



1050

CASE STUDY

Boulder Community Health Center West Medical Building:

Five Years of Guardian Hybrid Vacuum IG™ Success

Located in the evolving area of East Boulder County, Boulder Community Health Center West Medical Building in Lafayette, Colorado is home to an eye clinic and ambulatory surgery center. The surgery center consists of two operating rooms and an area for retinal laser procedures. The building has accommodations for 4-5 medical practices.

Busy attending to their patients, the occupants don't know their place of business is a valuable location for an important advancement in building

construction: **Vacuum insulated glass (VIG) technology**. Guardian Glass' collaboration with **Boulder Associates** led the architecture firm to specify 318 Guardian Hybrid Vacuum IG™ windows for the nearly 30,000 sf facility.¹ Completed in 2019, this building was the **first new construction project to install Guardian Hybrid Vacuum IG™ windows**, which combine the performance of Vacuum IG and the additional benefits of a traditional insulating glass unit (IGU).



318

Guardian Hybrid Vacuum IG units installed

16

As in R-16 R-value insulation;
comparable to a wall²

5° F

Surface temperature difference
between standard IGU and
Guardian Hybrid Vacuum IG³

'The New Kid' Braves a Brutal Environment

This area of Colorado is known for significant temperature fluctuations and abundant sunshine. That, combined with the architect's commitment to environmental stewardship meant Boulder Associates had a unique challenge to balance the two, making this project an **ideal test site for an innovative, energy-efficient design**.

To align with the client's goals of stable interior temperatures and year-round energy efficiency, the architect collaborated closely with the Guardian Glass team during this pilot project for the energy-efficient glazing prototype.

1. There are windows on the building that are not composed of Guardian Hybrid Vacuum IG. That includes the corner windows that are butted together, glass doors and any windows that were broken and replaced.

2. Walls typically have a value between R13-R23 depending on location, code and age of the building.

3. Inside temperature of a Guardian Hybrid Vacuum IG unit was 62°F and a traditional double pane unit was 57°F. Images taken at 6:30 a.m. in April 2024, overcast, 33°F outside temperature. Inside temperature was 64°F in unoccupied space. See images above.

How VIG Works

Guardian Vacuum IG™ design seals two glass panes airtight, **creating a vacuum in the space between the two panes**. Guardian Hybrid Vacuum IG™ combines the performance of Vacuum IG with the additional benefits of a traditional IGU. With no air or gas between the panes, **heat and cold have no medium by which to transfer**, helping the unit deliver performance that exceeds a typical IGU⁴:

- **Thermal:** While a double-pane Vacuum IG unit with a second-surface low-E coating – also known as a Hybrid Vacuum IG – has an R-value of around R-4, Hybrid Vacuum IG that incorporates a second low-E coating boasts an impressive R-16, **making its overall insulation comparable to that of a wall**.
- **Acoustic:** Outdoor-indoor transmission class (OITC) is the typical measurement used to account for acoustic performance of an exterior façade as it emphasizes acoustic performance in the low- to mid-frequency ranges (i.e. noise from aircraft, trains and automobiles). The higher the OITC rating, the greater the sound resistance the glazing will offer. In a typical thermally broken aluminum window system, the **OITC improves from 26 for a double pane IGU to 31 for the same window system with Hybrid Vacuum IG**.

Guardian Hybrid Vacuum IG that incorporates a second low-E coating boasts **an impressive R-16**.



Hybrid Improves Healthcare Built Environment

The architect specified Guardian Hybrid Vacuum IG windows for the building because of the product's **superior thermal insulation performance**. Reducing the transfer of heat or cold through the glass helps deliver stable room temperatures and better energy efficiency to the building when comparing with standard double IGU configurations. Guardian Hybrid Vacuum IG units also deliver **sound insulation to help contribute to a quiet indoor environment** not polluted by external noise.

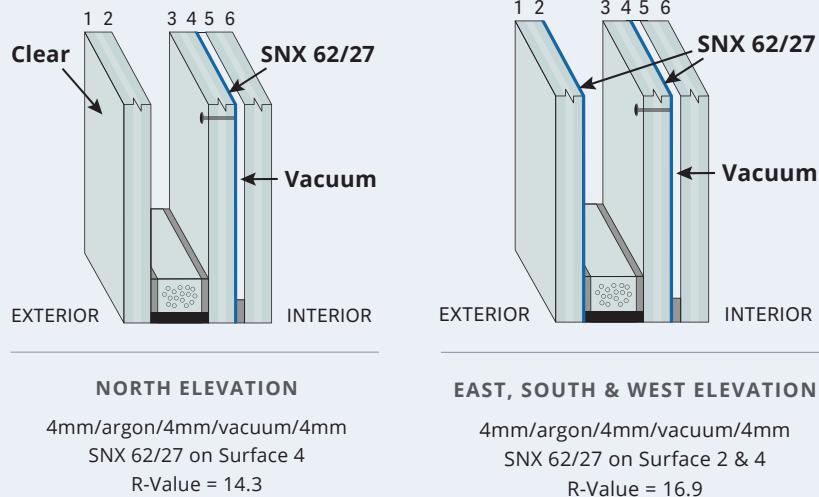
4. Typical IGU makeup: The commercial construction standard in North America is a 1" IGU that consists of two $\frac{1}{4}$ " lites of glass separated by a $\frac{1}{2}$ " argon cavity.

The Guardian Hybrid Vacuum IG™ units for the Boulder Community Health Center West Medical Building feature **Guardian SunGuard™ SNX 62/27 low-E coating** on surface 4. SunGuard SNX 62/27 low-E coated glass helps the building achieve **energy-saving performance** while

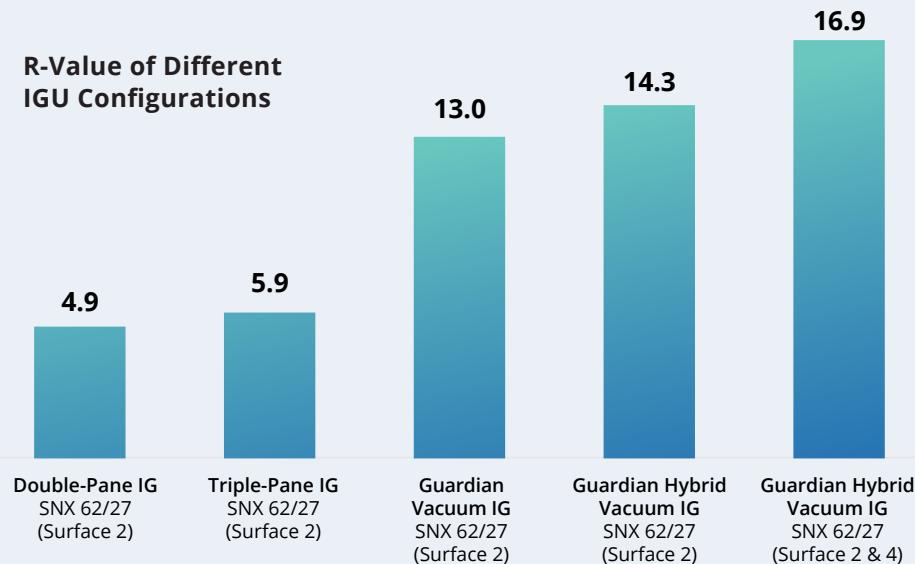
balancing light transmission and reflectivity. The south, west and east elevation units also have SunGuard SNX 62/27 coating on surface 2 to further support the building's energy efficiency.

Guardian Hybrid Vacuum IG Configuration

The IG configurations on the Boulder Community Health Center West Medical Building, featuring Guardian Hybrid Vacuum IG windows with Guardian SunGuard SNX 62/27 low-E coating.



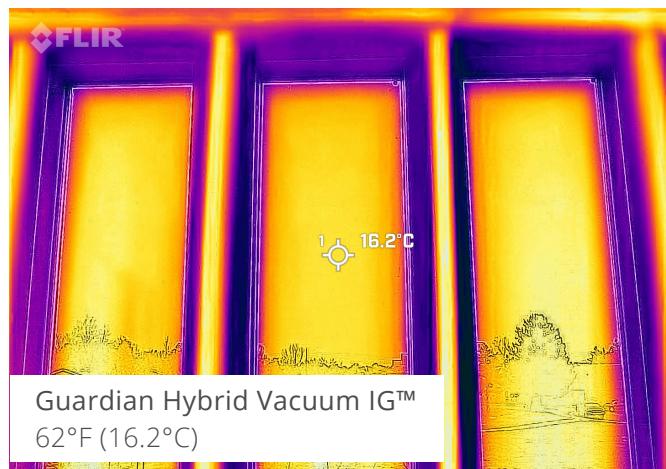
R-Value of Different IGU Configurations



Thermal performance of Guardian Hybrid Vacuum IG products compared to other glazing options for Guardian SunGuard SNX 62/27 low-E coating. Glass thickness for all options is 4mm. Double pane, triple pane and hybrid options include a 12.7mm spacer with argon.

Five Years In, People Prefer a Window Seat

Five years after installation, each window was evaluated with thermal imaging equipment.



Guardian Hybrid Vacuum IG™
62°F (16.2°C)



Traditional IG
57°F (14.1°C)

Inside temperature of a Guardian Hybrid Vacuum IG™ unit and a traditional double pane unit installed after the original Hybrid Vacuum IG window was vandalized. Images taken at 6:30am, overcast, 33°F (0.6°C) outside temperature. Inside temperature was 64°F (17.8°C) in unoccupied space.

The Guardian Hybrid Vacuum IG surface temperature is 5°F (2.8°C) warmer than the traditional IG (interior temperature of the building was 64°F).

Analysis of all the windows in the building revealed that one of the Guardian Vacuum IG™ units failed, giving the installation a 99.7% success

"This building really showcases the combination of Guardian low-E coatings to minimize thermal radiation and Vacuum IG for insulation performance in a high desert climate like Denver."

Jason Blush

Guardian Advanced IG Product Manager,
Americas

rate (314/315), which is consistent with traditional IG installations. When analyzed, the failed Guardian Vacuum IG had a diminished insulative performance comparable to the traditional IG, but did not completely lose its vacuum.

Property manager and occupant interviews revealed that **employees were very pleased with their comfort levels** regarding temperature and acoustics:

- Employees noted their offices were remarkably quiet, despite the building's location adjacent to a busy road.
- Workstations by the windows were highly sought-after.
- The property manager has not received any complaints related to the performance of the windows, compared to complaints from nearby buildings where draft affected occupant comfort.
- No one commented on noticing the micro-spacers.



The Next Frontier: Tempered VIG

"Having been available for over two decades, vacuum insulated glass (VIG) has established its presence in the market; however, the advent of tempered VIG marks a revolutionary shift," says Blush. "The thermal performance of tempered VIG, offering R-values twice that of its non-tempered counterpart, coupled with its enhanced strength, paves the way for its application in the commercial sector. **This technology is poised to help reduce energy consumption and concurrently diminish the operational and embodied carbon footprint of the built environment.**"⁵

Project Details

PROJECT: Boulder Community Health Center West Medical Building

LOCATION: Lafayette, Colorado

Companies Involved

ARCHITECT: Boulder Associates

GLAZIER: Steel City Glass LLC

Glazing Solution

Guardian Hybrid Vacuum IG™ glass⁶ with Guardian SunGuard™ SNX 62/27 coated glass

5. Embodied carbon claims are based on comparing glass components of a 6mm/4mm/4mm Vacuum IG hybrid versus the glass components of a 6mm/6mm/6mm triple IG. A Vacuum IG with 4mm glass can be used in place of a triple IG with 6mm glass due to the Vacuum IG's enhanced mechanical strength.

6. Guardian Vacuum IG and Guardian Hybrid Vacuum IG units are certified by the Insulating Glass Certification Council (IGCC) confirming the long-term durability of both products. (IGCC #4909, #4910). Guardian Hybrid Vacuum IG units for this project were produced in a Guardian Glass pilot facility.