



**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-45@25-10-XHP35-20-1g-1_ASM	1. 01. 6750	XD 45@25-10 Degree lens
HK-45@25-10-XHP35-20-1g-1	1. 01. 6750_01	XD 45@25-10 degree lens_01
HK-11@11-0077-S	1. 01. 6750_02	XD 45@25-10 Degree Awl_02



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.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.

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

#### Product material:

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

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

#### product data:

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

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

#### Product changes and improvements:

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

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

#### Operation cautions:

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



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恒坤光电

# Basic product information

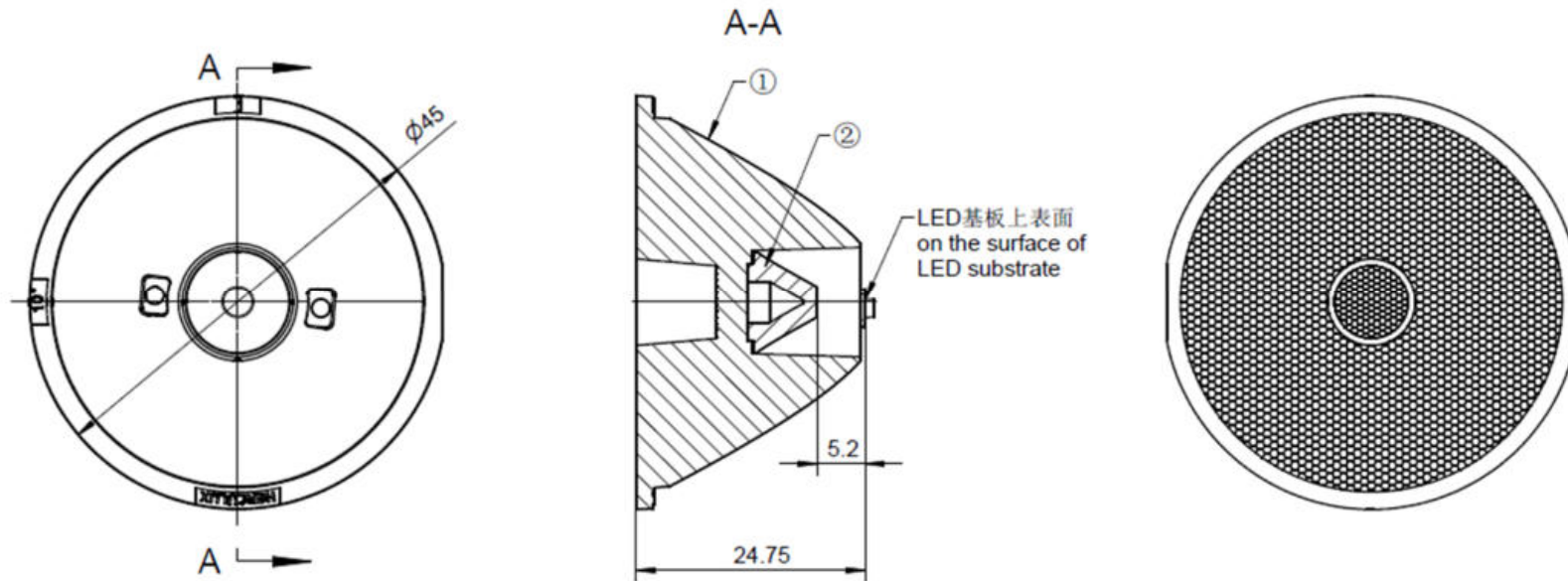
TEL: 0755-2937 1541

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

Date updated: 2023/5/6

Product Picture:	
PN:	HK-45@25-10-XHP35-20-1g-1_ASM
Size(L*W*H/Φ*H):	Φ:45mm; H:24.75mm
Material:	Assembly(PC,PC + White)
Efficiency:	\
Temperature(Topr):	Material extreme temperature resistance : -40°C to +120°C long-term use temperature : -40°C to +90°C
FWHM:	10°
Matched LES:	CREE:XHP35
Recommended power Usage:	No more than 15W

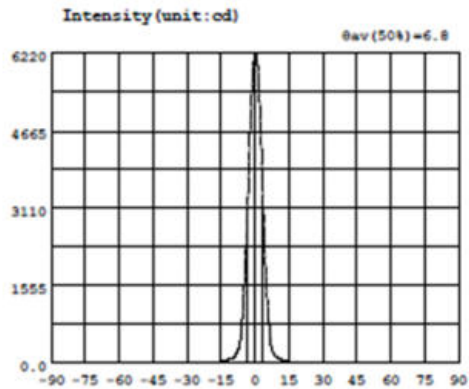
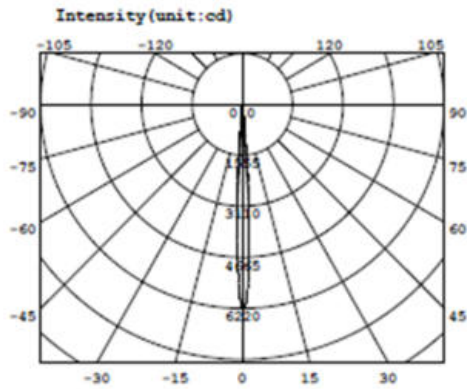


**Technical remark:**

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.

NO.	Code	Product Name	PN	Product material
①	1.01.6750_01	XD 45@25-10 degree lens_01	HK-45@25-10-XHP35-20-1g-1	PC
②	1.01.6750_02	XD 45@25-10 Degree Awl_02	HK-11@11-0077-S	PC + White
Optical design				HK-45@25-10-XHP35-20-1g-1_ASM
Structure design			XD 45@25-10 Degree lens	1.01.6750
Review				number of draw    qty    weight
Validation			Material:	CDHK

MT5 Tolerance table	Basic size	<3	3~10	10~24	24~65	65~140	140~250	250~450	>450
	tolerance val		±0.1	±0.15	±0.20	±0.35	±0.50	±0.80	±1.2



Intensity data:(deg , cd) C0-180

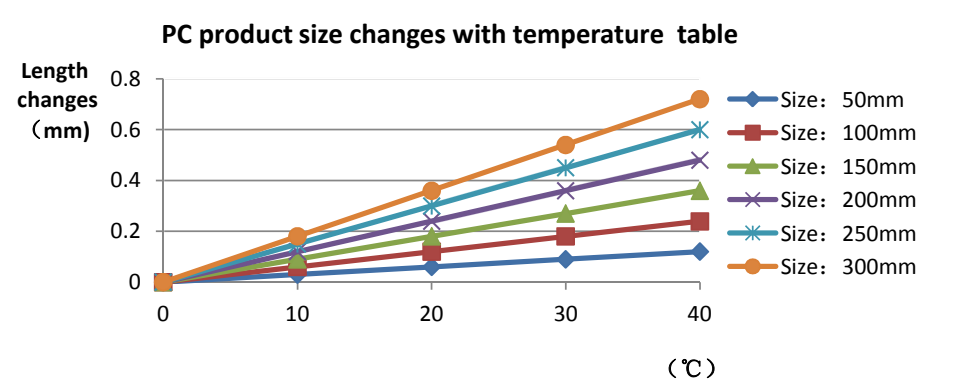
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2802	-88.5	1.180	-87.0	9.916	-85.5	2122	-84.0	36.0	-82.5	4.072
-87.0	0.3304	-85.5	1.235	-84.0	11.25	-82.5	880.8	-81.0	37.5	-79.5	3.661
-84.0	0.3544	-82.5	1.320	-81.0	13.00	-79.5	285.5	-78.0	39.0	-76.5	3.276
-81.0	0.4071	-79.5	1.434	-78.0	14.84	-76.5	142.5	-75.0	40.5	-73.5	2.906
-75.0	0.4698	-73.5	1.555	-72.0	17.07	-70.5	88.50	-70.5	42.0	-69.0	2.777
-72.0	0.5318	-70.5	1.614	-69.0	20.10	-67.5	61.65	-66.0	43.5	-64.5	2.513
-69.0	0.6115	-67.5	1.801	-66.0	24.15	-64.5	44.77	-63.0	45.0	-61.5	2.326
-66.0	0.6792	-64.5	1.975	-63.0	28.70	-61.5	34.37	-60.0	46.5	-58.5	2.215
-63.0	0.7174	-61.5	2.162	-60.0	35.23	-58.5	27.23	-57.0	48.0	-55.5	2.046
-57.0	0.7275	-55.5	2.270	-54.0	44.09	-52.5	22.52	-51.0	49.5	-49.5	1.932
-49.5	0.7732	-48.0	2.487	-46.5	57.99	-45.0	18.60	-43.5	51.0	-42.0	1.807
-42.0	0.8469	-40.5	2.699	-39.0	81.62	-37.5	15.87	-36.0	52.5	-34.5	1.739
-34.5	0.8760	-33.0	2.888	-31.5	129.7	-30.0	13.55	-28.5	54.0	-27.0	1.686
-27.0	0.9420	-25.5	3.201	-24.0	260.2	-22.5	11.80	-21.0	55.5	-19.5	1.636
-19.5	0.9736	-18.0	3.540	-16.5	655.5	-15.0	10.34	-13.5	57.0	-12.0	1.414
-12.0	1.048	-10.5	3.960	-9.0	1739	-8.0	9.084	-7.5	58.5	-6.0	1.327
-6.0		-4.5	4.596	-3.0	3427	-2.0	7.936	-1.5	60.0	0.0	1.178
0.0		-1.5	5.348	0.0	5280	0.0	6.830	1.5	61.5	3.0	1.114
3.0		0.0	6.444	1.5	6216	3.0	6.089	4.5	63.0	6.0	1.085
6.0		1.5	7.511	3.0	5747	6.0	5.201	9.0	64.5	9.0	1.006
9.0		3.0	8.708	4.5	4018	9.0	4.527	12.0	66.0	12.0	0.8646

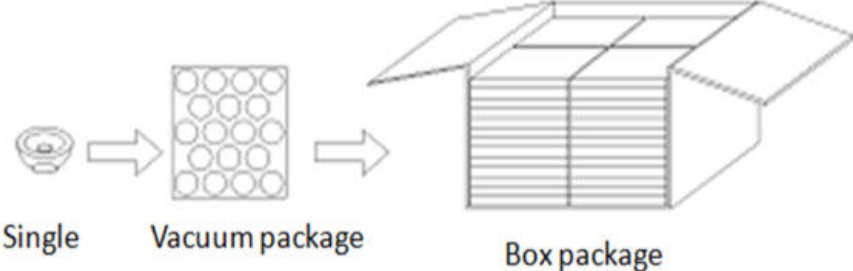
Electricity Parameter:

Current I: 0.1000A Power: 1.120W  
 Voltage V: 11.19V PF: 1.000

Optical Parameter(Distance=2.559m):

Equivalent Luminous flux:  $\Phi_{eff} = 130.5lm$  Efficiency:  $Eff=116.55lm/W$   
 Diffuse angle: @ (25%): 9.6deg @ (50%): 6.8deg @ (75%): 4.5deg @ (50%): 6.8deg  
 Diffuse angle: @ (25%): 9.6deg @ (50%): 6.8deg @ (75%): 4.5deg @ (50%): 6.8deg  
 Imax=6219cd (C=0.0deg,G=0.5deg) C0-180Plane Imax= 6219cd(G=0.5deg)  
 C0-180Plane I0= 6216cd

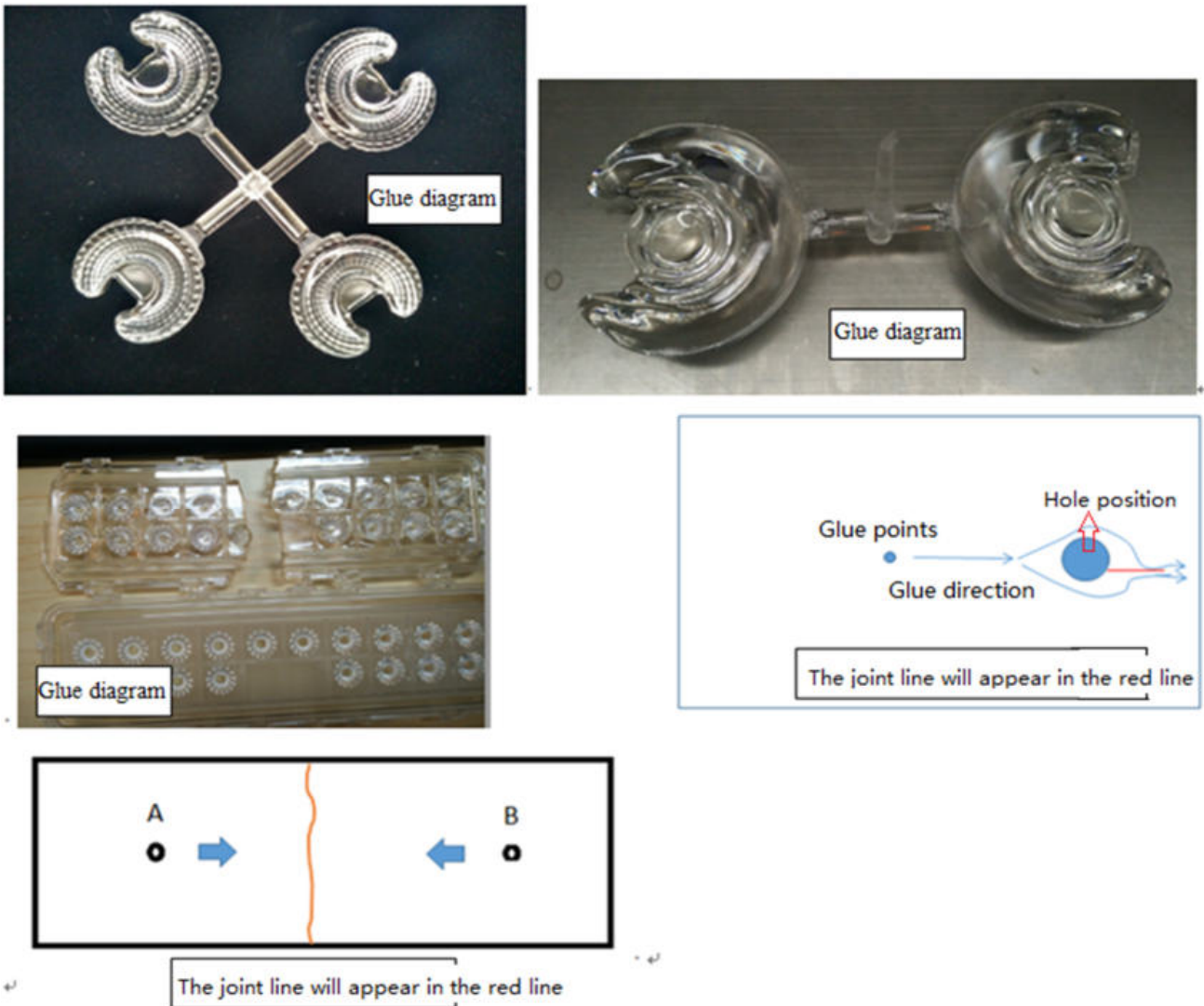
	Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																									
1.Size	diameter	45		44.87	44.88	44.85	44.87		Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																									
	height	24.75		24.85	24.84	24.85	24.85																																											
	diameter	2		2.03	1.95	2.02	1.95																																											
	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	Assembly(PC,PC + White)			Color	Transparent		OK																																											
4.Optical index	Testing LED	CREE:XHP35																																																
	The size and rated power of the light-emitting surface (LES) of the COB recommended by this lens should conform to the parameters in the product basic information table. if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.																																																	
	FWHM	See light distribution curve																																																
	angle		7°	6.9°	6.8°																																													
	K-value		44.12	45.91	47.66																																													
	Efficiency		70.05%	74.62%	72.78%																																													
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;"><b>PC product size changes with temperature table</b></p>  <table border="1"> <caption>PC 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>0.20</td> <td>0.25</td> <td>0.30</td> <td>0.35</td> <td>0.40</td> </tr> <tr> <td>40</td> <td>0.20</td> <td>0.25</td> <td>0.30</td> <td>0.35</td> <td>0.40</td> <td>0.45</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	0.20	0.25	0.30	0.35	0.40	40	0.20	0.25	0.30	0.35	0.40
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	0.20	0.25	0.30	0.35	0.40																																												
40	0.20	0.25	0.30	0.35	0.40	0.45																																												
<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-45@25-10-XHP35-20-1g-1_ASM	Product Name	XD 45@25-10 Degree lens			
Product material		Assembly(PC,PC + White)					
Package diagram							
Product packing		23	A/ Box	4	pcs/Layer		
		11	Layer/Box	792	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0066	Blister box	23cm*21cm	44	BAG	
	2	2.08.0001	PE film	30cm*30cm	44	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	44	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	12	PCS	
	6	2.06.0015	big flat carton	48cm*44cm*19cm	1	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail						

## Special notice

When 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 <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 $100 \times 100\text{mm}$ 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		√	



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**Product Approval**

Approval number :

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Customer :

Product : HK 45@24-15 degree D6 lens -a

Material Code : 1.01.91864

PN : HK-45@24-15-D6-21-1g-1-A

Synthetic information:1.07.81402\_HK-257@02-0221-S

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"/>			
Audit		DATE		Audit		DATE	
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( Confirmation of acceptance by both parties must be signed and sealed )

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# Product Approval

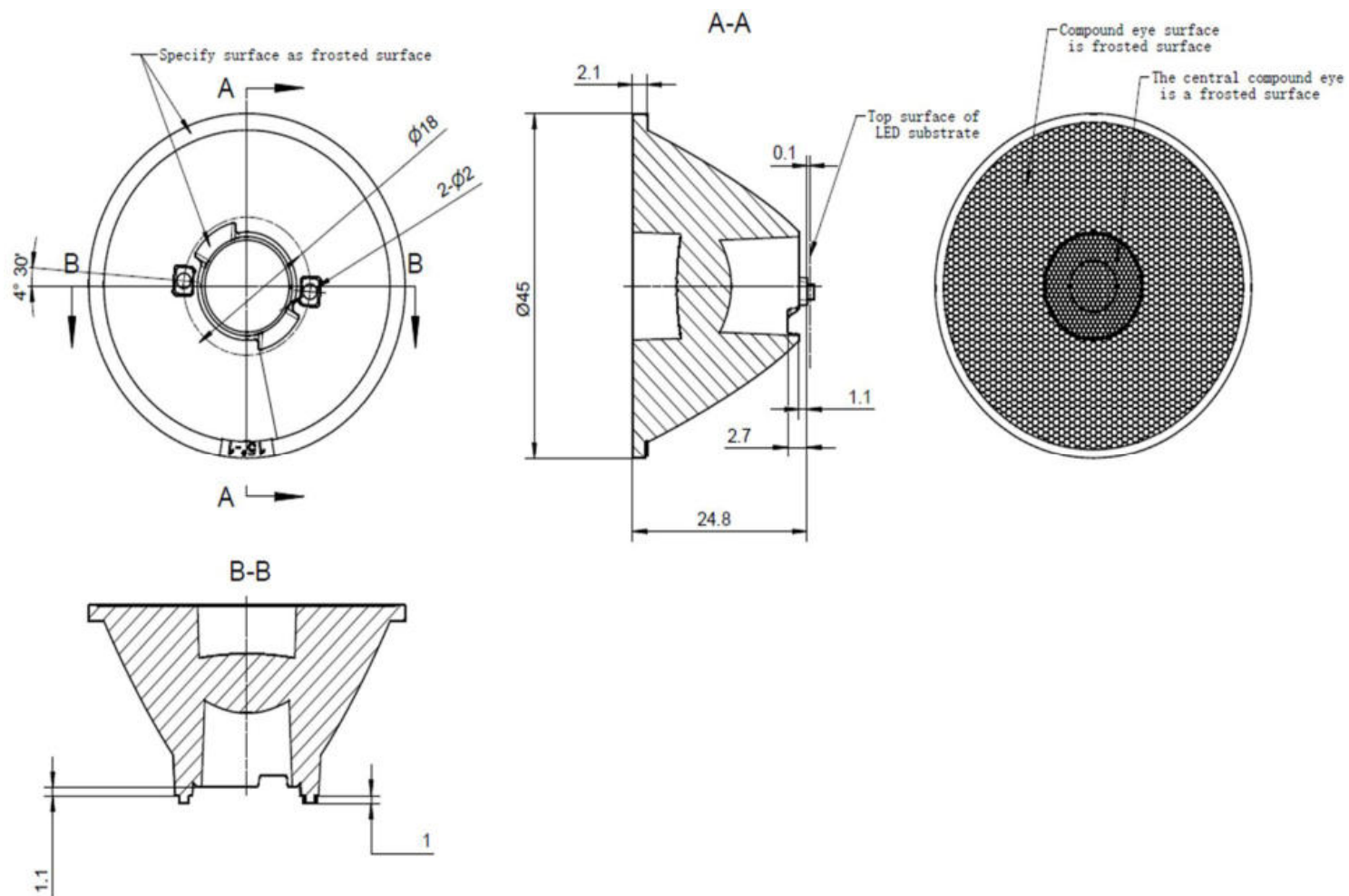
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Date updated: 2020/7/7

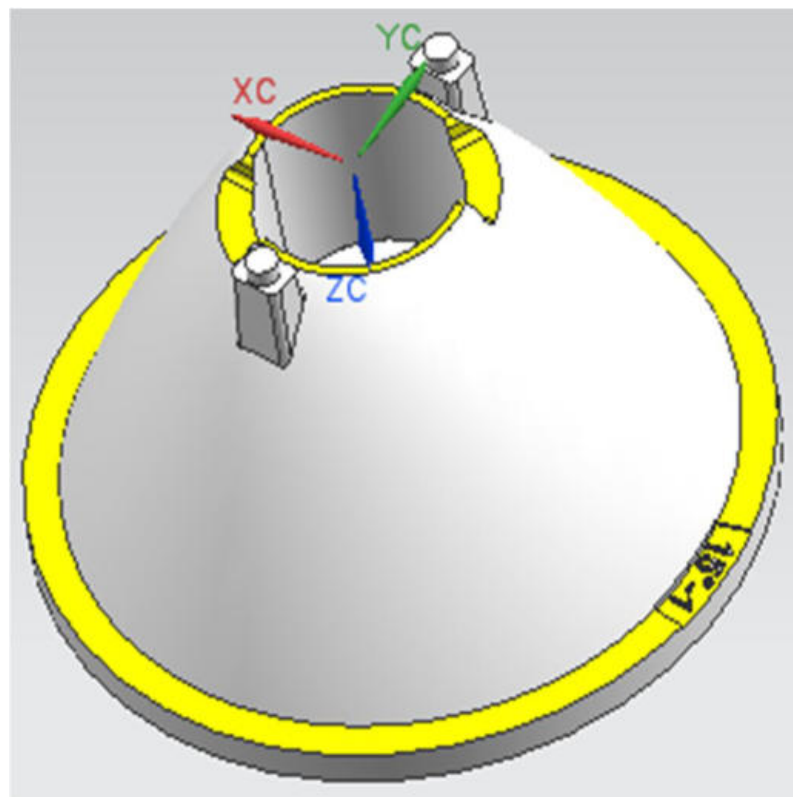
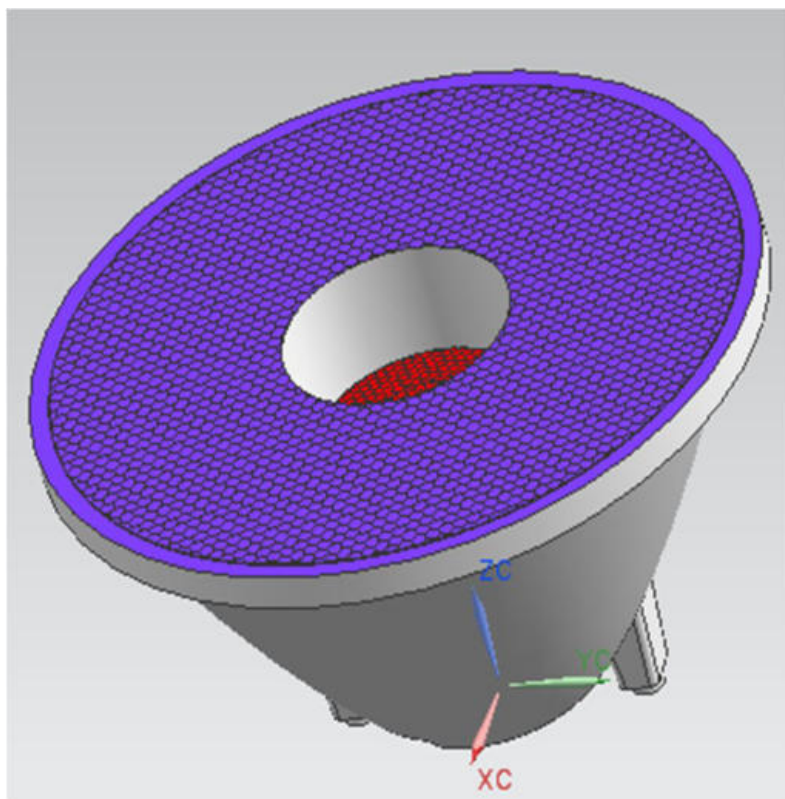
Product Picture:	
PN:	HK-45@24-15-D6-21-1g-1-A
Size(L*W*H/Φ*H):	Φ:45mm; H:24mm
Material:	PC
Efficiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	15°
Matched LES:	D6

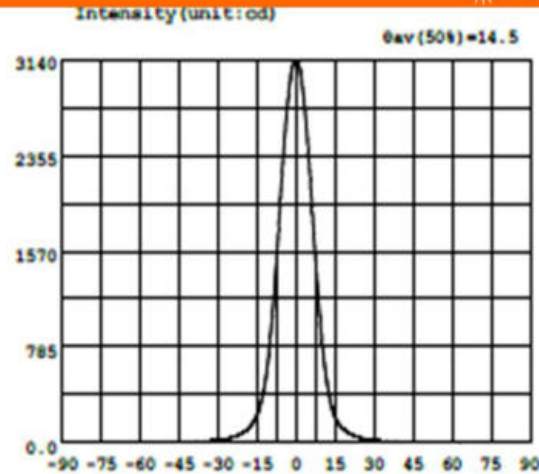
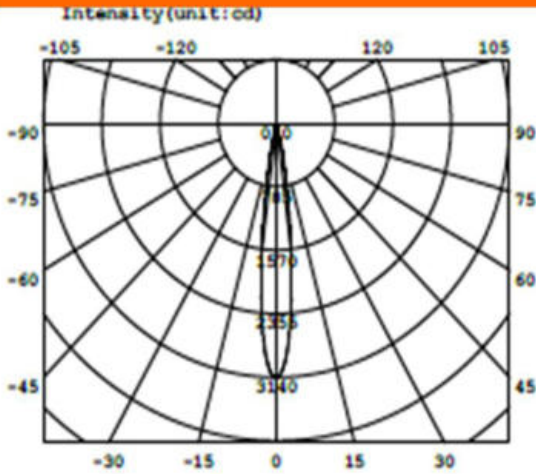


Technical Requirement:

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-45@24-15-D6-21-1g-1-A	1.01.91864
Structure Design		HK 45@24-15 degree D6 lens -a	Pages	Qty
Assess			2	
Authorized		Material:PC		CDHK





Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2486	-58.5	3.601	-27.0	32.00	4.5	2424	36.0	14.99	67.5	2.124
-88.5	0.2488	-57.0	3.941	-25.5	39.12	6.0	1960	37.5	13.87	69.0	1.963
-87.0	0.3169	-55.5	4.341	-24.0	48.23	7.5	1479	39.0	12.84	70.5	1.787
-85.5	0.4191	-54.0	4.853	-22.5	60.13	9.0	1051	40.5	11.91	72.0	1.646
-84.0	0.5320	-52.5	5.405	-21.0	75.47	10.5	713.5	42.0	11.02	73.5	1.518
-82.5	0.6675	-51.0	6.043	-19.5	96.24	12.0	474.1	43.5	10.09	75.0	1.395
-81.0	0.7821	-49.5	6.797	-18.0	126.0	13.5	299.9	45.0	9.178	76.5	1.295
-79.5	0.9300	-48.0	7.590	-16.5	169.9	15.0	207.6	46.5	8.280	78.0	1.193
-78.0	1.076	-46.5	8.456	-15.0	234.6	16.5	150.0	48.0	7.431	79.5	1.089
-76.5	1.210	-45.0	9.347	-13.5	335.0	18.0	113.5	49.5	6.619	81.0	0.9878
-75.0	1.326	-43.5	10.31	-12.0	497.1	19.5	88.47	51.0	5.873	82.5	0.8941
-73.5	1.463	-42.0	11.26	-10.5	747.1	21.0	70.53	52.5	5.255	84.0	0.8164
-72.0	1.633	-40.5	12.20	-9.0	1096	22.5	56.68	54.0	4.690	85.5	0.7484
-70.5	1.824	-39.0	13.15	-7.5	1537	24.0	45.92	55.5	4.155	87.0	0.7043
-69.0	2.004	-37.5	14.15	-6.0	2024	25.5	37.32	57.0	3.761	88.5	0.7082
-67.5	2.199	-36.0	15.29	-4.5	2492	27.0	30.71	58.5	3.426	90.0	0.7231
-66.0	2.383	-34.5	16.65	-3.0	2857	28.5	25.84	60.0	3.149		
-64.5	2.598	-33.0	18.21	-1.5	3077	30.0	22.40	61.5	2.911		
-63.0	2.822	-31.5	20.22	0.0	3139	31.5	19.83	63.0	2.684		
-61.5	3.060	-30.0	22.89	1.5	3047	33.0	17.91	64.5	2.500		
-60.0	3.322	-28.5	26.69	3.0	2802	34.5	16.34	66.0	2.308		

Electricity Parameter:

Current I: 0.1000A Power: 3.549W  
 Voltage V: 35.50V PF: 1.000

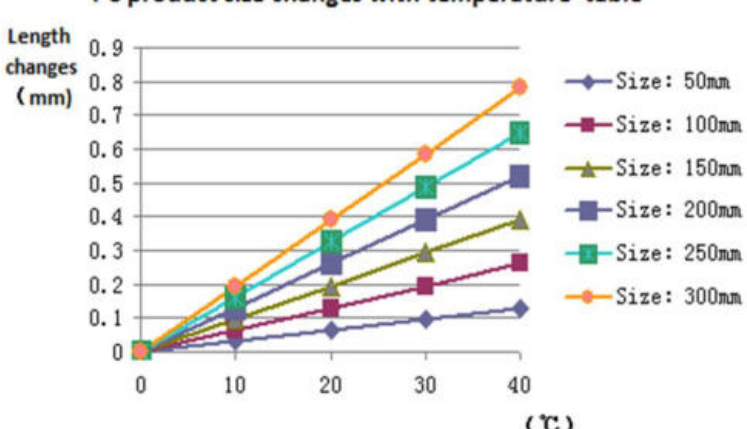
Optical Parameter(Distance=2.410m):

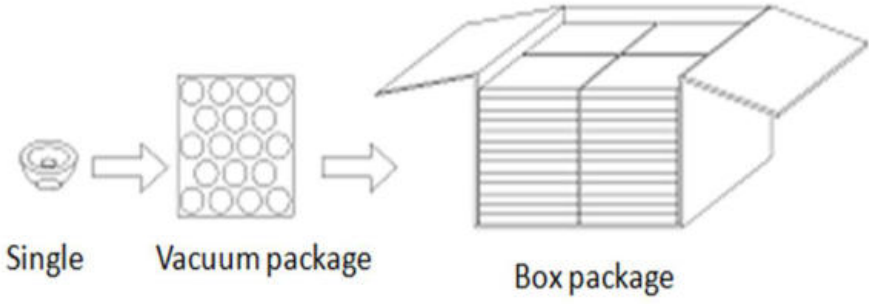
Equivalent Luminous flux:  $\Phi_{eff} = 288.91lm$  Efficiency:  $Eff=81.41lm/W$   
 Diffuse angle: @ (25%): 20.4deg @ (50%): 14.5deg @ (75%): 9.6deg @ (50%): 14.5deg  
 Diffuse angle: @ (25%): 20.4deg @ (50%): 14.5deg @ (75%): 9.6deg @ (50%): 14.5deg  
 $I_{max}=3139cd$  (C=0.0deg,G=0.0deg) C0-180Plane  $I_{max}= 3139cd$ (G=0.0deg)  
 C0-180Plane  $I_0= 3139cd$

Lamp Type:LY-10  
 Tester:Lee  
 Temperature:25.3deg  
 Manufacturer:EVERFINE

Luminaires Type:  
 Test Date:2019-08-27  
 Humidity:65%  
 Remarks:

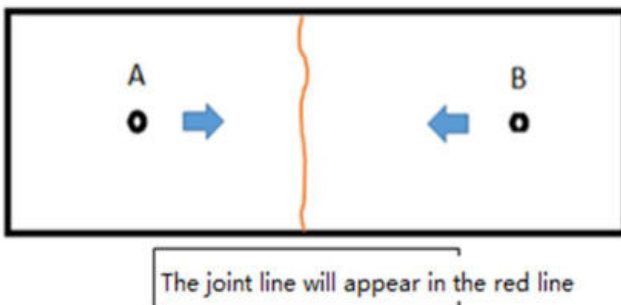
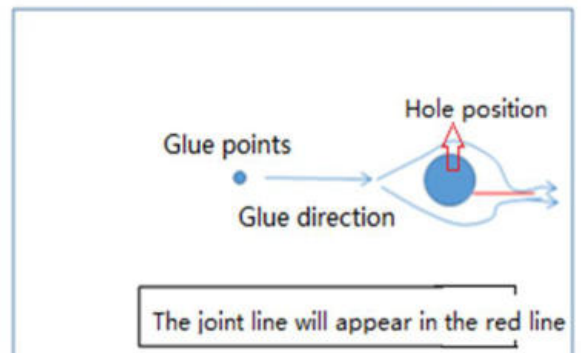
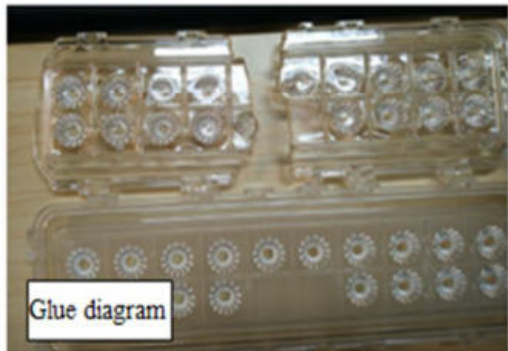
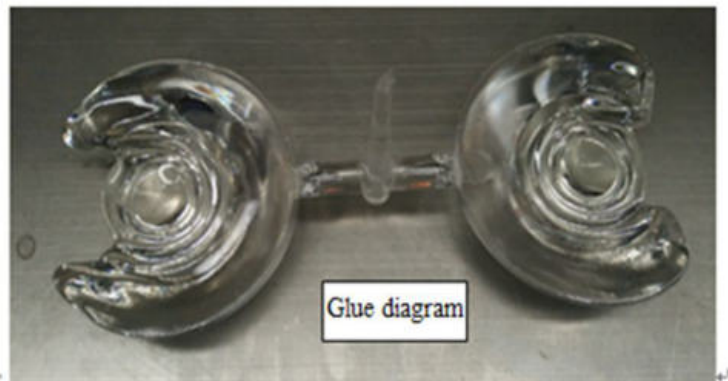


		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
1.Size	highly	24.8			24.76	24.8	24.77	24.79	OK	Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																										
	The diameter of	45			44.98	45.01	44.93	45	OK																																											
	Locating column diameter	2			1.93	1.9	1.91	1.9	OK																																											
	Positioning column spacing	18			18.03	18.04	18.03	17.89	OK																																											
	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	D6																																																		
	FWHM	See light distribution curve																																																		
	Angle				10.45	10.38	10.41	10.25	OK																																											
	Efficiency				14.4	14.5	14.5	14.7	OK																																											
	K				83.50%	85.30%	84.40%	84.70%	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 style="text-align: center;"><b>PC product size changes with temperature table</b></p>  <table border="1"> <caption>Data for PC 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>0.02</td> <td>0.05</td> <td>0.08</td> <td>0.12</td> <td>0.18</td> <td>0.25</td> </tr> <tr> <td>20</td> <td>0.04</td> <td>0.10</td> <td>0.15</td> <td>0.22</td> <td>0.32</td> <td>0.45</td> </tr> <tr> <td>30</td> <td>0.06</td> <td>0.15</td> <td>0.22</td> <td>0.32</td> <td>0.48</td> <td>0.65</td> </tr> <tr> <td>40</td> <td>0.08</td> <td>0.20</td> <td>0.30</td> <td>0.42</td> <td>0.60</td> <td>0.80</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	0.02	0.05	0.08	0.12	0.18	0.25	20	0.04	0.10	0.15	0.22	0.32	0.45	30	0.06	0.15	0.22	0.32	0.48	0.65	40	0.08	0.20	0.30	0.42	0.60	0.80
Temperature (°C)	Size: 50mm	Size: 100mm	Size: 150mm	Size: 200mm	Size: 250mm	Size: 300mm																																														
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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>																																																			

PN		HK-45@24-15-D6-21-1g-1-A		Product Name		HK 45@24-15 degree D6 lens -a	
Product material		PC		Customer			
Package diagram		 <p style="text-align: center;">Single      Vacuum package      Box package</p>					
Product packing		18	A/box	4	Box/layer		
		11	Layer/the box	792	A/the box		
Packaging Materials	NO.	Material Code	Item name	Specification	Single box usage	Unit	Remarks
	1	2. 07. 0066	Blister box	23cm*21cm	44	PCS	
	2	2. 08. 0001	PE film	25cm*27cm	44	block	
	3	2. 06. 0005	Box label paper	62mm*42mm	44	zhang	
	4	2. 06. 0005	Box label paper	62mm*70mm	1	zhang	
	4	2. 06. 0003	The big plate	46cm*42cm	12	PCS	
	4	2. 06. 0011	The big carton	48cm*44cm*37cm	1	PCS	
Remarks	Scattered packaging is not restricted by this specification, the customer has the requirements of the customer 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:



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 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 things, impurities	The product may not be attached to foreign objects, including oil, fiber, dregs of water gap and so on				√
Deformation	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces.	Visual, feeler			√
Poor ejection	Products may not appear bad ejection, including no convex top, thimble printed on the assembly surface shall not be higher than the product surface, non-assembled surface thimble height should not exceed the product size tolerances; thimble printing should be less than the product surface and no more than 0.3; thimble surface treatment should be consistent with the product side.	Visual, point card		√	
	Ejection strain: the optical surface and the appearance of the exposed surface after assembly are not allowed to have a strain, and the structural surface does not allow visual obvious strain.				
Insufficient filling	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces , The signature sample shall prevail.	Visual, point card		√	
Shrink	When the entire surface of the product shrinks, the optical properties and dimensions must meet the requirements, and the visual will not significantly affect the appearance.Part shrink reference point defects	Visual, point card		√	
Flow marks, Welding line	1 : Product does not allow the presence of flow marks and welding lines unless the structure can not be avoided;	Visual		√	
	2: The remaining flow marks shall not appear in the optical surface, a single L ≤ 10mm, no more than two				
Bubble	No bubbles are allowed	Visual		√	
Foreign objects, black spots, white spots	Not obvious or D ≤ 0.3mm black spots and foreign bodies in the area of 100x100mm not more than 1; Exceeded foreign matter black spots is judged bad.	Visual, point card	√		
Damaged	No damage is allowed	Visual			√
Cold glue	Optical surface may not have cold glue, non-optical surface cold glue should meet the visual is not obvious.	Visual	√		
Bad incision	1: Do not affect the product size, shall not penetrate the optical surface, the cut should be smooth;	Visual			√
	2: Laser cutting products, the optical surface burns shall not occur after the processing is completed. Beading must not affect product installation				
	3: Three molds and hot runner gate shall not appear residue.				
Scrub	Scrub surface should be uniform, off the scrub phenomenon should not be obvious , A single off scrub imprint requires D ≤ 1 mm and no more than 1 area within a 50x50 mm area	Visual		√	



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

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

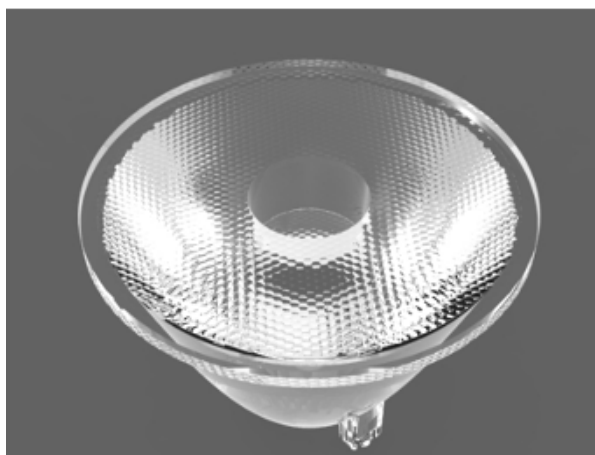
Customer :

Product : XD 45@24-24°Lens

Material Code : 1.01.6575

PN : HK-45@24-24-D6-20-1g-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

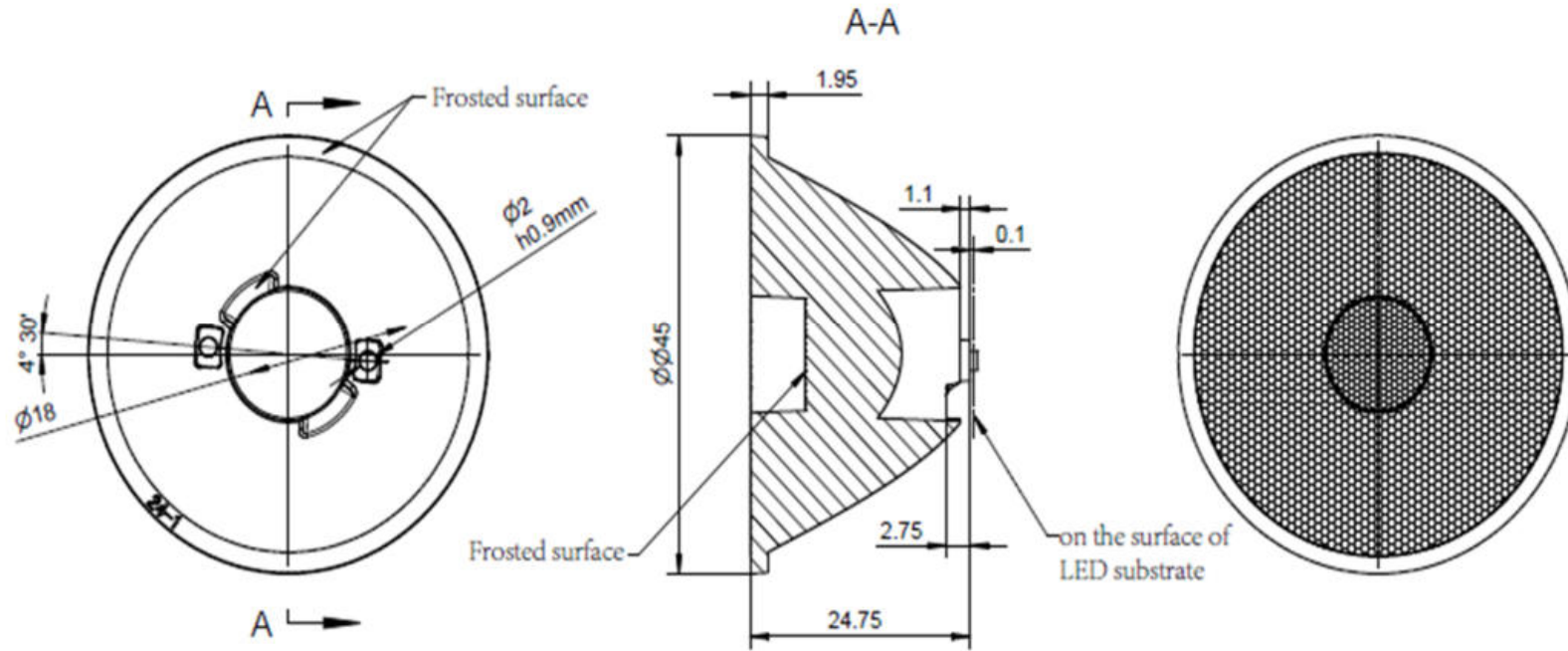
TEL: 0755-2937 1541

FAX: 0755-2907 5140

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

Date updated: 2021/4/27

Product Picture:	
PN:	HK-45@24-24-D6-20-1g-1
Size(L*W*H/Φ*H):	Φ:45mm; H:24.75mm
1.07.81418_HK-166@03-0223-S	PC
Efficiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	24°
Matched LES:	Gen. 7 V4 HD

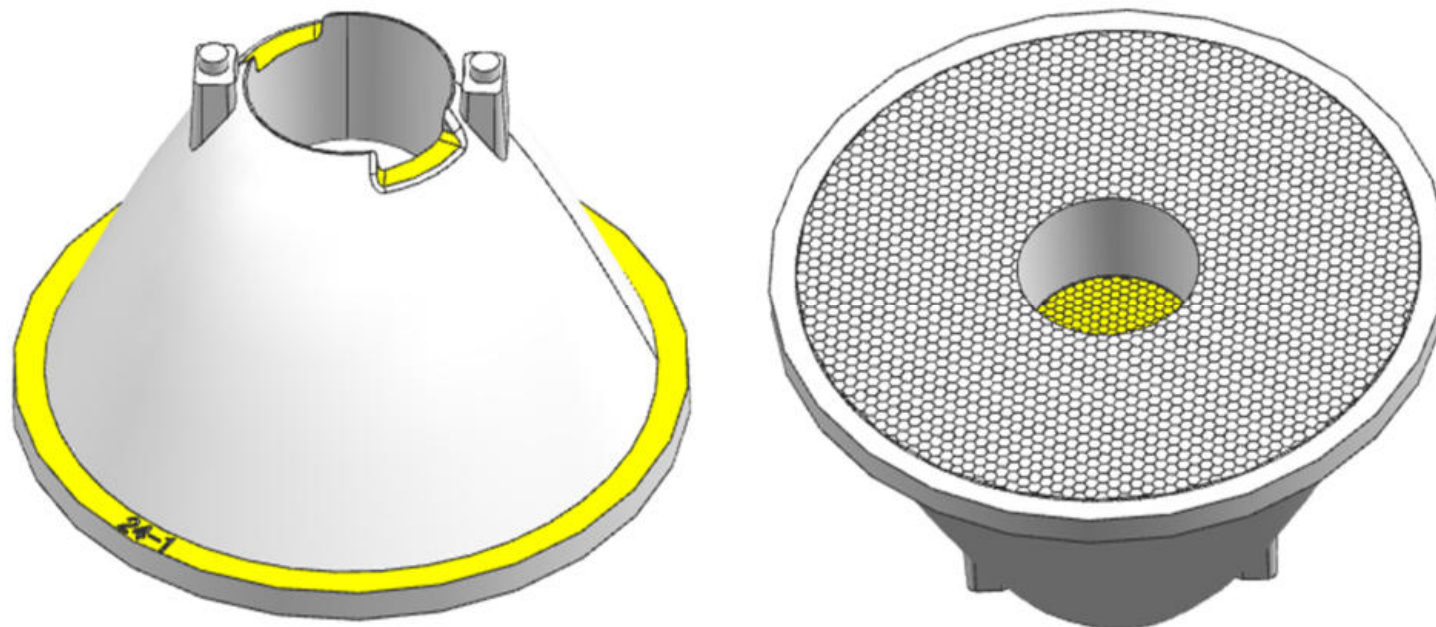


Technical Requirement:

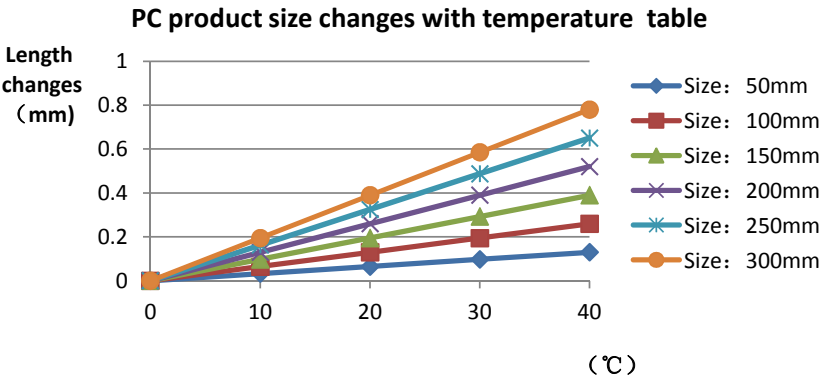
1. The surface don't have any defects of flash, shrink and bubble.
2. The uncharted fillet and pattern draft subject to the 3D drawing.
3. The uncharted dimensional tolerance subject to the 3D drawing.

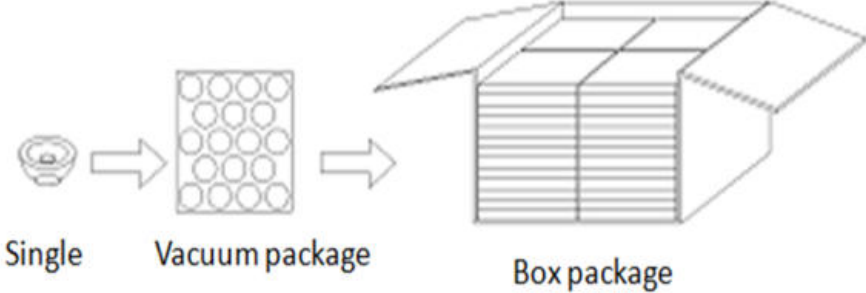
Optical Design			XD 45@24-24° Lens	HK-45@24-24-D6-20-1g-1		1.01.6575
Structure Design				Pages	Qty	Weight
Assess				2		
Authorized			Material:	PC	CDHK	







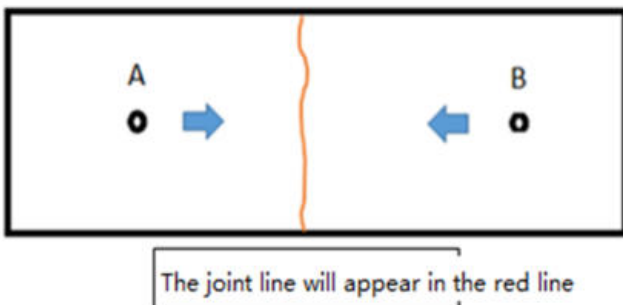
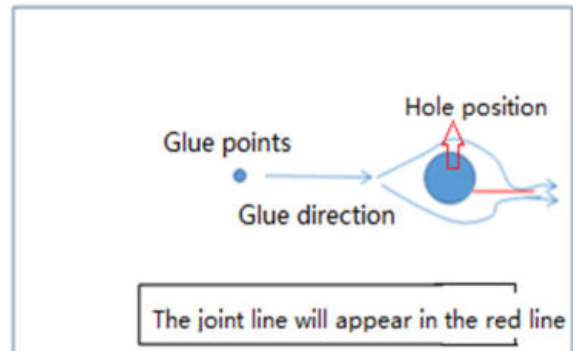
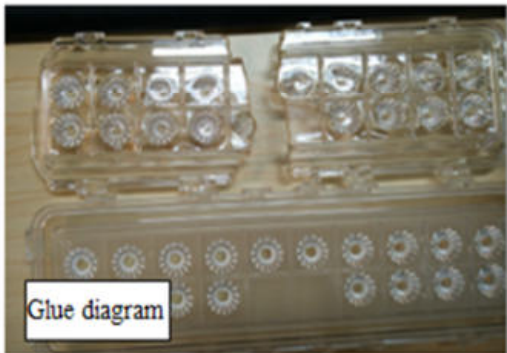
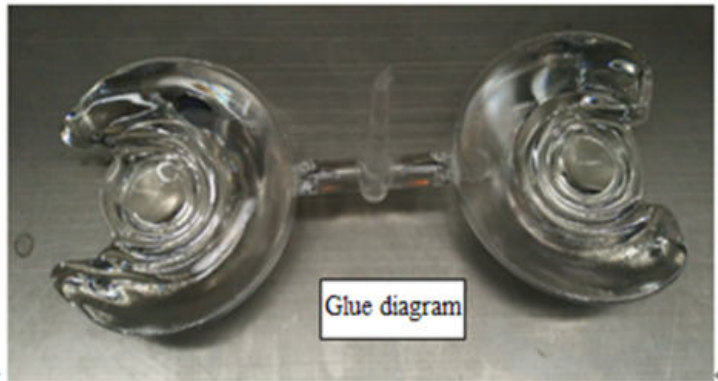
		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
1.Size	diameter	45	45.15	44.85	44.96	44.99	45.05	45.1	OK	Test environment: In 20℃ -25℃ environment to achieve thermal equilibrium after the test.																																										
	height	24.75	24.95	24.55	24.9	24.89	24.85	24.9	OK																																											
	Location column	18	18.1	17.9	18.05	18	18.05	18.04	OK																																											
	Registration mast	2	2.05	1.85	1.9	1.92	1.92	1.9	OK																																											
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	FWHM	See light distribution curve																																																		
	angle					17.4	16.7	16.3	16.8	OK																																										
	K-value					7.68	8.63	7.78	8.44	OK																																										
	Efficiency					74.28%	74.03%	85.41%	75.34%	OK																																										
Facula	See the signature sample																																																			
Comprehensive judgment	Qualified																																																			
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PN	HK-45@24-24-D6-20-1g-1		Product Name	XD 45@24-24°Lens			
Product material	PC		Customer				
Package diagram	 <p>Single → Vacuum package → Box package</p>						
Product packing	18	A/ Box	4	Box/Layer			
	11	Layer/Box	792	A/ Carton			
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0062	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	1	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	2.06.0001	big carton	46.8cm*42.8cm*36cm	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 : \_\_\_\_\_

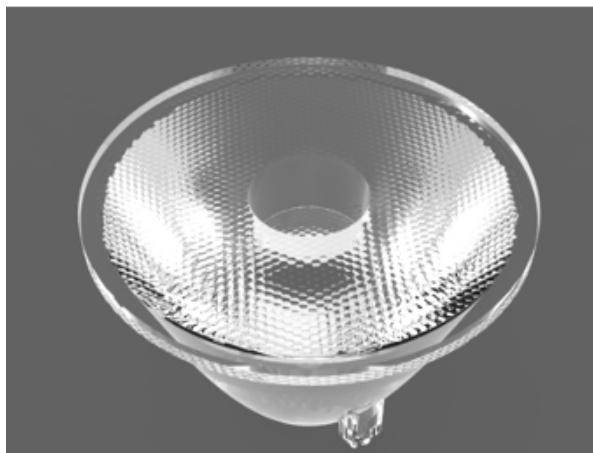
Customer :

Product : XD 45@24-34°Lens

Material Code : 1.01.6576

PN : HK-45@24-34-D6-20-1g-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

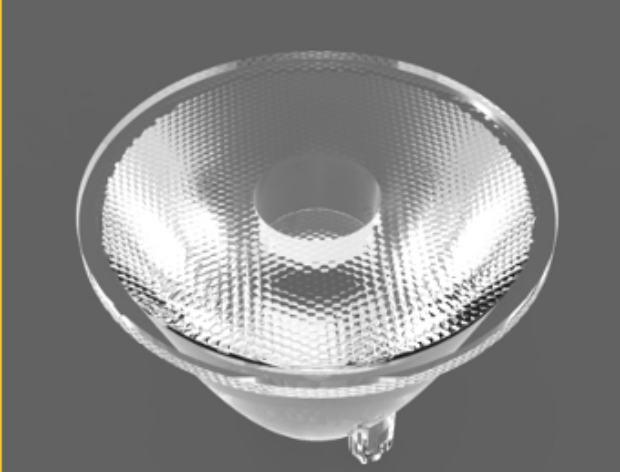
# Product Approval

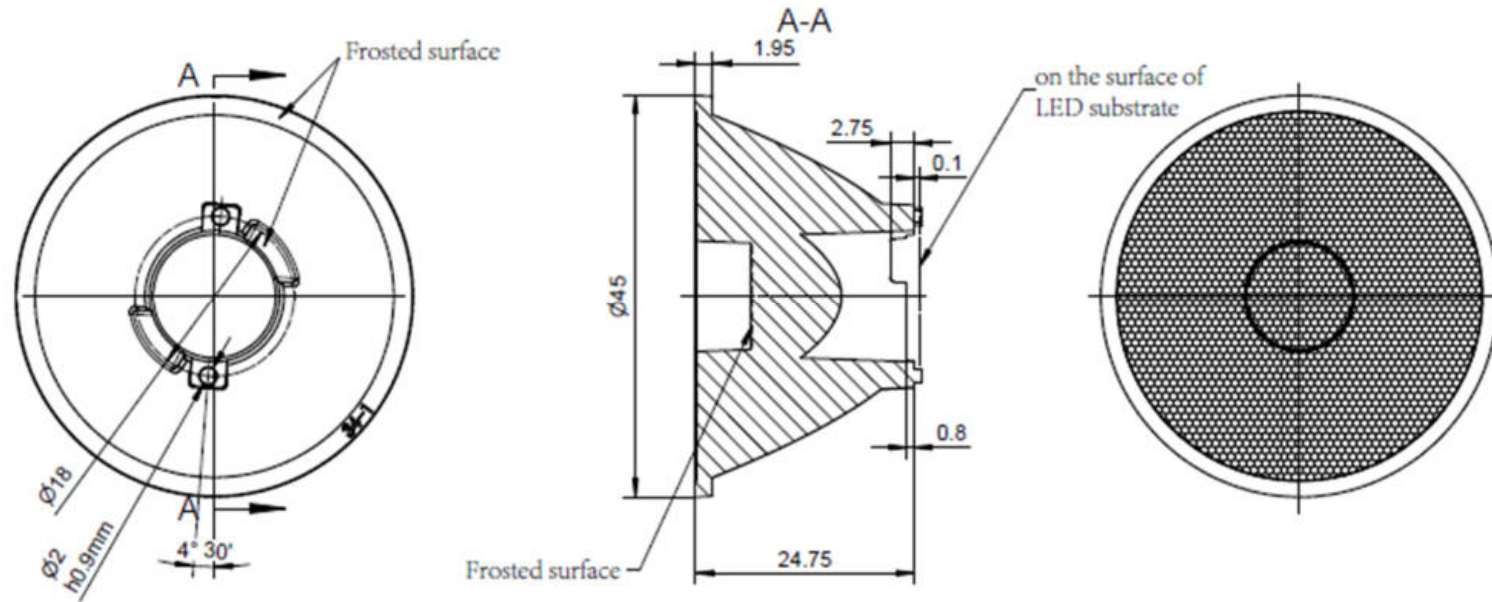
TEL: 0755-2937 1541

FAX: 0755-2907 5140

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

Date updated: 2021/10/8

Product Picture:	
PN:	HK-45@24-34-D6-20-1g-1
Size(L*W*H/Φ*H):	Φ:45mm; H:24.75mm
1.07.81418_HK-166@03-0223-S	PC
Efficiency:	\
Temperature(Topr):	Material extreme temperature resistance : -40°C to +120°C long-term use temperature : -40°C to +90°C
FWHM:	34°
Matched LES:	Gen. 7 V4 HD

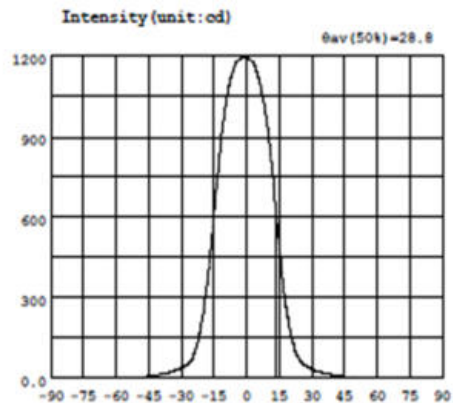
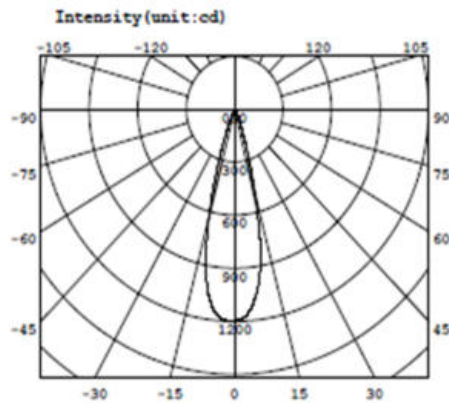


**Technical remark:**

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

Optical design			XD 45@24-34°Lens	HK-45@24-34-D6-20-1g-1		
Structure design				1.01.6576		
Review				number of drawing	qty	weight
Validation				CDHK		
			Material:	PC		

MT5 Tolerance table	Basic size	<3	3~10	10~24	24~65	65~140	140~250	250~450	>450	
	tolerance val	±0.1	±0.15	±0.2	±0.35	±0.50	±0.80	±1.2	±2.0	



Intensity data: (deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2486	-88.5	1.867	-27.0	52.02	4.5	1147	26.0	17.72	67.5	0.9295
-88.5	0.2273	-87.0	2.105	-25.5	68.00	6.0	1104	27.5	14.91	69.0	0.7629
-87.0	0.2273	-85.5	2.392	-24.0	92.81	7.5	1048	29.0	12.46	70.5	0.6506
-85.5	0.2599	-84.0	2.728	-22.5	125.5	9.0	972.2	40.5	10.47	72.0	0.5805
-84.0	0.2609	-82.5	3.202	-21.0	192.2	10.5	872.4	42.0	8.792	72.5	0.5125
-82.5	0.2946	-81.0	3.720	-19.5	268.4	12.0	752.0	43.5	7.406	75.0	0.4558
-81.0	0.3290	-79.5	4.324	-18.0	366.8	13.5	619.2	45.0	6.252	76.5	0.3973
-79.5	0.3407	-78.0	5.062	-16.5	484.1	15.0	491.9	46.5	5.269	78.0	0.3764
-78.0	0.3749	-76.5	5.927	-15.0	612.7	16.5	373.8	48.0	4.602	79.5	0.3232
-76.5	0.4406	-75.0	6.982	-13.5	744.8	18.0	272.0	49.5	3.944	81.0	0.3067
-75.0	0.4884	-73.5	8.215	-12.0	867.8	19.5	195.7	51.0	3.297	82.5	0.2742
-73.5	0.5555	-72.0	9.942	-10.5	970.6	21.0	128.6	52.5	2.885	84.0	0.2515
-72.0	0.6142	-70.5	11.98	-9.0	1052	22.5	98.81	54.0	2.499	85.5	0.2400
-70.5	0.7275	-69.0	14.50	-7.5	1114	24.0	72.62	55.5	2.192	87.0	0.2285
-69.0	0.8997	-67.5	17.27	-6.0	1154	25.5	58.28	57.0	1.941	88.5	0.2285
-67.5	1.078	-66.0	20.60	-4.5	1180	27.0	48.21	58.5	1.721	90.0	0.2271
-66.0	1.202	-64.5	24.17	-3.0	1191	28.5	40.71	60.0	1.572		
-64.5	1.314	-63.0	28.04	-1.5	1194	30.0	34.50	61.5	1.427		
-63.0	1.405	-61.5	32.57	0.0	1193	31.5	29.19	63.0	1.292		
-61.5	1.521	-60.0	37.81	1.5	1189	32.0	24.77	64.5	1.239		
-60.0	1.671	-28.5	44.07	3.0	1175	34.5	21.01	66.0	1.117		

**Electricity Parameter:**

Current I: 0.1000A      Power: 3.240W  
Voltage V: 32.40V      PF: 1.000

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

Equivalent Luminous flux:  $\eta_{eff} = 312.7lm$       Efficiency:  $Eff=96.51lm/W$   
Diffuse angle:      @ (25%): 36.5deg @ (50%): 28.8deg @ (75%): 21.7deg @ (50%): 28.8deg  
Diffuse angle:      @ (25%): 36.5deg @ (50%): 28.8deg @ (75%): 21.7deg @ (50%): 28.8deg  
I<sub>max</sub>=1194cd (C=0.0deg, G=-1.5deg)      C0-180Plane I<sub>max</sub>= 1194cd (G=-1.5deg)  
C0-180Plane I<sub>0</sub>= 1193cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	45	45.15	44.85	44.95	44.97	44.9	44.94	OK	Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.
	height	24.75	24.95	24.55	24.85	24.88	24.87	24.85	OK	
	Location column	18	18.1	17.9	18.05	18.04	18.05	18.04	OK	
	Registration mast	2	2.05	1.85	1.97	2.01	1.97	1.99	OK	
Gate shear can not affect the appearance of the lamp										
See attachment "Appearance Inspection Standards"										

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

3.Material	PC	Color	Transparent	OK
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4.Optical index	Testing LED	Gen. 7 V4 HD					
	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		30.1	29.8	29.6	29.3	OK
	K-value		3.82	3.77	3.80	3.77	OK
	Efficiency		76.55%	72.34%	76.70%	73.71%	OK
Facula	See the signature sample						

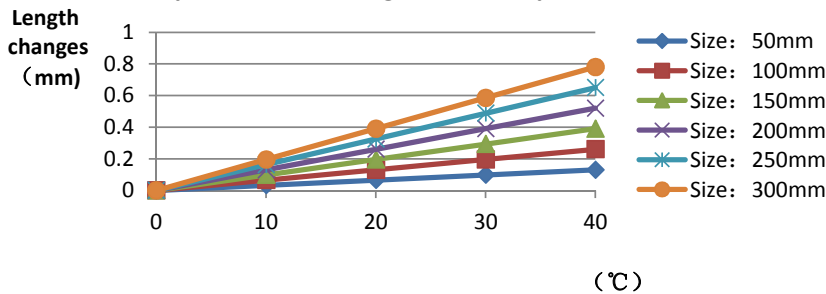
Comprehensive judgment	Qualified
------------------------	-----------

Remarks:

1、Tool Number: V-Vernier Caliper 2D-Quadratic H-Height Gauge M-Tool Microscope P-Needle T-Thick Gauge R-Radius Gauge E-Visual.

2、Ambient temperature on the size of the product refer to the table on the right

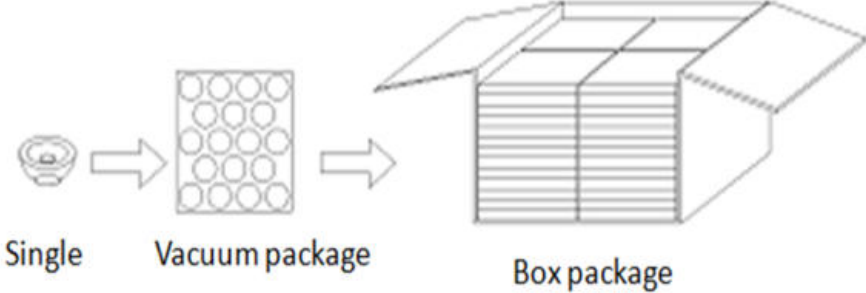
**PC product size changes with temperature table**



Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.05	0.10	0.15	0.20	0.25	0.30
20	0.10	0.20	0.30	0.40	0.50	0.60
30	0.15	0.30	0.45	0.60	0.75	0.90
40	0.20	0.40	0.60	0.80	1.00	1.20

Precautions:

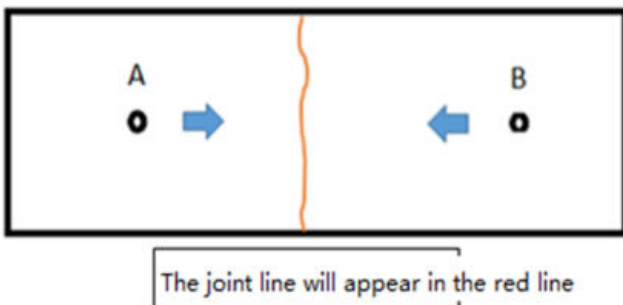
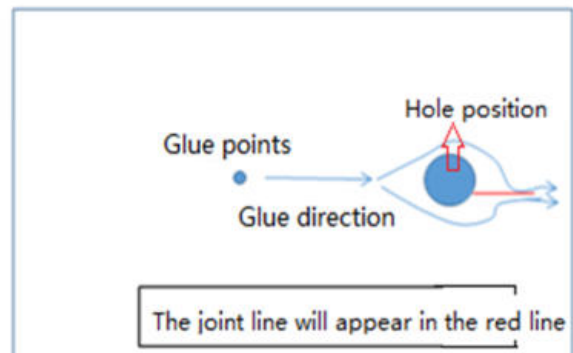
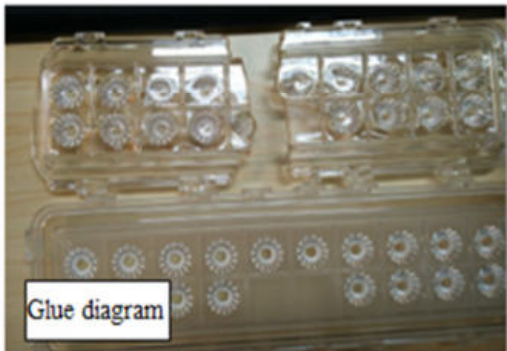
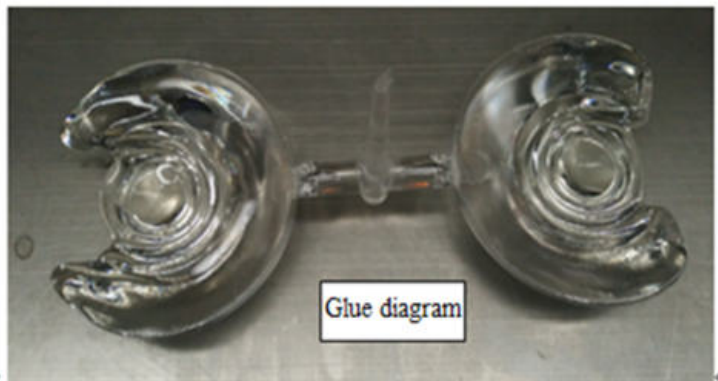
- Please wear clean gloves during the lens assembly process to prevent the lens surface from being contaminated.
- Try to avoid touching the total reflection surface when taking the lens.
- The lens surface is contaminated. Only use a soft cotton cloth dipped in analytically pure neutral solvent to wipe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

PN	HK-45@24-34-D6-20-1g-1		Product Name	XD 45@24-34°Lens			
Product material	PC		Customer				
Package diagram	 <p>Single → Vacuum package → Box package</p>						
Product packing	18	A/ Box	4	Box/Layer			
	11	Layer/Box	792	A/ Carton			
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0066	Blister box	23cm*21cm	44	BAG	
	2	2.08.0001	PE film	30cm*30cm	44	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	44	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	12	PCS	
	6	2.06.0001	big carton	46.8cm*42.8cm*36cm	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 : XD 45@24-60°D6 Lens

Material Code : 1.01.71228

PN : HK-45@24-60-D6-20-1g-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

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\*Approval In duplicate , for both supplier and customer.

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**HERCULUX**  
恒坤光电

# Product Approval

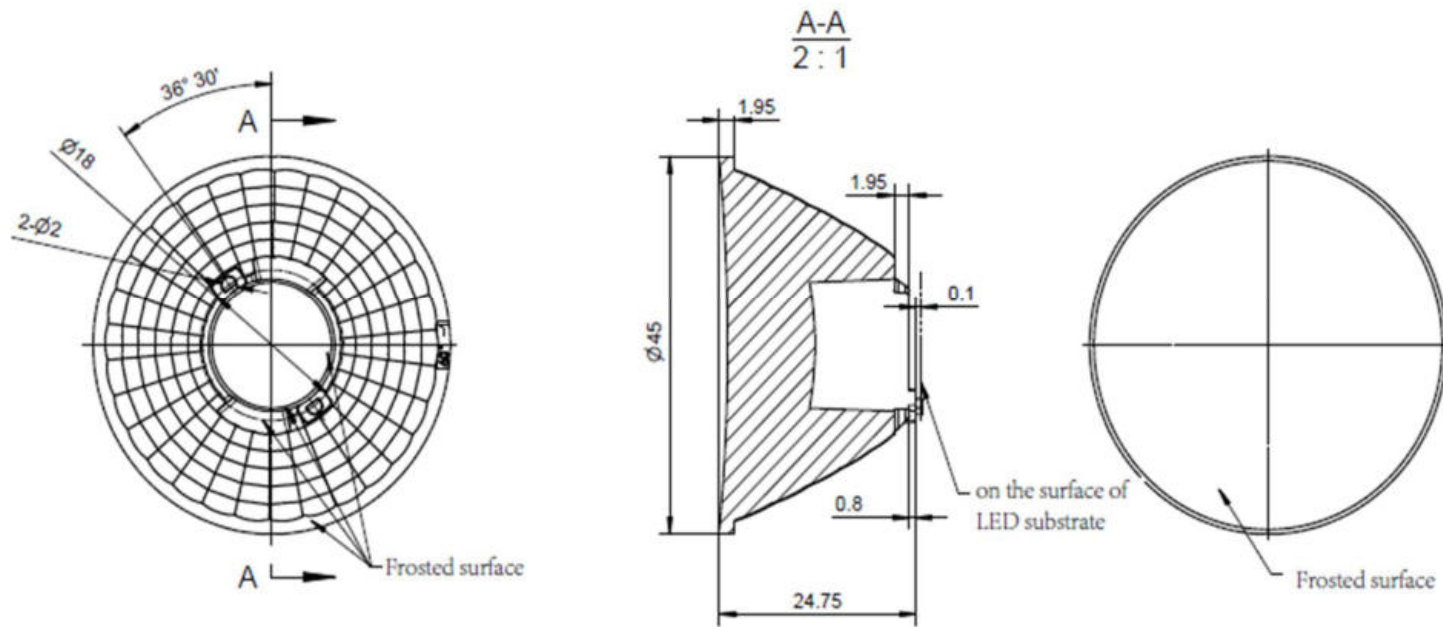
TEL: 0755-2937 1541

FAX: 0755-2907 5140

www.hkoptics.com

Date updated: 2019/1/21

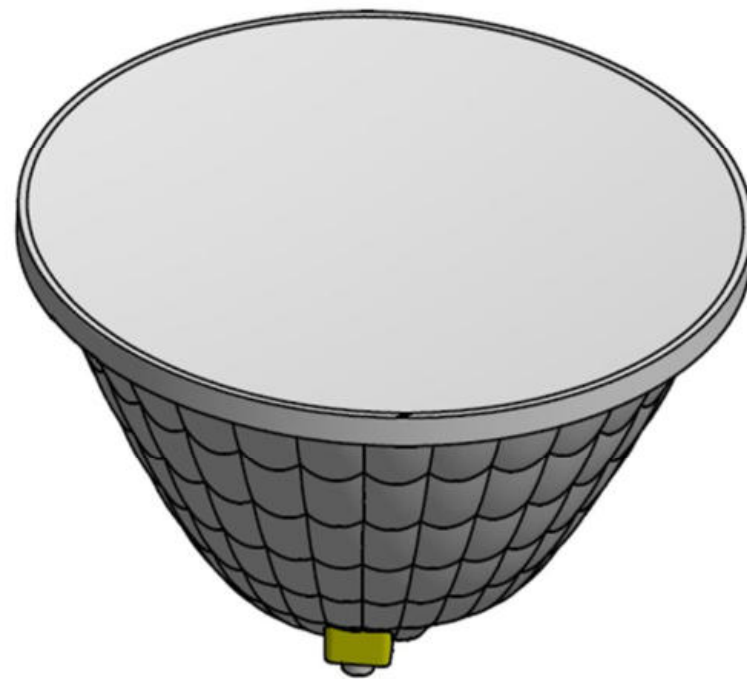
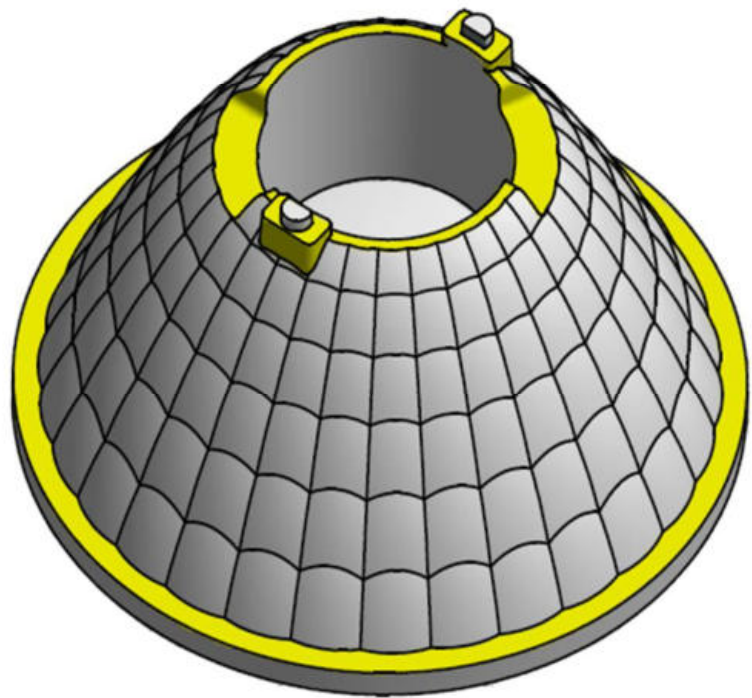
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PN:	HK-45@24-60-D6-20-1g-1
Size(L*W*H/Φ*H):	Φ : 45 H : 24.75
1.07.81418_HK-166@03-0223-S	PC
Effiency:	\
Temperature(Topr):	-40°C to +120°C
FWHM:	60°
Matched LES:	D6

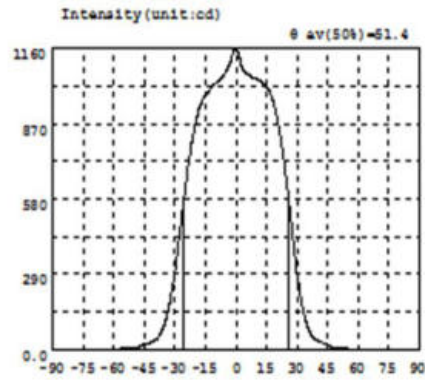
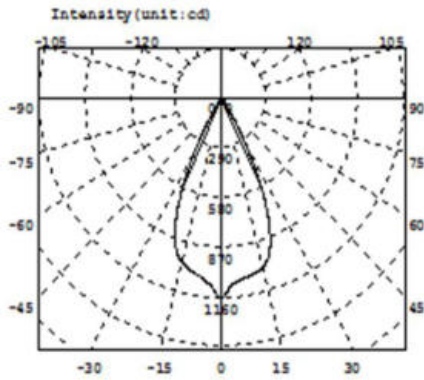


Technical Requirement:

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			XD 45@24-60° D6 Lens	HK-45@24-60-D6-20-1g-1		1.01.71228
Structure Design				Pages	Qty	Weight
Assess				2		
Authorized			Material:	PC	CDHK	





Intensity data:(deg , cd) CO-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2675	-58.5	0.6725	-27.0	486.7	4.5	1072	36.0	70.94	67.5	0.3439
-88.5	0.2803	-57.0	0.8831	-25.5	584.9	6.0	1062	37.5	51.11	69.0	0.3567
-87.0	0.3179	-55.5	1.208	-24.0	675.4	7.5	1052	39.0	39.28	70.5	0.3415
-85.5	0.2808	-54.0	1.770	-22.5	756.2	9.0	1048	40.5	31.72	72.0	0.3567
-84.0	0.2683	-52.5	2.559	-21.0	825.3	10.5	1041	42.0	26.54	73.5	0.3753
-82.5	0.2920	-51.0	3.611	-19.5	883.8	12.0	1035	43.5	21.95	75.0	0.4032
-81.0	0.3046	-49.5	5.062	-18.0	928.5	13.5	1025	45.0	16.03	76.5	0.3949
-79.5	0.3178	-48.0	8.758	-16.5	960.6	15.0	1014	46.5	9.852	78.0	0.4566
-78.0	0.2803	-46.5	14.06	-15.0	981.7	16.5	992.8	48.0	5.895	79.5	0.4694
-76.5	0.2956	-45.0	18.60	-13.5	995.5	18.0	963.9	49.5	4.241	81.0	0.5096
-75.0	0.2803	-43.5	21.83	-12.0	1010	19.5	918.2	51.0	2.956	82.5	0.5715
-73.5	0.2951	-42.0	25.51	-10.5	1023	21.0	859.4	52.5	2.029	84.0	0.6337
-72.0	0.3196	-40.5	30.63	-9.0	1033	22.5	787.0	54.0	1.327	85.5	0.6848
-70.5	0.3452	-39.0	38.62	-7.5	1042	24.0	702.2	55.5	0.9448	87.0	0.7516
-69.0	0.3312	-37.5	52.83	-6.0	1057	25.5	606.9	57.0	0.6537	88.5	0.8139
-67.5	0.3454	-36.0	77.65	-4.5	1076	27.0	504.8	58.5	0.5004	90.0	0.9020
-66.0	0.3837	-34.5	111.4	-3.0	1103	28.5	395.7	60.0	0.4075		
-64.5	0.3822	-33.0	159.5	-1.5	1143	30.0	295.7	61.5	0.3694		
-63.0	0.4001	-31.5	221.0	0.0	1155	31.5	215.8	63.0	0.3567		
-61.5	0.4422	-30.0	296.4	1.5	1131	33.0	153.2	64.5	0.3439		
-60.0	0.5134	-28.5	388.9	3.0	1088	34.5	105.8	66.0	0.3340		

Electricity Parameter:

Current I: 0.1000A Power: 4.179W  
Voltage V: 41.79V PF: 1.000

Optical Parameter (Distance=2.559m):

Equivalent Luminous flux:  $\Phi_{eff}$  = 740.5lm Efficiency:  $Eff$  = 177.22lm/W  
Diffuse angle: @ (25%) : 60.2deg @ (50%) : 51.4deg @ (75%) : 40.7deg @ (50%) : 51.4deg  
Diffuse angle: @ (25%) : 60.2deg @ (50%) : 51.5deg @ (75%) : 40.7deg @ (50%) : 51.5deg  
Imax=1157cd (C=0.0deg,G=-0.5deg) CO-180Plane Imax= 1157cd(G=-0.5deg)  
CO-180Plane IO= 1155cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	diameter	45			44.9	44.9	45			test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test
	height	24.75			24.97	24.91	24.96			
	thickness	1.95			2.06	2.12	2.01			
Gate shear can not affect the appearance of the lamp										
See attachment "Appearance Inspection Standards"										

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

3.Material	PC	Color	Transparent	OK
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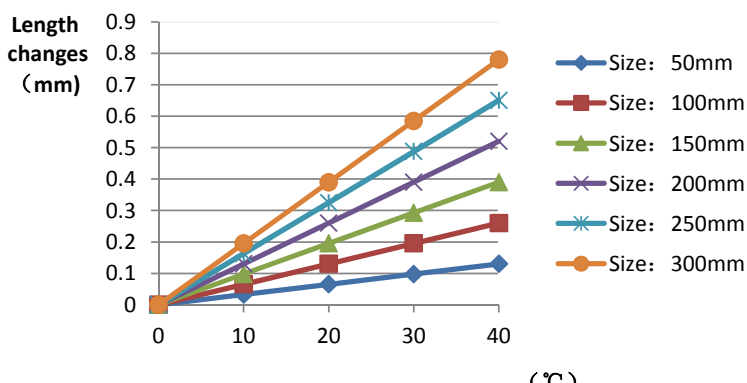
4.Optical index	Testing LED	D6									
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and										
	FWHM	See light distribution curve									
	angle		50.5	51.1	51.4						
	K-value										
	Efficiency		82.90%	83.50%	82.80%						
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**

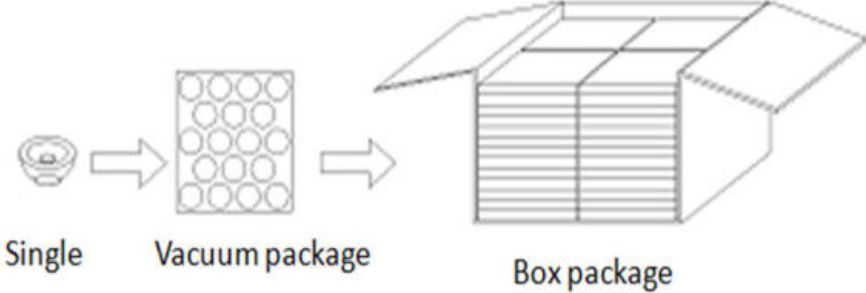


Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm
0	0.00	0.00	0.00	0.00	0.00	0.00
10	0.05	0.10	0.15	0.20	0.25	0.30
20	0.10	0.20	0.30	0.40	0.50	0.60
30	0.15	0.30	0.45	0.60	0.75	0.90
40	0.20	0.40	0.60	0.80	1.00	1.20

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.

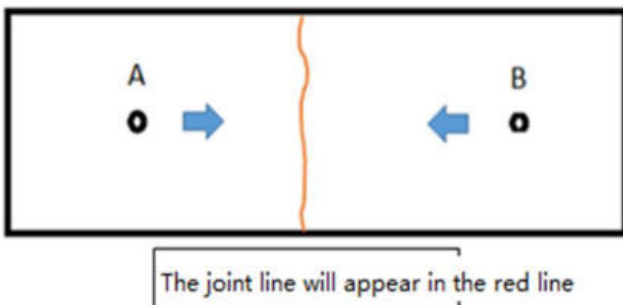
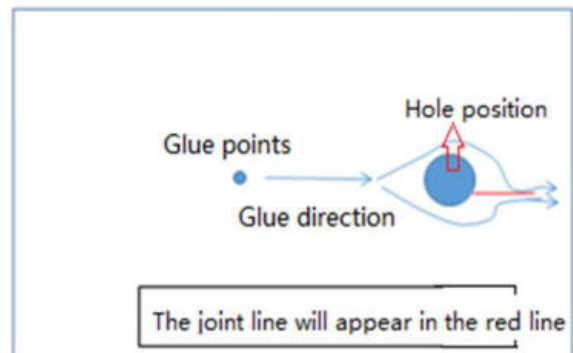
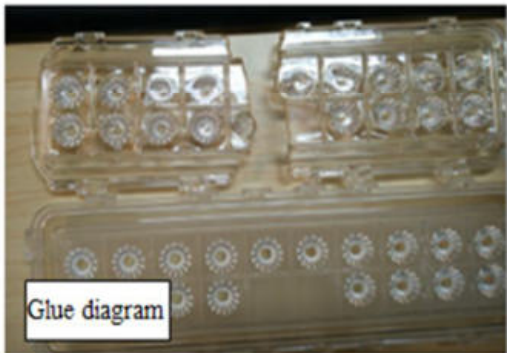
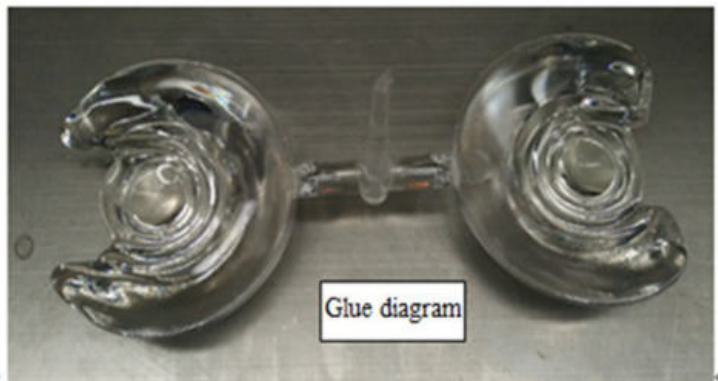


PN	HK-45@24-60-D6-20-1g-1		Product Name	XD 45@24-60°D6 Lens			
Product material	PC		Customer				
Package diagram	 <p style="text-align: center;"> <span>Single</span>      <span>Vacuum package</span>      <span>Box package</span> </p>						
Product packing	18	A/ Box	4	Box/Layer			
	11	Layer/Box	792	A/ Carton			
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0066	Blister box	23cm*21cm	44	BAG	
	2	2.08.0001	PE film	30cm*30cm	44	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	44	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	12	PCS	
	6	2.06.0001	big carton	46.8cm*42.8cm*36cm	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		√	