

## Center of Glass U-Values for Double and Triple Glazed Insulating Glass Units using *Solarban*<sup>®</sup> 60 & *Solarban*<sup>®</sup> 70 Solar Control Low-e Glasses with 100% Air, Argon, or Krypton, or Mixtures of These Gases

As explained in Vitro’s TD-101, insulating glass U-values vary with airspace width, gas fill type, and gas fill quantity. This technical document demonstrates how U-values vary in double and triple glazed insulating glass units (IGU) when using *Solarban*<sup>®</sup> 60 compared to *Solarban*<sup>®</sup> 70 Solar Control Low-e coated glasses.

Using the LBNL WINDOW v7.8 computer program, simulations were run for seven different IGU gap widths, and for six different gas fill configurations. As shown in the graphs to follow, there is an optimum gap width for each different gas fill configuration.

Notice that in both double-glazed and triple-glazed IGU, the line for “100% argon filled” nearly overlaps the line for “5% air & 95% argon filled” indicating the performance

between these two gas fill types is similar. The same is true of krypton gas.

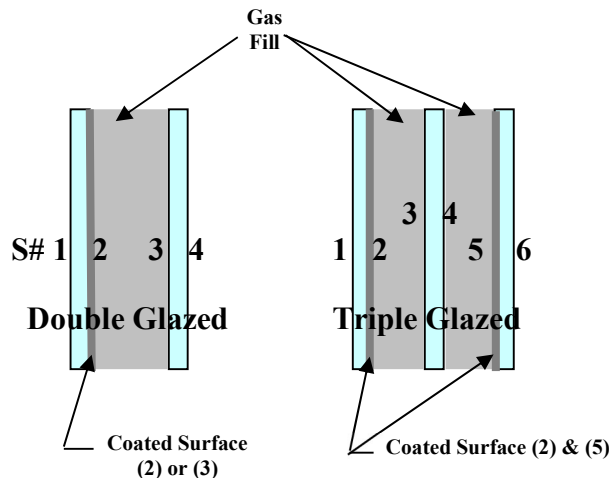
### Gap widths analyzed:

- .250” (1/4” / 6mm)
- .313” (5/16” / 8mm)
- .375” (3/8” / 10mm)
- .438” (7/16” / 11mm)
- .500” (1/2” / 13mm)
- .563” (9/16” / 14mm)
- .625” (5/8” / 16mm)

### Gas mixtures analyzed:

- 100% air
- 5% air & 95% argon
- 100% argon
- 12% air, 22% argon & 66% krypton
- 5% air & 95% krypton
- 100% krypton

- In the analysis, clear glass is used.
- Glass thickness is 1/8” (3mm).
- Glass thicknesses of 2.5mm produces nearly identical results.
- Standard NFRC Environmental Conditions are used.

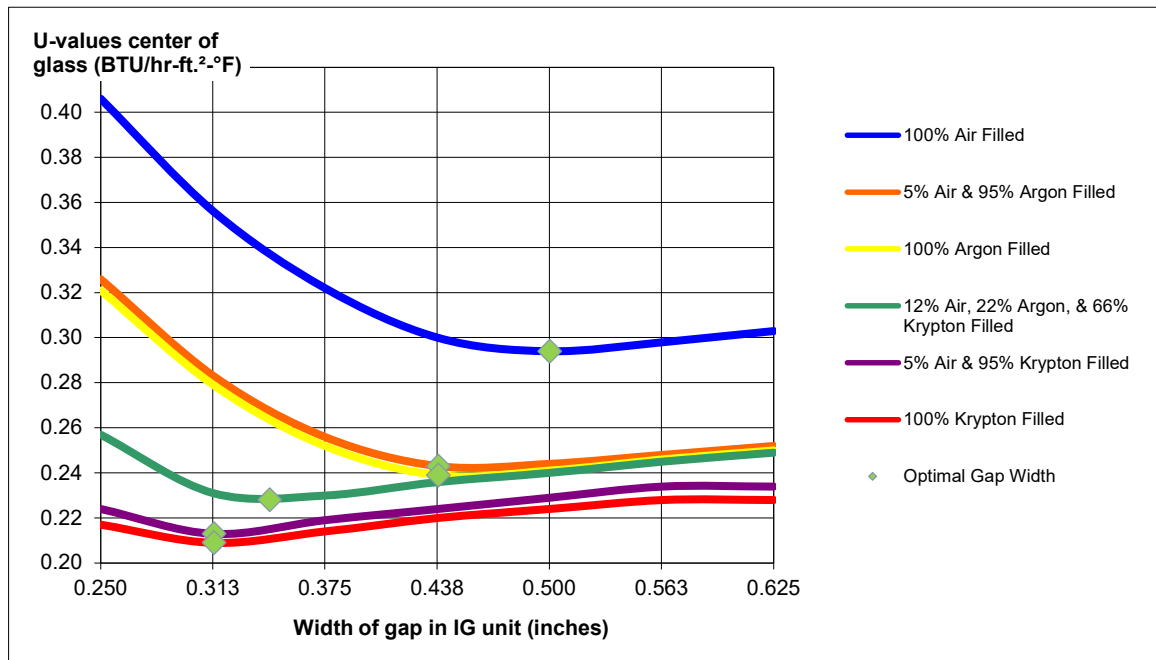


**Center of Glass U-Values for Double and Triple Glazed Insulating Glass Units using Solarban® 60 & Solarban® 70 Solar Control Low-e Glasses with 100% Air, Argon, or Krypton, or Mixtures of These Gases**

**DOUBLE GLAZED INSULATING GLASS WITH LOW-E S(2) OR S(3)**

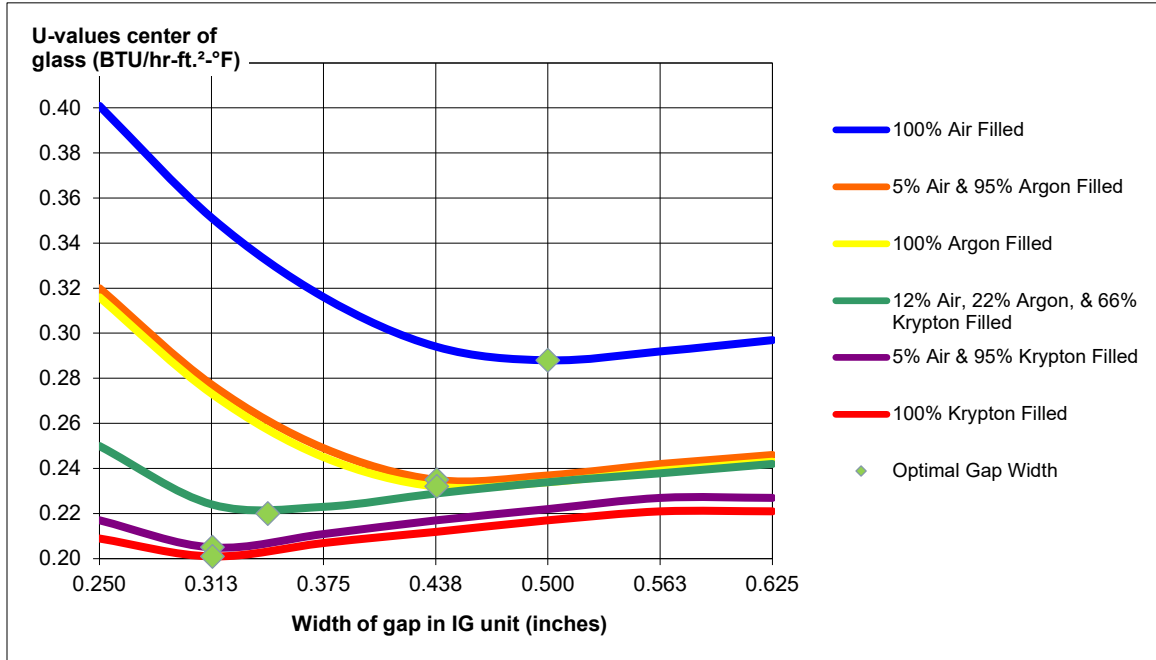
Gap Width	Low-e Coating	Winter Nighttime U-values for various gas fill types					
		100% Air Filled	5% Air / 95% Argon Filled	100% Argon Filled	12% Air / 22% Argon / 66% Krypton Filled	5% Air / 95% Krypton Filled	100% Krypton
1/4"	Solarban 60	.406	.326	.321	.257	.224	.217
	Solarban 70	.401	.320	.316	.250	.217	.209
5/16"	Solarban 60	.356	.283	.279	.231	.213	.209
	Solarban 70	.351	.277	.273	.224	.205	.201
3/8"	Solarban 60	.322	.256	.252	.230	.219	.214
	Solarban 70	.316	.249	.245	.223	.211	.207
7/16"	Solarban 60	.300	.243	.239	.236	.224	.220
	Solarban 70	.294	.235	.232	.229	.217	.212
1/2"	Solarban 60	.294	.244	.241	.240	.229	.224
	Solarban 70	.288	.237	.234	.234	.222	.217
9/16"	Solarban 60	.298	.248	.246	.245	.234	.228
	Solarban 70	.292	.242	.239	.238	.227	.221
5/8"	Solarban 60	.303	.252	.250	.249	.234	.228
	Solarban 70	.297	.246	.243	.242	.227	.221

**DOUBLE GLAZED INSULATING GLASS WITH SOLARBAN® 60**



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**DOUBLE GLAZED INSULATING GLASS WITH SOLARBAN® 70**

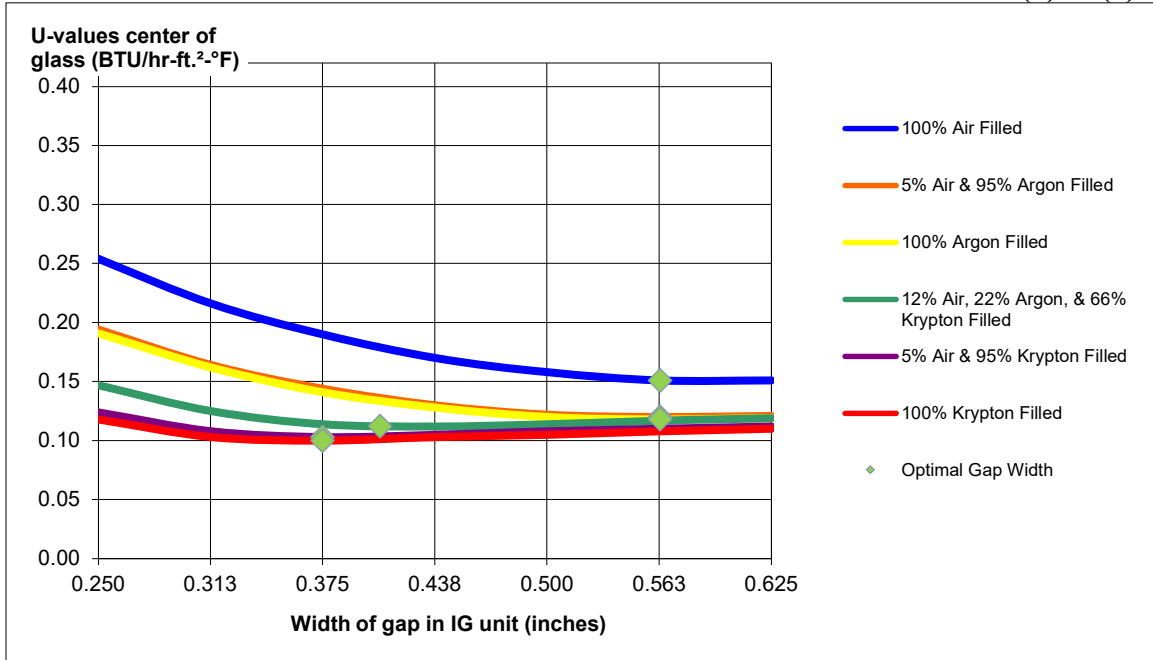


**TRIPLE GLAZED INSULATING GLASS WITH LOW-E S(2) AND S(5)**

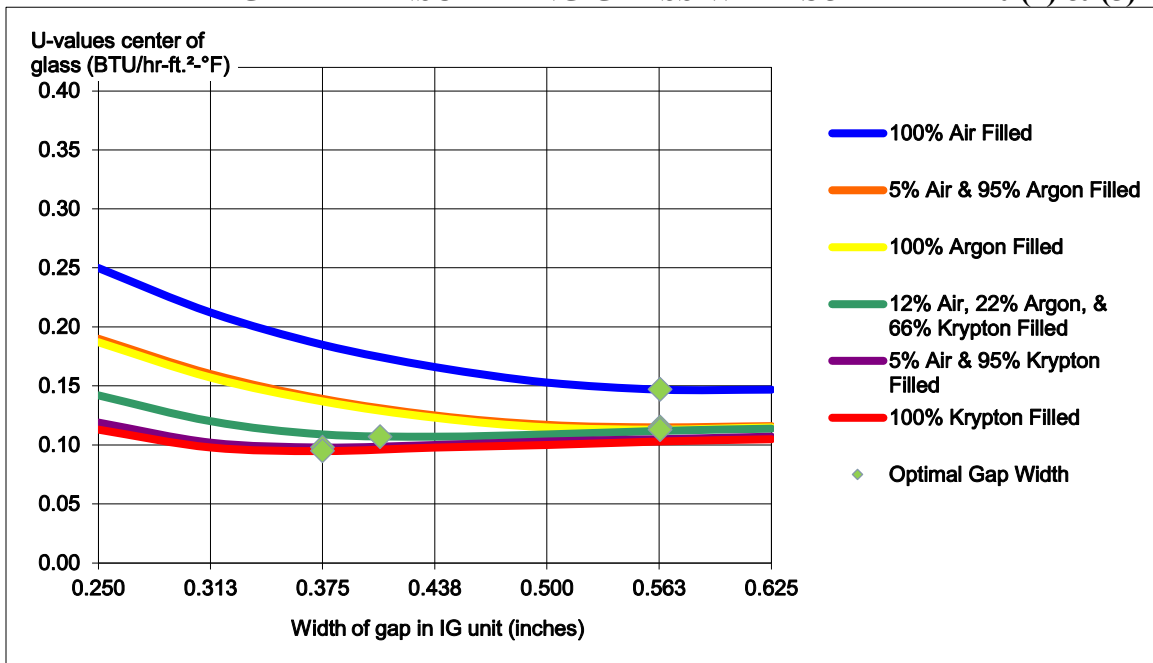
Gap Width	Low-e Coating	Winter Nighttime U-values for various gas fill types					
		100% Air Filled	5% Air / 95% Argon Filled	100% Argon Filled	12% Air / 22% Argon / 66% Krypton Filled	5% Air / 95% Krypton Filled	100% Krypton
1/4"	Solarban 60	.254	.194	.191	.147	.124	.118
	Solarban 70	.250	.190	.187	.142	.119	.113
5/16"	Solarban 60	.216	.164	.162	.125	.108	.103
	Solarban 70	.212	.160	.157	.120	.102	.098
3/8"	Solarban 60	.190	.144	.141	.114	.103	.100
	Solarban 70	.185	.139	.137	.109	.098	.095
7/16"	Solarban 60	.170	.130	.128	.112	.105	.103
	Solarban 70	.166	.125	.123	.107	.100	.098
1/2"	Solarban 60	.158	.122	.120	.114	.108	.105
	Solarban 70	.153	.117	.115	.109	.103	.100
9/16"	Solarban 60	.151	.120	.118	.117	.110	.108
	Solarban 70	.147	.115	.113	.112	.105	.103
5/8"	Solarban 60	.151	.121	.119	.119	.112	.110
	Solarban 70	.147	.116	.115	.114	.107	.105

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**TRIPLE GLAZED INSULATING GLASS WITH *SOLARBAN* 60 (2) & (5)**



**TRIPLE GLAZED INSULATING GLASS WITH *SOLARBAN* 70 (2) & (5)**



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To get a copy of the LBNL WINDOW computer simulation program and other software related to the glazing industry, use this Internet link: <http://windows.lbl.gov/software/>

HISTORY TABLE		
ITEM	DATE	DESCRIPTION
Original Publication	4/22/2002	TD-121
Revised and updated	5/4/2002	Added reference to TD-128
Revision #2	10/04/2016	Updated to Vitro Logo and format
Revision #3	1/25/2019	Updated to Vitro Logo and format
Revision #4	12/12/2023	Updated references and added Solarban 70

*This document is intended to inform and assist the reader in the application, use, and maintenance of Vitro Flat Glass products. Actual performance and results can vary depending on the circumstances. Vitro makes no warranty or guarantee as to the results to be obtained from the use of all or any portion of the information provided herein, and hereby disclaims any liability for personal injury, property damage, product insufficiency, or any other damages of any kind or nature arising from the reader's use of the information contained herein.*

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