



**This wall
wants to be
a window.**

**Now
it can be.**

VacuMax™
Vacuum Insulating Glass

Add extraordinary insulation to any configuration

The new tempered *VacuMax™* vacuum insulating glass (VIG) units are made up of two lites of 4mm (0.16") glass. Surface #3 on the interior lite includes *Solarban® 60* solar control, low-e glass, and the lites are separated by a non-lead proprietary metal seal and a vacuum space. The entire VIG unit has a total thickness of 8.3mm (0.33"), only slightly thicker than a standard 8mm (0.31") glass lite.

The unit's slim construction and light weight allows it to be incorporated into virtually any traditional glazing system, window frame or curtainwall application. *VacuMax™* VIG units are available in sizes from 0.30m x 0.30m (12" x 12") to 1.47m x 2.44m (58" x 96").



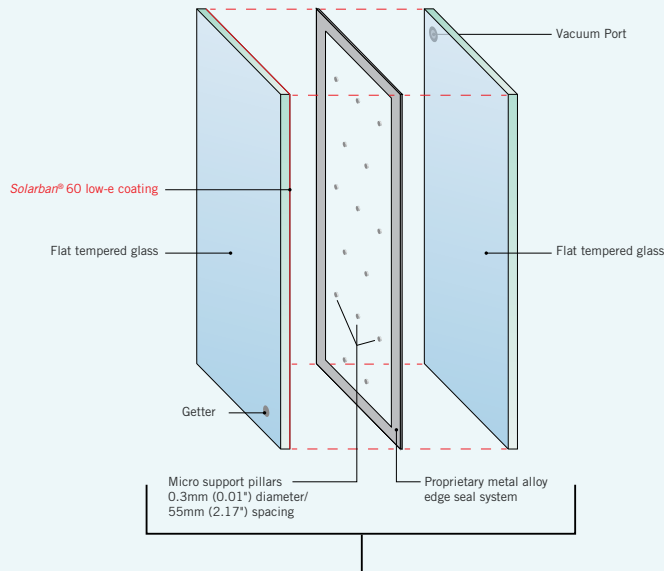
VacuMax™ VIG Performance Data

Attribute	Monolithic (Single-Pane) Glass	Double-Glazed IGU with Low-e Coating	Triple-Glazed IGU with Low-e Coating	<i>VacuMax™</i> VIG
U-Value (Btu/hr•ft ² •°F)	1.02	0.29	0.16	0.07
R-Value	1.00	3.40	6.30	14.30
Visible Light Transmittance (VLT)	89%	70%	56%	70%
Solar Heat Gain Coefficient (SHGC)	0.82	0.39	0.31	0.38
STC/OITC*	31/28	34/29	40/32	33/32
Seal Strength	N/A	150psi	150psi	3000psi
Thickness	6mm (0.24")	25mm (0.98")	44mm (1.73")	8.3mm (0.33")

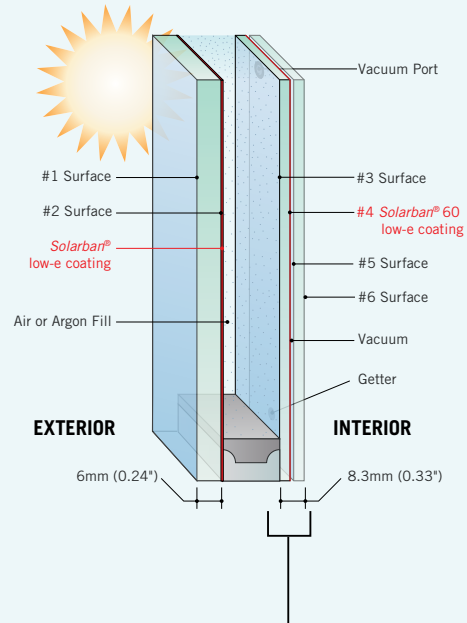
*STC/OITC Tolerance +/-2

Thanks to its innovative insulating technology, *VacuMax™* VIG provides thermal insulation performance that is 2-4x better than conventional insulating glass units and 6-10x better than monolithic glass. *VacuMax™* VIG also offers extraordinary R-values and delivers energy savings and reduced carbon emissions due to decreased HVAC use and subsequent Btu usage.

R14+ VIG Insulating Glass Unit



R16+ Nominal 1" Hybrid IGU



Hybrid configurations bring added versatility

In many cases, the new tempered *VacuMax™* VIG units can be used alone as 8.3mm (0.33") thick glass to replace monolithic (single-pane) glass without the need to replace or radically modify the framing system. Furthermore, tempered *VacuMax™* VIG units can be used as a substitute for the interior lite in any double- or triple-glazed insulating glass unit (IGU), where it forms an insulating gas space in addition to a vacuum insulating cavity and creates a hybrid IGU.

The strength of tempered glass

As the only VIG units in the world to use SGCC-certified fully tempered safety glass, *VacuMax™* VIG can be used globally across indoor and outdoor temperature extremes.

Built for the long term

With its proprietary metal alloy edge seal system, *VacuMax™* VIG has exceptionally long life compared to other VIG products and delivers superior resistance against thermal expansion or contraction caused by extreme indoor/outdoor temperature differences.

Improved acoustics & condensation performance

VacuMax™ VIG also delivers increased acoustic performance for dramatic noise dampening plus reduced center of glass condensation at temperatures as low as -58 °F.

Perfect for a range of applications

VacuMax™ VIG is an ideal solution for any commercial or residential renovation or new construction project requiring extraordinary insulating performance, including office buildings, educational institutions, hospitality and healthcare.

For additional technical and logistics information about *VacuMax™* VIG, visit VacuMaxVIG.com, call 1-855-VTRO-GLS (887-6457) or contact your Vitro representative.



With wall-like R-values of 14+, *VacuMax™* delivers the ultimate in thermal insulation performance.

Insulating Glass Unit Performance Comparisons 27.3mm (1.07") Units with 13mm (0.51") Airspace and One 6mm (0.24") Lite and One 8.3mm (0.33") *VacuMax*TM Vacuum Insulating Glass Unit¹

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light- to-Solar Gain (LSG) ⁵	R-Value ⁶
				Exterior %	Interior %	Winter Nighttime	Winter Argon			Winter Night

SOLARBAN® 60 Solar Control Low-E Glass

SOLARBAN 60 (2) CLEAR + SOLARBAN 60 (4) <i>VacuMax</i> VIG	57	12	15	0.06	0.06	0.27	2.11	16.7
SOLARBAN 60 (2) STARPHIRE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	59	13	15	0.06	0.06	0.29	2.03	16.7
SOLARBAN 60 (2) ACUITY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	58	13	15	0.06	0.06	0.28	2.07	16.7
SOLARBAN 60 (2) SOLEXIA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	50	11	14	0.06	0.06	0.22	2.27	16.7
SOLARBAN 60 (2) ATLANTICA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	43	9	14	0.06	0.06	0.18	2.39	16.7
SOLARBAN 60 (2) AZURIA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	44	9	14	0.06	0.06	0.19	2.32	16.7
SOLARBAN 60 (2) SOLARBLUE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	36	8	14	0.06	0.06	0.18	2.00	16.7
SOLARBAN 60 (2) PACIFICA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	27	6	13	0.06	0.06	0.14	1.93	16.7
SOLARBAN 60 (2) SOLARBRONZE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	34	7	14	0.06	0.06	0.18	1.89	16.7
SOLARBAN 60 (2) OPTIGRAY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	41	8	14	0.06	0.06	0.20	2.05	16.7
SOLARBAN 60 (2) SOLARGRAY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	29	6	13	0.06	0.06	0.15	1.93	16.7

SOLARBAN® 67 Solar Control Low-E Glass

SOLARBAN 67 (2) CLEAR + SOLARBAN 60 (4) <i>VacuMax</i> VIG	44	20	17	0.06	0.06	0.21	2.10	16.7
SOLARBAN 67 (2) STARPHIRE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	45	21	17	0.06	0.06	0.21	2.14	16.7
SOLARBAN 67 (2) ACUITY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	45	21	17	0.06	0.06	0.21	2.14	16.7
SOLARBAN 67 (2) SOLEXIA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	38	16	17	0.06	0.06	0.17	2.24	16.7
SOLARBAN 67 (2) ATLANTICA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	33	13	17	0.06	0.06	0.14	2.36	16.7
SOLARBAN 67 (2) AZURIA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	34	14	17	0.06	0.06	0.15	2.27	16.7
SOLARBAN 67 (2) OPTIBLUE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	32	13	17	0.06	0.06	0.16	2.00	16.7
SOLARBAN 67 (2) SOLARBLUE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	28	11	17	0.06	0.06	0.14	2.00	16.7
SOLARBAN 67 (2) PACIFICA + SOLARBAN 60 (4) <i>VacuMax</i> VIG	21	8	17	0.06	0.06	0.11	1.91	16.7
SOLARBAN 67 (2) SOLARBRONZE + SOLARBAN 60 (4) <i>VacuMax</i> VIG	26	10	17	0.06	0.06	0.13	2.00	16.7
SOLARBAN 67 (2) OPTIGRAY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	31	12	17	0.06	0.06	0.15	2.07	16.7
SOLARBAN 67 (2) SOLARGRAY + SOLARBAN 60 (4) <i>VacuMax</i> VIG	22	8	17	0.06	0.06	0.12	1.83	16.7

Insulating Glass Unit Performance Comparisons 27.3mm (1.07") Units with 13mm (0.51") Airspace and One 6mm (0.24") Lite and One 8.3mm (0.33") VacuMax™ Vacuum Insulating Glass Unit¹

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light- to-Solar Gain (LSG) ⁵	R-Value ⁶
				Exterior %	Interior %	Winter Nighttime	Winter Argon			Winter Night

SOLARBAN® 70 Solar Control Low-E Glass

SOLARBAN 70 (2) CLEAR + SOLARBAN 60 (4) VacuMax VIG	52	15	16	0.06	0.06	0.21	2.48	16.7
SOLARBAN 70 (2) SOLEXIA + SOLARBAN 60 (4) VacuMax VIG	46	12	16	0.06	0.06	0.18	2.56	16.7
SOLARBAN 70 (2) ATLANTICA + SOLARBAN 60 (4) VacuMax VIG	40	10	15	0.06	0.05	0.15	2.67	16.7
SOLARBAN 70 (2) AZURIA + SOLARBAN 60 (4) VacuMax VIG	40	11	15	0.06	0.05	0.16	2.50	16.7
SOLARBAN 70 (2) SOLARBLUE + SOLARBAN 60 (4) VacuMax VIG	33	9	15	0.06	0.05	0.14	2.36	16.7
SOLARBAN 70 (2) PACIFICA + SOLARBAN 60 (4) VacuMax VIG	25	7	15	0.06	0.05	0.11	2.27	16.7
SOLARBAN 70 (2) SOLARBRONZE + SOLARBAN 60 (4) VacuMax VIG	31	8	15	0.06	0.05	0.13	2.38	16.7
SOLARBAN 70 (2) OPTIGRAY + SOLARBAN 60 (4) VacuMax VIG	37	10	15	0.06	0.05	0.15	2.47	16.7
SOLARBAN 70 (2) SOLARGRAY + SOLARBAN 60 (4) VacuMax VIG	26	7	15	0.06	0.05	0.12	2.17	16.7

SOLARBAN® 72 Solar Control Low-E Glass

SOLARBAN 72 (2) STARPHIRE + SOLARBAN 60 (4) VacuMax VIG	54	15	16	0.06	0.05	0.21	2.57	16.7
SOLARBAN 72 (2) ACUITY + SOLARBAN 60 (4) VacuMax VIG	54	15	16	0.06	0.05	0.21	2.57	16.7

SOLARBAN® 90 Solar Control Low-E Glass

SOLARBAN 90 (2) Clear + SOLARBAN 60 (4) VacuMax VIG	42	13	19	0.06	0.06	0.17	2.47	16.7
SOLARBAN 90 (2) STARPHIRE + SOLARBAN 60 (4) VacuMax VIG	43	14	19	0.06	0.06	0.17	2.53	16.7
SOLARBAN 90 (2) ACUITY + SOLARBAN 60 (4) VacuMax VIG	34	33	16	0.06	0.06	0.16	2.13	16.7
SOLARBAN 90 (2) SOLEXIA + SOLARBAN 60 (4) VacuMax VIG	36	11	19	0.06	0.06	0.15	2.40	16.7
SOLARBAN 90 (2) ATLANTICA + SOLARBAN 60 (4) VacuMax VIG	31	9	19	0.06	0.06	0.13	2.38	16.7
SOLARBAN 90 (2) AZURIA + SOLARBAN 60 (4) VacuMax VIG	32	10	19	0.06	0.06	0.13	2.46	16.7
SOLARBAN 90 (2) OPTIBLUE + SOLARBAN 60 (4) VacuMax VIG	30	9	19	0.06	0.06	0.13	2.31	16.7
SOLARBAN 90 (2) SOLARBLUE + SOLARBAN 60 (4) VacuMax VIG	26	8	19	0.06	0.06	0.12	2.17	16.7
SOLARBAN 90 (2) PACIFICA + SOLARBAN 60 (4) VacuMax VIG	20	6	19	0.06	0.06	0.09	2.22	16.7
SOLARBAN 90 (2) SOLARBRONZE + SOLARBAN 60 (4) VacuMax VIG	25	7	19	0.06	0.06	0.11	2.27	16.7
SOLARBAN 90 (2) OPTIGRAY + SOLARBAN 60 (4) VacuMax VIG	29	9	19	0.06	0.06	0.13	2.23	16.7
SOLARBAN 90 (2) SOLARGRAY + SOLARBAN 60 (4) VacuMax VIG	21	7	19	0.06	0.06	0.10	2.10	16.7

Insulating Glass Unit Performance Comparisons 27.3mm (1.07") Units with 13mm (0.51") Airspace and One 6mm (0.24") Lite and One 8.3mm (0.33") VacuMax™ Vacuum Insulating Glass Unit¹

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light- to-Solar Gain (LSG) ⁵	R-Value ⁶
				Exterior %	Interior %	Winter Nighttime	Winter Argon			Winter Night

SOLARBAN® z50 Solar Control Low-E Glass †

SOLARBAN 60 (2) OPTIBLUE + SOLARBAN 60 (4) VacuMax VIG	41	9	14	0.06	0.06	0.22	1.86	16.7
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SOLARBAN® z75 Solar Control Low-E Glass †

SOLARBAN 70 (2) OPTIBLUE + SOLARBAN 60 (4) VacuMax VIG	38	10	15	0.06	0.05	0.16	2.38	16.7
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SOLARBAN® R77 Solar Control Low-E Glass

SOLARBAN R77 (2) CLEAR + SOLARBAN 60 (4) VacuMax VIG	38	26	17	0.06	0.06	0.18	2.11	16.7
SOLARBAN R77 (2) STARPHIRE + SOLARBAN 60 (4) VacuMax VIG	39	27	17	0.06	0.06	0.18	2.17	16.7
SOLARBAN R77 (2) ACUITY + SOLARBAN 60 (4) VacuMax VIG	39	27	17	0.06	0.06	0.18	2.17	16.7
SOLARBAN R77 (2) SOLEXIA + SOLARBAN 60 (4) VacuMax VIG	33	21	17	0.06	0.06	0.15	2.20	16.7
SOLARBAN R77 (2) ATLANTICA + SOLARBAN 60 (4) VacuMax VIG	29	17	17	0.06	0.06	0.13	2.23	16.7
SOLARBAN R77 (2) AZURIA + SOLARBAN 60 (4) VacuMax VIG	30	17	17	0.06	0.06	0.13	2.31	16.7
SOLARBAN R77 (2) OPTIBLUE + SOLARBAN 60 (4) VacuMax VIG	28	16	17	0.06	0.06	0.14	2.00	16.7
SOLARBAN R77 (2) SOLARBLUE + SOLARBAN 60 (4) VacuMax VIG	24	13	17	0.06	0.06	0.12	2.00	16.7
SOLARBAN R77 (2) PACIFICA + SOLARBAN 60 (4) VacuMax VIG	18	9	17	0.06	0.06	0.10	1.80	16.7
SOLARBAN R77 (2) SOLARBRONZE + SOLARBAN 60 (4) VacuMax VIG	23	12	17	0.06	0.06	0.12	1.92	16.7
SOLARBAN R77 (2) OPTIGRAY + SOLARBAN 60 (4) VacuMax VIG	27	15	17	0.06	0.06	0.13	2.08	16.7
SOLARBAN R77 (2) SOLARGRAY + SOLARBAN 60 (4) VacuMax VIG	19	10	17	0.06	0.06	0.10	1.90	16.7

SOLARBAN® R100 Solar Control Low-E Glass

SOLARBAN R100 (2) CLEAR + SOLARBAN 60 (4) VacuMax VIG	34	33	16	0.06	0.06	0.16	2.13	16.7
SOLARBAN R100 (2) STARPHIRE + SOLARBAN 60 (4) VacuMax VIG	35	34	16	0.06	0.06	0.17	2.06	16.7
SOLARBAN R100 (2) ACUITY + SOLARBAN 60 (4) VacuMax VIG	34	33	16	0.06	0.06	0.16	2.13	16.7
SOLARBAN R100 (2) SOLEXIA + SOLARBAN 60 (4) VacuMax VIG	29	26	16	0.06	0.06	0.13	2.23	16.7
SOLARBAN R100 (2) ATLANTICA + SOLARBAN 60 (4) VacuMax VIG	25	20	15	0.06	0.06	0.11	2.27	16.7
SOLARBAN R100 (2) AZURIA + SOLARBAN 60 (4) VacuMax VIG	26	21	15	0.06	0.06	0.12	2.17	16.7

Insulating Glass Unit Performance Comparisons 27.3mm (1.07") Units with 13mm (0.51") Airspace and One 6mm (0.24") Lite and One 8.3mm (0.33") VacuMax™ Vacuum Insulating Glass Unit¹

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr•ft ² •F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light- to-Solar Gain (LSG) ⁵	R-Value ⁶
				Exterior %	Interior %	Winter Nighttime	Winter Argon			Winter Night

SOLARBAN® R100 Solar Control Low-E Glass (continued)

SOLARBAN R100 (2) OPTIBLUE + SOLARBAN 60 (4) VacuMax VIG	24	19	15	0.06	0.06	0.13	1.85	16.7
SOLARBAN R100 (2) PACIFICA + SOLARBAN 60 (4) VacuMax VIG	16	11	15	0.06	0.06	0.09	1.78	16.7
SOLARBAN R100(2) SOLARBRONZE + SOLARBAN 60 (4) VacuMax VIG	20	15	15	0.06	0.06	0.11	1.82	16.7
SOLARBAN R100 (2) OPTIGRAY + SOLARBAN 60 (4) VacuMax VIG	24	18	15	0.06	0.06	0.12	2.00	16.7
SOLARBAN R100 (2) SOLARGRAY + SOLARBAN 60 (4) VacuMax VIG	17	12	15	0.06	0.06	0.09	1.89	16.7

Hybrid VIG ½" gap is filled with either 100% Air or 90% Argon/10% Air mixture as indicated.

Simulations were ran using LBNL Window 7.6 and Optics 6 software with version 81.0 of the International Glazing Database and represents center of glass performance data.

Thermal performance data is provided for estimating purposes only and is not a guarantee of actual results. Thermal performance calculation methodology for Vacuum Insulating Glass Units is not yet fully approved by NFRC.

Performance data is based on representative samples of factory production. Actual values may vary slightly due to variations in the production process. This data is to be used for comparison purposes and should not be considered a contract or guarantee of product availability. It is the recipient's responsibility to ensure the manufacturability of the above glazing configurations as well as evaluating appropriate design considerations such as wind and snow load analysis, thermal stress analysis, and local building code compliance. Vitro recommends that a full size mock-up be reviewed under the specific job-site conditions and retain the mock-up as a basis of acceptable product.

Simulations provided are not NFRC approved.

† *Optiblue*® is a unique substrate by Vitro Glass designed for use with several *Solarban*® glass coatings.

1. Data is based on center-of-glass performance of representative factory production samples. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 7.6 software.
2. Transmittance and Reflectance values based on spectrophotometric measurements and energy distribution of solar radiation.

3. U-Value – A measure of the insulating characteristics of the glass or how much heat gain or loss occurs through the glass due to the difference between indoor and outdoor temperatures and is measured Btu/hr•ft²•°F. The lower the number, the better the insulating performance. This number is the reciprocal of the R-value. Winter argon represents the winter nighttime U-value performance when the cavity is filled with a 90% argon/10% air/gas mixture.
4. Solar Heat Gain Coefficient (SHGC) – Measures how well a window blocks (or shades) the heat from sunlight. SHGC is the fraction of solar radiation transmitted through a window or skylight, as well as the amount that is absorbed by the glass and reradiated to the interior. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits and the greater the shading ability. The SHGC is similar to the Shading Coefficient (SC), but also accounts for absorbed, converted and inwardly radiated solar energy.
5. Light-to-solar gain (LSG) ratio is the ratio of visible light transmittance to solar heat gain coefficient.
6. R-Value – A measure of thermal performance of parts of the building envelope, such as walls, floors and roofs. It is the mathematical reciprocal of U-value.

VacuMax™

Vacuum Insulating Glass

VacuMaxVIG.com



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