Window Installation



Window PSI_{Install} Thermal Bridges





PSI: 0.0509 Btu/hr-ft-F (9x recommended value)

PSI: 0.0261 Btu/hr-ft-F (4x recommended value)



Calculating Window PSI_{Install}

 ΔT



Typ. Jamb Detail in 2x Stl. Std Wall





Model the Window Frame + Glazing



CENTER FOR Architecture

bldgtyp

AIA

New York

ISO 10077-2: For the glass, use a 'Panel' material with standard conductivity: 0.02 Btu/h-ft-F (*0.035 W/m-k*)

Model the Window Frame + Glazing



Options / Preferences /...

# THERM 7.4 - [Therm Example_Window_Frame+Glazing.THM] # File Edit View Draw Libraries Options Calculation Window Help		– Ø × _ 8 ×
D╔╏ॖॖॖॖॖऀॖॏॖॖॖॖॖॖॏॖॖॖॖॖॖॖॖॖॖॖ ॻॖॖऀॖॖॖॖॖ ॻॖॖऀॖ ॴॖॾॱॶॖॾॱॶढ़ॶढ़ॶढ़ॖॖॎॾॖॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾॾ	v	
	Therm File Options Snap Settings Updates Preferences Drawing Options Simulation Save program settings on exit Prompt for saving libraries on program exit Automatic WINDOW 4 Export on Save	-
	 Automatic XML Export on Save ✓ Auto Recover every 5minutes ✓ Automatically display results after simulation ✓ Ask before automatically adjusting points Unit System © Inch-Pounds ⊙ SI Conductivity Units © Btu/hrft-F © Btu/hrft2-F 	
	Default vertical jamb cavity height 1.55 inches Allow editing of Frame Cavity heat flow and temperatures Windows 95 Radiance Mode Results Display Display R-Values instead of U-Factors	
↓ x,y 49.9, 20.5 dx,dy -329.6,177.5 len 374.3 [Step 76.2 mm Ready	Image: Heat How Image: Heat Hux Simulation directory: C:\Users\Public\LBNL\THERM7.4\Sim Change Image: Use Them 6 file format	NUM
AIA CENTER FOR bldgtyp	OK Cancel Apply	

Model the Window Frame + Glazing





Record the Glass + Frame Heat Loss

Psi_{Install} Value = Losses_{2D} - (Losses_{Wall} + Losses_{Frame & Glass})

THERM OUTPUTS					
Туре	U-Factor (Btu/hr·ft²·F)	Delta T (F)	Length in the Combined Detail (ft)		Total Heat Loss (Btu/h-ft)
Losses _{2D}					
Losses _{Frame + Glass}				=	10.0965
Losses _{Wall}					



Model the Combined Detail

THERM 7.4 - [Therm Example_Window_Full_Detail.THM]		– 0 ×
The File Edit View Draw Libraries Options Calculation Window Help		- 5 ×
口 取 整 書 国 匠 日 巻 注 ● ス 타 か ら え 人 今 今 の 入 修 日 ろ		
		▼ ▶
	1	<u></u>
Ready	Sill	NUM



Model the Combined Detail

THERM 7.4 - [Therm Example_Window_Full_Detail.THM]	- 0 ×
Record the 'Heat Flow'	
U-Factors	×
U-factor delta T Length Btu/h-ft2-F F inches Rotation EXTERIOR 0.0647 54.0 57.0605 N/A Projected Y I6.625	low Heat Flux h Btu/h-ft2 50 3.4963
Display © U-factor © R-value	
% Error Energy Norm 7.24% Export	
'Exterior' U-Factor Tag	
y -238.7,1219.2 dx, dy -606.7,1210.6 len 1354.1 Step 76.2 mm leady	Sill NUN



Record the Losses_{2D} Heat Loss

Psi_{Install} Value = Losses_{2D} - (Losses_{Wall} + Losses_{Frame & Glass})

THERM OUTPUTS					
Туре	U-Factor (Btu/hr·ft ² ·F)	Delta T (F)	Length in Combined I (ft)	the Detail	Total Heat Loss (Btu/h-ft)
Losses _{2D}				=	16.6250
Losses _{Frame + Glass}				=	10.0965
Losses _{Wall}				=	



Model the Clear Wall





Model the Clear Wall

THERM 7.4 - [Therm Example_Window_Clear Wall.THM]	– 0 × - 8 ×
□☞▣噕□■└□☞⊣■╡마┾┍♀∥◈│ፇё੫╎%	
Record the LI-Eactor and dT	
U-Factors	×
U-factor delta T Length Heat Flow	Heat Flux
Btu/h-ft2-F F inches Rotation Btu/h	Btu/h-ft2
EXTERIOR 0.0283 54.0 32.0001 N/A Projected Y 4.0817	1.5306
i'	
Display ———	
U-factor	
Export	
% Error Energy Norm 5.72%	
ОК	
Image: state	Þ.
311	INDIVI



Calculate Total Clear Wall Heat Loss

Psi_{Install} Value = Losses_{2D} - (Losses_{Wall} + Losses_{Frame & Glass})

THERM OUTPUTS					
Туре	U-Factor (Btu/hr·ft²·F)	Delta T (F)	Length in the Combined Detail (ft)		Total Heat Loss (Btu/h-ft)
Losses _{2D}				=	16.6250
Losses _{Frame + Glass}				=	10.0965
Losses _{Wall}	0.0283	54		=	





Calculate Total Clear Wall Heat Loss

Psi_{Install} Value = Losses_{2D} - (Losses_{Wall} + Losses_{Frame & Glass})

THERM OUTPUTS					
Туре	U-Factor (Btu/hr·ft ² ·F)	Delta T (F)	Length in the Combined Detail (ft)		Total Heat Loss (Btu/h-ft)
Losses _{2D}				=	16.6250
Losses _{Frame + Glass}				=	10.0965
Losses _{Wall}	0.0283	54	41.312" ÷ 12"/ft	=	5.26108



Calculate the PSI-Value

 $Psi_{Install} Value = Losses_{2D} - (Losses_{Wall} + Losses_{Frame & Glass})$ ΔT

Psi_{Install} = 16.63 Btu/hr-ft – (10.1 Btu/hr-ft + 5.26 Btu/hr-ft) = **0.024 Btu/hr·ft·F**

54 F



The frame geometry and material properties **must** come from the window supplier. There isn't any other way to find this data unfortunately.



