Glass Other Considerations

Module #3C
Product Knowledge Training
Home Center
Other Energy Control Options

Argon Gas

- Argon gas is a colorless and harmless inert gas that is injected in the airspace of an insulating unit to improve energy efficiency and increases U-values.
- Argon’s thermal conductivity is 30% lower than that of air. The lower conductance of argon is due to the fact that its molecular mass is greater than that of air, and there are fewer molecular collisions. Few collisions result in less heat transfer, which also results in a lower U-Value.
- The second reason for the use of argon are the cost and stability. Because argon is the most abundant inert gas, it is inexpensive compared to other gases or man-made compounds. Since argon is completely inert and very pure in commercial grades, there is no concern over chemical reactions with other materials used in an insulating glass unit.
- Argon will improve the thermal performance of a Low-E unit by 5 points, at a fill rate of 90% or better. For example, an IG unit that has a U-Value of .30 can be improved to .25 with the addition of argon gas.

Note: For Milgard products with argon or krypton gas-filled insulating glass units, Milgard injects the gas at that time of manufacture. The gradual dissipation of inert gas may occur naturally over time and is not a defect. Other than gas loss due to seal failure, the Milgard warranty does not cover the gradual dissipation of inert gas or the amount of inert gas remaining in the Milgard products a any time after manufacture. Also not available with capillary tubes (the argon gas would leak out).
Ultra Violet (UV) Rays

UV Concerns
- Ultra Violet light is made up of invisible rays of solar radiation at the short-wavelength end of the light spectrum.
- Ultra Violet rays cause fading of paint finishes, carpets, furniture, and fabrics, as well as discoloration of some other materials.
- Heat, and other wavelengths of the sun’s light, humidity will also cause fading.
- No glazing combination can completely eliminate fading.
- UV can be reflected off of other outdoor surfaces; not only by direct sunlight.

Solutions for UV Glass:
- Laminated glass cuts 99% of the sun’s UV rays.
- SunCoat® Low-E reduces UV up to 84%.
- Low-E/Tint combinations reduce UV rays.
- Bronze or Grey tinted glass reduces UV rays.
- SunCoatMAX® can greatly reduce UV damage by 95%.

Other Considerations
- High altitudes actually face a greater UV challenge than our hot climate areas. For example, Telluride, Colorado has one of the worst UV indexes in the country at 10,000 ft above sea level.
- Keep in mind that factors other than UV light contribute to fading, so do not make the statement “that by using SunCoat®, it will prevent fading.”
Glass Facts

Glass Limitations
The larger the window, the thicker the glass needs to be for it to be strong enough to be stable.

Glass Considerations
• When using tints, specify the same thickness of glass within any single viewing area or room. The thicker the glass – the darker the tint
• All Low-E products have a slight color, and in certain light conditions can appear reflective.
• A tint or Low-E product may change the color appearance of grids so that the grids don’t match the frame color.
• Pay close attention to orientation of the home. The South and West-facing walls will have the greatest exposure to the sun.
• Walls, overhangs, shades or even plantings can also help to block out the heat of the sun.
• Any windows being shipped to an area with an elevation gain of 2500 + feet may require breather tubes.

<table>
<thead>
<tr>
<th>Glass Thickness</th>
<th>Max unit size Dual Glazed</th>
<th>Max unit size Single Glazed</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/32” (SS)</td>
<td>Up to 12 s.f.</td>
<td></td>
</tr>
<tr>
<td>1/8” (DS)</td>
<td>12-25 s.f.</td>
<td>Up to 12 s.f.</td>
</tr>
<tr>
<td>3/16”</td>
<td>25-40 s.f.</td>
<td>12-24.9 s.f.</td>
</tr>
<tr>
<td>1/4”</td>
<td>40 s.f.</td>
<td>25-40 s.f.</td>
</tr>
</tbody>
</table>

- Some plants don’t provide insulated units over 40 sq.ft.
- Maximum thickness is 1/4”.
- Field glazing may be required. See your Sales Manager or Plant Manager for specific location limitations.
**Noise Reduction**

Sound transmission occurs whenever there is an air-space. It is important to note that sound reducing glazing systems are less effective if any air leaks exist around glass, doors, vents, or other areas. Sound will always travel through the weakest component. There are two fundamental considerations, which come into play when measuring the reduction of sound through windows, walls, or other building components:

**Sound Transmission Loss (STL)** – Indicates the effectiveness of a window or wall in reducing exterior sounds and are measured in decibels. When measuring the ability of a window or wall to reduce outdoor sounds such as traffic noise, STL's are generally figured in the frequency range of 125 – 40,000 Hz. STL's are frequency dependent.

**Sound Transmission Class (STC)** – Measured in decibels, STC is an average value associated with a material’s effectiveness in reducing sound. An STC rating is a quick reference number for the entire frequency band, and is designed to measure interior noises at levels most common to human speech (500Hz – 2,000Hz). *The higher the value, the greater the reduction of sound.*
Factors Relating To The Effectiveness of Sound Control

There are three physical properties of glass that impact its effectiveness in sound reduction:

1. **Mass**: Sound reduction will increase with increased glass thickness due to the greater mass involved.

2. **Damping**: The reduction of sound due to the ability of a material to absorb sound rather than allowing it to transfer through. Laminated glass, with its polyvinyl butyral interlayer, is an example of a material effective in absorbing sound.

3. **Stiffness**: Refers to the ability of a glazing system to bend or wave with the sound motion. 1/8” glass will bend or wave with sound, whereas 1/4” is likely to resonate or vibrate.

Example:
1/4” over 7/32” laminated glass provides the following benefits: 1/4” provides the mass, which reduces sound transmission. The 3/32” lites, which make up the 7/32” laminated glass, have the ability to bend rather than vibrate. The polyvinyl butyral interlayer in the laminated glass provides the damping or absorbing of sound. **This glazing option benefits all three physical properties of glass: Mass, Damping, and Stiffness.**
Safety Glass Options

Tempered Glass
Tempered glass is a safety glass, strengthened through the process of heating, and then rapidly cooling the surface of the glass, which creates a tensile strength that aides in the glass to resist breakage to a certain point. It is often used as a safety glass because when broken, it shatters into tiny pebble-sized particles, not shards. It is about four times stronger than annealed glass. Wind pressure, foreign object impact and thermal stress or other applied loads must first overcome the surface tension of tempered glass before there is a possibility of breakage. Tempered glass is available in most glass types, colors and thicknesses, but the glass must be at least 1/8” thick and cut to size prior to being tempered. All of Milgard’s obscure glass is at least 1/8” thick and is therefore temperable.
Safety Glass Options

Laminated Glass
Laminated glass is produced by permanently bonding two pieces of glass together with a tough plastic interlayer (Poly Vinyl Butyral- PVB) under heat and pressure. Once bonded together, the sandwich behaves as a single piece. Like a car windshield, the interlayer is invisible when viewed through the glass, and with glass on either side, the finished lite is indistinguishable from plain glass when installed. Laminated glass is usually produced from annealed glass, but Heat Strengthened or Tempered glass can be used when special performance needs are present. Standard Laminated glass is 7/32” thick, including a 1/32” Poly Vinyl Butyral interlayer.

Benefits:
▪ Laminated glass can be used as a safety glass.
▪ Laminated glass is highly effective in reducing noise.
▪ It eliminates 99.5% of ultraviolet rays, providing the highest degree of protection from the sun for home furnishings.
▪ If the glass is broken, the PVB interlayer holds the glass in place and can continue to provide security until the unit is replaced.
▪ Laminated, annealed glass can be cut or drilled.

Laminated Glass is required in the following sloped glazing application (such as a skylight) under these conditions:
▪ If the area of each pane (single glass) or unit (insulating unit) exceeds 16 square feet.
▪ If the highest point of the glass is greater than 12 feet above any walking surface or other accessible area.
▪ If the nominal thickness of each pane exceeds 3/16 inch
Other Glass Options

**Heat Strengthened Glass**
Heat Strengthened glass is produced in much the same way as tempered glass, but with lower levels of surface compression, 3500 – 7,500 psi. Heat Strengthened Glass is two times stronger than annealed glass. However, Heat Strengthened glass breaks like annealed glass and is therefore not a safety glass.

**Performance of Heat Strengthened Glass**
- Provides necessary resistance to thermal stress when combining high performance glazing materials such as tinted glass and Cardinal Low-E in an insulating unit.
- Allows the interlayer of laminated glass to adhere more evenly because of a flatter finish surface, when producing Heat Strengthened laminated glass.

Note: Heat-strengthened glass availability is location-specific.
Other Glass Options

Wire Glass

**Wire Glass is NOT a safety glass.** It is composed of a wire mesh sandwiched by two pieces of glass and fused together. It is not considered safety glass because if your fist was to go through it, there would be no safe way to remove it.

**Note:** Milgard doesn't offer wire glass. Heat-strengthened glass availability is location-specific.
Decorative & Obscure Glass

**Obscure**
Obscure glass gets its name from the ability to screen out, or obscure, visibility through the glass while letting light come through. A typical obscure glass application would be a bathroom or shower where privacy is desired. The degree of diffusion is dependent on the depth and density of the pattern.

**Types of Obscure Glass**

- Milgard has numerous types of obscure and decorative glass available.

- Some patterns have size limitations based on Width or Height of the piece of glass.

- Some glass types are location specific.

A description of these glass types can be found on the following page.
Obscure Glass

**Types of Obscure Glass**

Milgard has numerous types of obscure and decorative glass available. Some glass types are location specific. Below are some of the more common types of obscure glass.

**P516**: Our standard obscure glass which features an orange-peel texture. Thickness available: 5/32”.

**Rain**: A directional type of obscure that gives the illusion of water running down the glass, primarily used in shower door applications. Thickness available: 5/32” and 3/16”.

**Aquatex**: Obscure scalloped pattern with less image disruption than #42 Clear. Thickness available: 5/32”.

**#42 Clear**: A rougher obscure scalloped pattern than Aquatex with one side smooth, and one side rough. It distorts the image behind the glass more than Aquatex. Thickness available: 5/32”.

P-516 | Rain
---|---
Aquatex | #42 Clear
Obscure Glass

**Narrow Reed:** A directional type glass which is clear, semi-transparent with slightly raised vertical-reeded impressions with smooth concave glass between the reeds.
Thickness available: 5/32”.

**Cross Reed:** A non-directional type of obscure with a crossed reed pattern.
Thickness available: 5/32”.

**Glue Chip:** A fine etched pattern glass that is made by pouring an epoxy on the glass and letting it dry in a high humidity environment. The glue is then chipped away, which removes portions of the glass. Milgard offers two options – Clue Chip and Frosted Glue Chip
Thickness available: 3/16”.

Narrow Reed  Cross Reed
Glue Chip  Frosted Glue Chip
Obscure Glass

**Delta Frost:** Delta Frost glass is a patterned glass that can be easily cut and tempered. This architectural glass with its frosted, ice-like design.
Thickness available: 5/32”.

**Matelux:** It is an acid-etched glass that combines a satin finish with a neutral, translucent appearance. Matelux creates a minimalist aesthetic that conveys simplicity and purity of form.
Thickness available: 5/32”.
Decorative Glass

2 Types of Decorative Glass

1. Etch Matte: A custom obscure glass in which a ceramic frit is applied to the glass in either a pattern or a solid (picture) using a screen printer.

2. Crystal V-Groove: Offers the classic look of traditional grids with virtually endless opportunities for custom patterns. Crystal Groove has a variety of options, for both windows and doors, without the view blocking characteristics of traditional divided lites:
   - Two profiles including V and U grooves.
   - Ground or polished finish availability is location-specific.
   - Available on tempered or annealed glass.
   - Minimum size is 12” x 12” and maximum size is 58-1/2” x 118”.
   - Groove begins 1” from the edge of the glass and 1/2” of that will be covered by glazing bead.
   - Groove Widths - check with your Sales Manager or Plant Manager.
Door Glass

Almost all of the options that are available in window glass are available in door glass. Below are some of the special features of door glass:

1. **Tempered**: Door glass must always be tempered to meet building code. Because of this, Milgard only offers tempered glass for doors.

2. **Standard Sizes/Up Charges**: Unlike windows, doors come in standard sizes or there is an up-charge for special sizing.

3. **Size Limitations**: Check to see the specifics for your area.

4. **SunCoat® Low-E standard**: All door glass comes standard with SunCoat® Low-E tempered glass.