

The Importance of the Existing Glass in a Building:

Before recommending a window film, it's critical to know as much as possible about the existing glass. This will help you accurately project energy savings, and also be confident that the film is safe to apply. The following meters will help you learn about the glass, are quick to use, and can be easily transported to job sites.

Visible Light Transmission – Meter to use: EDTM Visible Light Transmission Meter (item 444217 or GT966)

- *How it affects the building?*

Visible light contains 44% of the heat in the solar spectrum (the remainder is in the IR and UV range). Cutting down VLT can reduce heat gain significantly. It also contributes to fading of furniture and fabrics inside a building and can cause glare/visibility problems.

- *How it affects film selection?*

Generally, buildings won't want glass darker than 10-15% VLT. For example, if an existing window is 30% VLT, then putting on a 30% film would bring it down to around 9% VLT, often too dark for an office, although not always in a state like Florida. If they do in fact want a very dark film, you must also remember this could cause them to need more lighting inside the building. This can offset some potential energy savings and is an important consideration in LEED projects, although generally the energy savings will be much more than cost of increased lighting. VLT also will help you know how much heat the glass is absorbing. Putting a tinted film on will increase the absorbance, and if it's increased too much, you risk breaking the glass. A customer in Florida might be ok with a 30% film on their 30% glass, but if the absorbance is too high then you have to go to a lighter film. Absorbance is the number one factor in whether a film is ok to install or not, it trumps energy savings and aesthetics.

Low E/Solar Control Coatings – Meter to use: EDTM E Tekt Low E Detector (item 444218 or GT960)

- *How it affects the building?*

Coated glass performs much better than clear or tinted glass. It often performs better than very high end window films. If a building has coated glass, they're already cutting down a lot of heat gain, so additional savings from film will be much smaller, if any. If it's a Low E glass, they're also getting some savings in colder months by reradiating heat back into the building when it's cold outside.

- *How it affects film selection?*

If a building has coated glass, then usually the only way to improve on it is to make it darker. The coatings usually block a lot of IR heat, so the heat in the visible range is the only thing left to block. Thus a dark film is often the best choice. Coatings generally reduce absorption quite a bit so dark films are usually safe to apply. It's important though to know what surface the coating is on. Film can be applied directly onto a coating, but it can be tricky. Also if you're working with a Low E coating, keep in mind that applying a film can reduce some of the Low E performance of the unit.

Glass and Air Space Thickness – Meter to use: Glass and IG Space Thickness Meter (item 444219 or GT961)

- *How it affects the building?*

Glass thickness can have large effects on heat rejection, while air space thickness can greatly improve a unit's insulating ability. Dual pane glass greatly reduces heat transfer through the window compared to single pane. If a coating is used on the window, it is often a dual pane unit with the coating on one of the inner surfaces of the glass, facing the air space.

- *How it affects film selection?*

Glass thickness will affect absorption, with thicker glass absorbing more heat and being at higher risk of glass breakage. The temperature in the air space between the 2 panes can vary a lot for different air space thicknesses. If one of the panes of glass is tinted or coated, the importance of glass and air space thickness can be even greater. Exterior films can be very effective on dual pane glass, as it eliminates the issue of heat build-up between the 2 panes.

Toughened Glass Indicator – Meter to use: Toughened Glass Indicator (item 444384 or GT969)

- *How it affects the building?*

The strength of the glass doesn't usually affect energy consumption too much. Different strengths of glass are required in different parts of a building for safety reasons, but won't change the heat rejection capabilities of the glass.

- *How it affects film selection?*

Glass strength has a huge impact on film selection though. The issues of absorption apply only to annealed glass. Heat strengthened or tempered glass is capable of absorbing a very high amount of heat without breaking, and thus can generally have any film applied to it. This is especially important with dual pane tinted glass. Often the outer pane is the tinted one, and if it's not heat strengthened or tempered, there can be a huge risk of breaking glass when adding film. This can really limit the film options available, and also the potential energy savings.

What to do with all this information?

Once all this info has been gathered, it's possible to build a computer model of the exact glass in the building. Different window films can then be applied to the model, and the solar optical properties will be recalculated with the each film. This will indicate if it's safe to apply the film from an absorption perspective, and will also provide heat rejection numbers so you can get a sense if the energy savings will be significant or not. You can also take it a step further and create a building model using these windows to estimate the annual energy savings for each film.