

# TECHNICAL DATA AND INSTALLATION GUIDE

**POLYSHADE-TORONTO-CANADA**

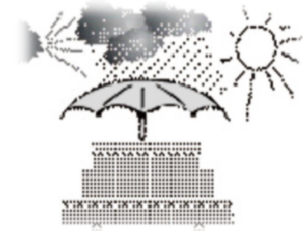
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## 1 • Product Use Note

### 1) Handing and Storage

A) Polycarbonate (PC) sheet must be transported and stored horizontally on a flat, sturdy pallet whose dimension are equal to or larger than those of the sheet. The sheets should be fastened to the pallet. It is possible to store sheets of smaller dimensions on top of sheets that are larger but never store sheet of larger dimensions on top of smaller sheets.(see picture right)



B) PC sheets are packed with waterproof polyethylene protective films at the factory. And the protective films should be removed before the actual installation; the sheets should be kept in the dry and ventilated place with a top proof, out of direct sunlight and rain.

C) Avoid PC sheet exposed in the rain long-term, though it has PE protected film. Because water will spill into inner panel, leading heat accumulation. And then the film will turn softening and melt in the surface of the sheets, which will be very difficult to tear.

D) Do not cover or place on the pallet with material that are good conductor of heat(e.g.Metal,pipes,clear or dark objects) They will absorb and conduct heat and make damage to the sheets.

E) In case where it is necessary to store the pallet outdoors, it is possible to cover it with a white opaque polyethylene sheet, carton or any other material that does not absorb or conduct heat. The total pallet must be covered.

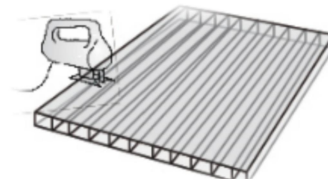
F) On the lower right corner of the UV side, Polyshade PC sheet has the factory qualified tags. Labels have UV side tip. To prolong the service life, please leave this face to the sun when installation.

### 2) Cutting Note

A) PC multi-wall sheets can be cut by standard wood or metal processing equipment, and the use of special designed plastic blade plate will mean better result. Ordinary circular saw and hand saw can also be used. It is possible to use a portable electric saw (machine saw).But be sure to cut them slowly.

B) The sheets with thin or medium thickness can be cut with short and sharp blade. A special manual longitudinal cable cutting tool can also be used (see picture right)

C) Note that in any case it is important to support the sheet in the vicinity of the cut to prevent vibration and to clear away the dust and debris generated by cutting to keep the sheet clean.



### 3) Sealing and bonding

PC multi-wall sheets can withstand a variety of corrosive chemicals (refer to the data list of PE common chemical properties), their tolerance is limited. There is also another group of chemicals which will damage the sheets. The extend of the damage depends on the severity of erosion the exposure time. Chloroprene rubber (CR), ethylene propylene diene monomer rubber (EPDM) and neutral silicone etc.are recommended when sealing. If other material is chosen, its chemical compatibility with Pc panels should be considered. In addition, the thermal expansion and anti-aging properties have to adapt to the sun sheet.

## 2、Hollow sheet Installation

Polyshade PC hollow sheet is also named hollow sun sheet. It is a comprehensive excellent engineering plastic. Its outstanding physical, mechanical and heat properties turn it as the idealist material for awning in the world at present. It also had a reputation of “the king of the transparent plastic”. Widely used in the swimming pool, gymnasium, waiting room, greenhouses, breeding shed and ecological restaurant lamp lighting awning.

### 1)Types and Specifications

| Type               | Thickness (mm) | Standard Length (mm) | Weight (kg/ m <sup>2</sup> ) | K-value (w/m <sup>2</sup> *k) | LT clear | Min bend radius(mm) | Voice low (DB) |
|--------------------|----------------|----------------------|------------------------------|-------------------------------|----------|---------------------|----------------|
| 2-wall R-structure | 4              | 2100,1050,700        | 0.85                         | 3.96                          | 80       | 700                 | 15             |
|                    | 6              | 2100,1050,700        | 1.3                          | 3.56                          | 78       | 1050                | 17             |
|                    | 8              | 2100,1050,700        | 1.5                          | 3.26                          | 76       | 1400                | 18             |
|                    | 10             | 2100,1050,700        | 1.7                          | 3.02                          | 73       | 1750                | 19             |
|                    | 12             | 2100,1050,700        | 1.9                          | 2.78                          | 72       | 2100                | 20             |
| 3-wall R-structure | 8              | 2100,1050,700        | 1.6                          | 2.76                          | 73       | 1400                | 19             |
|                    | 10             | 2100,1050,700        | 1.80                         | 2.68                          | 71       | 1750                | 19             |
|                    | 12             | 2100,1050,700        | 2.10                         | 2.60                          | 71       | 2100                | 19             |
|                    | 14             | 2100,1050,700        | 2.40                         | 2.42                          | 69       | 2450                | 20             |
|                    | 16             | 2100,1050,700        | 2.70                         | 2.27                          | 68       | 2800                | 21             |
|                    | 18             | 2100,1050,700        | 3.00                         | 2.21                          | 67       | 3150                | 22             |
| 4-wall R-structure | 8              | 2100,1050,700        | 1.80                         | 2.56                          | 71       | 1400                | 18             |
|                    | 10             | 2100,1050,700        | 2.10                         | 2.39                          | 71       | 1750                | 19             |
|                    | 12             | 2100,1050,700        | 2.30                         | 2.30                          | 70       | 2100                | 20             |
|                    | 14             | 2100,1050,700        | 2.50                         | 2.10                          | 69       | 2450                | 21             |
|                    | 16             | 2100,1050,700        | 2.80                         | 2.00                          | 68       | 2800                | 22             |
|                    | 18             | 2100,1050,700        | 3.10                         | 1.88                          | 66       | 3150                | 22             |
|                    | 20             | 2100,1050,700        | 3.30                         | 1.69                          | 63       | 3500                | 23             |
| 4-wall H-structure | 6              | 2100,1050,700        | 1.30                         | 2.96                          | 59       | 1050                | 18             |
|                    | 8              | 2100,1050,700        | 1.7                          | 2.58                          | 58       | 1400                | 18             |
|                    | 10             | 2100,1050,700        | 1.9                          | 2.16                          | 57       | 1750                | 19             |
|                    | 12             | 2100,1050,700        | 2.20                         | 1.98                          | 56       | 2100                | 20             |
|                    | 14             | 2100,1050,700        | 2.40                         | 1.74                          | 55       | 2450                | 20             |
|                    | 16             | 2100,1050,700        | 2.70                         | 1.56                          | 53       | 2800                | 21             |
| 5-wall X-structure | 12             | 2100,1050,700        | 2.10                         | 2.56                          | 66       | 2100                | 20             |
|                    | 16             | 2100,1050,700        | 2.80                         | 2.10                          | 65       | 2800                | 21             |
|                    | 20             | 2100,1050,700        | 2.95                         | 2.27                          | 63       | 3500                | 22             |
|                    | 25             | 2100,1050,700        | 3.35                         | 2.16                          | 60       | 4375                | 23             |
| 7-wall D-          | 22             | 2100,1050,700        | 3.40                         | 1.51                          | 58       | 3850                | 22             |
|                    | 25             | 2100,1050,700        | 3.60                         | 1.41                          | 57       | 4375                | 23             |

|           |    |               |      |      |    |      |    |
|-----------|----|---------------|------|------|----|------|----|
| structure | 32 | 2100,1050,700 | 4.00 | 1.32 | 53 | 5600 | 23 |
|           | 35 | 2100,1050,700 | 4.50 | 1.19 | 50 | 6125 | 24 |
|           | 40 | 2100,1050,700 | 5.00 | 1.19 | 50 | 6125 | 24 |

## 2) Related Characteristics

### 1/Bending Radius

Use of the natural characteristics of polycarbonate plate without heat treatment. It can be cold-formed to the smallest allowed radius, the stress and strain that produced by overtaking the minimum allowable bending radius of the lock plate products will damage sheet and lead it leaving the warranty. In cold-formed sheet metal products, pls refer to the product specification of bending radius parameters in performance, or may be a problem.

### 2/Wind load and snow in computing and support the spacing between purline

Taking into account the pressure building and lighting body will affected by various factors fluctuate, give full consideration to the appropriate pressure coefficient is necessary. Determining the pressure coefficient requires the incorporation of the following factors: the structure and type of construction ,the height of the lighting and lighting mentioning shape, flat or vertical side, the roof slope or not ,whether the curve of installation. The total wind load pressure can clear slow the strength of the wind and its destructive power to building. Detailed wind pressure coefficient can be found from the national building standards.

The following table is a typical wind speed and wind pressure table.

The relationship between wind speed and dynamic pressure.

|                                         |    |     |     |     |     |     |     |      |      |      |      |      |
|-----------------------------------------|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| Wind Speed<br>(m/s)                     | 10 | 15  | 20  | 25  | 30  | 35  | 40  | 45   | 50   | 55   | 60   | 65   |
| Dynamic Pressure<br>(N/m <sup>2</sup> ) | 61 | 138 | 245 | 383 | 552 | 751 | 981 | 1240 | 1530 | 1850 | 2210 | 2590 |

The relationship between wind speed and static pressure.

|                                        |       |          |         |         |
|----------------------------------------|-------|----------|---------|---------|
| Wind                                   | Light | Moderate | Strong  | storm   |
| Speed(m/s)                             | 6     | 11-17    | 22-28   | 33-39   |
| Static pressure<br>(N/m <sup>2</sup> ) | 20    | 40-62    | 300-480 | 680-950 |

B) Snow load on the roof can be considered equivalent to the uniform vertical load, Expressed as per Square meter of the horizontal projection of light material load. Because of its excellent thermal insulation properties, good roof plate do not lat the snow melt immediately, so the snow loads must be considered .Fresh snow each cm height weights:2.0-8.0kg/m<sup>2</sup>.Snow load factor can be obtained from the local building codes.

### C) Purlines distance calculation

The distance between the purlines according to the distributed wind and snow loading.

The distance between the purlines according of the roof surface.

| Type                   | Thickness<br>(mm) | vertical purline<br>distance(mm) | Lateral purline distance(mm) |     |     |      |      |      | load (KN/ m <sup>2</sup> ) |      |      |  |
|------------------------|-------------------|----------------------------------|------------------------------|-----|-----|------|------|------|----------------------------|------|------|--|
|                        |                   |                                  | 400                          | 600 | 800 | 1000 | 1200 | 1400 | 1600                       | 1800 | 2000 |  |
| 2-wall R-<br>structure | 4                 | 1050                             | 0.5                          | 0.4 | 0.3 | -    | -    | -    | -                          | -    | -    |  |
|                        | 6                 | 1050                             | 0.7                          | 0.6 | 0.5 | -    | -    | -    | -                          | -    | -    |  |
|                        | 8                 | 1050                             | 0.9                          | 0.8 | 0.7 | 0.6  | -    | -    | -                          | -    | -    |  |
|                        | 10                | 1050                             | -                            | 1.1 | 1   | 0.9  | 0.8  | -    | -                          | -    | -    |  |
|                        | 12                | 1050                             | -                            | -   | 1.2 | 1.1  | 1    | 0.9  | -                          | -    | -    |  |
| 3-wall R-<br>structure | 8                 | 1020                             | 1.2                          | 1.1 | 1   | 0.9  | -    | -    | -                          | -    | -    |  |
|                        | 10                | 1050                             |                              | 1.3 | 1.2 | 1.1  | 1    | -    | -                          | -    | -    |  |
|                        | 12                | 1050                             |                              |     | 1.4 | 1.3  | 1.2  | 1.1  | -                          | -    | -    |  |
|                        | 14                | 1050                             | -                            | -   | -   | 1.5  | 1.4  | 1.3  | 1.2                        | -    | -    |  |
|                        | 16                | 1050                             | -                            | -   | -   | -    | 1.6  | 1.5  | 1.4                        | 1.3  | -    |  |
|                        | 18                | 1050                             | -                            | -   | -   | -    | -    | 1.7  | 1.6                        | 1.5  | -    |  |
| 4-wall R-<br>structure | 8                 | 1050                             | -                            | 1.3 | 1.2 | 1.1  | -    | -    | -                          | -    | -    |  |
|                        | 10                | 1050                             |                              |     | 1.4 | 1.3  | 1.2  | -    | -                          | -    | -    |  |
|                        | 12                | 1050                             | -                            | -   | -   | 1.5  | 1.4  | 1.3  | -                          | -    | -    |  |
|                        | 14                | 1050                             | -                            | -   | -   |      | 1.6  | 1.5  | 1.4                        | -    | -    |  |
|                        | 16                | 1050                             | -                            | -   | -   | -    | -    | 1.7  | 1.6                        | 1.5  | -    |  |
|                        | 18                | 1050                             | -                            | -   | -   | -    | -    | -    | 1.8                        | 1.7  | 1.6  |  |
|                        | 20                | 1050                             | -                            | -   | -   | -    | -    | -    | 1.9                        | 1.8  | 1.7  |  |
| 4-wall H-<br>structure | 6                 | 1050                             | 1.3                          | 1.2 | 1.1 | -    | -    | -    | -                          | -    | -    |  |
|                        | 8                 | 1050                             |                              | 1.4 | 1.3 | 1.2  | -    | -    | 1.9                        | 1.8  | 1.7  |  |
|                        | 10                | 1050                             |                              |     | 1.5 | 1.4  | 1.3  | -    | -                          | -    | -    |  |
|                        | 12                | 1050                             | -                            | -   | -   | 1.6  | 1.5  | 1.4  | -                          | -    | -    |  |
|                        | 14                | 1050                             | -                            | -   | -   | -    | 1.7  | 1.6  | 1.5                        | -    | -    |  |
|                        | 16                | 1050                             | -                            | -   | -   | -    | -    | 1.8  | 1.7                        | 1.6  | -    |  |
| 5-wall X-<br>structure | 12                | 1050                             | -                            | -   | -   | 1.7  | 1.6  | 1.5  | -                          | -    | -    |  |
|                        | 16                | 1050                             | -                            | -   | -   | -    | 1.8  | 1.7  | 1.6                        | -    | -    |  |
|                        | 20                | 1050                             | -                            | -   | -   | -    | -    | 2.1  | 2                          | 1.9  | 1.8  |  |
|                        | 25                | 1050                             | -                            | -   | -   | -    | -    | 2.2  | 2.1                        | 2    | 1.9  |  |
| 7-wall D-<br>structure | 22                | 1050                             | -                            | -   | -   | -    | -    | 2.2  | 2.1                        | 2    | 1.9  |  |
|                        | 25                | 1050                             | -                            | -   | -   | -    | -    | 2.3  | 2.2                        | 2.1  | 2    |  |
|                        | 32                | 1050                             | -                            | -   | -   | -    | -    | 2.4  | 2.3                        | 2.2  | 2.1  |  |
|                        | 35                | 1050                             | -                            | -   | -   | -    | -    | -    | 2.5                        | 2.4  | 2.3  |  |
|                        | 40                | 1050                             | -                            | -   | -   | -    | -    | -    | -                          | 3.2  | 3    |  |

**Above data is just for reference.**

Expresses: The load of different specific sheet on the basic of recommened vertical and lateral purlines distances.

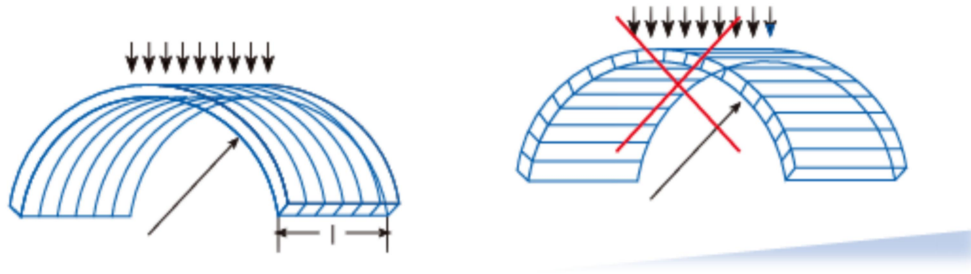
Distance calculation is based on general knowledge, previous experience and professional technique directing to this kind of products.

D) General notes of construction design:

- a) As the load/spacing shows that the recommend support distance couldn't replace the local structures and construction standards. The final distance is determined by the actual conditions for the construction site and the engineering designs.
- b) The space distance between the last continuous beams should be at the most the 80% of the distance of the middle span, for the special cases are designed by the designer.

### 3) Setting and Layout

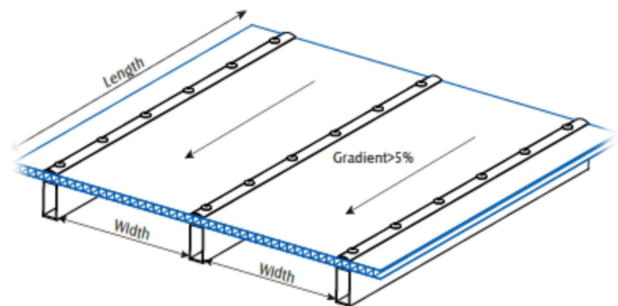
A) The installation of Polyshade steel sheets should make the holes of the sheets face the downside, so we can reduce the accumulation of dust inside, and condensate can be exported (picture one).



Picture one

B) We should use the material which are easily to get the light to connect the edge of the adjacent sheets for installation.

C) In the circumstance of level or flat surface installation (such as in the roof, skylights etc.) the falling gradient must be at least 5%, the falling gradient the equal to or larger than 10% is better. The larger the falling gradient is, the better the drainage and self-cleaning systems are. We should reduce the risk that water and dust penetrate in the connectors and fasteners, at the same time, it's good for us to reduce the Curvature deviation which is cause by load bending.



D) The direction of the length and rib should be in the same direction, and the direction of the width and the rib should be vertical.

### 4) Installation Method guidance

(A) Preparation before Installation

- a. As a rule, we recommend to install the Polyshade sheets under relatively high temperature, so we can minimize the thermal expansion. In summer, we recommend that, when we install two sheets, we

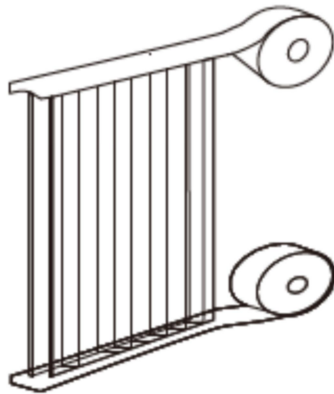
should reserve 5mm space distance between the two plates, and when in winter, we should reserve 8mm.

b. We should make the strip in the open end of the sheets and the protective film 70-100mm (3-4in) from the end of the sheet, so we can stick the foil weather strip. We should stick the weather-strip along the open end ,so we can well-proportioned and firmly attached it to the two sides of the sheets, what's more, we should make sure that all the open ends of the fin grooves are properly sealed.

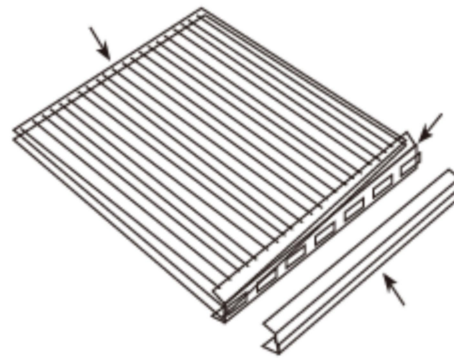
c. Both sides of the sheets have protective film. In order to maintain surface of the sheets clean, we should not damage the film before installation. We should remove the bottom film before actually install the sheets to the roof .Remove the protective film too early may lead to damage the sheets during the installation.

d) During the process of installation, we can tear the edge of the protective film to about 5cm according to the needs. After the installation being complete, we can tear up the protective film; after the lighting area is installed, we should immediately remove the outer protective film, or remove it in the shortest time. If we don't do this, the protective film will be exposed to the sunlight directly. As the degradation of the film itself, it's very difficult to remove it then, and the warranty will be invalidated.

e) Before using the U-shaped protective plug is installed ,it is necessary to drill a number of  $\Phi 4$ mm holes, holes between the separated the 500mm,for water supply and damage.



(Picture one)



(Picture two)

## B) Installation Method

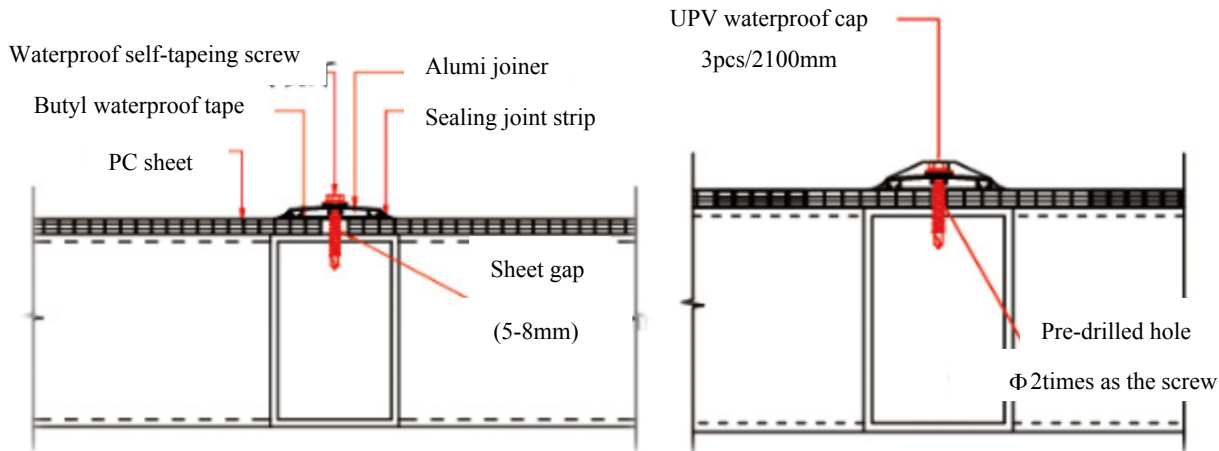
### a. Common installation method (with longitudinal design purlines)

In addition to horizontal purlines design of supporting the connection between two sheets a longitudinal purline has support, which is able to withstand greater wind, snow load factor and it is widely used. Another advantage of this design is that only need a few accessories: silicone, waterproof tape, profile, and plastic washer can be installed to achieve desired effect.

1. Along the longitudinal continuous span purline, two pieces of sheets should keep a distance of 5-8mm (5mm in summer and 8mm in winter).
2. After adjusting the spacing, drill Sealing again with waterproof adhesive tape on the connect of the sheet.
3. Cover the waterproof adhesive tape with a matching profile, fixing them with screw and the distance between the screw should be 300mm



4. It should use the drill-limited device to fasten screws, to avoid excessive tightening caused by stress. The early failure of internal stresses can cause sheet and warping. Each screw should be equipped with rubber mat, plastic washer. Tighten the screw carefully and avoid making the gasket, rubber sheet and the surface of the PC sheet distorted. Large cap to prevent over-drilling and fracturing under the screws around the board, so even pressed, to avoid cracking opening; while sealing plate hole to prevent water and dust penetration into the inner plate. (picture two)
5. Sealing the 2 sides of the profiles with silicone tape.



Picture one

Picture two

It is suggested that to fix the screw with plastic washer, rather than directly fix the sheets with screws. Because fixing with screws directly must be pre-drilled to meet the thermal expansion and construction of the sheets which will bring up the risk of leakage of water. The plastic washer can perfectly meet the thermal expansion and contraction of the sheets and avoid the risk of leakage of water.

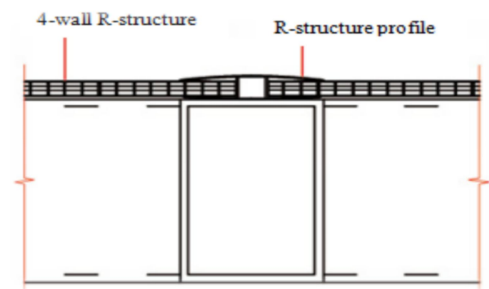
b. The simple installation method (no longitudinal purline)

Designing of no longitudinal purline supported bellow, it's an economic and convenient connected method, but, it needs connectors' help. For 12mm thickness or more that 12mm Pc sheets, does not recommend the use of this profiles. Connectors (alumina, and iron, rigid PVC or polycarbonate) omission of bearing capacity considering only connection, through which you can form a watertight barrier of external as well as moderate increase in overall stiffness.

Here are two common connector installation methods:

H-shaped connecting plate (PC, aluminum or other material compatible with polycarbonate)

1. The edge of the map sheet sides marked with neutral silicon into the profile system, side wing set aside to allow thermal expansion and contraction of the plate displacement.
2. Seal H-connection profile on both sides with natural silicon. Connectors don't fasten with screw.



SNAP profile (PC, aluminum materials or other material compatible with polycarbonate)

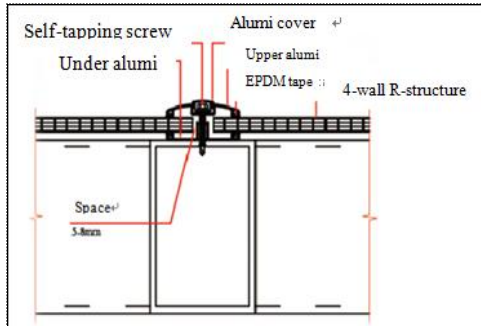
1. SNAP profile is installed to the purline vertically, usually the one that is better in stiffness in the two parts

2. The two sides of the plates are put on the buckle up and down profile after pasted with water-proof tape.

Two side wings allow the displacement of heating or cooling plate.

3. Up side profile (already sealed), covers right above on the down profile. Connect up above side profile, sheets, down profile, lurline with self-screw.

5. Like the linking method of mode H, we use silicon to seal the two sides of the up and down buckle.



## 5) Comprehensive advice for Polyshade hollow sheet

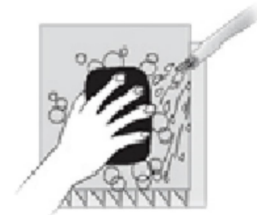
### (A) Clean

a. Usually the rain is enough for self-clean. We can take advantage of dilute neutral detergent (such as ethanol, ethane, butyl cellulose) or household detergent, using a sponge or soft cloth to scrub the sheets,. Then put clean water to wash portable and small area. Make sure that cleaning detergents do not contain abrasive agent or some acid alkali solvent.

b. Serious oil stain can be removed with isopropyl alcohol aqueous solution. Do not use alkaline substances or cleaner that incompatible with PC sheet (such as benzene, gasoline, acetone, carbon tetrachloride, etc.)

c. Avoid dry cleaning, adhesion of dust particles may scratch the surface, the damage to the plate.

d. Large areas can be washed by the high-pressure spray, joint the compatibility of solvents. We can also use steam spray gun flushing.



### (B) Safety precautions

a. When assembly Polyshade sheets or maintenance work, we should use the unit title walk ladder for roof structure or segments.

b. Don't trample the purline part of Polyshade sheet. Emergency can only walk on it.

c. When construction is completed, we should clean up the sun sheet.

### 3.Solid Sheet Installation

Solid sheet is clear as the glass, but its weight is just half as the glass. At the same time, it has the property of unbreakable and high impact. Thus it can be bended, equipment processed and thermal synthesis processed, so widely used in kinds buildings, engineer project ,advertisement ,decoration.

#### 1) Polyshade solid sheets specification

| Type                     | thickness<br>(mm) | Width<br>(mm)            | length<br>(mm)                        | weight<br>(kg/ m <sup>2</sup> ) | UV<br>coating<br>(um) | Transmittance<br>clear | minimum<br>bend<br>radius(mm) |      |
|--------------------------|-------------------|--------------------------|---------------------------------------|---------------------------------|-----------------------|------------------------|-------------------------------|------|
| universal<br>solid sheet | 1.5               | 1220-2100                | 30000                                 | 1.8                             | 0.5                   | 90                     | 300                           |      |
|                          | 2                 | custom-made              | custom-made                           | 2.4                             | 0.5                   | 89                     | 400                           |      |
|                          | 2.7               |                          |                                       | 3.24                            | 0.5                   | 88                     | 540                           |      |
|                          | 3                 | 1220-2100<br>custom-made | 2440<br>10000<br>30000<br>custom-made | 3.6                             | > 50                  | 88                     | 600                           |      |
|                          | 4                 |                          |                                       | 4.8                             | 0.5                   | 87                     | 800                           |      |
|                          | 6                 |                          |                                       | 2440、10000<br>custom-made       | 7.2                   | 0.5                    | 86                            | 1200 |
|                          | 8                 |                          |                                       |                                 | 9.6                   | 0.5                    | 83                            | 1600 |
|                          | 10                |                          |                                       |                                 | 12                    | 0.5                    | 82                            | 2000 |
|                          | 12                |                          |                                       |                                 | 14.4                  | 0.5                    | 81                            | 2400 |
|                          | 14                |                          |                                       |                                 | 16.8                  | 0.5                    | 77                            | 2800 |
| 14                       | 16.8              |                          |                                       |                                 | 0.5                   | 77                     | 2800                          |      |
| Embossed<br>solid sheet  | 3                 | 1220、2100<br>custom-made | 2440<br>custom-made                   | 3.6                             | 0.5                   |                        | 600                           |      |
|                          | 4                 |                          |                                       | 4.8                             | 0.5                   |                        | 800                           |      |
|                          | 4.5               |                          |                                       | 5.4                             | 0.5                   |                        | 900                           |      |
|                          | 6                 |                          |                                       | 7.2                             | 0.5                   |                        | 1200                          |      |
|                          | 8                 |                          |                                       | 9.6                             | 0.5                   |                        | 1600                          |      |
|                          | 10                |                          |                                       | 12                              | 0.5                   |                        | 2000                          |      |
|                          | 12                |                          |                                       | 14.4                            | 0.5                   |                        | 2400                          |      |
|                          | 15                |                          |                                       | 18                              | 0.5                   |                        | 3000                          |      |
| Frosted<br>solid sheet   | 1.5               | 1220-2100<br>custom-made | 2440                                  | 1.8                             | 0.5                   |                        | 300                           |      |
|                          | 2                 |                          | 10000、30000                           | 2.4                             | 0.5                   |                        | 400                           |      |
|                          | 3                 |                          | custom-made                           | 3.6                             | 0.5                   |                        | 600                           |      |
|                          | 4.5               |                          | 3000、6000<br>custom-made              | 5.4                             | 0.5                   |                        | 900                           |      |
|                          | 6                 |                          |                                       | 7.2                             | 0.5                   |                        | 1200                          |      |
|                          | 8                 |                          |                                       | 9.6                             | 0.5                   |                        | 1600                          |      |
|                          | 10                |                          |                                       | 12                              | 0.5                   |                        | 2000                          |      |
|                          | 12                |                          |                                       | 14.4                            | 0.5                   |                        | 2400                          |      |

|                                         |         |                          |                                     |             |     |  |      |
|-----------------------------------------|---------|--------------------------|-------------------------------------|-------------|-----|--|------|
|                                         | 15      |                          |                                     | 18          | 0.5 |  | 3000 |
| Advertising<br>diffusion<br>solid sheet | 2       | 1220-2100<br>custom-made | 2440<br>3000<br>6000<br>custom-made | 2.4         | 0.5 |  | 400  |
|                                         | 2.5     |                          |                                     | 3           | 0.5 |  | 500  |
|                                         | 3       |                          |                                     | 3.6         | 0.5 |  | 600  |
|                                         | 4       |                          |                                     | 4.8         | 0.5 |  | 800  |
|                                         | 5       |                          |                                     | 6           | 0.5 |  | 1000 |
|                                         | 6       |                          |                                     | 7.2         | 0.5 |  | 1200 |
|                                         | 2       | 1220-2100<br>custom-made | 1000                                | 2.4         | 0.5 |  | 400  |
| Anti-scratch<br>solid sheet             | 3       |                          | 2440                                | 3.6         | 0.5 |  | 600  |
|                                         | 4.5     |                          | 3000                                | 5.4         | 0.5 |  | 900  |
|                                         | 6       |                          | 6000                                | 7.2         | 0.5 |  | 1200 |
|                                         | 8       |                          | custom-made                         | 9.6         | 0.5 |  | 1600 |
| Corrugated<br>solid sheet               | 0.7-1.5 | 600-1300mm               | custom-made                         | custom-made |     |  |      |

## 2) Typical Physical Properties

According to the solid sheets and hollow sheets are all polycarbonate, uses and assembly is alike.  
Related detailed assembled data pls refer to hollow sheets technical data.

Typical physical properties:

| Property                         | Unit                 | Value          |
|----------------------------------|----------------------|----------------|
| Specific gravity                 | g/m <sup>3</sup>     | 1.2            |
| Impact strength                  | J/m                  | 850            |
| Tensile strength                 | N/mm <sup>2</sup>    | > 60           |
| Flexural strength                | N/mm <sup>2</sup>    | 100            |
| Modulus of elasticity            | Mpa                  | 2400           |
| Elongation at break              | %                    | 100            |
| Coefficient of thermal expansion | mm/m/°C              | 0.0652         |
| Heat conductivity                | W/ m <sup>2</sup> .k | 2.3-2.9        |
| Use temperature                  | °C                   | -40 ~+120      |
| Fire rating                      | /                    | GB8624-1997 B1 |
| UV protection layer              | um                   | 50             |
| Yellowing index                  | /                    | ΔY≤10          |
| Anti-snow load strength(6-8mm)   | KN/m <sup>2</sup>    | 1.2            |
| Anti-wind load strength(6-8mm)   | KN/m <sup>2</sup>    | 1.8            |
| Light transmittance reduce       | %                    | 10             |

## Assembly data

| Type        | Thickness | vertical purline | Lateral purline distance(mm) |     |     |     | load (KN/m <sup>2</sup> ) |      |      |
|-------------|-----------|------------------|------------------------------|-----|-----|-----|---------------------------|------|------|
|             | (mm)      | distance(mm)     | 200                          | 400 | 600 | 800 | 1000                      | 1200 | 1400 |
| Solid sheet | 1.5       | 1050             | 0.4                          | 0.3 | 0.2 | -   | -                         | -    | -    |
|             | 2         | 1050             | 0.5                          | 0.4 | 0.3 | -   | -                         | -    | -    |
|             | 3         | 1050             | 0.7                          | 0.6 | 0.5 | -   | -                         | -    | -    |
|             | 4         | 1050             | -                            | 0.9 | 0.8 | 0.7 | -                         | -    | -    |
|             | 5         | 1050             | -                            | 1.1 | 1   | 0.9 | -                         | -    | -    |
|             | 6         | 1050             | -                            | 1.3 | 1.2 | 1.1 | -                         | 0.9  | -    |
|             | 7         | 1050             | -                            | 1.5 | 1.4 | 1.3 | 1.2                       | 1.1  | -    |
|             | 8         | 1050             | -                            | -   | 1.7 | 1.6 | 1.4                       | 1.4  | -    |
|             | 9         | 1050             | -                            | -   | 1.9 | 1.8 | 1.7                       | 1.6  | -    |
|             | 10        | 1050             | -                            | -   | -   | 2.1 | 2                         | 1.9  | 1.8  |
|             | 11        | 1050             | -                            | -   | -   | -   | 2.2                       | 2.1  | 20   |
|             | 12        | 1050             | -                            | -   | -   | -   | 2.5                       | 2.4  | 2.3  |
|             | 13        | 1050             | -                            | -   | -   | -   | 2.7                       | 2.6  | 2.5  |
|             | 14        | 1050             | -                            | -   | -   | -   | 2.9                       | 2.8  | 2.7  |
|             | 15        | 1050             | -                            | -   | -   | -   | 3                         | 2.9  | 2.8  |

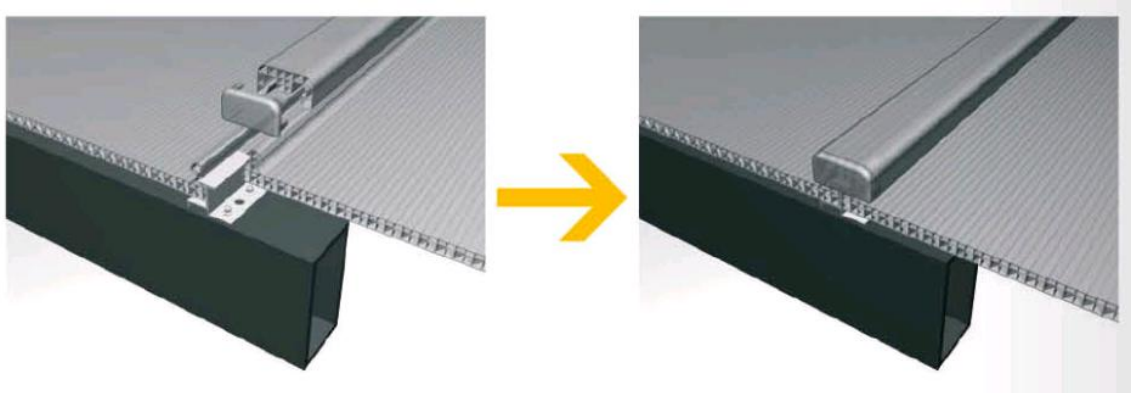
Above data is just for reference.

Expresses: The load of different specific sheet is on the basic of recommend vertical and lateral purlines distances.

Distance calculation is based on general knowledge, previous experience and professional technique directing to this kind of products.

## 4、 U-Panel Installation

PCU is an advanced polycarbonate U-shaped panel system designed by POLYSHADE TECHNOLOGY (SHANGHAI) CO.,LTD.. PCU is a self-fastening system; T-Fasteners fix the system to the structure by clamping, without any penetration through the panels. The panels join together by polycarbonate or aluminum joiners which are sealed at the ends by End-caps. Aluminum Sealing Strip plugs the panel lower end, to prevent dirt from entering the flutes, while providing efficient drainage. U-Profile (PC / Aluminum) or Aluminum F-Profile seals the upper end of the panel. Aluminum F-Profile fits to the panel side edges, to interface with the structure for a fully framed installation.

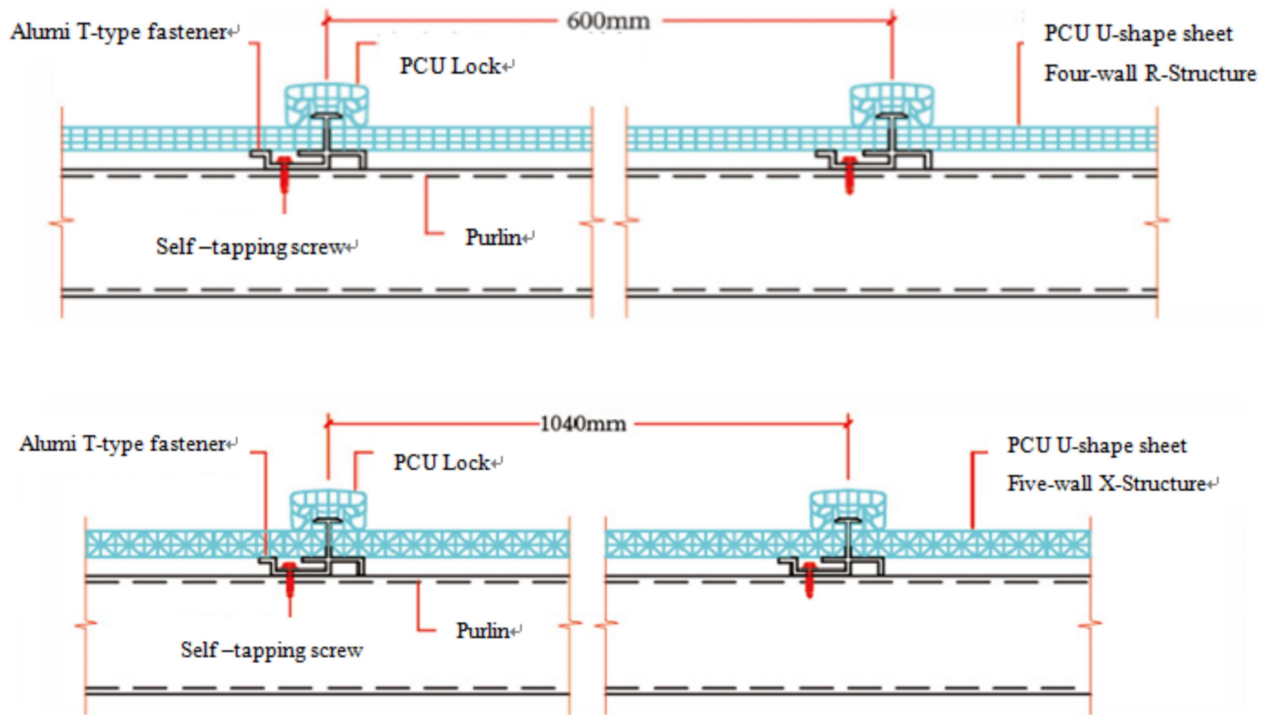


### 1) Types and Specifications

| Type                                        | Thickness (mm) | Standard Length (mm) | Weight (kg/m <sup>2</sup> ) | K-value (w/m <sup>2</sup> *k) | LT clear | min bend radius(m) | Sound Reduction (DB) |
|---------------------------------------------|----------------|----------------------|-----------------------------|-------------------------------|----------|--------------------|----------------------|
| PCU U-shape sheet<br>Twin wall R-Structure  | 4              | 2100,1050,700        | 0.85                        | 3.96                          | 80       | 700                | 15                   |
|                                             | 6              | 2100,1050,700        | 1.3                         | 3.56                          | 78       | 1050               | 17                   |
|                                             | 8              | 2100,1050,700        | 1.5                         | 3.26                          | 76       | 1400               | 18                   |
| PCU U-shape sheet<br>Four wall R-Structure  | 8              | 2100,1050,700        | 1.6                         | 2.76                          | 73       | 1400               | 19                   |
|                                             | 10             | 2100,1050,700        | 1.80                        | 2.68                          | 71       | 1750               | 19                   |
|                                             | 12             | 2100,1050,700        | 2.10                        | 2.60                          | 71       | 2100               | 19                   |
| PCU U-shape sheet<br>Fiver wall X-Structure | 12             | 2100,1050,700        | 1.80                        | 2.56                          | 71       | 1400               | 18                   |
|                                             | 14             | 2100,1050,700        | 2.10                        | 2.39                          | 71       | 1750               | 19                   |
|                                             | 16             | 2100,1050,700        | 2.30                        | 2.30                          | 70       | 2100               | 20                   |
|                                             | 18             | 2100,1050,700        | 2.50                        | 2.10                          | 69       | 2450               | 21                   |
|                                             | 20             | 2100,1050,700        | 2.80                        | 2.00                          | 68       | 2800               | 22                   |
| PCU U-shape sheet<br>Seven wall R-Structure | 22             | 2100,1050,700        | 1.30                        | 2.96                          | 59       | 1050               | 18                   |
|                                             | 25             | 2100,1050,700        | 1.7                         | 2.58                          | 58       | 1400               | 18                   |
|                                             | 27             | 2100,1050,700        | 1.9                         | 2.16                          | 57       | 1750               | 19                   |
|                                             | 30             | 2100,1050,700        | 2.20                        | 1.98                          | 56       | 2100               | 20                   |

Above width of PCU U-shape sheet is fixed value, and the length can be custom-made.(on the basis of transport easily)

Below is the standard assembly drawing:



## 2) Assembly Guidance

Assembly data

| Type               | Thickness (mm)     | vertical purline distance(mm) | Lateral purline distance(mm) |     |      |      |      | load (KN/㎡) |      |      |
|--------------------|--------------------|-------------------------------|------------------------------|-----|------|------|------|-------------|------|------|
|                    |                    |                               | 600                          | 800 | 1000 | 1200 | 1400 | 1600        | 1800 | 2000 |
| PCU U-shape        | 6                  | 4000/6000                     | 1.3                          | 1.2 | 1.1  | -    | -    | -           | -    | -    |
| 2-wall R-structure | 8                  | 4000/6000                     | 1.4                          | 1.3 | 1.2  | -    | -    | -           | -    | -    |
|                    | 10                 | 4000/6000                     |                              | 1.5 | 1.4  | 1.3  | -    | -           | -    | -    |
| PCU U-shape        | 8                  | 4000/6000                     | 1.5                          | 1.4 | 1.3  | 1.2  | -    | -           | -    | -    |
|                    | 4-wall R-structure | 10                            | 4000/6000                    | -   | 1.6  | 1.5  | 1.4  | 1.3         | -    | -    |
|                    |                    | 12                            | 4000/6000                    | -   | -    | 1.7  | 1.5  | 1.5         | 1.4  | -    |
| PCU U-shape        | 12                 | 4000/6000                     | -                            | -   | 1.8  | 1.7  | 1.6  | 1.5         | -    | -    |
|                    | 14                 | 4000/6000                     | -                            | -   | 2    | 1.9  | 1.8  | 1.7         | -    | -    |
|                    | 16                 | 4000/6000                     | -                            | -   | -    | 2.1  | 2.0  | 1.9         | 1.8  | -    |
|                    | 18                 | 4000/6000                     | -                            | -   | -    | -    | 2.2  | 2.1         | 2.0  | 1.9  |
| PCU U-shape        | 20                 | 4000/6000                     | -                            | -   | -    | -    | -    | 2.3         | 2.2  | 2.1  |
|                    | 22                 | 4000/6000                     | -                            | -   | -    | -    | -    | 2.4         | 2.3  | 2.2  |
| 7-wall R-          | 25                 | 4000/6000                     | -                            | -   | -    | -    | -    | 2.4         | 2.4  | 2.3  |

|           |    |           |   |   |   |   |   |   |     |     |
|-----------|----|-----------|---|---|---|---|---|---|-----|-----|
| structure | 27 | 4000/6000 | - | - | - | - | - | - | 2.6 | 2.5 |
|           | 30 | 4000/6000 | - | - | - | - | - | - | 2.7 | 2.6 |

Above data is just for reference.

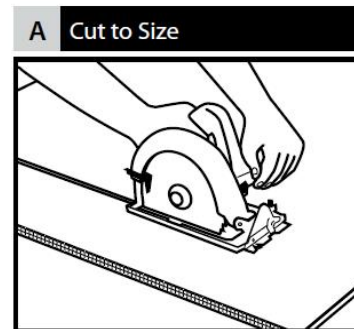
Expresses: The load of different specific sheet is on the basic of recommend vertical and lateral purlines distances.

Distance calculation is based on general knowledge, previous experience and professional technique directing to this kind of products.

### Installation Step-By-Step Instructions

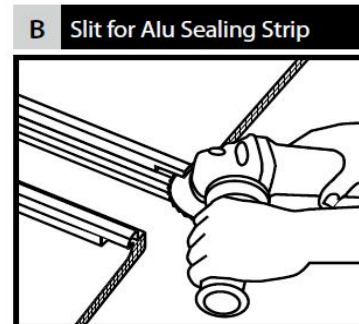
#### A) Cut the panel to prescribed length

The overhang of the panels of each ends should be exceed 100mm, which is recommend to be cut by circular saw or hand-saw, into at minimum 50mm to reach the rain spouts.



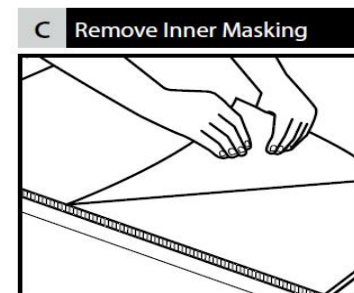
#### B) Slit for Alu Sealing Strip

Cut horizontally each side of the panels at 18mm by using disc (2mm thick). The cut should no damage the panel surface and be in remaining horizontal to the upper surface. Clean up the Chipping and remaining when completing cutting before the installation is recommended.



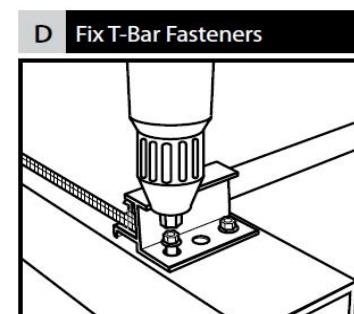
#### (C) Remove inner masking

Place the first panel and remove the inner protective film. Keep this side away from the purline to avoid scratching until final positioning.



#### (D) Fix-fastener

Along panel on remaining purlines, place T fasteners against panel and fix into place using hex head fixings provided. T-fasteners, as an arch type component, could be fix as the mid fastener at the top of the arch.

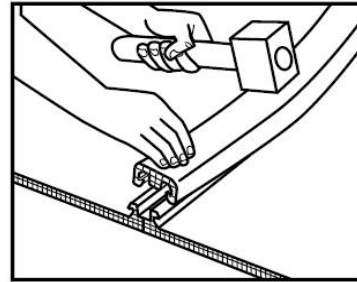




**(E) Assembly**

Remove protective film from underside of second panel and place against T fastener. Using a rubber mallet, start to fix the joint, locking the 2 panels together by striking with short intervals (5-10cm) along the joiner. Fix the connector from the end of the panel to the top of the roof(ensure that the connector overhang exceed 13mm than the panel for the aluminum sealing bar being installed later).

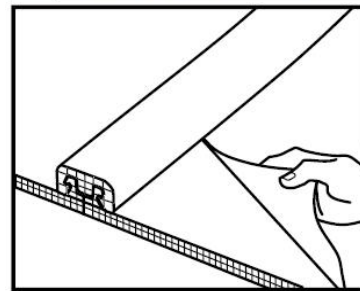
**E Assemble**



**(F) Remove outer masking**

Remove 500mm of the protective film along the panel ends, and the rest of the film should be removed immediately when installation is complete, preventing removing problem from some delays.

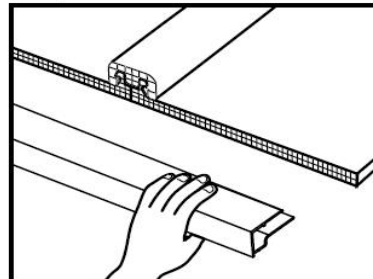
**F Remove Outer Masking**



**(G) Install the U-Profile**

U-profile is designed to be fit for panels tightly. Install it by pushing one end on and slowly tap it until it is firmly napped in. PC U-profile could be installed by hand while aluminum by rubber mallet.

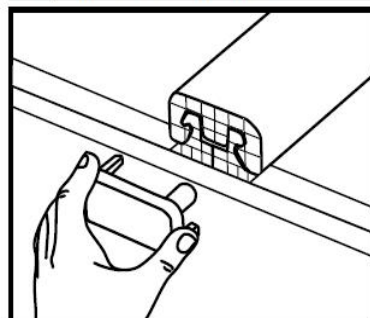
**G Fix Sealing Strip**



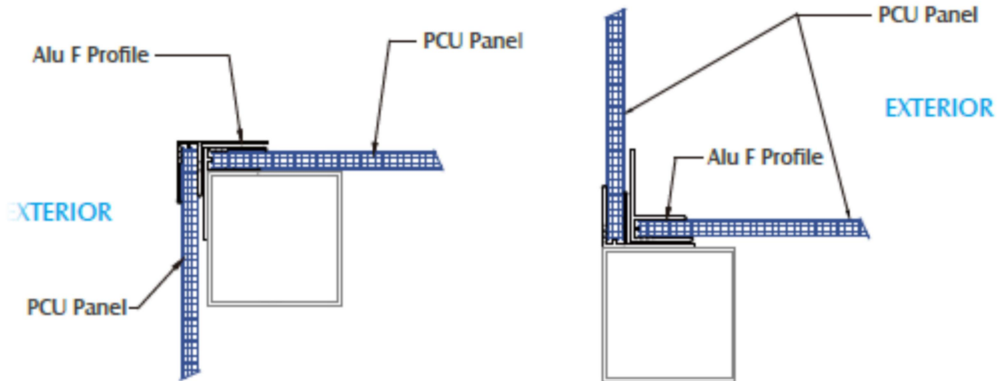
**(H) Insert end-cap**

Insert end-cap in both end of the connector by pushing.

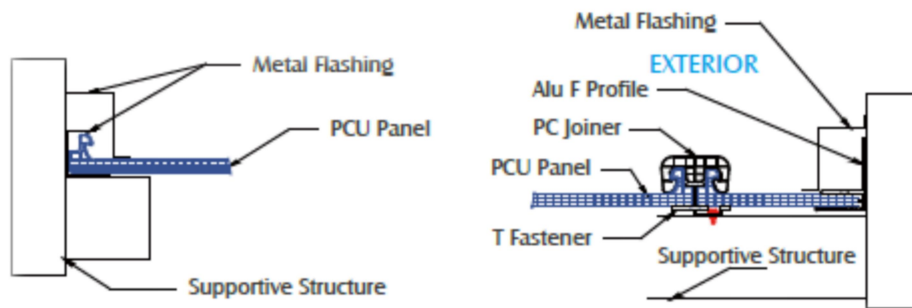
**H Fix Joiner End-Caps**



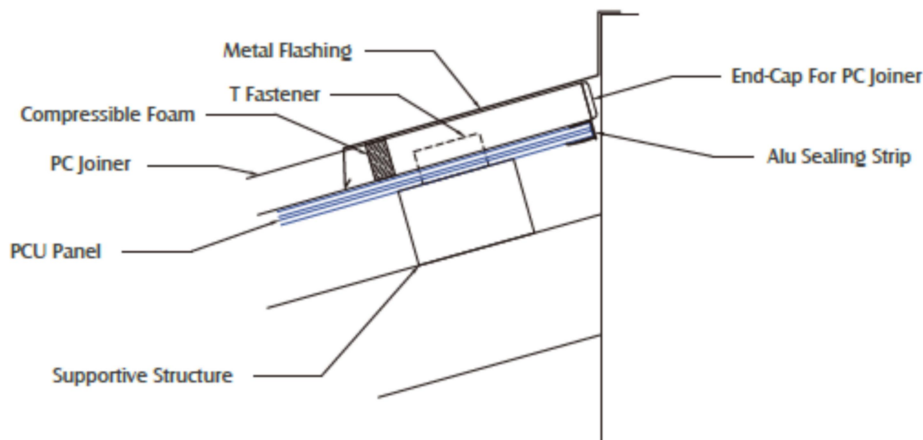
Installation details



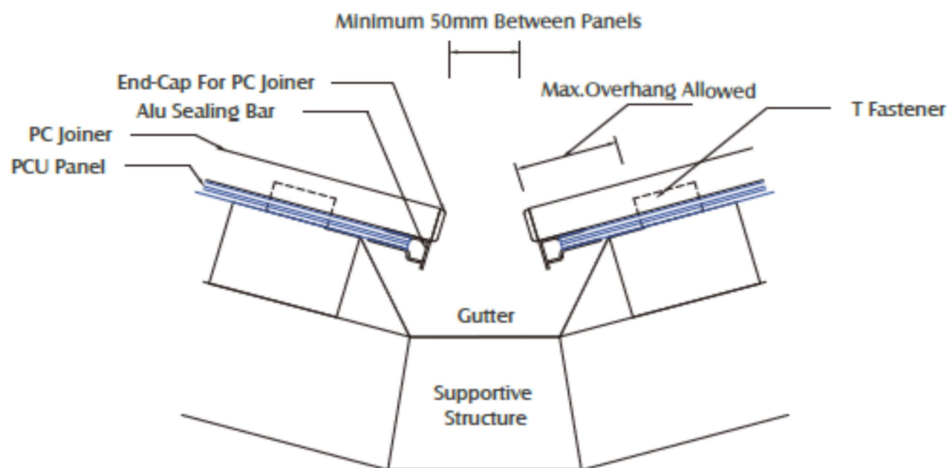
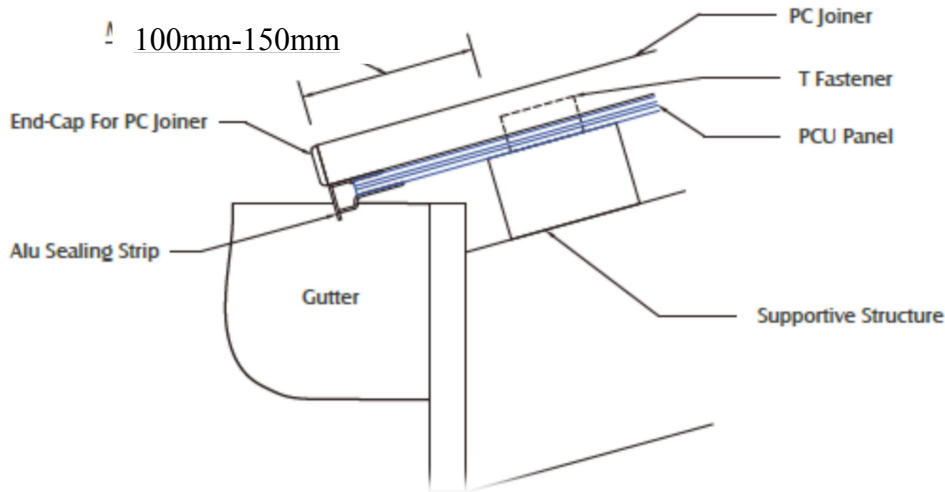
Above are the drawing of turning corner when install sheets, just sketch drawing ,pls refer to the actual situation.



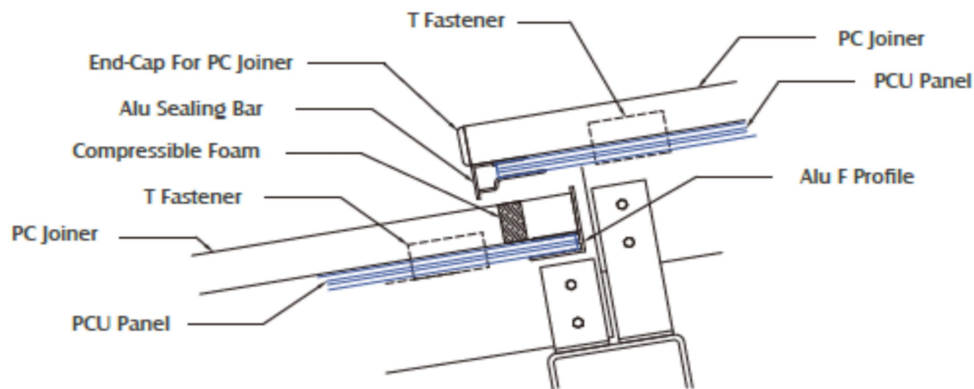
Above are the drawing of side surface and wall building when install sheets, just sketch drawing, pls refer to the actual situation.



Above is the drawing of end and wall building waterproof when install sheets, just sketch drawing, pls refer to the actual situation.



Above is the drawing of telos and waterproof gutter when install sheets, just sketch drawing, pls refer to the actual situation.



Above is the connection drawing when install sheets, just sketch drawing, pls refer to the actual situation.

## 5、Corrugated sheet Installation

Polyshade Polycarbonate Corrugated Multiwall system, researched and developed by Polyshade Technology (Shanghai) Co., Ltd. Which is an advanced building systems. This system is designed flexibly, and it can offer high light transmission, excellent performance of heat insulation, water-proof features and high load strength. Polyshade Polycarbonate corrugated multiwall system is an ideal system for the cladding and roofing.

### 1) Types and Specifications

| Type                          | Valid Width (mm) | Thickness (mm) | Weight (kg/ m <sup>2</sup> ) | LT% (clear) | Min bend radius(mm) | Color                     |
|-------------------------------|------------------|----------------|------------------------------|-------------|---------------------|---------------------------|
| Corrugated 3-wall R-structure | 1050             | 8              | 2.2                          | 76          | 700                 | Clear, blue, gray, bronze |
|                               | 1050             | 10             | 2.5                          | 74          | 7875                | Custom-made               |

### 2) Assembly Guidance

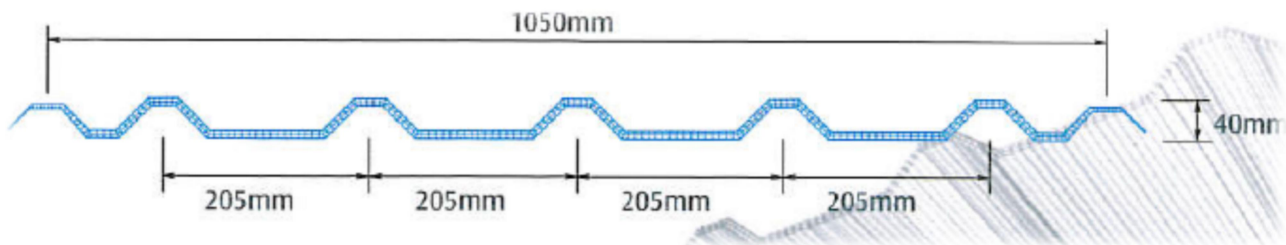
Assembly data

| Type               | Thickness (mm) | vertical purline distance(mm) | Lateral purlinee distance(mm) |     |      |      |      | load (KN/ m <sup>2</sup> ) |      |      |
|--------------------|----------------|-------------------------------|-------------------------------|-----|------|------|------|----------------------------|------|------|
|                    |                |                               | 600                           | 800 | 1000 | 1200 | 1400 | 1600                       | 1800 | 2000 |
| 3-wall R-structure | 8              | 4000/6000                     | -                             | 1.5 | 1.4  | 1.3  | 1.2  | -                          | -    | -    |
|                    | 10             | 4000/6000                     | -                             | 1.7 | 1.6  | 1.5  | 1.4  | 1.3                        | -    | -    |

Above data is just for reference.

Expresses: The load of different specific sheet is on the basic of recommend vertical and lateral purlines distances.

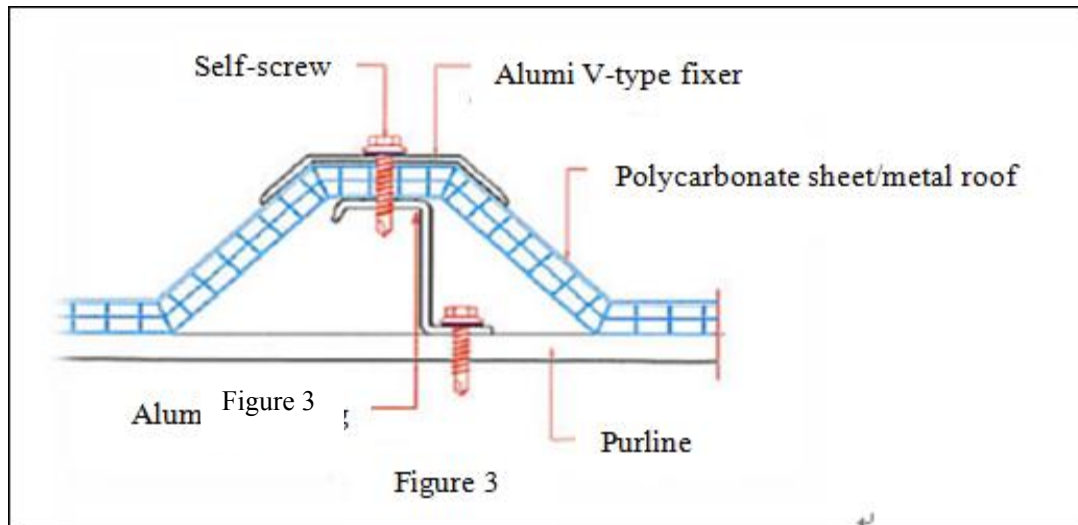
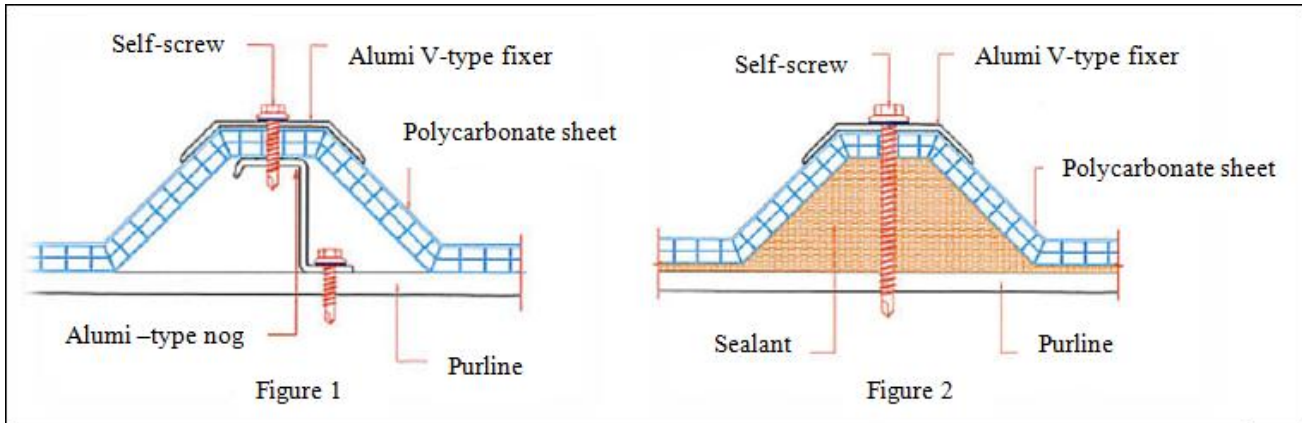
Distance calculation are based on general knowledge, previous experience and professional technique directing to this kind of products



Assembly details

Corrugated multiwall sheet is a kind of wave polycarbonate hollow sheet. It has obvious peak and trough. In the peak position of wave, use aluminum V type fasteners on the upper, use Z type bracket fixed on the keel in the lower side. Waterproof self tapping screws locks the upper side and the lower side. Sheet in the middle (picture 1).The trough is the water channels, which are not fixed. It can solve rainwater infiltration. High density PE cotton is used at the end part of the cladding plate, filling the gap. It can solve assembly sealing problem. Each side of the sheet have a peak.

We may clad layer of the same type or metal pressed sheets (picture 3)



## 6、 Thermo click System Installation

### 1) Types and Specifications

| Type               | Thickness (mm) | Standard Length(mm) | Weight (kg/m <sup>2</sup> ) | K-value (w/m <sup>2</sup> *k) | LT clear | Min bend radius(mm) | Voice low (DB) |
|--------------------|----------------|---------------------|-----------------------------|-------------------------------|----------|---------------------|----------------|
| 8-wall R-structure | 40             | 500                 | 6                           | 1.41                          | 58       | 16000               | 35             |

## 2) Assembly Guidance

### Assembly data

| Type               | Thickness (mm) | vertical purline distance(mm) | Lateral purline distance(mm) |     |      |      |      | load (KN/m <sup>2</sup> ) |      |      |
|--------------------|----------------|-------------------------------|------------------------------|-----|------|------|------|---------------------------|------|------|
|                    |                |                               | 600                          | 800 | 1000 | 1200 | 1400 | 1600                      | 1800 | 2000 |
| 8-wall R-structure | 40             | 4000/6000                     | -                            | -   | -    | -    | -    | 3.2                       | 3.1  | 3.0  |

Above data is just for reference.

Expresses: The load of different specific sheet is on the basic of recommend vertical and lateral purlines distances.

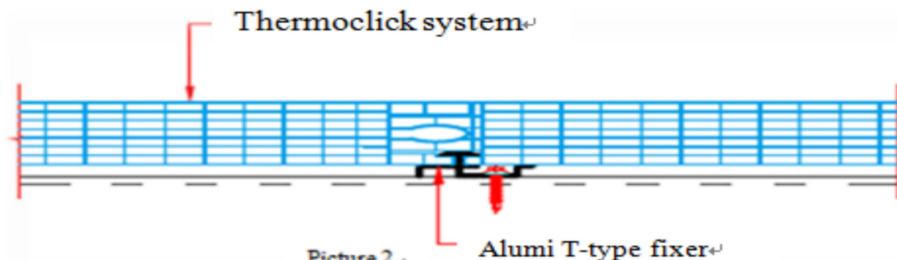
Distance calculation are based on general knowledge, previous experience and professional technique directing to this kind of product

### Assembly details

Thermo click system is PC level hollow sheets, multi-wall designed, meet the strong building requirement of facades assembly. Every single side face uses concave and convex appearance of self locking form, which are very beautiful (picture one); Concave and convex lock bottoms remain certain space, put T-type fixer in, using self screw fastened the T-type, Assembly conveniently (picture two); On the basics of meeting building structure stability, we use thermo click system can leave out vertical steel structure, saving quantity of steel and saving cost.



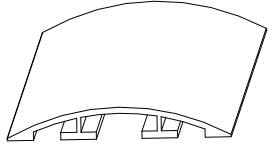
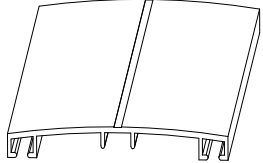

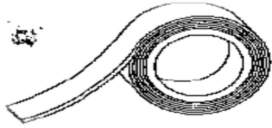

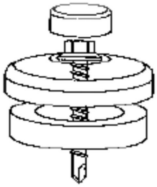
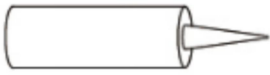
Picture 1..



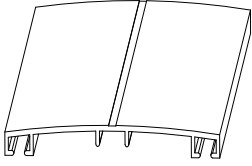
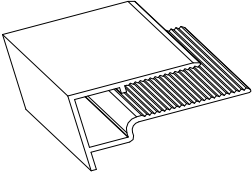
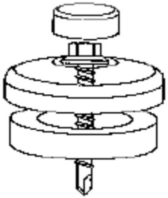
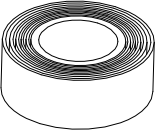
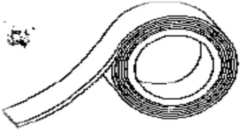

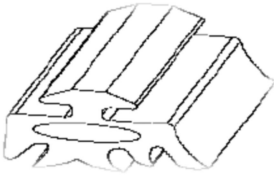

Picture 2..

## 7、 System Components

### 1、 solid sheet components

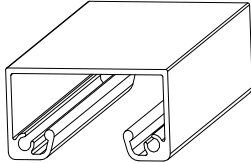
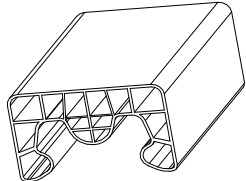
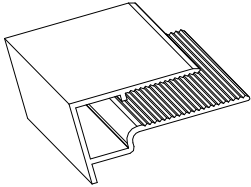
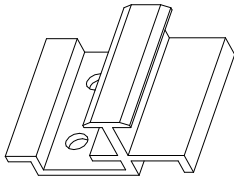
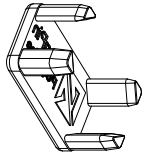
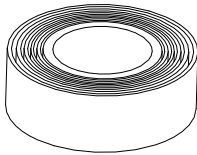
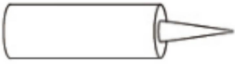
| NO | name                 | drawing                                                                             | specification | application                                               |
|----|----------------------|-------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------|
| 1  | Aluminum arch joiner |    | 6m/pc         | PC sheet assembly                                         |
| 2  | Aluminum joiner      |    | 6m/pc         | PC sheet assembly                                         |
| 3  | EPDM tape joiner     |   | /             | Combine use with joiner                                   |
| 4  | waterproof tape      |  | 30m/roll      | PC solid sheet assembly<br>connected sheet,<br>waterproof |
| 5  | self-tapping screw   |  | /             | use with joiner,<br>20/profile                            |
| 6  | waterproof gap       |  | /             | PC sheet assembly                                         |
| 7  | neutral silicon      |  | 350m/pc       | all PC products                                           |

## 2、 hollow sheet components

| NO | name                          | drawing                                                                             | specification | application                   |
|----|-------------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|
| 1  | Aluminum joiner               |    | 6m/pc         | PC sheet assembly             |
| 2  | U profile                     |    | 6m/pc         | PC,PC U-shape sheet           |
| 3  | waterproof gap                |   | /             | PC sheet                      |
| 4  | Aluminum foil tape            |  | 50m/roll      | PC,PC U-shape sheet           |
| 5  | Waterproof tape               |  | 30m/roll      | Pc sheet, combine with joiner |
| 6  | waterproof self-tapping screw |  | /             | 20/joiner                     |
| 7  | EPDM tape joiner              |  | /             | combine with joiner           |
| 8  | neutral silicon               |  | 350ml/pc      | all PC products               |

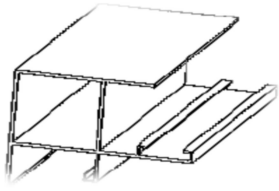
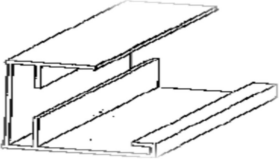
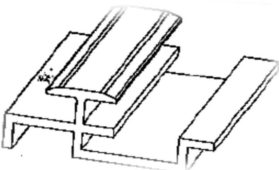

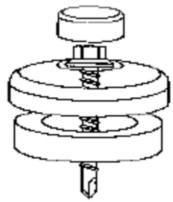
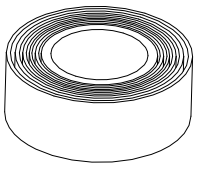



### 3、 U-shape sheet components

| NO | name               | drawing                                                                             | specification | application                              |
|----|--------------------|-------------------------------------------------------------------------------------|---------------|------------------------------------------|
| 1  | Aluminum joiner    |    | 6m/pc         | PC U-shape sheet                         |
| 2  | PC joiner          |    | 6m/pc         | PC U-shape sheet                         |
| 3  | U profile          |    | 6m/pc         | PC hollow sheet, PC U-shape sheet        |
| 4  | T fastener         |  | 40mm/pc       | PC U-shape sheet, PC thermclick system   |
| 5  | en-up cap          |  | /             | PC thermclick system                     |
| 6  | Aluminum foil tape |  | 50m/roll      | PC sheet ,U-shape sheet,corrugated sheet |
| 7  | neutral silicon    |  | 350m/pc       | all PC products                          |

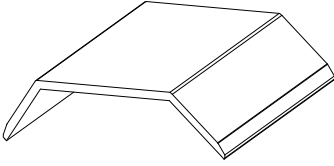
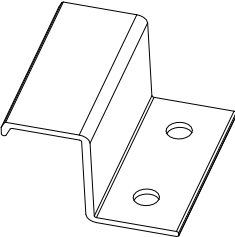

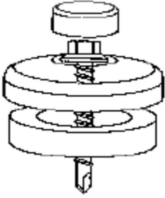
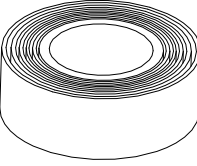

### 4、 PC thermo click sheet components

| NO | name | drawing | specification | application |
|----|------|---------|---------------|-------------|
|----|------|---------|---------------|-------------|

|   |                        |                                                                                     |          |                                                               |
|---|------------------------|-------------------------------------------------------------------------------------|----------|---------------------------------------------------------------|
| 1 | turning corner profile |    | 6m/pc    | Thermoclick system turning corner assembly                    |
| 2 | U profile              |    | 6m/pc    | Thermo click system                                           |
| 3 | T fastener             |    | 40m/pc   | Thermo click system                                           |
| 4 | EPDM tape joiner       |   | /        | Combine use with joiner                                       |
| 5 | waterproof cap         |  | /        | PC sheet                                                      |
| 6 | Aluminum foil tape     |  | 50m/roll | PC sheet ,U-shape sheet, corrugated sheet ,thermo click sheet |
| 7 | neutral silicon        |  | 350m/pc  | All pc products                                               |

5 、 Corrugated sheet components

| NO | name              | drawing | Specification | application               |
|----|-------------------|---------|---------------|---------------------------|
| 1  | V-type snap joint |         | 40mm/pc       | Corrugated sheet assembly |

|   |                              |                                                                                     |          |                                                            |
|---|------------------------------|-------------------------------------------------------------------------------------|----------|------------------------------------------------------------|
|   |                              |    |          |                                                            |
| 2 | Z-type support               |    | 40mm/pc  | Corrugated sheet assembly                                  |
| 3 | Waterproof self-taping screw |    | /        | PC sheet                                                   |
| 4 | Waterproof cap               |   | /        | PC sheet                                                   |
| 5 | Aluminum foil tape           |  | 50m/roll | PC sheet ,U-shape sheet,corrugated sheet,thermoclick sheet |
| 6 | neutral silicon              |  | 350m/pc  | All PC products                                            |

## 8、 Common Chemical properties List of PC material

| Chemical material                    | concentration%* | tolerance | Chemical material            | concentration%* | tolerance |
|--------------------------------------|-----------------|-----------|------------------------------|-----------------|-----------|
| PAEs                                 |                 | N         | kerosene                     |                 | N         |
| Diesel                               |                 | R         | lactic acid                  | 20              | R         |
| diethyl ethe                         |                 | N         | paint and diluent            |                 | N         |
| DMF                                  |                 | N         | Laundry detergent(most)      |                 | LR or R   |
| DMSO                                 |                 | N         | ligroin(HC mixture)          |                 | R         |
| dinonyl phthalate                    |                 | LR        | whitewash(2%) or lime putty  |                 | R         |
| DEHS(plasticizer)                    |                 | LR        | White wine or liqueur        |                 | R         |
| dioxane                              |                 | N         | flax seed oil                |                 | R         |
| Diphy15,3                            |                 | LR        | loctite glue                 |                 | N         |
| ethyl alcohol and water              | 96              | R         | lubricating oil(most)        |                 | LR or LR  |
| ethyl alcohol                        | pure alcohol    | LR        | engine oil(most)             |                 | R         |
| ethylamine                           |                 | N         | magnesium chloride           | saturation      | R         |
| ethyl acetate                        |                 | N         | magnesium sulfate            | saturation      | R         |
| Ethyl bromide                        |                 | N         | manganese sulfate            | saturation      | R         |
| chloroethylene                       |                 | N         | .Margarine                   |                 | R         |
| chlorohydrin                         |                 | N         | mayonnaise                   |                 | R         |
| ethylene dichloride                  |                 | N         | meat                         |                 | R         |
| ethylene glycol(anti freezing agent) |                 | LR        | mercuric chloride            | saturation      | R         |
| ferric chloride                      | saturation      | N         | mercury                      |                 | R         |
| Ferric sulfate                       |                 | R         | Methane                      | —               | R         |
| fish and fish oil                    |                 | R         | methanol                     | pure            | LR        |
| floor wax                            |                 | R         | methylamine                  | —               | N         |
| formalin                             | 10%             | R         | ethylene glycol methyl ether | —               | N         |
| formic acid                          | 10%(30%)        | R(LR)     | dichloromethane              | —               | N         |
| Freon TF                             |                 | R         | ethyl ketene                 | —               | N         |
| Freon (all)                          |                 | N         | methyl methacrylate          | —               | N         |
| fruit juice and pulp                 |                 | R         | milk                         | —               | R         |
| gasoline                             |                 | R         | mineral oil                  | —               | R         |
| gear oil                             |                 | R         | engine oil(most)             | —               | LR OR R   |
| glazing putty                        |                 | R         | mustard                      | —               | R         |
| glucose                              |                 | R         | naphtha                      | —               | N         |
| glycerol                             |                 | R         | nickel sulfate               | —               | R         |
| glycerin                             |                 | R         | nitrate                      | 20              | R         |
| ethylene glycol                      |                 | R         | nitrobenzene                 | —               | N         |
| glutaraldehyde                       | 50%             | R         | nitro propane                | —               | N         |
| automotive grease                    |                 | R         | nitrous oxide                | —               | N         |
| heptanes                             |                 | R         | nutmeg                       | —               | N         |

|                                      |                  |       |                       |                            |         |
|--------------------------------------|------------------|-------|-----------------------|----------------------------|---------|
| hexane                               |                  | R     | oleic acid            | —                          | R       |
| hydrazine                            |                  | N     | Onions                | —                          | R       |
| 20 (enrichment)<br>hydrochloric acid |                  | R(N)  | oxalic acid           | 10                         | R       |
| hydrofluoric acid                    | 20               | R     | oxygen                | —                          | R       |
| hydrogen peroxide                    | 30               | R     | ozone                 | —                          | N       |
| Hydrogen sulfide                     |                  | R     | Chili                 | —                          | R       |
| iodine (water solution)              | 5                | R     | paraffin wax          | —                          | R       |
| iodine                               |                  | N     | pentane               | —                          | R       |
| printing ink                         |                  | R     | pepper                | —                          | R       |
| isoamyl alcohol                      |                  | LR    | perchlorate           | —                          | R(LR)   |
| isopropyl alcohol                    |                  | R     | perc                  | —                          | N       |
| acetaldehyde                         | 10               | N     | butane                | —                          | R       |
| acetic acid                          |                  | R     | butter                | —                          | R       |
| acetic acid                          | 25(concentrated) | LR(N) | butyl acetate         | —                          | N       |
| acetone                              |                  | N     | butanol               | —                          | R       |
| acetylene                            |                  | R     | butanediol            | —                          | R       |
| acrylonitrile                        |                  | N     | butyric acid          | —                          | N       |
| Ajax cleaner                         |                  | R     | calcium chloride      | <a href="#">saturation</a> | R       |
| more sweet fruit powder              |                  | N     | calcium hypochlorate  | —                          | R       |
| allyl alcohol                        |                  | LR    | calcium nitrate       | —                          | R       |
| ammonium aluminum<br>sulfate         |                  | R     | calcium soap with fat | —                          | R       |
| alumina                              | pure             | R     | camphor oil           | —                          | N       |
| aluminum oxalate                     |                  | R     | phenol                | —                          | N       |
| aluminum sulfate                     | pure             | R     | sulfite carbon        | —                          | N       |
| ammonia                              |                  |       | carbon dioxide(wet)   | —                          | R       |
| ammonia                              |                  |       | carbon disulfide      | —                          | N       |
| ammonium carbonate                   |                  |       | carbon monoxide       | —                          | R       |
| ammonium chloride                    |                  |       | carbon tetrachloride  | —                          | N       |
| benzoic acid                         |                  | N     | cresol                | —                          | N       |
| benzyl alcohol                       |                  | N     | Copper chloride       | <a href="#">saturation</a> | R       |
| aquatic-beta iodine                  |                  | R     | Cuprous chloride      | <a href="#">saturation</a> | R       |
| sodium hypochlorite                  |                  | R     | Ring has amine        | —                          | R       |
| Blood and plasma                     |                  | R     | Ring of ethanol       | —                          | LR      |
| borax                                |                  | R     | Ring ethyl ketone     | —                          | N       |
| boric acid                           |                  | R     | Dichloro diphenyl     | —                          | R       |
|                                      |                  |       | cross-linked with b   |                            |         |
| brake fluid                          |                  | N     | decalin               | —                          | R       |
| Br                                   |                  | N     | cleaner               | —                          | LR or R |
| <a href="#">bromobenzene</a>         |                  | N     | developing solution   | —                          | N or LR |
| <a href="#">petroleum</a>            |                  | LR    | LR                    | —                          | N       |

|                                 |                       |                               |    |                               |                |
|---------------------------------|-----------------------|-------------------------------|----|-------------------------------|----------------|
| petroleum ether                 |                       | LR                            | LR | —                             | R              |
| petroleum(refine)               |                       | R                             | R  | —                             | R              |
| <a href="#">phenol</a>          |                       | N                             | N  | —                             | R              |
| phosphoric acid                 | 10                    | R                             | R  | —                             | R              |
| Phosphorus oxychloride          |                       | R                             | R  | —                             | N              |
| Five oxidation of phosphorus    | 25                    | LR                            | LR | <a href="#">sugar</a>         | situation      |
| three oxidation of phosphorus   |                       | N                             | N  | —                             | R              |
| Polyethylene                    |                       | R                             | R  | <a href="#">sulfuric acid</a> | < 50 (50 < 70) |
| Polyethylene glycol             |                       | R                             | R  | <u>10</u>                     | N              |
| Potassium acetate               |                       | LR                            | LR | —                             | N              |
| Potassium alum aluminum sulfate | as the name           | saturation                    | R  | —                             | R              |
| Sodium dichromate               |                       | R                             | R  | <u>30</u>                     | R              |
| Potassium bromated              |                       | R                             | R  | —                             | LR             |
| Potassium bromide               |                       | R                             | R  | —                             | N              |
| Potassium chloride              | Potassium chloride    | saturation                    | R  | —                             | N              |
| Potassium cyanide               |                       | N                             | N  | —                             | N              |
| Potassium dichromate            | Potassium dichromate  | saturation                    | R  | —                             | N              |
| Potassium hydroxide             |                       | N                             | N  | —                             | R              |
| Potassium metabisulfite         | 4                     | R                             | R  | —                             | R              |
| Potassium nitrate               | Potassium nitrate     | saturation                    | R  | —                             | R              |
| Potassium perchlorate           | 10                    | R                             | R  | —                             | N              |
| Potassium permanganate          | 10                    | R                             | R  | —                             | R              |
| High potassium sulphate         | 10                    | R                             | R  | —                             | R              |
| Potassium thiocyanate           | Potassium thiocyanate | saturation                    | R  | <u>20</u>                     | LR             |
| Potassium sulfate               | Potassium sulfate     | saturation                    | R  | —                             | N              |
| propane                         |                       | R                             | R  | —                             | N              |
| Propargyl alcohol               |                       | R                             |    | —                             | LR             |
| Propionic acid                  | 20                    | R                             | R  | —                             | N              |
| Propionic acid                  | Propionic acid        | <a href="#">concentration</a> | N  | —                             | R              |
| Propyl alcohol                  |                       | R                             | R  | —                             | LR             |
| pyridine                        |                       | N                             | N  | —                             | R              |
| Salad oil                       |                       | R                             | R  | —                             | R              |
| salt                            |                       | R                             | R  | —                             | R              |
| fluosilicate                    | 30                    | R                             | R  | —                             | R              |
| Silicon grease                  |                       | R                             | R  | —                             | N              |
| Silicone oil                    |                       | R                             | R  | —                             | R              |
| Silver nitrate                  |                       | R                             | R  | —                             | R              |
| soap                            |                       | R                             | R  | —                             | R              |
| Sodium bicarbonate              | Sodium bicarbonate    | saturation                    | R  | —                             | R              |

|                     |                     |            |   |   |   |
|---------------------|---------------------|------------|---|---|---|
| Sodium bisulfate    | Sodium bisulfate    | saturation | R | — | R |
| Sodium sulfite      | Sodium sulfite      | saturation | R | — | N |
| Sodium carbonate    | Sodium carbonate    | saturation | R | — | R |
| Sodium chlorate     |                     | R          | R | — | R |
| Sodium chloride     | Sodium chloride     | saturation | R | — | R |
| Sodium chromate     |                     | R          | R | — | N |
| Sodium hydroxide    |                     | N          | N | — | R |
| Sodium hypochlorite | Sodium hypochlorite | 5%chlorine | R | — | R |
| Sodium nitrate      |                     | N          | N | — | R |
| Sodium sulfate      | Sodium sulfate      | saturation | R | — | R |

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