



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 E366/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm No Grids		
		Whole-window installed U-value		Ucog-Value		
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F
Climate specific recommendations:						
8		0.86	0.15	0.230	0.625	0.110
7		0.85	0.15	0.230	0.612	0.108
6		0.84	0.15	0.230	0.601	0.106
5		0.84	0.15	0.230	0.600	0.106
4		0.84	0.15	0.230	0.597	0.105
Marine North		0.84	0.15	0.230	0.595	0.105
Marine South	✓	0.84	0.15	0.230	0.592	0.104
3	✓	0.84	0.15	0.230	0.594	0.105
2 West	✓	0.81	0.14	0.230	0.555	0.098
2 East	✓	0.81	0.14	0.230	0.555	0.098
Universal Inswing Hopper Window Cardinal Endur		FRAME		Psi-spacer		Psi-opaque
		Frame height		U-frame		W/mK
		mm	in	W/m2K	BTU/hr.ft2.F	
Head		105	4.12	1.11	0.20	0.007
Sill		105	4.12	1.11	0.20	0.004
left jamb		105	4.12	1.12	0.20	0.007
right jamb		105	4.12	1.12	0.20	0.004


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ASHRAE/IECC /DOE North American Climate Zone	North, East, South- facing West - facing			Cardinal E366/ 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		0.86	0.15	0.201	0.625	0.110
7		0.85	0.15	0.201	0.612	0.108
6		0.84	0.15	0.201	0.601	0.106
5		0.84	0.15	0.201	0.600	0.106
4		0.84	0.15	0.201	0.597	0.105
Marine North		0.84	0.15	0.201	0.595	0.105
Marine South	✓	0.84	0.15	0.201	0.592	0.104
3	✓	0.84	0.15	0.201	0.594	0.105
2 West	✓	0.81	0.14	0.201	0.555	0.098
2 East	✓	0.81	0.14	0.201	0.555	0.098
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	1.11	0.20	0.007
Sill		105	4.12	1.11	0.20	0.004
left jamb		105	4.12	1.12	0.20	0.007
right jamb		105	4.12	1.12	0.20	0.004
						W/mK
						0.134
						BTU/hr.ft.F
						0.078
						Grade B


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Climate specific recommendations:		Whole-window installed U-value		Ucog-Value		
		W/m2K	BTU/hr.ft2.F	SHGC	W/m2K	BTU/hr.ft2.F
8		0.86	0.15	0.201	0.625	0.110
7		0.85	0.15	0.201	0.612	0.108
6		0.84	0.15	0.201	0.601	0.106
5		0.84	0.15	0.201	0.600	0.106
4		0.84	0.15	0.201	0.597	0.105
Marine North		0.84	0.15	0.201	0.595	0.105
Marine South	✓	0.84	0.15	0.201	0.592	0.104
3	✓	0.84	0.15	0.201	0.594	0.105
2 West	✓	0.81	0.14	0.201	0.555	0.098
2 East	✓	0.81	0.14	0.201	0.555	0.098
Universal Inswing Hopper Window		FRAME		Psi-spacer		Psi-opaque
Cardinal Endur		Frame height		U-frame		W/mK
		mm	in	W/m2K	BTU/hr.ft2.F	
Head		105	4.12	1.11	0.20	0.134
Sill		105	4.12	1.11	0.20	BTU/hr.ft.F
left jamb		105	4.12	1.12	0.20	0.078
right jamb		105	4.12	1.12	0.20	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	<div> Passive House Institute US</div>			Cardinal E366/ Arg/ E180/ Arg/ i89(#6) (6mm) 44,0mm Internal grids And SDL with 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			0.92	0.16	0.201	0.625	0.110	
7			0.91	0.16	0.201	0.612	0.108	
6			0.90	0.16	0.201	0.601	0.106	
5			0.90	0.16	0.201	0.600	0.106	
4			0.90	0.16	0.201	0.597	0.105	
Marine North		✓	0.90	0.16	0.201	0.595	0.105	
Marine South	✓	✓	0.89	0.16	0.201	0.592	0.104	
3	✓	✓	0.90	0.16	0.201	0.594	0.105	
2 West	✓	✓	0.87	0.15	0.201	0.555	0.098	
2 East	✓	✓	0.87	0.15	0.201	0.555	0.098	
Universal Inswing Hopper Window		FRAME			Psi-spacer		Psi-opaque	
Cardinal Endur		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	1.11	0.20	0.007	0.004	0.134
Sill		105	4.12	1.11	0.20	0.007	0.004	BTU/hr.ft.F
left jamb		105	4.12	1.12	0.20	0.007	0.004	0.078
right jamb		105	4.12	1.12	0.20	0.007	0.004	Grade B


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ASHRAE/IECC /DOE North American Climate Zone	South-facing	North, East, West - facing	<div></div>			Cardinal E366/ 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			0.86	0.15	0.173	0.625	0.110	
7			0.85	0.15	0.173	0.612	0.108	
6			0.84	0.15	0.173	0.601	0.106	
5			0.84	0.15	0.173	0.600	0.106	
4		✓	0.84	0.15	0.173	0.597	0.105	
Marine North		✓	0.84	0.15	0.173	0.595	0.105	
Marine South	✓	✓	0.84	0.15	0.173	0.592	0.104	
3	✓	✓	0.84	0.15	0.173	0.594	0.105	
2 West	✓	✓	0.81	0.14	0.173	0.555	0.098	
2 East	✓	✓	0.81	0.14	0.173	0.555	0.098	
Universal Inswing Hopper Wi		FRAME				Psi-spacer		Psi-opaque
Cardinal Endur		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	1.11	0.20	0.007	0.004	0.134
Sill		105	4.12	1.11	0.20	0.007	0.004	BTU/hr.ft.F
left jamb		105	4.12	1.12	0.20	0.007	0.004	0.078
right jamb		105	4.12	1.12	0.20	0.007	0.004	Grade B


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7			0.85	0.15	0.173	0.612 0.108		
6			0.84	0.15	0.173	0.601 0.106		
5			0.84	0.15	0.173	0.600 0.106		
4		✓	0.84	0.15	0.173	0.597 0.105		
Marine North		✓	0.84	0.15	0.173	0.595 0.105		
Marine South	✓	✓	0.84	0.15	0.173	0.592 0.104		
3	✓	✓	0.84	0.15	0.173	0.594 0.105		
2 West	✓	✓	0.81	0.14	0.173	0.555 0.098		
2 East	✓	✓	0.81	0.14	0.173	0.555 0.098		
Universal Inswing Hopper Window		FRAME			Psi-spacer		Psi-opaque	
Cardinal Endur		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	1.11	0.20	0.007	0.004	0.134
Sill		105	4.12	1.11	0.20	0.007	0.004	BTU/hr.ft.F
left jamb		105	4.12	1.12	0.20	0.007	0.004	0.078
right jamb		105	4.12	1.12	0.20	0.007	0.004	Grade B

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4		0.90	0.16	0.173	0.597	0.105
Marine North		0.90	0.16	0.173	0.595	0.105
Marine South	✓	0.89	0.16	0.173	0.592	0.104
3	✓	0.90	0.16	0.173	0.594	0.105
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Universal Inswing Hopper Wi		FRAME		Psi-spacer		Psi-opaque
Cardinal Endur		Frame height		Ψ		
		mm	in	W/m2K	BTU/hr.ft.F	W/mK
Head		105	4.12	1.11	0.20	0.134
Sill		105	4.12	1.11	0.20	BTU/hr.ft.F
left jamb		105	4.12	1.12	0.20	0.078
right jamb		105	4.12	1.12	0.20	Grade B

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