

Re-Arch: The Initiative for Renewable Energy in Architecture

Fact Sheet



Technology: Glazing Selection

Common Uses:

The choice of glazing type depends on a number of factors. These include whether or not passive solar gain is desired or not and whether the building is primarily a “skin-dominated” or “internal-load” dominated structure. Smaller buildings tend to be more “skin-dominated.” Orientation should be a factor in choosing glazing parameters.

Site Considerations:

The type and amount of glazing is dependent on orientation. North glazing provides the best light quality and south glazing is easiest to shade or use seasonally. East and west glazing can be problematic from a cooling standpoint. Site vegetation and topography can be used to provide for or augment desired shading.

Size Considerations:

Higher than average amounts of south-facing glazing are common in passive solar buildings. For “skin-dominated” buildings, large areas of glazing are a major contributor to heat loss, so lower U-values, warm-edge spacers and thermally-broken frames are important. Glazing should be sized and located for a specific purpose, and not placed where it has no value.

Design Considerations:

Minimize large expanses of west-facing windows. Avoid un-shaded south-facing or overhead glazing. Use high clerestory, transom or roof-monitor windows instead of skylights, to increase daylight penetration & facilitate shading. Use tinted glass in view-window areas to minimize glare and clearer glass in higher daylighting window areas and avoid reflective glass. Use low-e gas-filled insulating glazing, with appropriate Solar Heat Gain Coefficient (SHGC) for orientation. For “skin-dominated” smaller buildings, use higher SHGC on south-facing glazing, or use clear south-facing glazing, with a lower SHGC on east, west & north-facing glazing. For “internal load” dominated larger buildings, use glazing with a lower SHGC to minimize cooling loads.

System Costs:

Gas-filled insulating glass, low-e coatings and warm-edge spacers usually represent a modest increase in incremental costs over clear insulated glazing. Spectrally-selective glazing can be a factor in higher initial costs, which can be offset by higher performance and lower operating costs.

More Information:

There are several books and reference guides that outline basic principles of glazing selection and window design. In addition, there are several web-based sets of guidelines. Many of these have downloadable case studies and design briefs. Most major glass manufacturers also have comparative performance information and technical data. Some of these include interactive selection and comparison tools.

Books and Resources:

- Window Systems for High-Performance Buildings, Stephen Selkowitz, Eleonor Lee, Dariush Arasteh, Todd Wilmert & John Carmody, Norton, 2003, ISBN 978-0393731217
- Residential Windows: A Guide to New Technologies and Energy Performance, John Carmody, Stephen Selkowitz, Dariush Arasteh & Lisa Heschong, Norton, 2000, 2007, ISBN 978-0393732252
- The Dumb Architect's Guide to Glazing Selection, Jason McLennan, Ecotone, 2004, ISBN 978-0974903316

Websites:

- Oikos Web Portal Green Resources oikos.org
- Efficient Windows Collaborative efficientwindows.org
- Commercial Windows for High Performance Buildings commercialwindows.umn.edu
- Glass Resources glass-resource.com
- Insulating Glass Manufacturers Association igmaonline.com
- National Fenestration Rating Council nfrc.org
- Oldcastle Glass glasselect.oldcastle.com
- Pilkington Glass pilkington.com
- Viracon Glass viracon.com
- Visteon Glass visteon.com
- AFG Glass afg.com
- Cardinal Glass cardinalcorp.com
- Guardian Glass guardian.com
- PPG Glass corporateportal.ppg.com

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