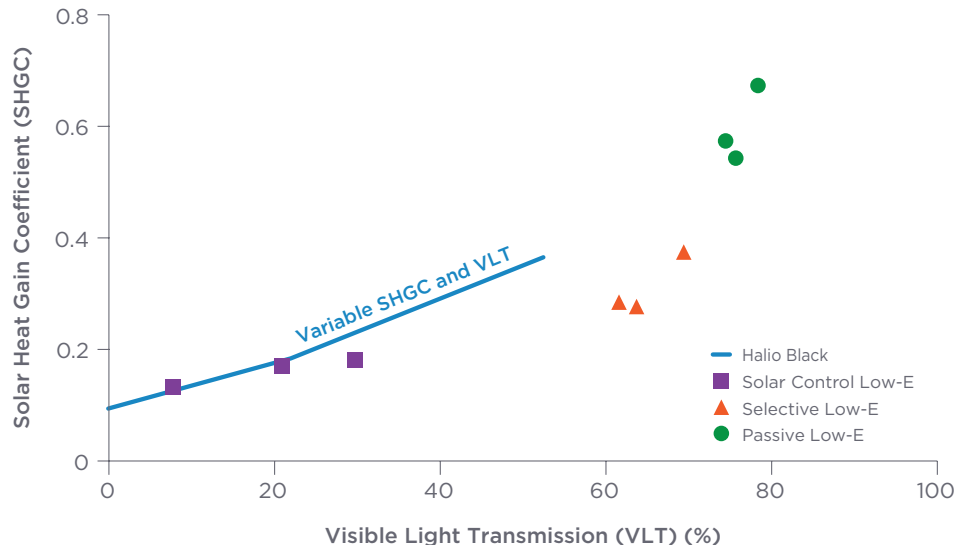


Halio® Black Insulated Glass Unit (IGU)

Halio smart-tinting glass gives architects and designers new opportunities to design beautiful, light-filled spaces that allow people to live and work feeling content, productive, and energized. Tinting automatically or on command, Halio provides expansive views and creates intimate spaces without the need for curtains or shades. Halio is the window of choice for builders committed to taking care of the most important aspect of any building - the people inside.

PROPERTIES

Halio Black enables a variable solar heat gain coefficient (SHGC) by modulating the visible light transmission (VLT). In a standard configuration, Halio Black is incorporated into a double-pane insulated glass unit (IGU) and can also be configured to support single- and triple-pane IGUs. Halio Black can be paired with various low-E coatings to change the characteristics of the IGU. Halio Black blocks 99.9% of UV light at all tint levels, including the clear state, and blocks up to 99.9% of visible light in the tinted state.



Halio provides the ability to optimize daylight and solar heat gain. Standard glazing units use a static low-E coating and, while a wide range of options exists, selecting one results in a compromise that is almost never optimal.

KEY FEATURES

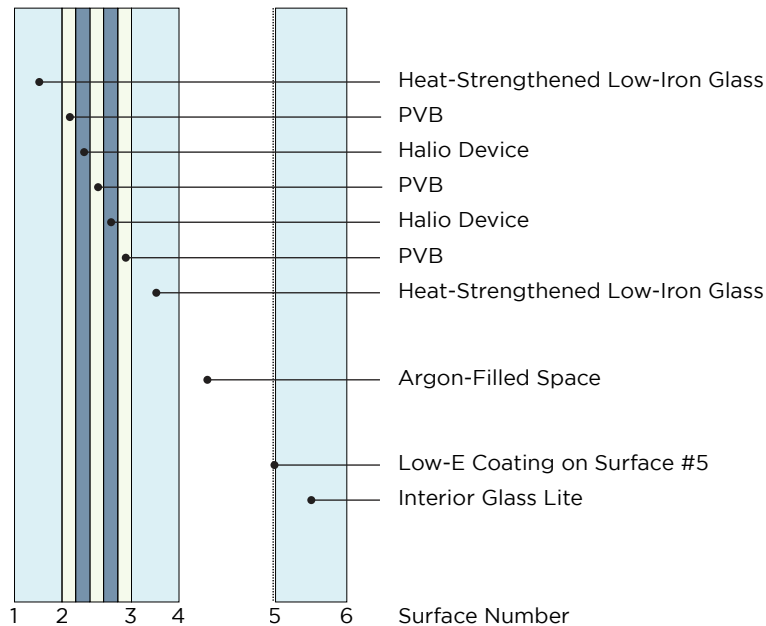
- Halio Black can block up to 99.9% of visible light, making it ideal for applications where direct sun and glare management are critical or where privacy (though not blackout) is required
- Fastest tinting speed: Halio tints and clears 10x faster than other electrochromics
- Natural color: Halio is the only dynamic glass that is perfectly clear until it tints to neutral grays
- Uniform tinting: Patented technology delivers a consistent, even tint without any iris or curtain effect

HALIO BLACK IGU PERFORMANCE OVERVIEW

IGU Configuration								
Neutral Color with 4mm Carrier Glass								
Outboard Pane: 13.8mm Halió Black Lite (4mm low-iron glass; 1.14mm PVB; EC Device; 1.14mm PVB; EC Device; 1.14mm PVB; 4mm low-iron glass)								
Gap: 10mm (3/8")								
Fill: 90% Argon								
Inboard Pane: 6mm clear with color-neutral low-e coating								
Overall Thickness	Tint Level	Transmittance			Reflectance		SHGC	U-Value (BTU/h-ft ² -°F)
		Visible	UV	Solar	Visible - Out	Visible - In		
30mm (1 1/4")	Clear	52%	<0.1%	32%	18%	20%	0.39	0.28
	Tinted	0.1%	<0.1%	<0.1%	6%	12%	0.09	

Notes:
 Other configurations available based on project requirements; to be confirmed by Halió.
 Properties shown only for clear and fully-tinted states.
 Properties based on Vitro Sungate 400 low-e on clear glass.
 Carrier glass thickness and overall thickness as required per structural analysis.

HALIO BLACK IGU CROSS-SECTION



IGU CONFIGURATIONS

With Halio, architects and engineers have the freedom to design an IGU that meets their performance and aesthetic goals. Halio IGUs can be customized, for example, to change performance by altering the low-E coatings or using triple glazed IGUs. IGU aesthetics can be altered by incorporating colored glass or different coatings that change the color or reflectance properties. Opportunities for customization include:

- Triple glazing
- Spacer thickness and gas fill
- Various low-E coatings
- Reflective coatings
- Body tinted glass
- Bird-safe frit patterns
- Impact-resistant (hurricane) glass applications
- Thicker exterior pane to accommodate higher wind load

TOLERANCES

Length, width, and thickness: 1/16" | 1.6mm

SHAPES

Halio IGUs are available with right angles.

SIZES (WITH HORIZONTAL ROLLER WAVE)

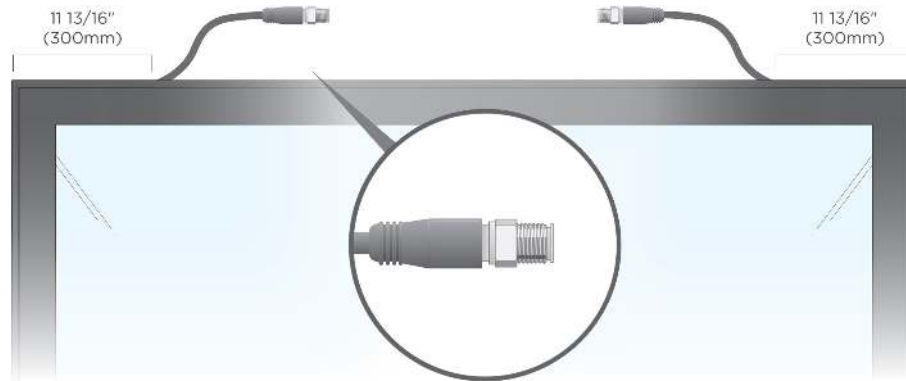
	Dimensions (in)	Dimensions (mm)
Portrait	Width: 23 15/16" to 59 3/8" Height: 23 15/16" to 120"	Width: 608mm to 1508mm Height: 608mm to 3058mm
Landscape	Width: 24" to 102" Height: 24" to 60"	Width: 608mm to 2800mm Height: 608mm to 1508mm

FRAMING

Halio is compatible with most framing systems. Accommodations must be made for routing of the cables through the framing system. Halio Black can also be installed in Structural Silicone Glazing (SSG) applications. Systems must accommodate a cable diameter of 8mm and a connector diameter of 14.8mm.

SYSTEM WIRING - THE IGU PIGTAIL

Each Halio Black IGU has two pigtails (below.) These waterproof cables run from the IGU and each connect to their own Tint Driver.

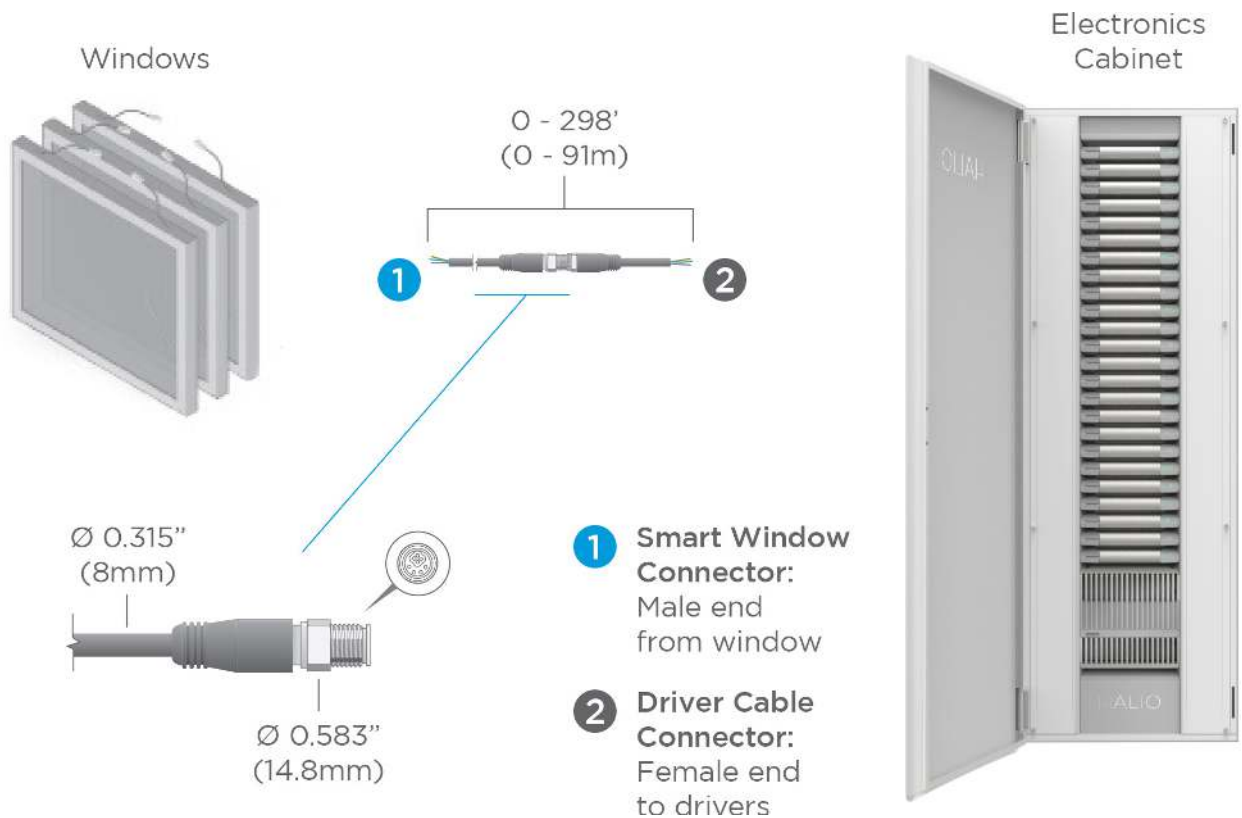


Specifications

- Standard location for each pigtail is 11 13/16" (300mm) from sequential corners of the window; referenced from the outside in
- Precise location for the pigtails will vary based on the orientation and size of window
- Standard cable lengths from the pigtail exit: 15.75" (0.4m), 39.37" (1m), 59.06" (1.5m), 118.11" (3m)

INSTALLATION

The IGU pigtail contains the male end of the cable.



CERTIFICATIONS

Certification	Test Reference	Test Type
Dynamic Function	ASTM 2141	EC properties UV + temperature
IGU	EN 1279 parts 2 and 3	Glass in building; insulating glass units
IGU	IGCC - ASTM E2190	IGU certification
Safety	Z97.1-2015, CPSC 16CFR 1201 and CA/CGSB 12.1-M90 (SGCC)	Impact safety standard
Safety - Additional Resistance	ASTM F3007	Ball drop impact resistance
	ASTM E1886	Cyclic pressure differential
	ASTM E330	Uniform static air pressure difference
	ASTM E822	Hail impact
Acoustics	ASTM E1425 (ASTM E413)	Glazing acoustics
	ASTM E1332 (ASTM E413)	OITC acoustics

Warranty

10 years, express limited warranty