



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

Approval number :

Customer :

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd

PN	Code	Product
HK-55@24-10-D6-22-1g-1	1. 01. 91904	HK-55@24-10° 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.



HERCULUX
恒坤光电

Product Approval

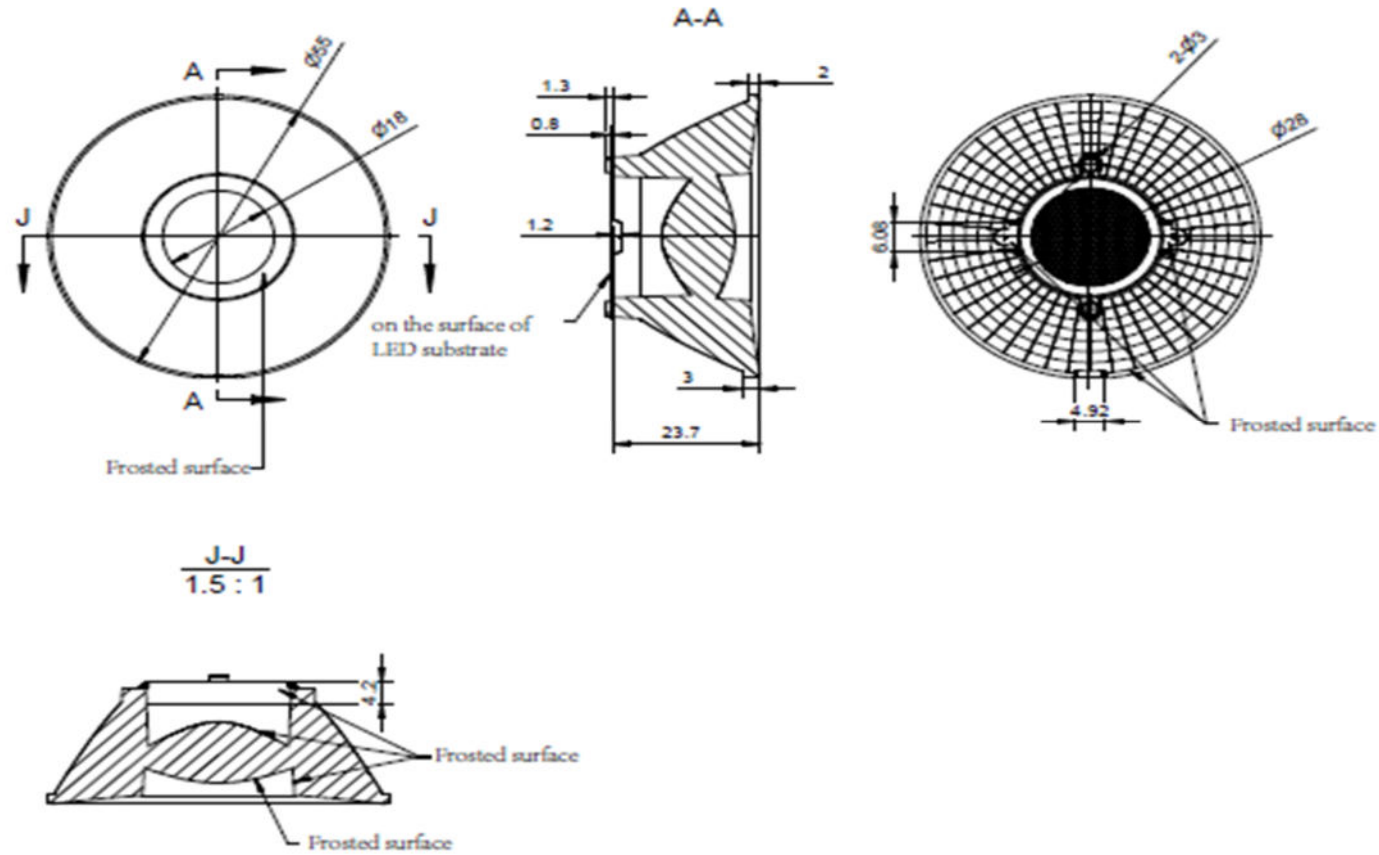
TEL: 0755-2937 1541

FAX: 0755-2907 5140

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Date updated: 2020/7/6

Product Picture:	
PN:	HK-55@24-10-D6-22-1g-1
Size(L*W*H/Φ*H):	Φ:55mm; H:23.7mm
Material:	PMMA
Efficiency:	\
Temperature(Topr):	-40°C to +80°C
FWHM:	10°
Matched LES:	D6

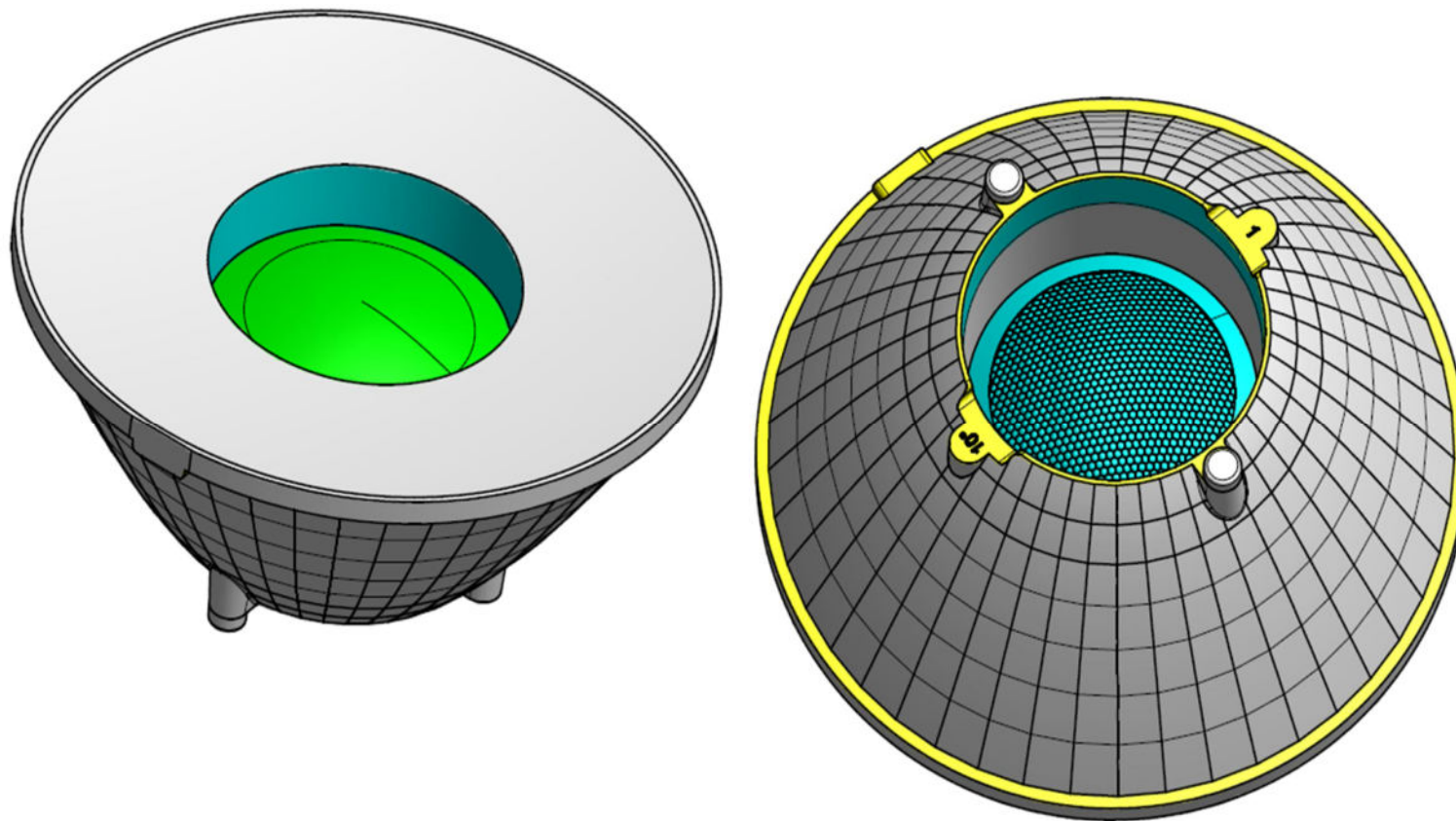


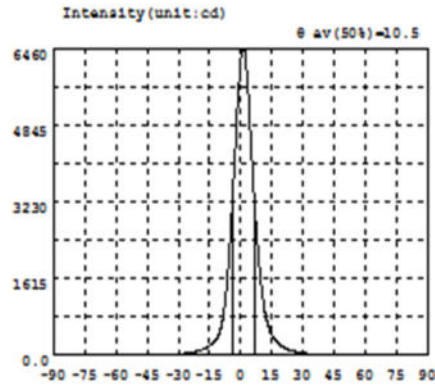
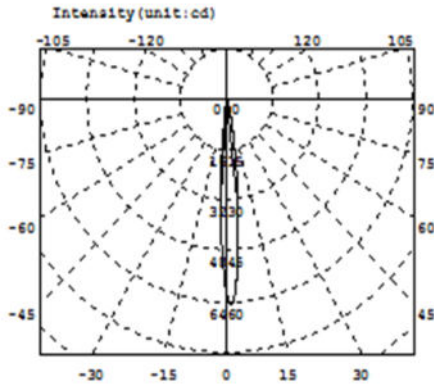
Technical remark:

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-55@24-10 ^g lens		HK-55@24-10-D6-22-1g-1		
Structure design			HK-55@24-10 ^g lens		1.01.91904		
Review					Number of drawing	qty	weight
Validation			Material:	PMMA	CDHK		

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	





Intensity data: (deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.3439	-58.5	6.158	-27.0	40.50	4.5	4797	36.0	24.26	67.5	4.964
-88.5	0.3566	-57.0	6.505	-25.5	48.61	6.0	3627	37.5	21.27	69.0	4.550
-87.0	0.3698	-55.5	6.888	-24.0	59.11	7.5	2650	39.0	18.86	70.5	4.129
-85.5	0.4980	-54.0	7.271	-22.5	73.61	9.0	1855	40.5	16.82	72.0	3.743
-84.0	0.6767	-52.5	7.715	-21.0	90.72	10.5	1230	42.0	15.21	73.5	3.272
-82.5	0.8314	-51.0	8.144	-19.5	110.4	12.0	825.2	43.5	13.72	75.0	2.913
-81.0	1.113	-49.5	8.553	-18.0	135.8	13.5	581.3	45.0	12.50	76.5	2.564
-79.5	1.418	-48.0	9.066	-16.5	169.3	15.0	429.2	46.5	11.50	78.0	2.229
-78.0	1.698	-46.5	9.623	-15.0	209.1	16.5	320.6	48.0	10.66	79.5	1.864
-76.5	2.033	-45.0	10.28	-13.5	259.3	18.0	254.0	49.5	9.958	81.0	1.595
-75.0	2.376	-43.5	11.06	-12.0	331.7	19.5	203.6	51.0	9.428	82.5	1.437
-73.5	2.660	-42.0	12.03	-10.5	457.1	21.0	164.4	52.5	8.909	84.0	1.216
-72.0	3.015	-40.5	13.17	-9.0	685.3	22.5	133.3	54.0	8.477	85.5	1.033
-70.5	3.409	-39.0	14.43	-7.5	1135	24.0	107.9	55.5	8.035	87.0	0.9554
-69.0	3.768	-37.5	15.83	-6.0	1893	25.5	85.84	57.0	7.638	88.5	0.8361
-67.5	4.114	-36.0	17.61	-4.5	2879	27.0	68.78	58.5	7.264	90.0	0.7808
-66.0	4.446	-34.5	19.80	-3.0	4054	28.5	55.89	60.0	6.862		
-64.5	4.806	-33.0	22.31	-1.5	5280	30.0	45.88	61.5	6.511		
-63.0	5.150	-31.5	25.38	0.0	6181	31.5	38.10	63.0	6.093		
-61.5	5.532	-30.0	29.19	1.5	6459	33.0	32.28	64.5	5.725		
-60.0	5.813	-28.5	34.16	3.0	5882	34.5	27.88	66.0	5.337		

Electricity Parameter:

Current I: 0.1000A Power: 3.368W
Voltage V: 33.70V PF: 1.000

Optical Parameter (Distance=2.559m):

Equivalent Luminous flux: Φ_{eff} = 418.9lm Efficiency: Eff=124.39lm/W
Diffuse angle: @ (25%): 15.9deg @ (50%): 10.5deg @ (75%): 6.4deg @ (50%): 10.5deg
Diffuse angle: @ (25%): 16.2deg @ (50%): 10.9deg @ (75%): 7.0deg @ (50%): 10.9deg
Imax=6459cd (C=0.0deg, C=1.5deg) C0-180Plane Imax= 6459cd(C=1.5deg)
C0-180Plane IO= 6181cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	55			54.84	55.04	55	55		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	23.7			24.09	24.09	24.07	24.07		
	thickness	2			1.95	2.01	1.96	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	D6				
	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		9.8	9.7	9.58	9.6
	K-value		16.74	16.81	17.36	16.83
	Efficiency		91.55%	90.58%	90.58%	91.30%
Facula	See the signature sample					

Comprehensive judgment	Qualified
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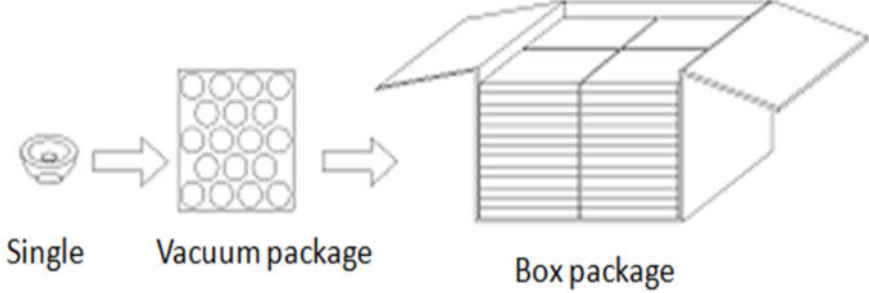
Remarks:

- 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)	Size: 50mm	Size: 100mm	Size: 150mm	Size: 200mm	Size: 250mm	Size: 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	0.08	0.12	0.18	0.25	0.32	0.38
30	0.10	0.15	0.22	0.30	0.38	0.45
40	0.12	0.18	0.28	0.38	0.48	0.58

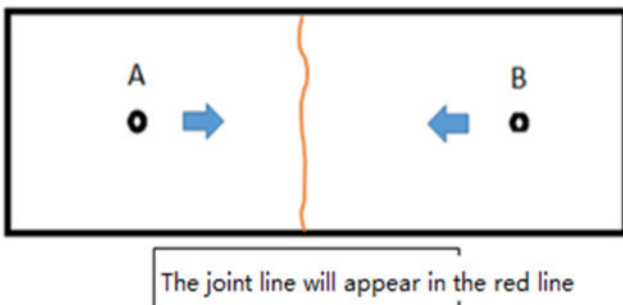
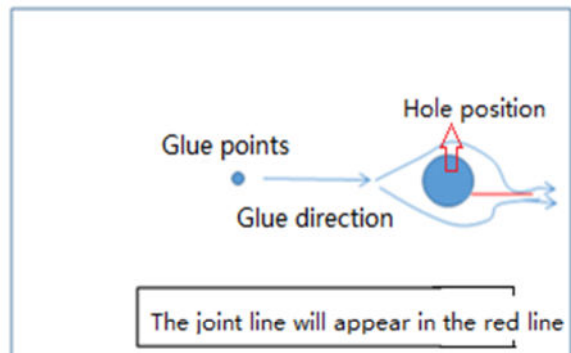
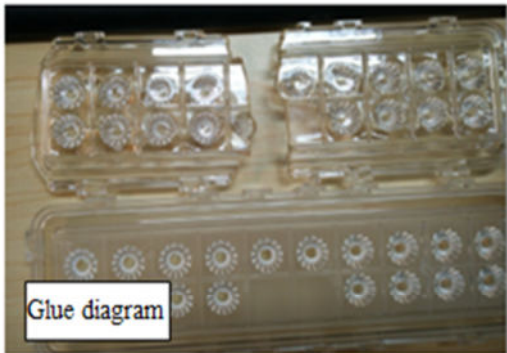
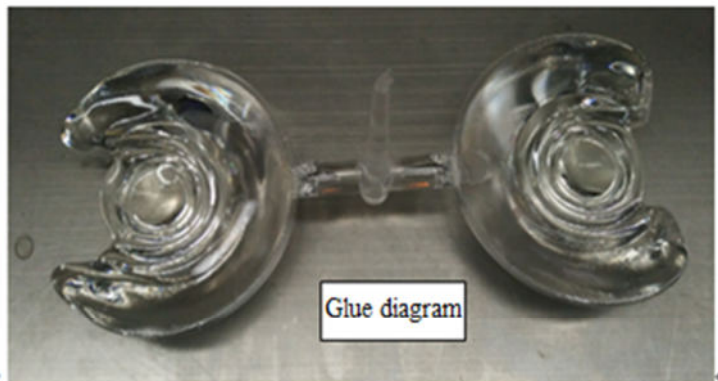
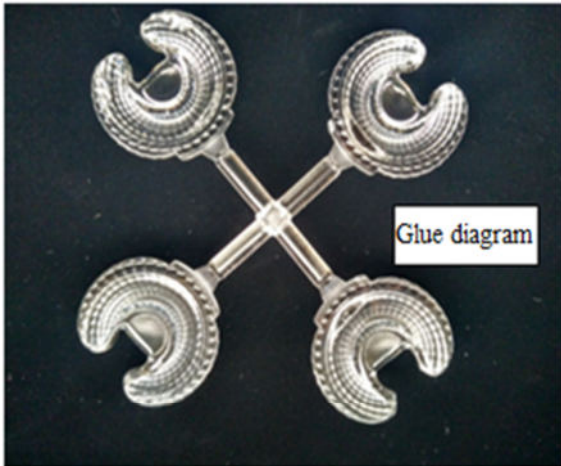
- Precautions:
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
 - Take the lens try to avoid touching the total reflection surface.
 - When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe 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-55@24-10-D6-22-1g-1		Product Name	HK-55@24-10° lens			
Product material	PMMA		Customer				
Package diagram	 <p style="text-align: center;"> Single Vacuum package Box package </p>						
Product packing	10	A/ Box	4	pcs/Layer			
	11	Layer/Box	440	A/ Carton			
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0041	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 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:

Syntner



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 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 $D \leq 1\text{ mm}$ and no more than 1 area within a 50x50 mm area	Visual		√	



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 恒坤光电 Technology Co.,Ltd
Product Approval

Approval number :

Customer :

PN	Code	Product
HK-55@24-15-D9-20-1g-1	1. 01. 71024	HK-55@24-15° Lens
HK-55@24-24-D9-20-1g-1	1. 01. 71045	HK-55@24-24° Lens
HK-55@24-36-D9-20-1g-1	1. 01. 71046	HK-55@24-36° Lens
HK-55@24-60-D9-20-1g-1	1. 01. 91785	HK-55@24-60° Lens

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified <input type="checkbox"/>		DATE	
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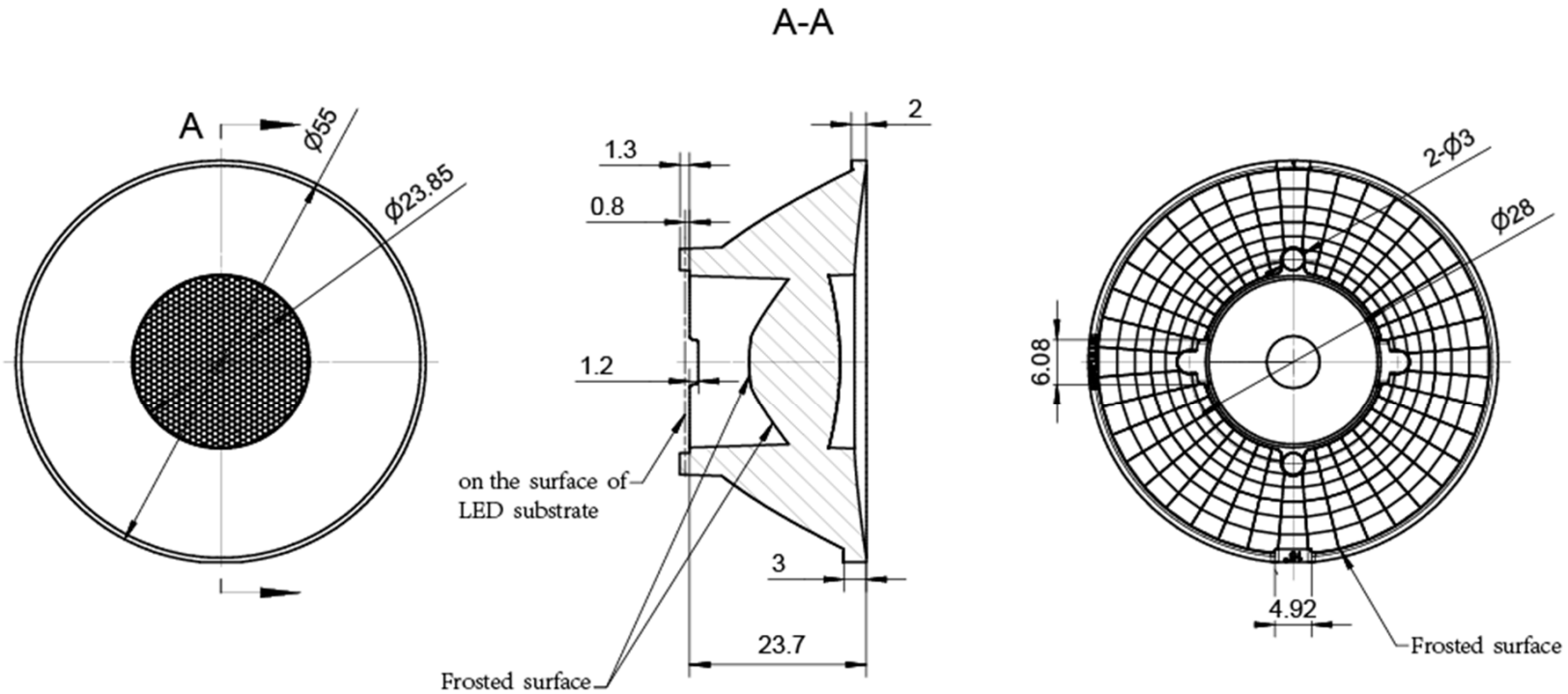
TEL: 0755-2937 1541

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Date updated: 2020/4/10

Product Picture:	
PN:	HK-55@24-15-D9-20-1g-1
Size(L*W*H/Φ*H):	Φ:55mm; H:23.7mm
1.07.81418_HK-166@03-0223-S	PMMA
Efficiency:	\
Temperature(Topr):	-40°C to +80°C
FWHM:	15°/24°/36°/60°
Matched LES:	D9

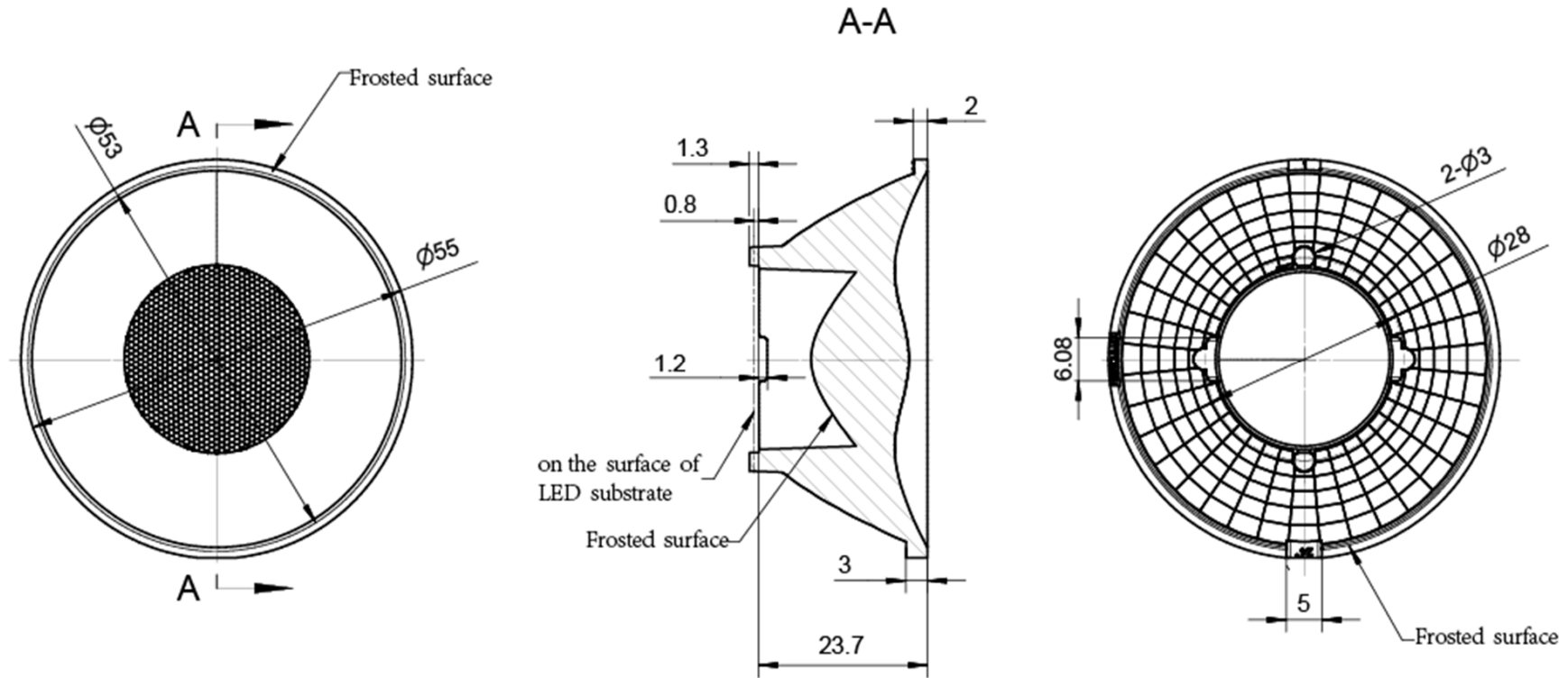


Technical remark:

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-55@24-15°Lens			HK-55@24-15-D9-20-1g-1		
Structure design						1.01.71024		
Review			Number of drawing		qty	weight		
Validation			Material:	PMMA		CDHK		

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

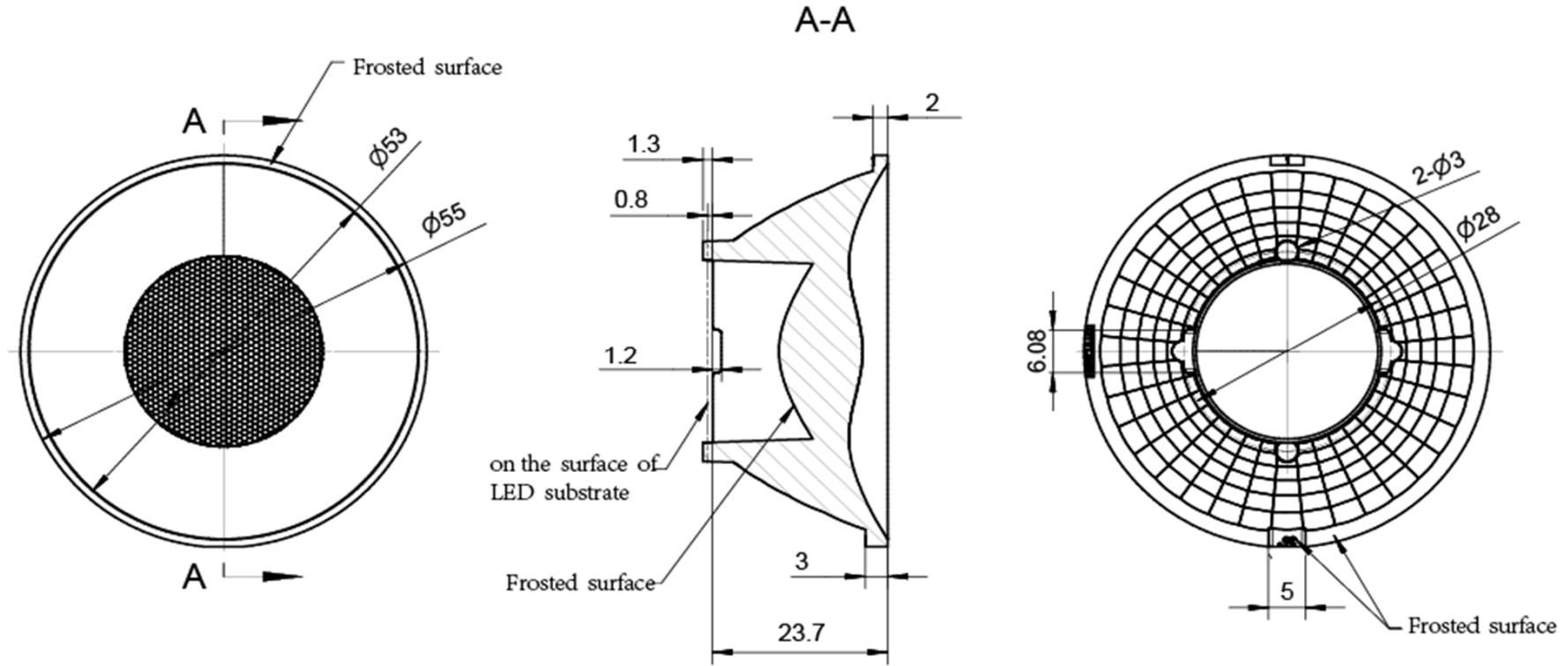


Technical remark:

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-55@24-24°Lens		HK-55@24-24-D9-20-1g-1		
Structure design			HK-55@24-24°Lens		1.01.71045		
Review					Number of drawing	qty	weight
Validation			Material:	PMMA	CDHK		

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

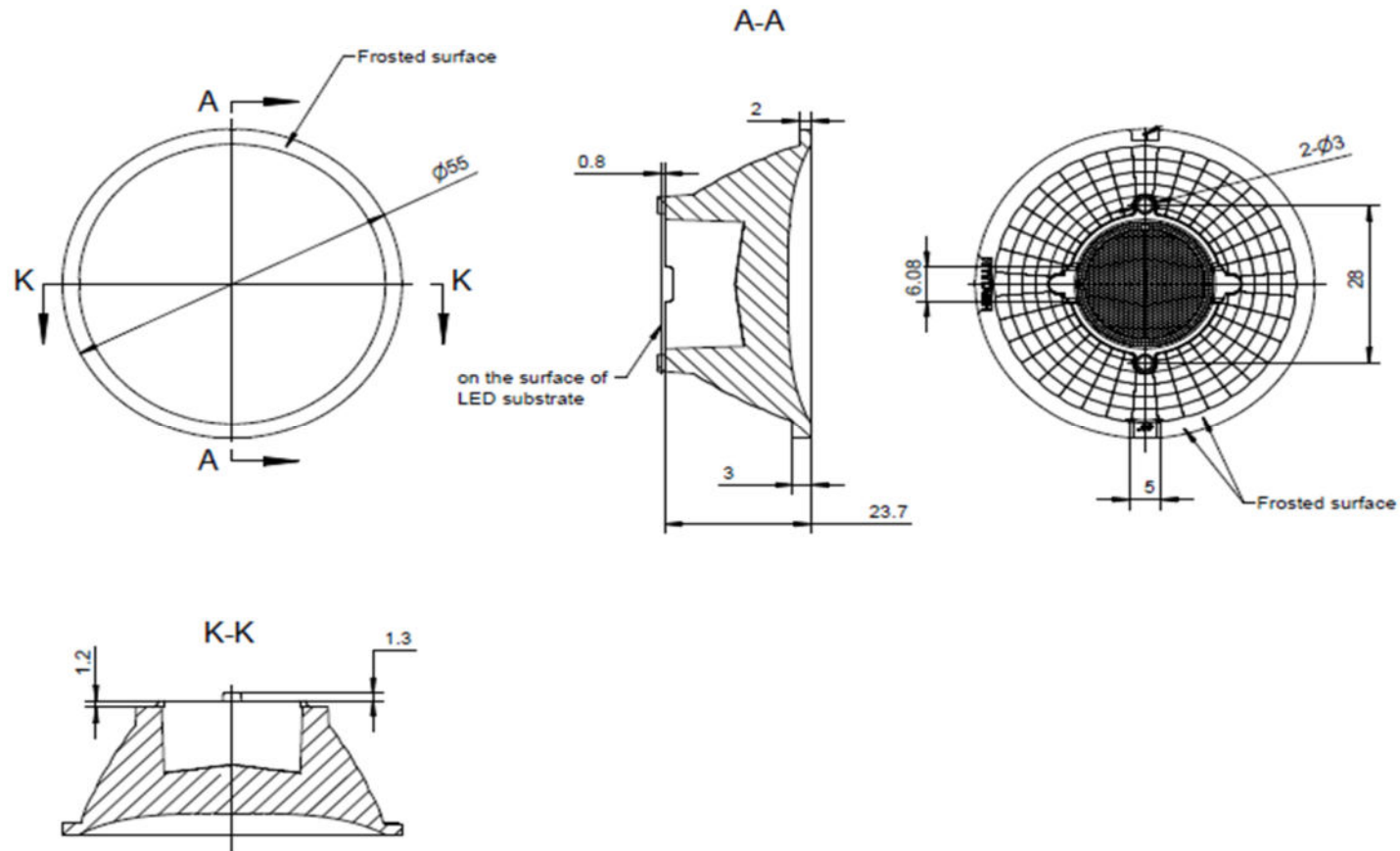


Technical remark:

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-55@24-36°Lens		HK-55@24-36-D9-20-1g-1		
Structure design			HK-55@24-36°Lens		1.01.71046		
Review					Number of drawing	qty	weight
Validation			Material:	PMMA	CDHK		

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

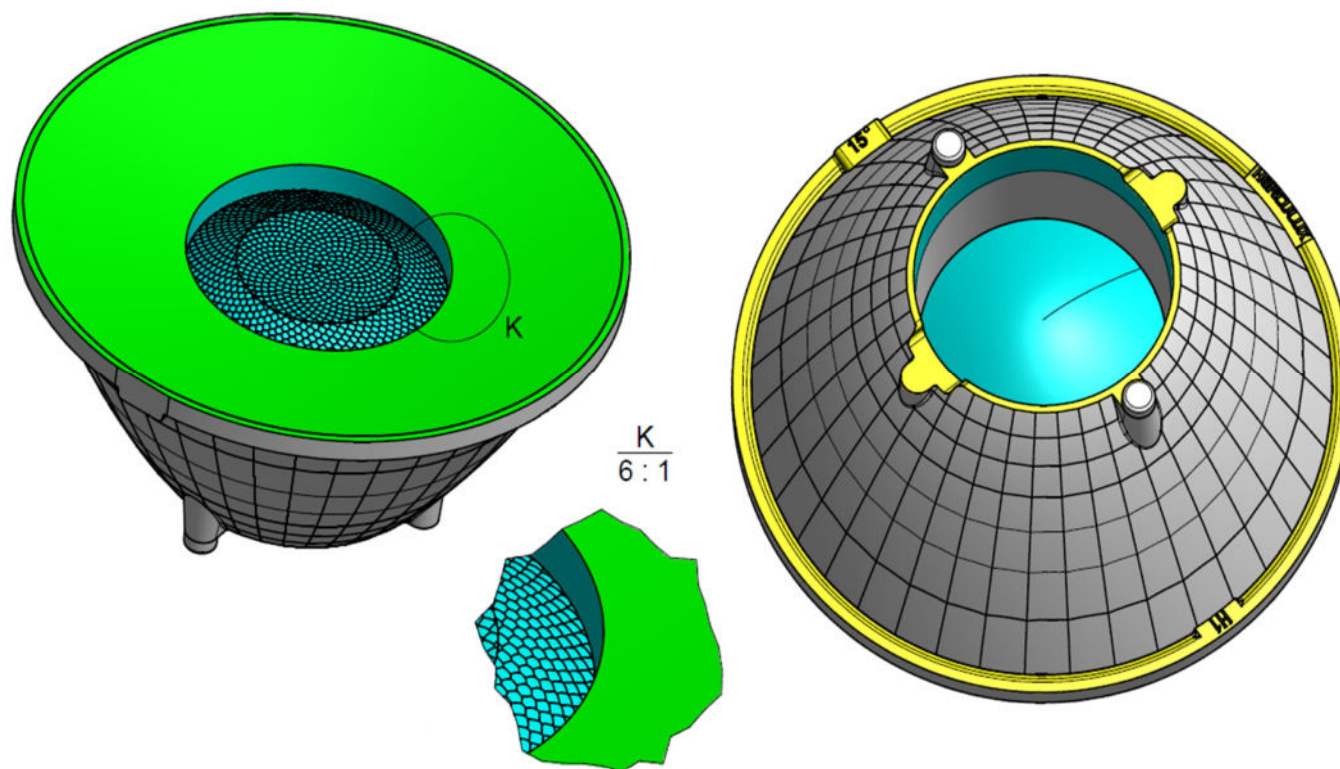


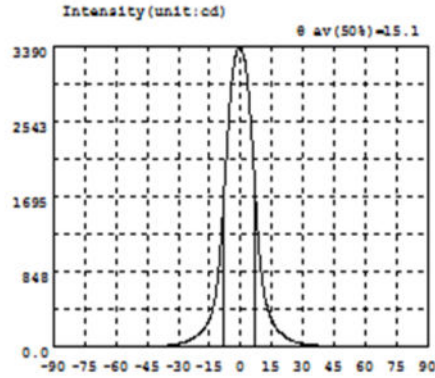
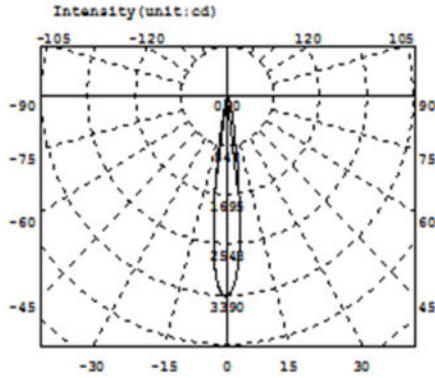
Technical remark:

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-55@24-60°Lens		HK-55@24-60-D9-20-1g-1		
Structure design					1.01.91785		
Review			Number of drawing	qty	weight		
Validation			Material:	PMMA	CDHK		

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





Intensity data: (deg , cd) C0-180

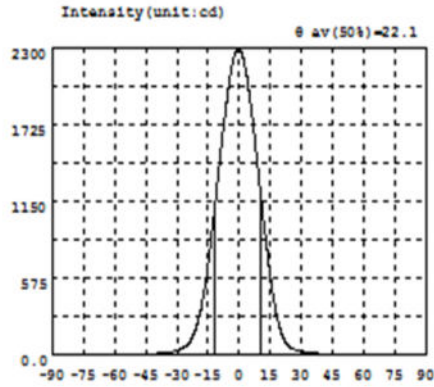
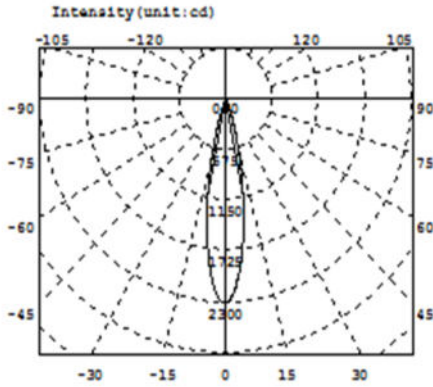
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-88.5	1.627	-57.0	5.596	-25.5	72.75	6.0	2104	37.5	17.43	69.0	4.117
-87.0	1.661	-55.5	6.023	-24.0	90.39	7.5	1512	39.0	14.28	70.5	3.942
-85.5	1.740	-54.0	6.621	-22.5	111.3	9.0	1035	40.5	12.66	72.0	3.734
-84.0	1.797	-52.5	7.168	-21.0	135.1	10.5	712.2	42.0	11.48	73.5	3.478
-82.5	1.853	-51.0	7.571	-19.5	165.0	12.0	512.6	43.5	10.53	75.0	3.201
-81.0	1.990	-49.5	7.990	-18.0	201.4	13.5	387.7	45.0	9.732	76.5	2.884
-79.5	2.112	-48.0	8.523	-16.5	252.1	15.0	293.1	46.5	9.065	78.0	2.605
-78.0	2.288	-46.5	9.169	-15.0	322.7	16.5	234.5	48.0	8.507	79.5	2.318
-76.5	2.584	-45.0	9.955	-13.5	429.2	18.0	190.2	49.5	8.074	81.0	2.056
-75.0	2.885	-43.5	10.66	-12.0	609.5	19.5	155.7	51.0	7.669	82.5	1.914
-73.5	3.138	-42.0	11.45	-10.5	919.0	21.0	128.7	52.5	7.124	84.0	1.867
-72.0	3.431	-40.5	12.65	-9.0	1368	22.5	104.9	54.0	6.530	85.5	1.810
-70.5	3.669	-39.0	14.20	-7.5	1935	24.0	84.58	55.5	6.002	87.0	1.688
-69.0	3.930	-37.5	16.25	-6.0	2492	25.5	68.12	57.0	5.777	88.5	1.609
-67.5	4.178	-36.0	18.84	-4.5	2950	27.0	55.15	58.5	5.587	90.0	1.507
-66.0	4.403	-34.5	22.22	-3.0	3226	28.5	45.33	60.0	5.400		
-64.5	4.607	-33.0	26.41	-1.5	3363	30.0	38.02	61.5	5.213		
-63.0	4.809	-31.5	31.78	0.0	3372	31.5	32.60	63.0	5.052		
-61.5	4.993	-30.0	38.65	1.5	3253	33.0	28.43	64.5	4.862		
-60.0	5.194	-28.5	47.52	3.0	3025	34.5	25.20	66.0	4.609		

Electricity Parameter:

Current I: 0.1000A Power: 3.299W
Voltage V: 33.00V PF: 1.000

Optical Parameter (Distance=2.410m):

Equivalent Luminous flux: Φ eff= 361.1lm Efficiency: Eff=109.46lm/W
Diffuse angle: @ (25%): 20.4deg @ (50%): 15.1deg @ (75%): 10.5deg @ (50%): 15.1deg
Diffuse angle: @ (25%): 20.6deg @ (50%): 15.1deg @ (75%): 10.6deg @ (50%): 15.1deg
Imax=3384cd (C=0.0deg,G=-0.5deg) C0-180Plane Imax= 3384cd(G=-0.5deg)
C0-180Plane IO= 3372cd



Intensity data: (deg , cd) C0-180

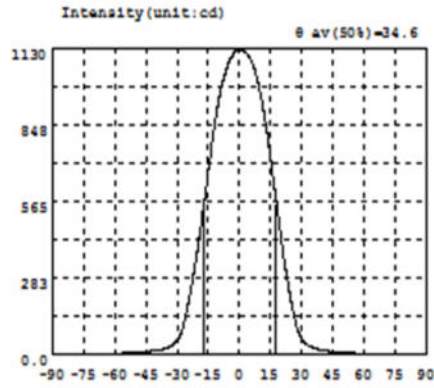
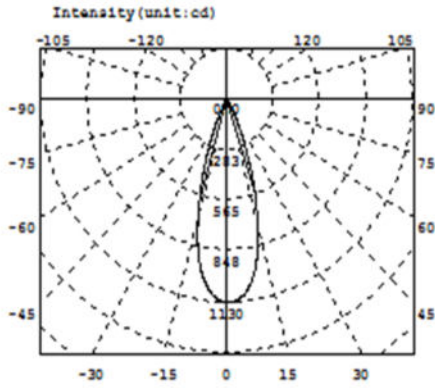
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.9172	-58.5	6.035	-27.0	55.32	4.5	1985	36.0	16.84	67.5	4.276
-88.5	1.032	-57.0	6.214	-25.5	72.60	6.0	1805	37.5	14.88	69.0	3.956
-87.0	1.173	-55.5	6.410	-24.0	99.31	7.5	1602	39.0	13.38	70.5	3.637
-85.5	1.364	-54.0	6.657	-22.5	140.4	9.0	1390	40.5	12.06	72.0	0.5771
-84.0	1.607	-52.5	6.958	-21.0	198.5	10.5	1172	42.0	10.99	73.5	2.988
-82.5	1.862	-51.0	7.382	-19.5	277.3	12.0	961.0	43.5	10.09	75.0	2.713
-81.0	2.119	-49.5	7.857	-18.0	384.7	13.5	758.5	45.0	9.377	76.5	2.443
-79.5	2.372	-48.0	8.402	-16.5	522.9	15.0	576.9	46.5	8.701	78.0	2.177
-78.0	2.628	-46.5	9.056	-15.0	692.0	16.5	421.8	48.0	8.122	79.5	1.909
-76.5	2.861	-45.0	9.802	-13.5	884.5	18.0	295.5	49.5	7.578	81.0	1.679
-75.0	3.114	-43.5	10.62	-12.0	1090	19.5	206.9	51.0	7.120	82.5	1.435
-73.5	3.410	-42.0	11.63	-10.5	1302	21.0	136.2	52.5	6.755	84.0	1.227
-72.0	3.715	-40.5	12.95	-9.0	1514	22.5	93.10	54.0	6.457	85.5	0.9646
-70.5	3.997	-39.0	14.49	-7.5	1719	24.0	68.68	55.5	6.193	87.0	0.8338
-69.0	4.302	-37.5	16.38	-6.0	1909	25.5	52.19	57.0	5.965	88.5	0.7301
-67.5	4.622	-36.0	18.68	-4.5	2077	27.0	41.98	58.5	5.764	90.0	0.7006
-66.0	4.900	-34.5	21.55	-3.0	2204	28.5	34.78	60.0	5.560		
-64.5	5.196	-33.0	25.15	-1.5	2277	30.0	29.34	61.5	5.346		
-63.0	5.462	-31.5	29.72	0.0	2289	31.5	25.09	63.0	5.129		
-61.5	5.677	-30.0	35.71	1.5	2240	33.0	21.74	64.5	4.879		
-60.0	5.856	-28.5	43.77	3.0	2135	34.5	19.06	66.0	4.572		

Electricity Parameter:

Current I: 0.1000A Power: 3.310W
Voltage V: 33.09V PF: 1.000

Optical Parameter (Distance=2.559m):

Equivalent Luminous flux: $\Phi_{eff}=414.4lm$ Efficiency: $Eff=125.22lm/W$
Diffuse angle: @ (25%): 31.0deg @ (50%): 22.1deg @ (75%): 14.0deg @ (50%): 22.1deg
Diffuse angle: @ (25%): 31.0deg @ (50%): 22.2deg @ (75%): 14.1deg @ (50%): 22.2deg
Imax=2293cd (C=0.0deg, G=-0.5deg) C0-180Plane Imax= 2293cd(G=-0.5deg)
C0-180Plane IO= 2289cd



Intensity data: (deg , cd) C0-180

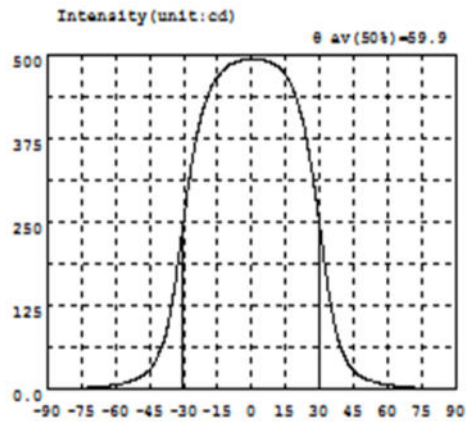
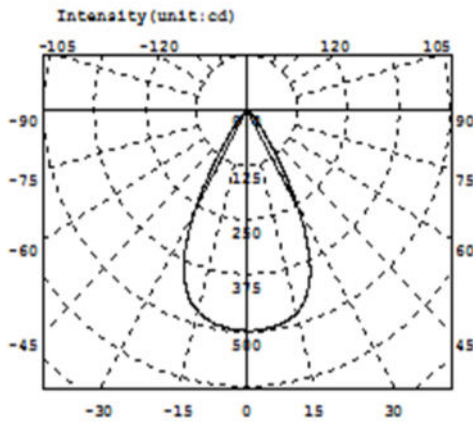
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.082	-58.5	6.364	-27.0	108.6	4.5	1100	36.0	25.07	67.5	3.997
-88.5	1.197	-57.0	6.751	-25.5	160.9	6.0	1078	37.5	21.92	69.0	3.630
-87.0	1.325	-55.5	7.160	-24.0	216.8	7.5	1044	39.0	19.16	70.5	3.281
-85.5	1.478	-54.0	7.637	-22.5	280.1	9.0	1000	40.5	16.88	72.0	2.976
-84.0	1.723	-52.5	8.188	-21.0	349.7	10.5	946.6	42.0	15.07	73.5	2.703
-82.5	1.977	-51.0	8.821	-19.5	424.1	12.0	882.4	43.5	13.66	75.0	2.423
-81.0	2.155	-49.5	9.516	-18.0	504.5	13.5	804.5	45.0	12.40	76.5	2.178
-79.5	2.309	-48.0	10.33	-16.5	588.2	15.0	719.1	46.5	11.26	78.0	1.935
-78.0	2.526	-46.5	11.29	-15.0	675.2	16.5	631.0	48.0	10.27	79.5	1.718
-76.5	2.731	-45.0	12.23	-13.5	762.9	18.0	547.4	49.5	9.452	81.0	1.595
-75.0	2.936	-43.5	13.38	-12.0	844.7	19.5	464.0	51.0	8.713	82.5	1.382
-73.5	3.189	-42.0	14.88	-10.5	915.4	21.0	374.0	52.5	8.058	84.0	1.170
-72.0	3.434	-40.5	16.60	-9.0	974.4	22.5	298.2	54.0	7.492	85.5	0.9870
-70.5	3.678	-39.0	18.61	-7.5	1021	24.0	231.8	55.5	6.974	87.0	0.8465
-69.0	4.000	-37.5	20.78	-6.0	1059	25.5	171.1	57.0	6.536	88.5	0.7201
-67.5	4.287	-36.0	23.81	-4.5	1087	27.0	119.5	58.5	6.175	90.0	0.6879
-66.0	4.421	-34.5	27.92	-3.0	1107	28.5	81.29	60.0	5.767		
-64.5	4.731	-33.0	33.55	-1.5	1120	30.0	59.25	61.5	5.355		
-63.0	5.112	-31.5	41.50	0.0	1124	31.5	44.85	63.0	4.934		
-61.5	5.499	-30.0	54.07	1.5	1123	33.0	35.75	64.5	4.573		
-60.0	5.966	-28.5	74.30	3.0	1114	34.5	29.56	66.0	4.251		

Electricity Parameter:

Current I: 1.000A Power: 3.500W
Voltage V: 35.00V PF: 1.000

Optical Parameter (Distance=2.559m):

Equivalent Luminous flux: $\Phi_{eff} = 418.81\text{lm}$ Efficiency: $Eff = 119.67\text{lm/W}$
Diffuse angle: @ (25%): 45.2deg @ (50%): 34.6deg @ (75%): 24.7deg @ (50%): 34.6deg
Diffuse angle: @ (25%): 45.2deg @ (50%): 34.6deg @ (75%): 24.7deg @ (50%): 34.6deg
 $I_{max} = 1125\text{cd}$ (C=0.0deg, G=0.5deg) C0-180Plane $I_{max} = 1125\text{cd}$ (G=0.5deg)
C0-180Plane $I_0 = 1124\text{cd}$



Intensity data: (deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.006	-58.5	8.457	-27.0	326.1	4.5	491.9	36.0	104.3	67.5	4.359
-88.5	1.031	-57.0	9.479	-25.5	356.2	6.0	490.3	37.5	81.73	69.0	3.768
-87.0	1.121	-55.5	10.69	-24.0	382.8	7.5	489.2	39.0	65.06	70.5	3.326
-85.5	1.223	-54.0	12.21	-22.5	404.3	9.0	487.6	40.5	52.94	72.0	2.933
-84.0	1.325	-52.5	13.98	-21.0	422.1	10.5	484.5	42.0	42.05	73.5	2.568
-82.5	1.389	-51.0	15.93	-19.5	437.0	12.0	480.6	43.5	33.49	75.0	2.187
-81.0	1.427	-49.5	18.15	-18.0	449.8	13.5	475.3	45.0	27.84	76.5	1.825
-79.5	1.504	-48.0	20.93	-16.5	459.9	15.0	468.5	46.5	23.46	78.0	1.566
-78.0	1.647	-46.5	24.71	-15.0	467.1	16.5	460.4	48.0	20.29	79.5	1.445
-76.5	1.944	-45.0	29.52	-13.5	473.5	18.0	449.5	49.5	17.74	81.0	1.390
-75.0	2.288	-43.5	36.18	-12.0	478.5	19.5	435.4	51.0	15.68	82.5	1.364
-73.5	2.647	-42.0	45.55	-10.5	482.5	21.0	419.2	52.5	13.69	84.0	1.289
-72.0	3.042	-40.5	57.06	-9.0	486.1	22.5	400.0	54.0	11.95	85.5	1.189
-70.5	3.455	-39.0	69.46	-7.5	488.1	24.0	374.7	55.5	10.55	87.0	1.026
-69.0	3.916	-37.5	88.32	-6.0	489.8	25.5	345.6	57.0	9.412	88.5	0.9809
-67.5	4.477	-36.0	112.3	-4.5	491.3	27.0	314.7	58.5	8.422	90.0	0.9184
-66.0	4.937	-34.5	141.5	-3.0	492.4	28.5	279.8	60.0	7.521		
-64.5	5.449	-33.0	176.3	-1.5	493.7	30.0	241.8	61.5	6.717		
-63.0	6.051	-31.5	214.7	0.0	494.3	31.5	202.5	63.0	6.034		
-61.5	6.735	-30.0	253.0	1.5	494.2	33.0	164.4	64.5	5.457		
-60.0	7.510	-28.5	291.6	3.0	493.4	34.5	131.7	66.0	4.953		

Electricity Parameter:

Current I: 0.3490A Power: 3.320W
Voltage V: 33.20V PF: 1.000

Optical Parameter (Distance=2.559m) :

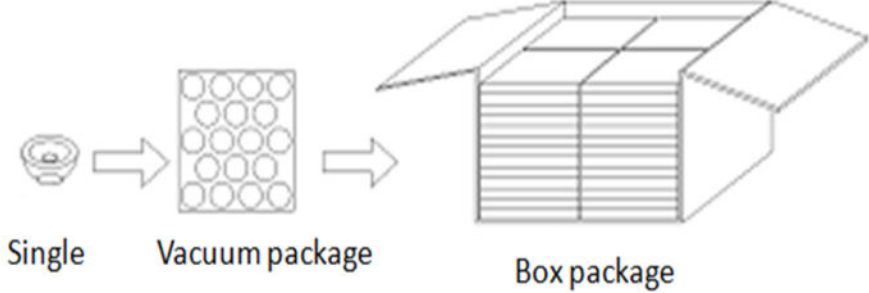
Equivalent Luminous flux: Φ_{eff} = 465.11lm Efficiency: Eff = 140.11lm/W
Diffuse angle: @ (25%) : 70.2deg @ (50%) : 59.9deg @ (75%) : 48.8deg @ (50%) : 59.9deg
Diffuse angle: @ (25%) : 70.2deg @ (50%) : 59.9deg @ (75%) : 48.8deg @ (50%) : 59.9deg
Imax=494.4cd (C=0.0deg,G=0.5deg) C0-180Plane Imax= 494.4cd(G=0.5deg)
C0-180Plane IO= 494.3cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
1.Size	diameter	55			55.17	55.13	55.17	55.12		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																										
	height	2			2.12	2.1	2.12	2.15																																												
	thickness	23.7			23.725	23.725	23.8	23.78																																												
	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	D9																																																		
	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		15.3°	15.1°	15.2	15.3																																														
	K-value		9.47	9.19	9.13	9.42																																														
	Efficiency		86.95%	87.31%	87.31%	87.83%																																														
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>Size: 50mm</th> <th>Size: 100mm</th> <th>Size: 150mm</th> <th>Size: 200mm</th> <th>Size: 250mm</th> <th>Size: 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>0.05</td> <td>0.08</td> <td>0.12</td> <td>0.15</td> <td>0.18</td> <td>0.22</td> </tr> <tr> <td>20</td> <td>0.10</td> <td>0.15</td> <td>0.20</td> <td>0.25</td> <td>0.30</td> <td>0.35</td> </tr> <tr> <td>30</td> <td>0.15</td> <td>0.22</td> <td>0.28</td> <td>0.35</td> <td>0.42</td> <td>0.50</td> </tr> <tr> <td>40</td> <td>0.20</td> <td>0.28</td> <td>0.35</td> <td>0.45</td> <td>0.55</td> <td>0.65</td> </tr> </tbody> </table>										Temperature (°C)	Size: 50mm	Size: 100mm	Size: 150mm	Size: 200mm	Size: 250mm	Size: 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
Temperature (°C)	Size: 50mm	Size: 100mm	Size: 150mm	Size: 200mm	Size: 250mm	Size: 300mm																																														
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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:	<p>1、 Wear clean gloves during lens assembly to prevent contamination of the lens surface.</p> <p>2、 Take the lens try to avoid touching the total reflection surface.</p> <p>3、 When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.</p> <p>4. 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.</p>																																																			

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
1.Size	diameter	55			55.02	55.02	55.04	55.05		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																										
	height	2			2.12	2.1	2.13	2.15																																												
	thickness	23.7			23.93	23.92	23.9	23.85																																												
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	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		22.3	22.2	22.3	22.2																																														
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	height	2			2.04	2.05	2.09	2.09																																												
	thickness	23.7			23.81	23.84	23.82	23.8																																												
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	FWHM	See light distribution curve																																																		
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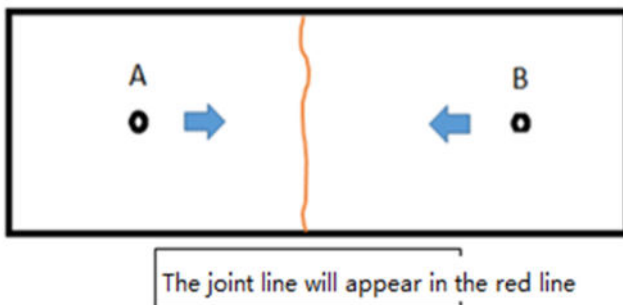
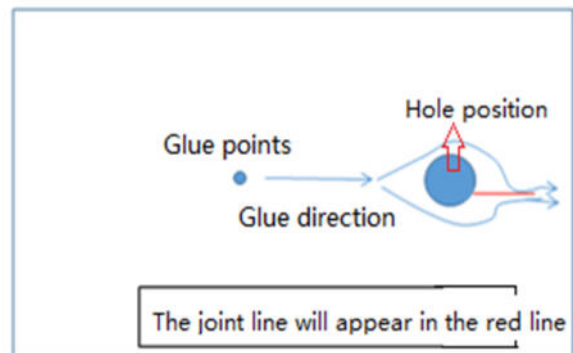
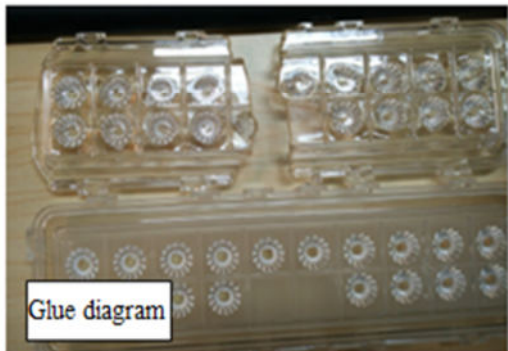
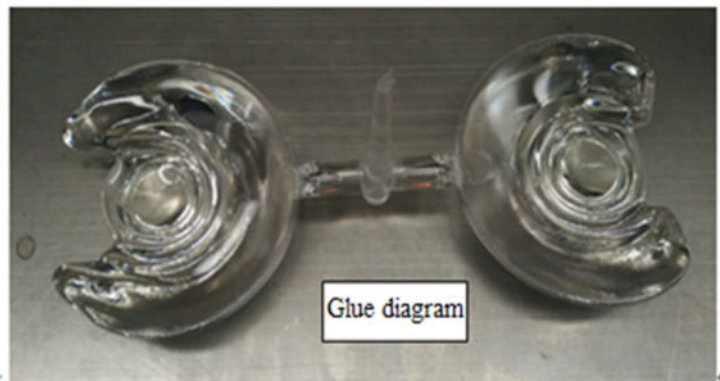
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PN		HK-55@24-15-D9-20-1g-1		Product Name		HK-55@24-15°Lens	
Product material		PMMA		Customer			
Package diagram		 <p style="text-align: center;"> Single Vacuum package Box package </p>					
Product packing		10		A/ Box		4	
		11		Layer/Box		440	
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0041	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	2.06.0011	big carton	48cm*44cm*37cm	1	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:

Synthesis



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 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 $D \leq 1\text{ mm}$ and no more than 1 area within a 50x50 mm area	Visual		√	