

Case Study



University of Pittsburgh Medical Center (UPMC) East

MONROEVILLE, PA

Owner

University of Pittsburgh Medical Center

Architect/Designers

BBH Design
Raleigh, NC

Vitro Products

Solarban® 70 glass
Solarban® 60 glass
Solargray® glass

Glazing Fabricator

Trulite Glass & Aluminum Solutions
Cheswick, PA

Glazing Contractor

D-M Products
Bethel Park, PA

Curtain Wall Fabricator

United Architectural Metals
North Canton, OH

PROJECT BACKGROUND

Hospitals spend more than \$6 billion a year on energy and, thanks to their 24-hour operation, reliance on energy-intensive equipment and high demand for air recovery and circulation, consume about twice as much energy per-square-foot as a typical office building.

UPMC East is a 156-bed facility in Pittsburgh's eastern suburbs, opened in July 2012, that is designed to reverse that trend using a variety of strategies, including smaller patient treatment rooms and a super-insulated building envelope that incorporates advanced Solarban® solar control, low-e glasses by Vitro Architectural Glass (formerly PPG glass).

Tim Spence, BHH Design, Raleigh, N.C., principal in charge for the project, said that selecting the right glazing for UPMC East was critical, not just for energy performance, but for achieving the clear glass aesthetic glazing the owners desired.



Solarban® 70 and Solarban® 60 glasses by Vitro Architectural Glass (formerly PPG glass) help UPMC East reduce mechanical requirements for heating and cooling. Additionally, the glasses maximize the sunlight entering the treatment rooms, making them feel more spacious, while lessening the need for artificial light.

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“We wanted R-30 [insulating] performance all the way around the building, but clarity was also a big deal,” he explained. “[The owners] did not want the glass to look green or the building to look dated. *Solarban*® 70 glass (formerly *Solarban*® 70XL glass) offered the best performance, along with the clear, low-iron glass look that all of us preferred.”

Ultimately, the building’s signature 6-story curtain wall was erected with *Solarban*® 70 glass on the south façade and *Solarban*® 60 glass on the north facade, along with light-gray *Solarban*® 70 *Solargray*® glass in the atrium, stair towers and other public areas to reduce glare.

The insulating performance of the building envelope was further optimized by the *275-850-MaxTherm Unitized Curtain Wall System* designed and manufactured by United Architectural Metals. In addition to incorporating high-performance solar control, low-e glasses by Vitro, the unitized curtain wall system created a robust thermal barrier between the inside and outside of the building through the use of a 24-millimeter dual iso-bar that eliminated any contact between interior and exterior metal framing elements. The result was an overall system U-value of 0.069.

According to Spence, the selection of *Solarban*® glass and design of the unitized curtain wall system enabled the hospital’s design team to achieve two critical energy management criteria. The first was to create a highly insulating building envelope that lowered mechanical requirements for heating and cooling. The second was to transmit high levels of daylight into treatment rooms to make them feel more spacious.

Using advanced thermal and daylighting analyses, along with other types of building information modeling, Spence and his team simulated countless siting and building design scenarios—from the orientation of the structure to the placement of windows, light shelves and shading devices.



Constructing UPMC East on an east-west axis lowered the hospital’s solar heat gain by 17 percent. *Solarban*® 70 and *Solarban*® 60 glasses are part of a super-insulating building envelope that provided the performance and aesthetics the owners desired.

One decision dictated by energy modeling was to construct the hospital on an east-west axis, which added nothing to the cost of the building but lowered potential solar heat gain by 17 percent.

The designers also elected to reduce the size of patient rooms by 80 square feet, which made them up to 30 percent smaller than conventional patient rooms.

“We enacted right-sizing of rooms [at UPMC East] to maximize effectiveness of spaces and comfort for staff, visitors and patients,” Spence explained. “We made a full-scale mock-up of a patient room to verify spatial relationships. The reduction of square-footage helped us to reduce the size of the HVAC systems and that had a direct positive effect on operational savings.”

Spence also said that, through extensive use of highly transmissive glass and strategic placement of windows, light shelves and shading devices, BBH Design was able to create the illusion of size in the patient rooms. “One thing we did was to bring the light in as

high as possible and allow it to flood the space,” he said. “It’s funny to hear people talk about how the patient rooms feel ‘so big,’ but they’re actually much smaller than usual.”

UPMC East, which earned LEED® Silver certification shortly after it opened, also incorporates *Solarban*® 70 and *Solarban*® 60 glasses along the corridors at every level of the hospital, with frosted glazing at high locations to diffuse light and at low locations to provide privacy when necessary. Artificial lighting acts as a supplement when daylighting is less abundant.

Thanks in part to these and other energy-saving strategies, UPMC East is expected to reduce its baseline cooling load by nearly 11 percent compared to similarly sized hospitals and to reduce overall energy consumption by almost 20 percent.

BBH Design also hopes to help UPMC East become one of the first hospitals in the country to achieve an Energy Use Index (EUI) rating of 180, which is nearly 100 points better than the average hospital EUI of 270.

For more information about *Solarban*® 70 glass, *Solarban*® 60 glass, *Solargray*® glass and other Cradle to Cradle Certified™ architectural glasses by Vitro Glass, visit vitroglazings.com or call 1-855-VTRO-GLS (887-6457).

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