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

Product Approval

Approval number：

Customer：

Manufacturer：Chengdu HercuLux Photoelectric Technology Co.,Ltd

PN	Code	Product
HK-35@12.4-24-D6-20-1g-1	1.01.3111	D6-24 Lens
HK-35@12.4-38-D6-20-1g-1	1.01.3112	D6-38 Lens

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

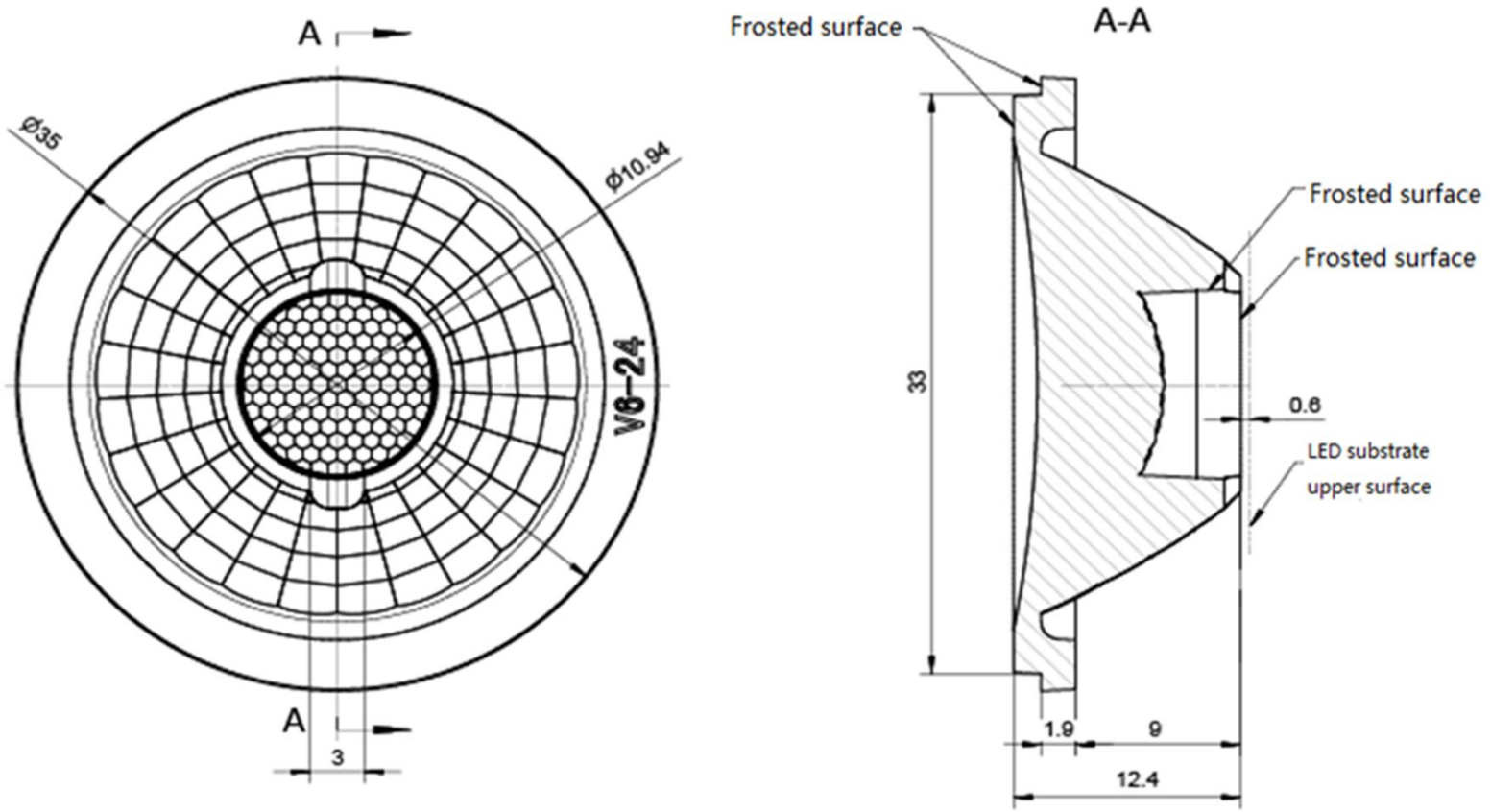
*Approval In duplicate， for both supplier and customer.

HERCULUX 恒坤光电

Product Approval

TEL: 0755-2937 1541 FAX: 0755-2907 5140 www.hkoptics.com Date updated: 2019/4/9

Product Picture:	
PN:	HK-35@12.4-24-D6-20-1g-1
Size(L*W*H/Φ*H):	Φ:35 mm; H:9.5mm
1.07.81418_HK-166@03-0223-S	PMMA
Effiency:	\
Temperature(Topr):	-40℃ to +80℃
FWHM:	24°/38°
Matched LES:	D6

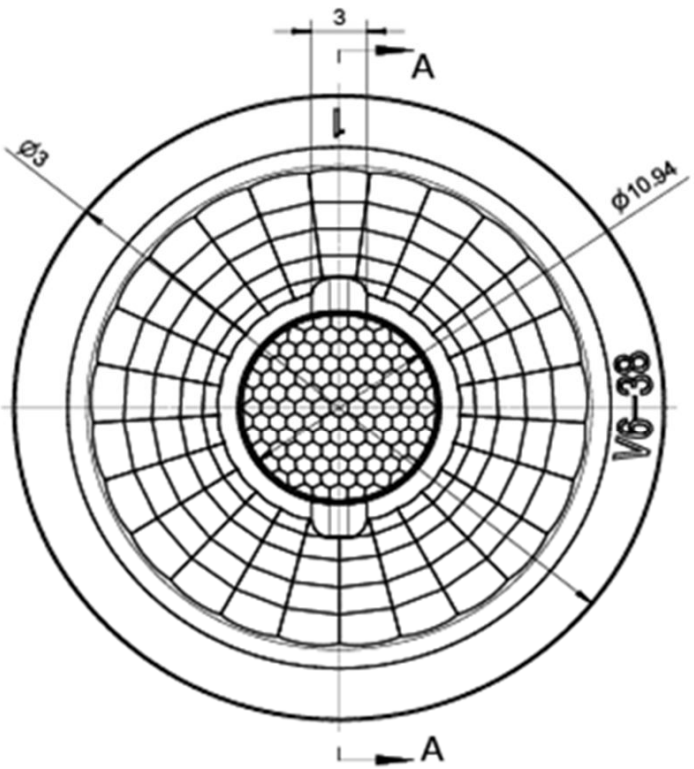


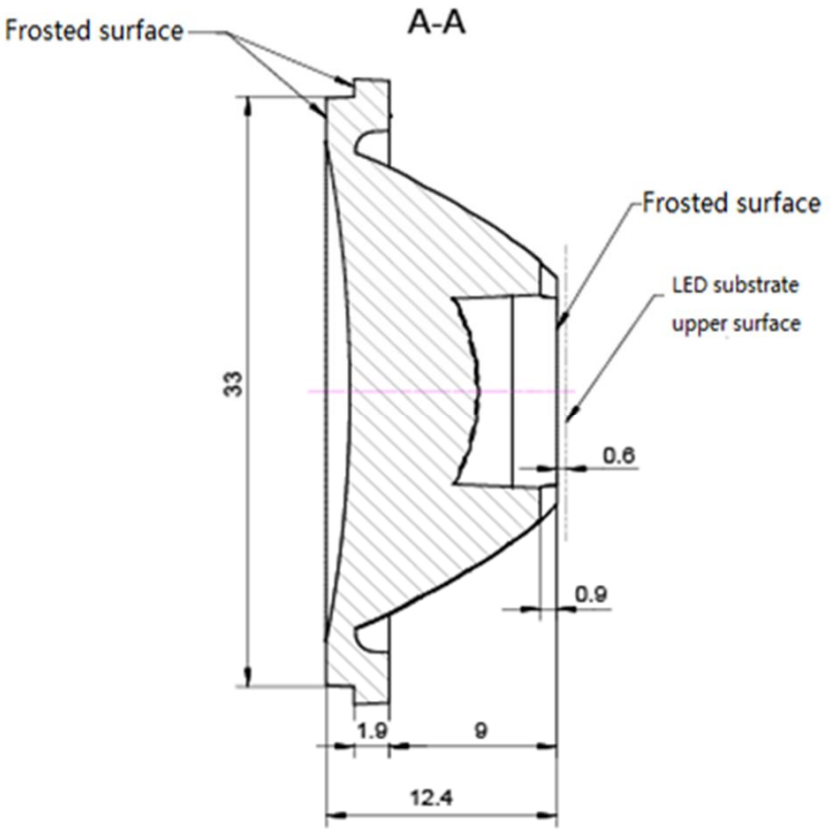
Technical remark:

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

Optical design			D6-24 Lens	HK-35@12.4-24-D6-20-1g-1	
Structure desig				1.01.3111	
Review				umber of drawin	qty / weight
Validation			Material:	PMMA	CDHK

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



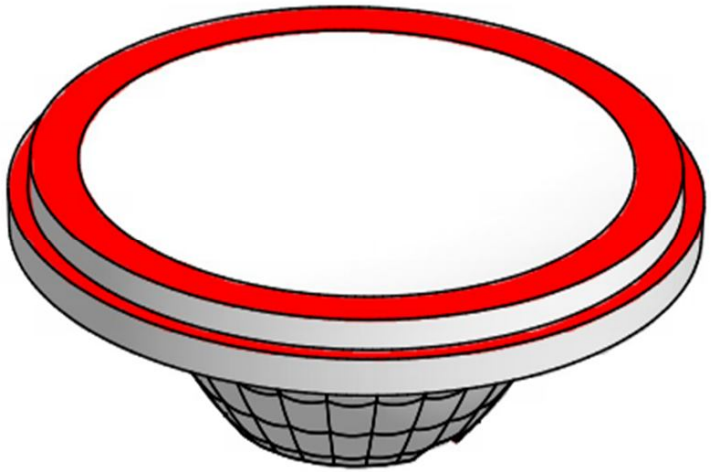


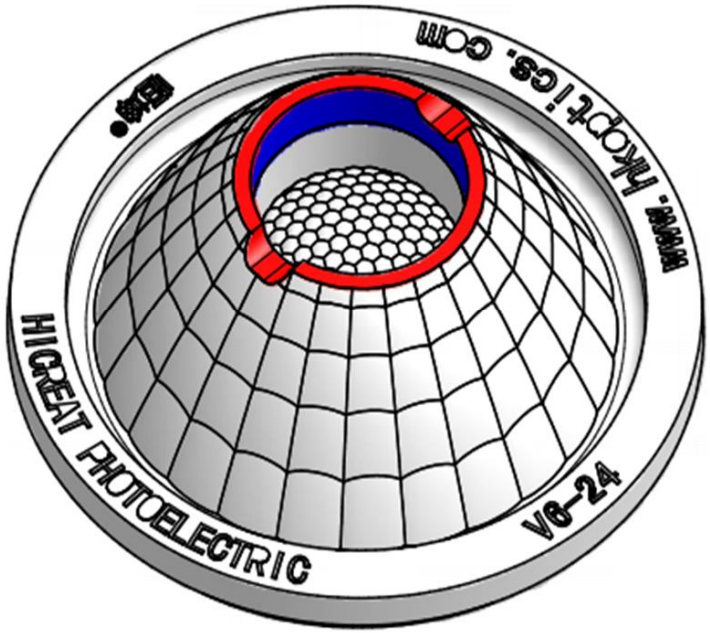
Technical remark:

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

Optical design			D6-38 Lens		HK-35@12.4-38-D6-20-1g-1
Structure desig					1.01.3112
Review				umber of drawin	qty / weight
Validation			Material:	PMMA	CDHK

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

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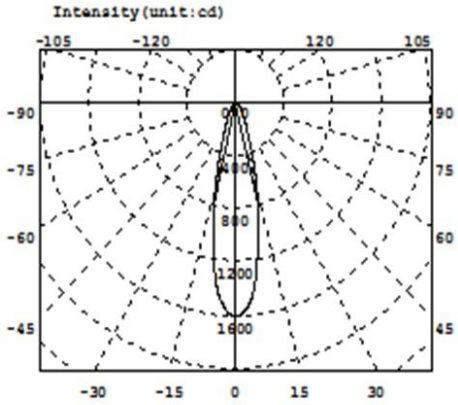
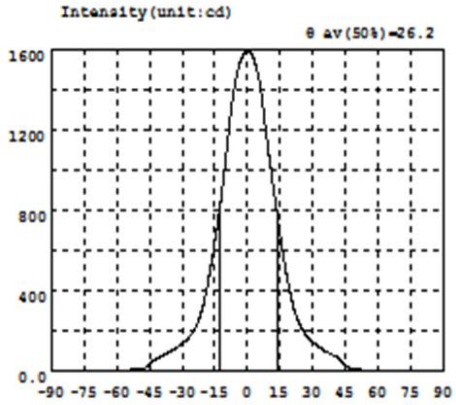




Intensity data:(deg , cd)　C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2825	-58.5	7.306	-27.0	169.7	4.5	1491	36.0	100.8	67.5	3.842
-88.5	0.4636	-57.0	8.095	-25.5	190.4	6.0	1403	37.5	91.87	69.0	3.588
-87.0	0.6449	-55.5	8.933	-24.0	216.5	7.5	1278	39.0	83.75	70.5	3.228
-85.5	0.8492	-54.0	9.779	-22.5	253.6	9.0	1145	40.5	76.37	72.0	2.910
-84.0	1.064	-52.5	11.00	-21.0	304.3	10.5	1023	42.0	65.58	73.5	2.628
-82.5	1.291	-51.0	12.09	-19.5	370.5	12.0	903.0	43.5	47.84	75.0	2.401
-81.0	1.540	-49.5	13.22	-18.0	450.6	13.5	783.0	45.0	29.73	76.5	2.080
-79.5	1.812	-48.0	15.15	-16.5	544.4	15.0	671.5	46.5	17.92	78.0	1.822
-78.0	2.085	-46.5	21.59	-15.0	644.9	16.5	567.3	48.0	13.58	79.5	1.611
-76.5	2.380	-45.0	35.30	-13.5	754.5	18.0	473.5	49.5	12.19	81.0	1.362
-75.0	2.673	-43.5	52.11	-12.0	872.6	19.5	393.4	51.0	10.83	82.5	1.157
-73.5	3.026	-42.0	64.77	-10.5	1005	21.0	323.2	52.5	9.398	84.0	1.005
-72.0	3.391	-40.5	71.88	-9.0	1151	22.5	271.7	54.0	8.504	85.5	0.7593
-70.5	3.774	-39.0	79.30	-7.5	1301	24.0	233.0	55.5	7.639	87.0	0.6378
-69.0	4.074	-37.5	87.35	-6.0	1414	25.5	203.5	57.0	6.874	88.5	0.4531
-67.5	4.476	-36.0	96.15	-4.5	1493	27.0	180.8	58.5	6.260	90.0	0.4373
-66.0	4.814	-34.5	105.6	-3.0	1548	28.5	161.9	60.0	5.677		
-64.5	5.134	-33.0	115.9	-1.5	1580	30.0	146.3	61.5	5.289		
-63.0	5.593	-31.5	127.1	0.0	1591	31.5	132.9	63.0	4.866		
-61.5	6.001	-30.0	139.6	1.5	1579	33.0	121.2	64.5	4.457		
-60.0	6.589	-28.5	154.0	3.0	1545	34.5	110.5	66.0	4.210		

Electricity Parameter:

Current I:　0.1000A　　Power:　3.710W

Voltage V:　37.09V　　PF:　1.000

Optical Parameter(Distance=2.410m):

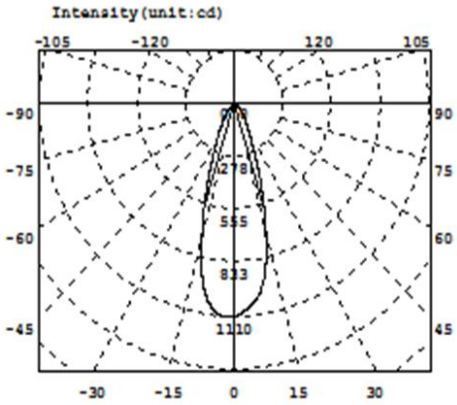
Equivalent Luminous flux: Φ eff= 516.5lm　Efficiency: Eff=139.23lm/W

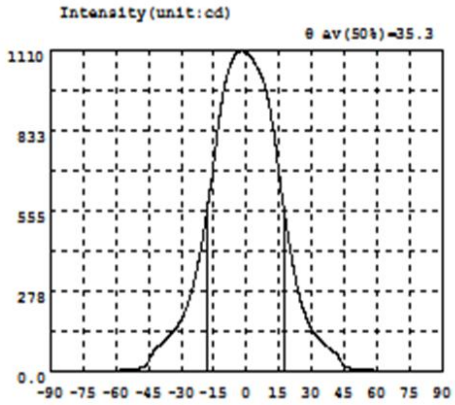
Diffuse angle:　@(25%): 38.3deg @(50%): 26.2deg @(75%): 16.9deg @(50%): 26.2deg

Diffuse angle:　@(25%): 38.3deg @(50%): 26.2deg @(75%): 16.9deg @(50%): 26.2deg

Imax=1591cd (C=0.0deg,G=0.0deg)　C0-180Plane Imax= 1591cd(G=0.0deg)

C0-180Plane I0= 1591cd





Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.2260	-58.5	6.616	-27.0	235.3	4.5	1055	36.0	94.49	67.5	4.444
-88.5	0.4745	-57.0	7.226	-25.5	270.9	6.0	1034	37.5	84.94	69.0	4.076
-87.0	0.5781	-55.5	8.054	-24.0	313.5	7.5	1008	39.0	76.46	70.5	3.791
-85.5	0.7711	-54.0	8.861	-22.5	363.7	9.0	968.6	40.5	68.61	72.0	3.380
-84.0	0.9747	-52.5	10.40	-21.0	421.0	10.5	916.5	42.0	56.37	73.5	2.995
-82.5	1.256	-51.0	12.09	-19.5	487.8	12.0	850.2	43.5	36.19	75.0	2.751
-81.0	1.416	-49.5	13.21	-18.0	562.6	13.5	765.6	45.0	20.95	76.5	2.372
-79.5	1.744	-48.0	14.80	-16.5	641.7	15.0	676.1	46.5	14.64	78.0	2.074
-78.0	2.015	-46.5	21.72	-15.0	724.0	16.5	593.4	48.0	13.28	79.5	1.824
-76.5	2.278	-45.0	38.25	-13.5	815.8	18.0	518.7	49.5	12.40	81.0	1.557
-75.0	2.515	-43.5	59.97	-12.0	901.0	19.5	447.4	51.0	11.36	82.5	1.266
-73.5	2.888	-42.0	79.53	-10.5	967.9	21.0	382.3	52.5	9.839	84.0	1.076
-72.0	3.160	-40.5	88.24	-9.0	1018	22.5	319.4	54.0	8.843	85.5	0.8713
-70.5	3.514	-39.0	97.52	-7.5	1056	24.0	269.3	55.5	7.996	87.0	0.6692
-69.0	3.834	-37.5	107.5	-6.0	1081	25.5	228.6	57.0	7.374	88.5	0.4805
-67.5	4.217	-36.0	118.6	-4.5	1099	27.0	195.4	58.5	6.780	90.0	0.2472
-66.0	4.544	-34.5	131.4	-3.0	1106	28.5	168.9	60.0	6.222		
-64.5	4.813	-33.0	145.6	-1.5	1105	30.0	147.4	61.5	5.821		
-63.0	5.244	-31.5	162.8	0.0	1101	31.5	129.8	63.0	5.449		
-61.5	5.652	-30.0	183.3	1.5	1089	33.0	116.2	64.5	5.103		
-60.0	6.055	-28.5	205.1	3.0	1074	34.5	104.7	66.0	4.770		

Electricity Parameter:

Current I: 0.1000A Power: 3.710W

Voltage V: 37.09V PF: 1.000

Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: Φ eff= 532.1lm Efficiency: Eff=143.45lm/W

Diffuse angle: @(25%): 48.9deg @(50%): 35.3deg @(75%): 25.6deg @(50%): 35.3deg

Diffuse angle: @(25%): 49.1deg @(50%): 35.5deg @(75%): 25.7deg @(50%): 35.5deg

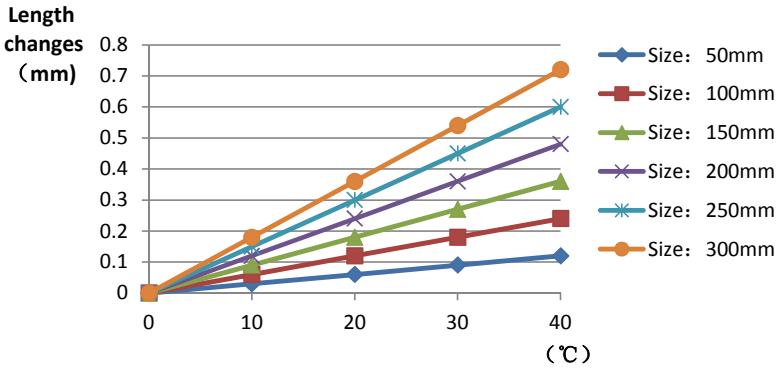
Imax=1106cd (C=0.0deg,G=-2.5deg) C0-180Plane Imax= 1106cd(G=-2.5deg)

C0-180Plane I0= 1101cd

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	External Diameter	35			35.05	34.98	35.02			Test environment: In 20 ℃ -25 ℃ environment to achieve thermal equilibrium after the test.
	Highth	9			9.03	8.94	9.01			
	External Diameter 2	33			33.04	33.03	32.96			
	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	D6								
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM	See light distribution curve								
	angle									
	K-value									
	Efficiency									
	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

PMMA product size changes with temperature table



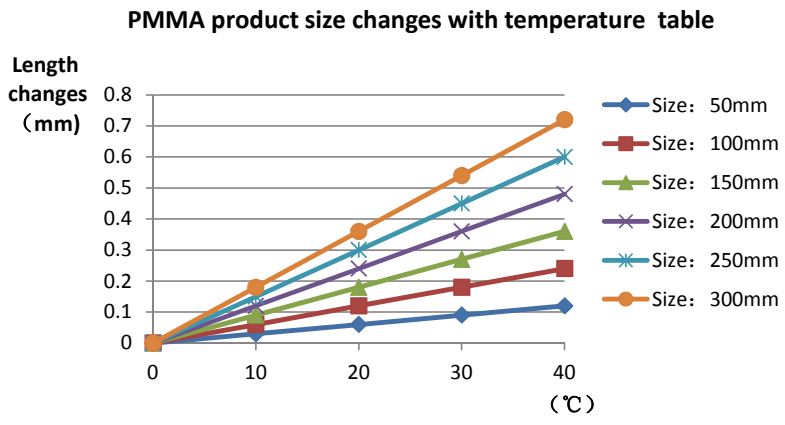
Precautions：
1、Wear clean gloves during lens assembly to prevent contamination of the lens surface.
2、Take the lens try to avoid touching the total reflection surface.
3、When the lens surface contamination, you can only gently wipe with soft cotton sticky neat neutral solvent, not allowed to wipe with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

		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
1.Size	External Diameter	35								Test environment: In 20 ℃ -25 ℃ environment to achieve thermal equilibrium after the test.
	Highth	9								
	External Diameter 2	33								
	Gate shear can not affect the appearance of the lamp									
	See attachment "Appearance Inspection Standards"									

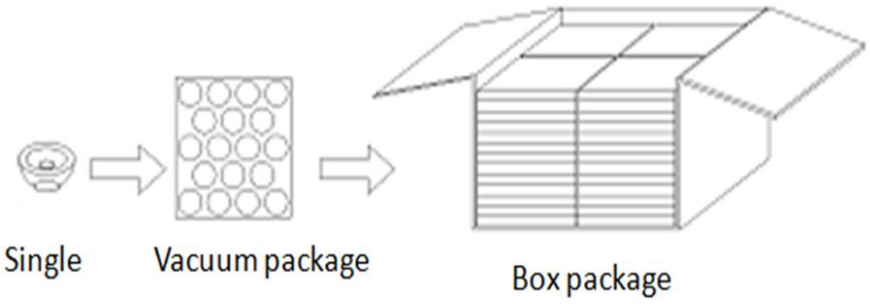
2.Appearance Quality	See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK
			No stains	No stains	No stains	No stains	
3.Material	PMMA		Color	Transparent			OK

4.Optical index	Testing LED	D6
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.	
	FWHM	See light distribution curve
	angle	
	K-value	
	Efficiency	
	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



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.
4. The working temperature of the lens should be within the temperature limit of the lens material. Exceeding the temperature limit will cause damage to the lens and affect the service life of the lens.

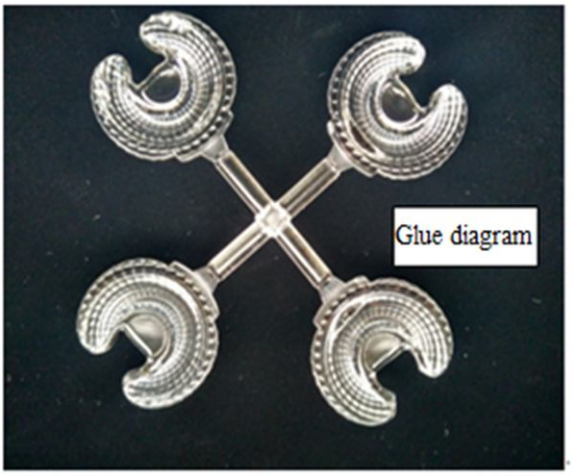
PN	HK-35@12.4-24-D6-20-1g-1	Product Name	D6-24 Lens
Product material	PMMA	Customer	
Package diagram			

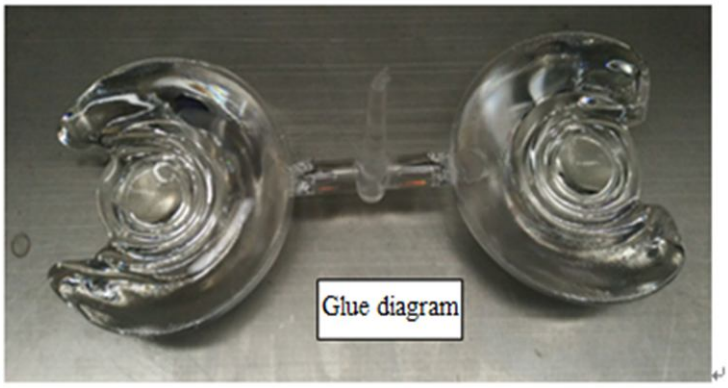
Product packing							
	27	A/ Box	4	Box/Layer		
	17	Layer/Box	1836	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0011	Blister box	23cm*21cm	68	BAG	
	2	2.08.0001	PE film	30cm*30cm	68	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	68	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	18	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						

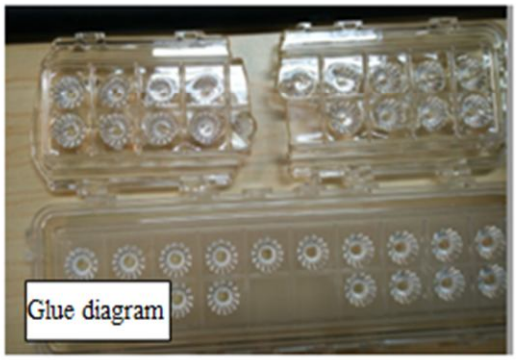
Special notice

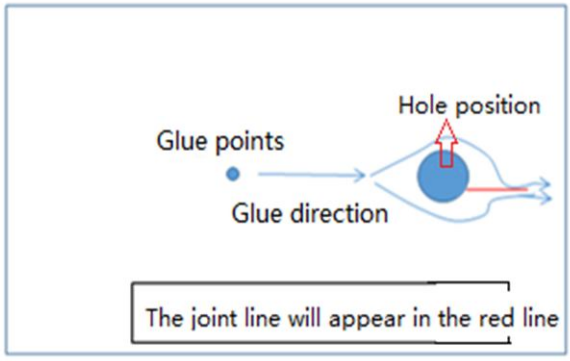
When gule pass through holes, columns and other structures, or part of the thin structure, will form a weld line. The product which uses multi-point injection welding line will appear because of the combination of sol, as shown below:

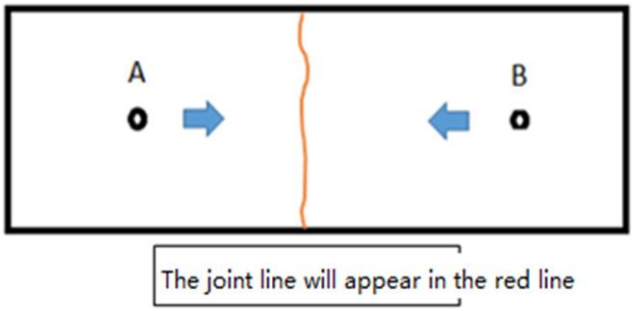
Syntheti











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, 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. 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 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 ≤ 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		√	