

The Complete Guide to Green Houses and Garden Projects - Framing Materials

Key  
Green = Useful  
Blue = Not Useful

Global Context

This shows Research Skills and Self Management Skills as I am finding information about the process in order to further the construction process

“To research and source the selected materials from local suppliers”

Human understanding of scientific principles allows for the manipulation of a variety of materials for example aluminium can be manipulated for use in our structures. Steel can be galvanised to protect it from corrosion and rust because of our understanding of these processes

## Learner Profile Links

# Inquirers Thinkers

## Why did I select this resource

This information was a publication from Black & Decker a credited DIY manufacturer

### How I can apply this information

This information will allow me to select the materials to construct the basic frame of my structure this will be useful as the frame plays a critical role in other design elements and the durability of the structure.

## Bibliography

Black&Decker 2011, The Complete Guide To Greenhouses & Garden Projects, Creative Publishing International, 400 First Avenue North, 300 Minneapolis, Minnesota, US.

# Framing Materials

## FRAMING MATERIALS

Although wood and aluminum are the most popular greenhouse framing materials, other products, such as steel and PVC, are available. Each type has advantages and disadvantages, so choose the one that best suits your purposes. For example, if you plan to hang baskets or put up shelves, or if your area gets a lot of snow, you'll need to choose a sturdy material to accommodate the extra weight.

## WOOD

**Advantages:** Often the first choice for custom greenhouses, wood framing is attractive, does not transfer heat as readily as aluminum, and has fewer condensation problems. It is also sturdy and, if you use cedar or redwood, rot-resistant and fragrant. You can easily fasten shelves, hooks, and other items to a wood frame. Western red cedar and redwood are recommended, but you can also use pressure-treated wood.

**Disadvantages:** Wood framing requires regular maintenance, and because it is bulkier than aluminum, it casts more shadow on greenhouse plants. This type of greenhouse is also difficult to add onto as a garden expands.



A wood frame with plastic glazing

A few available options for the frame of my structure

There will be load on the frame so a sturdy material will need to be selected



simple and sturdy but may not go with the galvanized steel or the mesh  
An aluminum frame with polycarbonate glazing  
Irrelevant as I am not building a greenhouse Regular building a greenhouse Maintenance is a major drawback

## ALUMINUM

**Advantages:** The foremost advantage of aluminum framing is that it is low-maintenance. It is strong and lightweight, lasts longer than wood, and can easily accommodate different glazing systems and connectors. Aluminum is used for most greenhouse kits (see page 78) and can be powder-coated or anodized in various colors, usually brown, green, or white. Kits are typically easy to assemble and come with predrilled holes for attachments. Some manufacturers offer thermally broken aluminum framing, which sandwiches a thermal barrier between two layers of extruded aluminum to decrease heat loss.

**Disadvantages:** Because aluminum loses heat at a faster rate than wood, this type of greenhouse is more expensive to heat. In addition, a cheaply made frame can be too flimsy to withstand high winds or heavy snow. Aluminum framing can also present condensation problems.

## GALVANIZED STEEL

**Advantages:** Galvanized steel framing, mostly used for commercial greenhouses, is extremely sturdy, strong, and durable.

**Disadvantages:** Steel greenhouses are very heavy and expensive, not just to build but also to ship. Galvanized steel is subject to rusting if it is scratched, and the rust-resistant coating can eventually wear off.



A PVC plastic tube frame with plastic sheeting

cheap but is very weak and  
the structure I am building  
will not be temporary or  
portable

## PVC (POLYVINYL CHLORIDE)

**Advantages:** Inexpensive and easy to assemble from a kit, PVC framing is a good choice if you are just trying your hand at greenhouse gardening. It is lightweight, does not rust, and is ideal for portable or temporary greenhouses.

**Disadvantages:** High winds can easily damage PVC, so it's suitable only for small greenhouses, and glazing choices are restricted to plastic sheeting.

## GLAZING & COVERS

Greenhouse glazing falls into two categories: glass and plastic, each with strengths and weaknesses. The ideal covering lets in maximum light and deters heat loss. It should also be durable and require minimal maintenance.

## GLASS

**Advantages:** Glass is the material traditionally used for greenhouse glazing, and it remains popular today. It offers excellent light transmission, resists degradation due to ultraviolet (UV) light, and has a long lifespan. It is also nonflammable and, when layered, retains heat well. Double- and even triple-pane glass is available.

**Disadvantages:** Uninsulated single-pane glass offers very little heat retention. Glass is also breakable—playing children, tree branches, and hail are all threats to a glass greenhouse. For safety, tempered glass is recommended because it shatters into small, rounded “pebbles” rather than sharp, jagged pieces. Glass is heavy and requires a strong, square frame and foundation or the glass can crack. Although glass offers excellent light transmission, the light is harsh and direct, not diffused, and can easily burn plants. Insulated glass can be costly.

## POLYCARBONATE

**Advantages:** Polycarbonate glazing is light, strong, and shatter-resistant, and when layered, it retains heat better than glass. It is available in corrugated, double-, and triple-wall panels. Corrugated polycarbonate provides excellent light transmission—equal to that of glass—but poor heat retention. Triple-wall polycarbonate (16 mm) offers excellent insulation but reduced light transmission. Polycarbonate is impact-resistant and long-lasting (15 years or longer). Unlike glass, it transmits diffused light, which eliminates shadows on plants and protects them from burns.

Using twin- or triple-wall polycarbonate roof panels can increase heat retention while still allowing good light transmission.

**Disadvantages:** Polycarbonate scratches

easily, and double- and triple-wall panels reduce light transmission. As with other plastic coverings, polycarbonate is subject to condensation, although it can be coated to reduce this problem. Like glass, it can also be costly, especially layered panels.

## ACRYLIC

**Advantages:** Acrylic offers clarity and light transmission similar to glass but is lightweight and more impact-resistant. Acrylic panels are UV-resistant and can easily be molded. The material is less expensive than polycarbonate and can be layered for extra strength and heat retention. It is easy to cut and can be shaped with ordinary hand tools. Like polycarbonate, it can be coated to reduce condensation.

**Disadvantages:** Acrylic is not commonly used in home greenhouses. Less expensive types of acrylic can yellow, and even UV-coated acrylic will eventually need replacement. Unless it's coated, it suffers from condensation problems.

## FIBERGLASS

**Advantages:** Fiberglass has improved since its debut as a replacement for glass. It is now more UV-resistant and resists yellowing. Its light transmission is almost equal to that of glass, but unlike glass, fiberglass diffuses light. It also offers better heat retention than glass and is much more durable. Good-quality fiberglass can last 20 years.

**Disadvantages:** Like other plastics, fiberglass tends to have condensation problems. If corrugated fiberglass is used, dirt can accumulate in the valleys, which detracts from its appearance. Inexpensive fiberglass may have a lifespan of no more than five years.