

**-:Guidelines for Handling & Installation of the Greenhouse covering film:-**

**A. Instructions for storage of film:**

- 1 The films must be stored on a smooth surface in horizontal position in an enclosed shade, out of exposure to direct sunlight.

**B. Guidelines for greenhouse structure:**

- 1 Metal tubes: The metal tubes must be clean, polished and preferably zinc galvanized. As higher concentration of Fe is detrimental to the life of the film and Fe acts as a photo-oxidant and pro-degrading agent. The angles & radius of the tubes should be well designed to give uniform tension across the film. The structure should give enough support so that there is no flapping of the film.
- 2 Wooden framework: The wood should be devoid of any sharp or protruding edges and must have a smooth surface. Before selecting the type of wood, one should ensure that it does not excrete any substance, which is detrimental to life of the film. (E.g. pine wood must be avoided)
- 3 Ensure that the framework is sturdy especially at the joints. If any components are loose or broken they ought to be rectified.

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**C. Preparations before installation of film:**

- 1 It is recommended that slats/locking channels/grippers made from aluminum be used instead of the ones made from PVC. Enough slats/grippers must be provided to be able to follow the contour of the arches avoiding sharp edges/bends. They must be tightened so that they do not move against the film.
- 2 All metal or wooden parts that are in contact with the film must be painted with a white acrylic-based paint.

**D. Installation of the film:**

- 1 While installing the multilayer film, first ensure that the respective layers are facing the right direction (i.e. inside or outside) as shown on film or instruction supplied along with the film.
- 2 It is advisable to keep a sample piece of 1 m<sup>2</sup> (One sqm.) along with the manufacturer's identification mark.
- 3 The film should be installed in early hours of morning on mild days when the ambient temperature is cooler (15-23oC) and there is no wind. When positioning the film it should be tensioned tightly enough so that there is no flapping of film on windy days.

- 4 Attention should be paid that proper care is taken so that the film is not damaged or torn during installation. The ideal method is to place film on the top and unroll along the length of greenhouse any other method should be avoided.

**E. Protection of film:**

- 1 White acrylic-based paint must be applied on the film wherever it comes in contact with the construction frame of greenhouse. If not, the film becomes warmer in the contact areas and is prone to faster degradation. Also the metal contact fastens the oxidation process leading to early degradation. It should be always checked that the Iron (fe) residues on the film do not exceed 50 ppm at any given time.

**F. Ongoing maintenance of film:**

- 1 Any holes or tears must be repaired immediately with a special adhesive tape (non PVC) designed for application in polyethylene films.
- 2 Whenever required the film, should be re-stretched between the seasons or after strong winds so as to maintain the even tension of the film.

**G. Ventilation and irrigation:**

- 1 The greenhouse must be suitably aerated, especially in summer season even if it is empty. This is to prevent overheating of the greenhouse. The area provided for ventilation should be at least 20% of the ground surface.
- 2 The greenhouse must be irrigated once a week even when there is no cultivation within so as to maintain the humidity within the structure. A drastic drop in relative humidity has a negative effect on the life of film.

**H. Crop Protection Chemicals (CPC):**

1. CPC's based on Sulphur, chlorine or halogens have a catalytic effect on the degradation process of film. Hence any direct contact of CPC's with the film should be avoided. However to better ensure the stability the following limitations with respect to the usage of chemicals must strictly adhered to.

Chemical name	Spraying limit	Residual limit
Sulphur	1500 ppm	500 ppm
Chlorine	150 ppm	150 ppm