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Center for Smart Agriculture

Applied Hi-Tech Horticulture



Module 1: Introduction to Hi-Tech Horticulture
Session 7: Types and uses of glazing materials in greenhouse



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Glazing Classifications

Type I

Thin films, 2-8 **mills** .002 - .008” inch
Polyethylene, EVA, PVC films, and
polyester

Type II

Flexible plastics
FRP, polycarbonate, acrylics, plastic
fused to glass

Type III

Rigid materials – float glass, tempered
class, rolled patterned glass





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Glass:

Advantage: Glass lets in most of the light at 90% or above

Glass transmits and holds more light than alternative plastic panels

Glass is easily sourced and is sustainable

Glass last a long time

With glass, there are plenty of upcycling opportunities

Disadvantages of Glass:

Heavy

Fragile

Needs a strong framework

Skill is required to assemble

Takes longer to assemble





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Acrylic:

An alternative to glass is acrylic and it is easy to cut to size

Advantages of Acrylic

- ✓ Lower price
- ✓ Lightweight and easy to transport
- ✓ Durable with good impact strength
- ✓ Acrylic insulates better than glass
- ✓ High light transmittance at around 85% when new and can be manufactured to stay clear for longer
- ✓ Easy to install

Disadvantages of Acrylic:

- ✓ Energy use in the manufacture
- ✓ Short lifespan
- ✓ Not readily biodegradable and lack of recycling uses





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Plastic Films

Flexible plastic films, including polyethylene, ethylene tetrafluoroethylene (Tefzel), polyvinyl chloride (PVC), and polyester, have been used for greenhouse coverings

- ✓ Plastic film is currently the leading greenhouse covering for two reasons.
- ✓ First, film plastic greenhouses with permanent metal frames cost less than glass greenhouses.



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Polyethylene Film

Polyethylene, sometimes also known as polythene or poly, has always been and still is the principal choice of film plastic for greenhouses in most of the world.

- ✓ The major advantage of polyethylene film plastics is cost, which are considerably less expensive to purchase and install than glass.
- ✓ Polyethylene film is very light in weight. Thus the film does not require a structural support system.



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Tefzel Film

The most recent addition of greenhouse film plastic covering is Tefzel T2 film (ethylene tetrafluoroethylene).

The light transmission is 95 percent and is greater than that of any other greenhouse covering material.

A double layer has a light transmission of 90 percent.



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Polyvinyl Chloride (PVC) Film

- ✓ Polyvinyl chloride has a number of properties that make it desirable as a covering.
- ✓ PVC has excellent resistance to wear.
- ✓ Oxidation has little effect on PVC, but heat and light break down PVC film in 2 to 3 years.
- ✓ PVC film reduces the transmission of long wavelength infrared radiation, resulting in less heat loss at night using PVC as a covering than using polyethylene.





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