ, G=0.0^\circ$)

C0-180平面 $I_{max} = 3234\text{cd}$ ($G=0.0^\circ$)

C0-180平面 $I_0 = 3234\text{cd}$



光强分布数据:(角度°, 光强cd) C0-180

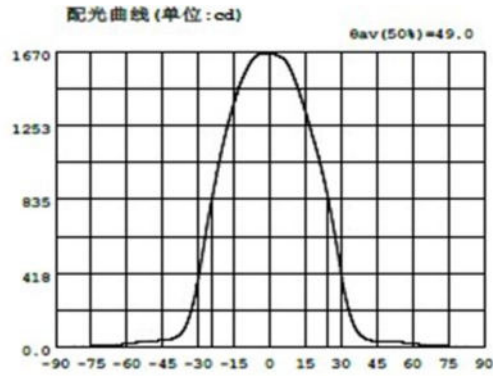
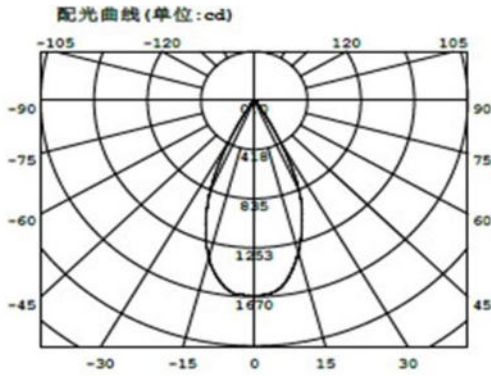
角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	1.502	-88.5	1.477	-87.0	1.606	-85.5	1.826	-84.0	2.119	-82.5	2.440
-81.0	2.824	-79.5	3.243	-78.0	3.649	-76.5	4.068	-75.0	4.465	-73.5	4.874
-72.0	5.324	-70.5	5.803	-69.0	6.359	-67.5	7.002	-66.0	7.785	-64.5	8.707
-63.0	9.726	-61.5	10.78	-60.0	11.81	-58.5	12.81	-57.0	13.62	-55.5	14.27
-54.0	14.66	-52.5	14.75	-51.0	14.59	-49.5	14.39	-48.0	14.24	-46.5	14.30
-45.0	14.71	-43.5	15.34	-42.0	16.20	-40.5	17.20	-39.0	18.57	-37.5	20.51
-36.0	23.14	-34.5	27.19	-33.0	32.82	-31.5	41.11	-30.0	55.46	-28.5	80.76
-27.0	119.7	-25.5	175.2	-24.0	246.6	-22.5	327.0	-21.0	443.0	-19.5	560.0
-18.0	682.9	-16.5	811.6	-15.0	936.2	-13.5	1054	-12.0	1160	-10.5	1247
-9.0	1290	-7.5	1350	-6.0	1377	-4.5	1392	-3.0	1400	-1.5	1405
0.0	1405	1.5	1400	3.0	1392	4.5	1382	6.0	1362	7.5	1322
9.0	1290	10.5	1221	12.0	1155	12.5	1060	12.5	952.3	12.5	827.5
15.0	718.2	15.0	595.0	15.0	480.4	15.0	362.5	15.0	268.5	15.0	191.9
18.0	212.0	18.0	142.7	18.0	91.01	18.0	62.70	18.0	44.66	18.0	32.63
21.0	84.0	21.0	58.5	21.0	41.12	21.0	28.51	21.0	19.74	21.0	14.12
24.0	22.08	24.0	16.70	24.0	11.74	24.0	8.472	24.0	6.172	24.0	4.591
27.0	6.476	27.0	5.894	27.0	5.407	27.0	4.940	27.0	4.529	27.0	4.102
30.0	2.877	30.0	2.686	30.0	2.506	30.0	2.215	30.0	1.967	30.0	1.725
35.8	1.591	35.8	1.625	35.8	1.591	35.8	1.591	35.8	1.591	35.8	1.591

电学参数:

电流: 0.1000A 功率: 3.358W
 电压: 33.59V 功率因数: 1.000

光学参数(测试距离2.559m):

等效光通量: $\Phi_{\text{eff}} = 541.41\text{lm}$ 光效: $\text{Eff} = 161.24\text{lm/W}$
 最大光强扩散角: $\theta(25\%): 44.8^\circ$ $\theta(50\%): 35.8^\circ$ $\theta(75\%): 27.0^\circ$ $\theta(50\%): 35.8^\circ$
 中心光强扩散角: $\theta(25\%): 44.8^\circ$ $\theta(50\%): 35.8^\circ$ $\theta(75\%): 27.0^\circ$ $\theta(50\%): 35.8^\circ$
 最大光强 $I_{\text{max}} = 1405\text{cd}$ ($C=0.0^\circ, G=-1.0^\circ$) C0-180平面 $I_{\text{max}} = 1405\text{cd}$ ($G=-1.0^\circ$)
 C0-180平面 $I_0 = 1405\text{cd}$



光强分布数据:(角度°, 光强cd) C0-180

角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	2.764	-58.5	22.77	-27.0	628.4	4.5	1642	36.0	109.1	67.5	11.99
-88.5	2.854	-57.0	25.25	-25.5	748.2	6.0	1629	37.5	77.16	69.0	10.82
-87.0	3.022	-55.5	27.74	-24.0	855.8	7.5	1603	39.0	58.79	70.5	9.794
-85.5	3.369	-54.0	30.33	-22.5	959.8	9.0	1562	40.5	47.87	72.0	8.904
-84.0	3.800	-52.5	32.89	-21.0	1058	10.5	1513	42.0	41.42	73.5	7.909
-82.5	4.262	-51.0	35.03	-19.5	1151	12.0	1460	43.5	37.54	75.0	7.070
-81.0	4.793	-49.5	36.85	-18.0	1235	13.5	1399	45.0	35.41	76.5	6.381
-79.5	5.281	-48.0	37.77	-16.5	1310	15.0	1334	46.5	34.26	78.0	5.776
-78.0	5.898	-46.5	38.59	-15.0	1381	16.5	1265	48.0	32.75	79.5	5.235
-76.5	6.425	-45.0	39.46	-13.5	1446	18.0	1193	49.5	32.42	81.0	4.693
-75.0	6.962	-43.5	41.19	-12.0	1498	19.5	1124	51.0	32.77	82.5	4.244
-73.5	7.735	-42.0	44.38	-10.5	1544	21.0	1053	52.5	31.65	84.0	3.782
-72.0	8.556	-40.5	49.98	-9.0	1585	22.5	971.0	54.0	30.04	85.5	3.447
-70.5	9.478	-39.0	59.41	-7.5	1620	24.0	878.8	55.5	27.98	87.0	3.096
-69.0	10.39	-37.5	74.97	-6.0	1642	25.5	775.9	57.0	25.66	88.5	2.800
-67.5	11.52	-36.0	100.6	-4.5	1654	27.0	664.2	58.5	23.27	90.0	2.992
-66.0	12.80	-34.5	144.7	-3.0	1652	28.5	546.6	60.0	20.97		
-64.5	14.27	-33.0	205.5	-1.5	1654	30.0	422.6	61.5	18.71		
-63.0	15.99	-31.5	284.4	0.0	1659	31.5	309.6	63.0	16.70		
-61.5	17.90	-30.0	385.3	1.5	1657	33.0	224.6	64.5	14.92		
-60.0	20.17	-28.5	504.7	3.0	1651	34.5	157.6	66.0	12.27		

电学参数:

电流: 0.1000A 功率: 3.240W

电压: 32.40V 功率因数: 1.000

光学参数(测试距离2.559m):

等效光通量: $\Phi_{eff} = 10631m$ 光效: $E_{eff} = 327.95lm/W$

最大光强扩散角: $\theta(25\%): 59.5^\circ$ $\theta(50\%): 49.0^\circ$ $\theta(75\%): 34.6^\circ$ $\theta(50\%): 49.0^\circ$

中心光强扩散角: $\theta(25\%): 59.6^\circ$ $\theta(50\%): 49.0^\circ$ $\theta(75\%): 34.7^\circ$ $\theta(50\%): 49.0^\circ$

最大光强 $I_{max} = 1660cd$ ($C=0.0^\circ, G=0.5^\circ$) C0-180平面 $I_{max} = 1660cd$ ($G=0.5^\circ$)

C0-180平面 $I_0 = 1659cd$

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	75			74.94	75.06	74.99	74.91		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	35.1			35.13	35.06	35.01	35.1		
	thickness	2.5			2.6	2.59	2.58	2.57		
	Buckle thickness	1.65			1.63	1.58	1.67	1.65		
	Buckle width	4			3.94	3.94	3.93	3.95		
	snap gap	8.2			8.11	8.1	8.15	8.12		
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	PMMA	Color	Transparent	OK
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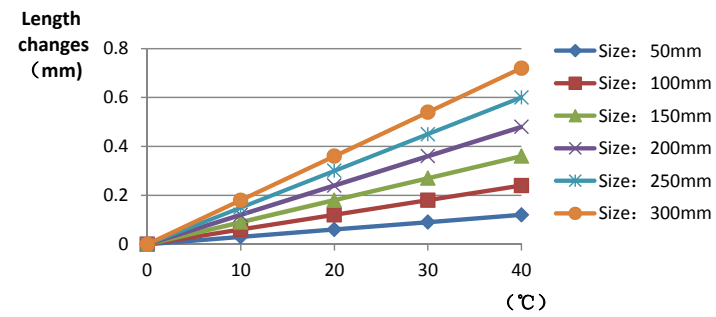
4.Optical index	Testing LED	D12						
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.							
	FWHM	See light distribution curve						
	angle	15° ±2°	15.0°	15.3°	15.2°	15.3°	OK	
	K-value		9.80	9.60	9.90	9.70	OK	
Efficiency								
Facula	See the signature sample							

Comprehensive judgment	Qualified
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Remarks:

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

PMMA product size changes with temperature table



Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.05	0.08	0.12	0.15	0.18	0.22
20	0.10	0.15	0.20	0.25	0.30	0.35
30	0.15	0.22	0.28	0.35	0.42	0.50
40	0.20	0.28	0.35	0.45	0.55	0.65

- Precautions:
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
 - Take the lens try to avoid touching the total reflection surface.
 - When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.
 - The working temperature of the lens should be within the temperature limit of the lens material. Exceeding the temperature limit will cause damage to the lens and affect the service life of the lens.

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	75			75.08	74.89	75.01	74.93		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	35.1			35.09	35.1	35.06	35.1		
	thickness	2.5			2.61	2.63	2.61	2.57		
	Buckle thickness	1.65			1.75	1.64	1.72	1.59		
	Buckle width	4			4.08	4.02	4.14	4		
	snap gap	8.2			8.15	8.26	7.97	8.18		
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	PMMA	Color	Transparent	OK
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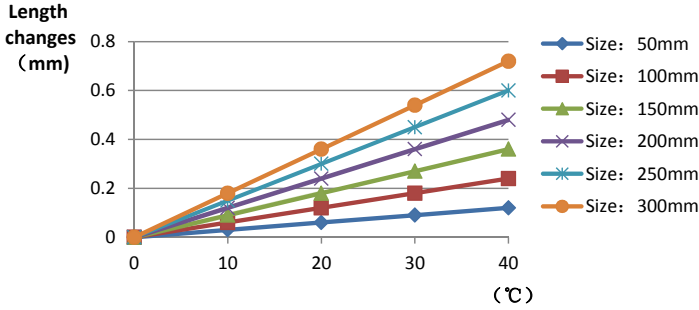
4.Optical index	Testing LED	D14						
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.							
	FWHM	See light distribution curve						
	angle	24° ±3°	23.0°	22.8°	23°	22.7°	OK	
	K-value		5.90	5.80	5.90	6.00	OK	
Efficiency								
Facula	See the signature sample							

Comprehensive judgment	Qualified
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Remarks:

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

PMMA product size changes with temperature table



Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.05	0.08	0.12	0.15	0.18	0.22
20	0.10	0.15	0.22	0.28	0.35	0.42
30	0.15	0.22	0.32	0.40	0.48	0.58
40	0.20	0.28	0.40	0.50	0.60	0.72

- Precautions:
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
 - Take the lens try to avoid touching the total reflection surface.
 - When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.
 - The working temperature of the lens should be within the temperature limit of the lens material. Exceeding the temperature limit will cause damage to the lens and affect the service life of the lens.

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	75			74.99	74.94	74.95	74.97		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	35.1			35.1	35.07	35.09	35.14		
	thickness	2.5			2.62	2.61	2.57	2.6		
	Buckle thickness	1.65			1.61	1.6	1.62	1.61		
	Buckle width	4			4.01	3.98	4	4.03		
	snap gap	8.2			8.15	8.17	8.16	8.15		
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	PMMA	Color	Transparent	OK
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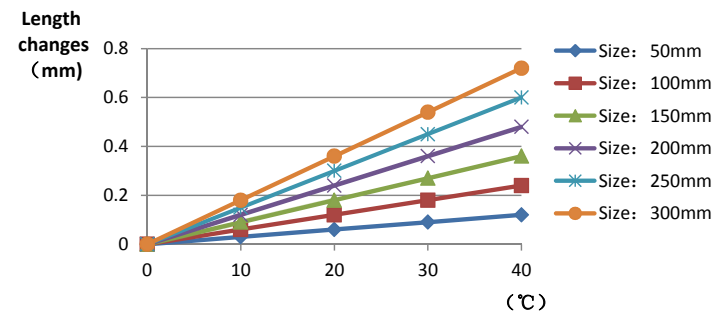
4.Optical index	Testing LED	D14						
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.							
	FWHM	See light distribution curve						
	angle	36° ±4°	35.8°	36.3°	35.7°	36.4°	OK	
	K-value		2.60	2.50	2.60	2.50	OK	
Efficiency								
Facula	See the signature sample							

Comprehensive judgment	Qualified
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Remarks:

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

PMMA product size changes with temperature table



Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.02	0.04	0.06	0.08	0.10	0.12
20	0.04	0.08	0.12	0.16	0.20	0.24
30	0.06	0.12	0.18	0.24	0.30	0.36
40	0.08	0.16	0.24	0.32	0.40	0.48

- Precautions:
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
 - Take the lens try to avoid touching the total reflection surface.
 - When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.
 - The working temperature of the lens should be within the temperature limit of the lens material. Exceeding the temperature limit will cause damage to the lens and affect the service life of the lens.

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	75			75.05	74.99	75.03	75		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	35.1			35.12	35.04	35.06	34.97		
	thickness	2.5			2.69	2.68	2.66	2.65		
	Buckle thickness	1.65			1.66	1.62	1.64	1.63		
	Buckle width	4			4	4.03	4.01	3.99		
	snap gap	8.2			8.15	8.17	8.16	8.2		
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	PMMA	Color	Transparent	OK
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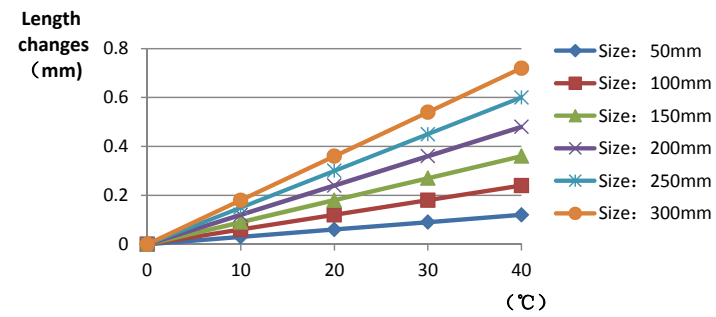
4.Optical index	Testing LED	D14						
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.							
	FWHM	See light distribution curve						
	angle	50° ±5°	49.2°	49.0°	48.4°	49.0°	OK	
	K-value		1.50	1.50	1.60	1.50	OK	
Efficiency								
Facula	See the signature sample							

Comprehensive judgment	Qualified
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Remarks:

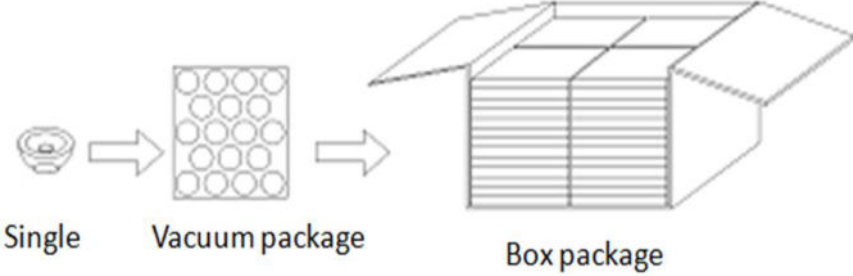
- Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
- Ambient temperature on the size of the product refer to the table on the right

PMMA product size changes with temperature table



Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.05	0.08	0.12	0.15	0.18	0.22
20	0.10	0.15	0.22	0.28	0.35	0.42
30	0.15	0.22	0.32	0.40	0.50	0.60
40	0.20	0.28	0.40	0.50	0.62	0.75

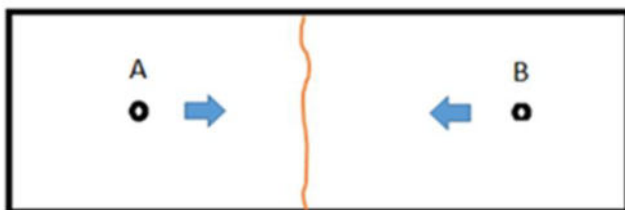
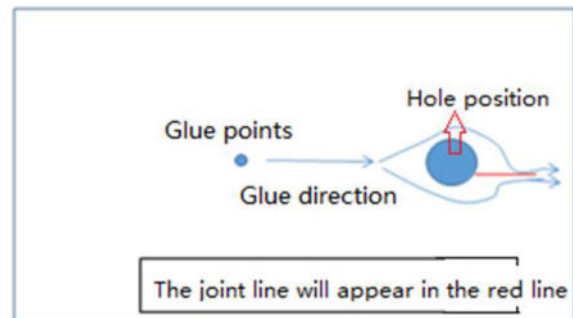
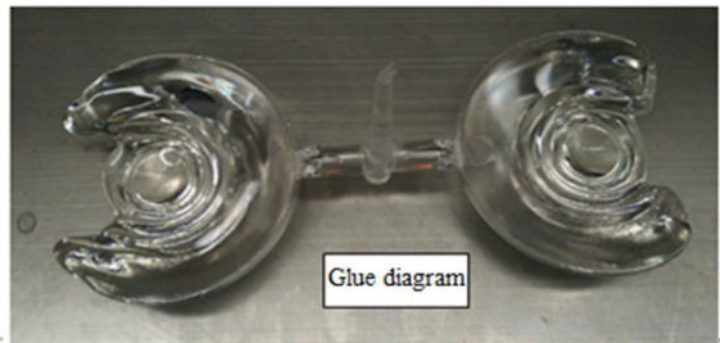
- Precautions:
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
 - Take the lens try to avoid touching the total reflection surface.
 - When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.
 - The working temperature of the lens should be within the temperature limit of the lens material. Exceeding the temperature limit will cause damage to the lens and affect the service life of the lens.

PN		HK-HG-75@35-15-D12-20-1g-1		Product Name		HK Dark 75@35-15°lens	
Product material		PMMA		Customer			
Package diagram		 <p style="text-align: center;">Single Vacuum package Box package</p>					
Product packing		A/ Box		Box/Layer			
		Layer/Box		A/ Carton			
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2. 07. 0093	Blister box	23cm*21cm	/	BAG	
	2	2. 08. 0001	PE film	30cm*30cm	/	PCS	
	3	2. 06. 0005	Reel label paper	6.2cm*8cm	/	PCS	
	4	2. 06. 0005	Box label paper	6.2cm*9.2cm	/	PCS	
	5	2. 06. 0003	big plate	46.8cm*42.8cm	/	PCS	
	6	2. 06. 0011	big carton	46.8cm*42.8cm*36cm	/	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail						

Special notice

When glue 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:

Symptom



The joint line will appear in the red line

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

1.1.1 Sampling standards, sampling plan and AQL

Test level : GB/T2828.1-2012 The 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.	Sample comparison , visual			
	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;				

	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 $D \leq 0.3\text{mm}$ black spots and foreign bodies in the area of $100 \times 100\text{mm}$ 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 $D \leq 1\text{ mm}$ and no more than 1 area within a $50 \times 50\text{ mm}$ area	Visual		√	



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

Approval number : _____

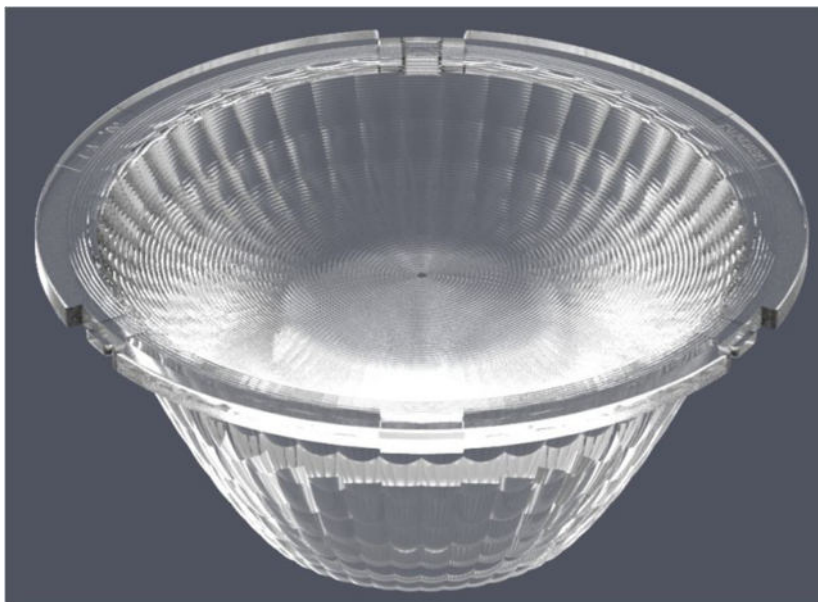
Customer :

Product : HK Dark 75@35-50°lens A

Material Code : 1.01.12633

PN : HK-HG-75@35-50-038-21-1g-1

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified <input type="checkbox"/>		DATE	
Project manager		DATE		Unqualified <input type="checkbox"/>		DATE	
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.cn/>

Sales Dept: Shenzhen Nanshan District Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building,

TEL: 0755-2937 1541

FAX: 0755-2907 5140

*Approval In duplicate , for both supplier and customer.



HERCULUX
恒坤光电

Product Approval

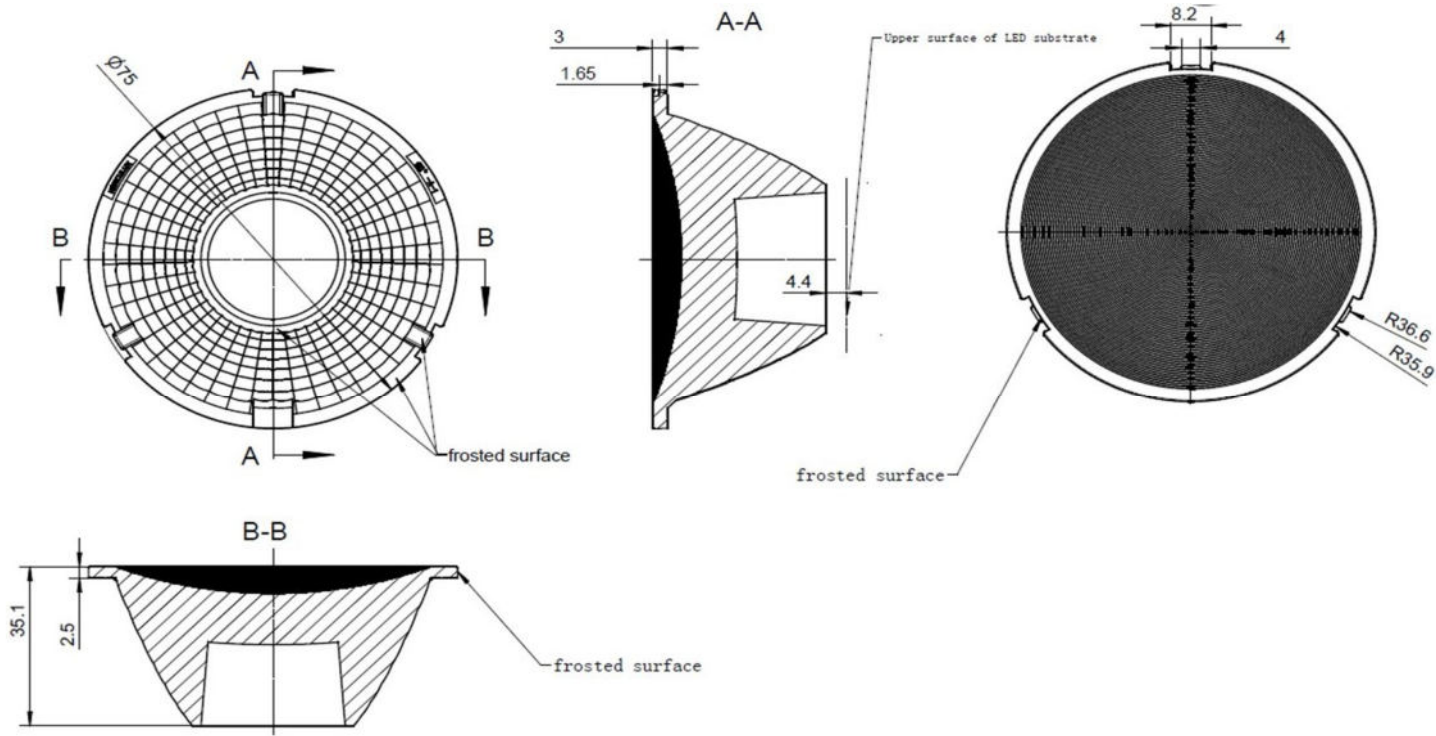
TEL: 0755-2937 1541

FAX: 0755-2907 5140

<http://www.herculux.cn/>

Date updated: 2021/5/20

Product Picture:	
PN:	HK-HG-75@35-50-038-21-1g-1
Size(L*W*H/Φ*H):	Φ75mm*H35.1mm
Material:	PMMA
Efficiency:	88.00%
Temperature(Topr):	Material extreme temperature resistance : -40°C to +100°C long-term use temperature : -40°C to +80°C
FWHM:	50°
Matched LES:	038

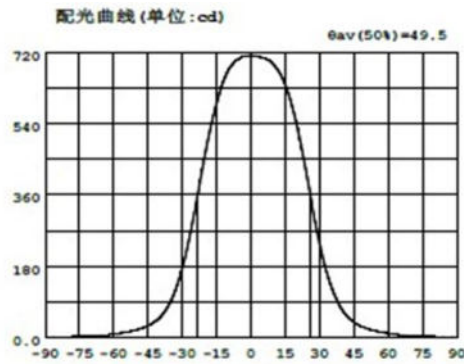
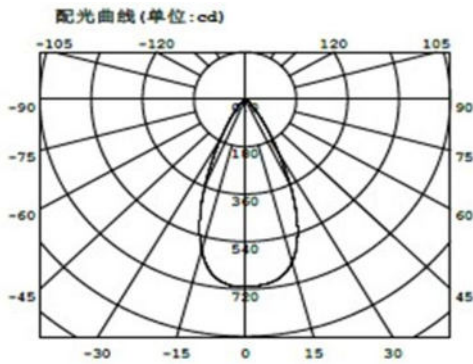


Technical remark:

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.

Optical design			HK Dark 75@35-50°lens A	HK-HG-75@35-50-038-21-1g-1		
Structure design				1.01.12633		
Review				number of drawing	qty	weight
Validation				CDHK		
			Material:	PMMA		

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



光强分布数据: (角度°, 光强cd) C0-180

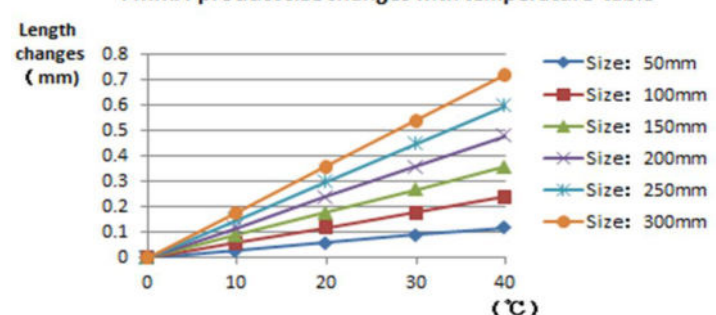
角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	1.807	-88.5	9.999	-27.0	247.8	4.5	706.9	36.0	116.2	67.5	6.116
-88.5	1.761	-87.0	11.38	-25.5	290.9	6.0	704.7	37.5	96.40	69.0	5.584
-87.0	1.718	-85.5	12.89	-24.0	326.8	7.5	700.2	39.0	79.46	70.5	5.108
-85.5	1.682	-84.0	14.52	-22.5	384.3	9.0	694.4	40.5	65.72	72.0	4.672
-84.0	2.107	-82.5	16.36	-21.0	432.2	10.5	685.5	42.0	54.89	73.5	4.281
-82.5	2.369	-81.0	18.49	-19.5	477.1	12.0	672.6	43.5	46.35	75.0	3.961
-81.0	2.629	-49.5	20.90	-18.0	519.3	13.5	658.9	45.0	39.44	76.5	3.696
-79.5	2.920	-48.0	23.55	-16.5	557.4	15.0	628.4	46.5	34.07	78.0	3.567
-78.0	3.187	-46.5	26.69	-15.0	591.1	16.5	612.9	48.0	29.48	79.5	3.251
-76.5	3.455	-45.0	30.40	-13.5	621.2	18.0	584.3	49.5	25.89	81.0	3.002
-75.0	3.702	-43.5	34.82	-12.0	646.8	19.5	550.6	51.0	22.82	82.5	2.764
-73.5	4.001	-42.0	40.42	-10.5	667.0	21.0	512.4	52.5	20.21	84.0	2.511
-72.0	4.300	-40.5	47.27	-9.0	682.5	22.5	470.1	54.0	17.86	85.5	2.248
-70.5	4.618	-39.0	55.91	-7.5	692.1	24.0	425.0	55.5	15.75	87.0	1.966
-69.0	4.998	-37.5	67.11	-6.0	701.2	25.5	378.0	57.0	13.89	88.5	1.726
-67.5	5.397	-36.0	81.22	-4.5	706.4	27.0	324.9	58.5	12.25	90.0	1.592
-66.0	5.857	-34.5	98.70	-3.0	710.4	28.5	280.1	60.0	10.79		
-64.5	6.561	-32.0	120.0	-1.5	711.4	30.0	239.7	61.5	9.495		
-62.0	7.015	-21.5	145.4	0.0	710.3	31.5	201.8	62.0	8.352		
-61.5	7.799	-20.0	175.7	1.5	710.6	33.0	168.4	64.5	7.462		
-60.0	8.774	-28.5	207.4	3.0	709.3	34.5	140.2	66.0	6.732		

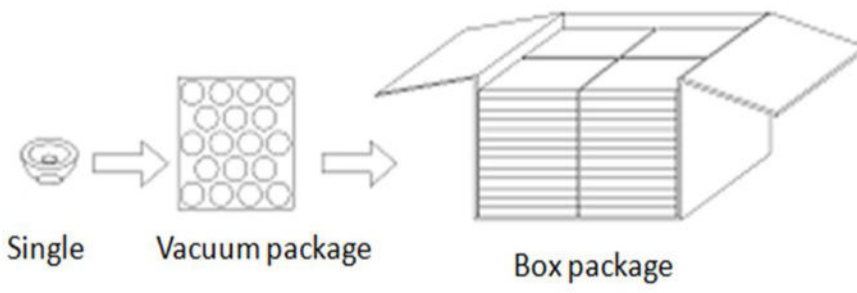
电学参数:

电流: 0.1000A 功率: 3.250W
电压: 32.50V 功率因数: 1.000

光学参数 (测试距离2.410m):

等效光通量: $\Phi_{eff} = 522.11\text{lm}$ 光效: $\text{Eff} = 160.66\text{lm/W}$
最大光强扩散角: $\theta(25\%): 62.3^\circ$ $\theta(50\%): 49.5^\circ$ $\theta(75\%): 37.6^\circ$ $\theta(50\%): 49.5^\circ$
中心光强扩散角: $\theta(25\%): 62.4^\circ$ $\theta(50\%): 49.5^\circ$ $\theta(75\%): 37.6^\circ$ $\theta(50\%): 49.5^\circ$
最大光强 $I_{max} = 711.4\text{cd}$ ($C=0.0^\circ, G=-1.0^\circ$) C0-180平面 $I_{max} = 711.4\text{cd}$ ($G=-1.0^\circ$)
C0-180平面 $I_0 = 710.3\text{cd}$

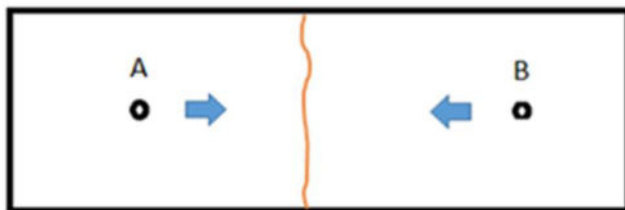
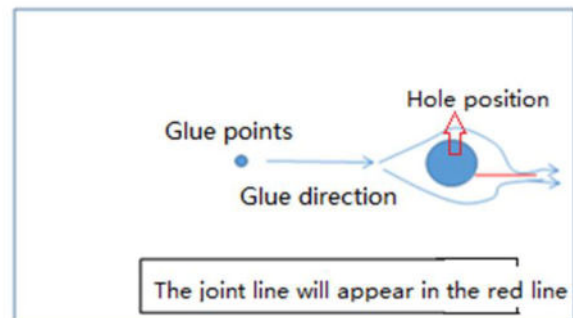
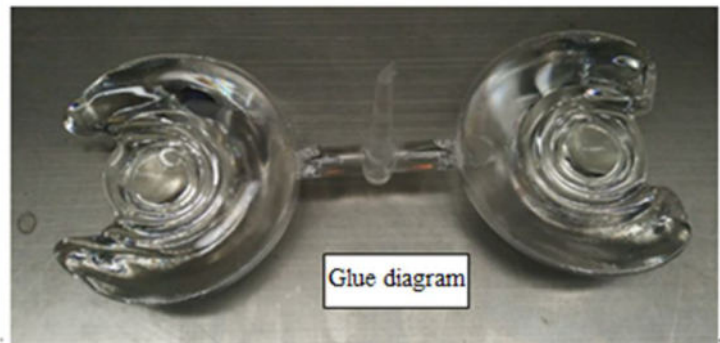
	Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
1.Size	diameter	75		75.25	75.26	75.21	75.25		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																										
	height	35.1		35.06	35.15	35.11	35.08																																												
	thickness	2.5		2.75	2.73	2.71	2.7																																												
	Buckle thickness	1.65		1.85	1.83	1.79	1.82																																												
	Buckle width	4		3.97	4.08	3.98	3.97																																												
	snap gap	8.2		8.13	8.08	8.17	8.12																																												
	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	PMMA			Color	Transparent			OK																																											
4.Optical index	Testing LED	038																																																	
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, 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																																																		
	FWHM	See light distribution curve																																																	
	angle	50° ±5°	49.3°	49.5°	48.5°	49°	OK																																												
	Efficiency	≥88%	90.40%	90.70%	91.20%	90.60%	OK																																												
Facula	See the signature sample																																																		
Comprehensive judgment	Qualified																																																		
Remarks:	<p>1、 Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.</p> <p>2、 Ambient temperature on the size of the product refer to the table on the right</p>																																																		
	<p align="center">PMMA product size changes with temperature table</p>  <table border="1"> <caption>PMMA product size changes with temperature table</caption> <thead> <tr> <th>Temperature (°C)</th> <th>50mm</th> <th>100mm</th> <th>150mm</th> <th>200mm</th> <th>250mm</th> <th>300mm</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>10</td> <td>0.02</td> <td>0.04</td> <td>0.06</td> <td>0.08</td> <td>0.10</td> <td>0.12</td> </tr> <tr> <td>20</td> <td>0.04</td> <td>0.08</td> <td>0.12</td> <td>0.16</td> <td>0.20</td> <td>0.24</td> </tr> <tr> <td>30</td> <td>0.06</td> <td>0.12</td> <td>0.18</td> <td>0.24</td> <td>0.30</td> <td>0.36</td> </tr> <tr> <td>40</td> <td>0.08</td> <td>0.16</td> <td>0.24</td> <td>0.32</td> <td>0.40</td> <td>0.48</td> </tr> </tbody> </table>									Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm	0	0.00	0.00	0.00	0.00	0.00	0.00	10	0.02	0.04	0.06	0.08	0.10	0.12	20	0.04	0.08	0.12	0.16	0.20	0.24	30	0.06	0.12	0.18	0.24	0.30	0.36	40	0.08	0.16	0.24	0.32	0.40	0.48
Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm																																													
0	0.00	0.00	0.00	0.00	0.00	0.00																																													
10	0.02	0.04	0.06	0.08	0.10	0.12																																													
20	0.04	0.08	0.12	0.16	0.20	0.24																																													
30	0.06	0.12	0.18	0.24	0.30	0.36																																													
40	0.08	0.16	0.24	0.32	0.40	0.48																																													
Precautions:	<p>1. Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.</p> <p>2. Try to avoid touching the total reflection surface when taking the lens.</p> <p>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.).</p> <p>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.</p>																																																		

PN		HK-HG-75@35-50-038-21-1g-1		Product Name		HK Dark 75@35-50°lens A	
Product material		PMMA		Customer			
Package diagram		 <p style="text-align: center;"> Single Vacuum package Box package </p>					
Product packing		6	A/ Box	4	PCS/Layer		
		9	Layer/Box	216	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2. 07. 0068	Blister box	23cm*21cm	6	BAG	
	2	2. 08. 0001	PE film	25cm*27cm	6	PCS	
	3	2. 06. 0005	Reel label paper	62mm*42mm	6	PCS	
	4	2. 06. 0005	Box label paper	62mm*70mm	1	PCS	
	5	2. 06. 0003	big plate	46cm*42cm	7	PCS	
	6	2. 06. 0011	big carton	48cm*44cm*37cm	1	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail(There are three layers of 24 bags for each layer and 5 bags for the top layer)						

Special notice

When glue 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:

Symptom



The joint line will appear in the red line

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

1.1.1 Sampling standards, sampling plan and AQL

Test level : GB/T2828.1-2012 The 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.	Sample comparison, visual			
	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;				

	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 $D \leq 0.3\text{mm}$ black spots and foreign bodies in the area of $100 \times 100\text{mm}$ 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 $D \leq 1\text{ mm}$ and no more than 1 area within a $50 \times 50\text{ mm}$ area	Visual		√	



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

Approval number : _____

Customer :

Product : HK Dark 75@35-50°lens

Material Code : 1.01.92080_PC

PN : HK-HG-75@35-50-D14-21-1g-1

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified <input type="checkbox"/>		DATE	
Project manager		DATE		Unqualified <input type="checkbox"/>		DATE	
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.cn/>

Sales Dept: Shenzhen Nanshan District Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building,

TEL: 0755-2937 1541

FAX: 0755-2907 5140

*Approval In duplicate , for both supplier and customer.



HERCULUX
恒坤光电

Product Approval

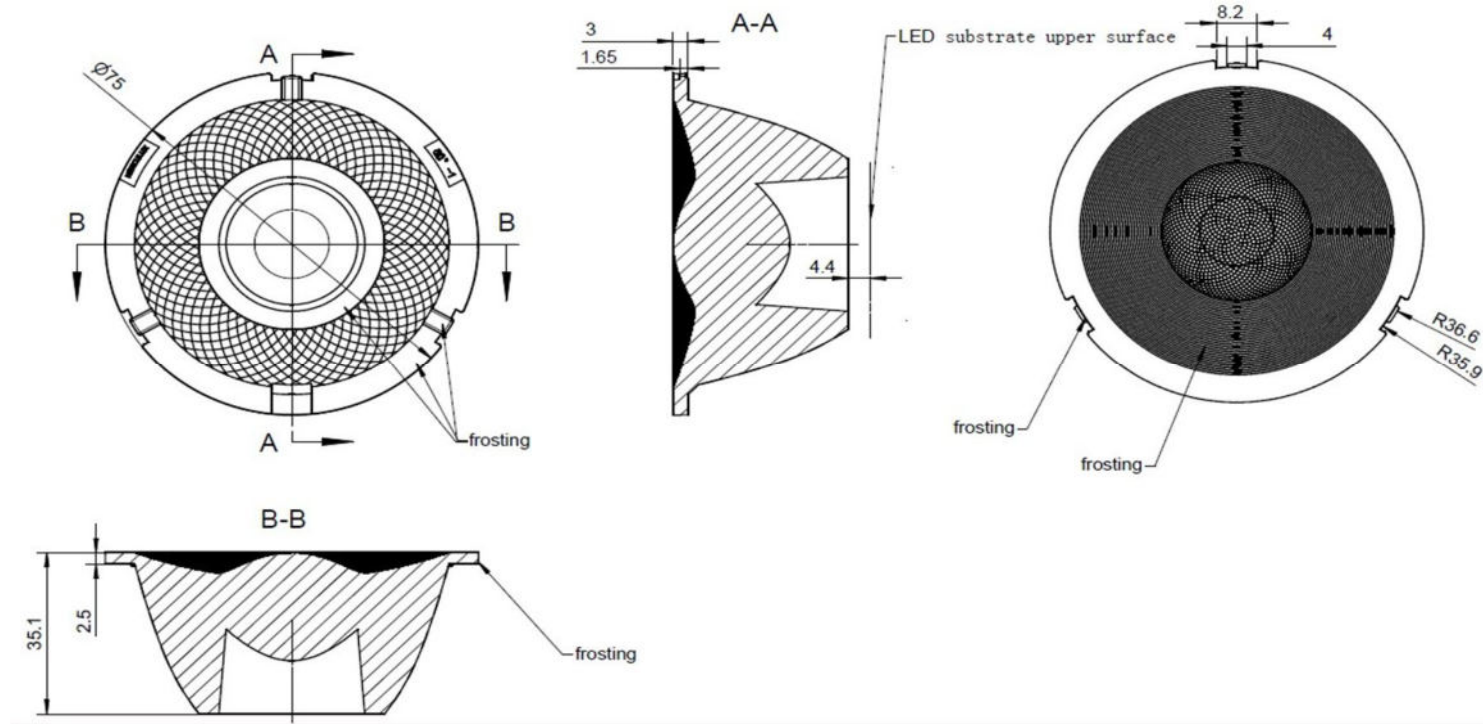
TEL: 0755-2937 1541

FAX: 0755-2907 5140

<http://www.herculux.cn/>

Date updated: 2021/6/21

Product Picture:	
PN:	HK-HG-75@35-50-D14-21-1g-1
Size(L*W*H/Φ*H):	Φ75mm*H35.1mm
Material:	PC
Efficiency:	\
Temperature(Topr):	Material extreme temperature resistance : -40°C to +120°C long-term use temperature : -40°C to +90°C
FWHM:	50°
Matched LES:	D14

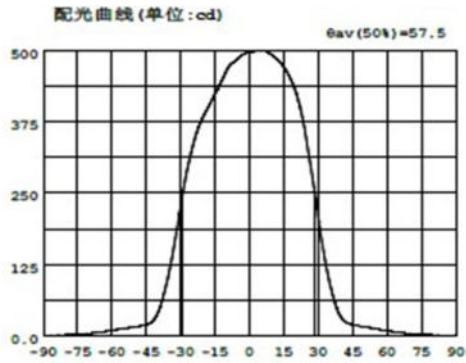
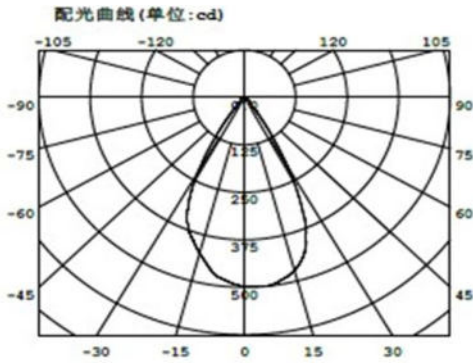


Technical remark:

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.

Optical design			HK Dark 75@35-50°lens		HK-HG-75@35-50-D14-21-1g-1		
Structure design					1.01.92080_PC		
Review					number of drawing	qty	weight
Validation					CDHK		
			Material:		PC		

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



光强分布数据:(角度°, 光强cd) C0-180

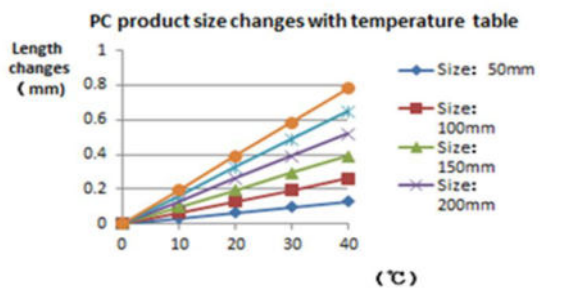
角度	光强	角度	光强	角度	光强	角度	光强	角度	光强	角度	光强
-90.0	1.175	-58.5	11.12	-27.0	292.7	4.5	498.6	36.0	77.24	67.5	5.326
-88.5	1.252	-57.0	12.14	-25.5	319.5	6.0	499.2	37.5	55.88	69.0	4.865
-87.0	1.309	-55.5	13.08	-24.0	342.8	7.5	498.0	39.0	40.22	70.5	4.216
-85.5	1.333	-54.0	13.89	-22.5	361.2	9.0	493.6	40.5	30.38	72.0	3.762
-84.0	1.275	-52.5	14.58	-21.0	376.3	10.5	489.1	42.0	24.72	73.5	3.330
-82.5	1.701	-51.0	15.21	-19.5	388.6	12.0	484.4	43.5	21.64	75.0	2.952
-81.0	1.940	-49.5	16.06	-18.0	400.0	13.5	478.4	45.0	19.88	76.5	2.627
-79.5	2.223	-48.0	17.09	-16.5	412.2	15.0	470.8	46.5	18.61	78.0	2.379
-78.0	2.504	-46.5	18.37	-15.0	424.0	16.5	461.5	48.0	17.51	79.5	2.138
-76.5	2.862	-45.0	19.86	-13.5	434.9	18.0	449.6	49.5	16.54	81.0	1.928
-75.0	3.209	-43.5	22.38	-12.0	447.1	19.5	435.2	51.0	15.71	82.5	1.711
-73.5	3.492	-42.0	27.13	-10.5	459.4	21.0	417.2	52.5	14.84	84.0	1.489
-72.0	3.971	-40.5	35.96	-9.0	471.0	22.5	395.1	54.0	13.92	85.5	1.272
-70.5	4.413	-39.0	49.97	-7.5	477.5	24.0	365.8	55.5	12.90	87.0	1.118
-69.0	4.973	-37.5	69.97	-6.0	482.0	25.5	327.2	57.0	11.76	88.5	1.061
-67.5	5.595	-36.0	93.82	-4.5	487.4	27.0	290.7	58.5	10.56	90.0	1.297
-66.0	6.306	-34.5	122.0	-3.0	492.1	28.5	251.2	60.0	9.526		
-64.5	7.196	-33.0	154.6	-1.5	494.9	30.0	209.8	61.5	8.486		
-63.0	8.088	-31.5	190.1	0.0	496.2	31.5	169.3	63.0	7.555		
-61.5	9.075	-30.0	226.4	1.5	497.6	33.0	122.7	64.5	6.725		
-60.0	10.08	-28.5	262.2	3.0	498.5	34.5	102.9	66.0	5.975		

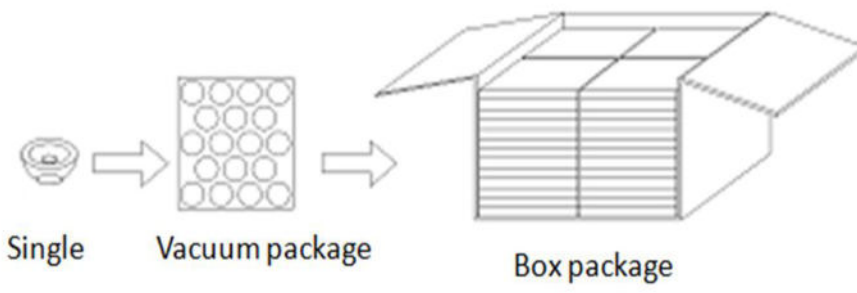
电学参数:

电流: 0.1000A 功率: 3.269W
电压: 32.70V 功率因数: 1.000

光学参数(测试距离2.410m):

等效光通量: $\Phi_{eff} = 428.01m$ 光效: $E_{ff} = 130.95lm/W$
最大光强扩散角: $\theta(25\%): 67.7^\circ$ $\theta(50\%): 57.5^\circ$ $\theta(75\%): 44.6^\circ$ $\theta(50\%): 57.5^\circ$
中心光强扩散角: $\theta(25\%): 67.7^\circ$ $\theta(50\%): 57.7^\circ$ $\theta(75\%): 45.0^\circ$ $\theta(50\%): 57.7^\circ$
最大光强 $I_{max} = 499.2cd$ ($C=0.0^\circ, G=6.0^\circ$) $C0-180$ 平面 $I_{max} = 499.2cd$ ($G=6.0^\circ$)
 $C0-180$ 平面 $I_0 = 496.3cd$

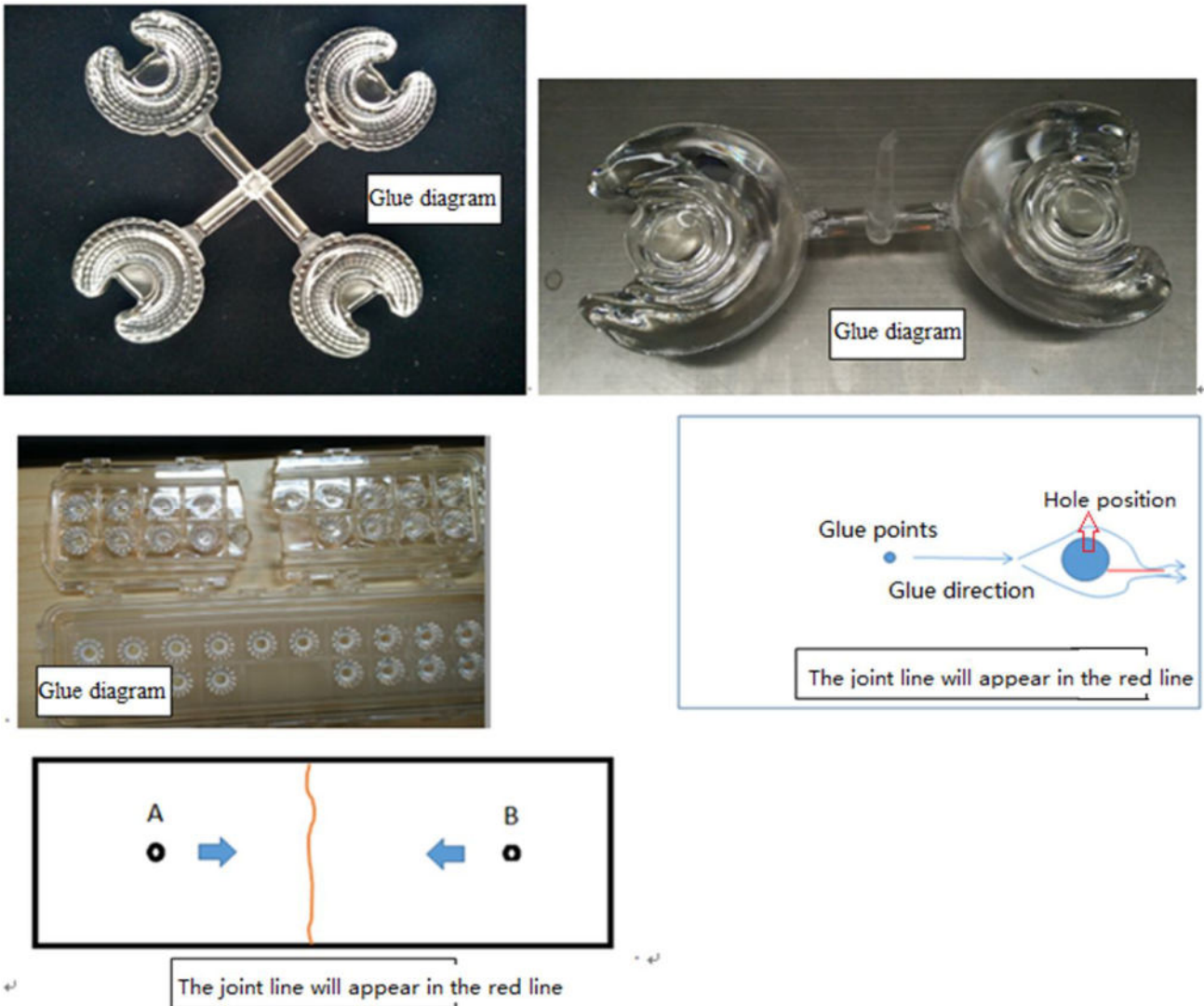
		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																														
1.Size	diameter	75	/	/	74.73	74.74	74.76	74.71	/	Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																														
	height	35.1	/	/	34.97	34.98	34.92	34.96	/																															
	thickness	2.5	/	/	2.56	2.55	2.55	2.58	/																															
	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	No burr	No burr	OK																															
			No stains	No stains	No stains	No stains	No stains																																	
3.Material	PC				Color	Transparent			OK																															
4.Optical index	Testing LED	D14																																						
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, 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																																							
	FWHM	See light distribution curve																																						
	angle	/	57.5°	58.1°	57.2°	57.4°	/																																	
	Efficiency	/	/	/	/	/	/																																	
Facula	See the signature sample																																							
Comprehensive judgment	Qualified																																							
Remarks:	<p>1、 Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.</p> <p>2、 Ambient temperature on the size of the product refer to the table on the right</p>																																							
	<p style="text-align: center;">PC product size changes with temperature table</p>  <table border="1"> <caption>PC product size changes with temperature table</caption> <thead> <tr> <th>Temperature (°C)</th> <th>50mm</th> <th>100mm</th> <th>150mm</th> <th>200mm</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> </tr> <tr> <td>10</td> <td>0.05</td> <td>0.10</td> <td>0.15</td> <td>0.20</td> </tr> <tr> <td>20</td> <td>0.10</td> <td>0.20</td> <td>0.30</td> <td>0.40</td> </tr> <tr> <td>30</td> <td>0.15</td> <td>0.30</td> <td>0.45</td> <td>0.60</td> </tr> <tr> <td>40</td> <td>0.20</td> <td>0.40</td> <td>0.60</td> <td>0.80</td> </tr> </tbody> </table>										Temperature (°C)	50mm	100mm	150mm	200mm	0	0.00	0.00	0.00	0.00	10	0.05	0.10	0.15	0.20	20	0.10	0.20	0.30	0.40	30	0.15	0.30	0.45	0.60	40	0.20	0.40	0.60	0.80
Temperature (°C)	50mm	100mm	150mm	200mm																																				
0	0.00	0.00	0.00	0.00																																				
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30	0.15	0.30	0.45	0.60																																				
40	0.20	0.40	0.60	0.80																																				
Precautions:	<p>1. Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.</p> <p>2. Try to avoid touching the total reflection surface when taking the lens.</p> <p>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.).</p> <p>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.</p>																																							

PN		HK-HG-75@35-50-D14-21-1g-1		Product Name		HK Dark 75@35-50°lens	
Product material		PC		Customer			
Package diagram		 <p style="text-align: center;">Single Vacuum package Box package</p>					
Product packing		6	A/ Box	4	PCS/Layer		
		9	Layer/Box	216	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2. 07. 0068	Blister box	23cm*21cm	36	BAG	
	2	2. 08. 0001	PE film	25cm*27cm	36	PCS	
	3	2. 06. 0005	Reel label paper	62mm*42mm	36	PCS	
	4	2. 06. 0005	Box label paper	62mm*70mm	1	PCS	
	5	2. 06. 0003	big plate	46cm*42cm	10	PCS	
	6	2. 06. 0011	big carton	48cm*44cm*37cm	1	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail (There are three layers of 24 bags for each layer and 5 bags for the top layer)						

Special notice

When glue 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:

Symptom



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

1.1.1 Sampling standards, sampling plan and AQL

Test level : GB/T2828.1-2012 The 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.	Sample comparison , visual			
	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;				

	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 $D \leq 0.3\text{mm}$ black spots and foreign bodies in the area of $100 \times 100\text{mm}$ 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 $D \leq 1\text{ mm}$ and no more than 1 area within a $50 \times 50\text{ mm}$ area	Visual		√	