



HERCULUX
恒坤光电

Chengdu HercuLux Photoelectric
Technology Co.,Ltd
Product Approval

Approval number :

Customer :

PN	Code	Product
HK-72@33-20-1820-20-1g-1	1. 01. 5435	SX-20° (1820) Lens
HK-72@33-15-1820-20-1g-1	1. 01. 5436	SX-15° (1820) Lens
HK-72@33-24-D9-20-1g-1	1. 01. 6771	SX-24° (D9) Lens
HK-72@33-36-D9-20-1g-1	1. 01. 6878	SX-36° (D9) Lens
HK-72@33-60-D9-20-1g-1	1. 01. 81460	HK-60° (D9) Lens

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



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, 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.



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Product Approval

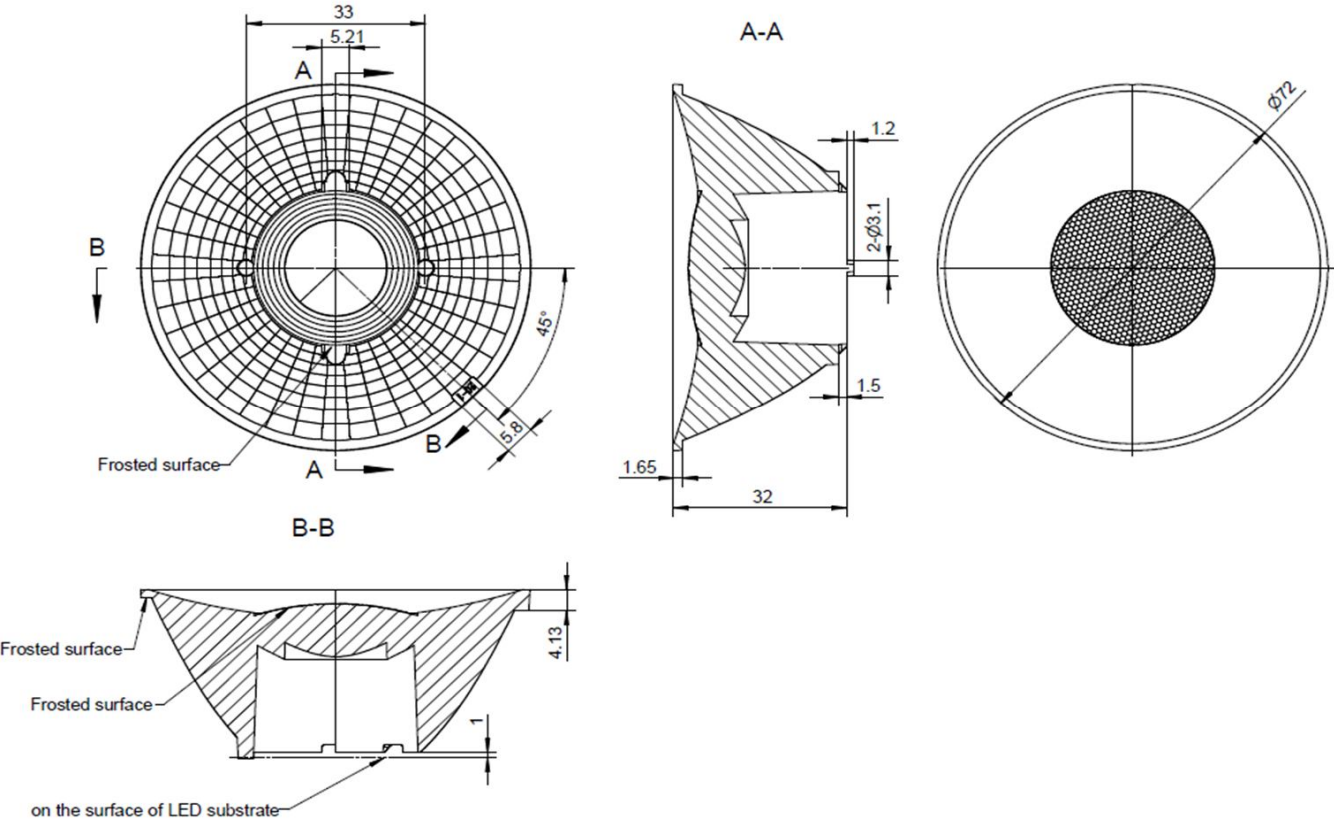
TEL: 0755-2937 1541

FAX: 0755-2907 5140

www.hkoptics.com

Date updated: 2019/2/15

Product Picture:		
PN:	HK-72@33-20-1820-20-1g-1	
Size(L*W*H/ Φ *H):	Φ :72mm; H:33.2mm	
1.07.81418_HK-166@03-0223-S	PMMA	
Effiency:	\	
Temperature(Topr):	-40°C to +80°C	
FWHM:	15°/20°/24°/36°/60°	
Matched LES:	CREE1820	

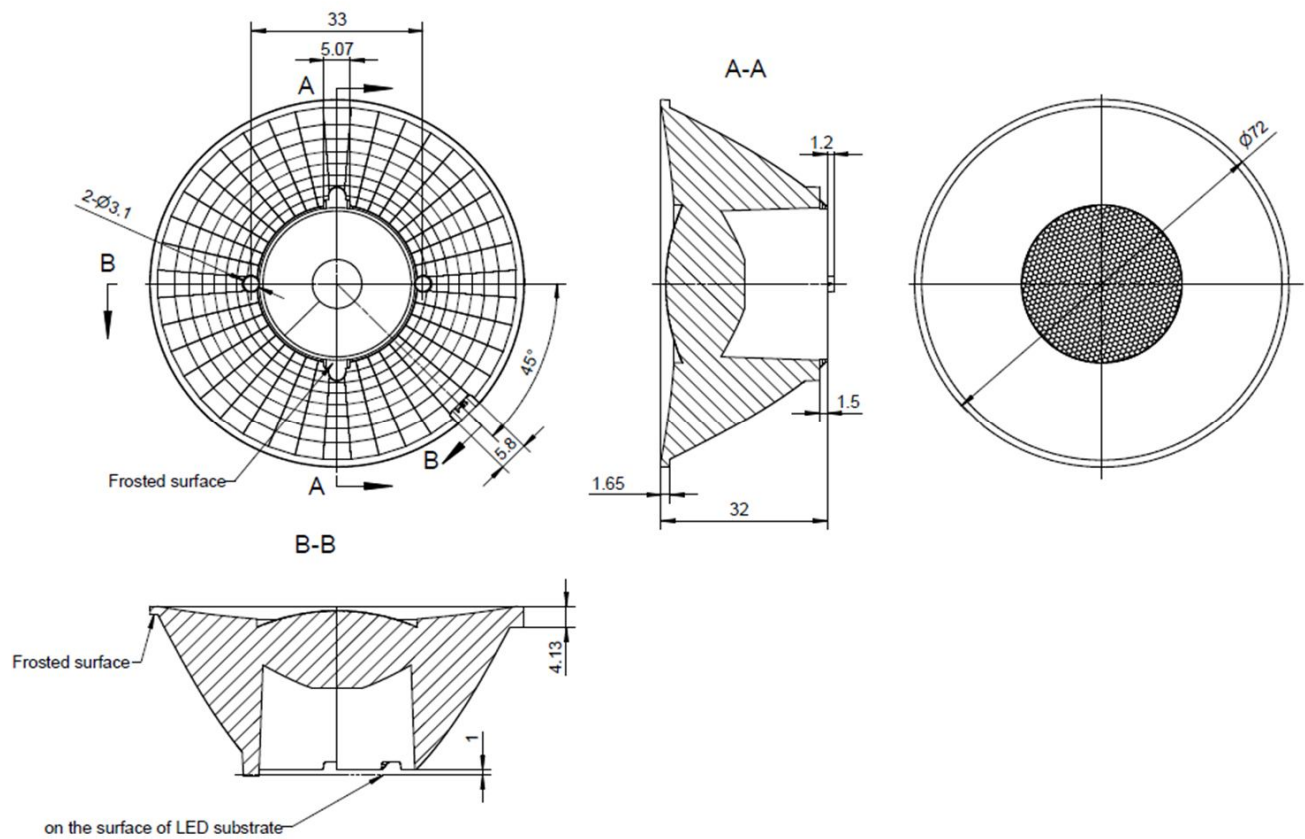


Technical remark:

- 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			SX-20° (1820) Lens		HK-72@33-20-1820-20-1g-1		
structure design					1.01.5435		
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		

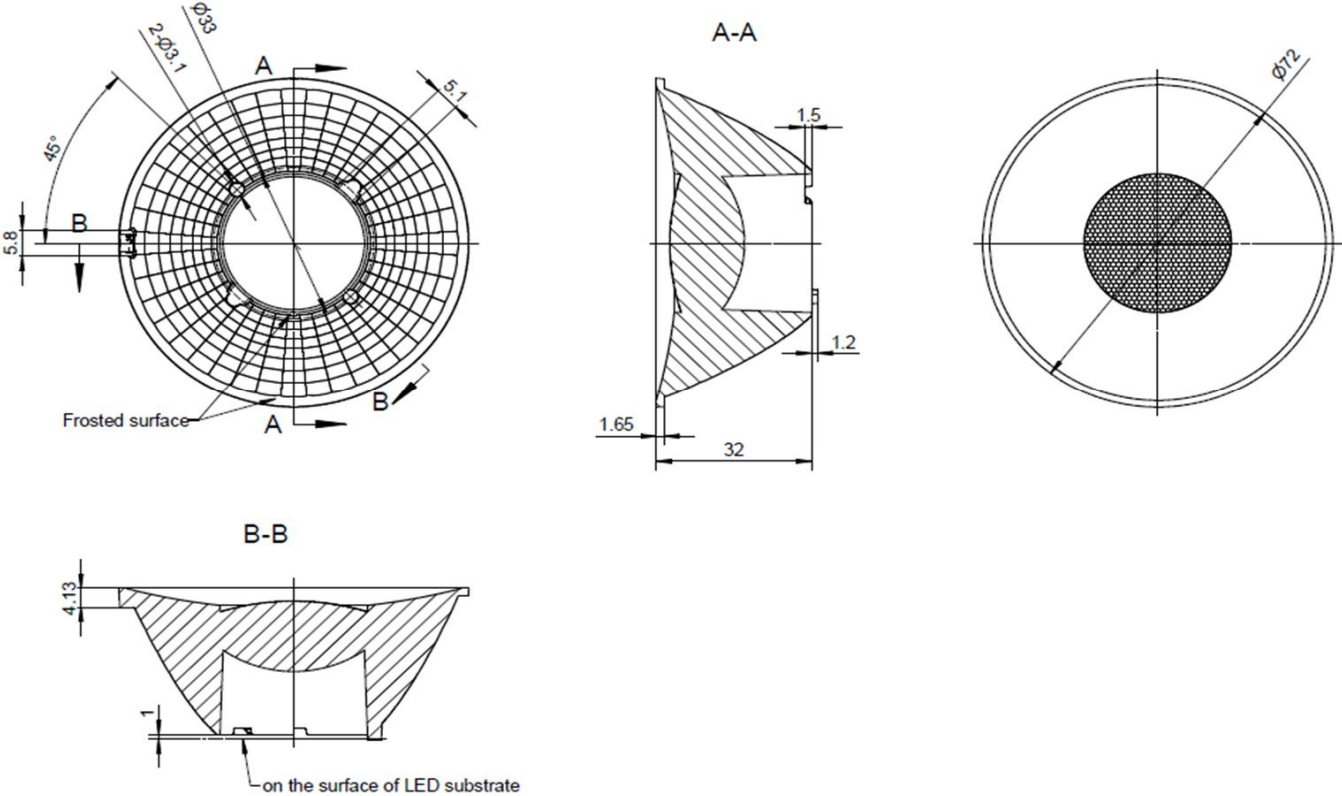


Technical remark:

- 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			SX-15° (1820) Lens		HK-72@33-15-1820-20-1g-1		
structure design					1.01.5436		
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		

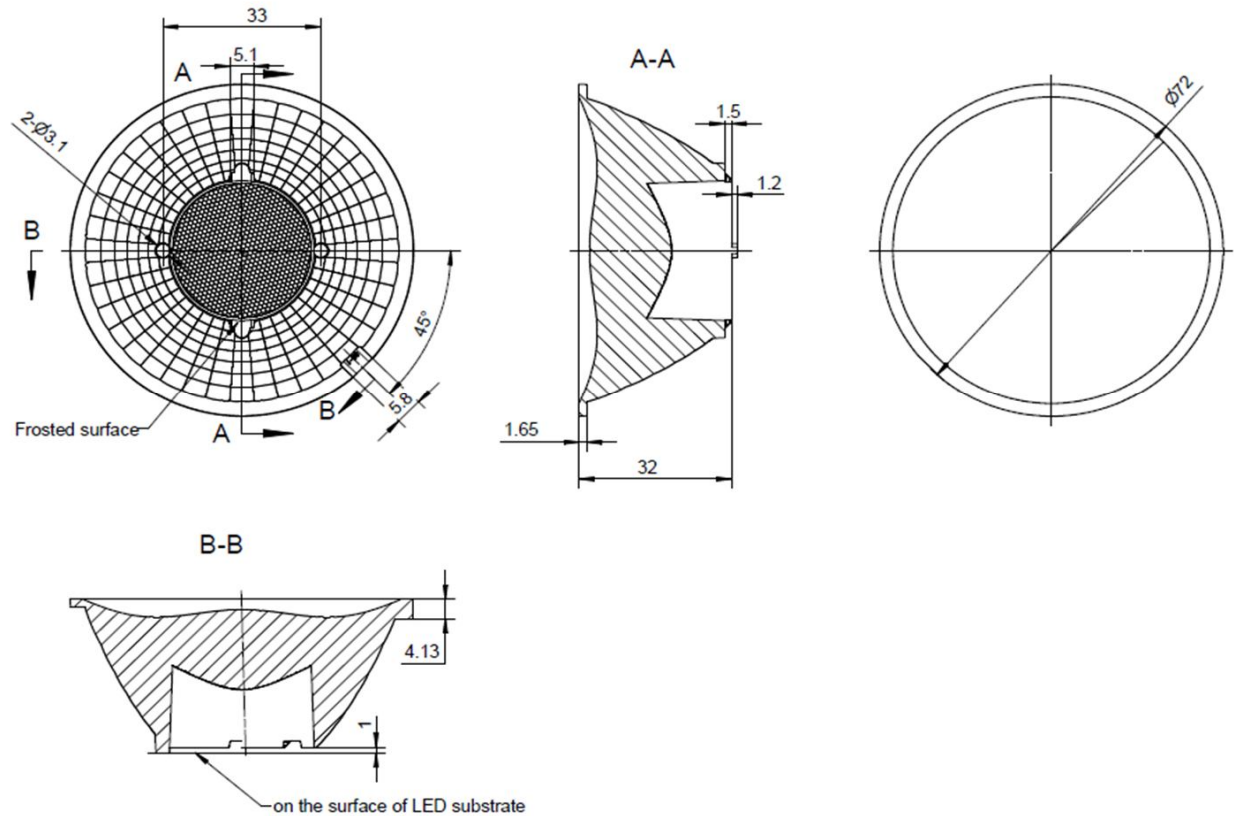


Technical remark:

- 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			SX-24° (D9) Lens		HK-72@33-24-D9-20-1g-1		
Structure design					1.01.6771		
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		

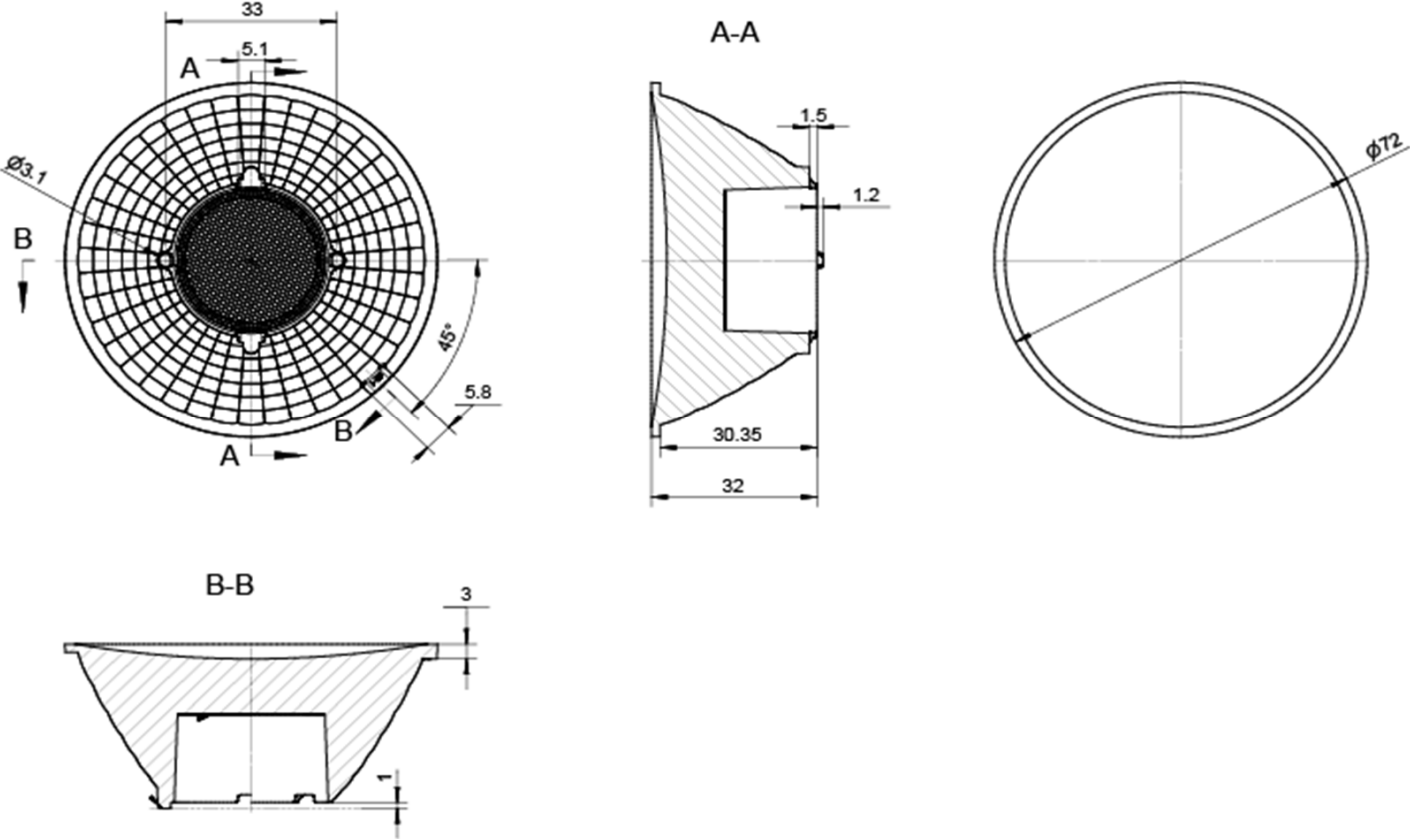


Technical remark:

- 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			SX-36° (D9) Lens		HK-72@33-36-D9-20-1g-1		
structure design						1.01.6878	
Review					umber of drawin	qty	weight
Validation			Material:	PMMA	CDHK		

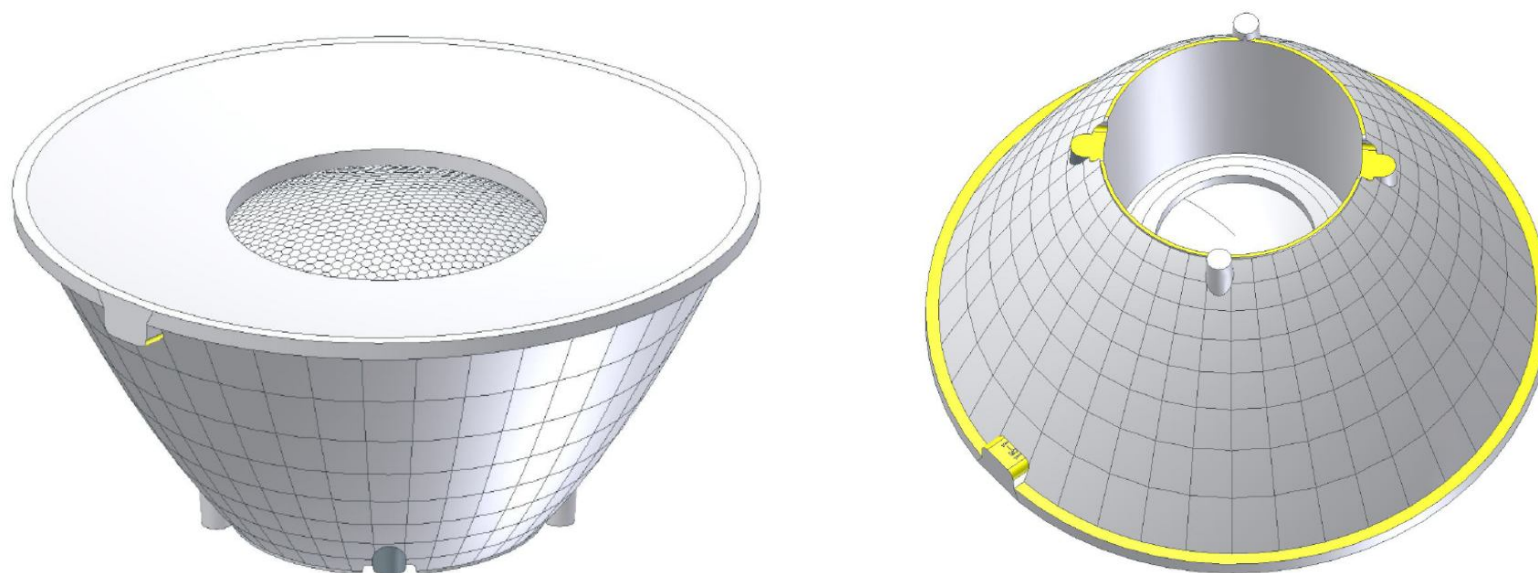
MT5 Tolerance table (mm)	Basic size	<3	3~10	24~65	65~140	140~250	250~450	>450		
	olerance valu	±0.1	±0.15	±0.35	±0.50	±0.80	±1.2	±2.0		

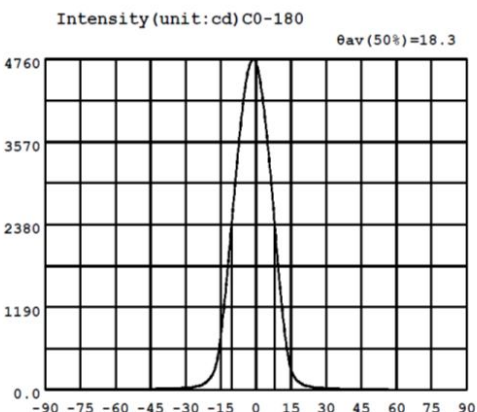
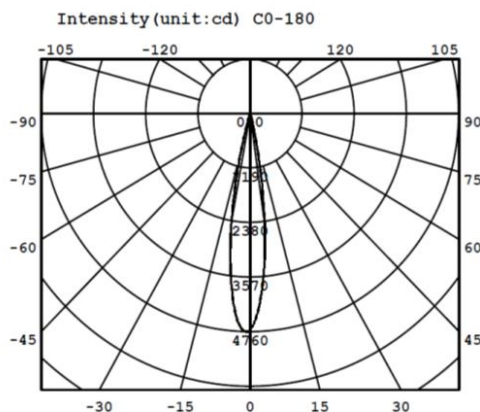


Technical remark:
1. The 3D map is not indicated for rounded corners and draft angle.
2. The dimensional tolerances are not specified according to GB/T 14486 2008 MT5.
3. The surface has no flash, shrinkage, bubbles and other defects.

Optical design			HK-60° (D9) Lens		HK-72@33-60-D9-20-1g-1		
Structure design					1.01.81460		
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		





Intensity data:(deg , cd) C0-180

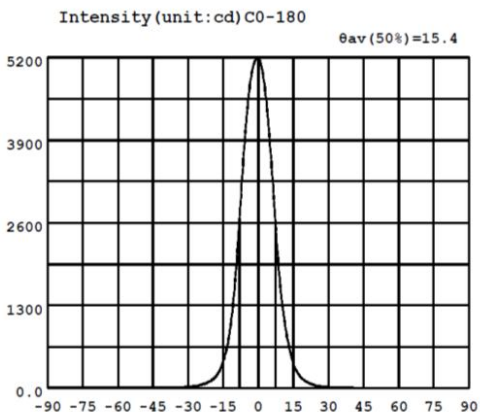
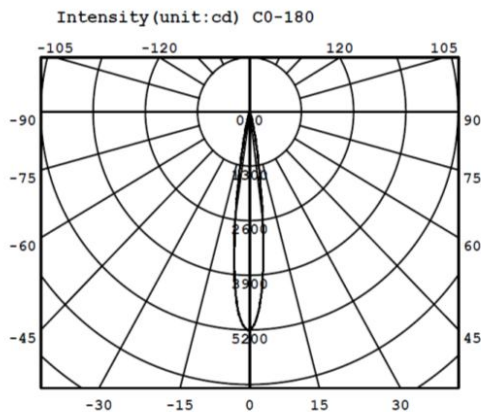
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	13.34	-58.5	13.52	-27.0	40.61	4.5	3732	36.0	16.06	67.5	5.199
-88.5	12.90	-57.0	13.75	-25.5	50.22	6.0	3206	37.5	15.07	69.0	4.947
-87.0	12.68	-55.5	14.00	-24.0	61.26	7.5	2625	39.0	14.20	70.5	4.710
-85.5	12.80	-54.0	14.19	-22.5	83.25	9.0	1982	40.5	13.38	72.0	4.409
-84.0	12.67	-52.5	14.35	-21.0	119.7	10.5	1414	42.0	12.59	73.5	3.853
-82.5	12.49	-51.0	14.49	-19.5	171.9	12.0	916.7	43.5	11.85	75.0	3.173
-81.0	12.32	-49.5	14.62	-18.0	258.7	13.5	539.9	45.0	11.21	76.5	0.4586
-79.5	12.32	-48.0	14.84	-16.5	434.2	15.0	289.1	46.5	10.75	78.0	0.3758
-78.0	12.29	-46.5	15.15	-15.0	779.4	16.5	185.3	48.0	10.44	79.5	0.2984
-76.5	12.28	-45.0	15.55	-13.5	1234	18.0	124.8	49.5	10.11	81.0	0.2707
-75.0	12.28	-43.5	16.02	-12.0	1760	19.5	88.24	51.0	9.715	82.5	0.2610
-73.5	12.24	-42.0	16.59	-10.5	2333	21.0	65.04	52.5	9.314	84.0	0.2511
-72.0	12.16	-40.5	17.18	-9.0	2926	22.5	52.00	54.0	8.915	85.5	0.2694
-70.5	12.10	-39.0	17.82	-7.5	3469	24.0	43.62	55.5	8.466	87.0	0.3008
-69.0	12.10	-37.5	18.57	-6.0	3957	25.5	35.44	57.0	8.007	88.5	0.2731
-67.5	12.23	-36.0	19.41	-4.5	4364	27.0	29.66	58.5	7.600	90.0	0.2718
-66.0	12.39	-34.5	20.60	-3.0	4637	28.5	25.28	60.0	7.176		
-64.5	12.57	-33.0	22.64	-1.5	4749	30.0	22.04	61.5	6.682		
-63.0	12.81	-31.5	25.27	0.0	4717	31.5	19.87	63.0	6.233		
-61.5	13.02	-30.0	28.77	1.5	4518	33.0	18.14	64.5	5.857		
-60.0	13.26	-28.5	33.60	3.0	4169	34.5	17.05	66.0	5.473		

Electricity Parameter:

Current I: 0.2000A Power: 3.339W
Voltage V: 33.40V PF: 1.000

Optical Parameter(Distance=2.410m):

Diffuse angle: @ (25%): 24.7deg@ (50%): 18.3deg@ (75%): 12.1deg@ (50%): 18.3deg
Diffuse angle: @ (25%): 24.7deg@ (50%): 18.5deg@ (75%): 12.2deg@ (50%): 18.5deg
Imax=4758cd (C=0.0deg,G=-1.0deg) C0-180Plane Imax= 4758cd(G=-1.0deg)
C0-180Plane I0= 4717cd



Intensity data:(deg , cd) C0-180

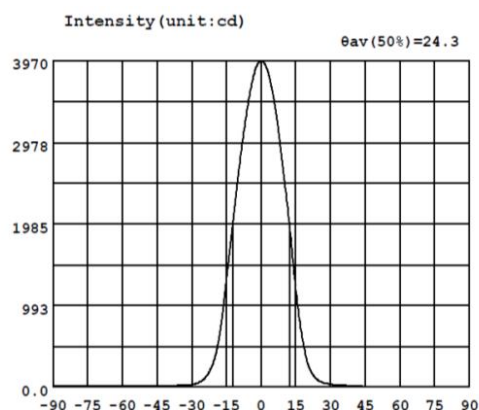
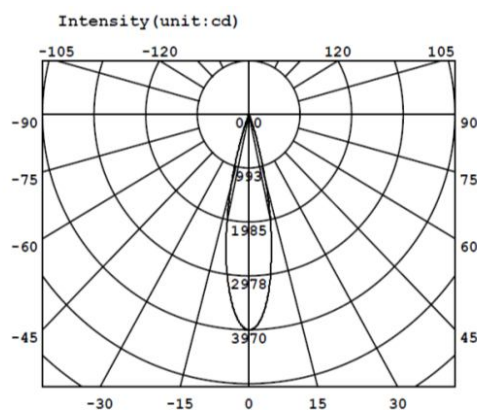
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	12.05	-58.5	11.61	-27.0	32.39	4.5	4097	36.0	10.43	67.5	4.383
-88.5	11.70	-57.0	11.58	-25.5	43.08	6.0	3363	37.5	9.696	69.0	3.991
-87.0	11.42	-55.5	11.48	-24.0	57.33	7.5	2529	39.0	9.194	70.5	3.634
-85.5	11.17	-54.0	11.41	-22.5	75.69	9.0	1782	40.5	8.929	72.0	3.336
-84.0	10.90	-52.5	11.28	-21.0	100.6	10.5	1257	42.0	8.746	73.5	3.011
-82.5	10.70	-51.0	11.20	-19.5	136.4	12.0	876.5	43.5	8.674	75.0	2.726
-81.0	10.59	-49.5	11.11	-18.0	191.0	13.5	599.3	45.0	8.567	76.5	2.407
-79.5	10.54	-48.0	11.04	-16.5	274.8	15.0	391.3	46.5	8.379	78.0	2.146
-78.0	10.50	-46.5	10.97	-15.0	416.2	16.5	264.3	48.0	8.137	79.5	1.949
-76.5	10.45	-45.0	10.85	-13.5	618.6	18.0	183.4	49.5	7.930	81.0	1.865
-75.0	10.45	-43.5	10.74	-12.0	931.2	19.5	129.7	51.0	7.769	82.5	1.782
-73.5	10.46	-42.0	10.76	-10.5	1416	21.0	93.93	52.5	7.616	84.0	1.720
-72.0	10.52	-40.5	11.02	-9.0	2137	22.5	68.93	54.0	7.508	85.5	1.693
-70.5	10.63	-39.0	11.42	-7.5	2944	24.0	49.26	55.5	7.403	87.0	1.729
-69.0	10.72	-37.5	11.97	-6.0	3765	25.5	35.01	57.0	7.221	88.5	1.779
-67.5	10.90	-36.0	12.78	-4.5	4436	27.0	25.87	58.5	6.970	90.0	1.830
-66.0	11.05	-34.5	13.91	-3.0	4899	28.5	20.69	60.0	6.657		
-64.5	11.23	-33.0	15.44	-1.5	5138	30.0	17.14	61.5	6.285		
-63.0	11.40	-31.5	17.47	0.0	5191	31.5	14.59	63.0	5.847		
-61.5	11.55	-30.0	20.22	1.5	5040	33.0	12.71	64.5	5.249		
-60.0	11.58	-28.5	24.69	3.0	4672	34.5	11.43	66.0	4.799		

Electricity Parameter:

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

Optical Parameter(Distance=2.559m):

Diffuse angle: @ (25%): 21.1deg@ (50%): 15.4deg@ (75%): 10.6deg@ (50%): 15.4deg
Diffuse angle: @ (25%): 21.1deg@ (50%): 15.4deg@ (75%): 10.6deg@ (50%): 15.4deg
Imax=5192cd (C=0.0deg,G=-0.5deg) C0-180Plane Imax= 5192cd(G=-0.5deg)
C0-180Plane I0= 5191cd



Intensity data:(deg , cd) C0-180

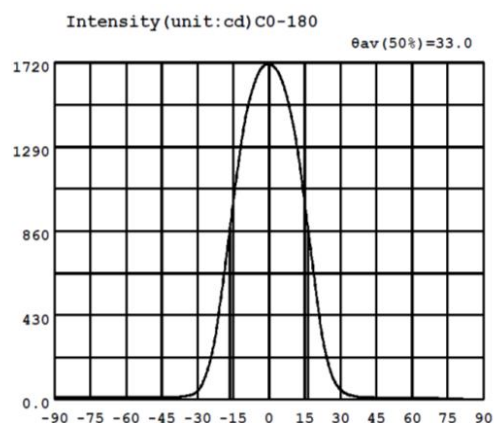
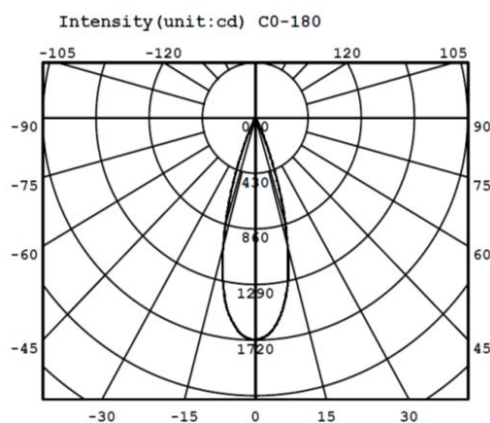
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	18.65	-58.5	17.52	-27.0	57.27	4.5	3656	36.0	22.10	67.5	7.292
-88.5	18.13	-57.0	17.35	-25.5	82.98	6.0	3425	37.5	19.53	69.0	6.685
-87.0	17.67	-55.5	17.07	-24.0	123.3	7.5	3127	39.0	17.50	70.5	6.132
-85.5	17.30	-54.0	16.75	-22.5	184.0	9.0	2774	40.5	16.03	72.0	5.608
-84.0	16.86	-52.5	16.39	-21.0	276.9	10.5	2415	42.0	14.81	73.5	5.176
-82.5	16.45	-51.0	16.06	-19.5	416.4	12.0	2035	43.5	13.82	75.0	4.818
-81.0	16.21	-49.5	15.85	-18.0	625.0	13.5	1630	45.0	12.98	76.5	4.470
-79.5	16.09	-48.0	15.73	-16.5	928.3	15.0	1214	46.5	12.46	78.0	4.209
-78.0	16.08	-46.5	15.70	-15.0	1307	16.5	860.4	48.0	12.19	79.5	4.015
-76.5	16.04	-45.0	15.82	-13.5	1671	18.0	582.2	49.5	12.16	81.0	3.891
-75.0	16.08	-43.5	16.12	-12.0	2042	19.5	367.5	51.0	12.21	82.5	3.937
-73.5	16.09	-42.0	16.53	-10.5	2422	21.0	229.6	52.5	12.14	84.0	4.160
-72.0	16.20	-40.5	17.18	-9.0	2791	22.5	150.8	54.0	11.98	85.5	4.426
-70.5	16.30	-39.0	18.18	-7.5	3109	24.0	101.4	55.5	11.70	87.0	4.585
-69.0	16.53	-37.5	19.38	-6.0	3392	25.5	71.44	57.0	11.40	88.5	4.836
-67.5	16.89	-36.0	20.99	-4.5	3633	27.0	53.97	58.5	11.06	90.0	5.165
-66.0	17.08	-34.5	23.22	-3.0	3820	28.5	44.34	60.0	10.60		
-64.5	17.29	-33.0	26.19	-1.5	3927	30.0	37.55	61.5	9.959		
-63.0	17.45	-31.5	29.33	0.0	3969	31.5	32.61	63.0	9.239		
-61.5	17.55	-30.0	33.51	1.5	3940	33.0	28.77	64.5	8.615		
-60.0	17.58	-28.5	41.39	3.0	3839	34.5	25.23	66.0	7.986		

Electricity Parameter:

Current I: 0.1000A Power: 3.319W
Voltage V: 33.20V PF: 1.000

Optical Parameter(Distance=2.559m):

Diffuse angle: @ (25%): 32.0deg@ (50%): 24.3deg@ (75%): 16.2deg@ (50%): 24.3deg
Diffuse angle: @ (25%): 32.0deg@ (50%): 24.3deg@ (75%): 16.2deg@ (50%): 24.3deg
Imax=3969cd (C=0.0deg,G=0.0deg) C0-180Plane Imax= 3969cd(G=0.0deg)
C0-180Plane I0= 3969cd



Intensity data:(deg , cd) C0-180

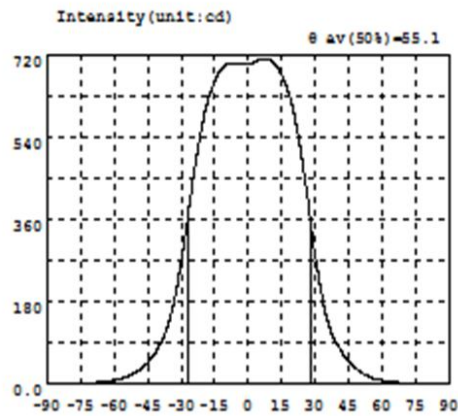
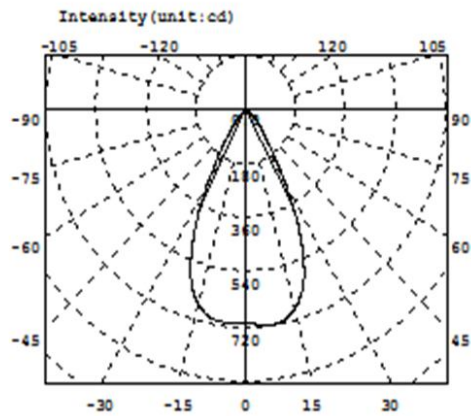
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	14.11	-58.5	12.13	-27.0	107.4	4.5	1657	36.0	16.80	67.5	6.576
-88.5	13.82	-57.0	11.65	-25.5	161.6	6.0	1609	37.5	14.33	69.0	6.326
-87.0	13.70	-55.5	11.27	-24.0	231.2	7.5	1548	39.0	12.37	70.5	6.002
-85.5	13.41	-54.0	10.94	-22.5	321.2	9.0	1471	40.5	11.09	72.0	5.668
-84.0	12.95	-52.5	10.70	-21.0	444.3	10.5	1382	42.0	10.07	73.5	5.185
-82.5	12.68	-51.0	10.57	-19.5	579.9	12.0	1273	43.5	9.126	75.0	4.622
-81.0	12.68	-49.5	10.51	-18.0	720.9	13.5	1146	45.0	8.405	76.5	4.069
-79.5	12.75	-48.0	10.54	-16.5	861.5	15.0	1003	46.5	7.848	78.0	3.626
-78.0	12.83	-46.5	10.64	-15.0	1009	16.5	865.6	48.0	7.394	79.5	3.670
-76.5	13.10	-45.0	10.92	-13.5	1147	18.0	725.7	49.5	6.999	81.0	3.088
-75.0	13.34	-43.5	11.38	-12.0	1276	19.5	579.8	51.0	6.704	82.5	2.654
-73.5	13.51	-42.0	11.88	-10.5	1395	21.0	438.5	52.5	6.539	84.0	2.693
-72.0	13.61	-40.5	12.48	-9.0	1491	22.5	315.4	54.0	6.464	85.5	2.828
-70.5	13.68	-39.0	13.34	-7.5	1561	24.0	227.0	55.5	6.472	87.0	2.423
-69.0	13.65	-37.5	14.39	-6.0	1618	25.5	157.9	57.0	6.596	88.5	2.148
-67.5	13.61	-36.0	15.99	-4.5	1664	27.0	106.6	58.5	6.816	90.0	2.185
-66.0	13.58	-34.5	18.18	-3.0	1695	28.5	73.19	60.0	6.966		
-64.5	13.39	-33.0	21.83	-1.5	1710	30.0	50.42	61.5	7.036		
-63.0	13.18	-31.5	28.77	0.0	1713	31.5	35.34	63.0	7.033		
-61.5	12.92	-30.0	42.45	1.5	1707	33.0	25.82	64.5	6.955		
-60.0	12.59	-28.5	67.16	3.0	1688	34.5	20.40	66.0	6.729		

Electricity Parameter:

Current I: 0.1000A Power: 3.310W
Voltage V: 33.09V PF: 1.000

Optical Parameter(Distance=2.559m):

Diffuse angle: @ (25%): 42.2deg@ (50%): 33.0deg@ (75%): 23.6deg@ (50%): 33.0deg
Diffuse angle: @ (25%): 42.2deg@ (50%): 33.0deg@ (75%): 23.6deg@ (50%): 33.0deg
Imax=1714cd (C=0.0deg,G=-0.5deg) C0-180Plane Imax= 1714cd(G=-0.5deg)
C0-180Plane I0= 1713cd



Intensity data: (deg , cd) CO-180

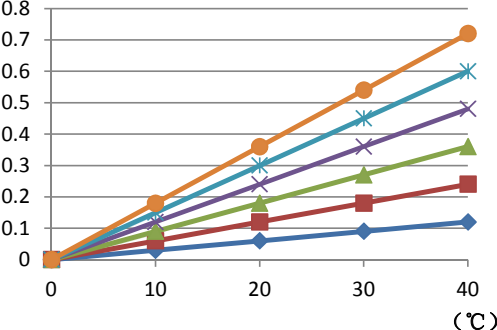
A	I	A	I	A	I	A	I	A	I	A	I
-90.0	0.4180	-58.5	11.05	-27.0	368.8	4.5	707.4	36.0	128.4	67.5	4.170
-88.5	0.5313	-57.0	12.90	-25.5	421.7	6.0	709.6	37.5	109.0	69.0	3.735
-87.0	0.6902	-55.5	14.95	-24.0	470.3	7.5	711.9	39.0	94.33	70.5	3.336
-85.5	0.8374	-54.0	17.60	-22.5	515.7	9.0	710.4	40.5	81.95	72.0	2.988
-84.0	0.9501	-52.5	20.77	-21.0	556.6	10.5	706.2	42.0	70.41	73.5	2.628
-82.5	1.007	-51.0	24.57	-19.5	592.5	12.0	699.1	43.5	59.05	75.0	2.341
-81.0	1.142	-49.5	28.97	-18.0	621.5	13.5	688.5	45.0	49.63	76.5	2.103
-79.5	1.279	-48.0	34.09	-16.5	644.0	15.0	674.1	46.5	42.09	78.0	1.897
-78.0	1.508	-46.5	40.42	-15.0	661.8	16.5	657.2	48.0	35.45	79.5	1.714
-76.5	1.803	-45.0	47.61	-13.5	676.6	18.0	636.9	49.5	29.76	81.0	1.589
-75.0	2.182	-43.5	55.91	-12.0	687.9	19.5	611.4	51.0	24.95	82.5	1.517
-73.5	2.610	-42.0	66.45	-10.5	695.3	21.0	578.6	52.5	20.74	84.0	1.502
-72.0	3.074	-40.5	79.61	-9.0	699.4	22.5	536.6	54.0	17.19	85.5	1.504
-70.5	3.552	-39.0	92.24	-7.5	701.7	24.0	491.4	55.5	14.23	87.0	1.407
-69.0	4.075	-37.5	107.9	-6.0	702.3	25.5	440.7	57.0	11.90	88.5	1.281
-67.5	4.700	-36.0	127.7	-4.5	702.0	27.0	387.9	58.5	10.09	90.0	1.210
-66.0	5.334	-34.5	153.7	-3.0	702.1	28.5	327.6	60.0	8.563		
-64.5	6.096	-33.0	185.6	-1.5	700.0	30.0	277.4	61.5	7.258		
-63.0	7.075	-31.5	223.7	0.0	700.0	31.5	231.3	63.0	6.194		
-61.5	8.218	-30.0	268.6	1.5	701.9	33.0	190.3	64.5	5.377		
-60.0	9.541	-28.5	316.9	3.0	705.1	34.5	155.4	66.0	4.713		

Electricity Parameter:

Current I: 0.1000A Power: 3.270W
Voltage V: 32.70V PF: 1.000

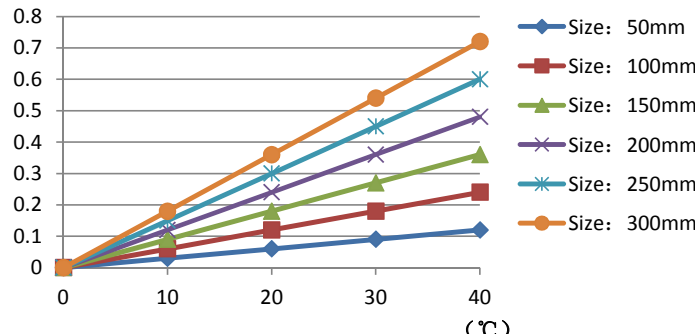
Optical Parameter(Distance=2.410m):

Equivalent Luminous flux: $\Phi_{\text{eff}} = 612.3\text{lm}$ Efficiency: $\text{Eff} = 187.28\text{lm/W}$
Diffuse angle: @ (25%): 66.7deg @ (50%): 55.1deg @ (75%): 44.3deg @ (50%): 55.1deg
Diffuse angle: @ (25%): 67.1deg @ (50%): 55.4deg @ (75%): 44.9deg @ (50%): 55.4deg
Imax=712.1cd (C=0.0deg, G=8.0deg) CO-180Plane Imax= 712.1cd (G=8.0deg)
CO-180Plane IO= 700.0cd

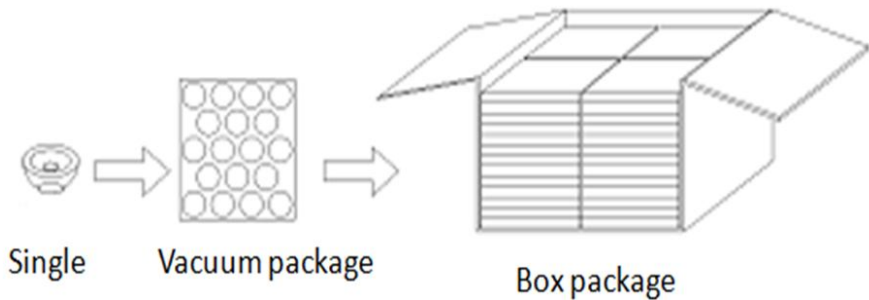
1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
	diameter	72			72.12	72.15	72.14			Test environment: In 20 ℃ -25 ℃ environment to achieve thermal equilibrium after the test.
	height1	32			31.98	32	31.99			
	height2	30.35			30.49	30.4	30.45			
	Registration mast	3.1			3.1	3.12	3.11			
	Location column	33			33.1	33	33.05			
	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		CREE1820							
	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				18.6°	18.4°				
	K-value				8.38	8.43				
	Efficiency				84.11%	85.27%				
	Facula		See the signature sample							
Comprehensive judgment		Qualified								
Remarks:		PMMA product size changes with temperature table Length changes (mm)  Size: 50mm Size: 100mm Size: 150mm Size: 200mm Size: 250mm Size: 300mm								
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.										

1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
	diameter	72			71.86	71.83	72.1			Test environment: In 20℃ -25℃ environment to achieve thermal equilibrium after the test.
	height1	32			32.07	32.04	32.06			
	height2	30.35			30.39	30.34	30.35			
	Registration mast	3.1			3.1	3.1	3.1			
	Location column	33			33.1	33.12	33.15			
	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		CREE1820							
	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				15.4	15.5	15.45			
	K-value				11.15	10.71	10.52			
	Efficiency				85.50%	86.90%	85.90%			
Facula		See the signature sample								
Comprehensive judgment		Qualified								
Remarks:		PMMA product size changes with temperature table Length changes (mm)								

1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
	diameter	72			72.26	72.26				Test environment: In 20℃ -25℃ environment to achieve thermal equilibrium after the test.
	height1	32			32.3	32.32				
	height2	30.35			30.49	30.44				
	Registration mast	3.1			3.02	3.05				
	Location column	33			33.06	33.13				
	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		D9							
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM		See light distribution curve							
	angle				23.9°	24.3°				
	K-value				5.46	6.01				
	Efficiency				91.14%	91.52%				
Facula		See the signature sample								
Comprehensive judgment		Qualified								
Remarks:		PMMA product size changes with temperature table Length changes (mm) Size: 50mm Size: 100mm Size: 150mm Size: 200mm Size: 250mm Size: 300mm 0 10 20 30 40 (℃)								
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.										

1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks																																									
	diameter	72			72.16	72.12				Test environment: In 20℃ -25℃ environment to achieve thermal equilibrium after the test.																																									
	height1	32			32.27	32.25																																													
	height2	30.35			30.54	30.53																																													
	Registration mast	3.1			3.08	3.08																																													
	Location column	33			33.09	33.12																																													
	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		D9																																																
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.																																																		
	FWHM		See light distribution curve																																																
	angle				32.7°	33°																																													
	K-value				3.04	3.01																																													
	Efficiency				92.90%	92.20%																																													
	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>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>0.15</td><td>0.18</td></tr><tr><td>20</td><td>0.04</td><td>0.10</td><td>0.16</td><td>0.24</td><td>0.30</td><td>0.36</td></tr><tr><td>30</td><td>0.06</td><td>0.15</td><td>0.24</td><td>0.36</td><td>0.45</td><td>0.54</td></tr><tr><td>40</td><td>0.08</td><td>0.20</td><td>0.32</td><td>0.48</td><td>0.60</td><td>0.72</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	0.15	0.18	20	0.04	0.10	0.16	0.24	0.30	0.36	30	0.06	0.15	0.24	0.36	0.45	0.54	40	0.08	0.20	0.32	0.48	0.60	0.72
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	0.15	0.18																																													
20	0.04	0.10	0.16	0.24	0.30	0.36																																													
30	0.06	0.15	0.24	0.36	0.45	0.54																																													
40	0.08	0.20	0.32	0.48	0.60	0.72																																													
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.																																																	

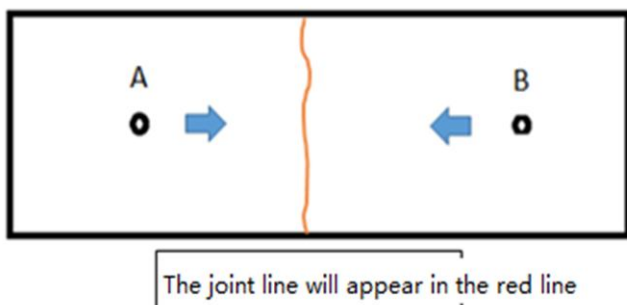
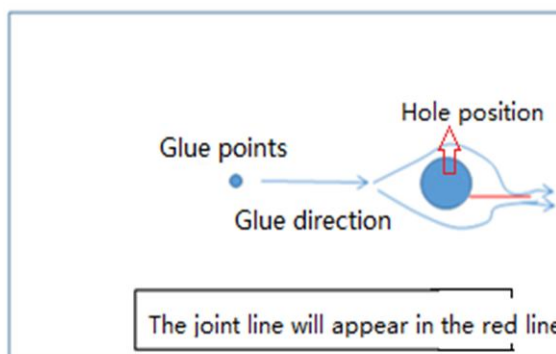
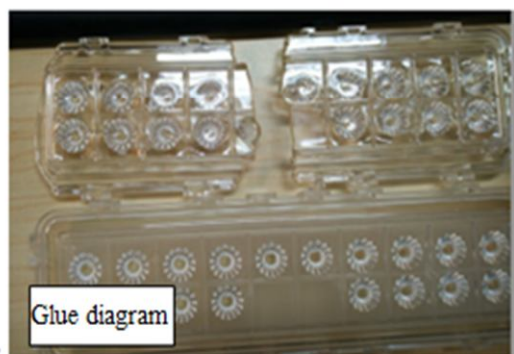
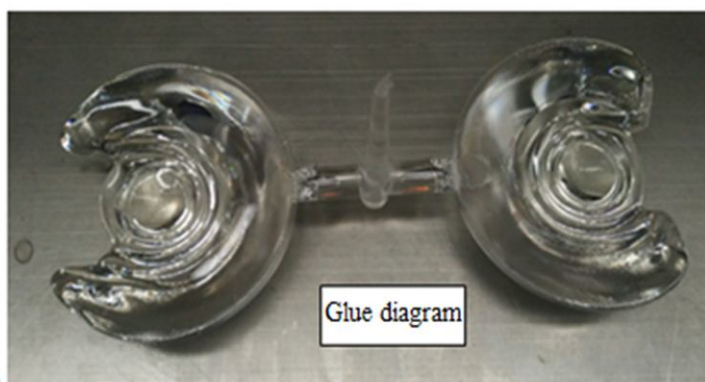
1.Size		Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Test result4	Judgment	Remarks
	diameter	72			72.01	71.94	71.92	72.01		Test environment: In 20℃ -25℃ environment to achieve thermal equilibrium after the test.
	height1	32			32.33	32.4	32.4	32.44		
	height2	30.35			30.34	30.28	30.24	30.22		
	Registration mast	3.1			3.09	3.15	3.11	3.19		
	Location column	33			33.1	33.09	33.09	33.1		
	Gate shear can not affect the appearance of the lamp									
See attachment "Appearance Inspection Standards"										
2.Appearance Quality		See attachment "Appearance Inspection Standards"	E	No burr	No burr	No burr	No burr	OK		
				No stains	No stains	No stains	No stains			
3.Material		PMMA				Color	Transparent		OK	
4.Optical index	Testing LED		D9							
	The recommended size and power rating of the LED light source recommended for this lens should be comparable to the source of the test, if it is required to be out of range. According to the heat dissipation capability of the lamp and the actual conditions of the use environment, the lens should be fully tested and tested to prevent the lens life.									
	FWHM		See light distribution curve							
	angle				55.1°	55.6°	56°	56.2°		
	K-value									
	Efficiency				92.63%	92.67%	92.95%	92.31%		
Facula		See the signature sample								
Comprehensive judgment		Qualified								
Remarks:		PMMA product size changes with temperature table Length changes (mm) </								

PN		HK-72@33-20-1820-20-1g-1		Product Name		SX-20°（1820）Lens	
Product material		PMMA		Customer			
Package diagram		 Single Vacuum package Box package					
Product packing		8	A/ Box	4	Box/Layer		
		4	Layer/Box	128	A/ Carton		
Packaging Materials	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0080	Blister box	23cm*21cm	16	BAG	
	2	2.08.0001	PE film	30cm*30cm	16	PCS	
	3	2.06.0005	Reel label paper	6.2cm*8cm	16	PCS	
	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	5	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:

Synthesis



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 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 $D \leq 0.3\text{mm}$ 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		√	