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High-Tech Glazing With Phase-Change Material

Posted June 21, 2010 8:16 PM by Alex Wilson

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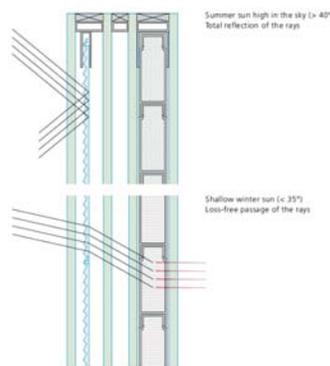
GlassX, a new high-tech glazing from Europe with heat-storing phase-change material (PCM) has just been introduced in North America. This remarkable glazing was developed by the Swiss company GlassX AG over the past 15 years and is licensed to the international building products company [Saint-Gobain](#) (parent company to [CertainTeed](#)), which is manufacturing the product in Austria and Germany.



While GlassX is available in various configurations (at least in Europe), here's how the version with all the bells and whistles (GlassX Crystal), which is being marketed in North America, works:

An outer insulated glazing unit (IGU) has a suspended prismatic filter (like a [Fresnel lens](#)) between the panes of glass that reflects higher-angle sunlight back out while transmitting low-angle sunlight. This offers a "passive" solar-control mechanism for south-facing glass to keep out most of the high summer sun, while benefiting from the lower-angle winter sun.

Sunlight that makes it through this outer IGU passes into an inner IGU that is filled with sealed polycarbonate channels into which a translucent salt-hydrate PCM is encapsulated. PCMs store a lot of heat as they change phase from solid to liquid (melt) over a narrow temperature range, then they release that heat as they cool off. The salt hydrate used in GlassX melts and freezes in the temperature range of 79-86 degrees F (26-30 degrees C).



Two separate low-emissivity (low-e) coatings and low-conductivity gas fill in the outer two sealed spaces glass help to push heat from the PCM inward while slowing outward heat loss. The U-factor is about 0.08 Btu/hr-ft²-F (0.48 W/m²-K). The direct-beam light transmission (assuming the sunlight isn't blocked by the prism layer) is up to 45% when the PCM is liquid and up to 28% when the PCM has crystallized.

Along with doing a remarkably good job at blocking heat loss, the glazing stores heat like a Trombe wall (or thermal storage wall)--offering a heat storage capacity of 376 Btu/ft² (1,185 Wh/m²). According to GlassX, the PCM will store as much heat as a nine-inch (24 cm) layer of concrete-- though I haven't been able to dig into the technical literature enough to figure out exactly what the assumptions are for coming up with that comparison. If that proves to be the case and if the phase-change efficiency is retained after hundreds or thousands of cycles, this will be a remarkable product indeed!

Overall, this glazing assembly is slightly over three inches thick (79 mm) and weighs 19.5 lb/ft² (95 kg/m²). Glazing modules are available in a maximum height of 110 inches (280 cm) and a maximum width of 59 inches (150 cm).

Not surprisingly, it's also fairly expensive: \$60-90/ft² (\$560-\$970/m²), according to Ryan Dennett, president and CEO of the exclusive North American distributor,



Greenlite Glass Systems, near Vancouver, British Columbia. Given the performance, Dennett said he expects a fairly rapid economic return. "We're looking at payback periods of five to ten years," he claims.

GlassX was introduced to the North American market at the AIA convention in Miami earlier this month. Dennett tells me that, while there aren't yet any installations of the product in North America, that should change fairly soon, as the glazing has been specified on several projects. "There's a lot of excitement about it," he says.



In Europe there are at least 25 installations of GlassX, most of them fairly large--on multi-family housing, office buildings, and retirement homes, for example.

Along with vacuum glazings and electrochromic glazings, GlassX is one of a number of an emerging high-tech glazing options that could revolutionize building design in the years ahead--and perhaps make the all-glass building a truly green option. (The upcoming July issue of *Environmental Building News* has a feature article, "Rethinking the All-Glass Building.") I'll keep you posted on these and other developments.

For more information:

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GlassX AG
 Zurich, Switzerland
 +41 (0) 44 445 17 40
www.glassx.ch (English available)

I invite you to share comments on this blog.

Alex Wilson is the executive editor of *Environmental Building News* and founder of *BuildingGreen, LLC*. To keep up with his latest articles and musings, you can [sign up for his Twitter feeds](#).

Schematic and Photos: Greenlite Glass Systems and GlassX AG. Photos are of GlassX installations in Europe

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Posted 6/22/10 1:44 AM by Peter vdm

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