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SHENZHEN SHENFANG-LUCKY PHOTOELECTRON MATERIALS CO., LTD

POLARIZER PRODUCT SPECIFICATION

(SPN1-1805T / SPN1-1805M / [SPN1-1825T](#))

SHENZHEN SHENFANG-LUCKY
PHOTOELECTRON MATERIALS CO., LTD

2nd Floor, Building 21, Tianjian Industrial Zone, Shangbao Road, Shenzhen, China
TEL: 0755-83930904,83935914 FAX:0755-83935004, 83933359
0755-61122712 0755-61122713

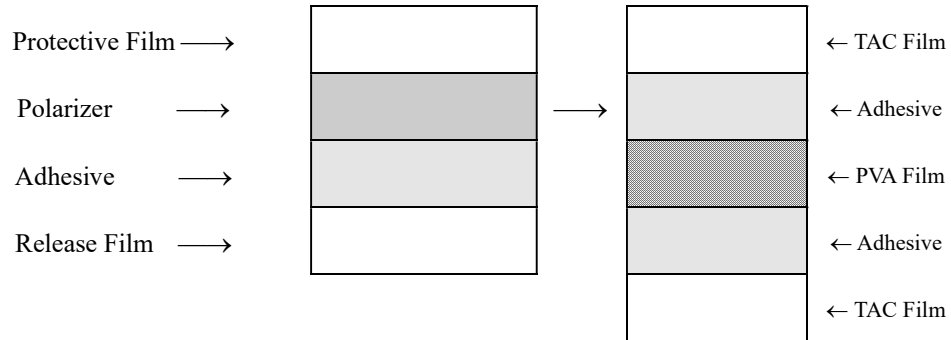
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1 Application :

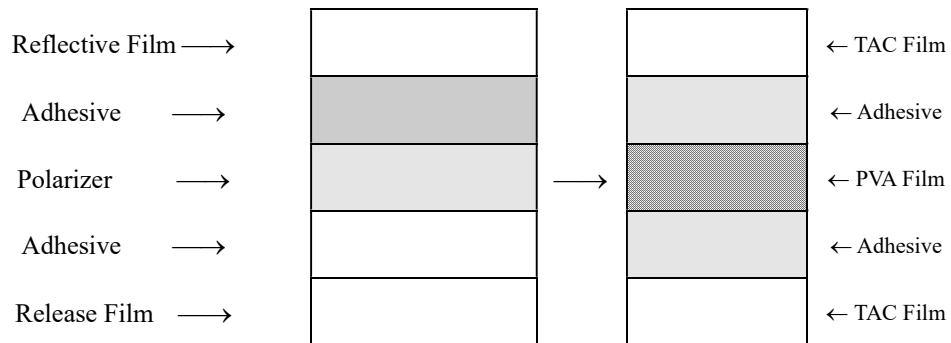
The specification applies to SHENFANG-LUCKY PHOTOELECTRON MATERIALS CO., LTD's polarizer. Which is supplied by SHENFANG-LUCKY PHOTOELECTRON MATERIALS CO., LTD to co.,LTD.

2 Polarizer's structure :

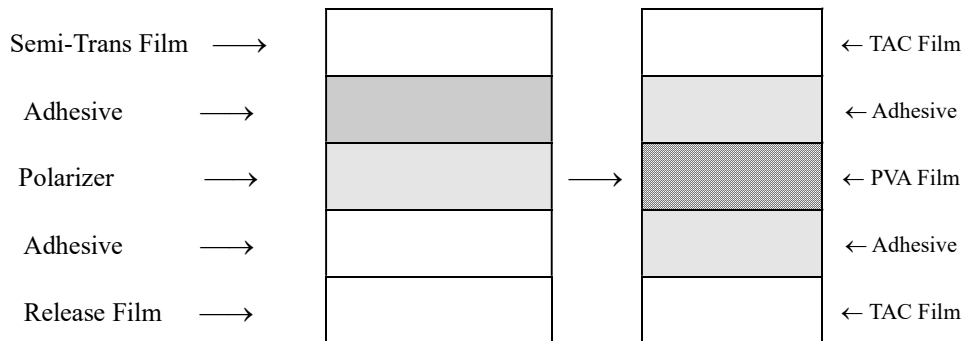
2.1 Transmission type:



2.2 Reflection type:



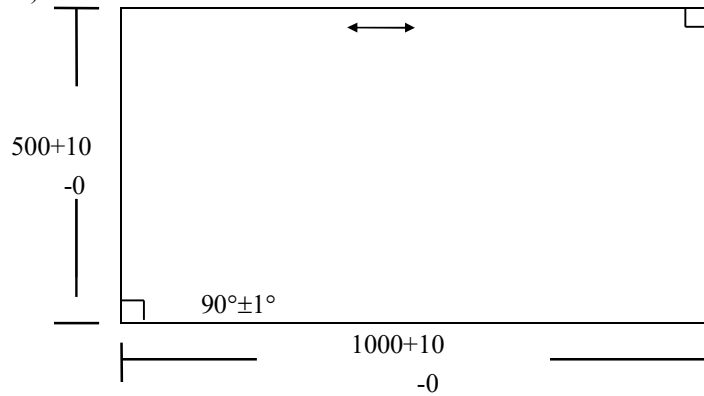
2.3 Semi-Trans type:



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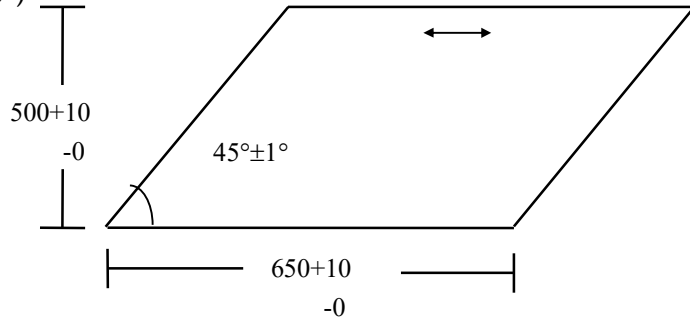
3 Polarizer's size:

3.1 500×1000mm (90°)



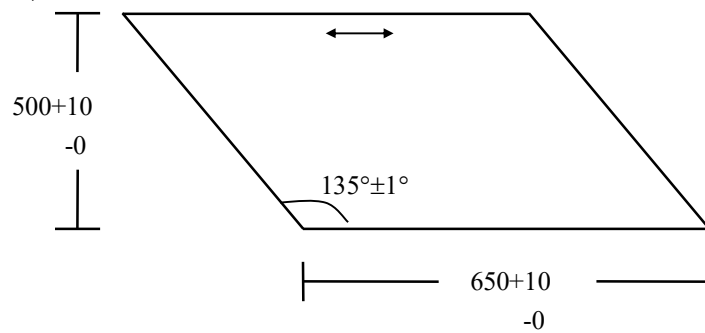
Notice: \longleftrightarrow absorption axis unit: mm

3.2 500×650mm (45°)



Notice: \longleftrightarrow absorption axis unit: mm

3.3 500×650mm (135°)



Notice: \longleftrightarrow absorption axis unit: mm

- Polarizer's release film should be upside when measured it.
- Warp of the absorption axis angle: $\pm 2^\circ$.

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4 Polarizer's Quality:

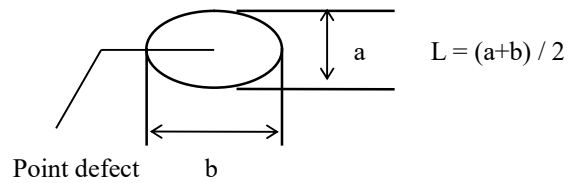
4.1 Appearance:

Defects of the size specified shall be visually inspected under 40w fluorescent tube, about 20cm away from the specimen.

4.2 Explanation of appearance defect:

4.2.1 Size:

The average diameter of a defect or foreign matter shall be not less than 0.20mm. Size of defect or foreign matter:



4.2.2 Standard value:

Defects more than 0.2mm is less than 12.

note: Pit that disappears by autoclave treatment processing is not taken as defects.

A autoclave treatment condition: 60°C ×5kgf/c m², 15 minutes.

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4.4 Polarizer's basic properties :

Product code		SPN1 – 1805 T	SPN1 – 1805 M	SPN1 – 1825 T	Testing method		
Item	Unit	Parameter	Parameter	Parameter			
Dimension	L	mm	1000+10 - 0	1000+10 - 0	1000+10 - 0	Refer to 5. 2	
	W	mm	500+10 - 0	500+10 - 0	500+10 - 0	Refer to 5. 2	
Thickness	Total	μm	305±30	315±30	305±30	Refer to 5. 3	
	effective	μm	210±20	215±20	210±20	Refer to 5. 3	
	Adhesive	μm	25±5	25±5	25±5	Refer to 5. 4	
Separation Strength	Release film	g/25mm	≤50	≤50	≤50	Refer to 5. 5	
	Protective film	g/25mm	≤50	—	≤50	Refer to 5. 5	
	Reflective Film	g/25mm	—	≥500	—	Refer to 5. 5	
	Adhesive with Glass plate	g/25mm	≥500	≥500	≥500	Refer to 5. 5	
Optical properties	Single transmittance	%	43±2	43±2	43±2	Refer to 5. 6	
	Parallel transmittance	%	36±2	36±2	36±2	Refer to 5. 6	
	Cross transmittance	%	< 2%	< 2%	< 2%	Refer to 5. 6	
	UV absorption (380 nm)	%	—	—	< 1.0	Refer to 5. 6	
	Polarizing Efficiency	%	≥95	≥95	≥95	Refer to 5. 6	
	HUE	a	NBS	-0.7±2	-0.7±2	-0.7±2	Refer to 5. 7
		b	NBS	0.7±2	0.7±2	-0.7±2	Refer to 5. 7
L		NBS	70±2	70±2	70±2	Refer to 5. 7	
Shrinking rate		%	≤2.0	≤2.0	≤2.0	Refer to 5. 10	
Curl		mm	≤40	≤40	≤40	Refer to 5. 11	
Defect		Per sheet	≤12	≤12	≤12	Refer to 4.2	
Reliability		Refer to 4. 5					

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4.5 Reliability Test Table : (assurance)

Product code: SPN1-1805T / SPN1 -1805M / SPN1-1825T	
Dry condition	70°C × 500h
Judge Standard	Change of single transmittance and polarizing efficiency: within 5% Without curling 、 air bubble、 separate、 peel
Humidity condition	40°C × 90%RH × 500h
Judge Standard	Change of single transmittance and polarizing efficiency: within 5% Without curling 、 air bubble、 separate、 peel
Cold condition	- 30°C × 500h
Judge Standard	Change of single transmittance and polarizing efficiency: within 5% Without curling 、 air bubble、 separate、 peel

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5 Test Method:

5.1 Environmental Condition:

Tests are proceeded in room temperature of $23\pm 2^{\circ}\text{C}$ and relative humidity of $65\pm 15\%\text{RH}$.
if without any notice.

5.2 Dimension Test:

Dimension should be measured with ruler. The result shall be average of 3 measurements

5.3 Total Thickness:

The thickness shall be average of the 3 measurements taken in the crosswise direction, using a dial gauge capable of reading to the nearest 1/1000 mm.

5.4 Adhesive Thickness:

Product is measured by 1/1000mm micrometer together with release filming adhesive (t_1) . After peeling off release film, adhesive layer is removed and film thickness is re-measured together with release film (t_2)

Thickness of adhesive layer $t = t_1 - t_2$

5.5 Adhesive strength test:

5.5.1 Adhesive strength with glass plate:

Samples are cut by $25\times 180\text{mm}$ and release film is peeled off about 135mm, then adhered to glass plate using 2kg rubber roller and placed in room condition about 1 hour. Using 90° peel strength testis measured by 200mm/min peeling speed, test 3 samples, Average value of peak point is regarded as peel strength of the adhesive layer.

5.5.2 Release film:

Samples are cut by $25\times 175\text{mm}$ and release film is peeled off about 75mm, then polarizer films bitten by upper clamp, release film is bitten by clamp, peel strength is measured by 500mm/min peeling speed . Average value of peak point is regarded as peel strength of the release film.

5.5.3 Protective film:

Use same methods as release film.

5.5.4 Reflective Film:

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Use same methods as release film.

5.6 Optical properties Test:

5.6.1 Single transmittance:

Using spectrophotometer optical values are measured scan range is 400 – 700nm and acquired data are corrected by human-eye sensitive curvature.

5.6.2 Polarizing Efficiency:

According 5.6.1 test two pieces absorbing axis parallel transmittance Y_{\parallel} and cross transmittance Y_{\perp} , polarizing efficiency is acquired by the following formula:

$$P = \sqrt{\frac{Y_{\parallel} - Y_{\perp}}{Y_{\parallel} + Y_{\perp}}} \times 100\%$$

Y_{\parallel} Parallel transmittance
 Y_{\perp} Cross transmittance

The result must accord with the item 4.4

5.6.3 380nm transmittance (UV absorption)

The transmittance at 380nm is measured by the same way in item 5.6.1 above.

5.7 Hue of polarizing Film:

According to item 5.6.1 the scan range of optical values is 400 – 700nm

(10nm sampling) L、 a、 b are calculated by CIE-1976, data must according to 4.4

5.8 Reliability test:

Samples are cut by 20mm×50mm and adhered on glass plate,

Changed optical values are calculated as following:

$$\Delta T = T1 - T2$$

$$\Delta P = P1 - P2$$

T1=Final transmittance, T2 = Initial transmittance

P1= Final polarizing efficiency, P2 = Initial polarizing efficiency

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5.9 Release after humidity management:

Samples are cut to 50 × 150mm and stick to clear glass plate , then pull them into pressure processor ,after 15 minutes , take the samples out and release the protective film, put these samples into aging processor with the condition is 55°C×90%RH, after 5 hours past, observe the samples visually whether they were peeled off or not.

Condition of the pressure processor: 60°C×5kg/ cm²×15 minutes

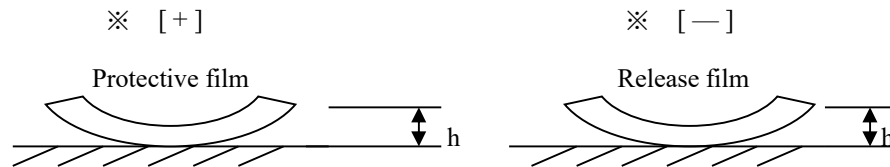
5.10 Shrinking rate of the Dimension:

Measure the Dimension of the samples after humidity management (refer to 5.9), of the Dimension is acquired by the following formula:

$$\text{Shrinking rate (\%)} = \frac{\text{original length (mm)} - \text{length after test (mm)}}{\text{original length (mm)}} \times 100$$

5.11 Curl:

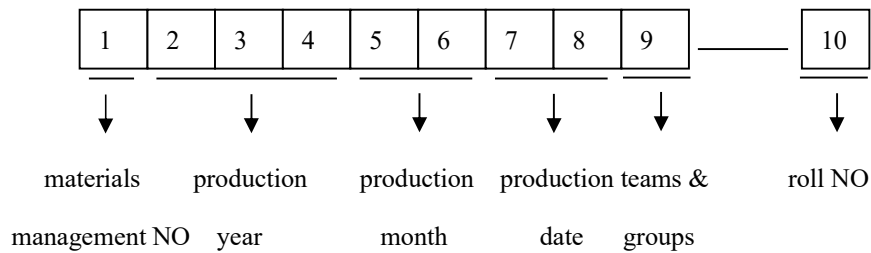
The camber of samples is tested in the condition of 23±2°C ,65±15%RH with protective film and release film, lay the samples flatly on the testing plate, then measure distance between the peak point of the bend and the testing plate .The measurement must carry out immediately after unsealing.



6. Inspection

6.1 Structure of Lot Number:

The same Lot Number is continuously produced by same materials, under the same production condition in one day.



6.2 Inspection mode:

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6.2.1 Properties:

Properties of every batch must have spot check except the assurance.

6.2.2 Appearance:

Appearance of every batch must have spot check.

6.3 Inspection Result Table

If you have other requirements, you can ask us to test items as the sheet below

1	Dimension	5	Optical properties (Optical properties \ Polarizing efficiency etc.)
2	Thickness	6	Hue (L, a, b)
3	Separation strength (Release film \ Reflective film etc.)	7	Reliability
4	Adhesive/Glass plate		

7 Packaging and Marking:

7.1 Packaging:

7.1.1 Each sheet is separated by space paper.

7.1.2 20 sheets of product are inserted in aluminum bag and sealed.

7.1.3 Aluminum bags are fixed on cardboard stage and 5 stages are inserted in the cardboard box. 100 sheets total.

7.2 Marking:

Each bag and box shall be legibly provided with the following information:

1	Name of product
2	Lot No
3	Quantity
4	Dimensions
5	Inspector

8 Warranty Period and Storing Conditions:

8.1 6 months after delivery. Product should be used at once after aluminum bag open, and storing in room condition.

8.2 Products should be sealed and stored in room condition (30±2°C, 75±5%RH) .

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8.3 Packages highness no less than 12 boxes.

9 Revision:

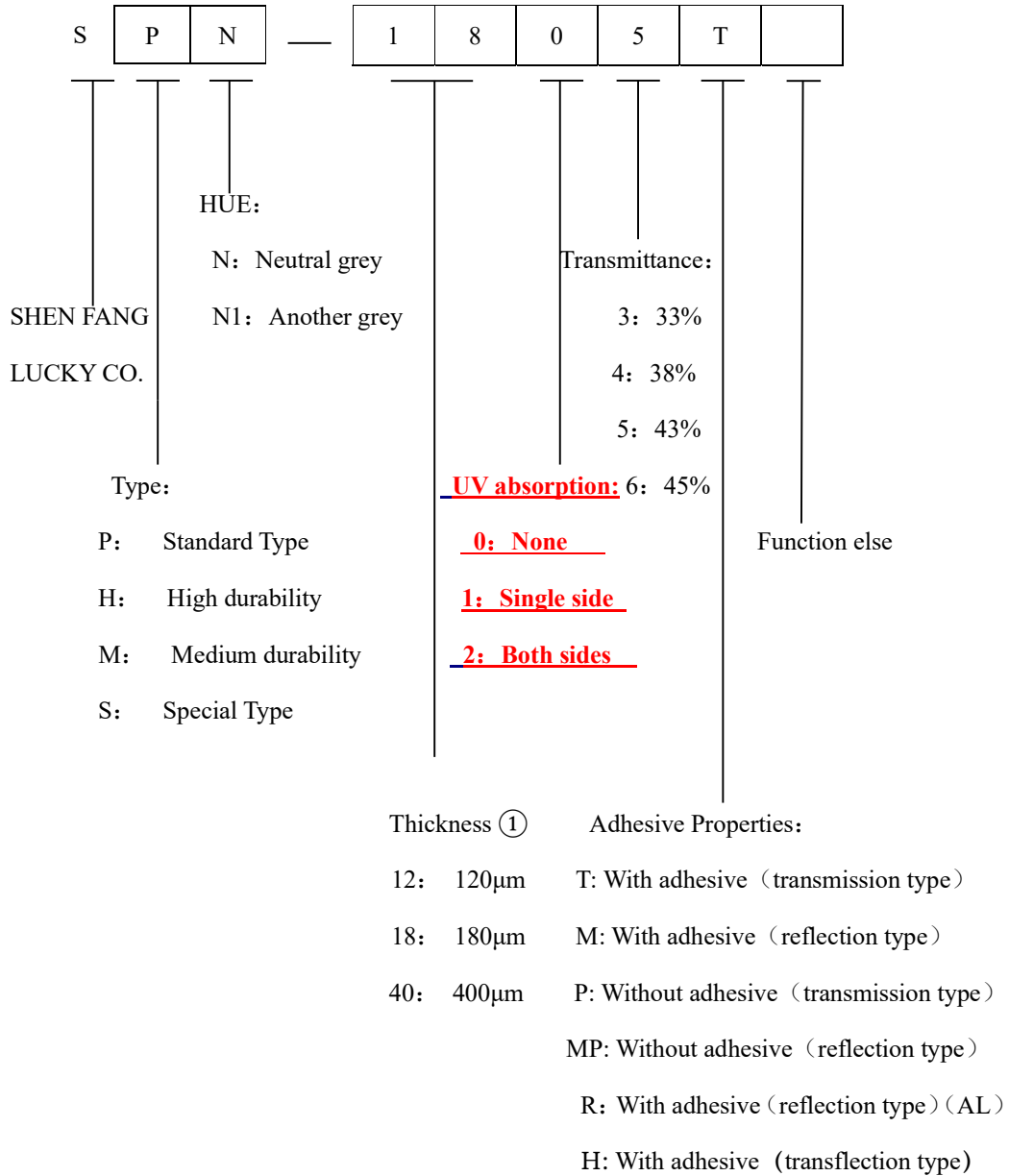
9.1 When the material or processing method is largely altered, SHENFANG-LUCKY PHOTOELECTRON MATERIALS CO., LTD shall inform of that in advance.

10 Explanation:

10.1 When the content of this specification needs to has some change, we will not inform the clients in advance.

10.2 The technology parameter in this specification should only be used as a technical reference.

APPENDIX: POLARIZER CODE



Remark: 1 When the product specification is altered, shall inform of that in advance.

2 Thicknesses① exclude release film, adhesive and protective film.

3 The thickness, optical properties and hue data presented here are just sample data and should not be used for specification purposes.