



Calculation based on ISO 15099

Product name: Universal Inswing Hopper Window				Center-of-glass properties		
ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing West - facing			Cardinal E180/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm No Grids		
Climate specific recommendations:		Whole-window installed U-value		Ucog-Value		
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F
8		0.88	0.16	0.487	0.653	0.115
7		0.87	0.15	0.487	0.642	0.113
6		0.87	0.15	0.487	0.635	0.112
5		0.87	0.15	0.487	0.634	0.112
4		0.87	0.15	0.487	0.632	0.111
Marine North		0.87	0.15	0.487	0.631	0.111
Marine South	✓	0.86	0.15	0.487	0.628	0.111
3	✓	0.87	0.15	0.487	0.630	0.111
2 West		0.84	0.15	0.487	0.589	0.104
2 East		0.84	0.15	0.487	0.589	0.104
Universal Inswing Hopper Window		FRAME		Psi-spacer		Psi-opaque
Cardinal Endur		Frame height		Ψ		W/mK
		mm	in	W/m2K	BTU/hr.ft2.F	
Head		105	4.12	1.12	0.20	0.135
Sill		105	4.12	1.12	0.20	BTU/hr.ft.F
left jamb		105	4.12	1.13	0.20	0.078
right jamb		105	4.12	1.13	0.20	Grade B


Valid through November 2022

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Product name: Universal Inswing Hopper Window				Center-of-glass properties		
ASHRAE/IECC /DOE North American Climate Zone	South- facing	North, East, West - facing			Cardinal E180/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm SDL/no Internal grids < 25.4mm	
Climate specific recommendations:			Whole-window installed U-value		Ucog-Value	
			W/m2K	BTU/hr.ft2.F	SHGC	BTU/hr.ft2.F
					W/m2K	
8			0.88	0.16	0.424	0.115
7			0.87	0.15	0.424	0.113
6			0.87	0.15	0.424	0.112
5			0.87	0.15	0.424	0.112
4			0.87	0.15	0.424	0.111
Marine North			0.87	0.15	0.424	0.111
Marine South	✓		0.86	0.15	0.424	0.111
3	✓		0.87	0.15	0.424	0.111
2 West			0.84	0.15	0.424	0.104
2 East			0.84	0.15	0.424	0.104
Universal Inswing Hopper Wi		FRAME		Psi-spacer		Psi-opaque
Cardinal Endur		U-frame		Ψ		
		mm	in	W/m2K	BTU/hr.ft.F	W/mK
Head		105	4.12	1.12	0.20	0.135
Sill		105	4.12	1.12	0.20	BTU/hr.ft.F
left jamb		105	4.12	1.13	0.20	0.078
right jamb		105	4.12	1.13	0.20	Grade B


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ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing West - facing			Cardinal E180/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm Internal grids And SDL with Internal grids < 25.4mm maintain 3mm clearance		
Climate specific recommendations:		Whole-window installed U-value		Ucog-Value		
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F
8		0.88	0.16	0.424	0.653	0.115
7		0.87	0.15	0.424	0.642	0.113
6		0.87	0.15	0.424	0.635	0.112
5		0.87	0.15	0.424	0.634	0.112
4		0.87	0.15	0.424	0.632	0.111
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Universal Inswing Hopper Window		FRAME		Psi-spacer		Psi-opaque
Cardinal Endur		Frame height		U-frame		Ψ
		mm	in	W/m2K	BTU/hr.ft2.F	
Head		105	4.12	1.12	0.20	0.007
Sill		105	4.12	1.12	0.20	0.004
left jamb		105	4.12	1.13	0.20	0.007
right jamb		105	4.12	1.13	0.20	0.004
						W/mK
						BTU/hr.ft.F
						0.135
						0.078
						Grade B


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ASHRAE/IECC /DOE North American Climate Zone	North, East, West - facing	South- facing			
			Cardinal E180/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm Internal grids And SDL with Internal grids < 25.4mm		
			Whole-window installed U-value		Ucog-Value
Climate specific recommendations:			W/m2K	BTU/hr.ft2.F	SHGC
					W/m2K
					BTU/hr.ft2.F
8			0.94	0.17	0.424
7			0.93	0.16	0.424
6			0.93	0.16	0.424
5			0.93	0.16	0.424
4			0.92	0.16	0.424
Marine North			0.92	0.16	0.424
Marine South	✓		0.92	0.16	0.424
3	✓		0.92	0.16	0.424
2 West			0.89	0.16	0.424
2 East			0.89	0.16	0.424
Universal Inswing Hopper Wi			FRAME		Psi-spacer
Cardinal Endur			Psi-opaque		
			Frame height		U-frame
			mm in		W/m2K BTU/hr.ft2.F
					Ψ
					W/mK
					BTU/hr.ft.F
					W/mK
					BTU/hr.ft.F
					0.078
					Grade B


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Product name: Universal Inswing Hopper Window				Center-of-glass properties				
ASHRAE/IECC /DOE North American Climate Zone	South-facing	North, East, West - facing			Cardinal E180/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm SDL/no Internal grids >= 25.4mm			
Climate specific recommendations:			Whole-window installed U-value		Ucog-Value			
			W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F	
8			0.88	0.16	0.365	0.653	0.115	
7			0.87	0.15	0.365	0.642	0.113	
6			0.87	0.15	0.365	0.635	0.112	
5			0.87	0.15	0.365	0.634	0.112	
4		✓	0.87	0.15	0.365	0.632	0.111	
Marine North		✓	0.87	0.15	0.365	0.631	0.111	
Marine South	✓		0.86	0.15	0.365	0.628	0.111	
3	✓		0.87	0.15	0.365	0.630	0.111	
2 West			0.84	0.15	0.365	0.589	0.104	
2 East			0.84	0.15	0.365	0.589	0.104	
Universal Inswing Hopper Window Cardinal Endur		FRAME				Psi-spacer		Psi-opaque
		Frame height		U-frame		Ψ		W/mK
		mm	in	W/m2K	BTU/hr.ft2.F	W/mK	BTU/hr.ft.F	
Head		105	4.12	1.12	0.20	0.007	0.004	0.135
Sill		105	4.12	1.12	0.20	0.007	0.004	BTU/hr.ft.F
left jamb		105	4.12	1.13	0.20	0.007	0.004	0.078
right jamb		105	4.12	1.13	0.20	0.007	0.004	Grade B


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Cardinal Endur	Frame height		U-frame		Ψ
	mm	in	W/m2K	BTU/hr.ft2.F	
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