



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

Approval number : \_\_\_\_\_

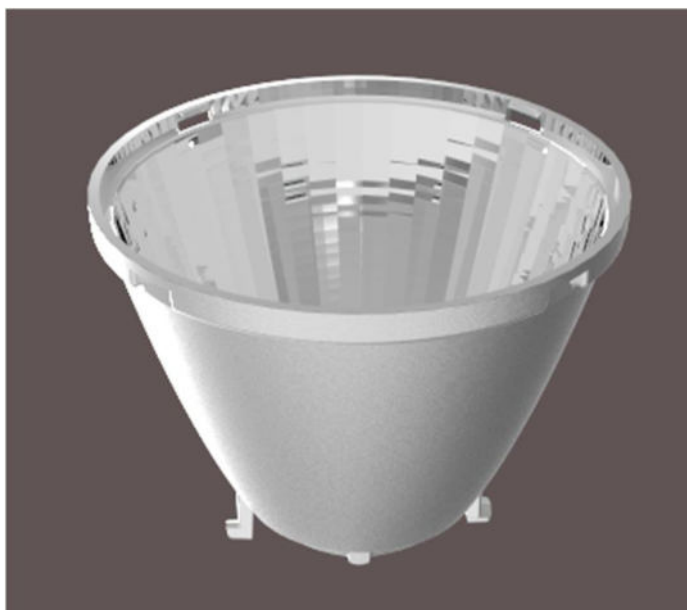
Customer :

Product : HK-5535-15 Reflective cup

Material Code : 1.08.6606

PN : HK-50@35-15-D9-2#-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 )

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www.hkoptics.com

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.



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恒坤光电

# Product Approval

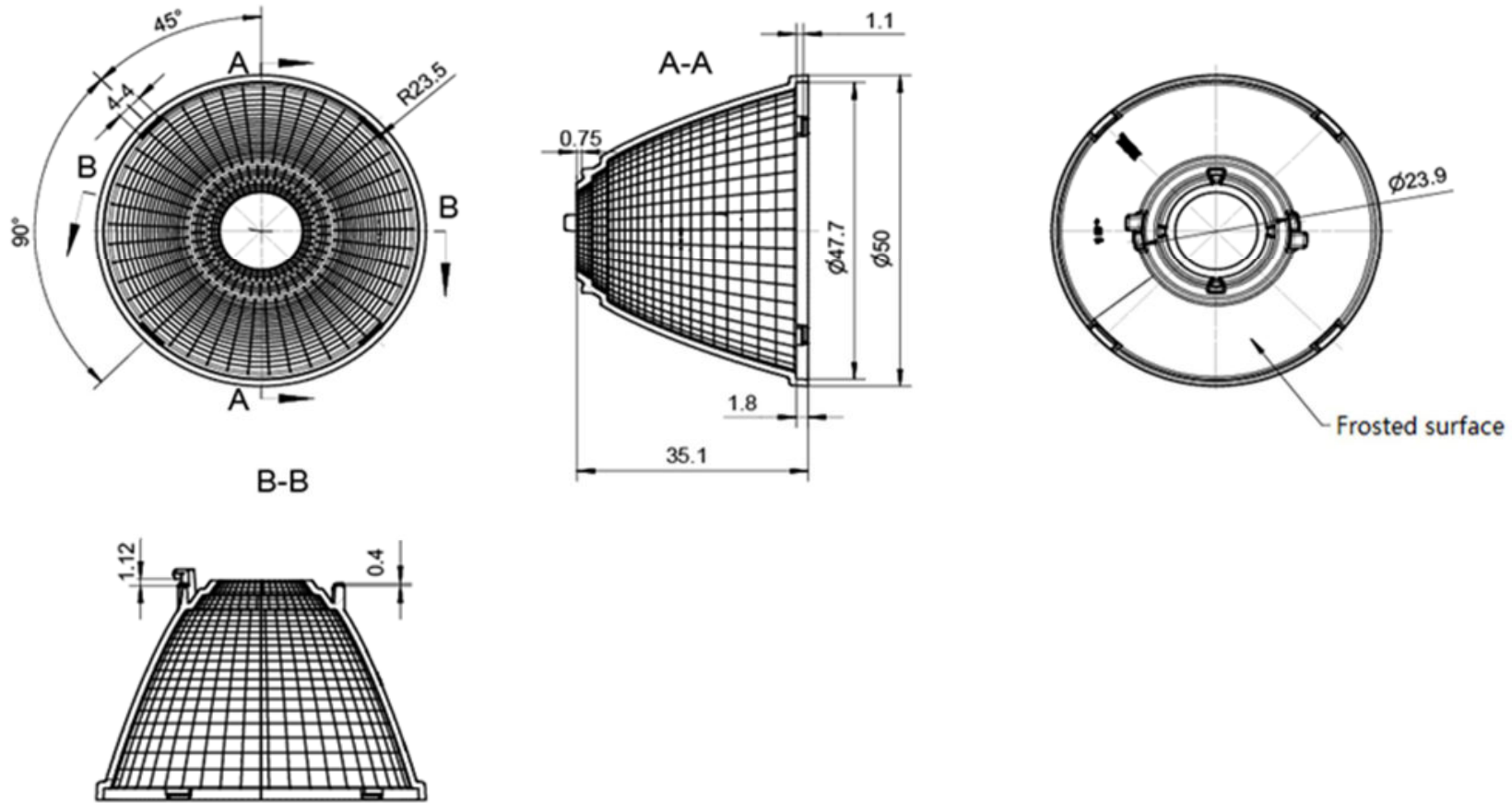
TEL: 0755-2937 1541

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Date updated: 2019/1/22

Product Picture:	
PN:	HK-50@35-15-D9-2#-1g-1
Size(L*W*H/Φ*H):	Φ:50mm*H:35.1mm
1.07.81418_HK-166@03-0223-S	PC镀铝
Efficiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	15°
Matched LES:	D9

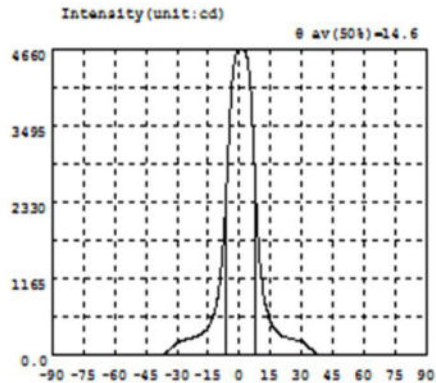
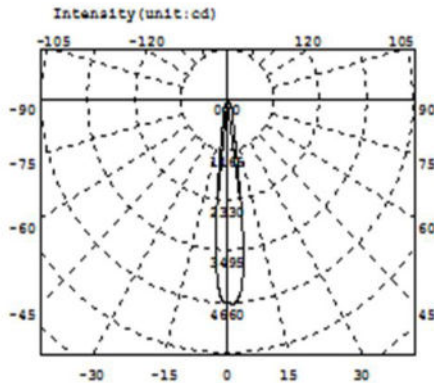


Technical Requirement:

1. The surface don't have any defects of flash, shrink and bubble.
2. The uncharted fillet and pattern draft subject to the 3D drawing.
3. The uncharted dimensional tolerance subject to the 3D drawing.

Optical Design			HK-5535-15 Reflective cup	HK-50035-15-D9-2#-1g-1		1.08.6606
Structure Design				Pages	Qty	Weight
Assess			2			
Authorized			Material:	PC镀铝	CDHK	





Intensity data: (deg , cd) CO-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	14.61	-58.5	6.831	-27.0	237.4	4.5	4337	36.0	52.59	67.5	0.7873
-88.5	14.16	-57.0	6.537	-25.5	248.3	6.0	3685	37.5	19.28	69.0	0.8302
-87.0	13.63	-55.5	6.267	-24.0	259.7	7.5	2722	39.0	3.783	70.5	0.8845
-85.5	13.17	-54.0	6.030	-22.5	272.7	9.0	1783	40.5	2.103	72.0	0.9433
-84.0	12.74	-52.5	5.783	-21.0	287.9	10.5	1198	42.0	1.805	73.5	1.007
-82.5	12.25	-51.0	5.559	-19.5	308.1	12.0	858.6	43.5	1.613	75.0	1.086
-81.0	11.82	-49.5	5.353	-18.0	335.7	13.5	647.3	45.0	1.477	76.5	1.158
-79.5	11.39	-48.0	5.156	-16.5	374.3	15.0	508.9	46.5	1.345	78.0	1.235
-78.0	11.00	-46.5	5.007	-15.0	436.7	16.5	425.3	48.0	1.244	79.5	1.316
-76.5	10.63	-45.0	4.899	-13.5	527.4	18.0	367.0	49.5	1.145	81.0	1.384
-75.0	10.27	-43.5	4.786	-12.0	665.4	19.5	323.5	51.0	1.044	82.5	1.485
-73.5	9.927	-42.0	4.732	-10.5	881.2	21.0	295.3	52.5	0.9540	84.0	1.584
-72.0	9.578	-40.5	4.701	-9.0	1248	22.5	277.8	54.0	0.8636	85.5	1.666
-70.5	9.238	-39.0	4.690	-7.5	1850	24.0	264.3	55.5	0.8070	87.0	1.799
-69.0	8.899	-37.5	4.696	-6.0	2702	25.5	251.6	57.0	0.7588	88.5	1.882
-67.5	8.596	-36.0	4.719	-4.5	3660	27.0	240.2	58.5	0.7445	90.0	2.003
-66.0	8.300	-34.5	4.752	-3.0	4329	28.5	230.5	60.0	0.7107		
-64.5	7.996	-33.0	4.794	-1.5	4589	30.0	215.5	61.5	0.7107		
-63.0	7.682	-31.5	4.845	0.0	4644	31.5	184.0	63.0	0.7159		
-61.5	7.409	-30.0	4.904	1.5	4656	33.0	140.7	64.5	0.7394		
-60.0	7.125	-28.5	4.971	3.0	4596	34.5	95.69	66.0	0.7671		

Electricity Parameter:

Current I: 0.1000A                      Power: 4.907W  
Voltage V: 49.09V                      PF: 1.000

Optical Parameter (Distance=2.410m):

Equivalent Luminous flux:  $\Phi_{eff}$ = 593.8lm      Efficiency:  $Eff=121.03lm/W$   
Diffuse angle:            @ (25%) : 19.8deg @ (50%) : 14.6deg @ (75%) : 11.0deg @ (50%) : 14.6deg  
Diffuse angle:            @ (25%) : 19.8deg @ (50%) : 14.6deg @ (75%) : 11.0deg @ (50%) : 14.6deg  
Imax=4656cd (C=0.0deg,G=1.5deg)                      CO-180Plane Imax= 4656cd(G=1.5deg)  
CO-180Plane I0= 4644cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	Diameter	50								Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	Highth	35.1								
Gate shear can not affect the appearance of the lamp										
See attachment "Appearance Inspection Standards"										

2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	

3.Material	PC镀膜	Color	Transparent	OK
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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					
	FWHM	See light distribution curve				
	angle		14.6	14.7	14.6	14.5
	Efficiency		82.20%	82.37%	82.03%	82.02%
Facula	See the signature sample					

Comprehensive judgment	Qualified
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Remarks:

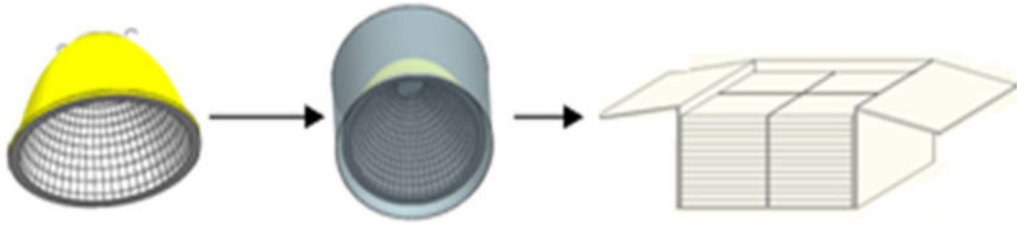
- Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
- Ambient temperature on the size of the product refer to the table on the right

### PC 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	0.20	0.25
20	0.10	0.15	0.22	0.28	0.35	0.42
30	0.15	0.22	0.30	0.38	0.48	0.58
40	0.20	0.28	0.38	0.48	0.60	0.72

Precautions:

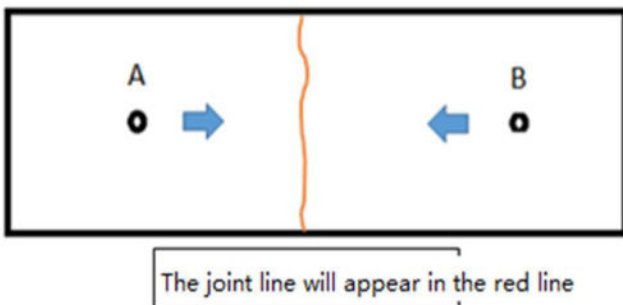
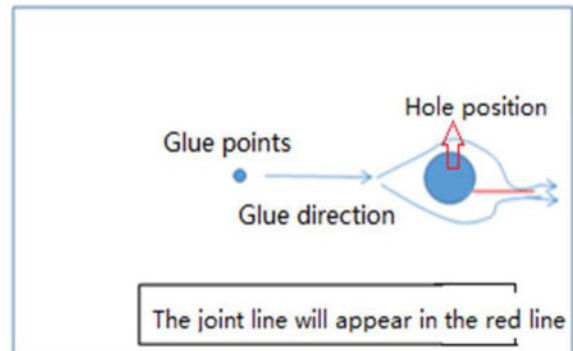
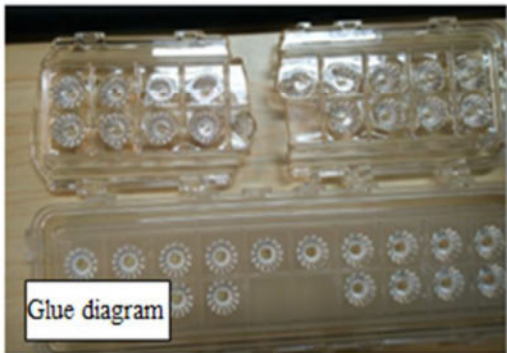
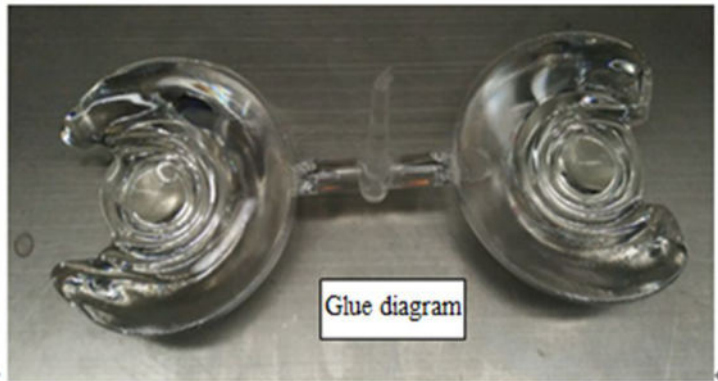
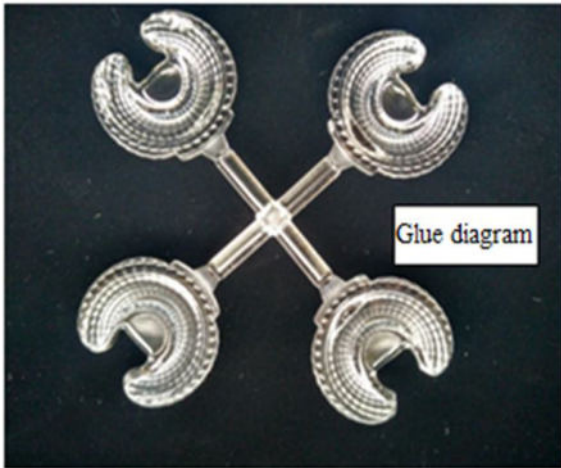
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
- Take the lens try to avoid touching the total reflection surface.
- When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.

PN		HK-50@35-15-D9-2#-1g-1		Product Name		HK-5535-15 Reflective cup	
Product material		PC镀铝		Customer			
Package diagram							
Product packing		39		PCS/BAG		4	
		4		Layer/Box		624	
Packaging Materials		NO.	Material Code	Item name	Specification	Single box usage	Unit
		1	—	Plastic bags	—	16	BAG
		2	2.06.0005	Box label	6.2cm*7.6cm	1	PCS
		3	2.06.0007	Partition	39*29cm	5	PCS
		4	2.06.0008	Carton	40*30*26cm	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:

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 <sup>2</sup>	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		√	



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

Approval number : \_\_\_\_\_

Customer :

Product : HK-5535-24 Reflective cup

Material Code : 1.08.6607

PN : HK-50@35-24-D9-2#-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

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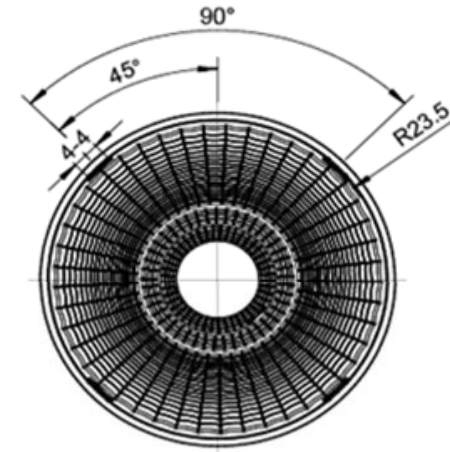
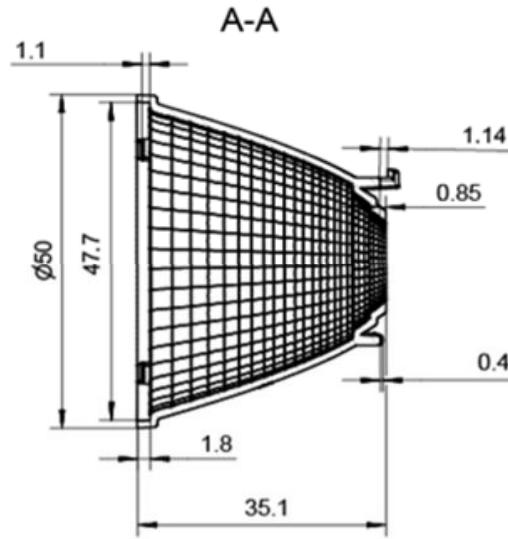
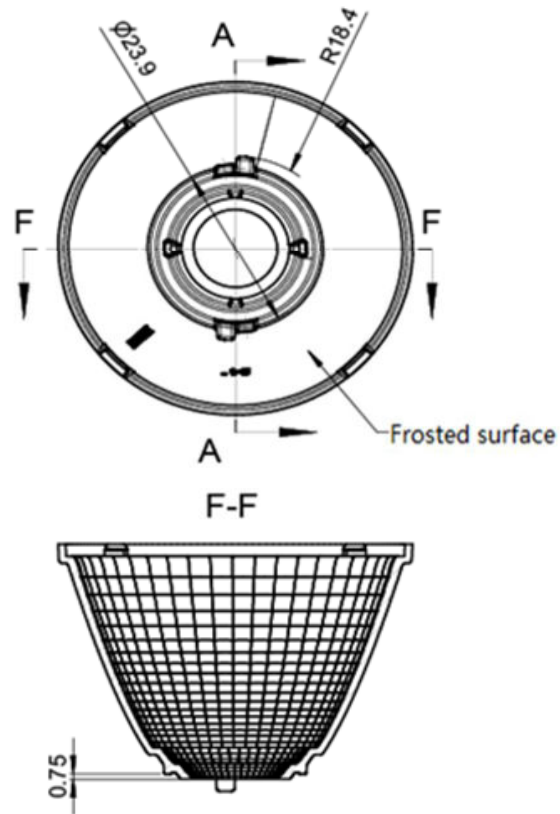
TEL: 0755-2937 1541

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Date updated: 2019/1/22

Product Picture:	
PN:	HK-50@35-24-D9-2#-1g-1
Size(L*W*H/Φ*H):	Φ:50mm*H:35.1mm
1.07.81418_HK-166@03-0223-S	PC镀铝
Efficiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	24°
Matched LES:	D9

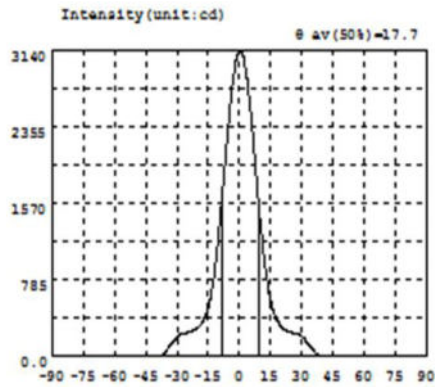
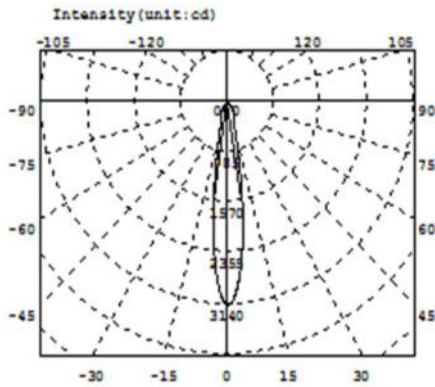


Technical Requirement:

1. The surface don't have any defects of flash, shrink and bubble.
2. The uncharted fillet and pattern draft subject to the 3D drawing.
3. The uncharted dimensional tolerance subject to the 3D drawing.

Optical Design			HK-5535-24 Reflective cup	HK-50035-24-D9-2#-1g-1		1.08.6607
Structure Design				Pages	Qty	Weight
Assess				2		
Authorized			Material:	PC镀铝		CDHK





Intensity data: (deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	13.59	-58.5	6.347	-27.0	234.9	4.5	2679	36.0	48.03	67.5	0.7962
-88.5	13.16	-57.0	6.106	-25.5	242.5	6.0	2360	37.5	16.95	69.0	0.8302
-87.0	12.66	-55.5	5.901	-24.0	251.2	7.5	1995	39.0	4.335	70.5	0.8529
-85.5	12.23	-54.0	5.722	-22.5	263.1	9.0	1613	40.5	3.220	72.0	0.8912
-84.0	11.81	-52.5	5.576	-21.0	281.1	10.5	1276	42.0	2.760	73.5	0.9548
-82.5	11.37	-51.0	5.448	-19.5	306.1	12.0	988.6	43.5	2.466	75.0	1.009
-81.0	10.93	-49.5	5.371	-18.0	344.1	13.5	749.1	45.0	2.187	76.5	1.056
-79.5	10.57	-48.0	5.285	-16.5	404.1	15.0	565.4	46.5	1.953	78.0	1.132
-78.0	10.21	-46.5	5.236	-15.0	505.4	16.5	450.7	48.0	1.727	79.5	1.203
-76.5	9.851	-45.0	5.262	-13.5	652.9	18.0	376.9	49.5	1.539	81.0	1.284
-75.0	9.490	-43.5	5.267	-12.0	862.6	19.5	322.0	51.0	1.362	82.5	1.394
-73.5	9.173	-42.0	5.335	-10.5	1140	21.0	288.3	52.5	1.200	84.0	1.494
-72.0	8.846	-40.5	5.555	-9.0	1481	22.5	268.9	54.0	1.067	85.5	1.609
-70.5	8.529	-39.0	6.222	-7.5	1837	24.0	255.0	55.5	0.9567	87.0	1.733
-69.0	8.212	-37.5	14.19	-6.0	2205	25.5	244.4	57.0	0.8716	88.5	1.835
-67.5	7.940	-36.0	39.15	-4.5	2554	27.0	234.8	58.5	0.8151	90.0	1.947
-66.0	7.659	-34.5	78.61	-3.0	2852	28.5	226.6	60.0	0.7671		
-64.5	7.398	-33.0	124.3	-1.5	3044	30.0	208.9	61.5	0.7359		
-63.0	7.115	-31.5	165.2	0.0	3131	31.5	174.8	63.0	0.7505		
-61.5	6.847	-30.0	200.3	1.5	3094	33.0	132.4	64.5	0.7532		
-60.0	6.579	-28.5	223.3	3.0	2931	34.5	89.21	66.0	0.7558		

**Electricity Parameter:**

Current I: 0.1000A      Power: 4.907W  
Voltage V: 49.09V      PF: 1.000

**Optical Parameter(Distance=2.410m):**

Equivalent Luminous flux:  $\Phi_{eff}$  = 549.9lm      Efficiency: Eff=112.06lm/W  
Diffuse angle:      @ (25%): 25.7deg @ (50%): 17.7deg @ (75%): 11.3deg @ (50%): 17.7deg  
Diffuse angle:      @ (25%): 25.7deg @ (50%): 17.7deg @ (75%): 11.4deg @ (50%): 17.7deg  
Imax=3134cd (C=0.0deg, C=0.5deg)      C0-180Plane Imax= 3134cd(G=0.5deg)  
C0-180Plane IO= 3131cd



		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	Diameter	50								Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	Highth	35.1								
Gate shear can not affect the appearance of the lamp										
See attachment "Appearance Inspection Standards"										

2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	

3.Material	PC镀膜	Color	Transparent	OK
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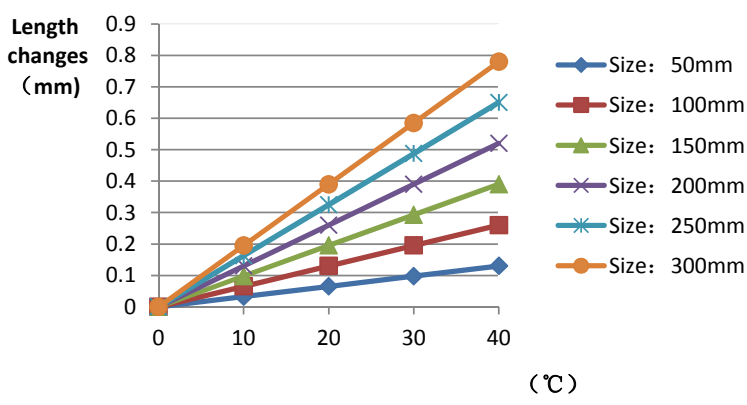
4.Optical index	Testing LED	D9				
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and					
	FWHM	See light distribution curve				
	angle		17.7	18	17.7	18
	Efficiency		76.06	81.13	77.52	73.31
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

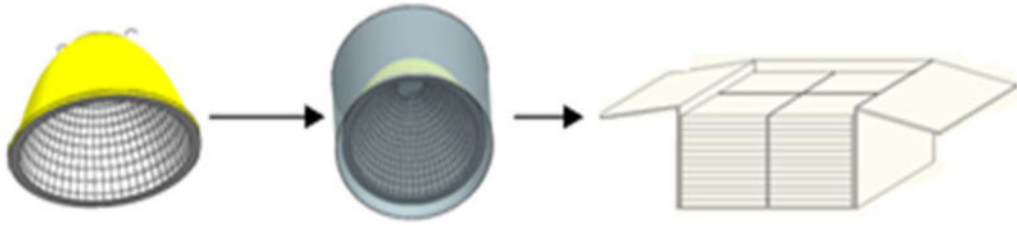
### PC product size changes with temperature table



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	0.20	0.25
20	0.10	0.15	0.22	0.28	0.35	0.42
30	0.15	0.22	0.30	0.38	0.48	0.58
40	0.20	0.28	0.38	0.48	0.60	0.72

Precautions:

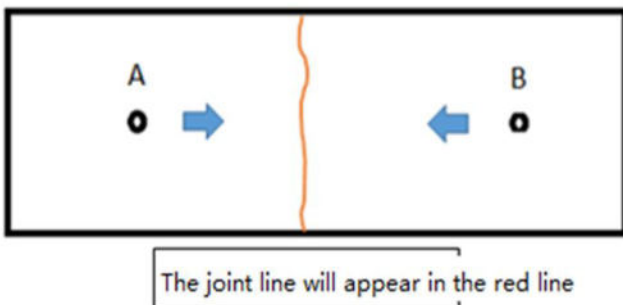
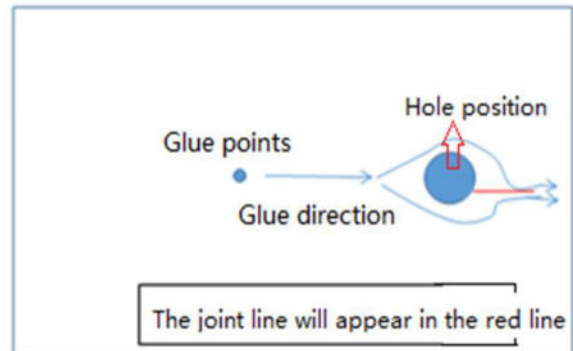
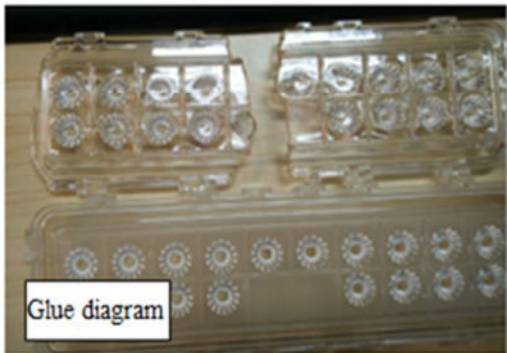
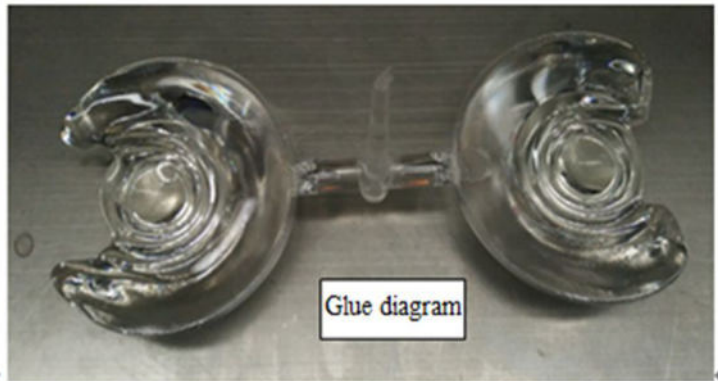
- Wear clean gloves during lens assembly to prevent contamination of the lens surface.
- Take the lens try to avoid touching the total reflection surface.
- When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with industrial solvents.

PN		HK-50@35-24-D9-2#-1g-1		Product Name		HK-5535-24 Reflective cup	
Product material		PC镀铝		Customer			
Package diagram							
Product packing		39		PCS/BAG		4	
		4		Layer/Box		624	
Packaging Materials		NO.	Material Code	Item name	Specification	Single box usage	Unit
		1	—	Plastic bags	—	16	BAG
		2	2.06.0005	Box label	6.2cm*7.6cm	1	PCS
		3	2.06.0007	Partition	39*29cm	5	PCS
		4	2.06.0008	Carton	40*30*26cm	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:

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 <sup>2</sup>	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		√	



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

Approval number : \_\_\_\_\_

Customer :

Product : HK-5535-36 Reflective cup

Material Code : 1.08.6608

PN : HK-50@35-36-D9-2#-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

www.hkoptics.com

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

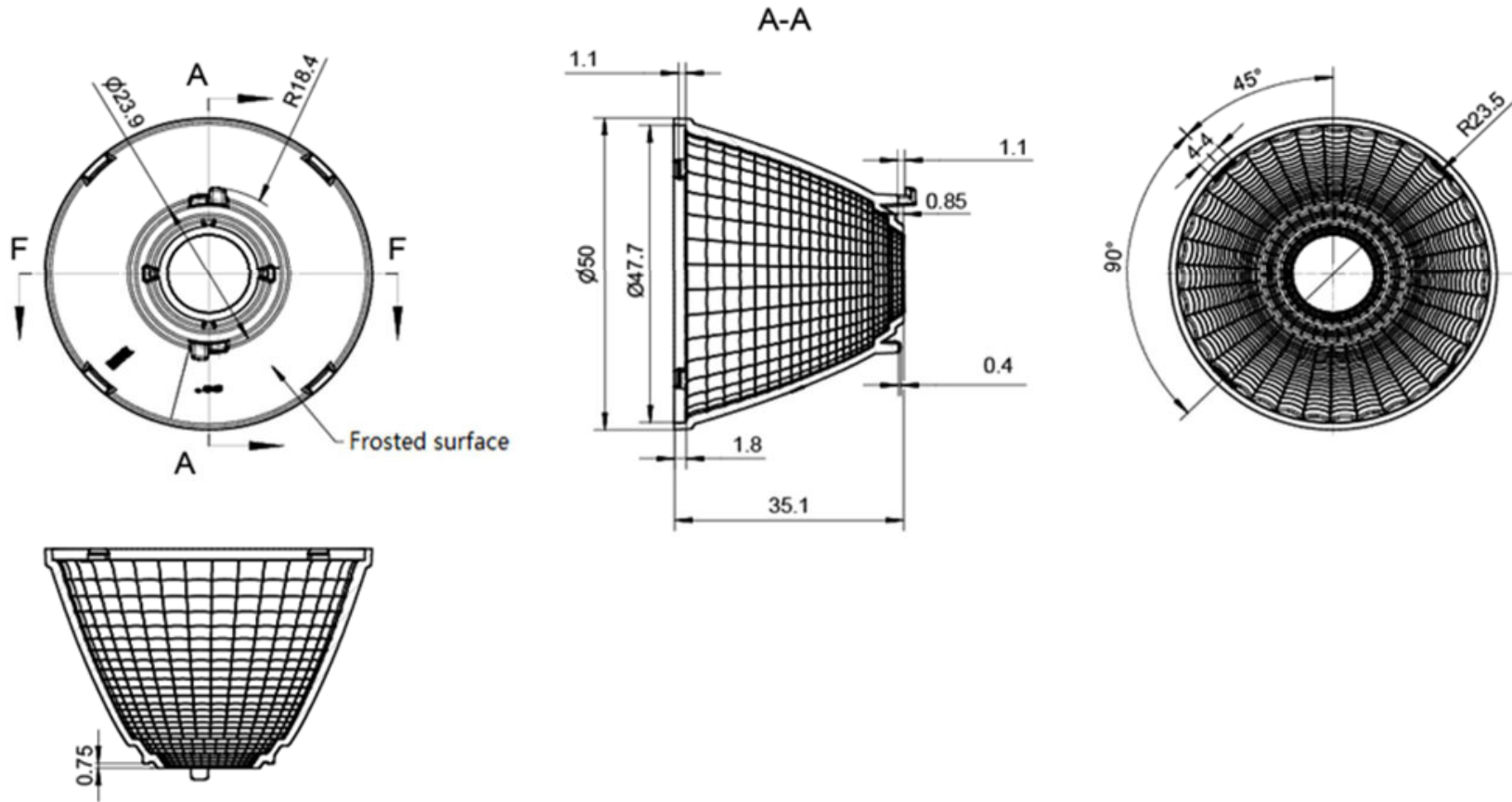
FAX: 0755-2907 5140

www.hkoptics.com

Date updated: 2019/1/22

Product Picture:	
PN:	HK-50@35-36-D9-2#-1g-1
Size(L*W*H/Φ*H):	Φ:50mm*H:35.1mm
1.07.81418_HK-166@03-0223-S	PC镀铝
Efficiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	36°
Matched LES:	D9

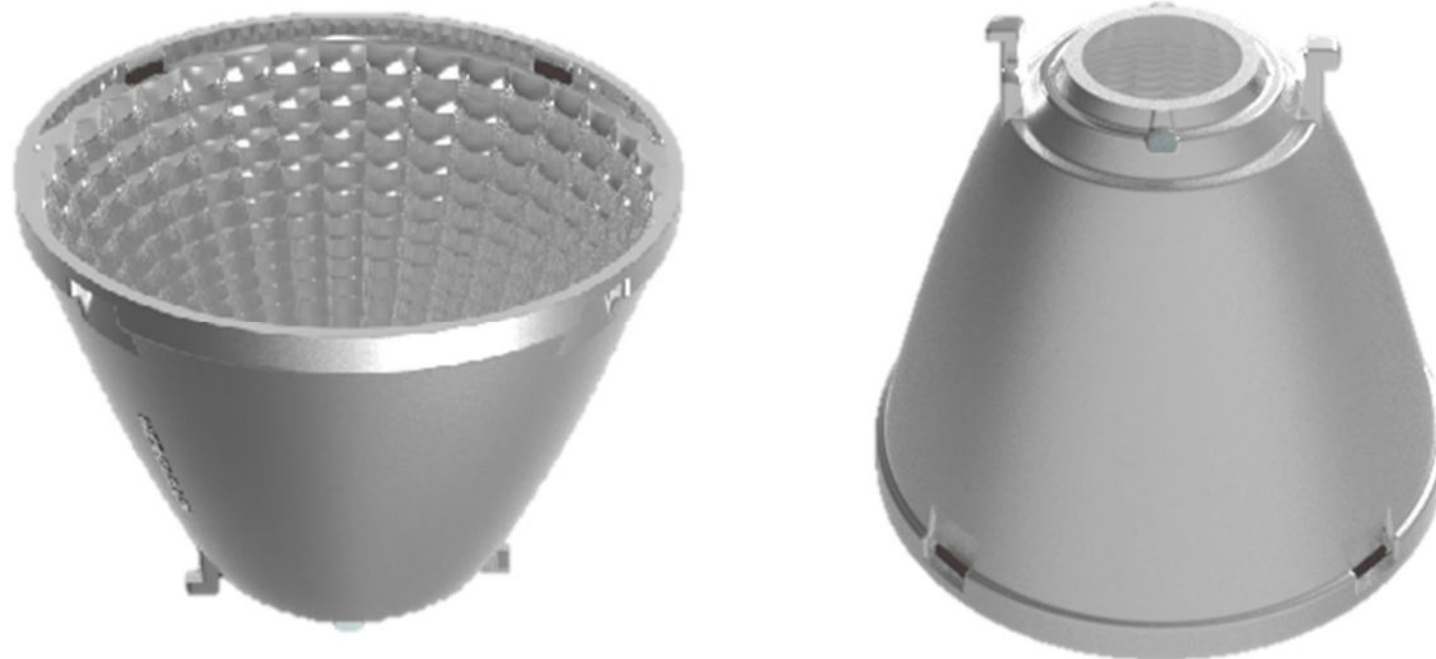


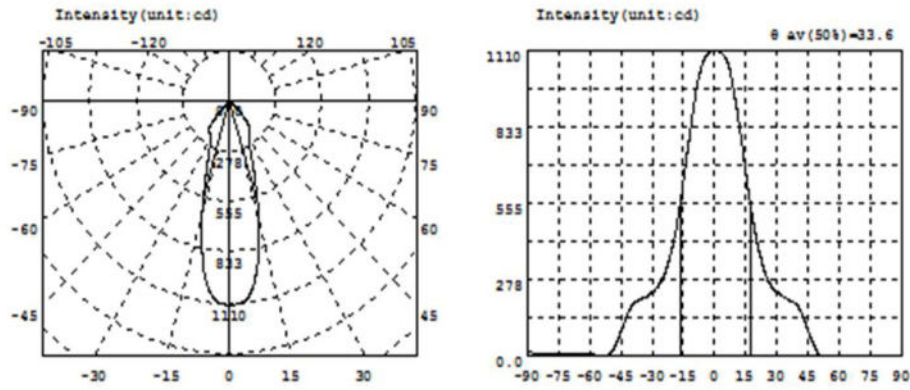


Technical Requirement:

1. The surface don't have any defects of flash, shrink and bubble.
2. The uncharted fillet and pattern draft subject to the 3D drawing.
3. The uncharted dimensional tolerance subject to the 3D drawing.

Optical Design			HK-5535-36 Reflective cup	HK-50035-36-D9-2#-1g-1		1.08.6608
Structure Design				Pages	Qty	Weight
Assess				2		
Authorized			Material:	PC镀铝		CDHK





Intensity data: (deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	14.37	-58.5	7.024	-27.0	258.2	4.5	1091	36.0	204.4	67.5	1.362
-88.5	13.99	-57.0	6.766	-25.5	275.9	6.0	1069	37.5	198.6	69.0	1.396
-87.0	13.61	-55.5	6.555	-24.0	300.1	7.5	1030	39.0	191.0	70.5	1.423
-85.5	13.20	-54.0	6.385	-22.5	333.7	9.0	972.2	40.5	176.7	72.0	1.484
-84.0	12.83	-52.5	6.303	-21.0	376.2	10.5	905.1	42.0	153.4	73.5	1.550
-82.5	12.42	-51.0	7.547	-19.5	424.4	12.0	831.0	43.5	123.8	75.0	1.629
-81.0	11.98	-49.5	15.69	-18.0	482.8	13.5	748.6	45.0	91.23	76.5	1.697
-79.5	11.59	-48.0	34.14	-16.5	554.9	15.0	663.1	46.5	61.89	78.0	1.797
-78.0	11.20	-46.5	59.85	-15.0	638.8	16.5	584.5	48.0	36.13	79.5	1.867
-76.5	10.83	-45.0	90.54	-13.5	719.7	18.0	511.9	49.5	14.66	81.0	1.978
-75.0	10.45	-43.5	120.6	-12.0	801.4	19.5	447.5	51.0	3.559	82.5	2.089
-73.5	10.09	-42.0	149.6	-10.5	880.8	21.0	392.5	52.5	1.634	84.0	2.196
-72.0	9.779	-40.5	175.4	-9.0	955.0	22.5	348.1	54.0	1.408	85.5	2.319
-70.5	9.439	-39.0	193.2	-7.5	1014	24.0	307.2	55.5	1.331	87.0	2.434
-69.0	9.101	-37.5	200.6	-6.0	1058	25.5	279.1	57.0	1.291	88.5	2.577
-67.5	8.796	-36.0	206.0	-4.5	1086	27.0	258.0	58.5	1.285	90.0	2.702
-66.0	8.459	-34.5	211.8	-3.0	1101	28.5	244.2	60.0	1.283		
-64.5	8.141	-33.0	216.9	-1.5	1107	30.0	233.7	61.5	1.291		
-63.0	7.839	-31.5	224.9	0.0	1109	31.5	224.9	63.0	1.308		
-61.5	7.556	-30.0	234.2	1.5	1108	33.0	217.1	64.5	1.319		
-60.0	7.294	-28.5	244.2	3.0	1102	34.5	210.5	66.0	1.336		

**Electricity Parameter:**

Current I: 0.1000A                      Power: 4.907W  
 Voltage V: 49.09V                      PF: 1.000

**Optical Parameter(Distance=2.410m):**

Equivalent Luminous flux:  $\Phi_{eff} = 636.91m$       Efficiency:  $Eff = 129.80lm/W$   
 Diffuse angle:      @ (25%): 50.9deg @ (50%): 33.6deg @ (75%): 23.3deg @ (50%): 33.6deg  
 Diffuse angle:      @ (25%): 50.9deg @ (50%): 33.6deg @ (75%): 23.3deg @ (50%): 33.6deg  
 Imax=1109cd (C=0.0deg,G=0.0deg)                      C0-180Plane Imax= 1109cd(G=0.0deg)  
    C0-180Plane I0= 1109cd

	Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	Diameter	50							Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	Highth	35.1							
Gate shear can not affect the appearance of the lamp									
See attachment "Appearance Inspection Standards"									

2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	

3.Material	PC镀铝	Color	Transparent	OK
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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					
	FWHM	See light distribution curve				
	angle		33.8	33.6	32.6	33.6
	Efficiency		88.34	88.01	86.96	87.25
Facula	See the signature sample					

Comprehensive judgment	Qualified
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Remarks:

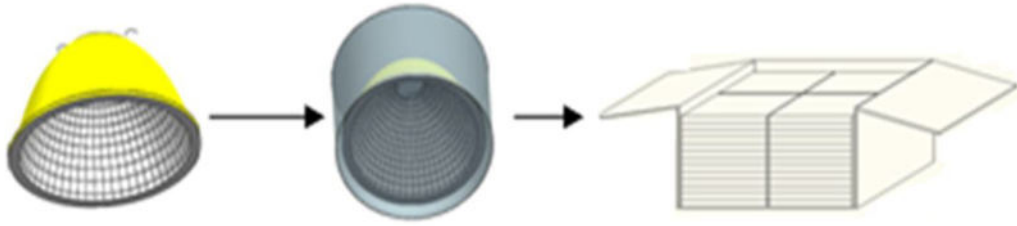
- Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.
- Ambient temperature on the size of the product refer to the table on the right

### PC 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	0.10	0.12	0.15	0.18
20	0.08	0.12	0.15	0.18	0.22	0.28
30	0.10	0.15	0.20	0.25	0.30	0.38
40	0.12	0.18	0.25	0.32	0.38	0.48

Precautions:

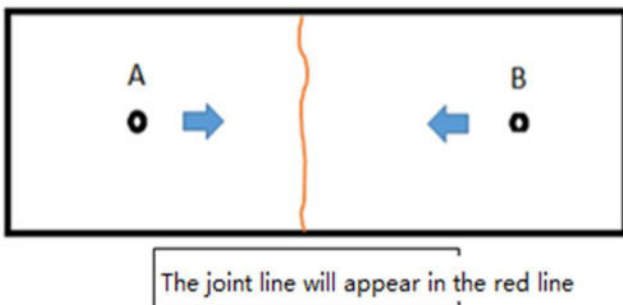
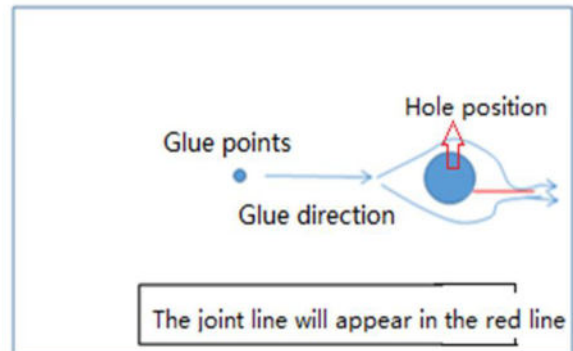
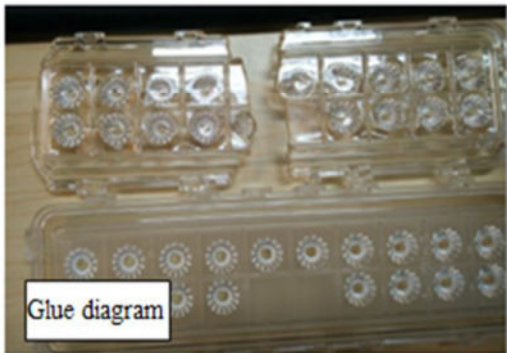
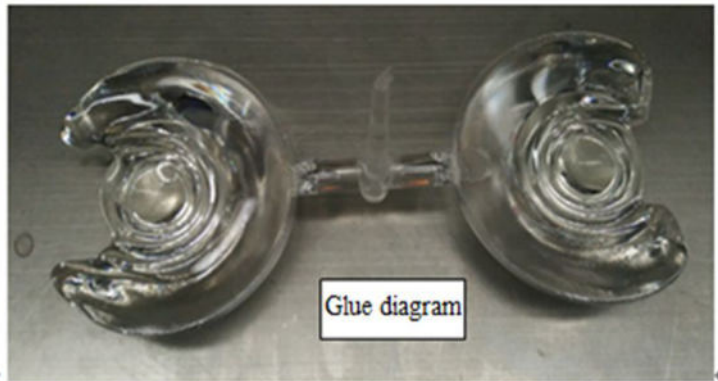
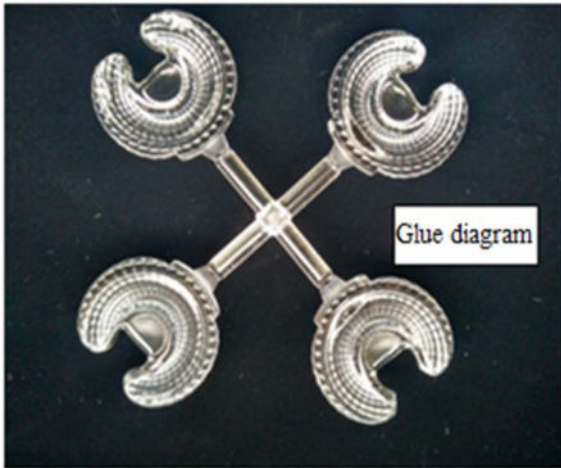
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- Take the lens try to avoid touching the total reflection surface.
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PN		HK-50@35-36-D9-2#-1g-1		Product Name		HK-5535-36 Reflective cup	
Product material		PC镀铝		Customer			
Package diagram							
Product packing		39		PCS/BAG		4	
		4		Layer/Box		624	
Packaging Materials		NO.	Material Code	Item name	Specification	Single box usage	Unit
		1	—	Plastic bags	—	16	BAG
		2	2.06.0005	Box label	6.2cm*7.6cm	1	PCS
		3	2.06.0007	Partition	39*29cm	5	PCS
		4	2.06.0008	Carton	40*30*26cm	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:

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 <sup>2</sup>	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 $L \leq 10\text{mm}$ , 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		√	