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# Center for Smart Agriculture

## Protected floriculture



**Module 2: Components Pre-requisites for  
protected cultivation of flower crops**

**Session 7: Different components of protected  
structure**



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## **Components of Protected structure**

Wood

Glass

Galvanized iron

PVC films

Polyethylene films

Tefzel T2 film

FRP rigid panel

Acrylic & polycarbonate  
rigid panel



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# Wood

- Generally used for low cost polyhouses used for making frames over which the polythene sheet is fixed.
- The commonly used woods are pine and casuarina which are strong and less expensive.
- In tropical areas, bamboo is often used to form the gable roof of a greenhouse structure.
- Red wood or cypress (natural decay resistance woods) can be used in desert or tropical regions.



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Cont.....

- Wood must be painted with white colour paint.
- Wood must be treated for protection against decay.
- Chromated copper arsenate and ammonical copper arsenate are water based preservatives that are applied to the wood that may come into contact with the soil.





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# Galvanised iron (gi), aluminum, steel and reinforced cement concrete

- Generally used for side posts, columns and purlins.
- In galvanising operation, the surface of iron or steel is coated with a thin layer of zinc to protect it against corrosion.
- The commonly followed processes to protect against corrosion are:
  - (i) Hot dip galvanising (hot process) process
  - (ii) Electro-galvanising (cold process) process



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**Galvanised iron**



**Greenhouse with steel structure**



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# Glass

- Glass has been traditional glazing material all over the world.
- Widely used glass for greenhouse are:
  - (i) Single drawn or float glass
  - (ii) Hammered and tempered glass





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# Polyethylene film

- Polyethylene is principally used today for two reasons-
  - (i) Plastic film greenhouses with permanent metal frames cost less than glass greenhouses.
  - (ii) These are popular because the cost of heating them is approximately 40% lower compared to single-layer glass or fiber glass-reinforced plastic greenhouses.





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**Polyethylene film**



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## Disadvantages

- These covering materials are short lived compared to glass and plastic panels.
- UV light from the sun causes the plastic to darken, thereby lowering transmission of light, also making it brittle, which leads to its breakage due to wind.
- Condensation causes disease development, development of water logged condition and oxygen deficient inside the greenhouse.



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# Polyvinyl chloride film (pvc films)

- UV light resistant vinyl films.
- Guaranteed for 4 to 5 years.
- Vinyl films tend to hold a static electrical charge, which attracts and holds dust. This in turn reduces light transmittance unless the dust is washed off.



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**Polyvinyl chloride film (pvc films)**



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# Fiberglass-reinforced plastic (FRP) rigid panel

## Advantages

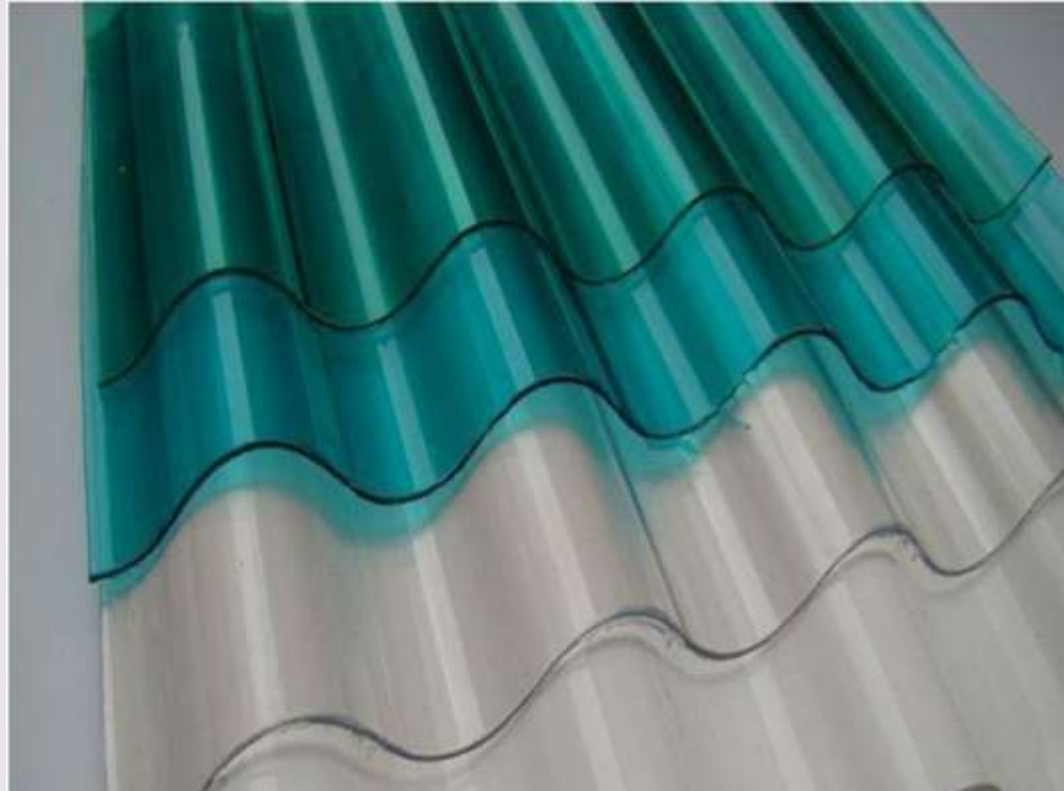
- (i) It is more resistant to breakage by factors, such as hail or vandals.
- (ii) The light intensity is rather uniform throughout the greenhouse in comparison with a glass covering.
- (iii) FRP has advantage over glass is that, it cools easily.
- (iv) FRP greenhouses require fewer structural members since sash bars are not needed.

## Disadvantages

- (i) The panels subjected to etching and pitting by dust abrasion and chemical pollution.



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**Fiberglass-reinforced plastic (FRP) rigid panel**



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# Acrylic and polycarbonate rigid-panel

- These panels have been available for about 15 years for greenhouse use.
- The panels have been used for glazing the side and end walls of plastic film greenhouses and retrofitting old glass greenhouse.
- Acrylic panels are highly inflammable.
- Acrylic panels are popular due to their higher light transmission and longer life.
- These panels are also available with a coating to prevent condensation drip.



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- Polycarbonate panels are non-flammable.
- Polycarbonate panels are preferred for commercial greenhouses due to -
  - (i) lower price
  - (ii) flame resistance
  - (iii) greater resistance to hail damage
- These panels are also available with a coating to prevent condensation drip and also with an acrylic coating for extra protection from UV light.





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**Acrylic and polycarbonate rigid-panel**



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**THANK YOU**