



HERCULUX
恒坤光电

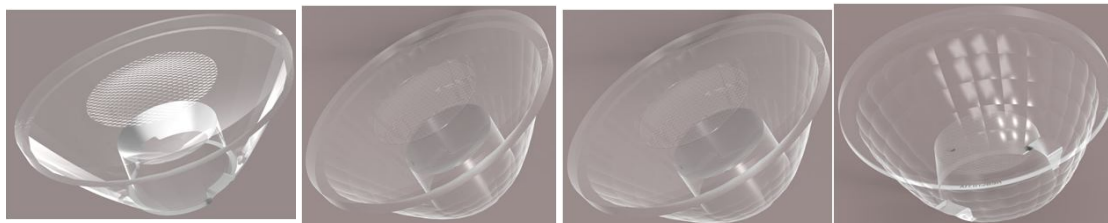
Chengdu HercuLux Photoelectric
Technology Co.,Ltd
Product Approval

Approval number :

Customer :

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd

PN	Code	Product
HK-35@16-15-D6-21-1g-1	1.01.81566	KA35-15° lens
HK-35@16-24-D6-21-1g-1	1.01.81567	KA35-24° lens
HK-35@16-36-D6-21-1g-1	1.01.81568	KA35-36° lens
HK-35@16-60-D6-20-1g-1	1.01.81581	KA35-60° lens



Supplier confirmation				Client confirmation			
Proposed		DATE		Qualified ☐		DATE	
Project manager		DATE		Unqualified ☐		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, lot 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.



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Product Approval

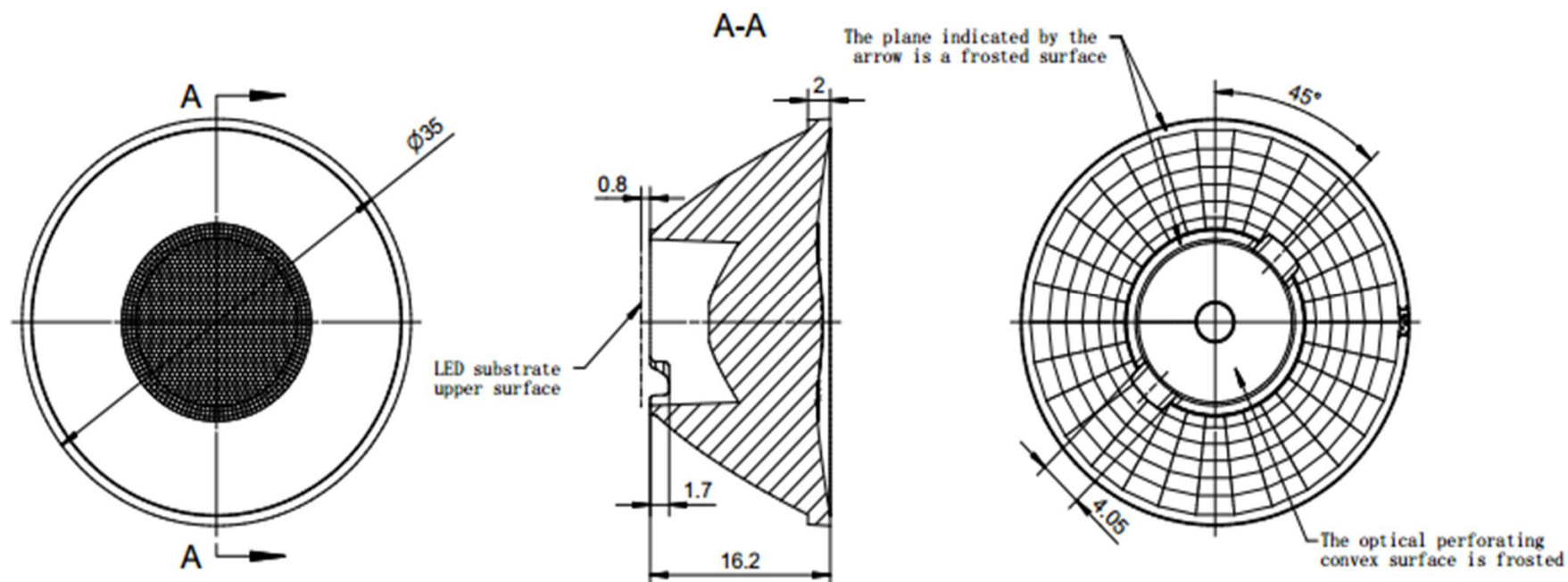
TEL: 0755-2937 1541

FAX: 0755-2907 5140

www.hkoptics.com

Date updated: 2019/7/8

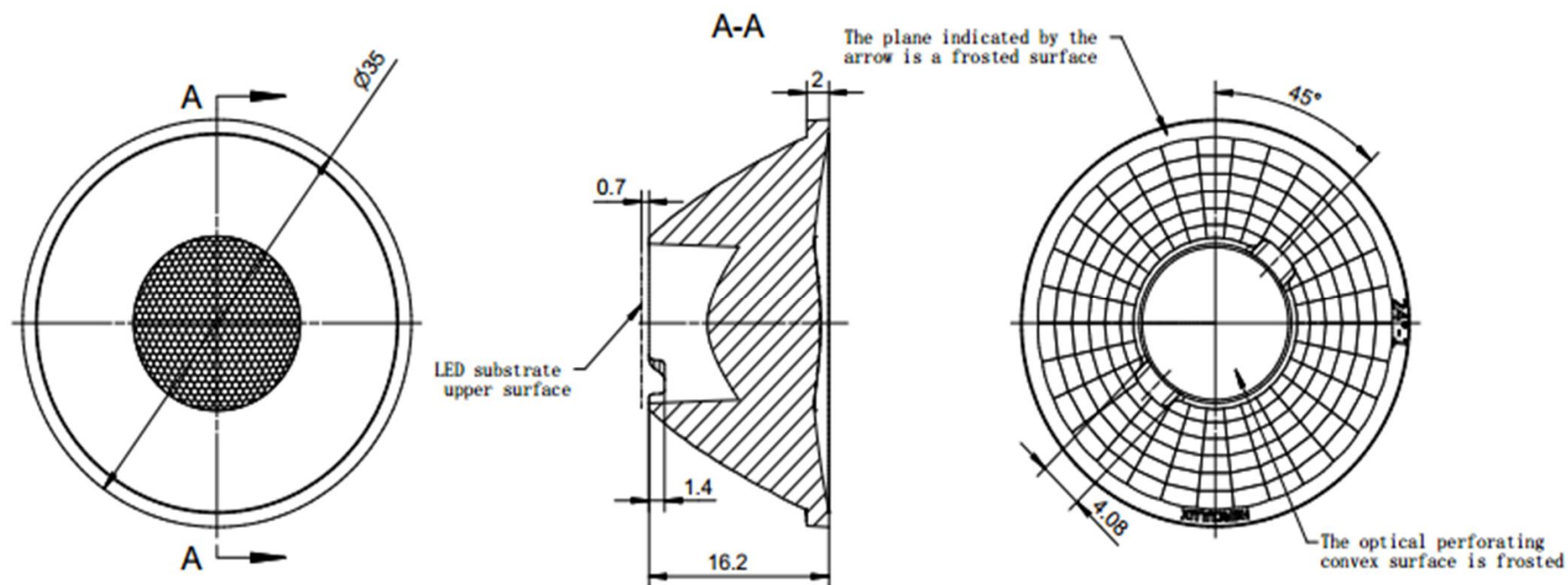
Product Picture:		
	PN:	HK-35@16-15-D6-21-1g-1
	Size(L*W*H/ Φ *H):	Φ :35mm; H:16mm
	Material:	PMMA
Efficiency:	$\geq 88\%$	
Temperature(Topr):	-40°C to +80°C	
FWHM:	15°、24°、36°、60°	
Matched LES:	D6	

**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			KA35-15°lens	HK-35@16-15-D6-21-1g-1		
Structure design				1.01.81566		
Review				Number of drawing	qty	weight
Validation						
			Material:	PMMA	CDHK	

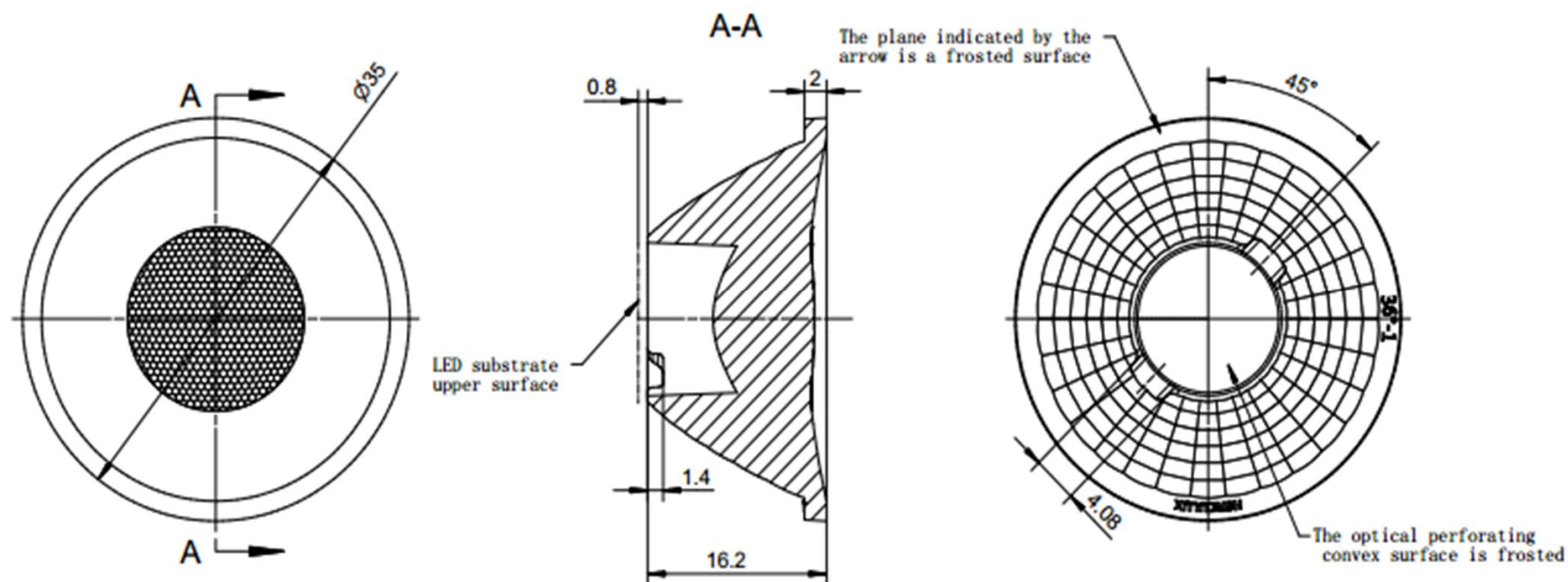
MT5 Tolerance table (mm)	Basic size	<3	3~10	24~65	65~140	140~250	250~450	>450		
	olerance value	±0.1	±0.15	±0.35	±0.50	±0.80	±1.2	±2.0		

**Technical remark:**

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

Optical design			KA35-24°lens		HK-35@16-24-D6-21-1g-1		
Structure design					1.01.81567		
Review					Number of drawing	qty	weight
Validation							
			Material:	PMMA	CDHK		

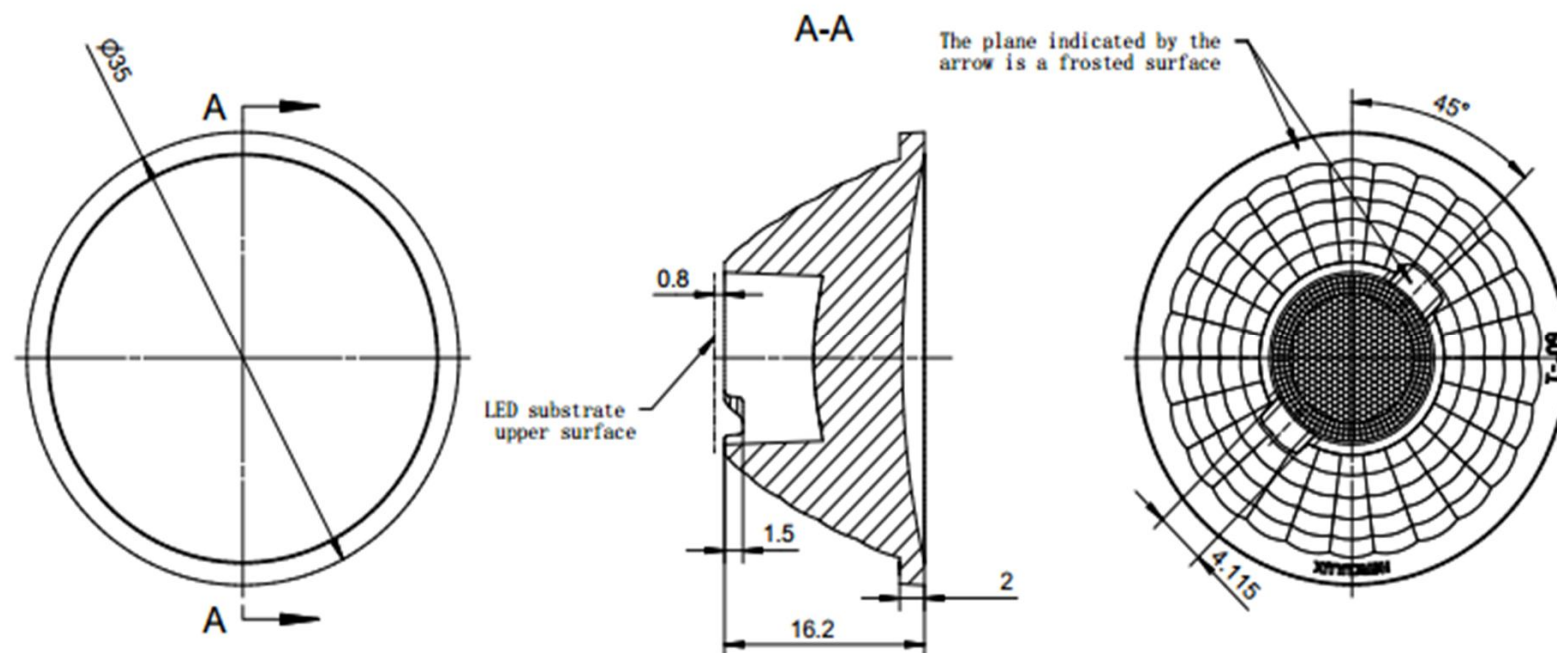
MT5 Tolerance table (mm)	Basic size	<3	3~10	24~65	65~140	140~250	250~450	>450		
	olerance valu	±0.1	±0.15	±0.35	±0.50	±0.80	±1.2	±2.0		

**Technical remark:**

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

Optical design			KA35-36°lens		HK-35@16-36-D6-21-1g-1		
Structure design					1.01.81568		
Review					Number of drawing	qty	weight
Validation							
			Material:	PMMA	CDHK		

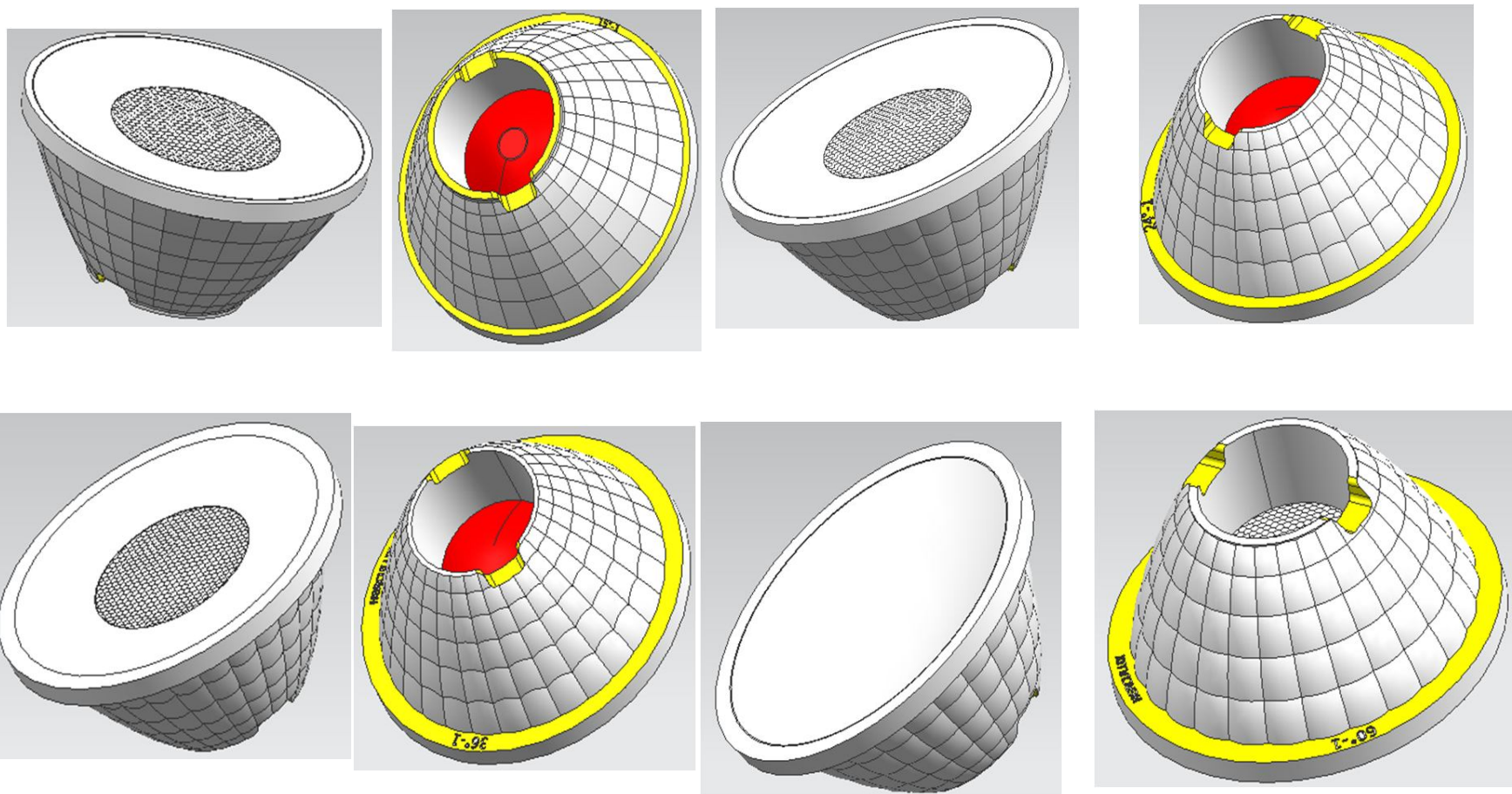
MT5 Tolerance table (mm)	Basic size	<3	3~10	24~65	65~140	140~250	250~450	>450		
	olerance valu	±0.1	±0.15	±0.35	±0.50	±0.80	±1.2	±2.0		

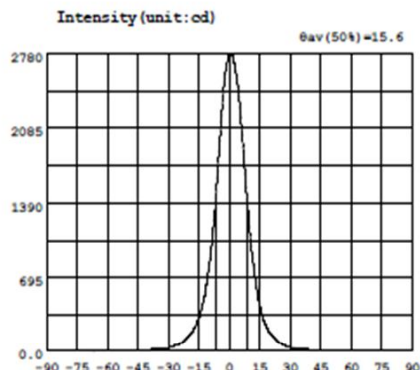
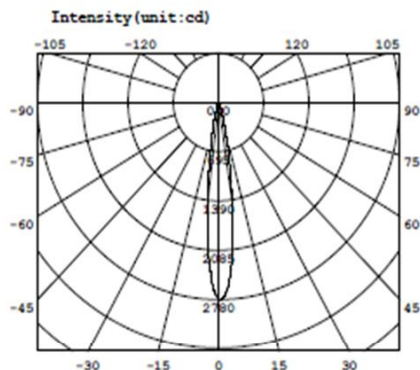
**Technical remark:**

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

Optical design			KA35-60°lens		HK-35@16-60-D6-20-1g-1		
Structure design					1.01.81581		
Review					Number of drawing	qty	weight
Validation			Material: PMMA		CDHK		

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





Intensity data:(deg , cd) C0-180

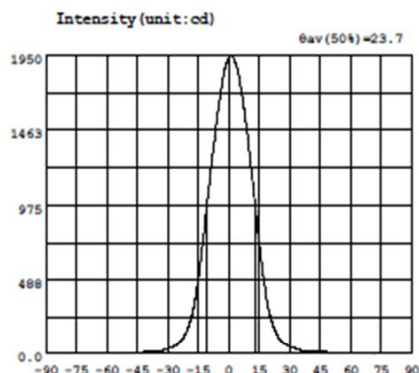
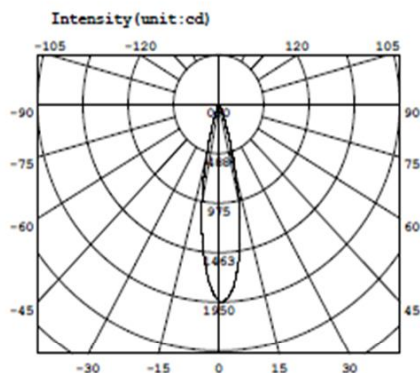
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	1.231	-88.5	8.645	-87.0	53.38	-85.5	2404	-84.0	22.89	-82.5	4.356
-88.5	1.921	-87.0	9.117	-85.5	65.28	-84.0	2087	-82.5	20.39	-81.0	3.722
-87.0	1.265	-85.5	9.565	-84.0	80.77	-82.5	1703	-81.0	18.48	-79.5	3.201
-85.5	1.265	-84.0	9.964	-82.5	101.6	-81.0	1331	-79.5	16.93	-78.0	2.836
-84.0	1.265	-82.5	10.40	-81.0	128.0	-79.5	1022	-78.0	15.57	-76.5	2.510
-82.5	1.221	-81.0	10.84	-79.5	160.8	-78.0	775.0	-76.5	14.46	-75.0	2.170
-81.0	1.277	-79.5	11.33	-78.0	199.0	-76.5	578.9	-75.0	13.47	-73.5	1.849
-79.5	1.335	-78.0	11.90	-76.5	251.7	-75.0	421.5	-73.5	12.23	-72.0	1.531
-78.0	1.483	-76.5	12.64	-75.0	323.3	-73.5	317.6	-72.0	11.28	-70.5	1.285
-76.5	1.779	-75.0	13.56	-73.5	423.3	-72.0	243.0	-70.5	10.57	-69.0	1.134
-75.0	2.132	-73.5	14.59	-72.0	558.7	-70.5	191.0	-69.0	10.01	-67.5	1.095
-73.5	2.496	-72.0	15.61	-70.5	737.8	-69.0	151.3	-67.5	9.526	-66.0	1.059
-72.0	2.883	-70.5	16.72	-69.0	967.6	-67.5	120.1	-66.0	9.110	-64.5	1.052
-70.5	3.340	-69.0	18.10	-67.5	1264	-66.0	95.31	-64.5	8.733	-63.0	1.023
-69.0	3.897	-67.5	19.73	-66.0	1636	-64.5	75.56	-63.0	8.340	-61.5	0.9955
-67.5	4.524	-66.0	21.71	-64.5	2056	-63.0	60.75	-61.5	7.949	-60.0	1.126
-66.0	5.237	-64.5	24.44	-63.0	2421	-61.5	49.40	-60.0	7.484		
-64.5	5.981	-63.0	27.87	-61.5	2661	-60.0	41.03	-58.5	6.960		
-63.0	6.682	-61.5	32.12	-60.0	2764	-58.5	34.73	-57.0	6.302		
-61.5	7.392	-60.0	37.37	-58.5	2747	-57.0	29.94	-55.5	5.638		
-60.0	8.128	-58.5	44.30	-57.0	2625	-55.5	26.07	-54.0	4.992		

Electricity Parameter:

Current I: 0.1000A Power: 3.460W
Voltage V: 34.59V PF: 1.000

Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: $\Phi_{eff} = 354.8lm$ Efficiency: $Eff = 102.55lm/W$
Diffuse angle: @ (25%): 23.3deg@ (50%): 15.6deg@ (75%): 10.4deg@ (50%): 15.6deg
Diffuse angle: @ (25%): 23.4deg@ (50%): 15.6deg@ (75%): 10.4deg@ (50%): 15.6deg
Imax=2772cd (C=0.0deg, G=0.5deg) C0-180Plane Imax= 2772cd(G=0.5deg)
C0-180Plane I0= 2764cd



Intensity data:(deg , cd) C0-180

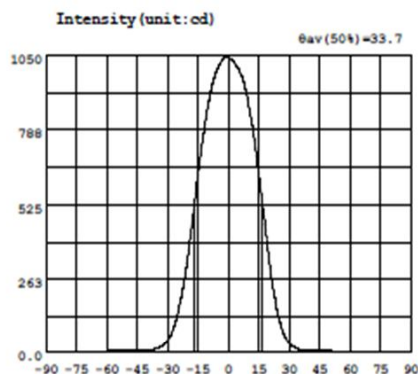
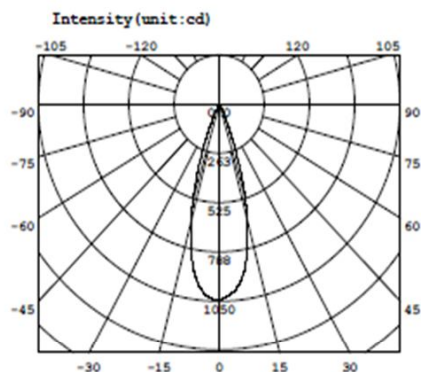
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.8917	-58.5	7.304	-27.0	52.92	4.5	1838	36.0	26.00	67.5	5.414
-88.5	0.9555	-57.0	7.615	-25.5	65.77	6.0	1732	37.5	22.92	69.0	4.558
-87.0	1.019	-55.5	7.917	-24.0	82.47	7.5	1599	39.0	20.51	70.5	3.797
-85.5	1.069	-54.0	8.258	-22.5	109.8	9.0	1445	40.5	18.71	72.0	3.230
-84.0	1.090	-52.5	8.699	-21.0	148.2	10.5	1272	42.0	17.50	73.5	2.717
-82.5	1.018	-51.0	9.148	-19.5	201.1	12.0	1089	43.5	16.36	75.0	2.300
-81.0	1.023	-49.5	9.628	-18.0	272.3	13.5	901.7	45.0	15.30	76.5	1.934
-79.5	1.200	-48.0	10.17	-16.5	368.9	15.0	720.9	46.5	14.25	78.0	1.629
-78.0	1.342	-46.5	10.80	-15.0	498.6	16.5	556.5	48.0	13.36	79.5	1.383
-76.5	1.536	-45.0	11.56	-13.5	656.1	18.0	416.5	49.5	12.55	81.0	1.202
-75.0	1.643	-43.5	12.40	-12.0	821.0	19.5	300.0	51.0	11.75	82.5	1.089
-73.5	2.085	-42.0	13.38	-10.5	1014	21.0	221.6	52.5	11.04	84.0	1.071
-72.0	2.485	-40.5	14.38	-9.0	1192	22.5	165.0	54.0	10.42	85.5	1.095
-70.5	3.081	-39.0	15.50	-7.5	1364	24.0	125.0	55.5	9.977	87.0	1.132
-69.0	3.626	-37.5	17.08	-6.0	1525	25.5	96.81	57.0	9.523	88.5	1.136
-67.5	4.246	-36.0	19.14	-4.5	1671	27.0	76.79	58.5	9.093	90.0	1.134
-66.0	4.838	-34.5	21.75	-3.0	1791	28.5	62.13	60.0	8.674		
-64.5	5.425	-33.0	25.10	-1.5	1881	30.0	50.60	61.5	8.141		
-63.0	5.974	-31.5	29.38	0.0	1934	31.5	41.50	63.0	7.579		
-61.5	6.474	-30.0	35.14	1.5	1943	33.0	34.85	64.5	6.947		
-60.0	6.963	-28.5	42.96	3.0	1910	34.5	29.83	66.0	6.242		

Electricity Parameter:

Current I: 0.1000A Power: 3.460W
Voltage V: 34.59V PF: 1.000

Optical Parameter(Distance=2.559m):

Equivalent Luminous flux: $\Phi_{\text{eff}} = 404.31\text{lm}$ Efficiency: $\text{Eff} = 116.88\text{lm/W}$
Diffuse angle: @ (25%): 32.3deg@ (50%): 23.7deg@ (75%): 15.4deg@ (50%): 23.7deg
Diffuse angle: @ (25%): 32.3deg@ (50%): 23.7deg@ (75%): 15.6deg@ (50%): 23.7deg
Imax=1945cd (C=0.0deg, G=1.0deg) C0-180Plane Imax= 1945cd(G=1.0deg)
C0-180Plane I0= 1934cd



Intensity data:(deg , cd) C0-180

A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.9278	-58.5	7.534	-27.0	92.90	4.5	1005	36.0	12.49	67.5	2.666
-88.5	1.050	-57.0	8.027	-25.5	120.9	6.0	993.8	37.5	10.70	69.0	2.327
-87.0	1.038	-55.5	8.431	-24.0	177.2	7.5	952.8	39.0	9.759	70.5	2.821
-85.5	0.9596	-54.0	8.774	-22.5	232.9	9.0	907.4	40.5	9.063	72.0	2.292
-84.0	0.9142	-52.5	9.060	-21.0	300.2	10.5	851.6	42.0	8.538	73.5	1.905
-82.5	0.8951	-51.0	9.311	-19.5	378.7	12.0	787.2	43.5	8.259	75.0	1.539
-81.0	1.087	-49.5	9.407	-18.0	462.1	13.5	709.1	45.0	8.240	76.5	1.257
-79.5	1.198	-48.0	9.509	-16.5	549.4	15.0	625.2	46.5	8.087	78.0	1.037
-78.0	1.234	-46.5	9.810	-15.0	635.7	16.5	540.1	48.0	7.652	79.5	0.9768
-76.5	1.395	-45.0	10.05	-13.5	719.0	18.0	453.4	49.5	7.322	81.0	0.9749
-75.0	1.714	-43.5	10.23	-12.0	793.5	19.5	361.8	51.0	7.133	82.5	0.8504
-73.5	2.100	-42.0	10.44	-10.5	859.5	21.0	274.8	52.5	6.785	84.0	0.7880
-72.0	2.606	-40.5	10.96	-9.0	916.9	22.5	206.1	54.0	6.507	85.5	0.8008
-70.5	3.262	-39.0	11.82	-7.5	962.5	24.0	149.5	55.5	6.316	87.0	0.8674
-69.0	3.869	-37.5	12.26	-6.0	995.1	25.5	104.9	57.0	6.028	88.5	0.9455
-67.5	4.289	-36.0	15.52	-4.5	1018	27.0	72.87	58.5	5.774	90.0	0.9593
-66.0	4.761	-34.5	18.90	-3.0	1033	28.5	50.64	60.0	5.527		
-64.5	5.162	-33.0	24.36	-1.5	1042	30.0	35.17	61.5	5.198		
-63.0	5.669	-31.5	32.91	0.0	1041	31.5	25.09	63.0	4.824		
-61.5	6.499	-30.0	46.24	1.5	1033	33.0	18.90	64.5	4.438		
-60.0	7.015	-28.5	66.16	3.0	1022	34.5	15.01	66.0	3.917		

Electricity Parameter:

Current I: 0.1000A Power: 3.440W
Voltage V: 34.40V PF: 1.000

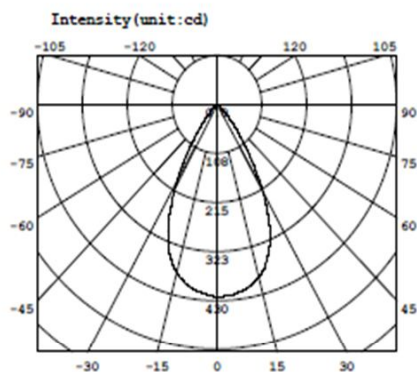
Optical Parameter(Distance=2.410m):Equivalent Luminous flux: Φ_{eff} = 359.1lm Efficiency: Eff=104.41lm/W

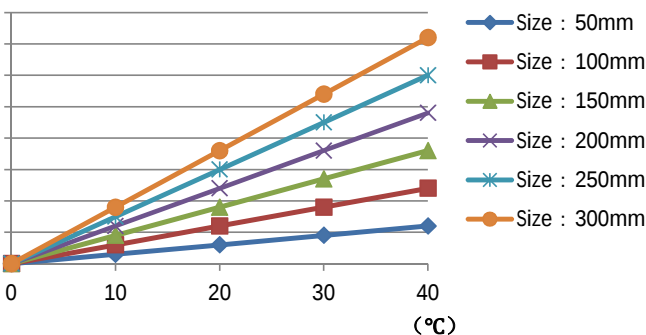
Diffuse angle: @ (25%): 43.0deg@ (50%): 33.7deg@ (75%): 24.3deg@ (50%): 33.7deg

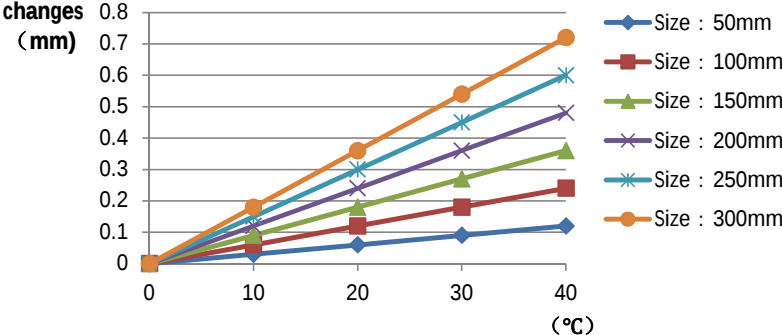
Diffuse angle: @ (25%): 43.1deg@ (50%): 33.7deg@ (75%): 24.3deg@ (50%): 33.7deg

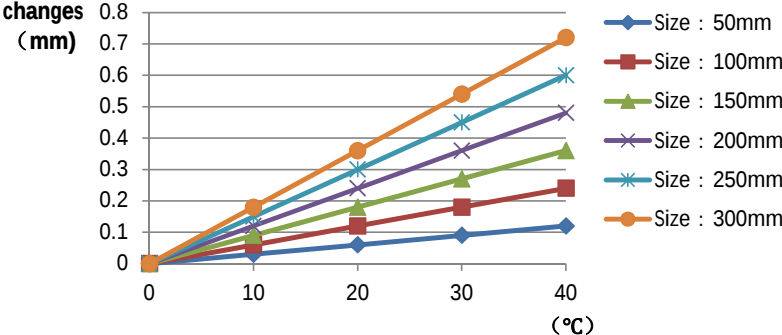
Imax=1042cd (C=0.0deg, G=-1.0deg) C0-180Plane Imax= 1042cd(G=-1.0deg)

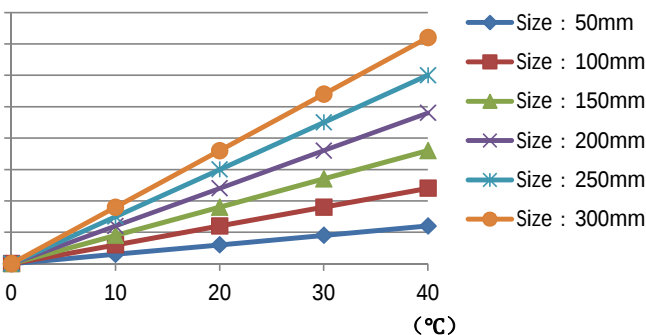
C0-180Plane IO= 1041cd



1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																										
	Diameter	35	35.3	34.9	35.14	35.13	35.14		OK	Test environment: In 20 °C -25 °C environment to achieve thermal equilibrium after the test.																																										
	height	16.2	16.4	16.1	16.28	16.29	16.27		OK																																											
	thickness	2	2.15	1.95	2.04	2.06	2.08		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	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	14 ° -18 °			15.6 °	15.7 °	15.6 °	15.5 °	OK																																											
	K value	≥6.3			7.81	7.72	7.83	7.87	OK																																											
	efficiency	≥88%			90.20%	91.00%	90.30%	89.80%	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 PMMA product size changes with temperature table Length changes (mm) <table><thead><tr><th>Temperature (°C)</th><th>50mm</th><th>100mm</th><th>150mm</th><th>200mm</th><th>250mm</th><th>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>0.10</td><td>0.12</td><td>0.15</td><td>0.18</td></tr><tr><td>20</td><td>0.08</td><td>0.12</td><td>0.18</td><td>0.22</td><td>0.28</td><td>0.35</td></tr><tr><td>30</td><td>0.10</td><td>0.18</td><td>0.25</td><td>0.35</td><td>0.45</td><td>0.55</td></tr><tr><td>40</td><td>0.12</td><td>0.22</td><td>0.35</td><td>0.48</td><td>0.60</td><td>0.72</td></tr></tbody></table>									Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm	0	0.00	0.00	0.00	0.00	0.00	0.00	10	0.05	0.08	0.10	0.12	0.15	0.18	20	0.08	0.12	0.18	0.22	0.28	0.35	30	0.10	0.18	0.25	0.35	0.45	0.55	40	0.12	0.22	0.35	0.48	0.60	0.72
Temperature (°C)	50mm	100mm	150mm	200mm	250mm	300mm																																														
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	K-value	≥4			5.96	5.87	4.81	4.84	OK																																											
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	FWHM	See light distribution curve																																																		
	angle	30 ° -38 °			33.7 °	33.6 °	33.6 °	33.8 °	OK																																											
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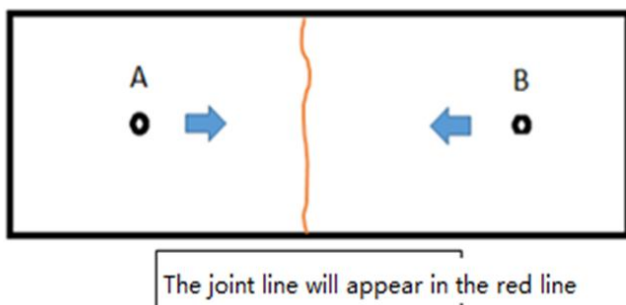
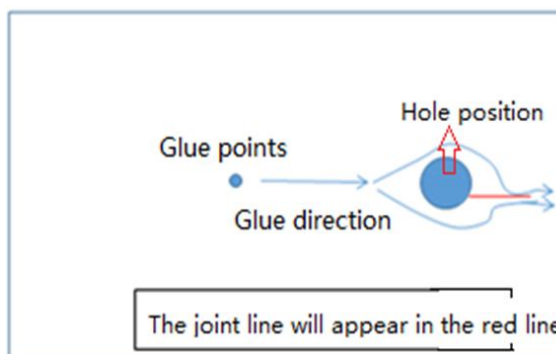
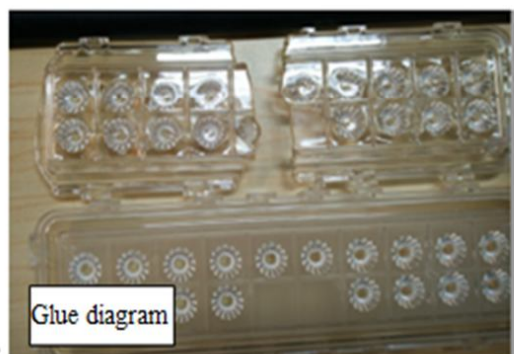
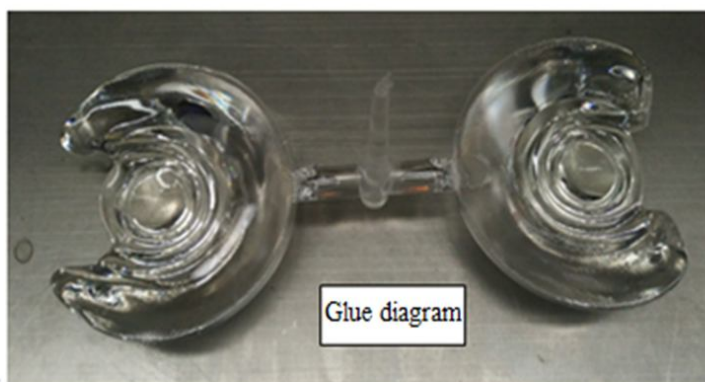
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PN		HK-35@16-15-D6-21-1g-1		Product Name		KA35-15°lens	
Product material		PMMA		Customer			
Package diagram		Single Vacuum package Box package					
Product packing		27	A/ Box	4	Box/Layer		
		16	Layer/Box	1728	A/ Box		
		8	Individual net weight	17.6	Weight of the whole case		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0011	Blister box	23cm*21cm	64	PCS	
	2	2.08.0001	PE film	25cm*27cm	64	block	
	3	2.06.0005	Inside label paper	62mm*42mm	64	zhang	
	4	2.06.0005	Case label paper	62mm*70mm	1	zhang	
	5	2.06.0003	The big plate	46cm*42cm	17	PCS	
	6	2.06.0011	The big carton	48cm*44cm*37cm	1	PCS	
Remarks	The loose packing is not subject to this specification. Customer's requirements shall prevail						

Special notice

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

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 Sampling standards, sampling plan and AQL

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

2 Code table

Code	Code description	Unit	Code		Code description	Unit
N	Amount/pcs	pcs	D		Diameter	mm
L	Length	mm	H		Depth	mm
W	Width	mm	DS		Distance	mm
S	Proportion	mm ²	SS		Offset	mm

3 Test conditions

3.1 Sight distance and working hours: Sight distance should be 30-35cm, each side of the inspection time does not exceed 12s, the visual angle of 45-135 degrees;

3.2 Light: 2x40w cool white fluorescent lamp, the light source is 500-550mm away from the lens surface; in order to make the appearance defect can be correctly recognized, the illumination should be 500-1000Lux, and the observation time is 10 seconds.

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

4 Appearance inspection standards

Test items	Judging standard	Inspection equipment	Defect level		
		Testing method	MI	MA	CR
Check the sample	When start the machine and process, all products have to check the appearance of the sample, the appearance of the sample is divided into qualified samples and limited samples.	Sample comparison, visual			√
	1: Qualified sample refers to the appearance and structure standard of the product which recognized by the client, the sample size should be confirmed before mass production;				
	2: The limited sample refers to the limit of a particular exceptionally developed sample. Limit the sample only for its specific point of exception to confirm; The priority is higher than the other criteria in this table. When there is a limited sample, the limit sample shall prevail.				
Raw edge	Not allowed to affect the size and assembly	Visual, point card		√	

Scratch	1: Non-optical surface and non-exposed surface scratches should be visually insignificant and the length is less than 1/10 of the maximum surface size.	Visual, point card, calipers		√	
Fingerprint	Fingerprints are not allowed on all products	Visual		√	
Foreign objects, black spots, white spots	The product may not be attached to foreign objects, including oil, fiber, dregs of water gap and so on				√
Deformation	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces.	Visual, feeler			√
Poor ejection	Products may not appear bad ejection, including no convex top, thimble printed on the assembly surface shall not be higher than the product surface, non-assembled surface thimble height should not exceed the product size tolerances; thimble printing should be less than the product surface and no more than 0.3; thimble surface treatment should be consistent with the product side.	Visual, point card		√	
	Ejection strain: the optical surface and the appearance of the exposed surface after assembly are not allowed to have a strain, and the structural surface does not allow visual obvious strain.				
Insufficient filling	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces , The signature sample shall prevail.	Visual, point card		√	
Shrink	When the entire surface of the product shrinks, the optical properties and dimensions must meet the requirements, and the visual will not significantly affect the appearance.Part shrink reference point defects	Visual, point card		√	
Flow marks、Welding line	1 : Product does not allow the presence of flow marks and welding lines unless the structure can not be avoided;	Visual		√	
	2: The remaining flow marks shall not appear in the optical surface, a single L ≤ 10mm, no more than two				
Bubble	No bubbles are allowed	Visual		√	
Foreign objects, black spots, white spots	Not obvious or D ≤ 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		√	