CONTENT

Инв. N 1041/ТМБ-20

PRODUCT RANGE

LLC SOTON produces sheets by the method of extrusion from high quality polycarbonate granules, which have high transparency, impact resistance, temperature and mechanical stability.

Multiwall polycarbonate sheets are a unique construction thermoplastic material. It combines excellent mechanical, optical and thermal properties. The versatility of polycarbonate allows it to be used in a variety of structural solutions.

Polycarbonate sheets of LLC SOTON are an ideal material for a wide range of glassing and construction projects, due to the optical properties and strength characteristics of polycarbonate extrusion sheets.

Types of SOTON multiwall polycarbonate sheets:

MPC – multiwall polycarbonate sheets for use indoors.

MPC - UV – multiwall polycarbonate sheets with one-sided coating for protection against ultraviolet radiation on the outer surface.

MPC -L – Light multiwall polycarbonate sheets for use in structures that are not exposed to solar radiation.

MPC -L - U– Light multiwall polycarbonate sheets with one-sided coating for protection against ultraviolet radiation on the outer surface.

MPC H/2 – multiwall polycarbonate sheet with H-shaped structure (thickness 4, 6, 8, 10 mm).
MPC H/3 – multiwall polycarbonate sheet with H-shaped structure (thickness 10, 16 mm).
MPC X/3 – multiwall polycarbonate sheet with H-shaped structure (thickness 8, 10, 16, 20 mm).
MPC H/6 – multiwall polycarbonate sheet with H-shaped structure (thickness 16, 20 mm).

Main fields of application of LLC SOTON sheets:

- roof glassing, when used as roof elements for the arrangement of passages, verandas, terraces.
- wall glassing (plane and dome), glassing of internal walls that are not load-bearing, and external walls of industrial, sports and commercial buildings, glassing of windows and doors;
- rooflights, suspended ceilings, balconies, bath partitions and showers;
- airports, railway stations, public transport stops, railway and metro stations, waiting rooms;
- parking lots, canopies, telephone booths, gas stations, covered parking lots;
- security premises;
- sound insulation screens;
- partitions of markets and shopping complexes;
- windows of windows, summer cafes, winter gardens, swimming pools and greenhouses, patios, playgrounds, gazebos, pergolas, summer kitchens;
- arched ceilings, peaks, fences, canopies, tunnels, crossings, pedestrian galleries, internal translucent partitions;
- light-transmitting partitions of sports facilities (tennis courts, stadiums, swimming pools, gyms) and exhibition facilities (stands, pavilions, storefronts);
- glassing of agricultural objects (greenhouses, greenhouses);
- interior decoration and design,
- outdoor advertising (signs, billboards).

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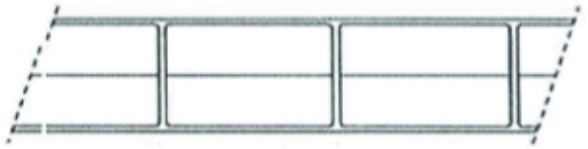
Types of sheet structures of LLC SOTON:

4 H/2

6 H/2

8 H/2

10 H/2



10 H/3, 16 H/3.

16 H/6, 20 H/6

8 X/3, 10 X/3, 16 X/3, 20 X/3

Standard sizes of multiwall sheets of LLC SOTON:

- **length 3,000 mm** +12 mm; **6,000 mm** (+0,4%); **9,000 mm** (+0,4%); **12,000 mm** (+0,4%)
- **width 2,100** (tolerance from – 2 mm to + 6 mm)
- **thickness (4-20)** ± 0.5 mm.

By agreement with the consumer it is possible to produce sheets of other sizes.

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GENERAL PROPERTIES OF SOTON MULTIWALL SHEETS

Table 1 summarizes the specifications of LLC SOTON multiwall sheets.

Table 1

General properties of multiwall polycarbonate sheets

Multiwall polycarbonate sheet TM SOTON MPC-UV H/2, colorless, thickness 4 mm, nominal mass 800 g/m², UV protected	
Water vapour permeability	3,8 x 10^{-5} mg/mh*Pa
* **Shatter properties (safe breakability)** as:	
- Small hard body impact resistance	After the tests, no breaks and cracks were found on the samples
- Large soft body impact resistance (assembly)	Test passed
* **Mechanical resistance** (deformation behaviour)	Bx= 4, 5 Nm^2/m By= 2, 7 Nm^2/m Sy= 2850 N/m Mb= 4,1 Nm/m
* **Direct airborne sound insulation**	***R*** =14 dB
* **Thermal transmittance**	***U*** = 0, 229 m^2 °C / W (4.36 W/m^2-K)
* **Light transmittance**	Tv = 83 %
* **Total solar energy transmittance**	***g***= 83 %

Multiwall polycarbonate sheet TM SOTON TITAN POLYCARBONATE MPC-UV X/3, colorless, thickness 10 mm, nominal mass 1700 g/m², UV protected	
Water vapour permeability	3,8 x 10^{-5} mg/mh*Pa
***Shatter properties (safe breakability)** as:	
- Small hard body impact resistance	After the tests, no breaks and cracks were found on the samples
- Large soft body impact resistance (assembly)	Test passed
***Mechanical resistance** (deformation behaviour)	Bx= 47, 4 Nm^2/m By= 19, 8 Nm^2/m Sy= 2670 N/m Mb= 38,8 Nm/m
***Direct airborne sound insulation**	R =18 *dB*
***Thermal transmittance**	U = 0, 44 m^2 °C / W (2, 27 W/m^2-K)
***Light transmittance**	Tv = 74 %
***Total solar energy transmittance**	g= 78 %

Multiwall polycarbonate sheet TM SOTON MPC-UV H/6, colorless, thickness 20 mm, nominal mass 2800 g/m², UV protected	
Water vapour permeability	3, 80 x 10^{-5} mg/mh*Pa
***Shatter properties (safe breakability)** as:	
- Small hard body impact resistance	After the tests, no breaks and cracks were found on the samples
- Large soft body impact resistance (assembly)	Test passed
***Mechanical resistance** (deformation behaviour)	Bx= 35, 2 Nm^2/m By= 16, 7 Nm^2/m Sy= 1720 N/m Mb= 30,1 Nm/m
***Direct airborne sound insulation**	R =21 dB
***Thermal transmittance**	U = 0,64 m^2 °K / W (1,56 W/m^2-K)
***Light transmittance**	Tv = 56 %
***Total solar energy transmittance**	g= 56 %

* The above results are average values that depend on the thickness of the sheet, its structure and color.

Инв. N 1021/ПТВ-20

MECHANICAL PROPERTIES

Impact resistance

SOTON multiwall polycarbonate sheets have excellent shock resistance over a wide temperature range (-40°C to + 120°C) and retain it under prolonged weather conditions. They resist any impact, absorbing their energy without destroying themselves.

Resistance to hail

Like other roofing materials, the SOTON sheet is subjected to various weather effects such as wind, storm, hail, snowfall and freezing. The SOTON multiwall polycarbonate sheet withstands sharp temperature fluctuations and different types of precipitation without changing its structure and surface quality.

Table 2 presents the results of a series of tests of three materials. These values show the limit at which the material did not withstand the test for each value of the diameter of the balls released. It should be noted that when testing glass and acrylic plastics (Plexiglas), fragments are formed, while SOTON gives an elastic deformation zone with small dents.

Table 2

Hail simulation test results

Material	Ball diameter (20mm)
Plexiglas	7-14 m/s
Window glass	10 m/s
SOTON multiwall sheet	> 21 m/s

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PHYSICAL PROPERTIES

Light transmission

Sunlight reaching the earth's surface has a wavelength of 295 – 2140 nm. This spectrum is customarily divided into the following sections:

- UV-b ultraviolet radiation 280 – 315 nm
- UV-a (near) ultraviolet radiation 315 – 380 nm
- Visible light emission 380 – 780 nm
- Infrared (near) radiation 780 – 1400 nm
- Infrared radiation 1400 – 3000 nm

In addition to the very good visible light transmittance, SOTON is virtually impervious to ultraviolet and infrared radiation (see Table 3). This useful shielding property helps to prevent the discoloration of materials such as fabrics and other organic materials that are not resistant to sunlight. These materials can be placed by the SOTON glassing in a factory warehouse, museum or mall.

Table 3

Directional light transmission

Colour	Thickness, mm	Colour code	T, %			
			Visible range		IR	
			T_{max}, %	At λ, nm	T_{avg}, %	At λ_{avg}, nm
Blue	4 H/2	2040107	65.6	462	75.6	886
	10 H/2	2100107	70.2	456	78.2	886
Bronze	6 H/2	2060301	36.4	460	55.4	886
	8 H/2	2080301	39.6	496	56.5	886
	16 X/3	2160301	17.3	434	29.2	886
Opal	8 H/2	2080601	18.1	728	29.9	886
	10 H/2	2100601	21.0	690	35.5	886
	16 H/3	2160601	9.8	752	17.6	886
Green	16 H/3	2161002	55.8	518	71.8	886
	16 X/3	2161002	42.8	520	53.7	886
Turquoise	6 H/2	2061101	64.6	500	68.8	886
	8 H/2	2081101	72.3	494	76.7	886
	16 X/3	2161101	45.9	498	47.1	886
Colourless	6 H/2	2060000	65.8	472	69.6	886
	8 H/2	2080000	78.9	528	72.2	886
	10 H/2	2100000	74.4	506	78.9	886
	16 X/3	2160000	45.0	652	46.1	886
	16 H/6	2160000	46.2	550	50.3	886
	20 H/6	2200000	50.6	624	55.7	886
Milky	6 H/2	2060502	0.2	654	0.4	886

Note: In the color code, the first digit indicates the type of sheet (monolithic, multiwall), the second and third indicate the thickness of the sheet.

SOLAR ENERGY TRANSMISSION

Increase of temperature inside buildings

Solar energy, when entering the building, directly heats the air, is partially absorbed by load-bearing structures, furniture, etc. and is released in the form of infrared radiation. SOTON multiwall polycarbonate sheets have high thermal insulation properties and cause a rise in temperature inside the building, the so-called "greenhouse effect". The temperature inside the building is regulated by the organization of an air-conditioning system in combination using tinted SOTON sheets.

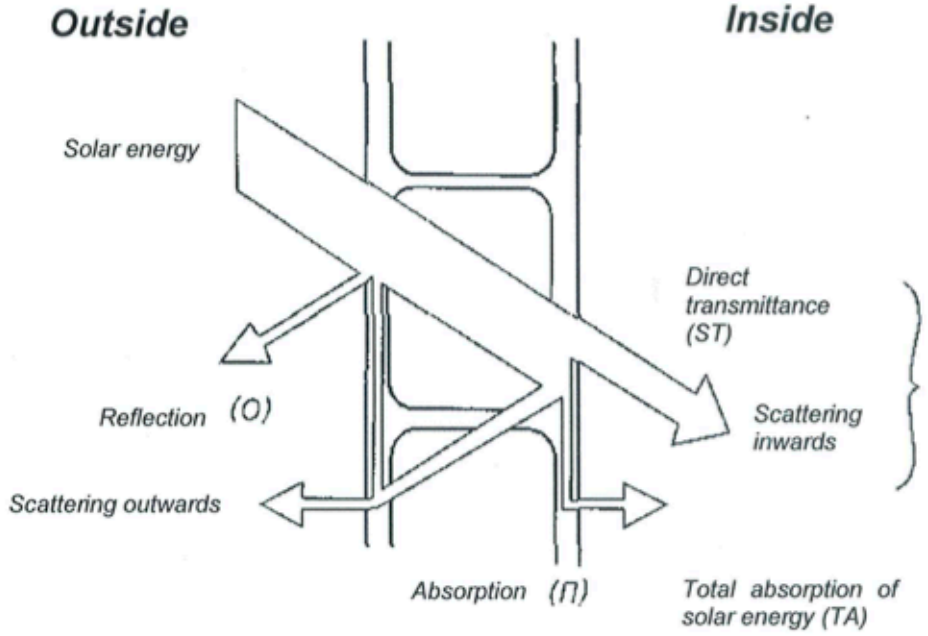
Transmission of solar energy

Transparent SOTON sheets have excellent light transmittance – from 50% to 80% depending on thickness. However, for buildings erected in hot climates or for buildings facing south, SOTON LLC offers tinted transparent sheets of SOTON (bronze, milk, gray, blue, green). They significantly reduce the effect of solar energy on the temperature inside the building and the brightness of sunlight to a pleasant level, as well as reduce the cost of air conditioning indoors in the summer.

Total transmission of solar energy

The sun's radiation is reflected, absorbed and passed through the SOTON sheet as shown in Figure 1. Most of the solar energy flow is directly transmitted by the material. The total transmittance of solar energy (TT) consists of the sum of direct transmittance (DT) and is scattered inside the building of the part absorbed by solar energy (A).

Fig. 1. Transmission of solar energy by SOTON sheet.



RESISTANCE TO ATMOSPHERIC INFLUENCES

Protection against ultraviolet radiation

The radiation of the sun especially destroys polymeric materials, causes their degradation and formation of surface microcracks, which cause further destruction of the material with water, dust, chemicals, etc. The speed of aging of the material depends on the climate, geographical location, altitude, seasonal temperature fluctuations, etc.

To protect against the effects of ultraviolet light, the SOTON multiwall polycarbonate sheet is made with a special UV layer, which is an integral part of the sheet and ensures the stability of its mechanical and optical properties throughout the warranty period, provided that it is properly used.

Key SOTON sheets parameters

Studies of the results of long-term effects of weather conditions on glassing materials are traditionally based on the study of changes in the properties of the material under study: mechanical strength, impact resistance, color retention, transparency, etc.

Accelerated weather tests were performed in accordance with GOST 30973-2002. The SOTON multiwall sheets was maintained for 54 cycles of climatic aging. This impact corresponds to more than 15 conventional years of material use in a temperate European climate.

OTHER PROPERTIES

Low specific gravity

The SOTON multiwall polycarbonate sheet is the perfect replacement for traditional glassing materials. SOTON is safe, easy to use, cut, install and almost impossible to break. The low weight of the material gives significant savings in the transportation, processing and installation of sheets (see Table 4). For example, a SOTON multiwall polycarbonate sheet with a thickness of 10 mm gives a weight loss of more than 85% compared to 6 mm reinforced glass.

Many SOTON sheets have resulted in a significant reduction in the cost of the entire assembly due to the small weight of the sheets and their ease of installation.

Table 4

Weight characteristics of SOTON multiwall polycarbonate sheets

Structure type	Sheet specific gravity, (kg/m^2), for thicknesses					
	4 mm	6 mm	8 mm	10 mm	16 mm	20 mm
H/2	0.75, 0.8	1.2, 1.3	1.4, 1.5	1.6, 1.7	-	-
H/3	-	-	-	1.7	2.5	-
H/6	-	-	-	-	2.5	2.8, 3.0
X/3	-	-	1.55	1.7	2.5	3.0

Table 5

Weight characteristics of SOTON light multiwall polycarbonate sheets

Structure type	Sheet specific gravity, (kg/m^2), for thicknesses			
	4 mm	6 mm	8 mm	10 m
H/2	0.55, 0.6, 0.67	0.8, 0.84, 0.93,1.05	1.0, 1.1, 1.25	1.12, 1,24, 1.40

Table 6

Comparison of weight characteristics

Thickness, mm	Weight, kg/m^2					
	SOTON multiwall sheet	Single glass	Double glass	PVC	Acryl (monolithic)	Acryl (multiwall)
4	0.8	10	-	-	-	-
6	1.3	15	30	-	-	-
8	1.5	20	40	11.2	9.4	3.5
10	1.7	25	50	-	-	-
16	2.7	-	-	-	-	5.0-5.5
20	3.0	-	-	-	-	-

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Sound insulation

Sound insulation performance of SOTON multiwall polycarbonate sheets is largely due to the rigidity of the material, its mass and physical structure. The absorption of sound, depending on the thickness of the sheet SOTON according to the standard DSTU B B.2.6-19 are shown in table 7.

Table 7

Indicators of sound absorption

Thickness, mm	Sound absorption, dB
4	11-14
6	14-17
8	15-18
10	16-19
16	20-21
20	21

Noise is generated by the pressure of the air waves and is measured by the wavelength and frequency. The noise measurement unit is decibels, with up to 60 dB noise being considered as quiet, 65 to 90 dB – significant, and over 90 dB – destructive. It is known that the effect of noise reduction is achieved by increasing the mass of the structure, which holds the noise, or by increasing the air gap between such structures. The noise reduction level by SOTON multiwall polycarbonate sheets of various thicknesses from 4 to 20 mm ranges from 17 to 21 dB (see Table 8).

Table 8

Single glassing

Thickness, mm	Sound insulation, dB	
	SOTON (standard weight)	Single glass
4	14	30
6	16	31
8	17	32
10	18	33
16	20	34
20	21	35

Temperature resistance

Heating of glassing materials can be considered as a function of the material absorbed by the solar energy and the intensity of the light flux passing through the material.

In countries with intense solar radiation, or when installing colored materials with a high energy absorption rate, heat accumulation in the glass can be significant. Calculations and measurements on glassing with SOTON showed that the surface of the sheet can withstand heating up to 100°C.

At elevated temperatures

Even at elevated temperatures, the SOTON sheet has excellent shock resistance and stiffness over a long period.

For example, at 80°C, SOTON polycarbonate sheets retain up to 85% of the elastic modulus (see Fig. 2).

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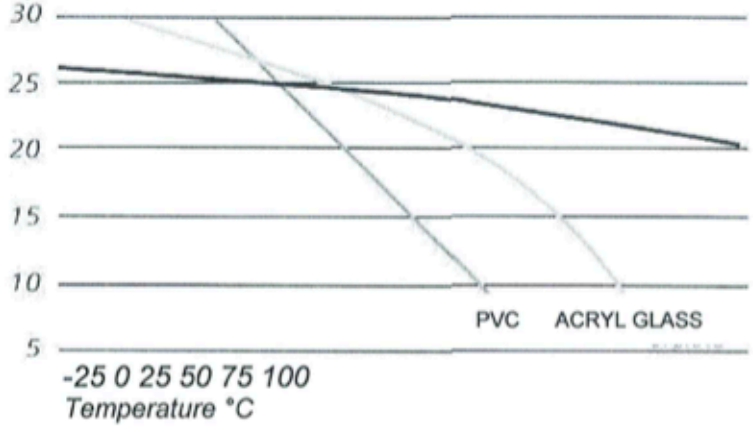
Fig. 2. Comparison of values of elastic modulus of PVC, acrylic glass and polycarbonate, MPa, x100



Fire safety

SOTON sheet has good fire safety performance. Like any thermoplastic, SOTON melts with intense heat from the flames of fire. However, the SOTON multiwall sheets does not support burning and spreading fire.

Table 9

Parameter	MULTIWALL SHEETS SOTON	
	thickness 4 mm (550-750 g/m^2)	thickness 4- 20 mm (800-3000 g/m^2)
Reaction to fire	E	B -s1, d0

Long-term exposure to temperature

The SOTON multiwall polycarbonate sheet has an upper temperature limit for prolonged exposure of + 100°C. The minimum temperature for prolonged exposure is set at -40°C. However, it is possible to use SOTON at lower temperatures, since the transition temperature to the fragile state is very low and is -110°C.

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THERMAL INSULATION PROPERTIES

Thermal insulation

The SOTON multiwall polycarbonate sheet has a significant advantage in cases where the thermal insulation properties of the structure are a determining factor. The multiwall structure of the SOTON sheet provides excellent thermal insulation performance compared to the glazed monolithic materials (see Table 10). The heat loss is usually denoted by the coefficient K, which shows the amount of energy (heat) transmitted by the material in an area of 1 square meter from one medium to another by changing the temperatures of these environments by 1 ° C (K). The coefficient K has the dimension W / m2 • K (degrees Kelvin).

Table 10

Value of the coefficient K

SOTON sheet thickness, mm	Heat transfer resistance, (m^2•°C)/W, not less than	Coefficient K, W/m^2•K
4 H/2	0.23	4.3
6 H/2	0.25	4.0
8 H/2	0.27	3.6
10 H/2	0.37	2.7
16 H/3	0.43	2.3
16 X/3	0.47	2.1
16 H/6	0.52	1.9
20 H/6	0.64	1.56

Additional glassing

By installing a SOTON sheet on the outside of the existing glassing or on the inside of the existing glassing, you can achieve additional heat loss. For effective thermal insulation it is recommended to leave an air gap of 20-50 mm between the existing glassing and the SOTON sheet.

Double glassing

A significant decrease in the value of the coefficient K occurs in double inclination. The combination of two SOTON multiwall polycarbonate sheets with an air gap of 20-50 mm significantly reduces heat loss, especially in the case of bent or inclined light lanterns.

Cold spread

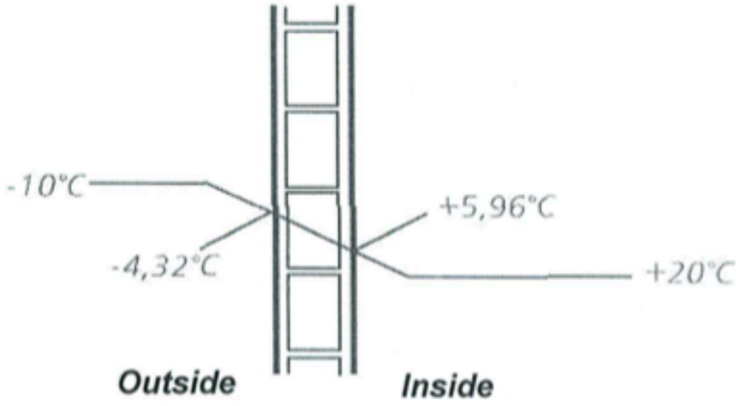
The excellent thermal insulation properties of the SOTON multiwall sheet prevent the spread of cold inside the building. The lower the value of the coefficient, the higher the temperature of the inner surface of the sheet in winter.

Figure 3 shows an example of a temperature gradient through a SOTON sheet 6 mm thick at an external temperature of -10°C and an internal + 20°C.

The multiwall design of the SOTON sheet has an air layer that defines the temperature transition between the outer and inner surfaces of the sheet.

Under these conditions, the temperature of the inner surface of the sheet remains well above zero and no cold penetration inside the building.

Fig. 3. Temperature gradient through the SOTON sheet at low outside temperature



Like most other transparent polymeric materials, sheet polycarbonate is an excellent substitute for silicate glass and can be used in glass, especially protective. The main operational indicator is thermal insulation, characterized by a coefficient of heat transfer (K).

The multiwall structure of SOTON polycarbonate sheets provides significant advantages where thermal insulation is a major requirement. Polycarbonate sheets provide significant energy savings (up to 50%) spent on heating or air conditioning compared to glass of similar thickness, since polycarbonate has less thermal conductivity compared to these materials (see Tables 11, 12) and air, contained in the space between the stiffening ribs (walls) is an excellent insulator to maintain the temperature in the room.

Even the thinnest sheets of multiwall polycarbonate (4 mm) are almost 2 times greater than the degree of thermal insulation of simple glassing. Sheets with thickness of 4, 6, 8 and 10 mm in terms of degree of thermal insulation can be compared with single-glazed windows (double glassing), and sheets with thickness of 16-20 mm can be compared and even exceed the performance of double-glazed windows (triple glassing).

Table 11

Comparative thermal characteristics

	Thickness, mm	**Heat transfer resistance, ($m^2 \cdot °C$)/W, not less than**	**Similar in terms of thermal and technical characteristics glass unit, thickness un mm**	**Similar in terms of thickness brick masonry**
Multiwall polycarbonate sheet of trade mark «S	4 H/2	0,23	One-chamber, 12	-
	6 H/2	0,25	One-chamber, 18	-
	8 H/2	0,27	One-chamber, 20	-
	10 H/2	0,37	Two-chamber, 24	-
	16 H/3	0,43	Two-chamber, 24	-
	16 X/3	0,47	Two-chamber, 32	-
	16 H/6	0,52	Two-chamber, 44	-
	20 H/6	0,64	One-chamber, energy saving, 44	Corresponds to the brick masonry with the thickness of 1.5 brick

Table 12

Comparative characteristics of brick and SOTON multiwall polycarbonate sheets

Characteristics	Burnt brick	Not burnt brick	SOTON
Thickness, mm	88 -138	88 -138	8 -20
Density, g/cm^3	1.7-1.9	1.7-2.2	1.2
Heat transfer, W/m·°C	0.8-1.0	0.9-1.1	0.2

Comparing glassing with SOTON multiwall polycarbonate sheet with ordinary glass glassing at the same temperature conditions, it was noted that the temperature of the inner surface of a single glass under the same conditions would be much lower than zero. This means that the cold spreads inside the building and adversely affects the entire temperature of the building, reducing the comfort level near the window openings.

CHEMICAL RESISTANCE

The SOTON multiwall has been successfully used in conjunction with various building materials and glassing materials.

WARNING! Given the complexity of the chemical compatibility, any additional materials that come into contact with the polycarbonate should be pre-tested and should only be used after obtaining confirmation of the use of these materials in conjunction with the polycarbonate by the manufacturer.

For sheet products, the most commonly used are sealants, gaskets and various detergents. The following table 13 shows a short list of the most commonly used formulations. When using sealing compounds for glassing, it is important that the system has a tolerance for thermal expansion, but without loss of adhesion to the frame or sheet (see Installation instructions).

Table 13

Substance	+ resistant	O limited resistance	- not resistant
Acetaldehyde			-
Acetone			-
Petrol			-
Benzene			-
Boric acid	+		
Butyl acetate			-
Butyl alcohol	+		
Hexane	+		
Aluminum hydroxide powder	+		
Sodium hydroxide dehydrated	+		
Glycerol	+		
Dimethylformamide			-
Octyl			-
Dibutyl phthalate			-
Isopropyl alcohol		O	
Maleic acid	+		
Meta-cresol			-
Methyl acetate	+		
Methylene chloride			-
Methyl alcohol			-
Alumina	+		
Copper oxide	+		
Ammonium oxalate	+		
Octane alcohol	+		
Oleic acid	+		
Palmitic acid	+		
Potassium permanganate			-
Pyridine			-
Sodium chloride, 10%	+		
Polyethylene glycol	+		
Propane	+		
Propylene	+		
Salicylic acid	+		

Sulfuric acid 70%			-
Sulfuric acid 5%			-
Hydrochloric acid, concentrated, 25%			-
Hydrochloric acid, 20%	+		
Sorbitol	+		
Aniline sulfate	+		
Tetrahydrofuran			-
Trichlorethylene			-
Carbon tetrachloride			-
Thioacetic acid	+		
Toluene			-
Acetic anhydride			-
Phenol-acetic acid	+		
Formaldehyde solution 37%	+		
Formalin	+		
Phosphoric acid 1%	+		
Phosphoric acid 10%			-
Hydrogen fluoride 25%	+		
Hydrogen chloride 20%	+		
Hydrogen chloride 25%			-
Chlorobenzene			-
Chloroform			-
Hydrogen tetrachloride			-
Alkaline solutions			-
Ethyl acetate			-
Ethyl bromoacetate	+		
Ethylene glycol	+		
Ethylene chloride			-
Ethanol			-

Note: The good resistance of SOTON multiwall polycarbonate sheets to chemicals (see Table 13) does not affect the properties regardless of the duration of exposure, temperature and load.

CLEANING AND WASHING

Cleaning / washing

To increase the service life of SOTON multiwall polycarbonate sheets, it is recommended to clean them periodically with compatible household detergents. This will extend the life of the polymer material.

Polycarbonate surfaces can be cleaned in the following ways:

1. Cleaning of little soiled surfaces:
   1.1. Static electricity removal with further dust removal:
      1.1.1. Treatment with an ionizer;
      1.1.2. Antistatic treatment;
      1.1.3. Dust removal;

2. Cleaning of heavily soiled surfaces:
   2.1. Cleaning with isopropyl alcohol;
   2.2. Treatment with special cleaning products.

Cleaning of lightly mudded polycarbonate surfaces

Treatment with an ionizer

When ionizing the air near the surface of the polycarbonate sheets, the electrostatic charge is removed. You can then remove the dust with a vacuum cleaner or a slightly damp, soft cotton cloth. The antistatic effect of the ionizer is not constant. It is neutralized by rubbing or touching the sheet.

Treatment with antistatic agents

Antistatic substances are alcohol or aqueous solutions that form a thin antistatic film on the surface of a polycarbonate sheet. They are applied by spraying or wiping the surface with a cloth soaked in antistatic solution. They are effective immediately after evaporation of the solvent, when the coating turns into a thin conductive layer.

The use of antistatic cleaners gives good results. They eliminate the accumulation of electrostatic charges on the surface of the plastic and at the same time clean the surface of dust.

Polycarbonate sheets can be cleaned with 100% cotton fabric and plenty of soft neutral non-abrasive detergents and water (soft dishwashing detergents may be used). Formulations containing ammonia, caustic alkali, chlorine should be avoided as they destroy polycarbonate.

Cleaning of heavily mudded polycarbonate surfaces

Purification with isopropyl alcohol

It is recommended to use isopropyl alcohol to clean the heavily soiled surfaces of the polycarbonate sheets. If the isopropyl alcohol contains water and the water droplets remain on the surface after the alcohol has evaporated, they should be wiped with a dry cloth. This method can also be used to get rid of residues on polycarbonate after removing the protective film.

Treatment with spray cleaners

Dust cleaners containing special paraffins and solvents can be used to clean the dust. They leave a glossy protective layer on the material to protect against static build-up and dust. The ideal way of servicing is to clean and polish the sheets once every one-two weeks with such a spray cleaner and soft 100% cotton cloth.

Recommended method No.1 for small areas:

1. Rinse the sheet with warm water.
2. Wash the sheet with a mild soap solution or household detergent and warm water using a soft cloth or sponge to remove any dirt and soot.

3. Rinse with cold water and dry, remove the water with a soft cloth.

Recommended method No.2 for large areas:
1. Clean the surface with high pressure water and / or steam cleaner.
2. Use only detergents and additives that are recommended for the SOTON sheet.

Attention!

- Never use abrasive or alkaline cleaners to clean the SOTON sheet;
- Detergents and additives, which are usually recommended for polycarbonate sheets, are not always compatible with the special coating of SOTON sheets to protect against the effects of ultraviolet radiation;
- DO NOT USE alcohol-based cleaners to clean the surface of SOTON sheets with coating against UV rays;
- Never rub the surface of the SOTON sheet with brushes, metallic cloth or other abrasive materials;
- Do not wash the SOTON sheet under scorching sun or high temperatures as this may cause stains.

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GENERAL RECOMMENDATIONS

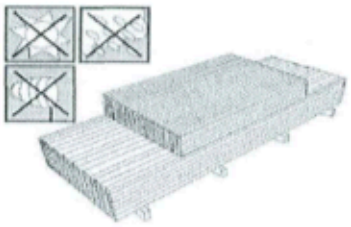
Handling

At handling and transportation of SOTON multiwall polycarbonate sheets they should be handled with care to avoid scratches and damage to the edges of the sheet. Each sheet must be horizontal when loading and transporting and must be packed in such a way as to minimize the risk of any damage.

Recommendations for sheet storage

1. Storage of pallets with multiwall sheets SOTON should be carried out in closed warehouses. The influence of direct sunlight on the sheet and precipitation is not allowed.
2. The sheets must be stored with its side protected by a packaging film bearing a logo, that is, the side with UV protection outside.
3. The edges of the structural sheets must be sealed with a protective tape (the protective film and tape should only be removed immediately before installation).
4. It is allowed to store pallets with sheets in stacks in an amount of no more than 5 pallets in a stack.
5. It is not allowed to transport and store the sheet together with chemical products.
6. The pallets with sheets must be kept at least one meter away from the heating appliances.
7. One-length SOTON multiwall sheets should be stacked horizontally on top of each other. If sheets of different lengths are stacked, then longer sheets should be stacked down in order to avoid sagging and hanging edges of the sheet due to lack of support (Fig. 4).
8. Bundles of sheets should lie on wooden bars. Do not place bundles of sheets where they will be walked on or may enter.

Fig. 4. Storage of polycarbonate sheets of different lengths.



Cutting

Cutting of multiwall polycarbonate sheets

Multiwall sheets can be accurately and easily cut using standard locksmith equipment: metal saw, hand saw, circular saw, jigsaw.

The following are general guidelines and specific guidelines for each cutting section:

- when using an automatic saw or hacksaw, the sheet should be pressed against the machine so as to avoid unwanted vibration and uneven cutting of the edges;
- all tools must be adjusted to sharp plastic knives with small teeth;
- the teeth of the saw should be well sharpened;
- the protective coating must remain on the sheet to prevent scratches and other damage to the surface;
- at the end of the work the edges of all sheets should be clean, without chipping and burrs;
- chips and dust must be blown with compressed air.

Laser cutting.

Multiwall polycarbonate sheets can be cut using a laser. Dissimilarity should be controlled more carefully than in normal machine operations. The laser power and cutting speed must be carefully selected to avoid the effects of whitewashing on the cutting area. When cutting with a laser, the edge of the cut always has a brown tint, so if you need to get a clean edge of the cut from laser cutting, it is better to refuse.

Sawing of multiwall polycarbonate sheets

Spraying of thermoplastic materials can be carried out with tape, circular, hand saws or jigsaws. New or well-sharpened tools must be used to obtain a quality result. At high processing speeds, it is recommended to cool the compressed air jet.

Circular saws:

This type of sawing is the most commonly used, and although cutting speed and operation feed are not as critical as when working with other thermoplastics, it is important to follow these guidelines:

- always use a low-speed clean cut feeder;
- start cutting only at the operating speed of the saw;

Band saws can be saws of ordinary vertical type or specially designed horizontal type, suitable for plastic sheet materials. In both cases, it is important that the sheet is well secured when cutting. The saw blades should be as close as possible to the blade to reduce the blade distortion and cut curve.

Hacksaws and machine tools – the most important factors to consider in this type of cutting are the support and the locking, especially when using a hacksaw with a distance of 2-2.5 mm between the teeth on the cutting blade.

Drilling

The holes in the multiwall sheet can be drilled with a manual or automatic drill, using drills for metal. When drilling, to prevent vibration, a support must be placed directly under the drill directly. The edges of the drilled hole should be monitored to avoid cracks. In the case of deep drilling, it is recommended that the drill is lifted frequently to remove the chips and limit the heating of the material. The use of refrigerants is not recommended.

Prerequisites for drilling:

- drilling of holes is carried out between stiffeners;
- the hole should be at least 40 mm away from the edge of the panel;
- the diameter of the holes should provide sufficient space for the expansion of the sheets (the hole for the screws should be 2 mm larger and preferably elliptical in shape);
- standard sharp metal drills are used for drilling: sharpening angle 30^{0}C, drilling angle 90 ^{0}C – 118 ^{0}C, cutting speed 10-40 m / min. Feed rate – 0.2-0.5 rpm.

Surface treatment

Cut edges and matte surface can be polished qualitatively with the help of a polishing wheel and a polishing paste. The surface of the material is cleaned with warm water using a mild solvent-free detergent.

Инв. № 101/ТЕБ-20

INSTALLATION INSTRUCTIONS

Installation

Installation of SOTON multiwall polycarbonate sheets should be planned as the final stage in the processing of the structure.

It should be borne in mind that the condition for obtaining certain optimal technical parameters of the design, created using SOTON polycarbonate sheets, is the use of appropriate mounting accessories recommended in this brochure, and strict adherence to the mounting recommendations specified in this manual.

WARNING! Design and installation of structures using polycarbonate sheets should be handled by appropriate companies that have licenses for this type of activity and qualified personnel. The appearance of polycarbonate sheets and the service life of structures with their application depend on the quality of the installation.

Pre-installation recommendations

Thermal expansion tolerance

When mounting SOTON polycarbonate sheets, the thermal expansion of the sheets equal to 6.7 • 10^{-5} m/m • °C must be taken into account. Because SOTON multiwall sheets have a higher coefficient of linear thermal expansion than traditional glassing materials, there should be a gap for expansion to help prevent sheet bending in the structure, deformation of sheets, slipping from the fasteners and even tearing or tearing due to the occurrence of critical internal stresses. Table 14 shows the comparative coefficients of linear thermal expansion for different materials:

Table 14

Material	Linear thermal expansion coefficient, 1/°C
SOTON sheet	$6,5 \cdot 10^{-5}$
Glass	$(0,7\text{-}0,9) \cdot 10^{-5}$
Aluminium	$(2,1\text{-}2,3) \cdot 10^{-5}$
Steel	$(1,2\text{-}1,5) \cdot 10^{-5}$

To prevent the effect of thermal expansion on the quality of the mounting structure, the following must be considered:

- leave the required gap of 3-5 mm in the profile to connect the structural sheets;
- when fastening the sheets to the frame with screws, the holes in the sheet should be made 3-6 mm larger than the diameter of the screw itself;
- for longer construction lengths, the panels should be additionally secured to the frame to compensate for thermal expansion;
- the holes in the sheet should be at least 40 mm from the edge;
- do not overtighten screws and other fasteners when mounting polycarbonate sheets, leaving the allowance for free lift.

Tolerances for thermal expansion should be provided for both the length and width of the SOTON sheets.

The minimum gap for thermal expansion when installing SOTON polycarbonate sheets should be provided depending on the length of the sheet (see Table 15).

Инв. N 1021/ТВ-20

Table 15

SOTON sheet length, mm	Minimal clearance for thermal expansion, mm
500	3.0
1000	5.0
1500	7.0
2000	10.0
3000	15.0

As a general principle, 3-5 mm tolerance for thermal expansion per linear meter of colorless sheet and 5-7 mm for each linear meter of colored sheet should be taken into account (Figs. 5, 6).

Fig. 5

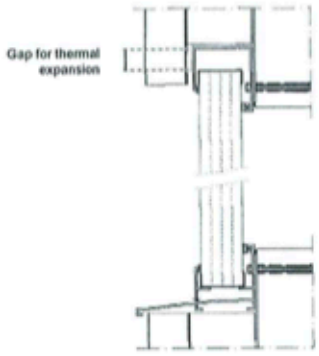
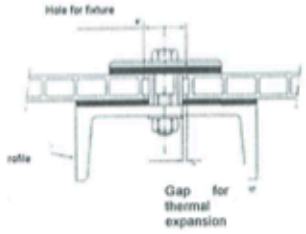
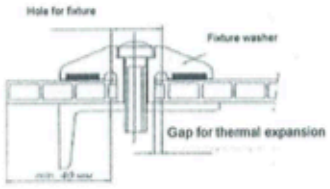


Fig. 6





Recommendations for sheets sealing

The packing tape used to secure the edges of the SOTON multiwall sheets is intended only to protect the edges during storage and transport, and not for sealing. Before mounting the sheets, this packing tape must be replaced by a special impermeable sealing / installation tape, which must meet the following requirements:

- The tape must have good weather resistance, without reducing adhesion and mechanical strength, for a long period of time.
- The tape must be resistant to damage during installation.

Before installing, remove strips approximately 50 mm wide from the edges of the sheets (from the outer and inner surfaces of the sheets). The remaining (most) of the protective film should only be removed after complete installation of the glassing.

Sealing instructions

The basic principles to be followed to protect against contamination and condensation during the operation of the sheets are as follows:

- Before using the sealing tape, make sure that the sheets have smooth and rounded edges;
- The channels of the multiwall sheets must be pre-treated with compressed air to remove dust and debris;
- Make sure that the tape is hidden under the profiles, seals, linings, i.e. the tape should not be visible after the installation is completed;
- All damaged sections of the tape must be replaced before the final installation of the profile sheet;

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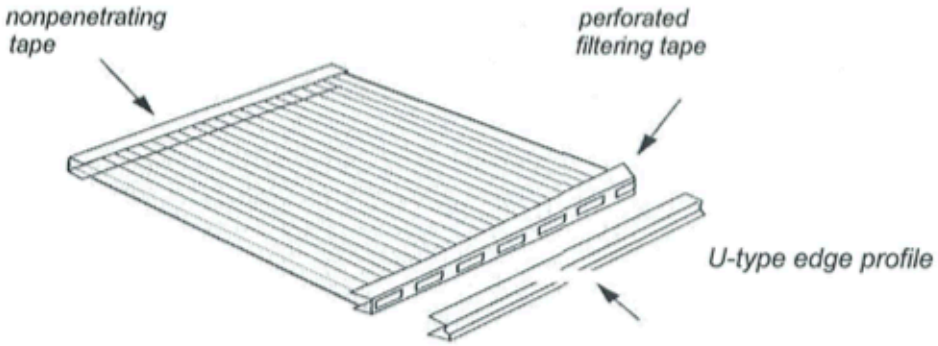
- It is important to remember that the tape needs protection from environmental influences, so it is necessary to cover the ends of the sheets with a bent metal sheet or special profiles (aluminum and polycarbonate end profiles);
- To ensure condensate runoff and unhindered drainage of water from hundreds of sheets through the grooves of the end profile, create an angle from the end to the end of the structure (not less than 5°), or drill small openings in the end profile (diameter = 4 mm and step of 300 mm).

Under **normal operating conditions** (with vertical glassing, with slope roofing) of SOTON multiwall polycarbonate sheets, the upper edge of the multiwall sheets should be sealed with an impermeable tape, and the lower edge with a perforated filter tape or U-shaped sealing tape or F end profile made of aluminum or polycarbonate (see Fig. 7).

Fig. 7. Sealing of sheet channels under normal operating conditions.



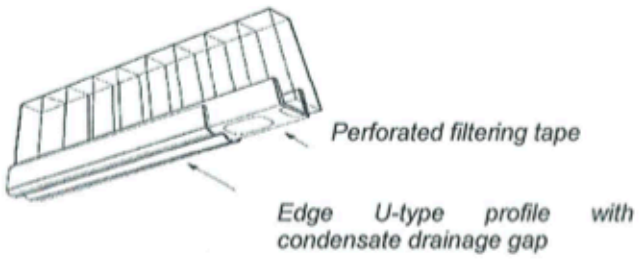
In extremely ***unfavorable operating conditions*** of SOTON multiwall polycarbonate sheet structures in rooms with high level of dust (on saw blades, welding shops) it is recommended to seal the inner ducts of sheets on both sides with an impermeable tape (see Fig. 8).

Fig. 8. Sealing of sheet channels under unfavorable operating conditions.

In the case of arch glassing, both edges of the sheet should be sealed with a perforated filter tape and use U-shaped end profiles with a gap for condensation drainage on both sides (see Fig. 9). This type of sealing is also recommended when using SOTON multiwall polycarbonate sheet designs in the following cases:

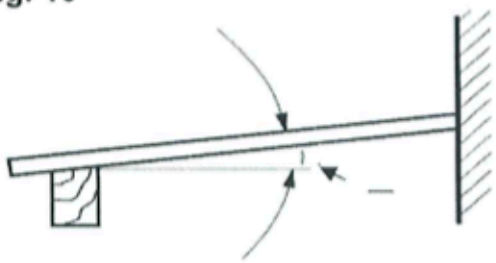
- at low humidity / in dry premises (shopping malls, warehouses, etc.);
- in the absence of temperature differences outside and inside the glazed space (roofs over football stadiums, railway stations, etc.).

Fig. 9. Sealing of the sheet channels in the case of arch glassing.



When glassing with SOTON multiwall polycarbonate sheets, the minimum angle of inclination from the end to the end of the structure should always be 5 ° for normal flow of condensate and rain water (see Fig. 10).

Fig. 10



Installation technology

When installing SOTON multiwall polycarbonate sheets, it is necessary to take into account all environmental influences: expansion of the material due to the temperature difference (summer – winter), which reaches ~ 5 mm / long meter; dust, humidity and air pollution; the effects of rain, snow and wind, solar radiation.

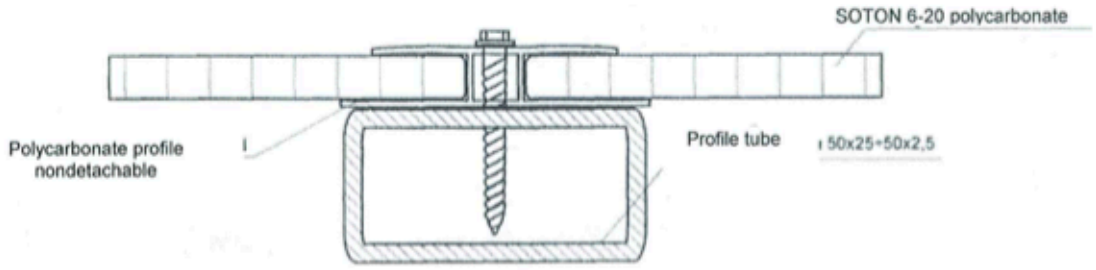
The presence of a UV protective layer on one side of the surface of the multiwall polycarbonate sheet not only protects the enclosure from the penetration of solid UV rays harmful to human health, but also protects the material from their destructive action.

For use outdoors only panels with a UV protective layer should be used. The side of the sheet with the protective layer should be oriented outwards. The film on this side of the multiwall polycarbonate sheet has a special marking with the logo of LLC SOTON. It is best to mount the sheets in the film and remove it as soon as the installation is complete (otherwise it can boil to the sheet under the sun).

For connection of multiwall sheets with each other and their attachment to the frame of the structure, special connecting profiles should be used, taking into account the peculiarities of mounting multiwall polycarbonate:

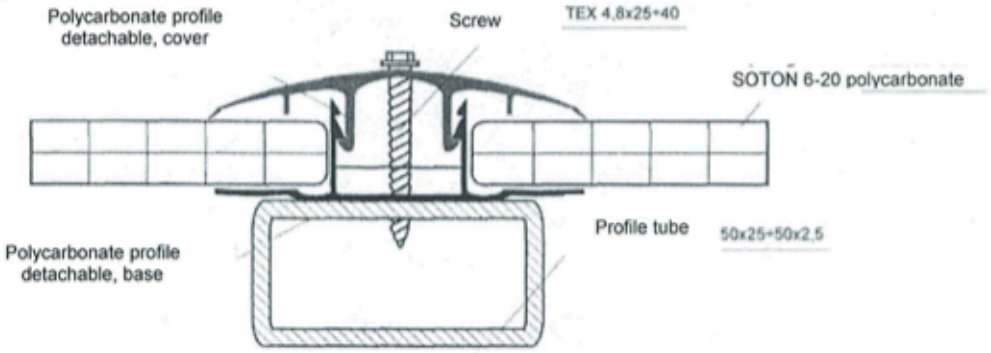
• solid H-shaped polycarbonate profile (see Fig. 11). Fastening it to the frame of the structure is carried out with the help of screws, it is desirable to use thermal washers. For polycarbonate sheets of different thickness, suitable profiles are assigned. Often solid binder profiles are used in small structures: for example, in the construction of seasonal greenhouses and outdoor advertising – where the length of the joint is small. However, it should be noted that for sheets 4 mm thick only these profiles are produced;

Fig. 11. Attach sheets with a solid H-shaped PC profile.



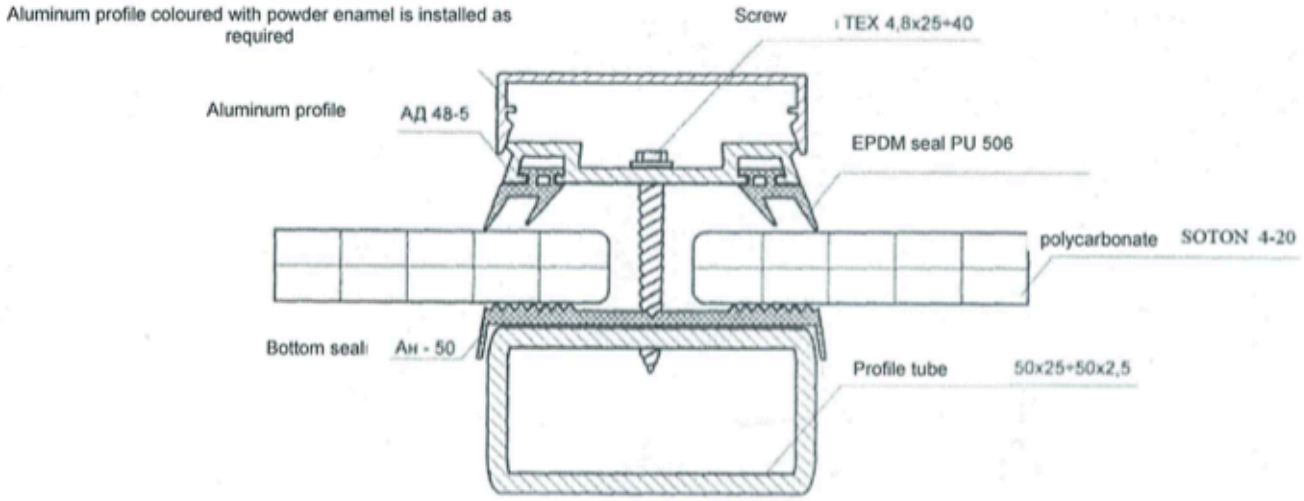
• detachable universal profile made of polycarbonate (see Fig. 12). The profile base is fixed to the main longitudinal supports of the frame, then polycarbonate sheets are installed, the profile cover is fixed in the desired position corresponding to the thickness of the sheet. These mounting elements ensure that the sheets are firmly sealed and fastened to the supporting supports of the frame, while allowing them to expand (contract) without warping under the influence of seasonal changes in ambient temperature. Profiles have the same properties as sheets as they are made from the same raw material. They are just as resistant to ultraviolet radiation, have the same minimum bending radii as the sheets, with the same coefficient of thermal expansion.

Fig. 12. Fixation of sheets with a detachable universal PC profile.



• Aluminum profiles with rubber seals (with EPDM) (see Fig. 13). They are suitable for sheets with a thickness of 6 to 20 mm, but they are used mainly in warm rooms when using 10-20 mm polycarbonate sheets – in the roofs of winter gardens, etc. They also consist of a base and cover and are secured with screws. If the width of the support (at least 50 mm) allows, instead of an aluminum base, you can use a profile seal with EPDM (this simplifies and reduces the connection). If desired, the upper aluminum profile can be closed with a decorative cover made of polycarbonate under the color of mounted polycarbonate sheets, which will close the screws and make the connection not only reliable but also aesthetic.

Fig. 13. Fastening of sheets with the help of aluminum profile with seals.

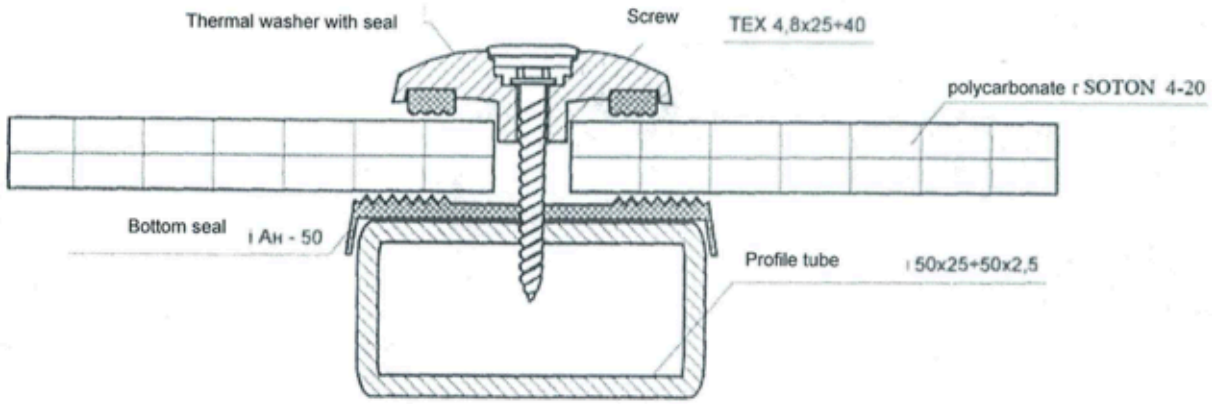


To attach the sheets to each other and attach them to the structure frame, it is best to use one of the types of specialized binder profiles suitable for the particular structure. The edge of the sheet in the profile must be at least 20 mm.

Several different methods are used for mounting SOTON polycarbonate sheets, the most rational and common of which is the installation of the entire sheet (without cutting and according to the step of supports). In this method, the profiles are set in steps corresponding to the standard width of the multiwall polycarbonate sheet – 2100 mm. The edges of the sheets are closed by profiles, and to the intermediate longitudinal supports and the grate the sheet is secured with screws. Here it is necessary to pay attention to the necessity of competent fastening of panels by screws.

For fastening of multiwall polycarbonate sheets, a special thermal washer was developed, which meets all the necessary installation conditions (see Fig. 14). It has an outside diameter of 37-40 mm, which guarantees reliable mounting of the panel even under the influence of hurricane winds. The plastic washer has a lid of the same lockable material – thus, the screw is completely insulated from the cold. In addition, instead of the usual rubber gasket, the thermal washer is provided with a sealing waterproofing ring made of special material. The design of the washer also prevents the panel from collapsing (a common mistake when installing a screwdriver that degrades the appearance of multiwall polycarbonate coating). In addition, the design of the thermal washers and their consistency with the panels by color (white, opal, blue, turquoise and bronze) meet the most stringent requirements for building structures.

Fig. 14. Specially designed thermal washer for sheets attachment.



The edges of the sheets must be closed and the edges sealed with regard to the type of glassing and operating conditions of the structure (see above).

The sequence of operations during installation

• It is necessary to take into account all the features of the construction under construction and the conditions in which the installation of SOTON multiwall polycarbonate sheets and their operation will take place;

• The supporting structure must be fully prepared for installation: all its constituent elements are fixed in place, and if the structure is painted or covered with special solutions, then all the applied coatings must be dried;

• SOTON polycarbonate multiwall sheets is able to condense moisture from the atmosphere. Decreasing the relative humidity can lead to condensation inside the channels of the sheet, which will not be easy to remove in the assembled structure. Therefore, before mounting it is necessary to withstand the material for several days in a dry room, and then seal the ends of the sheet with self-adhesive aluminum tape (perforated or impermeable, depending on the features of installation and operating conditions of the future construction). If condensation has already formed, it can be removed by blowing the voids with compressed air;

• To protect the sealing tape itself, a U-shaped (or F-shaped) aluminum or polycarbonate profile should be used, which should be worn on the edge of the sheet so that its short part is on top;

• Keep in mind that the SOTON sheet must always be installed so that the direction of the internal stiffening ribs (channels) corresponds to the direction of the slope of the roof, which will allow more efficient removal of condensate from the inner channels of the sheet;

• The sheet must be mounted in such a way that the outside is facing outwards, which has a protective layer against UV radiation. It can be determined by the protective film on which the company logo and product marking are affixed;

• Shortly before mounting, remove the protective film on both sides of the sheet at a distance of about 50 mm from the edges of the sheet and the support surfaces. The complete protective film should only be removed after installation is complete;

• Roofing of SOTON multiwall polycarbonate sheets should always be designed with a slope of at least 15° to ensure rainwater runoff;

• The required width of the support surface of the sheet in the mounting profile must be at least 20 mm. It is important to remember that at least one edge must be installed and secured in the profile of the main system;

• Note that due to the thermal expansion of polycarbonate sheets, which are generally higher than other materials used in the structure, they cannot be fixed too tightly. In practice, the required gap between the mounting profile and the polycarbonate sheet can be defined as 3-5 mm per meter of length or width of the sheet format, and the diameter of the hole for the mounting screws or thermowells should be at least 3-6 mm larger than the diameter of the self-tapping screw;

• After taking into account all the above requirements, the size of the SOTON polycarbonate multiwall sheets required for installation should be calculated, leaving room for thermal expansion;

• Choose the right thickness that meets the requirements of load, thermal conductivity (coefficient K), etc.;

• Secure the SOTON sheet on the support to avoid vibrations and uneven edges;

• Cut the sheet to the correct size using standard circular saw or saw blade;

• Remove chips and dust from the internal ducts with compressed air;

• Cut the edges of the sheet and remove any sharp bumps and burrs;

• Correctly select the sealing tape according to the type of glassing;

• Secure the polycarbonate sheet to the structure using connecting profiles, self-tapping screws and thermal washers;

• Remove all protective film immediately after installation;

• It should be remembered that the sheets are not designed to support the weight of the person during installation and cleaning. Special gadgets should be used for these purposes.

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Recommendations for fixing the edges of the sheet

When installing SOTON multiwall sheets, it is especially important that the edges of the sheets are properly and securely fixed, regardless of whether the glassing will be operated in dry or humid conditions.

The retaining strap and profiles with rubber gaskets or silicone sealant hold the sheet in place and create a watertight seal. In both cases, there should be sufficient clearance for the thermal expansion of the sheet. It is also important that the edge of the sheet be included in the glassing profile by at least 20 mm, also taking into account the thermal expansion tolerance (≈ 3-5 mm) and including at least one longitudinal inner partition – a stiffening rib. (See Figs. 15, 16).

Fig. 15

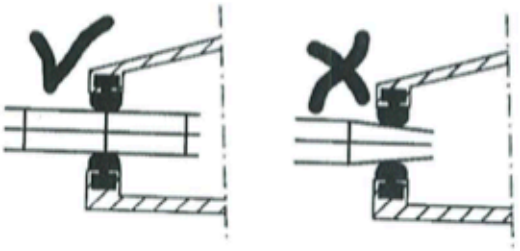
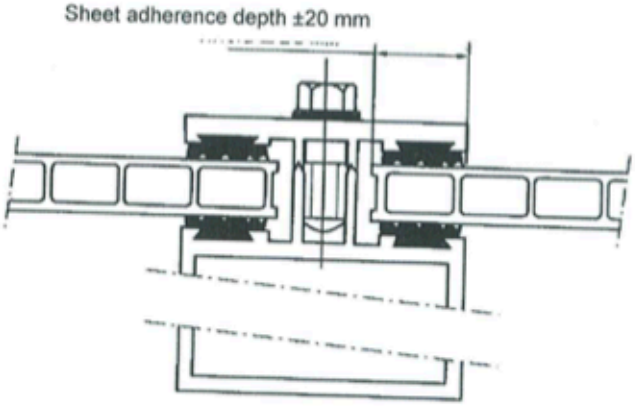


Fig. 16



It is forbidden:

- to use plasticized PVC or polycarbonate-incompatible rubber sealing tapes or seals;
- to use amino-, benzamide- or methoxy-containing sealants or screeds, as well as benzene, gasoline, acetone and carbon tetrachloride;
- to use abrasive or alkaline cleaners;
- to scrape the SOTON sheet with dampers, blades or other sharp tools;
- to walk on the SOTON sheet;
- to Install a damaged sheet during transport or handling or with a damaged sealing tape;
- to wash the SOTON sheet under the scorching sun or at high temperatures.

WIND AND SNOW LOAD

Dynamic wind load

Wind speed determines the actual wind load on the SOTON multiwall sheets used for glassing. Wind load pressure is calculated by multiplying the square of the wind speed by a factor of 0.613 (see Tables 16 and 17).

$$q = K \cdot V^2,$$

where q is the dynamic wind load in N/m^2;
K = 0.613;
V – wind speed in m / s.

Table 16

Value of q in SI units N/m^2

Wind speed, m/s	Wind pressure, N/m^2
10	61
15	138
20	245
25	383
30	552
35	751
40	981
45	1240
50	1530
55	1850
60	2210
65	2590

Table 17

Biaufort table
for wind loads into static ones conversion

Wind	Light	Moderate	Moderate	Storm
Speed, km/h	22	40-60	80-100	120-140
Speed, m/s	6	11-17	22-28	33-39
Static load, N/m^2	20	80-170	300-480	680-950

Pressure factor

Taking into account the fluctuations of the building under the influence of wind load, it is necessary to take into account the pressure factor, which is determined by:

- the shape and type of the building;
- height of the building;
- glassing type (plane, inclined, arched).

The values of the wind load on the glassing are obtained by multiplying the value of the dynamic wind load q by the coefficient of wind pressure. The exact values of the wind pressure coefficients can be found in the relevant National Building Regulations.

Snow load

Snow pressure on roof glassing can be defined as vertical, evenly distributed pressure acting per square meter of horizontal projection of the glassing. Due to the high thermal insulation properties of SOTON multiwall sheets, there is no rapid melting of snow, so it is imperative to consider the snow load.

The value of the specific gravity of snow per centimeter of height

Snowfall	~ 0.8-1.9 kg/m^2
Wet snow	~ 2.0-8.0 kg/m^2

The exact values of the snow load coefficients can be found in the relevant National Building Regulations.

GLASSING SYSTEMS

Dry glassing systems

Figures 17 and 18 show examples of glassing using public profiles that have already proven compatible with SOTON sheets. In conditions where the sheet expansion limits exceed the plasticity limits of the sealant, the "dry" type of glassing system provides the perfect solution. Often this type of installation is chosen for aesthetic reasons. The advantage of dry systems is that the rubber seals are clamped into the glassing frame, which allows the sheet to move freely during cyclic extensions and compression.

WARNING!

Do not use PVC (PVC) seals.

Due to the diffusion of polyvinyl chloride additives, cracks may appear on the SOTON sheets and may cause damage to the sheet.

Fig. 17. "Dry" type of glassing system.

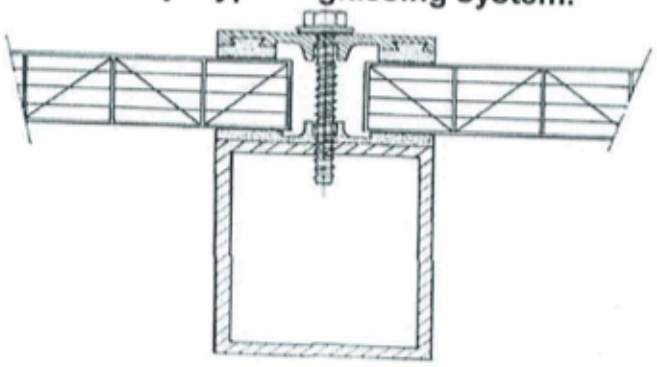
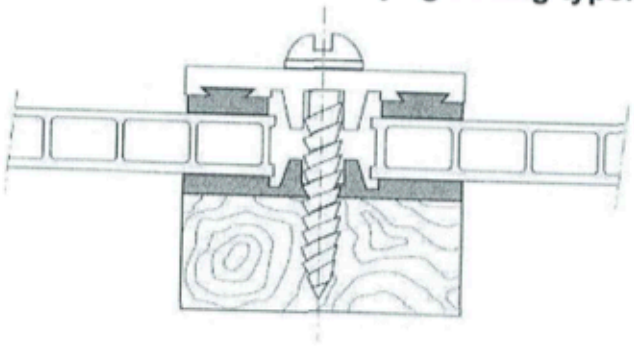


Fig. 18. EPDM seals in "dry" glassing type.



Wet glassing systems

Basically, this type of SOTON multiwall sheets installation is used for local glassing of homes, car gates, warehouses, greenhouses, and in other cases the replacement of glass use.

Using standard metal profiles or wooden frames, together with ribbons and other glassing accessories (Figures 19 and 20), different design solutions can be implemented.

When choosing glassing binders, it is important that the glassing system has a gap for thermal expansion without losing traction with the frame or sheet. Usually it is recommended to use silicone sealants, and when using other sealants, check their compatibility with the SOTON sheet in advance.

Neither amino nor benzamide-curing silicone sealants can be used as they are not compatible with the SOTON multiwall sheet, and this may lead to the formation of microcracks, especially in the presence of stresses in the sheet.

Fig. 19 "Wet" glassing system with the help of wooden frame

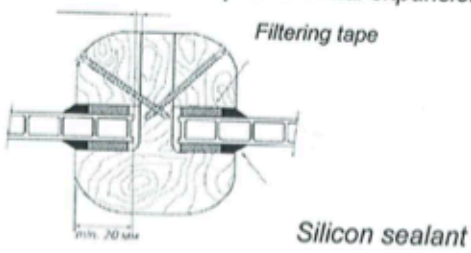
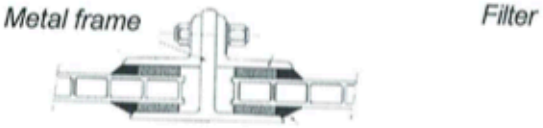


Fig. 20. "Wet" glassing system with the help of metal profile.



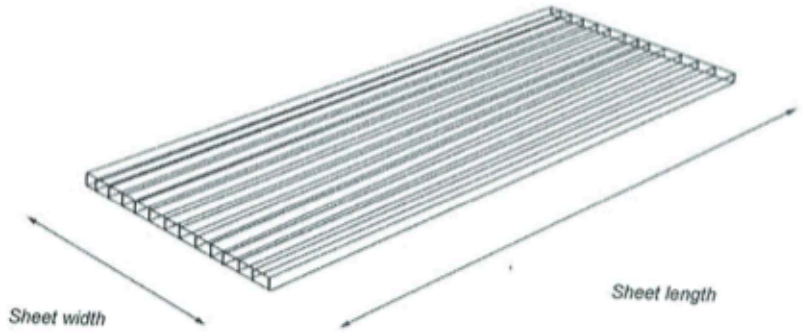
SHEET THICKNESS SELECTION

Requirements for supporting structures

Note

Whatever the configuration of the support, the SOTON sheet must always be installed so that the inner stiffening ribs and the channels between them are pointing down. The width of the sheet is the size perpendicular to the system of internal stiffening ribs, and the length is the size parallel to this system (see Fig. 21).

Fig. 21



Plane sheet installation

When mounting different designs of mounting multiwall sheets in several ways:

1. fastening of a sheet from four sides.

Such fastening is necessary in structures where fixed parameters of length or width, for example, windows, etc., are specified. In such cases, the deflection of the sheet is affected by the ratio of the width of the sheet to its length. With different values of this ratio, depending on the value of the wind load and the thickness of the sheet, the distance between the fastening elements along the width (a) will change and, accordingly, the length (b) will also change. In practice, the magnitudes of wind loads do not exceed 1600 N/m², and the ratio of width and length of the mounting hole are as follows:

1) a:b = 1:1;
2) a:b = 1:1.5;
3) a:b = 1:>1.5.

Table 18 shows the recommended design values for the width (a) of the slot of the installation along the system of internal channel ducts at different ratios a: b and different wind loads.

Table 18

Sheet width to length ratio	Sheet thickness, mm					Load N/m²
	6	8	10	16	20	
1:1	1050	1250	1500	1700	1800	600
1:1.5	920	1100	1150	1420	1650	
1:>1.5	610	720	815	1100	1200	
1:1	950	1150	1375	1600	1700	800
1:1.5	850	1020	1070	1310	1550	
1:>1.5	570	655	730	980	1160	
1:1	900	1075	1280	1500	1600	1000
1:1.5	780	940	950	1210	1400	
1:>1.5	530	610	670	880	1070	

1:1		1020	1215	1450	1055	**1200**
1:1.5		900	920	1120	1310	
1:>1.5		570	620	810	980	
1:1		970	1160	1400	1500	**1400**
1:1.5		830	850	1060	1220	
1:>1.5		535	583	750	920	
1:1		930	1110	1300	1450	**1600**
1:1.5		780	800	1000	1170	
1:>1.5		510	545	700	860	
1:1			1070	1250	1400	**1800**
1:1.5			760	950	1080	
1:>1.5			520	665	810	
1:1				1200	1350	**2000**
1:1.5				900	1050	
1:>1.5				620	770	

Examples of table use:

a) window size: width 1100 mm, length 3000 mm (ratio a:b = 1:>1.5).
Load: 600 N/m². Required sheet thickness: 16 mm.

b) window size: width 800 mm, length 1200 mm (ratio a:b = 1:1.5).
Load 1600 N/m². Required sheet thickness: 10 mm.

2. Fastening of the sheet from both sides, the beam is perpendicular to the ribs.

In this situation, the bending of the sheet is affected by the frequency of the scaffolding. The width of the sheet does not affect the bend, so it can be maximum (up to 2100 mm). In the case of an inclined horizontal or rounded glassing, it is recommended to use a support profile to connect the two sheets to connect the sheet by its own weight to connect the two sheets. When attaching the sheet to the grate, it is necessary to use mounting washers with plugs to distribute the mounting force evenly over the maximum possible area.

The bolts should not be tightened too much to avoid deformation of the sheet and not to limit the natural thermal expansion; the distance between the hole and the edge of the sheet should be at least 40 mm. The described method of attachment is used in cases where the aesthetic appearance of the structure does not play a role. In addition, it has some disadvantages, for example, the H-shaped profile is not protected from UV radiation and after some time it will fade. Due to the fact that the H-shaped profile connects the sheets along their width, the channels can become clogged, but the use of silicone sealant can significantly impede this process.

Table 19 shows the recommended design values for the width (a) of the slot of the installation perpendicular to the system of internal channels of the sheets at different ratios a: b and different wind loads.

Table 19

Load, N/m²	Sheet thickness, mm				
	6	8	10	16	20
600	690	830	900	1450	1550
800	630	760	910	1325	1440
1000	590	720	855	1240	1350
1200	570	680	800	1180	1275
1400	540	650	770	1130	1220
1600	520	630	740	1085	1175
1800	500	600	710	1050	1140

2000	480	580		1000	1100

3. Fastening of the sheet from both sides, the beam parallel to the ribs.

With this method of attachment, the distance between the axes of the mounting profiles is an important indicator affecting the deflection of the sheet. The length of the sheet does not affect the bend, so it can be maximum (up to 6000 mm). Knowing the intended load, it is easy to calculate the distance to which the support beams are to be installed.

Table 20 shows the recommended design values for the width (a) of the slot of the installation parallel to the system of internal channels of the sheets at different ratios a: b and different wind loads.

Table 20

Load, N/m²	Sheet thickness, mm				
	6	**8**	**10**	**16**	**20**
600	570	655	730	1100	1200
800	530	610	670	980	1160
1000		570	620	880	1070
1200		535	585	810	980
1400		510	545	750	920
1600			520	700	860
1800				665	810
2000				620	770

Safety at the construction site

When installing or cleaning floors, SOTON sheets should not be used as a support for the installer during operation (see fig. 22). Temporary wooden bridges, scaffolding, stairs or other fixtures that rely on the main load-bearing roof structures must always be used for these purposes.

Fig. 22. It is forbidden to walk on SOTON sheets.

BENDED STRUCTURES GLASSING

The SOTON multiwall sheet can be successfully bent without heating and stacked on curved support structures using special glassing profiles. Thus, various glassing projects can be carried out, such as arches, window openings in roofs, etc. It should be ensured that the radius of curvature of the structure is not less than the minimum radius of curvature recommended for this type of sheets (see Table 21).

The sheet should always be bent longitudinally and should never be bent laterally. It is recommended that the width of the sheet be less than 2 times the length.

Rubber seals for metal or wooden structural support beams and for lockable aluminum lock rails should be used for greater economic effect.

Table 21

Minimum bend radius

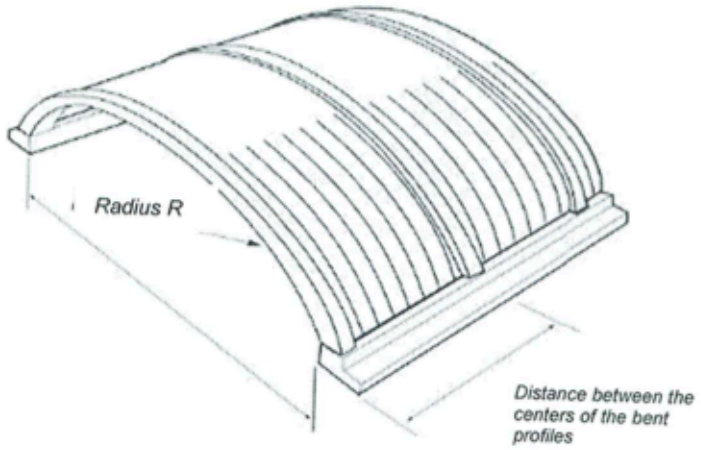
SOTON sheet thickness	Minimal radius, mm
4	700
6	1050
8	1400
10	1750
16	2800
20	3500

WARNING!

Reducing the minimum bend radius can damage the multiwall sheets.

The length of the sheet should always be greater than the width of the sheet – to facilitate bending. In practice, a ratio of less than 1: 2 is never considered due to the geometry of the structures being mounted (see Fig. 23).

Fig. 23. Applied option of installation of multiwall polycarbonate sheets.



GUARANTEE

LLC SOTON guarantees compliance of the quality of the sheets with the requirements of the Technical specifications of TU U 22.2-42410804-002: 2018 while observing the rules of transportation, storage and use established by the consumer.

The guarantee period for storage of sheets is two years from the date of manufacture.

Guarantee period for exploitation:

- multiwall sheets – 10 years;
- light multiwall sheets – 7-10 years.

The guarantee period of the sheets is calculated:

- for non-market consumption – from the date of receipt of the product by the buyer (consumer);

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Note: All materials presented above are for guidance only and are provided voluntarily by LLC SOTON. The product characteristics and performance characteristics described in this document are generalized and require self-review by the consumer for the suitability of the product for consumer purposes.
As LLC SOTON is unable to control the use and use of its products, as well as products produced on its basis by the consumer, the responsibility for the use and use of the products of the enterprise is entirely borne by the consumer. In case of violation of the order of use and use of the products provided by this technical manual by the consumer the LLC SOTON is not responsible.