

Approval number :

Effective date of approval :

Customer :

Product : HK 4 in 1 Road lam Lens (TYPEV)

Material Code : 1.02.6864

PN: HK-50@09-148-5050-#0-1g-4

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



	Supplier confirmation			Client confirmation			
Proposed		DATE		Qualified□			
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 ParkPhone : 028-85887727 (801)028-85887990 (801)Fax : 028-85887730www.hkoptics.comSales Dept: Shenzhen NanshanDistrict Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building,TEL: 0755-2937 1541FAX: 0755-2907 5140

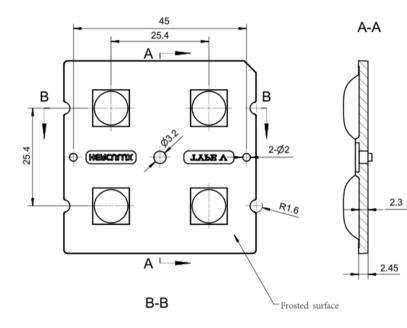
*Approval In duplicate, for both supplier and customer.

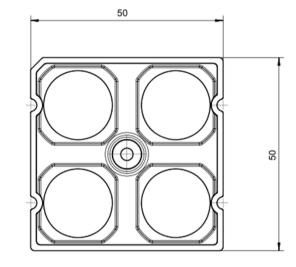


TEL: 0755-2937 1541	FAX: 0755-2907 5140	www.hkoptics.com	Date updated: 2018/3/9
Product Picture:			
PN:		HK-50@09-148-5050-#0·	·1g-4
Size(L*W*H/Φ*H):		Ф:50mm; Н:6.38mm	
Material:		РС	
Effiency:		90%	
Temperature(Topr):		-40°C to +120°C	
FWHM:		148°	
Matched LES:		LUXEON 5050	

Product 2D drawings









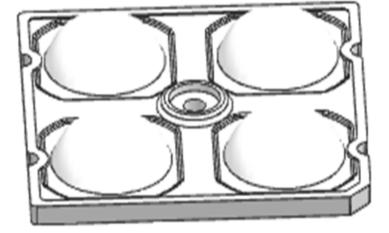
Technical Requirement:

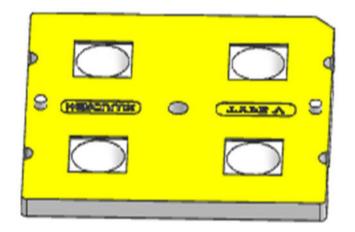
- 1. The surface don't have any defects of flash, shrink and bubble.
- 2. The uncharted fillet and pattern draft subject to the 3D drawing.
- 3. The uncharted dimensional tolerance subject to the 3D drawing.

Dptical Desig	tical Design			HK-50@09-148-	1.02.6864	
ructure Desi	gn		HK 4 in 1 Road lam Lens (TYPEV)	Pages	Qty	Weight
Assess				2		
Authorized			Material:PC		CDHK	

Image illustration

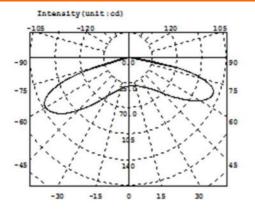


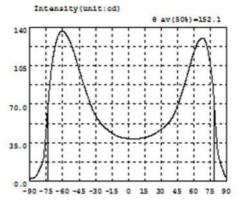




IES—— LUXEON 5050







Intensity data: (deg , cd) CO-180

λ	I	A	I	λ	1	λ	I	λ	I	A	I
-90.0	2.429	-58.5	135.2	-27.0	55.23	4.5	38.68	36.0	52.11	67.5	129.6
-88.5	3.029	-57.0	133.4	-25.5	53.31	6.0	38.72	37.5	53.92	69.0	129.4
-87.0	2.871	-55.5	131.2	-24.0	51.57	7.5	38.79	39.0	55.99	70.5	127.2
-85.5	3.534	-54.0	128.5	-22.5	49.91	9.0	38.91	40.5	58.34	72.0	122.5
-84.0	5.095	-52.5	125.0	-21.0	48.51	10.5	39.02	42.0	61.12	73.5	115.1
-82.5	7.849	-51.0	121.1	-19.5	47.32	12.0	39.18	43.5	64.56	75.0	106.0
-81.0	11.34	-49.5	116.6	-18.0	46.18	13.5	39.42	45.0	68.34	76.5	95.21
-79.5	14.62	-48.0	111.7	-16.5	45.03	15.0	39.72	46.5	72.51	78.0	79.07
-78.0	18.68	-46.5	106.5	-15.0	43.89	16.5	40.09	48.0	77.02	79.5	55.70
-76.5	29.57	-45.0	101.3	-13.5	42.85	18.0	40.53	49.5	81.85	81.0	36.02
-75.0	47.32	-43.5	96.41	-12.0	41.97	19.5	41.11	51.0	86.49	82.5	23.19
-73.5	67.01	-42.0	91.82	-10.5	41.20	21.0	41.73	52.5	91.50	84.0	17.51
-72.0	85.02	-40.5	87.18	-9.0	40.64	22.5	42.40	54.0	96.59	85.5	12.87
-70.5	100.4	-39.0	82.86	-7.5	40.17	24.0	43.25	55.5	101.9	87.0	8.855
-69.0	111.0	-37.5	78.36	-6.0	39.79	25.5	44.06	57.0	107.3	88.5	4.979
-67.5	119.5	-36.0	74.04	-4.5	39.51	27.0	45.02	58.5	112.5	90.0	3.452
-66.0	126.3	-34.5	69.90	-3.0	39.23	28.5	46.01	60.0	117.1		
-64.5	131.2	-33.0	66.13	-1.5	39.03	30.0	47.04	61.5	121.2		
-63.0	134.1	-31.5	62.82	0.0	38.84	31.5	48.13	63.0	124.8		
-61.5	135.9	-30.0	59.92	1.5	38.71	33.0	49.33	64.5	127.5		
-60.0	136.2	-28.5	57.33	3.0	38.66	34.5	50.63	66.0	129.1		

Electricity Parameter:

Current	I:	0.1000A	Power:	2.170W
Voltage	V:	21.70V	PF:	0.000

Optical Parameter (Distance=2.410m) :

 Equivalent Luminous flux: # eff= 464.81m
 Efficiency: Eff=214.221m/W

 Diffuse angle: @(25%): 157.1deg@(50%): 152.1deg@(75%): 145.7deg@(50%): 152.1deg

 Diffuse angle: @(25%): 168.2deg@(50%): 161.2deg@(75%): 158.1deg@(50%): 161.2deg

 Imax=136.3cd (C=0.0deg,G=-60.5deg)

 C0-180Plane Imax= 136.3cd(G=-60.5deg)

C0-180Plane IO= 38.84cd

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			Standard size	Upper Size limit	Lower size limit	Test result1	Test result2	Test result3	Judgment			
	OW		50	50.15	49.8	49.88	49.85	49.89	OK			
4.01	S of loca	ating	45	45.1	44.9	44.99	44.99	4.99 44.99				
1.Size	D of loca	ating	2	2.05	1.9	1.96	1.97	1.97	ОК			
	TH		2.3	2.35	2.25	2.29	2.31	2.33	ОК			
	Gate shear can not affect the appearance of the lamp											
				See attachmen	t "Appearance Ins	pection Standa	ards"					
2.Appear	rance		e attachment ppearance	F	No burr	No burr	No burr	No burr	ок			
Quality	Quality Inspection		No stains									
3.Materia	al			PC		Color	Transparent					
	Testing	LED	ED LUXEON 5050									
1 Option	FWHM		See light distribution curve									
4.Optica I index	Angle					152.1°	152.2°	152.6	° OK			
	Effiency					93.41%	93.49%	93.64	% OK			
	Facula	See th	ne signature sa	mple	``							
	ehensive ment				(Qualified						
Caliper 2 Height G Microsco Thick Ga Gauge E 2、Test c °C -25 °C achieve t after the temperat	Number: \ D-Quadra auge M-T ppe P-Nee uge R-Ra -Visual. environme environme thermal ec test. (Amb ture on the	tic H- ool dle T- dius ent: In 2 ent to juilibriu oient e size c	20 Im	ses	ct size changes w	vith tempera		Size: 50mm Size: 100m Size: 150m Size: 200m Size: 250m Size: 300m	m m m			
on the rig Precautio	ons:			nbly to prevent con	tamination of the le		(°C)					

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

HERCULUX 恒坤光电

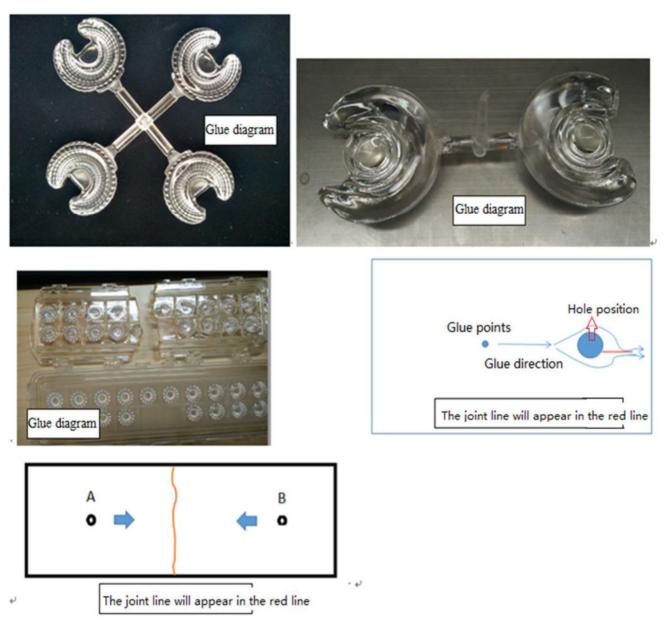
Packaging Information



PI	N	HK-50@09-148-505	0-#0-1g-4	Product Name	HK 4 in 1 Road lam	Lens (1	TYPE V)	
Product	material	PC		Customer				
Package	diagram	Single Vacut	um package	BOX package				
Draduat	naakina	24	A/ Box	4	Box/Floor			
Product	раскіпд	15	Floor/Carton	1440	A/ Carton			
	NO.	Part No	Part name	Size	Dosage	Unit	Remar ks	
	1	2.07.0049	Blister box	23cm*21cm	60	BAG		
	2	2.08.0001	PE film	30cm*30cm	60	PCS		
Packagin	3	2.06.0005	Reel label	6.2cm*8cm	60	PCS		
g Materials	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS		
	5	2.06.0003	big plate	46.8cm*42.8cm		PCS		
	6	2.06.0001	big carton	46.8cm*42.8cm* cm	1	PCS		
Remarks		Scattered	l d packaging is not	subject to this spe	L	<u> </u>	I	

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 Π 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	Н	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	ludeing stondard	Inspection equipment	Defect level		
restitents	Judging standard	f equipment MI	MA	CR	
	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.				
Check the sample	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			v

	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	V	
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	V	
Fingerprint	Fingerprints are not allowed on all products	Visual	V	
Foreign things, impurities	The product may not be attached to foreign objects, including oil, fiber, dregs of water gap and so on			V
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. 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.	Visual, point card	V	
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	V	
Flow marks、Welding line	 Product does not allow the presence of flow marks and welding lines unless the structure can not be avoided; The remaining flow marks shall not appear in the optical surface, a single L ≤ 10mm, no more than two 	Visual	V	

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	\checkmark		
Damaged	No damage is allowed	Visual			\checkmark
Cold glue	Optical surface may not have cold glue, non- optical surface cold glue should meet the visual is not obvious.	Visual	\checkmark		
	1: Do not affect the product size, shall not penetrate the optical surface, the cut should be smooth;				
Bad incision	2: Laser cutting products, the optical surface burns shall not occur after the processing is completed. Beading must not affect product installation	Visual			V
	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 $D \le 1$ mm and no more than 1 area within a 50x50 mm area	Visual		V	



Approval number :

Customer :

Product : HK-4in1 Lens (TYPEV)

Material Code : 1.02.6864

PN: HK-50@09-148-5050-#0-1g-4

Manufacturer : Chengdu HercuLux Photoelectric Technology Co.,Ltd



	Supplier confirmation			Client confirmation			
Proposed		DATE		Qualified□			
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 ParkPhone : 028-85887727 (801)028-85887990 (801)Fax : 028-85887730www.hkoptics.comSales Dept: Shenzhen NanshanDistrict Nanshan Cloud Valley Innovation Industrial Park Comprehensive Service Building,TEL: 0755-2937 1541FAX: 0755-2907 5140

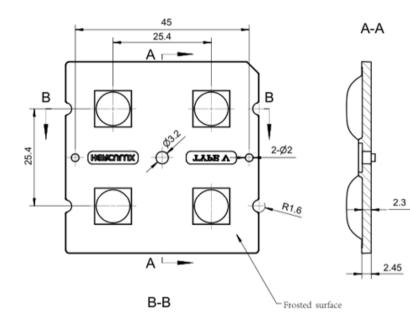
*Approval In duplicate, for both supplier and customer.

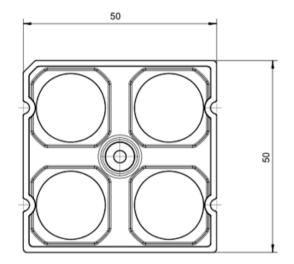


TEL: 0755-2937 1541	FAX: 0755-2907 5140	www.hkoptics.com	Date updated: 2018/12/10
Product Picture:			
PN:		HK-50@09-148-5050-#0)-1g-4
Size(L*W*H/Φ*H):		L:50mm*W:50mm*H:6.3	3mm
1.07.81418_HK-166@03-0223-S		PMMA	
Effiency:		λ	
Temperature(Topr):		-40°C to +80°C	
FWHM:		148°	
Matched LES:		LUXEON 5050	

Product 2D drawings







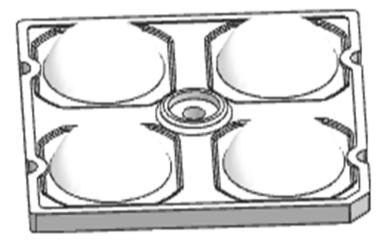


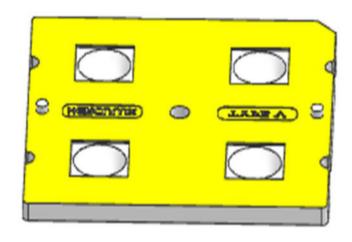
Optical Design				HK-50@09-	148-5050-#0-1g-4	1.02.6864
Structure Design		HK-4in1 Lens (TYPEV)		Pages	Qty	Weight
Assess						
Authorized		Material: PMMA			CDHK	

Technical Requirement:

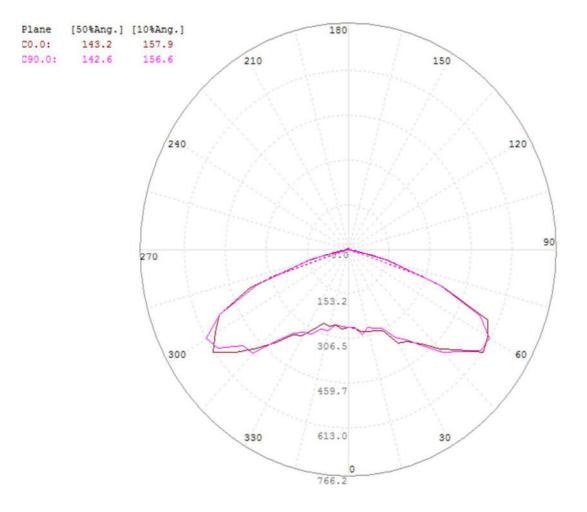
- 1. The surface don't have any defects of flash, shrink and bubble.
- 2. The uncharted fillet and pattern draft subject to the 3D drawing.
- 3. The uncharted dimensional tolerance subject to the 3D drawing.











Sample size test report HK-4in1 Lens (TYPE V)

HERCULUX ^{恒坤光电}

						T					-	
			Standard size	Upper Size limit	Lower size limit	Test result		Test result2	Test result3	Test result4	Jud gme nt	Remarks
	OW		50		$\overline{}$	49.88	5	49.85	49.89	49.85	\backslash	Test environment
1.Size	S of loca	iting	45			44.99		44.99	44.99	44.99	\backslash	In 20 ℃ -25 ℃ environment
1.0120	D of loca	iting	2			1.96		1.97	1.97	1.97	\backslash	to achieve thermal
	ТН		2.3		$\overline{}$	2.29		2.31	2.33	2.31	\square	equilibrium after the test
				Gate she	ar can not	affect the	e ap	pearance	of the lamp)		
				See atta	chment "A	ppearan	ce Ir	nspection	Standards"			_
2 Appearance attachr		See achment pearance	E		No burr		No burr	No burr	No bu	ırr	ок	
Quality	Inspec		spection andards"	ion		lo stains	o stains No		No stains	No stains		ÖR
3.Materia	ıl			PMMA				Color	Transparent O			OK
Testing LED				LUXEON 5050								
FWHM				See light distribution curve								
4.Optica I index	angle	Э						\backslash	/			
1 maox	Efficie	ency						\backslash	\backslash			
	Facula	See t	the signatu	re sample		`						
	ehensive ment							Q	ualified			
					PMMA	produc	t siz	-	es with ter	nperatur	e	
Remarks		/_\/orr	vier	Length changes				table	-	Size:	50mm	
 Tool Number: V-Vernier Caliper 2D-Quadratic H- Height Gauge M-Tool Microscope P-Needle T- Thick Gauge R-Radius Gauge E-Visual. Ambient temperature on the size of the product refer to the table on the right 			(mm)	0.8				*	Size: 100mn Size: 150mn Size:			
				0.2	10	20	0 30	40 (°C)	200mn	n		
(℃) Precautions:												

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

Packaging Information

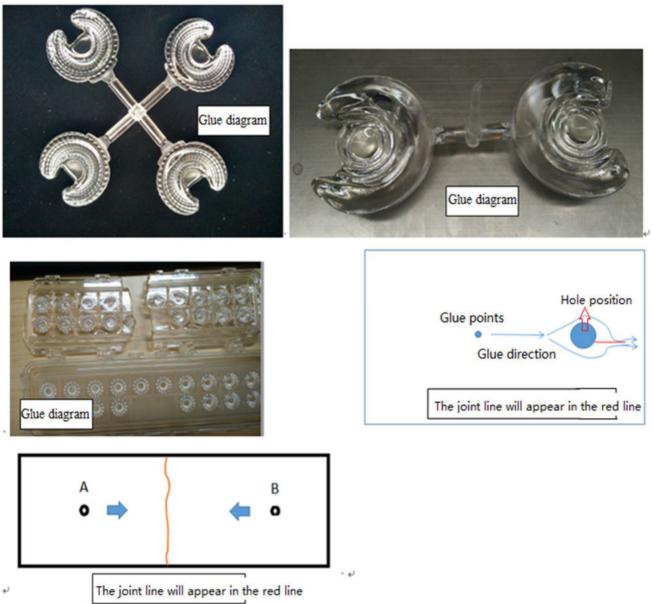


P	N	HK-50@09-148-5050-#()-1g-4	Product Name	HK-4in1 Lens	(TYPE)	V)
Product	material	PMMA		Customer			
Package	diagram	Image: Single Vacuum package Box package					
Product packing		24	A/ Box	4	Box/Layer		
		15	Layer/Box	1440	A/ Carton		
	NO.	Part No	Part name	Size	Dosage	Unit	Remarks
	1	2.07.0049	Blister box	23cm*21cm	60	BAG	
Dookogin	2	2.08.0001	PE film	30cm*30cm	60	PCS	
Packagin g Materials	3	2.06.0005	Reel label paper	6.2cm*8cm	60	PCS	
Materials	4	2.06.0005	Box label paper	6.2cm*9.2cm	1	PCS	
	5	2.06.0003	big plate	46.8cm*42.8cm	16	PCS	
	6	2.06.0001	big carton	46.8cm*42.8cm*36c m	1	PCS	
Remarks		packing is not subject to this spe 4 bags for each layer and 5 bags			shall prevail(The	re are th	iree

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:

Syntneti



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 Π 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	Н	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	ludging stondard	Inspection equipment	Defectievel			
restitents	Judging standard	Testing MI MA method		CR		
	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.					
Check the sample	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			v	

	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	V	
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	V	
Fingerprint	Fingerprints are not allowed on all products	Visual	V	
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			V
Deformation	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces.	Visual, feeler		V
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. 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.	Visual, point card	V	
Insufficient filling	Insufficient filling shall not affect the appearance of the assembly and the exposed surfaces, The signature sample shall prevail.	Visual, point card	V	
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	V	
Flow marks、Welding line	 Product does not allow the presence of flow marks and welding lines unless the structure can not be avoided; The remaining flow marks shall not appear in the optical surface, a single L ≤ 10mm, no more than two 	Visual	v	

Bubble	No bubbles are allowed	Visual		\checkmark	
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	V		
Damaged	No damage is allowed	Visual			\checkmark
Cold glue	Optical surface may not have cold glue, non- optical surface cold glue should meet the visual is not obvious.	Visual	\checkmark		
	1: Do not affect the product size, shall not penetrate the optical surface, the cut should be smooth;				
Bad incision	2: Laser cutting products, the optical surface burns shall not occur after the processing is completed. Beading must not affect product installation	Visual			V
	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 $D \le 1$ mm and no more than 1 area within a 50x50 mm area	Visual		V	