

Polycarbonate assembly instructions

Rules of installation of polycarbonate sheets:

Polycarbonate sheets should be established so that the sunlight fell on the sheet side protected from UV-radiation. That side is covered by the marked film. Co-extrusion UV - layer protects sheet from change of properties throughout guaranteed exploitation term.

Installation of cellular polycarbonate is carried out vertically concerning an arrangement of edges, in parallel length of an arch or a direction of a slope of a roof.

Connection of sheets from cellular polycarbonate is carried out by usage of H-structured profiles (demountable and one-piece) during installation of designs. We recommend to use profiles of the mark «Novattro».

Open edges of sheets are closed with the help of U-structured face profile either sticky aluminum hermetic or punched tapes.

As a fixing element it is necessary to use cut pins, screws, the cutting carving or the self-screwed up screw which is in the complete set with gasket and washer of the wide area of support.

For the control of thermal gap (about 3 mm/i. m.) it is necessary to provide free expansion of the material by the organization of the apertures which diameter exceeds fixing element diameter, or it is necessary to do oval apertures round fixing element to the direction of edges (about 1-2 mm).

It is necessary to avoid direct contact of polycarbonate with metal or a tree during installation of designs from polycarbonate. It is recommended to use rubber gasket in diameter of 3-4 sm and thickness of 3-4 mm.

It is necessary to paint surface of basic designs in white color for prevention of local heating under the sun rays influence.

Cellular polycarbonate sheets should be established with a downgrade not less than 15 degrees. The biggest downgrade of a roof covering is preferable.

For basic overlapping the minimum radius is equal $R_{min}=150d$, where d - is a thickness of polycarbonate plate.

It is necessary to use wooden boards of width > 40 sm during packing of sheets as spontaneously circulation of sheets is inadmissible.

Considering ability of polycarbonate to heat accumulation , it is necessary to provide the organization of window leaves or transom at the rate of 30 % from the general surface of a glazing .

It is necessary to remove a film after installation. Washing polycarbonate plates you should avoid the solutions containing concentrated alkalis, or aggressive solvents on their action as it can cause formation of microcracks on a surface of plates.

For hermetic sealing of apertures or seams of plates apply only the neutral silicone which is not containing harmful substances for polycarbonate. The use of PVC gaskets is forbidden categorically.

During polycarbonate installation it is necessary to adhere of recommendations about admissible loads and the minimum radiuses of bending as each pressure, vibration or deformation change mechanical characteristics of the material and are capable to reduce time of its exploitation essentially.

Manipulations with sheets during installation

During installation or cleaning it is impossible to subject polycarbonate sheets to influence of weight of the person. It is always necessary to use temporary wooden beams or other adaptations based on the portion of the roof structure (the board or the shield should have the width not less than 50 sm) on a building platform for movement.

The polycarbonate surface is very sensitive to mechanical influences. In contact to abrasive substances friction to rough surfaces scratches are formed. Try not to subject the material to similar tests and if there is a possibility, keep superficial protective film till the end of works. For the reason specified above, despite of strong properties, polycarbonate without a special firm varnish covering can't be applied as floor designs (podiums, ladders, scenes with internal illumination, etc.).

You should clean a polyethylene protective film at once after installation. Otherwise at long-term sun influence polyethylene can "become attached" to a surface of the sheet and its further removal will be complicated.

Cleaning

For washing sheets it is recommended warm water with a soft rag or a sponge and you should use only weak soap solution. It is not recommended to use rubber spatulas. It is necessary to exclude synthetic surface-active substances, solvents and other aggressive things for cleaning.

You shouldn't use scrapers, edges or other similar sharp subjects during cleaning of the surface of the panels.

Contact of a material with rust isn't recommended. If ferrous metal for carcass is used it is necessary to clean, to paint it beforehand and to cover places of contact with polycarbonate with an isolating rubber tape.

Detailed installation instruction

The preparatory works

It is necessary to release end faces of sheets from packing and to protect them with the face tape before polycarbonate installation immediately. Thus the end face of sheet turned to a bottom, should be protected with the punched aluminum tape, and the top end face - with continuous aluminum tape (hermetic tape). If the top end face does not contact directly to environment, it is possible to apply an adhesive tape of suitable width instead of a special tape. In case if the top end face will be monolithic, is admissible to refuse application of a continuous tape in general. The bottom end face isn't exposed to be monolithic under no circumstances - it should be mounted openly for maintenance of an effluence of a condensate.

It is recommended to protect the punched tape at the bottom end face structured profiles with the russian "П" or "Г" letters, thus the profile should be mounted so that to provide a free exit of a condensate. (It is recommended to use profiles «Novattro»).

The short side of many face profiles on the sheet should be turned outside as only it has a protective UV-layer. Face profiles «Novattro» have a protective UV-layer on all external surface that gives more possibilities for installation and usage.

Orientation of sheets

At correct technology of installation of polycarbonate it is necessary to focus without fail a protective layer outside. Non-observance of this rule can lead to polycarbonate damage by ultra-violet beams and decrease its toughness and durability. The protective layer is determined by the packaging - labels and office icons are plotted on the part of the protective layer of polycarbonate panels on the package. After installation the original packing should be removed.

Sheets should be mounted only vertically, otherwise it is possible amassment of a condensate in internal channels. It is possible to subject plates to a bend in a cold condition in a cross-section direction (i.e. when the arrow of a deflection is parallel to a direction of edges of rigidity). To bend polycarbonate sheets along edges of rigidity is inadmissible.

Arrangement of edges of rigidity of cellular polycarbonate

If at installation there is a probability of formation of a condensate inside of polycarbonate sheet, it should be established in such position that edges of rigidity were in vertical position for maintenance of an independent flow of moisture. The condensate is formed at humidity of air of 32 % for glass, 50 % - for 16 mm th polycarbonate and 68 % - for 20 mm th polycarbonate (the data is received at air temperature outside-20C, indoors +10C).

At sheet installation in horizontal position the angle of slope shouldn't be less than 5 degrees (9 sm to the meter of length of sheet) for maintenance of a flow of moisture. Irrespective of the chosen type of fastening the sheet always should be established so that edges of rigidity of sheet settle down vertically.

Systems of connecting profiles

Using brand profiles it is necessary to remember that:

Connecting one-piece profiles (4; 6; 8; 10 mm) don't provide reliable fastening of sheet in a profile and reliable hermetic sealing of a joint; they aren't intended for fastening to purlin. It is recommended to apply them only to a joint of edges of vertical designs in the absence of high loadings and obligatory additional fastening of plates to purlin.

Connecting demountable profiles (8, 10 and 16 mm) provide both reliable hermetic sealing of a joint and high effort of a clip of sheets, allowing to manage without additional fixing elements. In this case, the width of mounted sheet shouldn't exceed 700-1050 mm (plates of 8 and 10 mm) and 1200-1400 mm for plates of 16 mm. For maintenance of reliable connection of sheets with a connecting profile the lateral soldered sheet edge should be cut off to the first parting wall.

The base of connecting demountable profile should lean on arches and fasten to them by screws. Distance between fixing elements is 300-400 mm. In the top parting wall of base of a profile is necessary to drill the aperture, a head of screw should rest against a profile bottom.

Connecting demountable profiles allow fixing polycarbonate sheets towards an angle to each other if this corner is not less 145-150°.

Using aluminum base the connecting demountable profile thanks to its rigidity allows raising easy arch designs with a minimum bearing constructions. Provided that the width of sheet doesn't exceed 600 mm for sheets of 8 mm and 700 mm - for sheets of 10-16 mm (thus presence of ridge element is obligatory!) the distance between bearing constructions of an arch can make from 6 m (plates of 8 mm) to 8 m (plates of 10-16 mm). Usage of similar profiles for erection of the facilitated flat designs is admissible provided that the width of sheets makes no more than 500 mm. In that case it is possible to refuse exponentation of longitudinal bearing elements (rafters) in general and to mount construction, using exclusively cross-section runs as power support.

Thermal change of the linear sizes

Thermal expansion/narrowing of material makes 2,5 mm/m for transparent and lacteous sheets, 4,5 mm/m for color sheets at a temperature range no more than +50 degrees of Celsius. A range of exploitation temperatures is from -40 to +120 degrees of Celsius. We recommend doubling this distance as it should be divided between both parties of sheet.

During installation it is necessary to consider property of polycarbonate to extend at high temperatures and to be compressed at low (see above). Thus, carrying out polycarbonate installation in hot weather it is necessary to establish a plate closely to the lock of a joint profile (when the temperature fall down the plate will decrease in sizes and will leave a necessary backlash for a condensate flow). It is necessary to make a space slightly more than the usual from the profile lock when the temperature is low.

Screws and washers

Using screws should be aware that the center axis of the aperture should be located no closer than 36 mm from the edge of a plate, and the aperture itself should have a diameter for 2.5-3 mm larger than the diameter of the screw - to compensate of thermal expansion. The recommended distance between the self-tapping screws - 400-500 mm for sheets of 8-10 mm and 600-800 mm for sheets of 16 mm. During the installing of a very long (more than 7 m) of whole sheets of aperture the screws should be oval, with long axis oriented along the plate. The aperture must be drilled for tapping only in the middle of the inner air channel list MUST NOT attempt to drill apertures through the center bar of the sheet.

Using sealing washers it is not necessary to apply excessive efforts tightening the screws. The effort necessary tightening the screws, should be chosen that the loading transferred by a sealing washer to polycarbonate sheet, there were in limits of 0,5-2 kg/sm². Traces of deformation of sheet under a washer (deflection) shouldn't be observed visually.

Seals

If necessary additional compacting of joints it is recommended to apply sealing tapes from following materials - silicone rubber, a neoprene, EPDM. It is not recommended to apply sealants from soft PVC as some sorts of elastic polyvinyl chlorides at aging and under the effect of atmospheric influences are capable to allocate the substances destroying the polycarbonate.

During compacting of joints polybutylene mastic (or a tape), and also the silicone hermetics compatible to polycarbonate can be applied as hermetics. Silicone hermetics on a basis of amines or benzamide are

incompatible with polycarbonate and can cause its destruction. Application of one- or two-componental polysulphidic hermetics is admitted.

Cutting panels

Cellular polycarbonate and polycarbonate profiles are easily cut. For the most qualitative cutting use high-speed circular saws with an emphasis, supplied with an edge with the small not dissolved teeth reinforced by firm alloys. During cutting sheets profiles should be supported reliably in order to avoid vibration. Cutting by a tape saw is possible.

After cutting it is necessary to remove a chipping from internal cavities of sheets.

Drilling of apertures

For drilling standard sharp metal drills are used. Drilling is made between edges of rigidity. The aperture should be removed from edge of sheet on distance of not less than 40 mm.

Characteristics of drills:

Sharpening corner - 30

Drilling corner - 90-118

Speed of cutting speed - 10-40 m./min

Speed of giving - 0,2-0,5 mm/tn.

Hermetic sealing of end faces of sheet

It is necessary to close end faces of sheets correctly. At vertical and inclined position of sheets the top end faces are tightly closed with the continuous aluminum self-adhesivetape, and bottom ones with the perforated tape interfering penetration of a dust and providing a flow of a condensate.

In arch designs it is necessary to close both end faces with the perforated tape:

Use similar color polycarbonate profiles. They are esthetic, convenient and reliable. The profile design provides dense fixing on the end faces of sheets and doesn't demand additional fastening.

For maintenance of the flow of a condensate drill in a profile some apertures.

It is impossible to leave end faces of cellular polycarbonate opened.

It is impossible to stick end faces with a usual adhesive tape.

It is impossible to close the bottom end faces of panels tightly.

Orientation of sheets at designing and installation

Internal edges of rigidity are located in cellular polycarbonate on length (which can be 3, 6 or 12 m). The panel in your design should be focused so that the condensate formed in it could flow down on internal channels of sheets and is expelled.

At the device of a vertical glass cover of an edge of rigidity of panels should settle down vertically, and in a slope designs - along a slope.

In the arched structure edge of rigidity should move in an arc.

Note these conditions of installation at designing, calculation of quantity of panels, their cutting and, of course, at installation.

For application cellular polycarbonate with the protective UV-stabilizing layer put on an external surface of sheet is used outdoor. The protective film has the special marks from this side of sheet. Not to be mistaken, sheets are necessary to be mounted in a film, and to remove it directly after installation.

It is impossible to bend sheets on radius less, than the minimum radius of a bend specified by the manufacturer for sheet of chosen thickness and structure of mount technology of polycarbonate.

It is impossible to break rules of orientation of sheets.