



## Greenhouse Film Installation Guide

Klerks' greenhouse film is manufactured as a high quality 3 layer co-extruded film. Our films are quality tested to ensure its conformance to rigorous specifications. To take full advantage of its features and avoid early failure, please follow the guidelines below.

### A. Transportation and storage

Transport and handle the film with care to avoid mechanical damage. Upon receiving poly, check the film carefully for any damage that may make the film unusable, or creates a risk of failure. Please inform your distributor immediately of any quality issue.

Store the rolls in their original packing on a smooth, dry surface, in a cool protected location. Greenhouse film should always be stored horizontally. Avoid exposing stored film to direct sunlight and rain.

### B. Installation

#### 1. Recording and Installing Film

We recommend that growers keep a record of each installed roll, noting the production code, found printed down the length of the roll, along with the packaging end label. Record greenhouse locations and installation dates to help determine the need for the next recovering cycle.

Installation should preferably take place early in the morning when wind speed is below 5 MPH, and temperatures are between 59 –70 degrees Fahrenheit.

#### 2. Preparation of the Greenhouse Structure

##### a. General Guidelines

Most degradation of greenhouse film occurs initially with film coming in contact with greenhouse frame members with elevated temperatures. Contact surface areas can be protected from heat buildup by applying white water soluble paint or applying white foam tape to their upper surfaces. Applying white latex paint on the film layer within 2" of poly lock is also helpful in reducing excessive heat buildup.

##### b. Wooden Structures:

Wood surfaces should be smooth with nails and abrasions removed. Polyethylene should not come in contact with wood that is exuding pitch or resins.

##### c. Metal Structures:

All metal parts coming in contact with poly should be rust free and smooth. It is recommended that the metal frame members be hot galvanized. Greenhouse frame design should allow the film to be firmly attached to the greenhouse, insuring that the greenhouse film will not excessively wear on frame members. Do not use PVC poly lock connectors. PVC releases free chlorine and plasticizers that tie up the films ultra violet inhibitor and results in shortened film life. Preferably aluminum or polypropylene poly lock should be used to secure film on the structure.

#### 3. Film Installation and Double Layer Air Inflation

##### a. Unrolling the Film:

When unrolling the film, secure the loose end of the roll and unroll by carrying the whole roll. This prevents dragging film over sharp objects that could tear or puncture the poly.

##### b. Stretching the Film on the Greenhouse Structure

Stretch the film gently and evenly over the structure, pulling out all the wrinkles. Over stretching might result in subjecting the film to tearing during the winter months, as the film shrinks at lower temperatures. After installation, the film may loosen as the temperature rises, and may need to be re-stretched. Re-stretching may also be necessary between seasons, or after strong winds.

##### c. Air Inflation of Double Layer Poly

The best insurance policy for your greenhouse is to invest in a manometer to measure the pressure between double layer poly installations. This will allow you to know when your film is too tight resulting in over stretching, or too loose resulting in flapping and excessive rubbing on stress points. Manometer air pressure between the two layers should be .2" for hot days to .45" on cold and windy days. A good manometer to use to measure air inflation is Dwyer Mark II model numbers 25 or 40. They can be obtained through a local horticultural distributor or contacting Dwyer Instruments at 219-879-8000.



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Installing an air deflector across the inflation fan is will keep air from damaging the outer film layer. Growers can also apply tape to the outside layer of film opposite the air inflation kit. We recommend using outside air for inflating double layer poly because it has less moisture and less chemicals which can come in contact with the film. Air inflation of double layer greenhouses structures should continue year round, including during non growing periods. Keeping the film inflated will prevent film damage due to mechanical abrasion, and reduced heat build up.

Avoid over inflation which stretches film on hot days. When the film cools, wrinkles form on inside film layers that interfere with condensed water flowing to the ground or gutter. Taut and smooth film surfaces will maximize water runoff. To maximize runoff, a minimum 3% slope is need in film installations.

### C. Maintenance

#### 1. Tears and Punctures

Promptly repair any holes or tears with adhesive tape designed for use with clear greenhouse polyethylene films.

#### 2. External Shading

Using shade paints on the exterior surface of the film can provide cooler greenhouse temperatures during the warm spring and summer growing seasons. Latex based shade paint can be applied by brush, roller or spray. Spray applications are generally the most efficient, and result in a uniform shade density and more even wear. For a denser shade, several light, more diluted coats are recommended over a single, concentrated heavy coat.

#### 3. Controlling Greenhouse Temperatures

In order to prevent in-house temperatures from rising to excessive levels, double layer air inflation should continuous and greenhouse well ventilated.

#### 4. Avoiding Excessive Humidity

Greenhouse relative humidity is influenced by many factors: plant density and maturity, watering practices, floor drainage, use of concrete or other ground covers that influence water evaporation, and the exchange of inside hot moist air with cooler dryer outside air. The use of drip control films can help reduce water droplet adhesion, caused by water condensing on the inside layer. The film's drip control additives migrate to the film surface and cause the condensed water to flow in thin layers, sheeting water to the ground or gutter.

### D. Chemicals harmful to the life of Greenhouse Film

Avoid film contact with PVC products that can release plasticizers" and free chlorine, which deteriorate greenhouse films by reducing the activity of the film ultra violet inhibitors. Burning sulfur in the greenhouses for disease control reduces film life significantly and voids a greenhouse film warranty. The chemicals listed below are known to reduce film life by deactivating ultra violet systems used to protect films from UV degradation. Never spray chemicals directly onto greenhouse film.

Harmful Chemicals to Avoid : Banrot, Bromoxynil, Captan, Chloropicrin, Chlorine gas, Chlorine bleach, Chlorpyrifos, Cooper Sulfate, Diazinon, Dientochlor, Dithiocarbmates, Fluvalinate, Formetanate, Hydrochloride , Iprodione, Mancozeb, Metham Sodium, Methomyl, PNCB, Silver Thiosulfate, and Vinclozolin.

### Limit of Liability

Manufacturer's liability in case of any damage is restricted to a discount on the value of the damaged film, according to our Limited Warranty. In no event shall the manufacturer be liable for any special, consequential or indirect damages, such as loss of profit or cost of substitute materials in case of any kind of failure.

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