THERMAL PANE

AND

LOW E PLATE GLASS

FACTS

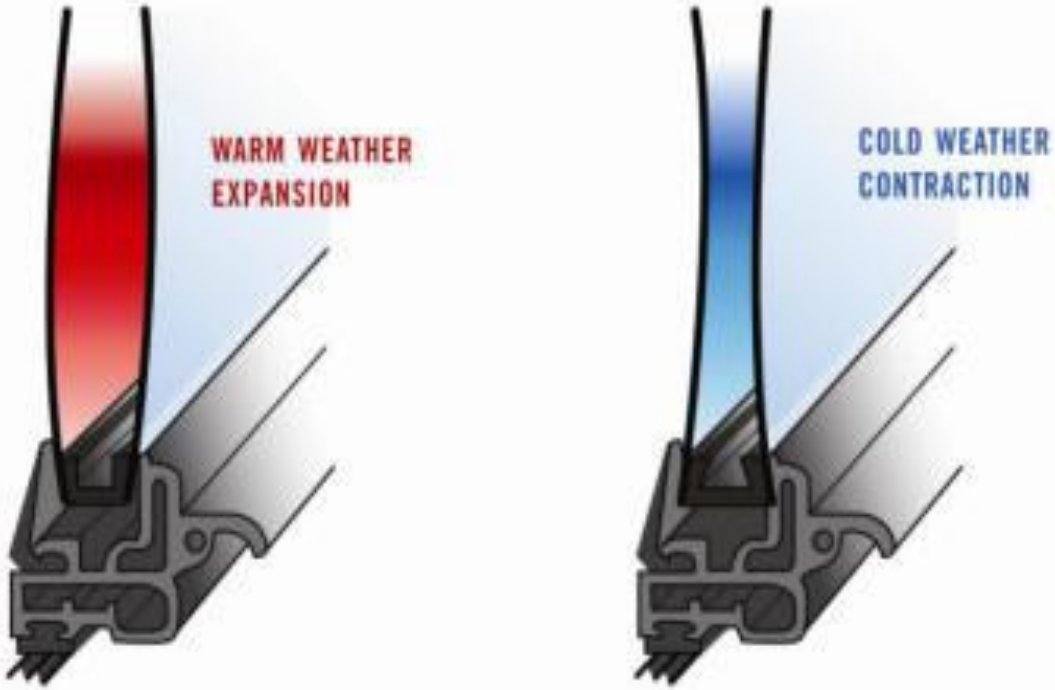
By: VanDerHoff Studios

Thermal Pane Facts:

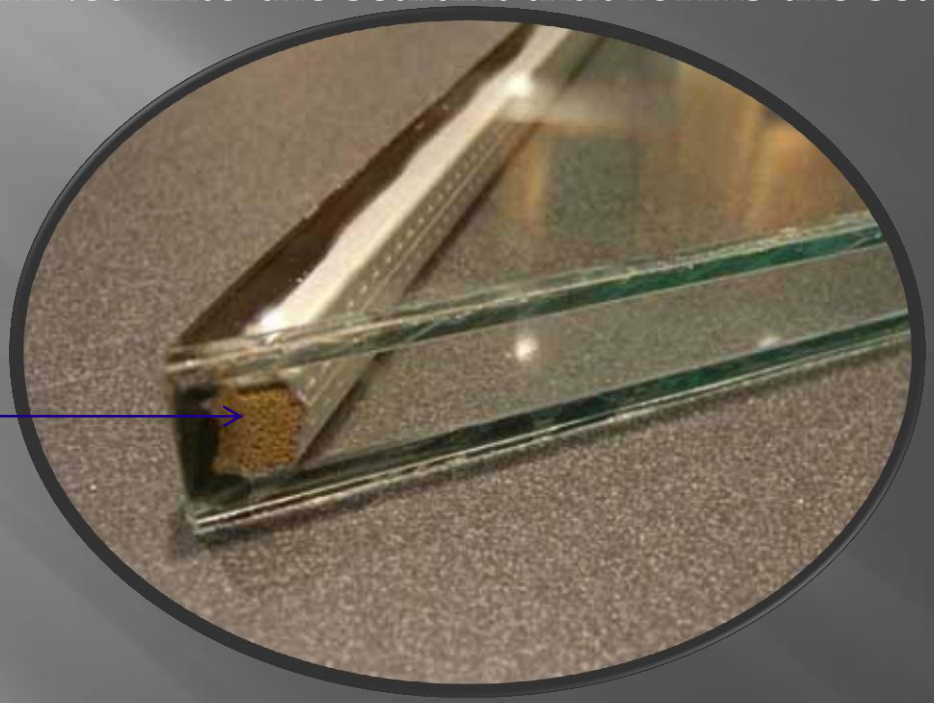
Why Do Thermal Pane Windows Fail?

- Every double pane window eventually fails. There is no such thing as a fail-proof thermal pane window. Wood framed windows tend to last 20 to 24 years (if well maintained). Newer, high-end wood/aluminum clad windows last about this long too. Traditional aluminum frame windows typically last 17 to 20 years. Vinyl framed windows may make it 15 years if they have standard box spacers. However most newer vinyl framed windows have a low-quality intercept spacer and these windows begin failing in 5 to 8 years.
- Sunshine is the biggest cause of window failure, which is why your south and west facing windows usually fail first. Sunshine causes both a process known as “solar pumping" and the hardening of the sealant that forms the seals of the window.
- When sunshine hits a double pane window the air inside heats up significantly, (think of a car on a hot day!) causing the sealed window unit to expand and pushing air out through the semi-permeable seals. In the evening, the window cools and contracts, drawing air—and humidity—with it. Day after day, year after year, this cyclical expansion and contraction occurs, stressing the window seals and filling the air space with moisture.

Glass moves constantly with weather conditions



Manufacturers expect and plan for solar pumping. Built into every thermal pane window frame is silica desiccant to absorb the small amounts of moisture inevitably drawn into the window. The desiccant, however, has a limited capacity and lifespan. In a standard box spacer the desiccant looks like the photo below. In an Intercept Spacer, the desiccant is mixed into the sealant that forms the seal of the window.



At some point the desiccant will have absorbed all the moisture it can hold and that is the day a hazy, misty bluish fog clouds your glass window pane. From this point on the window begins deteriorating rapidly. If left untreated, the trapped moisture quickly corrodes the inner window glass surfaces, eventually leaving mineral deposits and a permanent white silica haze.

Thermal Panes should never be used as a protective storm covering over stained glass windows.

When Protective Storm Coverings are installed to stained glass windows light passes through clear glass and hits the darker surface of your stained glass windows which in turn generates heat "excessive solar pumping" hitting the thermal pane from the interior of the unit as manufacturers plan for and also from the "interior" area between the stained glass and the thermal pane that is not planned for and is much hotter. That heat gets trapped between the two building up an enormous temperature and develops condensation. Three (3) to Four (4) inches of dead air space is recommended so that the heat generated doesn't become excessive. The protective storm coverings used over stained glass are single pane and vented in the framework to allow this heat build up to escape.

Using thermal pane storm coverings over stained glass builds excessive heat in the dead air space and that heat not only causes damage to your stained glass but will also pop the seal prematurely on the thermal panes. The outcome is a little better when Low E glass is used in the thermal pane but is not reduced enough to be thought of as a good solution.

In a house the heat that generates is minimal because it doesn't have the dark glass absorbing and radiating heat back at the thermal pane and it also has the entire interior of the house to emit the minimal heat into. When placed over stained glass the excessive heat generated is trapped and deteriorates the thermal pane seal.

Although the stained glass in your windows may be blue, yellow or green, the overall effect is a darker color than a clear glass window in a house. That darker color draws and generates heat. Go to a south window in your church when the sun is out and put your hand on it.

Other Problems with using Thermal Pane Storm Coverings

Thermal panes do not fit into traditional storm covering framework. The framework that is used is a special frame with two channels, one to receive the thermal pane and one to receive the stained glass. You are probably thinking that your stained glass is already installed into beautiful wooden framework. You are correct, but if you want to install thermal pane storm coverings you will have to say goodbye to that original wood framework and replace it with the new double channeled framework to insure correct dead air space and venting. Although this framework is in use it still will not last the test of time mother nature has to offer like a traditional storm covering. Thermal pane storm coverings are not only a detriment to the history , beautiful millwork and aesthetic value of your stained glass windows but it will also be a detriment to your budget!

If thermal panes are not the answer,
in the age of living a greener and more efficient lifestyle
what are the options for more efficient storm coverings?

US DEPARTMENT OF ENERGY

Energy Efficiency & Renewable Energy

Low-Emissivity Window Glazing or Glass

Low-emissivity (Low-E) coatings on glazing or glass control heat transfer through windows with insulated glazing. Windows manufactured with Low-E coatings typically cost about 10%–15% more than regular windows, but they reduce energy loss by as much as 30%–50%. A Low-E coating is a microscopically thin, virtually invisible, metal or metallic oxide layer deposited directly on the surface of one or more of the panes of glass. The Low-E coating reduces the infrared radiation from a warm pane of glass to a cooler pane, thereby lowering the U-factor of the window.

Low-Emissivity Coating Glass

Low emissivity coating glasses are manufactured through coating several layer of metal oxide films on high quality SGG transparent float glasses or tint glasses by the means of vacuum magnetism control and cathodic sputtering. Through different kinds of combinations of metal oxide films, low emissivity coating glass is of good selection towards spectrum. It is able to receive a great deal of near infrared and visible light to assure the brightness indoors. It can also prevent medium infrared an far infrared produced by heat source radiation. Thus, in hot summer, it is able to prevent the solar radiation heat from entering the buildings to assure a cool indoors; and in the cold winter, it is able to make the heat of a warming apparatus reflected indoors, but not get out of the buildings by passing through common glasses. Therefore, it's good heat insulation performance can save the energy consumption of buildings greatly.

Winter: outer cold and inner warm
Summer: outer hot and inner cool

Low-E glass can reduce the sun's heat entering your windows by 68% and can significantly reduce heat loss from your church. Low-E also helps reduce fading caused by UV from sunlight. And though it's coating, Low E lets the light shine in to warm your church during the cooler winter months.

Frigid Outside, Cozy Inside

During cold weather, the insulating effect of your windows has a direct impact on how your rooms feel. Typically, 75% of the exposed surface of a window is glass, and the temperature of the room-side of the glass directly affects the air temperature in the room. The better insulated the window glass, the warmer your room will be. The Efficient Window Collaborative suggests that when glass surface temperatures fall below 52° F, there is a risk of thermal discomfort. As the chart on the next slide shows, the insulating potential of Low E coatings are equivalent to a four-pane insulating glass unit!

Inside Glass Temperatures	Outside temperatures 20°F	Outside temperatures -20°F
Single-pane, clear	31°	0°
Double-pane, clear	51°	37°
Low-E	58°	47°
Speciality Low - E	61°	52°

So regardless of where your church is located, choosing protective storm coverings that provide you with the highest level of comfort, energy savings year-round and protection of your cherished windows is extremely important. And choosing the right glass for your application and budget is the most important factor in that decision.

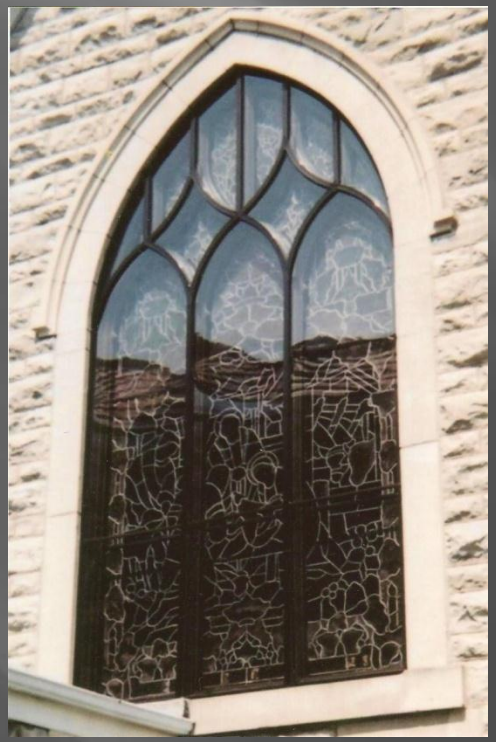
VanDerHoff Studios

Offers many popular options of glass for you and your congregation to choose from:

1. ¼" Clear Plate Glass
2. ¼" Clear Low E Plate Glass
3. ¼" Clear Laminated Low E Plate Glass
4. 3/16" Clear Unbreakable Lexan

Note that ¼" Clear Plate Glass, ¼" Clear Low E Plate Glass and ¼" Clear Laminated Low E Plate Glass are breakable, although ¼"Clear and Low E Plate Glass will break, it takes a pretty strong force (determined by dimension of each panel and wind load). Laminated glass will break but can withstand a stray baseball hit and is like a windshield that will shatter into tiny pieces that are less likely to harm your stained glass if broken. Laminated Low E Plate glass has less E value due to the lamination being applied instead of the E on one side, but still has a very good UV rating.

There are a lot of considerations to think about when choosing glass. We hope that you have found this presentation educational and helpful in making your decision about which protective storm covering to use to protect the historical and cherished stained glass windows that adorn your church.



Don & Barbara Vanderhoff