

COVERING MATERIALS: ROOFING, WALLS AND HEADS

Our structures are designed to protect the items placed inside them from external atmospheric agents. They are designed to be covered both with plastic films and with rigid materials.

The table below shows the different materials with the main characteristics indicated.

Description	Thickness (mm)	Weight (Kg/m ²)	Thermal conductivity K W/(m ² K)	Durati on (years)
Single wall polyethylene film (simple sheet)	0.2	0.18	6.0	3/4
Polyethylene film with an inflated gap (double-layer sheet)	0.2+0.2	0.18+0.18	3.0	6/7
Coated polyethylene sheet	0.3 / 0.6	0.24/0.38	N/A	5/7
White green polyethylene sheet	0.25	0.22	N/A	5
PVC sheet	0.5	0.65	N/A	>15
Polyethylene mesh	variable	variable	N/A	10/15
Alveolar polycarbonate	6	1.3	3.7	8/10
Alveolar polycarbonate	10	1.7	3.1	8/10
Insulated panel	30	8.75	0.7	>20
Insulated panel	40	9.15	0.5	>20
Ondex PVC bi-oriented sheet	0.9	1.3	5.5	12/15
Clear glass	4	10	5.8	>20
G-GLASS (low-emission pyrolytic)	4	10	3.7	>20

Thanks to this simple table it is possible to extract a number of interesting evaluations.

If the purpose of the structure is to create a greenhouse for the production of flowers, with a need for medium-high temperatures, most of the materials listed above may be used, with the exclusion of those that do not allow the passage of sunlight.

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If, on the other hand, the aim is to produce vegetables, which normally do not require high temperatures, plastic film with a single layer is without doubt the most suitable solution. It allows good transparency and has an excellent duration, relatively also to the low cost of the material.

The shading / anti-hail nets are used when the irradiation needs to be reduced or in order to protect whatever is placed under the structures from the sun and hail.

Polycarbonate, insulated panels and glass are suitable for large structures, where the cost of the covering materials is a minimal part of the total cost of the work.

For gardens, the product that offers the best value for money is undoubtedly Ondex.

Plastic film with an inflated gap, commercially called double-layer sheet, is certainly the most widely used roofing system in greenhouses. It allows, at very low costs, a considerable saving in the fuel needed for heating. In fact, with a simple electric turbine with consumption of 67 W, controlled by our specific timer, it manages to keep the air gap at constant pressure.

Transparent polyethylene sheet: *EVA copolymers (ethylene and vinyl acetate) and additives.*

It has the following characteristics: exceptional transparency, excellent thermal effect and high mechanical characteristics. Double mounted and inflated, allows considerable energy savings. Our specific timing system allows optimal inflation control. The type of sheet that we use is the **PATILUX D/G**, which has a transparency guarantee of 33 months and a real lifespan that is close to 10 years. The inner side, identifiable by specific wording printed on the sheet, has an anti-drip treatment: the additive, emerging from the inside, increases the surface tension of the film and thus prevents fogging and the formation of drops.

The sheet is fixed by a safe combination of aluminium profiles and PVC raceways.



Coloured polyethylene sheet: *synthetic geomembrane in reinforced polyethylene, produced with a triple coating of polyolefins (TPO) and reinforced with an internal reinforcement in high density polyethylene (HDPE) fabric and stabilized against UV rays.*

It is an ideal multi-purpose sheet for both temporary and permanent use. It can be used to cover vehicles, timber and materials in general. In agriculture it is used to cover high tunnels, as well as in the industrial sector for packaging and goods storage.

It is available in four colours (green, white, light blue and orange) and in two thicknesses (240 and 380 g/sqm); the choice is determined according to the intended use.

It can be fixed with three systems:

- a safe combination of aluminium profiles and PVC raceways.
- if provided with eyelets, with a simple elastic cord directly onto the structure
- if provided with slots/pockets, with straps and ratchets



White/green polyethylene sheet: *three layer coextruded polyethylene film*

It has been specially designed for the livestock sector, both for the shelter of animals and for the covering of hay or agricultural equipment. It is manufactured in two colours: green on the outside, so as to be better integrated with the environment and white on the inside, in order to make the protected area very bright.

The sheet is fixed by a safe combination of aluminium profiles and PVC raceways.



PVC sheet: *PVC coated polyester fabric*

Ideal for industrial roofing and for the livestock sector, both for the shelter of animals and for the covering of hay or agricultural equipment. It is available in different colours

It can be fixed with two systems:

- if provided with eyelets, with a simple elastic cord directly onto the structure
- if provided with slots/pockets, with straps and ratchets



Alveolar polycarbonate: *rigid sheet of extruded thermoplastic polymer*

Used in many sectors due to the low thermal coefficient, alveolar polycarbonate sheets are used on many structures, both on the roof and for the walls.

However, our experience has led us to use them only vertically, as when placed on the roof, they are particularly fragile to hail. They are cold curvable and available in different sizes and thicknesses, depending on the thermal coefficient required. They are protected against U.V. rays on one side.

They can be fixed using self-drilling screws equipped with a sealing washer.



Insulated panel for roofing: *Insulating and load-bearing sandwich panel, composed of a sheet of corrugated sheet (external part) and sheet metal plate (internal part) interposed with closed-cell, high density polyurethane foam.*

Insulated panels are normally used to obtain an insulating roof on prefabricated structures and do not allow the passage of solar rays

They are available in different colours and have a wide range of accessories, such as junction ridges or special perforated flashings to solve any infiltration problem.

For the wall covering, smooth insulated panels are used on both sides



Anti-hail net: *UV-stabilized polyethylene monofilament*

Net used to protect crops from damage caused by hail.

It is warp-knit with the **RASCHEL** system, so as to be run resistant

It is available in **green** or **black**.



Shading net : *UV-stabilized polyethylene monofilament*

Net used to reduce the intensity of sunlight in greenhouses, stables and car parks.

It is warp-knit with the **RASCHEL** system, so as to be run resistant.

It is available at 30 and 90% in **black**, while at 50/70% in both **green** and **black**.

Both the anti-hail and shading nets can be fixed directly to the supporting structure, with the use of simple clips, in **DACROMET** galvanized steel, in order to allow easy disassembly in the winter.





It is also possible to make a sturdy frame with $\varnothing 30 \times 1.2$ mm tubes and sendzimir Z275 zinc-plated "U" profiles $30 \times 30 \times 30$, in order to build a superior structure, to support the nets. This allows a significant increase to the level of protection from hail for any type of roofing material used.



Ondex HR BIO 2: *corrugated extruded sheets in biaxial oriented PVC*

As a rigid material for the covering of our structures, after having experimented for several years all the various materials available on the market, we opted for the corrugated sheets called Ondex.

They are manufactured according to a traditional extrusion process, but what makes them very resistant is their biaxial orientation, which consists in stretching the slabs both in length and in width.

This creates a mesh structure within the structure of the molecules, like the weave of a fabric.

Designed for the construction of roofing and coverings for greenhouses and garden centres, it is available in 4 shades, from crystal to opaque, it adapts to any type of crop and is also used for storage facilities or other technical premises.

It is guaranteed for 10 years both for transparency and mechanical resistance, it is resistant to the impact of hail, is non-flammable (class 1) and is 100% recyclable.

It can be fixed in different ways: normally we use self-drilling screws, special corrugated sheet that acts as a washer and specific corrugated sponges to reduce possible infiltrations. Self-tapping screws with sealing rings are also an excellent solution.

The types we use are the following:

Profile 76/18	T01	- transparent	transparency 89%
	TL50%	- milky white colour	transparency 50%
Profile 77/20	TL80%	- light blue colour	transparency 80%
	G10	- white wall colour	no transparency
Profile 70/18	Green/white	- green colour RAL 6021	no transparency









CLEAR GLASS: *silicon oxide sheets*

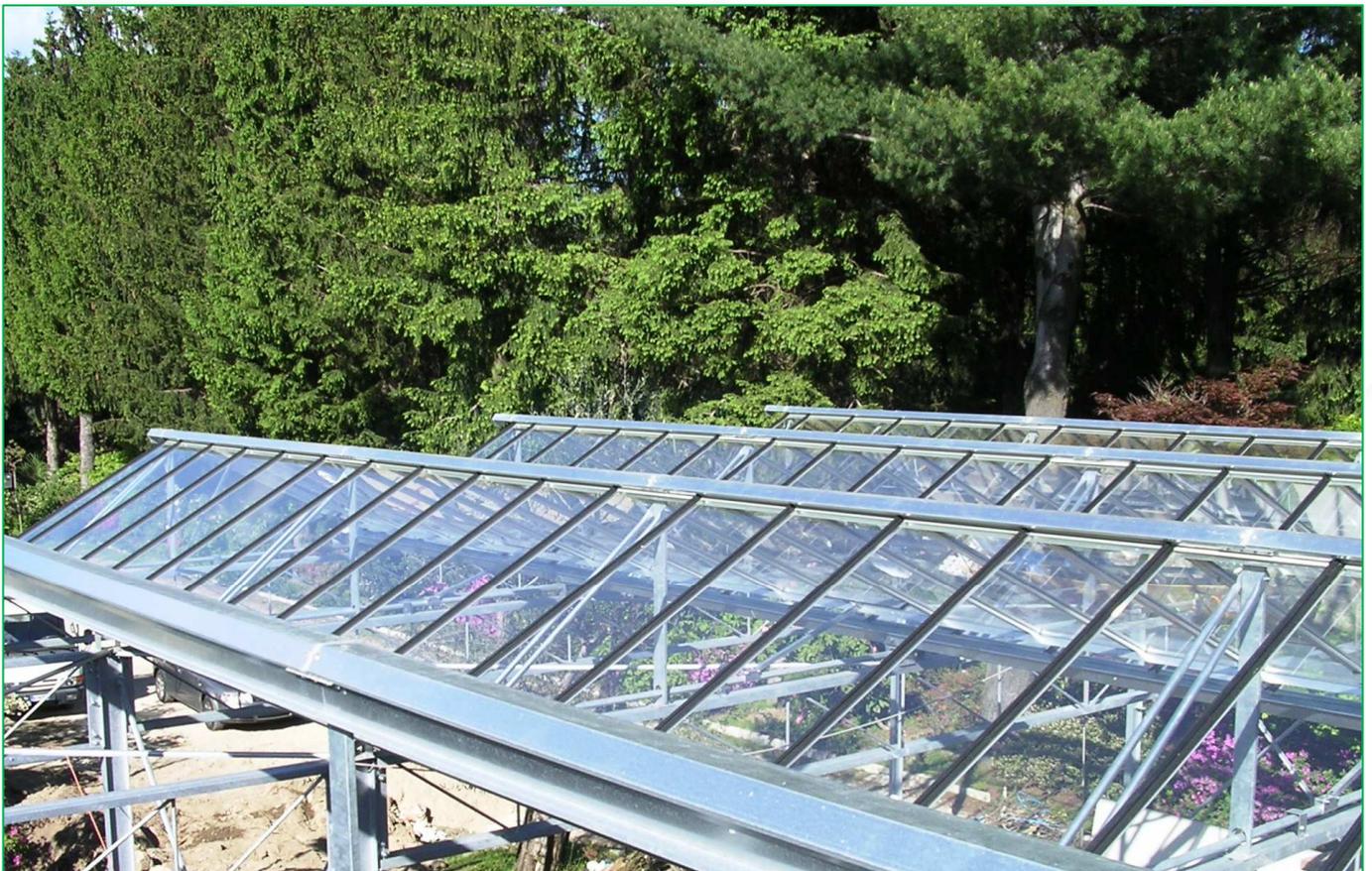
This glass is used in many sectors and most uses are due to its transparency and the inalterable nature of its chemical-physical properties.

We use the **FLOAT** type, **4 mm thick**, normal or hardened.

Normal glass is undoubtedly cheaper but in the case of breakages, it breaks into medium-large and sharp pieces, thus becoming potentially dangerous for people or things. It can not be used as roofing material for gardens.

Tempered glass, on the other hand, in the event of breakage, breaks into lots of small fragments, which are not usually dangerous.

The tempered glass is obtained by hardening through heat treatment and is about six times more resistant than normal glass. The cost is about 60/70% higher than normal glass.



G-GLASS (low-emission pyrolytic) In some cases, mainly for reasons of energy saving, we have also used this type of glass. It is glass on which a film of metal oxides has been laid, which greatly improves its thermal insulation performance, without substantially altering the transmission of light. It may be slightly coloured due to the surface treatment.



All types of glass can be used on our structures, placing them on the special aluminium glass holder profiles that act as a support. They are fixed and sealed perfectly using black dutral gaskets.