

# Helpful Glazing Hints

When it comes to greenhouse glazing, oftentimes growers have many different questions. The National Greenhouse Manufacturers Association is available to help growers answer these questions.

By Denise Calabrese

You've got questions, and the experts at the National Greenhouse Manufacturers Association have the answers. Here are some frequently asked questions related to glazing for greenhouse structures.

## What is total solar radiation?

It is the entire energy spectrum (all wavelengths) created by the sun.

## What are UV absorbers?

They are chemical compounds with the ability to selectively absorb UV radiation. When incorporated into plastics, they reduce the degrading effects of ultraviolet light.

## How is the energy efficiency of glazing rated?

Most manufacturers report "U" and "R" values. The "U" value is the overall rate of heat or energy transfer: the lower the value the more resistance to heat transfer. "R" value is the reciprocal (1/U) and is commonly used in consumer advertising and reported on a per inch basis. The higher the value the more resistance to heat transfer the material is.



*All glazing materials are available with formulations that can reduce heat gain and light transmission.*

**Is there a difference in energy efficiency in different glazing systems?**

Air infiltration is a significant factor in heat loss, but is not a part of the “U” value calculation. Glazing systems, or the way in which the glazing is attached, can vary significantly in regards to heat loss due to air infiltration. Gasketed systems are tighter, restricting air infiltration and therefore are more energy efficient than non-gasketed systems.

**What is anti-drip and why is anti-drip important?**

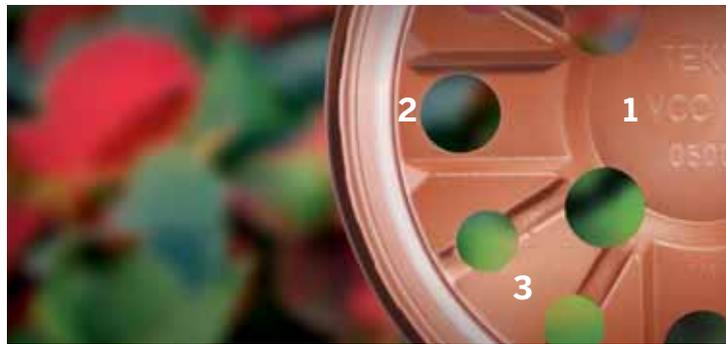
Anti-drip treatments lower the

co-efficient of friction on the surface of the material. This slippery surface ensures that the condensation sheets off in an even film and is not allowed to form into a droplet. The anti-drip feature reduces the incidence of moisture dependent diseases and damage to delicate crops. It ensures high light quality during the early morning sunrise hours.

**Is there a covering made that will reduce heat-gain in a greenhouse?**

All greenhouse glazing materials are available with formulations or tints that can reduce heat-gain and light transmission.

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**Do government regulations apply to greenhouse glazing materials?**

Yes, OSHA governs the installation of greenhouse coverings and permits are required depending on local zoning and codes.

**What are the characteristics of the most commonly used glazing materials?**

Acrylic is the most weatherable clear thermoplastic. It has the highest light transmission of the clear multi-wall panels, which allows for energy efficiency. Acrylic is not affected by UV, is shatter resistant and has limited impact strength.

Fiberglass-reinforced plastic (FPR) is one of the least weatherable of the glazing options. It is also the most flammable of the rigid glazing materials.

Glass is typically annealed or tempered (tempering increases impact strength). Three mm is the most common thickness used.

Impact Modified Acrylic is the newest clear weatherable thermoplastic. It is not affected by UV, has 10 times the impact strength of acrylic and is ideal for locations where hail is a concern.

Polycarbonate is a clear thermoplastic polyester. It offers the highest impact strength when new. It is the most fire resistant of all the plastic glazing materials. It is available in either single pane corrugated or multi-wall panels. Corrugated panels are the least energy efficient of the glazing materials while multi-wall panels are some of the highest.

**Are there specific tests for various types of glazing materials?**

Most glazing materials are manufactured to meet specific industry standards for strength and light transmission according to ASTM (Association of Standards and Test Methods) guidelines.

**What is light transmission and how is it measured?**

Light transmission is the amount of solar energy which is able to pass through a given substance of glazing material. Light transmission can be objectively tested according to ASTM tests. The unit of measurement for light is nanometers (nm). The entire solar spectrum contains various ranges of light.

**Ultraviolet Light**

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### Visible Light and PAR light

Colors occur in the sequence seen in the rainbow, ranging from violet through blue, green, yellow, and orange to red. PAR (photosynthetically active radiation) is the visible portion of the spectrum and is regarded by many horticulturists as being critical for proper plant growth and development.

### Near-Infrared

Near-Infrared is thermal solar radiation which adds to the heating of the greenhouse.

### Medium and Far-Infrared

Far-infrared energy is the energy reproduced by the mass inside the greenhouse. Transmission rate of far-infrared through a covering affects the heat retention capability of a greenhouse. Far-infrared transmission varies widely among different types of coverings and should be closely evaluated.

### How do I find out more about glazing?

You can find out more about glazing by contacting the NGMA for a free copy of the glazing standards or download them off the web: [www.NGMA.com](http://www.NGMA.com).

*The National Greenhouse Manufacturers Association (NGMA) is a professional trade organization for the manufacturers and suppliers of greenhouses and greenhouse components. NGMA members are committed to building greenhouses with a level of professionalism not found anywhere else. To learn more about NGMA, please visit [www.ngma.com](http://www.ngma.com).*

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