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

Product Approval

Approval number: Effective date of approval:

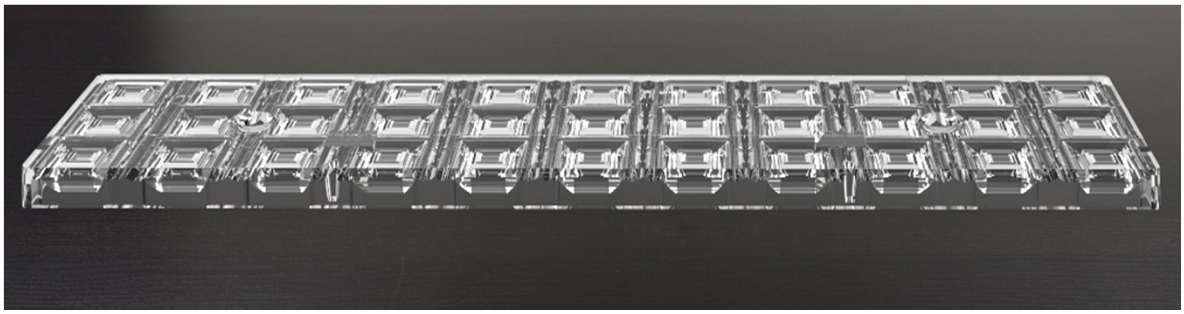
Customer:

Product: HK-286@08-Mining lamp-60°

Material Code: 1.01.71081

PN: HK-286@08-60-3030-22-1g-33

Manufacturer: Chengdu HercuLux Photoelectric Technology Co.,Ltd



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

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

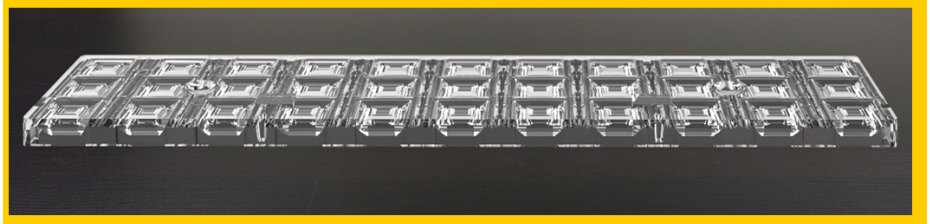
Factory: Chengdu Shuangliu District, Iot industrial park 2 road HercuLux Photoelectric Park
Phone: 028-85887727（801） 028-85887990（801） Fax: 028-85887730 www.hkoptics.com
Sales Dept: Shenzhen Nanshan District Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building,
TEL: 0755-2937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

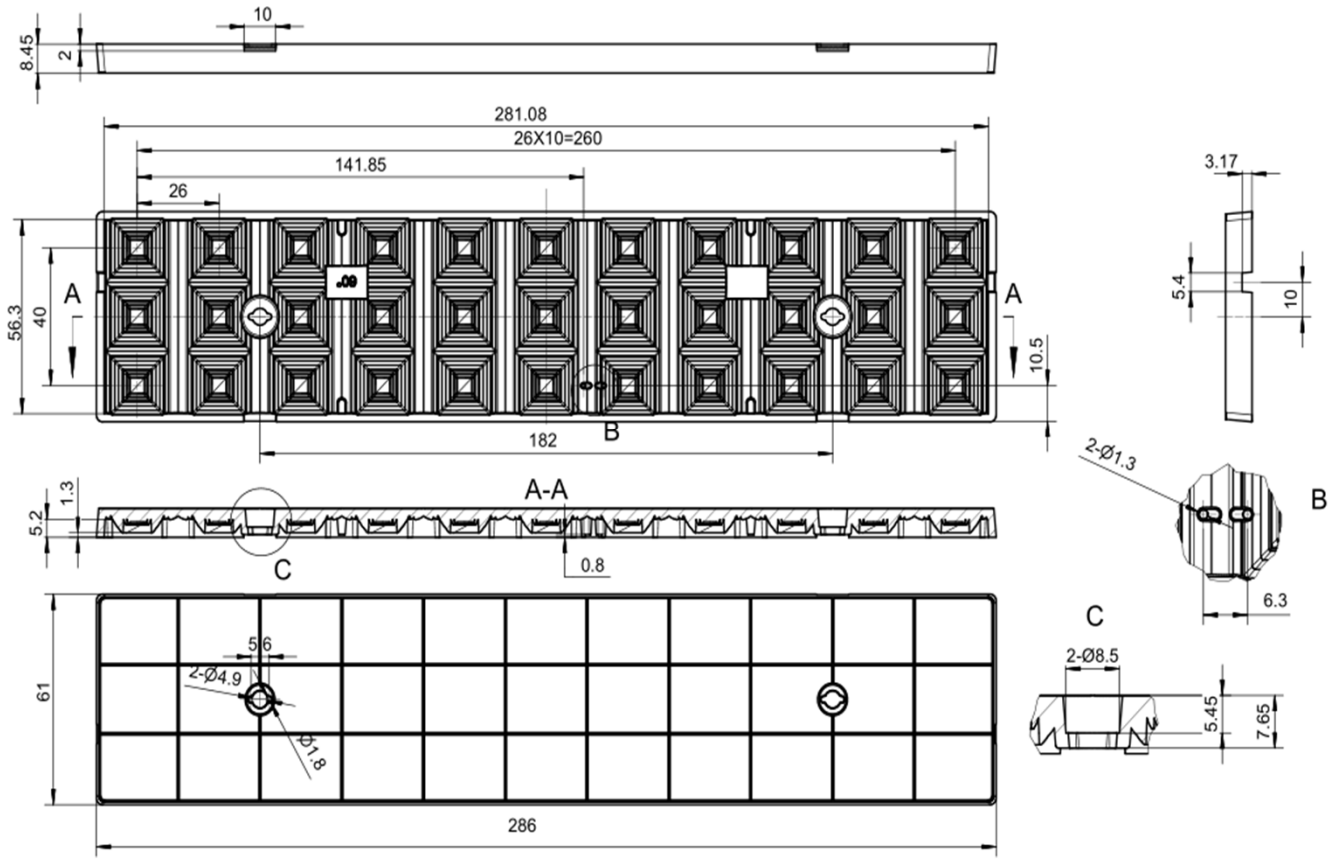
*Approval In duplicate, for both supplier and customer.

HERCULUX 恒坤光电

Product Approval

TEL: 0755-2937 1541 FAX: 0755-2907 5140 www.hkoptics.com Date updated: 2025/3/14

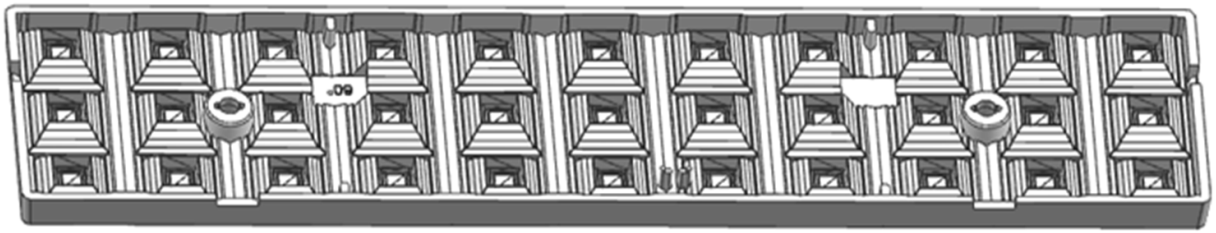
Product Picture:	
PN:	HK-286@08-60-3030-22-1g-33
Size(L*W*H/Φ*H):	286mm*61mm*08mm
Material:	PMMA
Effiency:	>80%
Temperature(Topr):	/
FWHM:	60°
Matched LES:	2835

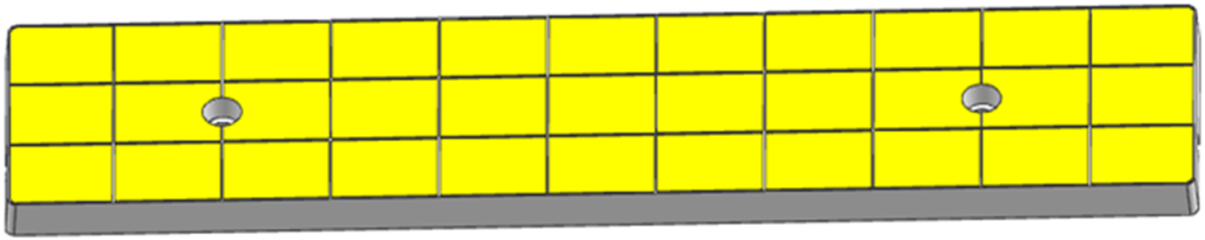


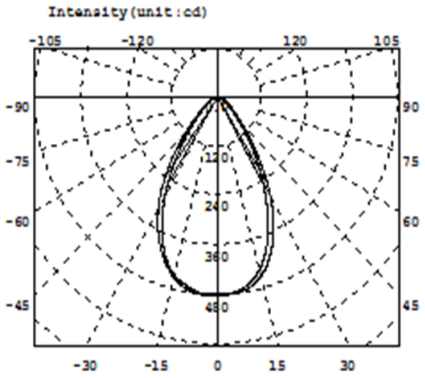
Technical Requirement:

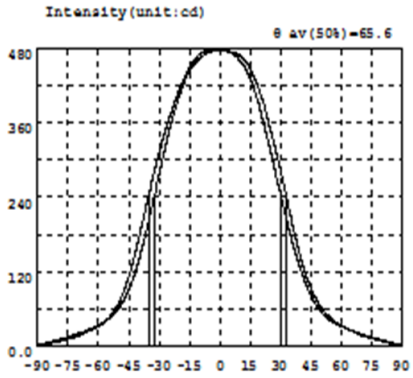
1. The surface don't have any defects of flash, shrink and bubble.
2. The uncharted fillet and pattern draft subiect to the 3D drawing.
3. The uncharted dimensional tolerance subiect to the 3D drawing.

Optical Design			HK-286@08-Mining lamp-60°	HK-286@08-60-3030-22-1g-33		1.01.71081
Structure Design				Pages	Qty	Weight
Assess				2		
Authorized			Material:PMMA	CDHK		









Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.477	-58.5	35.28	-27.0	346.1	4.5	473.9	36.0	166.5	67.5	21.88
-88.5	2.269	-57.0	38.91	-25.5	361.7	6.0	471.9	37.5	149.1	69.0	19.55
-87.0	3.189	-55.5	43.39	-24.0	376.0	7.5	468.1	39.0	133.0	70.5	17.79
-85.5	4.160	-54.0	48.72	-22.5	390.5	9.0	463.5	40.5	118.3	72.0	16.25
-84.0	5.220	-52.5	55.46	-21.0	404.4	10.5	457.5	42.0	105.1	73.5	14.76
-82.5	6.307	-51.0	63.48	-19.5	416.9	12.0	450.2	43.5	92.98	75.0	13.31
-81.0	7.456	-49.5	72.97	-18.0	428.3	13.5	441.0	45.0	82.24	76.5	11.91
-79.5	8.658	-48.0	84.14	-16.5	438.8	15.0	430.2	46.5	72.88	78.0	10.53
-78.0	9.885	-46.5	97.11	-15.0	447.9	16.5	417.8	48.0	64.78	79.5	9.179
-76.5	11.20	-45.0	111.9	-13.5	456.5	18.0	402.9	49.5	57.86	81.0	7.878
-75.0	12.50	-43.5	128.7	-12.0	462.0	19.5	387.6	51.0	52.06	82.5	6.661
-73.5	13.86	-42.0	147.1	-10.5	468.6	21.0	366.0	52.5	47.35	84.0	5.461
-72.0	15.33	-40.5	167.1	-9.0	471.8	22.5	346.9	54.0	43.38	85.5	4.347
-70.5	16.99	-39.0	187.9	-7.5	474.8	24.0	327.6	55.5	40.08	87.0	3.264
-69.0	18.98	-37.5	209.5	-6.0	475.6	25.5	307.4	57.0	37.17	88.5	2.238
-67.5	21.30	-36.0	230.9	-4.5	477.3	27.0	286.5	58.5	34.77	90.0	1.611
-66.0	23.64	-34.5	250.0	-3.0	477.5	28.5	265.5	60.0	32.68		
-64.5	25.70	-33.0	272.9	-1.5	478.7	30.0	244.5	61.5	30.71		
-63.0	27.68	-31.5	293.0	0.0	478.0	31.5	223.7	63.0	28.82		
-61.5	29.83	-30.0	311.6	1.5	477.4	33.0	203.6	64.5	26.84		
-60.0	32.37	-28.5	329.4	3.0	476.3	34.5	184.5	66.0	24.45		

Electricity Parameter:

Current I: 0.1000A Power: 3.098W

Voltage V: 31.00V PF: 0.000

Optical Parameter(Distance=2.559m):

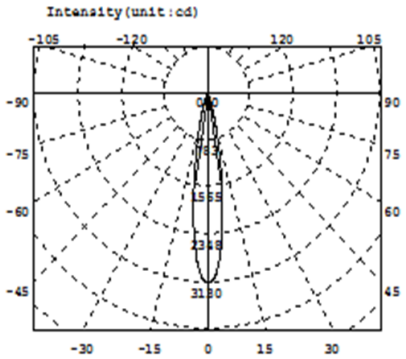
Equivalent Luminous flux: Φ eff= 617.7lm Efficiency: Eff=199.40lm/W

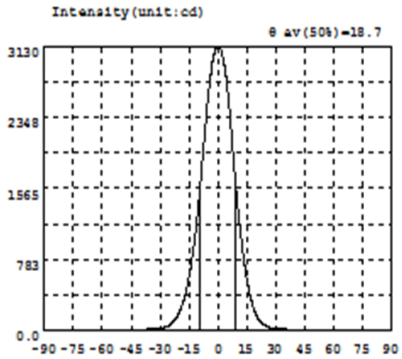
Diffuse angle: @(25%): 84.2deg @(50%): 65.6deg @(75%): 47.8deg @(50%): 65.6deg

Diffuse angle: @(25%): 84.3deg @(50%): 65.6deg @(75%): 47.9deg @(50%): 65.6deg

Imax=478.7cd (C=0.0deg,G=-1.5deg) C0-180Plane Imax= 478.7cd(G=-1.5deg)

C0-180Plane I0= 478.0cd





Intensity data:(deg , cd) C0-180

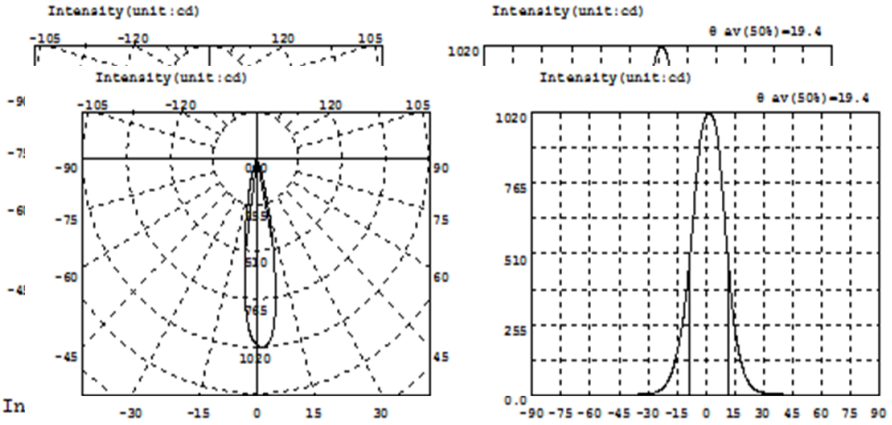
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.1128	-58.5	6.971	-27.0	44.65	4.5	2739	36.0	16.01	67.5	3.481
-88.5	0.1021	-57.0	7.734	-25.5	58.14	6.0	2426	37.5	14.71	69.0	3.070
-87.0	0.1695	-55.5	8.540	-24.0	79.99	7.5	2047	39.0	13.71	70.5	2.634
-85.5	0.3171	-54.0	9.313	-22.5	116.3	9.0	1660	40.5	12.94	72.0	2.258
-84.0	0.4758	-52.5	10.18	-21.0	170.0	10.5	1327	42.0	12.29	73.5	1.959
-82.5	0.6681	-51.0	10.95	-19.5	234.6	12.0	1031	43.5	11.87	75.0	1.683
-81.0	0.8147	-49.5	11.59	-18.0	322.7	13.5	775.8	45.0	11.53	76.5	1.426
-79.5	1.006	-48.0	11.96	-16.5	439.3	15.0	566.2	46.5	11.23	78.0	1.247
-78.0	1.142	-46.5	12.25	-15.0	593.4	16.5	413.8	48.0	11.00	79.5	1.091
-76.5	1.315	-45.0	12.60	-13.5	777.2	18.0	282.8	49.5	10.63	81.0	0.8605
-75.0	1.575	-43.5	12.79	-12.0	1005	19.5	194.0	51.0	10.19	82.5	0.6583
-73.5	1.880	-42.0	13.23	-10.5	1290	21.0	130.0	52.5	9.619	84.0	0.4937
-72.0	2.145	-40.5	13.75	-9.0	1634	22.5	90.23	54.0	8.932	85.5	0.2690
-70.5	2.527	-39.0	14.66	-7.5	1990	24.0	64.91	55.5	8.222	87.0	0.2143
-69.0	2.948	-37.5	15.83	-6.0	2355	25.5	48.85	57.0	7.518	88.5	0.1015
-67.5	3.370	-36.0	17.19	-4.5	2681	27.0	38.00	58.5	6.896	90.0	0.1444
-66.0	3.839	-34.5	18.96	-3.0	2929	28.5	30.95	60.0	6.316		
-64.5	4.397	-33.0	21.30	-1.5	3070	30.0	25.81	61.5	5.708		
-63.0	4.968	-31.5	24.27	0.0	3126	31.5	22.10	63.0	5.054		
-61.5	5.604	-30.0	28.64	1.5	3095	33.0	19.40	64.5	4.504		
-60.0	6.299	-28.5	35.09	3.0	2963	34.5	17.52	66.0	3.962		

Electricity Parameter:

Current I: 0.1500A Power: 3.350W
Voltage V: 33.50V PF: 0.000

Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: Φ eff= 443.3lm Efficiency: Eff=132.33lm/W
Diffuse angle: @(25%): 26.8deg @(50%): 18.7deg @(75%): 12.3deg @(50%): 18.7deg
Diffuse angle: @(25%): 26.8deg @(50%): 18.7deg @(75%): 12.3deg @(50%): 18.7deg
Imax=3126cd (C=0.0deg,G=0.0deg) C0-180Plane Imax= 3126cd(G=0.0deg)
C0-180Plane I0= 3126cd



Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.0790	-58.5	2.131	-27.0	11.89	4.5	985.3	36.0	6.567	67.5	1.437
-88.5	0.1573	-57.0	2.334	-25.5	14.84	6.0	930.7	37.5	6.007	69.0	1.270
-87.0	0.1472	-55.5	2.545	-24.0	19.33	7.5	832.3	39.0	5.530	70.5	1.130
-85.5	0.1918	-54.0	2.794	-22.5	26.78	9.0	702.7	40.5	5.171	72.0	0.9716
-84.0	0.1712	-52.5	3.016	-21.0	39.05	10.5	574.5	42.0	4.952	73.5	0.8398
-82.5	0.2148	-51.0	3.169	-19.5	55.04	12.0	454.4	43.5	4.752	75.0	0.7278
-81.0	0.3507	-49.5	3.271	-18.0	77.51	13.5	336.6	45.0	4.598	76.5	0.6147
-79.5	0.4174	-48.0	3.368	-16.5	110.2	15.0	246.9	46.5	4.462	78.0	0.5337
-78.0	0.4181	-46.5	3.430	-15.0	154.7	16.5	182.7	48.0	4.315	79.5	0.4834
-76.5	0.4776	-45.0	3.523	-13.5	203.5	18.0	131.2	49.5	4.081	81.0	0.3416
-75.0	0.6343	-43.5	3.628	-12.0	263.5	19.5	91.69	51.0	3.892	82.5	0.3189
-73.5	0.7013	-42.0	3.778	-10.5	344.0	21.0	63.64	52.5	3.706	84.0	0.2256
-72.0	0.7957	-40.5	3.970	-9.0	446.0	22.5	45.40	54.0	3.496	85.5	0.1606
-70.5	0.8516	-39.0	4.264	-7.5	556.8	24.0	32.12	55.5	3.174	87.0	0.0853
-69.0	1.043	-37.5	4.624	-6.0	681.1	25.5	23.05	57.0	2.884	88.5	0.1128
-67.5	1.189	-36.0	5.029	-4.5	805.6	27.0	17.19	58.5	2.609	90.0	0.0033
-66.0	1.247	-34.5	5.536	-3.0	909.8	28.5	13.56	60.0	2.380		
-64.5	1.405	-33.0	6.273	-1.5	969.4	30.0	11.11	61.5	2.148		
-63.0	1.577	-31.5	7.160	0.0	1001	31.5	9.364	63.0	1.922		
-61.5	1.791	-30.0	8.222	1.5	1016	33.0	8.081	64.5	1.778		
-60.0	1.916	-28.5	9.767	3.0	1010	34.5	7.294	66.0	1.582		

Electricity Parameter:

Current I: 0.1500A Power: 0.8390W

Voltage V: 8.399V PF: 0.000

Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: Φ eff= 152.21m Efficiency: Eff=181.50lm/W

Diffuse angle: @(25%): 27.0deg @(50%): 19.4deg @(75%): 13.3deg @(50%): 19.4deg

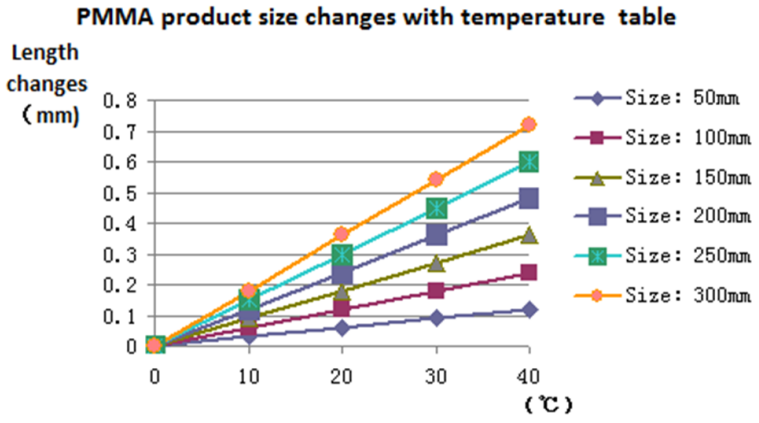
Diffuse angle: @(25%): 27.1deg @(50%): 19.6deg @(75%): 13.5deg @(50%): 19.6deg

Imax=1016cd (C=0.0deg,G=2.0deg) C0-180Plane Imax= 1016cd(G=2.0deg)

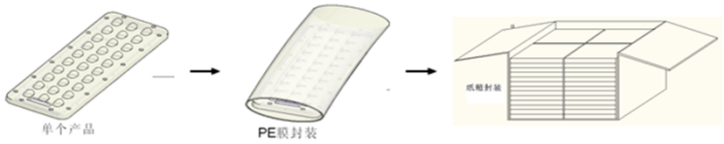
C0-180Plane I0= 1001cd

1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Judgment
	OL	286	286.7	286	286.64	286.38	OK
	OW	61	61.3	61	61.27	61.29	OK
	D of locating	1.3	1.35	1.2	1.23	1.22	OK
	S of locating	6.3	6.35	6.3	6.31	6.35	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	PMMA			Color	Transparent		OK
4.Optical index	Testing LED	2835					
	FWHM	See light distribution curve					
		Standard		Test result 1	Test result 2		
	Angle	60° +7°		66.6°X66.7°	65.5°X65.6°		OK
	Effiency	＞80%		84. 40%	85. 30%		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、Test environment: In 20 ℃ -25 ℃ environment to achieve thermal equilibrium after the test. (Ambient temperature on the size of the product refer to the table on the right)



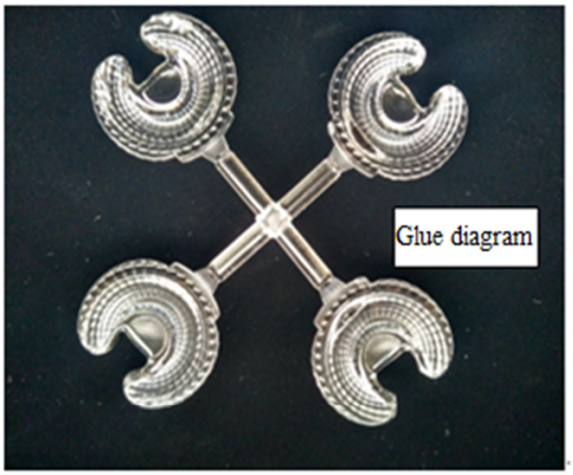
Precautions：
1、Wear clean gloves during lens assembly to prevent contamination of the lens surface.
2、Take the lens try to avoid touching the total reflection surface.
3、When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with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

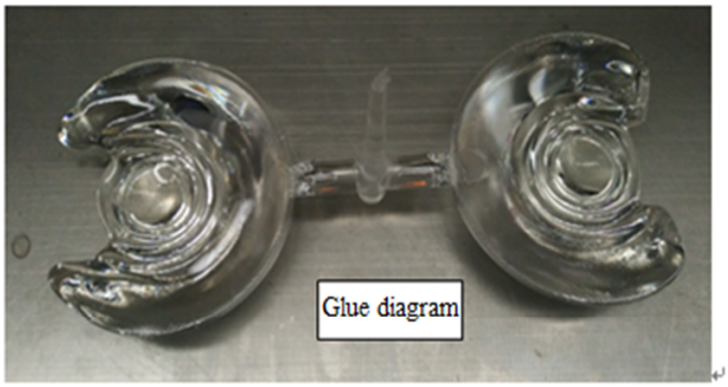
PN	HK-286@08-60-3030-22-1g-33	Product Name	HK-286@08-Mining lamp-60°
Product material	PMMA	Customer	
Package diagram			

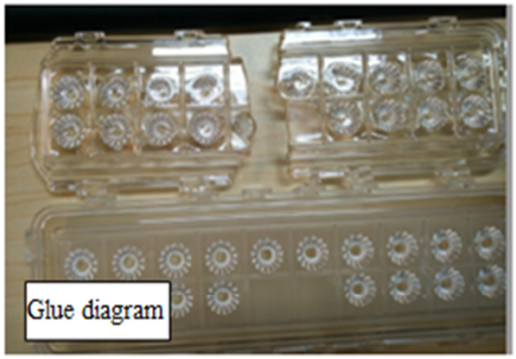
Product packing							
	2	Packet	3/46:2/12	Each layer	5	The number of	
	162	Floor/Carton					
Packaging Materials	NO.	Material Code	Item name	Specification	Single box usage	Unit	Remarks
	1		Blister box		81	PCS	
	2	2.06.0005	Box label paper	62mm*70mm	1	PCS	
	3	2.06.0007	Middle plate	39cm*29cm	6	PCS	
	4	2.06.0012	Middle carton	40cm*30cm*26cm	1	PCS	
Remarks	Scattered packaging is not subject to this specification						

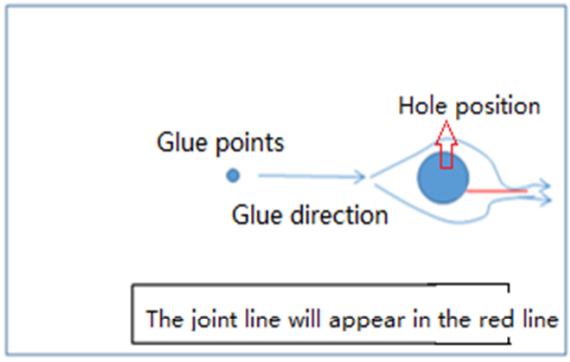
Special notice

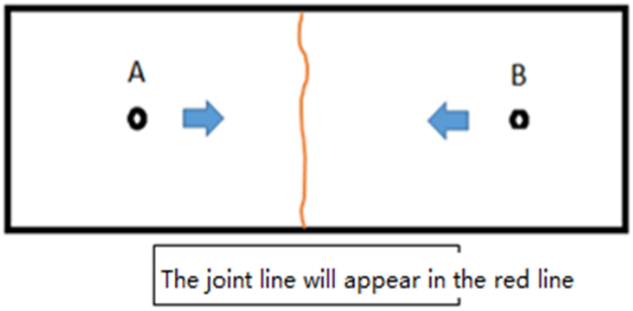
When gule pass through holes, columns and other structures, or part of the thin structure, will form a weld line. The product which uses multi-point injection welding line will appear because of the combination of sol, as shown below:











Please note:

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

Appearance inspection standards

1 Operating procedures

1.1.1Sampling standards, sampling plan and AQL

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

2 Code table

Code	Code description	Unit	Code		Code description	Unit
N	Amount/pcs	pcs	D		Diameter	mm
L	Length	mm	H		Depth	mm
W	Width	mm	DS		Distance	mm
S	Proportion	mm²	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, chip should be from the lens surface 500-550mm, in order to make the bad appearance can be correctly found, the illumination should not be less than 500Lux；

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

4 Appearance inspection standards

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

	2: The limited sample refers to the limit of a particular exceptionally developed sample. Limit the sample only for its specific point of exception to confirm; The priority is higher than the other criteria in this table. When there is a limited sample, the limit sample shall prevail.				
Raw edge	Not allowed to affect the size and assembly	Visual, point card		√	
Scratch	1: Non-optical surface and non-exposed surface scratches should be visually insignificant and the length is less than 1/10 of the maximum surface size.	Visual, point card, calipers		√	
Fingerprint	Fingerprints are not allowed on all products	Visual		√	
Foreign 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 matter、Dark 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		√	