

Glass Selected For The Horticultural Environment

CONSERVAGLASS PLUS™ is a desirable glass selection for plant growth because its properties optimize sunlight energy. Plant growth benefits by the elimination of extreme light conditions created by using clear insulated glass. The most *important* effect of glass products on plant growth is their influence on *photosynthesis*. Photosynthesis is the plants ability to convert sunlight into food with the resultant growth in the plant tissues.

Light characteristics: quality, intensity, & duration all play specific roles in plant growth. However, when growing plants, these light characters need to be considered, along with the other environmental factors of temperature and humidity.

Light quality, which is effective in driving photosynthesis, falls within the spectral range of 400 to 790 nanometers. This “spectral range” is the visible light. All of these aspects (characters) of light influence plant growth one way or another.

Intensity of light refers to the amount of light, or brightness of light. Intensity is measured in foot-candles. As light intensity increases so does temperature. This necessitates more frequent watering of plants, or increased cooling in the greenhouse air space. Most sunlight energy converts to heat energy as it contacts the airspace and objects in the greenhouse.

Although clear greenhouse glass is designed to admit the maximum amount of light, there is not enough light intensity available during the winter months in the North Latitudes, nor is the duration long enough for optimum plant growth. Conversely, in the summer months, the noonday sunlight is too intense, and the duration too long for optimum growth.

What, then, are the recommended foot-candles for satisfactory plant growth? Keep in mind that ordinary office lighting provides 200 *ft-c* at desk level. In general, 200 *ft-c* of light will prove adequate for good plant growth. In the Northern Latitudes, the three dark months of December, January and February will average 700-1500 *ft-c*. For example, New York during the three dark months has very low light intensity, less than 1000 *ft-c*. During the summer, New York has registered intensity in excess of 10000 *ft-c*.

Remember that the higher the light intensity in the greenhouse, the greater the solar input, or heat load. There is a straight-line correlation between higher light intensity and higher temperatures.

Controlling the intense heat buildup before damage is done to the plant is paramount. Intense heat creates a hardship on plant growth. Not only are the extreme high daytime temperatures critical, but the difference between day and night temperatures are equally as critical.

Temperature rangers varying 5° - 10°F, between day and night are recommended for adequate plant growth. A fluctuation of 2°F between day and night is most favorable. It is obvious therefore, that there is a need to control the amount of heat energy absorbed into the greenhouse in the daytime to more closely achieve this night temperature differential. Clear glass transmits 2.4 times more radiant heat than MC-22. With the higher radiant heat transmissions, the need to ventilate, or cool, the airspace makes another demand on your mechanical systems.

Duration of light is the lengths of time plants are exposed to light, regardless of the intensity. Since wintertime is stingy with light duration and summer too generous, a compromise needs to be

found. Selection of plants that are “tuned” to the specific greenhouse environment will produce optimal growth. Minimum light requirements for selected plants are available in other publications.

Clear insulated glass allows 81% of *visible* light to pass through and 69% of solar radiation. This glass has an R-2 rating.

MC -22 /Argon/Clear CONSERVAGLASS PLUS™ insulated glass allows 22% of visible light and 10% of solar radiation to pass through to the greenhouse airspace. The glass has an R-4 rating.

The MC-22 needs three times the light of clear glass to transmit the same foot-candles. Using MC-22 CONSERVAGLASS PLUS™ plant growth will be slowed during cloudy winter days, but not adversely affected. In the spring, summer & fall, when light intensity is much higher, MC-22 is more desirable than clear glass because MC-22 drastically reduces radiant heat gain in the airspace of the greenhouse, while at the same time allowing copious amounts of foot-candles. Above 3000-5000 *ft-c* there is not much increase in *photosynthesis*. With clear glass there is a very short time during daylight before reaching, and exceeding, the recommended foot-candles. The greenhouse manager’s effort is to reduce light intensity before plant leaves burn.

Temperatures above 85°-95°F reduces photosynthesis. As day temperatures increase rapidly, the temperature balance between day and night quickly gets critical, again putting a demand on the venting and cooling mechanisms. Such a change in the environment is never “smooth” with mechanical devices.

Choose MC-22 CONSERVAGLASS PLUS™ glass for multiple duty in greenhouse growing. Avoid the pitfalls of using clear insulated glass. These features (duties) are constantly happening regardless of man’s presence in the greenhouse.

- 1. Provides adequate foot-candles for the vast majority of time.**
- 2. Reduces the need for frequent cooling and watering.**
- 3. Reduces the premature and frequent venting, resulting in heat loss.**
- 4. Provides for moderate temperature changes. Reduces the day and night differential.**
- 5. Eliminates leaf scorch. Hanging baskets can touch the roof glass.**
- 6. Eliminates leaf freeze in winter. Provides full utilization of greenhouse space.**
- 7. Eliminates cold spots and drafty areas.**
- 8. The high R-Value and radiant heat reflectivity greatly reduces heating requirements.**
- 9. Reduces the need for supplemental lighting because desirable light quality is transmitted while light intensity is controlled.**

It is important to note that hobby greenhouse manufacturers keep their initial costs low by not offering a high performance glass, but make up the price difference with after-market accessories to rectify the selection of inferior greenhouse glass.