





Why S	hould an Energy Rater
Pe	erform HVAC Load
	Calculations?
Energy star	NERGY STAR Qualified Homes Iational Performance Path Notes
7. All cooling equipme STAR products requir ACCA Manuals J and S equivalent computatio and heat pumps is 15 8, where the maximur by the rater performin the professional contra contractor).	ent, regardless of whether it is used to satisfy the ENERGY ement, must be sized according to the latest editions of S, ASHRAE 2001 Handbook of Fundamentals, or an on procedure. Maximum over sizing limit for air conditioners % (with the exception of heat pumps in Climate Zones 5 - n over sizing limit is 25%). This can be accomplished either g the calculations or reviewing documentation provided by actor or engineer who calculated the sizing (e.g., HVAC
\$\$\$ A	dditional Profit Center \$\$\$
CALCS-PLUS	

From Number 7 of the National Performance Path Notes.



The Whole-House approach calculates the heat gain and loss for the envelope. It is a quicker way to accurately calculate the building's heating and cooling loads to verify overall equipment sizing. But this method is no help when trying to satisfy an individual room's requirement.



By breaking the house up into rooms we can get a better idea of each rooms unique requirements.

























In order to perform an accurate HVAC load calculation you will need scalable blueprints, a scale, MJ8 forms, and of coarse Manual Jv8 to obtain all the heat transfer factors.



A Computer Only Proced	ure
Y	Addendum B to
From "Addendum B" from ACCA Manual J®	ACCA Manual J <sub>&amp;</sub> <b>Residential Load</b> <b>Calculation</b> Eighth Edition ANSI/ACCA Man J 2-2004
	ISBN# 1-592765-27-6 This addendum updates, Version 1.10 of Manual Eighth. Edition (MS <sup>®</sup> ) and addresses AE Protocol Revisions to the MS <sup>®</sup> procedures.
Executive Summary	
Now that the industry and software houses have had time to work with the Eighth ACCA has determined that AED simplifications would ease implementation vendors and improve the understanding and use of MJ8 by practitioners. This adequate exposure diversity (AED) approach on window/glass exposures in the fo a) MJ8 shall become a computer-only procedure. (Note: A shorter, abridged v development that supports a hand calculation procedure aimed at single-fam with single-zone, constant-volume systems). b) A computer-only, hourly fenestration gain (HFG) procedure shall be u	Edition of Manual $J_{\oplus}$ , by third-party software addendum revises the llowing manners: version of MJ8 is under tily, detached dwellings sed for all application
scenarios.	
<ul> <li>Coloriations shall be used for middenmone unloss south only for in a foundation</li> </ul>	
c) Calculations shall be made for midsummer, unless southerly-facing fenestration the fall.	on causes a peak gam m

The is from the Executive Summery in Addendum B to ACCA Manual J. Version 8 is a very complex calculation which was designed to be performed by a computer.

Residential Loa Calculation	d Re RE ECYTON	
Includes demo software en CD-ROM.	recognized by a standards of M	ware programs are ACCA as meeting the anual J residential
	load calculation	IS.
Powered by	Elite Software	RHVAC
ACCCA. Ar Conditioning Contractors of America MANULAL. 1.	WrightSoft	Right-J
CALCS-PLUS	Nitek	HVAC Wizard



From the ACCA website which is www.ACCA.org.





The software we will be using for this program will be Elite Software. Not to say that Elite Software is better than Wright Soft or HVAC Wizard, we started using Elite back in 1987. At that time, and even now the basis of our business is HVAC load calculations. After researching both Elite and Write Soft we chose Elite because we thought it appeared more user friendly. We have learned it well and are very satisfied with our selection and have found the Elite Software company to be sensitive to our needs.



In order to perform an accurate HVAC load calculation only three things are required: a blue print, a scale, and a certified ACCA MJ8 computer program. Most of the certified programs have a computer aided drawing program that, if set up correctly will do the loads in the background while you draw the floor plan. For the purposes of satisfying the intent of this session we will do the take-off the old fashioned way; understanding the construction documents which includes scaling the plans.



The certified programs have "Table 1-A" database from Manual J already built into them. This table shows outdoor design conditions for the United States and Canada. Selection of the climate area for the location of the building is very important. For this example we will be using West Palm Beach, Florida.

Calculation			ap	Ie	IA				
	RH <sup>V</sup> AC(	VAC CA M nates	weat lanua s).	her da Il J ve	ata ba rsion 8	se co 8 Tab	mes o le 1A	directly & 1B(	y fror micro
c	utdoor D	esign Co	Ta	able 1A For the L	Inited Stat	es and Ca	anada		
	Elevention	Lastanda	1022-0-0			0	1977A-1955		
Location	Elevation Feet	Latitude Degrees North	Winter Heating 99%	Cooling 1%	Coincident Wet Bulb	Sum Design Grains	nmer Design Grains	Design Grains	Daily Range
Location	Elevation Feet	Latitude Degrees North	Winter Heating 99% Dry Bulb	Cooling 1% Dry Bulb	Coincident Wet Bulb	Sum Design Grains 55% RH	nmer Design Grains 50% RH	Design Grains 45% RH	Daily Range (DR)
Location St. Augustine	Elevation Feet	Latitude Degrees North 29	Winter Heating 99% Dry Bulb 35	Cooling 1% Dry Bulb 89	Coincident Wet Bulb 78	Sum Design Grains 55% RH	nmer Design Grains 50% RH 66	Design Grains 45% RH 72	Daily Range (DR) M
Location St. Augustine St. Petersburg	Elevation Feet 10 11	Latitude Degrees North 29 28	Winter Heating 99% Dry Bulb 35 47	Cooling 1% Dry Bulb 89 93	Coincident Wet Bulb 78 79	Sum Design Grains 55% RH 59 59	nmer Design Grains 50% RH 66 66	Design Grains 45% RH 72 72	Daily Range (DR) M M
Location St. Augustine St. Petersburg Sanford	Elevation Feet 10 11 55	Latitude Degrees North 29 28 28	Winter Heating 99% Dry Bulb 35 47 38	Cooling 1% Dry Bulb 89 93 93	Coincident Wet Bulb 78 79 76	Sum Design Grains 55% RH 59 59 39	Design Grains 50% RH 66 66 46	Design Grains 45% RH 72 72 52	Daily Range (DR) M M M
St. Augustine St. Petersburg Sanford Sarasota/Bradenton	Elevation Feet 10 11 55 30	Latitude Degrees North 29 28 28 28 28 27	Winter Heating 99% Dry Bulb 35 47 38 43	Cooling 1% Dry Bulb 89 93 93 93 92	Coincident Wet Bulb 78 79 76 79	Sum Design Grains 55% RH 59 59 39 61	nmer Design Grains 50% RH 66 66 46 68	Design Grains 45% RH 72 72 52 74	Daily Range (DR) M M M M
St. Augustine St. Petersburg Sanford Sarasota/Bradenton Tallahassee AP	Elevation Feet 10 11 55 30 55	Latitude Degrees North 29 28 28 27 30	Winter Heating 99% Dry Bulb 35 47 38 43 43 28	Cooling 1% Dry Bulb 89 93 93 92 93 92	Coincident Wet Bulb 78 79 76 79 76 79 76	Sum Design Grains 55% RH 59 59 39 61 39	Design Grains 50% RH           66           66           46           68           46	Design Grains 45% RH 72 72 52 74 52	Daily Range (DR) M M M M M
St. Augustine St. Petersburg Sanford Sarasota/Bradenton Tallahassee AP Tampa AP	Elevation Feet 10 11 55 30 55 19	Latitude Degrees North 29 28 28 27 30 28	Winter           Heating 99%           Dry Bulb           35           47           38           43           28           40	Cooling 1% Dry Bulb 89 93 93 93 92 93 92 93 91	Coincident Wet Bulb 78 79 76 79 76 79 76 77	Sum Design Grains 55% RH 59 59 39 61 39 61 39 49	Design Grains 50% RH           66           66           66           66           46           68           46           56	Design Grains 45% RH 72 72 52 74 52 74 52 62	Daily Range (DR) M M M M M M
St. Augustine St. Petersburg Sanford Sarasota/Bradenton Tallahassee AP Tampa AP Valpariso, Eglin AFB	Elevation Feet 10 11 55 30 55 19 85	Latitude Degrees North 29 28 28 28 27 30 28 30	Winter           Heating 99%           Dry Bulb           35           47           38           43           28           40           33	Cooling 1% Dry Bulb 89 93 93 93 92 93 92 93 91 90	Coincident Wet Bulb 78 79 76 79 76 79 76 77 78	Sum Design Grains 55% RH 59 59 39 61 39 61 39 49 57	Design Grains           50% RH           66           66           68           46           56           64	Design Grains 45% RH 72 72 52 74 52 62 70	Daily Range (DR) M M M M M M M
St. Augustine St. Petersburg Sanford Sarasota/Bradenton Tallahassee AP Tampa AP Valpariso, Eglin AFB Vero Beach	Elevation Feet 10 11 55 30 55 19 85 13	Latitude Degrees North 29 28 28 27 30 28 30 28 30 28 30 27	Winter           Heating 99%           Dry Bulb           35           47           38           43           28           40           33           43	Cooling 1% Dry Bulb 89 93 93 92 93 92 93 91 90 90	Coincident Wet Bulb 78 79 76 79 76 79 76 77 78 78 78	Sum Design Grains 55% RH 59 59 39 61 39 61 39 49 57 57	Besign Grains           50% RH           66           66           66           66           66           66           66           66           66           66           66           66           66           66           66           66           64           64	Design Grains 45% RH 72 52 74 52 62 70 70 70	Daily Range (DR) M M M M M M M M M

Setting up the correct design conditions for the area the building is very important when it comes to satisfying one of MJ8's sensitivities.



We are going to be using a simple 3 bedroom 2 bath floor plan. The home has 9' CB (cement block) walls with R-5 board insulation on the inside of the wall; 100% coverage, furred and dry walled. The ceiling has a vented attic above with R-19 insulation, floor is slab on grade, all of the glass is single pane clear, and the top of the window as at 8' with an average overhang of 2'.



Set up a default room. The materials in the Default Room Data are those materials that make up the air and thermal barrier of the building. This room will be used as a template and it will include the most common building materials used in the home we will be sizing, All of the ACCA MJ8 materials are stored in the program's database. Some boxes will be left at 0 or unfilled but at minimum the floor to ceiling height should be entered, the floor material, roof material, wall material, glass material, and door material. This will save a lot of time later.

Default Room Data		
None None None None Default Room Floor Material 1 [22A-ph 1 ]358 ↓0 Sleb on grade. No edge inclution. no insulation b Roof Material 1 ]661-19 ↓0.049 ↓0 Under stil: or knee well. Vented Altr. Not colornt Membrane. F-19 insulation Vall Material 1 ]165-05 ↓0.75 ↓0 Block. board insulation by P-5 board insulation Gloss Material 1 ]1A-cb-0 ↓0.88 ↓0.75 Single pane. operable window. clear. metal finme reflective color dreps with light weave with 50% c Door Material 1 ]11P ↓0.29 ↓0 Metal-Polyurethane Core	To select a material type click the down arrow next to the material type	eight Check Errors
Special Section 2014	We will be using the wall section at th	e right (rinned off from l

To set the floor "material type" click the down arrow

x       x	A S X R A 48 X & B D D I C O RA 14 B X X     A 48 X & B D D I C O RA 14 B X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C O X     A 48 X & B D D C I C C X     A 48 X & B D D C I C X     A 48 X & B D D C I C X     A 48 X & B D D C I C X     A 48 X & B D D C X     A 48 X & A A8 X & A A8 X & A A8 X & A A8 X     A A8 X &	A Const No. U-Value Crisp Value Const		Jili Data					manu-
No.       No.       Floor Material         Boor Material       Const. No.       U-Value       Catspan       Catspan <th>Image: Second Second</th> <th>Image: State in the select a floor in that category for the 2 select a floor in that category for cover         2 select a category from the 1 select a floor in that category from the 2 select a floor in that category for cover           1/13A         Block bit         20 - Over End. Craw/Basement         20 - Over Craw/Basement         21 - Over Craw/Basement         22 - Slab         10 - Over Craw/Basement         22 - Over Craw/Basement         22 - Slab         10 - Ove</th> <th></th> <th>🐂 📾 🗙 🖁 📾</th> <th>90¢</th> <th>₽b % Fb @B ×</th> <th></th> <th></th> <th>Internet Line</th>	Image: Second	Image: State in the select a floor in that category for the 2 select a floor in that category for cover         2 select a category from the 1 select a floor in that category from the 2 select a floor in that category for cover           1/13A         Block bit         20 - Over End. Craw/Basement         20 - Over Craw/Basement         21 - Over Craw/Basement         22 - Slab         10 - Over Craw/Basement         22 - Over Craw/Basement         22 - Slab         10 - Ove		🐂 📾 🗙 🖁 📾	90¢	₽b % Fb @B ×			Internet Line
Biology       Favorites       Recent       Custom         Biology       Const No.       U-Value       Category       Cr.Sp.VV       Seeled       Radiant       Options       Description         Steb on       22A-p1       0.385       22-Slab       r/a       No       c       passive. light dy soil         20P-dt       0.385       22-Slab       r/a       r/a       No       c       passive. light dy soil         20P-dt       0.385       20-Over       r/a       r/a       No       c       no insulation, carpet or hardwood         02P-dt       0.521       20-Over       r/a       r/a       No       Recent Category       Passive. light dy soil         20P-dt       0.521       20-Over       r/a       r/a       No       Recent Category from the category from the category from the category from the 21 list below, then select a floor in that category from the 2nd list.         1       1       Salect       a category       Description on insulation cover       22         22A       No edge insulation below floor cover       22A       No edge insulation covers stab edge attracted starting tracking 4" horizontally, any floor cover         22A       Horizontal board insulation covers stab edge tracking stabe adge trackends 4" horizontally, any floor cover	Constraint         Constraint         Constraint         Constraint         Constraint           Station         Const No.         U-Value         Category         Cr.Sp.W         Sealed         Radiant         Options         Description           Const No.         U-Value         Category         Cr.Sp.W         Sealed         Radiant         Options         Description           Const No.         U-Value         Category         Cr.Sp.W         Sealed         Radiant         Options         Description           Const No.         U-Value         Category         Cr.Sp.W         Sealed         Radiant         Options         Description           Const No.         U-Value         Category         Cr.m.         n/a         No         no         no         insulation, carpet or hardwood           Under at         Membra         10-5         20 - Over         n/a         No         R-19 blanket insulation, carpet or wind           State ta category from the 1st list below, then select a floor in that category from the 2nd list.         Category         <	Joor Mater         Favorites         Recent         Custom           Joor Mater         Const. No.         U-Value         Category         Cr.Sp.W         Sealed         Radiant         Optons         Description           22A-pl         0.385         22 - Slab         n/a         n/a         No         c         passive. light dry soil           20P-00         0.385         22 - Over         n/a         n/a         No         c         no insulation. carpet or hardwood           20P-01         0.55         20 - Over         n/a         n/a         No         c         no insulation. the or vinyl           1180-         20P-01         0.55         20 - Over Open Craw//Garage         21 - Baseme         22 - Slab on Grade           Vall Mater         19 - Over End. Craw/Basement         20 - Over Open Craw//Garage         21 - Baseme         22 - Slab on Grade           Vall Mater         Select a category from the 1st list below, then select a floor in that category from the 2nd list.         113A-           113A-         Tabagory.         Description of the Category         22 - No edge insulation no insulation below floor caver           220         Vertical board insulation extends of under slab and floor in that category from the 2nd list.         113A-           113A-         22 - No		oor Materi	al				Name of the second seco
1       122-r.         Sisb on 22A-pl       Const. No.       U-Value       Category. Cr.Sp.W Sealed Radiant. Options. Description         22A-pl       0.989       22 - Slab r/a       r/a       No       c       passive. light dry soil         Boot Matter       20P-0t       0.385       20 - Over r/a       r/a       No       c       passive. light dry soil         Boot Matter       20P-10       0.521       20 - Over r/a       r/a       No       c       no insulation. cerpt or hardwood         20P-10       0.521       20 - Over r/a       r/a       No       c       no insulation. expet or hardwood         20P-11       0.521       20 - Over r/a       r/a       No       Residuation       Residuation and cover         Under at Memota       19 - Over Encl. Crawl/Basement       20 - Over Open Crawl/Garage       21 - Basement       22 - Slab on Grade         Wall Mater       1/1A-c       1/1A-c       1/1A-c       1/1A-c       1/1A-c       1/1A-c         Block to       Select a category from the 1st list below, then select a floor in that category from the 2d list.       Category       22 - Slab on Grade         1/1A-ct       Electa actegory insulation, no insulation below floor, any floor cover       22 - Vencia board insulation oxtends 4" under slab, any floo	1       22x+ Sleb on 0       Const No.       U-Value       Category       C:Sp.W       Sealed       Radiant       Options       Description         22x-pi       0.989       22 - Slab n/a       Na       Na       c       passive, light dry soil         20=0       0.385       20 - Over n/a       n/a       No       c       no insulation, carpet or hardwood         20=0       0.385       20 - Over n/a       n/a       No       c       no insulation, carpet or hardwood         20=0       0.521       20 - Over n/a       n/a       No       no insulation, carpet or hardwood         10=0       Description       10       20 - Over n/a       n/a       No       R-19 blanket insulation, any cover         Under at Membra       Image: Same and the category from the 1st list below, then select a floor in that category from the 2nd list.       Category       Description at this Category         1       144       Select a category from the 1st list below, then select a floor in that category floor the 2nd list.       Category       Description at this Category         22A       No edge insulation, no insulation below floor, any floor cover       Category       Description at eage and extends straing to dow to 3' below grade, any floor cover         22D       Verical board insulation covers slab edge, turns under slab	1 [224- Sieb on 204-pi       Const No.       U-Velue       Category       Cr.Sp.W       Seeled       Radiant       Options       Description         204-pi       0.385       20 - Over       n/a       n/a       No       c       passive.light dry soil         10-00-00       0.581       20 - Over       n/a       n/a       No       c       passive.light dry soil         10-00-00       0.581       20 - Over       n/a       n/a       No       c       passive.light dry soil         10-00-01       0.581       20 - Over       n/a       n/a       No       c       passive.light dry soil         10-00-01       0.581       20 - Over       n/a       n/a       No       c       passive.light dry soil         10-00-01       0.591       20 - Over       n/a       n/a       No       c       passive.light dry soil         11-00-01       Over Encl.       Crawl/Basement       20 - Over Open Crawl/Garage       21 - Basement       22 - Slab on Grade         20-01-01       Over Encl.       Crawl/Basement       20 - Over Open Crawl/Garage       21 - Basement       22 - Slab on Grade         20-01       Over Baselation.no insulation cover state state at one on in that category from the 2nd list.       Covere	Floor Mater Favo	rites Recent C	ustom				And
Biod Mitter     22A-p1     0.989     22 - Slab n/a     n/a     No     c     passive, light dry soil       Boof Matter     20P-0t     0.385     20 - Over n/a     n/a     No     c     passive, light dry soil       20P-10     0.385     20 - Over n/a     n/a     No     c     passive, light dry soil       20P-10     0.385     20 - Over n/a     n/a     No     c     no insulation, cirpt or hardwood       20P-11     0.521     20 - Over n/a     n/a     No     c     no insulation, any cover       Under at Memota     19 - Over Encl. Crawl/Basement     20 - Over Open Crawl/Garage     21 - Basemen     22 - Slab on Grade       Wall Mater     113-4     Select a category from the 1st list below, then select a floor in that category from the 2nd list.     Category       22A     No edge insulation, no insulation below floor, any floor cover     22     Slab on Grade       22A     No edge insulation, no insulation below floor, any floor cover     22     Vertica board insulation extends 4" under slab, any floor cover       21     1     Category     Decirabiand insulation extends 4" under slab, any floor cover     22       22C     Horizontal board insulation extends 4" under slab, any floor cover     22       22D     Vertica board insulation extends 4" under slab, any floor cover     22   <	Stall off     224-pil     0.989     22-Slab	Salau uni     22A-pl     0.389     22 - Slab n/a     n/a     No     c     passive, light dry soil       Soft Mather     20P-0c     0.385     20 - Over n/a     n/a     No     c     no insulation, carept or hardwood       Soft Mather     20P-0c     0.352     20 - Over n/a     n/a     No     c     no insulation, carept or hardwood       1     16B-     20P-0c     0.352     20 - Over n/a     n/a     No     c     no insulation, carept or hardwood       1     16B-     20P-19     0.05     20 - Over n/a     n/a     No     P-19 blanket insulation, any cover       Valid Mather     19 - Over Encl. Crawl/Basement     20 - Over Open Crawl/Grage     21 - Basement     22 - Slab on Grade       Valid Mather     20P-0     Osciption of this Catagony     East a category from the 1st list below, then select a floor in that category from the 2nd list.       1     Tategony     Description of this Catagony     East and this Catagony     East and the category floor cover       22A     No edge insulation no insulation below floor, any floor cover     22C     Vertical board insulation extends 4" under slab, any floor cover       20D Verid al board insulation cover slab edge, tums under slab and extends 4" horizontally, any floor cover     22C     Vertical board insulation cover slab edge, tums under slab and extends 4" horizontally, any floor cover	1 22A-1 Cons	t.No. U-Value	Category C	r.Sp.W Sealed	. Radiant Or	ptions Descript	ion
Boot Mater         Correct Council of a bit Over n/a         n/a         No         no insulation.caper on hadwood           1         166         20P-oft         0.521         20-Over n/a         n/a         No         R-19 blanket insulation.caper on hadwood           20P-oft         0.521         20-Over n/a         n/a         No         R-19 blanket insulation.caper on hadwood           Valid Matter         20P-oft         0.521         20-Over n/a         n/a         No         R-19 blanket insulation.caper on substance           Valid Matter         19 - Over Encl. Crawl/Basement         20 - Over Open Crawl/Garage         21 - Basement         22 - Slab on Grade           Valid Matter         Select a category from the 1st list below, then select a floor in that category from the 2nd list.         Category         Description of this Category           Block to         Category         Description of this Category         Description of this Category         Edges           I I-Act         Vencar topard insulation, no insulation below floor, any floor cover         22         Vencar topard insulation covers state edge and extends straight down to 3' below grade, any floor cover           21 I-Act         Vencar board insulation covers state edge and extends 4' under slab and extends 4' haizontally, any floor cover           22 D         Vencar board insulation covers state edge and extends 4' haizontal	Call Matter     Call Society State     Const. No.     No.     Const. No.     No.     Const. No.	Boot Mate     Carbo Color     Carbo	22A-p	0.989	22 - Slab n/	'a n/a	No c	passive,	, light dry soil
1   66- Under at Membra     20P-19     0.05     20 - Over	I Iber     20P-19     0.05     20 - Over	1 16-2       20P-19       0.05       20 - Over n/a       n/a       No       P-19 blanketinsulation, any cover         Under at Membra       19 - Over Encl. Crawl/Basement       20 - Over Open Crawl/Garage       21 - Basement       22 - Slab on Grade         Vali Meter Membra       19 - Over Encl. Crawl/Basement       20 - Over Open Crawl/Garage       21 - Basement       22 - Slab on Grade         Vali Meter Methra       Select a category from the 1st list below, then select a floor in that category from the 2nd list.       -         1 13A- Black bit       Pategory       Description of this Category       -         22A       No edge insulation no insulation below floor, any floor cover       -         22D       Vertical board insulation covers stab edge, turus under slab, any floor cover       -         22D       Vertical board insulation covers slab edge, turus under slab, any floor cover       -         22D       Vertical board insulation cover slab edge, turus under slab, any floor cover       -         22D       Vertical board insulation cover slab edge, turus under slab and extends 4" horizontally, any floor cover       -         20D       Vertical board insulation cover slab edge, turus under slab and extends 4" horizontally, any floor cover       -         21Meter       Custom       Slab on Grade Floor, User-Defined       -         11Pect       Const. No.<	Boof Mater 20P-0	t 0.521	20-Over n/	a n/a	No	no insula	ation, carper or narawoo ation, tile or vinyl
Under et Membra         19 - Over Encl. Crawl/Basement         20 - Over Open Crawl/Garage         21 - Basement         22 - Slab on Grade           Wall Matter I Select a category from the 1st list below, then select a floor in that category from the 2nd list.         Category.         Description of the Category.           Block b         EXA         No edge insulation no insulation below floor, any floor cover         22A           Stock b         ZA         No edge insulation extends 4" under slab, any floor cover         22C           Link d         Link down insulation extends 4" under slab, any floor cover         22D         Vertical board insulation extends 4" under slab, any floor cover           Single pr reflective         Const. No.         U-Value         Cr.Sp.Wall U-Val.         Seeled Cr.Sp.         Radiant         Description           1 [In-C0         Const. No.         U-Value         Cr.Sp.Wall U-Val.         Seeled Cr.Sp.         Radiant         Description           1 [In-P         E2A-ph         1.358         n/e         n/e         No         passive heavy moist soil           22A-pt         1.989.         n/e         n/e         No         passive heavy moist soil	Under dia     19 - Over Encl. Craw//Basement     20 - Over Open Craw//Garage     21 - Basement     22 - Slab on Grade       Fall Mattin     134     Select a category from the 1st list below, then select a floor in that category from the 2nd list.     Category, Description of this Category       Block, bit     Category, Description of this Category, 22 No edge insulation, no insulation below floor, any floor cover     22       Vertical board insulation, no insulation below floor, any floor cover     220     Vertical board insulation cover state edge and extends straight down to 3' below grade, any floor cover       201 Mattin     1 Act     220     Vertical board insulation cover state edge and extends straight down to 3' below grade, any floor cover       210 Vertical board insulation cover state edge and extends straight down to 3' below grade, any floor cover     220       210 Vertical board insulation cover state edge deg, turns under slab and extends 4' horizontally, any floor cover       211 Part     Const. No.     U-Value       1 Part     Const. No.     U-Value       1 Part     Const. No.     U-Value       22A-pi     0.989     n/a     n/a       22A-pi     0.989     n/a     n/a       22A-mit     1.38     n/a     n/a       22A-mit     0.989     n/a     n/a       22A-mit     0.989     n/a     n/a       22A-mit     0.989     n/a	Under Membra         19 - Over Encl. Crawl/Basement         20 - Over Open Crawl/Barage         21 - Basement         22 - Slab on Grade           Vali Meter         Select a category from the 1st list below, then select a floor in that category from the 2nd list.         Tategory         Description of this Category           Block bit         No edge insulation, no insulation below floor, any floor cover         22A         No edge insulation covers star edge and exercis straight down to 3' below grade, any floor cover           22C         Ventical board insulation covers star edge and exercis straight down to 3' below grade, any floor cover         22C           22D         Ventical board insulation covers star edge and exercis straight down to 3' below grade, any floor cover         22D           20D         Ventical board insulation cover stab edge, turns under slab, any floor cover         Custom           Single picture         Custom         Slab on Grade Floor, User-Defined           Ventical board insulation, cover slab edge, turns under slab, any floor cover         Slab on Grade Floor, User-Defined           Ventical board insulation, and n/a         n/a         No         passive, heavy moist soil           22A-ph         138         n/a         n/a         No         passive, heavy driver light wet soil           22A-ph         138         n/a         n/a         No         passive, heavy driver light wet soil	1 16B-1 20P-1	9 0.05	20 - Over n	′a n/a	No	R-19 bla	nket insulation, any cov
Wall Matter         Select a category from the 1st list below, then select a floor in that category from the 2nd list.           1         13-4         Externor Description of this Category.           Block bit         Block bit         Externor Description of this Category.           Block bit         Single picture of this Category.         Externor Description of this Category.           I IA-C         Vertical board insulation below floor, any floor cover         22           Vertical board insulation extends 4" under slab, any floor cover         22D         Vertical board insulation extends 4" under slab, any floor cover           Single picture         Custom         Slab on Grade Floor, User-Defined         Extended the extends 4" horizontally, any floor cover           Door Matter         Const. No.         U-Value         Cr.Sp.Wall U-Val         Seeled Cr.Sp.         Radiant         Description           11P-C         Const. No.         U-Value         Cr.Sp.Wall U-Val         Seeled Cr.Sp.         Radiant         Description           11P-C         22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.38         n/a         n/a         No         passive, heavy moist soil	Catalogoury from the 1st list below, then select a floor in that catagory from the 2nd list.           134- Block to Isos Mute         Catagooury from the 1st list below, then select a floor in that catagory from the 2nd list.           134- Block to Isos Mute         Catagooury floor the Catagooury control board insulation covers state args and exerneds straign down to 3' below grade, any floor cover 22D Vertical board insulation covers slab and exerneds straign down to 3' below grade, any floor cover 22D Vertical board insulation covers slab edge, turns under slab and extends 4' horizontally, any floor cover Custom           Single pr Catagooury 1         Canst No.         L-Value         Cr.Sp.Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1         Canst No.         L-Value         Cr.Sp.Wall U-Val         Sealed Cr.Sp.         Radiant         Description           22A-pn         0.989         n/a         n/a         No         passive, heavy moist soil passive, heavy moist soil           22A-pn         1.38         n/a         n/a         No         passive, heavy moist soil           22A-pn         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pn         1.38         n/a         n/a         No         passive, heavy moist soil           22A-pn         0.989         n/a         n/a         No         passive, heavy doy or light we	Val Metry         Select a category from the 1st list below, then select a floor in that category from the 2nd list.           1         11A           Block bit         Category           Vertical board insulation below floor, any floor cover           220         No edge insulation covers slab edge, turns under slab, any floor cover           221         Vertical board insulation covers slab edge, turns under slab, any floor cover           222         No         Gategory           220         Vertical board insulation covers slab edge, turns under slab, any floor cover           220         Vertical board insulation covers slab edge, turns under slab, any floor cover           220         Vertical board insulation covers slab edge, turns under slab, any floor cover           220         Vertical board insulation covers slab edge, turns under slab, any floor cover           220         No         Dessive, hewy moist soil           224-min         1.358         n/a         n/a           224-min         1.358	Membrai 19 - 0	Over Encl. Crawl/I	Basement   20	- Over Open Crav	wl/Garage   21	1 - Basement	22 - Slab on Grade
Dirac         Category         Description of the Category           Block bit         22A         No edge insulation below floor, any floor cover           Cite State         22A         No edge insulation no, no insulation below floor, any floor cover           Cite State         22A         Horizontal board insulation extends 4" under slab, any floor cover           Cite State         22C         Horizontal board insulation extends 4" under slab, any floor cover           Single pr         Custom         Slab on Grade Floor, User-Defined           Door Materint         1 IIP-O           Metal -P         Const. No.         U-Value         Cr.Sp.Wall U-Val         Sealed Cr.Sp.         Radiant         Description           Metal -P         22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-pt         1.989         n/a         n/a         No         passive, heavy moist soil	Cotogosy         Description efficie Category           Block bi         A         No edge insulation on issulation below floor, any floor cover           Idex bit         Vertical oper insulation on issulation below floor, any floor cover           Image insulation and insulation experts sinar bage and extends strangerown to 3' below grade, any floor cover           Image insulation experts sinar bage and extends strangerown to 3' below grade, any floor cover           Image insulation experts and bage insulation experts and extends strangerown to 3' below grade, any floor cover           Image insulation experts and bage insulation experts and edge, tims under slab and extends 4' horizontally, any floor cover           Custom         Slab on Grade Floor, User-Defined           Image insulation experts and edge, tims under slab and extends 4' horizontally, any floor cover           Visitom         Slab on Grade Floor, User-Defined           Image insulation experts and edge, tims under slab and extends 4' horizontally, any floor cover           Image insulation experts and edge, tims under slab and extends 4' horizontally, any floor cover           Custom         Slab on Grade Floor, User-Defined           Image insulation experts and extends 4' horizontally, any floor cover           Image insulation experts and extends 4' horizontally, any floor experts           Z2A-pi         0,989         n/a         n/a         No         passive, heavy moist soil           Z2A-pi <td>Category         Description of this Category           Block bit         22A         No edge insulation no insulation below floor, any floor cover           22D         Venical board insulation covers stab edge and extends straight down to 3' below grade, any floor cover           21D         Venical board insulation covers stab edge, tumis under slab, any floor cover           22D         Venical board insulation covers stab edge, tumis under slab, any floor cover           Single provide         Custom           Slab on Grade Floor, User-Defined           reflective         Const. No.           U-Venue         Cr.Sp. Wall U-Val           Stage provide         Stage provide           22A-ph         1.358           7/4         No           22A-pi         0.989           22A-pi         1.38           22A-pi         1.38           22A-pi         1.38           22A-pi         1.38           22A-pi         0.989           22A-pi         1.98           22A-pi         1.98           22A-pi         1.98           22A-pi         0.989           22A-pi         1.98           22A-pi         1.98           22A-pi         0.989</td> <th>Wall Materi Seler</th> <td>st a category from</td> <td>the 1st list be</td> <td>low, then select a</td> <td>tfloor in that o</td> <td>category from t</td> <td>he 2nd list.</td>	Category         Description of this Category           Block bit         22A         No edge insulation no insulation below floor, any floor cover           22D         Venical board insulation covers stab edge and extends straight down to 3' below grade, any floor cover           21D         Venical board insulation covers stab edge, tumis under slab, any floor cover           22D         Venical board insulation covers stab edge, tumis under slab, any floor cover           Single provide         Custom           Slab on Grade Floor, User-Defined           reflective         Const. No.           U-Venue         Cr.Sp. Wall U-Val           Stage provide         Stage provide           22A-ph         1.358           7/4         No           22A-pi         0.989           22A-pi         1.38           22A-pi         1.38           22A-pi         1.38           22A-pi         1.38           22A-pi         0.989           22A-pi         1.98           22A-pi         1.98           22A-pi         1.98           22A-pi         0.989           22A-pi         1.98           22A-pi         1.98           22A-pi         0.989	Wall Materi Seler	st a category from	the 1st list be	low, then select a	tfloor in that o	category from t	he 2nd list.
Construct         Construct         Construction         Construction <thconstruction< th="">         Construction</thconstruction<>	Mole adge insulation, no insulation below floor, any floor cover         Provide insulation in a subation below floor, any floor cover           ass Mine         22C         Vertical board insulation cover state adge and extends straight down to 3' below grade, any floor cover           22D         Vertical board insulation cover state adge and extends straight down to 3' below grade, any floor cover           22D         Vertical board insulation cover state adge and extends af horizontally, any floor cover           22D         Vertical board insulation cover state adge, turns under slab and extends 4' horizontally, any floor cover           23mp         Slab on Grade Floor, User-Defined           11P-0         Const. No.         U-Value           22A-ph         1.358         n/a         n/a           12A-pm         1.358         n/a         n/a           22A-ph         1.358         n/a         n/a           22A-ph         1.358         n/a         n/a           22A-ph         1.358         n/a         n/a           22A-m         1.38	Const No.         U-Value         Cr.Sp.Wall U-Val.         Sealed Cr.Sp.         Radiant         Description           1         1         Prefactor         Vences         Sp. Mail         Vences	Block br	yony Description	of this Catagon	·		_	
Glass Mate         22C         Horizontal board insulation extends 4' under slab, any floor cover           1         IA-d         Vertical board insulation covers slab edge, turns under slab and extends 4' horizontally, any floor cover           Single pr effective         Custom         Slab on Grade Floor, User-Defined           Door Mater         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1         11P         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-pm         1.8         n/a         n/a         No         passive light dry soil	Inses         Mate         22C         Horizontal board insulation extends 4' under slab, any floor cover           1         1         22D         Vertical board insulation extends 4' under slab, any floor cover           22D         Vertical board insulation covers slab edge, turns under slab and extends 4' horizontally, any floor cover           1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1         1           1         1         1         1         1         1         1           1         1         1         1         1         1         1         1           1	Constitute         C2C         Horizontal board insulation extends 4" under slab, any floor cover           1         TA-ct         22D         Vertical board insulation covers slab edge, turns under slab and extends 4" horizontally, any floor cover           Single preferetor         Slab on Grade Floor. User/Defined         Slab on Grade Floor. User/Defined           Door Mater         Const. No.         U-Velue         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1         11P         Const. No.         U-Velue         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1         11P         Const. No.         U-Velue         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           22A-ph         1.36         n/a         n/a         No         passive, heavy moist soil           22A-ph         0.989         n/a         n/a         No         passive, logating soil           22A-rin         1.38         n/a         n/a         Yes         radiant, heavy dry or light wet soil           22A-rid         0.989         n/a         n/a         Yes         radiant, heavy dry or light wet soil	22A	venicai bo	sulation, no insu ard insulation co	lation below floor, an	ly tidor cover extends stratan	it gown to 3' below	v grade, anv floor cover
Door Mater         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1         11P         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           224-ph         1.358         n/a         n/a         No         passive heavy moist soil           224-ph         1.36         n/a         n/a         No         passive heavy moist soil	I Ard         22D         Vertical board insulation covers slab edge, turns under slab and extends 4" honzontally, anythor cover Single prefetche           Custom         Slab on Grade Floor, User-Defined           Image prefetche         Const. No.         U-Value         Cr.Sp. Wall U-Val.           Metal-P         22A-ph         1.358         n/a         n/a         No           22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.38         n/a         n/a         No         passive, heavy moist soil           22A-pt         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pt         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pt         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pt         0.989         n/a         n/a         Yes         radiant, heavy moist soil           22A-rin         1.38         n/a         n/a         Yes         radiant, heavy doy or light wit soil	I I Acc         22D         Vertical board insulation covers slab edge, turns under slab and extends 4" honzontally, any floor cover site device           Slab on Grade Floor, User-Defined         Slab on Grade Floor, User-Defined         Slab on Grade Floor, User-Defined           Joor Matrix         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           J IIP         Z2A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           Z2A-ph         0.989         n/a         n/a         No         passive, loeavy moist soil           Z2A-ph         1.358         n/a         n/a         No         passive, loeavy moist soil           Z2A-ph         1.38         n/a         n/a         No         passive, loeavy moist soil           Z2A-ph         1.38         n/a         n/a         Yes         radiant, heavy moist soil           Z2A-m         1.8         n/a         n/a         Yes         radiant, heavy dry or light wet soil           Z2A-m         1.8         n/a         n/a         Yes         radiant, heavy dry or light wet soil           Z2A-m         1.8         n/a         n/a         Yes         radiant, heavy dry or light wet soil           Z2A-m <th>Glass Mate 22C</th> <th>Horizontal I</th> <th>board insulation</th> <th>extends 4' under sla</th> <th>b, any floor cov</th> <th>er</th> <th></th>	Glass Mate 22C	Horizontal I	board insulation	extends 4' under sla	b, any floor cov	er	
Single preserve         Occurrence         Ocurrenco         Ocurrence         Ocur	Single prefetcher         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           007 Matter         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           110         22A-ph         1.356         n/a         n/a         No         passive. heavy moist soil           22A-ph         0.989         n/a         n/a         No         passive. heavy moist soil           22A-ph         1.380         n/a         n/a         No         passive. heavy moist soil           22A-ph         1.398         n/a         n/a         Na         passive. heavy drow moist soil           22A-m         1.18         n/a         n/a         Na         passive. heavy drow moist soil           22A-m         0.989         n/a         n/a         Na         passive. heavy drow moist soil           22A-m         1.38 n/a         n/a         n/a         Yes         radiant. heavy droy or light wet soil           22A-m         0.989         n/a         n/a         Yes         radiant. heavy droy or light wet soil	Single prefective         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1 (IIP         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           1 (IIP         22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-pn         1.18         n/a         n/a         No         passive, heavy moist soil           22A-pn         0.993         n/a         n/a         No         passive, heavy moist soil           22A-pn         1.18         n/a         n/a         No         passive, heavy moist soil           22A-pn         0.993         n/a         n/a         No         passive, heavy moist soil           22A-pn         0.993         n/a         n/a         Yes         radiant heavy moist soil           22A-rth         1.358         n/a         n/a         Yes         radiant heavy dry or light wet soil           22A-rth         0.989         n/a         n/a         Yes         radiant heavy dry or light wet soil	1 1A-ct 22D	Vertical bo	ard insulation co ade Floor, Liser	vers slab edge, turn Defined	s under slab an	d extends 4' horiz	contaily, any floor cover
Door Mater         Const. No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           Metal - P         224-ph         1.358         n/a         n/a         No         passive heavy moist soil           224-ph         1.36         n/a         n/a         No         passive heavy moist soil           224-ph         1.36         n/a         n/a         No         passive heavy moist soil	Dor Matter 1         Const. No.         U-Value         Cr. Sp. Wall U-Val         Sealed Cr. Sp.         Radiant         Description           Metal -P         22A-ph         1.356         n/a         n/a         No         passive, heavy moist soil           V2A-ph         1.38         n/a         n/a         No         passive, heavy moist soil           V2A-ph         0.989         n/a         n/a         No         passive, heavy moist soil           V2A-pi         0.989         n/a         n/a         No         passive, heavy moist soil           V2A-pi         0.989         n/a         n/a         No         passive, heavy moist soil           V2A-pi         0.989         n/a         n/a         No         passive, heavy drown indiverse to ill           V2A-pi         0.989         n/a         n/a         Yes         radiant, heavy drown is soil           V2A-mi         0.989         n/a         n/a         Yes         radiant, heavy drown is soil	Door Meter         Const No.         U-Value         Cr.Sp. Wall U-Val         Sealed Cr.Sp.         Radiant         Description           Matal - P         22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.388         n/a         n/a         No         passive, heavy moist soil           22A-ph         0.993         n/a         n/a         No         passive, light dry soil           22A-ph         1.358         n/a         n/a         No         passive, light dry soil           22A-ph         0.393         n/a         n/a         No         passive, light dry soil           22A-ph         0.393         n/a         n/a         No         passive, light dry soil           22A-rh         1.358         n/a         n/a         No         passive, light dry soil           22A-rh         1.398         n/a         n/a         Yes         radiant, light dry soil           22A-rh         0.389         n/a         n/a         Yes         radiant, light dry soil	Custo	111 (31011111111111111111111111111111111					
Metal-P 22A-ph 1.358 n/a n/a No passive, heavy moist soil 22A-ph 1.18 n/a n/a No passive, heavy moist soil 22A-ph 0.989 n/a n/a No passive light dry soil	Metel-P         22A-ph         1.353         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.18         n/a         n/a         No         passive, heavy moist soil           22A-pl         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pl         0.989         n/a         n/a         No         passive, heavy moist soil           22A-pl         0.989         n/a         n/a         No         passive, heavy moist soil           22A-th         1.354         n/a         n/a         Yes         radiant, heavy day or light wet soil           22A-m         1.18         n/a         n/a         Yes         radiant, heavy day or light wet soil           22A-rit         0.989         n/a         n/a         Yes         radiant, light day soil	Metal         P         22A-ph         1.358         n/a         n/a         No         passive, heavy moist soil           22A-ph         1.8         n/a         n/a         No         passive, heavy moist soil           22A-ph         0.999         n/a         n/a         No         passive, heavy moist soil           22A-pi         0.999         n/a         n/a         No         passive, heavy moist soil           22A-pi         0.999         n/a         n/a         No         passive, heavy moist soil           22A-rin         1.358         n/a         n/a         Yes         radiant, heavy dry or light wet soil           22A-rin         1.18         n/a         n/a         Yes         radiant, heavy dry or light wet soil           22A-rid         0.989         n/a         n/a         Yes         radiant, light dry soil	Single pe reflective	in side on di					
224-pm 118 p/a p/a No passive heavy dovor light wet soil	Image         D/2         D/a         D/a         No         Daskie Leavy Acy unight wet soil           Image         Image         n/a         No         Daskie Leavy Acy unight wet soil           Image         Image         n/a         No         Daskie Leavy Acy unight wet soil           Image         Image         n/a         n/a         No         Daskie Leavy Acy unight wet soil           Image         Image         n/a         n/a         Yes         radiant heavy dry or light wet soil           Image         0.989         n/a         n/a         Yes         radiant light dry soil	122 App         118         n/a         n/a         No         passive legit/dx or light/wet soil           22A-pi         0.999         n/a         n/a         No         passive legit/dx or light/wet soil           22A-pi         0.999         n/a         n/a         No         passive legit/dx or light/wet soil           22A-pi         0.999         n/a         n/a         Yes         radiant heavy moist soil           22A-m         1.18         n/a         n/a         Yes         radiant heavy dry or light wet soil           22A-rit         0.989         n/a         n/a         Yes         radiant light dry soil	Single pr reflective	No. U-Value	Cr.Sp.Wall U-	/al Sealed Cr.Sp	. Radiant I	Description	
	IZZ+pi         0.363         n/a         n/a         No         passive. light dysel, light dysel           IZZ+n         1.354         n/a         n/a         Yes         rodiant, heavy moist soil           IZZ+n         1.18         n/a         n/a         Yes         radiant, heavy moist soil           IZZ+n         0.989         n/a         n/a         Yes         radiant, light dry soil	IZ2A+th         1.38         n/a         n/a         res         ressme infraring from your           IZ2A+th         1.38         n/a         n/a         n/e         res         realiant freezy moist soil           IZ2A+th         1.18         n/a         n/a         Yes         realiant freezy day or light wet soil           IZ2A+th         0.989         n/a         n/a         Yes         realiant light dry soil	Single pr reflective Door Mater 1 11P Cons 22A-p	t. No. U-Value h 1.358	Cr.Sp.Wall U-	/al   Sealed Cr.Sp n/a	. Radiant I	Description passive, heavy m	noist soil
2224-th 1.358 n/a n/a Yes radiant heavy most soil	22A-rm 1.18 n/a n/a Yes radiant heavy dry or light wet soil 22A-rl 0.989 n/a n/a Yes radiant, light dry soil	22A-m 1.18 n/a n/a Yes radiant heavy dry or light wet soil 22A-rl 0.989 n/a n/a Yes radiant light dry soil	Single por reflective 1 11P Metal - P	t No. U-Value h 1.358 m 1.18	Cr.Sp.Wall U-	/al Sealed Cr.Sp n/a n/a	No	Description passive, heavy m	noist soil ev or light vet soil
22A-mm 1.18 n/a. n/a. Yes radiant heavy dry or light wet soil	22A-nl 0.989 n/a. n/a. Yes radiant, light dry soil	22A-rl 0.989 n/a n/a Yes radiant light dry soil	Single por reflective 1 11P Metal - P 22A-p 22A-p 22A-p 22A-p 22A-p	t No. U-Value h 1.358 m 1.18 l 0.989 i 1.358	Cr.Sp.Wall U- n/a n/a n/a	/al Sealed Cr.Sp n/a n/a n/a	). Radiant I No No No	Description passive, heavy m passive, heavy dr passive, light dry : radiant, heavy mo	noist soil ny or light wet soil soil
22A-rl 0.989 n/a. n/a. Yes radiant, light dry soil			Single pr reflective Door Mater 1 11P Metal-P 22A-r 22A-r 22A-r 22A-r 22A-r 22A-r	t No. U-Value h 1.358 m 1.18 l 0.989 i 1.358 n 1.18	Cr.Sp.Wall U-4 n/a n/a n/a n/a	/al   Sealed Cr.Sp n/a n/a n/a n/a	I. Radiant I No No No Yes Yes	Description passive, heavy m passive, light dry - radiant, heavy mo radiant, heavy dry	noist soil sor light wet soil soil Jost soil y or light wet soil

Here we click on the Floor Material and the Floor Material database window pops up. For this home we will choose "Slab on Grade", "No edge insulation, no insulation below floor, any floor cover", "passive, light dry soil".

- I- D-()		System Zone	Width Length	Height Check E	rrors
n/a Default	Koom			▼  <sup>9</sup> ▼ n/a — People & Equi	
Floor Material	U-Value Width	Length Perimeter		Dal: 0	-
Slah on grade	No edge insulation no insulation heli	without carnet covering passive	light dry soil	S Eat 0	
situs on grade,	recouge monoient, no monoir beit	in noor, corper coverning, passive	ingin ary son	5.Eq: 0	
Roof Material	U-Value Width	Length Direction		L.Eq:	<u> </u>
1 168-19	▼ 0.049 ▼ 0			Other	
Under attic or k Membrane, R-	nee wall, Vented Attic, No <del>modiant Ba</del> 19 insulation	rrier, Dark Asphalt Shingles or Da	Select the	Roof	<b>- -    </b> · · · · ·
Wall Material	U-Value Length	Height Dir STI	Matarial T		
1 13A-5ocs	▼ 0.125 ▼ 0	• 9 • N • 0	Material Ty	/pe	
Block, board in	sulation only, R-5 board insulation, op	en core, siding finish		Light 0	
Glass Material	U-Value SHGC	Width Height Ref O	cc. 0.Proj 0.Off	0cc: 1	
1 1A-cb-o	▼ 1.08 ▼ 0.75 ▼		<b>•</b> 0 <b>•</b> 0	Mode: Both	
Single pane, o	perable window, clear, metal frame with	h break, outdoor insect screen wi	th 50% coverage, white or	Red E:0	
Pear Material	LI Valua Midth	Hoight Dof			'
1 11P	▼ 0.29 ▼ 0				
Metal - Polyure	thane Core				
oor Material	U-Value Width • 0.29 • 0	Height Ref 0			

To set the roof "material type" click the down arrow.

Roof Ma	aterials
Default Room Dat	a 🗌 🗌 🗙
< >   @   <u>@   %   *</u> ? A   @ ?	
No. Name ∩/a → Default Room	System Zone Width Length Height Check Errors
Eloor Material U- 1 22A-pl ▼ 0.4	Value People & Equip.
Slab on grade, No edge insule	tion, no ins Favorites Recent Custom
Boof Material         U-           1         166-19         ↓           Under attic or knee wall.         Venter Membrane, R-19 insulation	Value         Const. No.         U-Value         Category         CLTD Index         Options         Description         ▲           149         16CR-28         0.034         16 - Under         2         R-28 insulation         ▲           147         16CR-28         0.034         16 - Under         1         R-29 insulation         ▲           16B-19         0.049         16 - Under         1         R-19 insulation         ▼
Wall Material     U-1       1     13A-5ocs     ▼       0.     Block, board insulation only, P	Value       16 - Under Attic or Kneewall       17 - On Exposed Beams       18 - Below Roof Joists         125
Glass Material U- 1 1A-cb-0 11. Single name merable wighter Shingles Vent	Value         Hit         Unrended Aftic, No Faciliant Barrier, Drug Rouding, Hadwind, Yuy Roud Roud         Facility Roud
R-19 Batt Insulation	C
CALCS-PLUS	Mat. & Color <u>Greate Custom</u> Organize <u>Add to Favorites</u> <u>OK</u> <u>Cancel</u>

For this home we will be using a vented attic; choose "16-Under attic or Kneewall", under category choose "16B Vented attic, No Radiant Barrier, Dark asphalt Shingles or Dark Metal, Tar and Gravel or Membrane", and under construction number choose "16B-19" for R-19 insulation. If you know the roof will be tile, or white metal select the proper vented attic description.

Ψ	Default Room Data	
	《》 Q  \$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\	
	No. Name System Zone Width Length Height Check	Errors
	Eloor Material         U-Value         Width         Length         Perimeter           1         22A-pl         0.989         0         0         0         0         -         Ppl:         0         0         Ppl:         0         Slab on grade. No edge insulation. no insulation below floor, carpet covering, passive, light dry soil         S.E.g.         0         S.E.g.         0 <td< td=""><td></td></td<>	
	Boof Material     U-Value     Width     Length     Direction       1     168-19     y     0.049     y     0     y     0       Under attic or knee well. Vented Attic. No Radiant Barrier. Dark Asphall Shingles or Dark Metal. Ter and Gravel or     Other     Other	
	Membrane, R-19 insulation     Regs:     0       Wall Material     U-Value     Length     Height     Dir     STD     WTD       1     13A-Socs     -0     125     -0     -     9     -     N     -0     -     0       Block how dissibilition only Extraord insulation only Extraord insulation only Extraord insulation only Extraord insulation     -     -     -     0	<u>•</u> •
	Glass Material         U-Value         SHGC         Width         Height         Ref         Occ.         0.0ff         Occ:         1           1         1A-cb-o         _         1.08         _         0.75         0         0         1         Select the W/all         lode: Both	<u>-</u> 
	Single pane, operable window, clear, metal frame with break, outdoor inserved Science Title Wall reflective color drapes with tight weave with 50% coverage Door Material U-Value Width Height Ref 1 11P - 0.29 - 0 - 0 - 0 - 0 - 0 - 0	
	Metal - Polyurethane Core	

To set the wall "material type" click the down arrow.

	= Wall Mate	rial				
	Favorites Recent	Custom				
	Const. No. U-Valu	e Group Cat	eapry Description		Abv.Grd.U-Value	^
🔍 👟 🖓 🚱	12B-0sw 0.097	B 12-	Frame no board insulation, siding	finish, wood studs	0	
	14B-4.5s 0.072	G 14-	Altern stucco or wood siding, inte	rior finish, 4.5 inc	0	
<u>N</u> o. Na	am 13AB-0ocs 0.258	E 13-	Block open core, siding finish		0	
n/a - De	fa 12E-0sw 0.068	E 12-	Frame no board insulation, siding	finish, wood studs	0	
	13AB-0fcs 0.183	E 13-	Block filled core, siding finish		0	*
Eloor Materi	al CustomWall2 0.069	1 13-	Block My earond avampla cueto	m wall	n	
1 22A-p	l 12 - Frame	13 - Block	14 - Alternative   15 - Baseme	ent		
Slab on gr	rai Select a category i	rom the 1st list l	below, then select a wall in that	category from the	e 2nd list.	
	Category	Description of this (	ategory			
Roof Materia	al 1366 M	Jo Blanket or Boar	d Insulation No Exterior Finish Oner	or Filled Core, No I	nterior Finish	
1 16B-1	9 13AB	lo Blanket or Boar	d Insulation; No Extend 1 mish; Open	/eneer: Onen or Filli	ed Core. Plus Interior F	inish
	13A F	Coard Insulation Or	Ny Stucco, Siding of Brick Veneer, O	inen ar Eilled Care	Plus Interior Einish	
Under atti	C0 13BA 0	Comine Mildle D. 11	In 2 v. 4 Physic Constant No. Record Insulat	ion No Estados Eini	h. Onon or Filled Cor	Dus Interior Finish
Membran	e. 13BB F	Framing with R-11 I	n 2 x 4 Stud Cavity. No Board Insulati	on. Any Exterior Fini	sh. Open or Filled Cor	e. Plus Interior Finish
Wall Materia	1 13B F	Framing With R-11	In 2 x 4 Stud Cavity Plus Board Insula	tion, Any Exterior Fir	hish, Open or Filled Co	ore, Plus Interior Finis
1 13A-5	oc 13CA F	Framing With R-13	in 2 x 4 Stud Cavity, No Board Insulat	ion, No Exterior Fini:	sh, Open or Filled Cor	e, Plus Interior Finish
	13CB F	framing With R-13	in 2 x 4 Stud Cavity, No Board Insulat	ion, Any Exterior Fin	ish, Open or Filled Co	re, Plus Interior Finisl
Block, box	ard 13C F	framing With R-13	in 2 x 4 Stud Cavity Plus Board Insula	tion, Any Exterior Fir	hish, Open or Filled Co	ore, Plus Interior Finis 🎽
	<					>
Glass Mater		-1	Description	1		
1 1A-cb	-0 Const. No. U-V	alue   Group	Description	10.011		<u>^</u>
	13A-30CS 0.16		H-3 board insulation, open core,	siaing finish		_
Single par	ne IJA-3000 0.17	4 F	R-3 board insulation, open core,	brick finish		
reflective	CO 13A-31CS 0.13		R-3 board insulation, filled core, s	siaing iinisn sriek fisiek		
Door Materia	al 13A-40cc 0.14	3 F	P-1 board insulation, med core, i	siding finish		
1 11P	134-40cs 0.14	8 F	P-4 board insulation, open core,	brick finich		
	134-4fcs 0.11	7 F	R-4 board insulation, open core;	sidina finish		
Metal - Po				in and in a		
	13A-5ocs 0.12	5 F	R-5 board insulation, open core,	siding finish		~
Martin and Article						
frame/masonry intersection under	201	Contract (1)		A.4.4.5. E		
weep screed flashing	Medianetal fire sheet	<u>c</u> rea	te custom Organize		ntes <u>O</u> r	Cancer
under Tyvek® StucceWrap®	Hardenia ine brop					
Britanas modified (BA) or	Gypsum board with latex pair or other permeshie or section	Mo will i	he using the wall costion	at the right	(ripped off from	n loo Letiburok
standard Portland cement stucco	permeable interior finish; held	VVE WIII I	be using the wall section	i ai ine nyni	(hpped on nor	II JUE LSUDUIEK,
	up from stab	Ph.D.,P.	Eng, Builders Guide, Hot	: Humid Clima	ate, Figure 7.18	5).
Matony wal	Martin Contractor	4-24				
Deductivelyne unter herter	senscal wood runnig	The wall	i is concrete block, open	core with stu	cco on the ext	erior and R-5
over masonry block stem wall	Permeable or semi-permeable rigid insulation	board in	sulation on the interior,	firing, and dr	ywall finish.	
"Seat" in concrete to receive	Concrete slab					

The Wall Material dialog box is the ACCA Manual J wall type database found in the tables of the manual. The construction numbers and properties come directly out of Manual-J. The wall type we will be using is "13-Block", "13A Board Insulation Only, Stucco, Siding or Brick Veneer, Open or Filled Core, Plus Interior Finish", and "13A-5ocs, R-5 board insulation, open core, siding finish.



## **Fenestration Notes**

In general, take full credit for the rated (or tested) performance of glazing assemblies, construction materials and construction features.

Take full credit for documented window, glass door and skylight U-values and SHGC values. For generic fenestration, use the Appendix 10 data provided by MJ8. For NFRC fenestration, use the Table 3D-1 procedures provided by MJ8.

Take credit for bug screens when such devices are installed or specified.

Take credit for internal shade (per MJ8 defaults and protocols, and Table 3D-4). Windows and glass doors shall be shaded by a medium blind. However, internal shades are not applicable for purpose-built day-lighting windows.

Take credit for overhangs (per MJ8 defaults and protocols, and Table 3E-1). The overhang adjustment shall be applied to all windows and glass doors, including purpose-built day-lighting windows.
Fevorites       Recent       Custom       Gaas Options         Const No.       U-Value       SHGC       SkyLight       Description         104-bo       0.87       0.53       No       single pane clear glass, metal frame with break.       Type:       Flat         104-bo       0.87       No       operately window, clear, metal frame with break.       Type:       Flat         104-bo       0.78       No       operately window, clear, metal frame with break.       Type:       Flat         104-bo       0.78       No       eler.metal frame with break.       Type:       Skylight Tit:       0         104       Mindows. Glass Doors. Glass Block       Skylight Sissed a category from the 1st list below, then select a glass in that category from the 2nd list.       Internal Shading         104       Single pane window fixed sash       Type:       Orage State         105       Double pane pane cereble window or sliding glass door       Insect Screen       Type:       Outs         105       Double pane window, fixed sash       Sa       Double pane window, fixed sash       Insect Screen       Type:       Outs         106       Harmon       127       Orage prace live window or sliding glass door       Type:       Outs       Coverage:       So         106 <th></th> <th>🛿 Glass Materi</th> <th>ial</th> <th></th> <th></th> <th></th> <th></th>		🛿 Glass Materi	ial				
Const. No.       U-Value       SHQC       SkyLight       Description         104-b       0.97       0.53       No       single pane clear glass, metal frame with break       Type:       Flat         104-b       0.97       0.53       No       operable window, clear, metal frame with break       Type:       Flat         118-b       10.7       0.78       No       eler.metal frame with break       Type:       Skylight       Skylight       Skylight       Skylight       Cound Reft:       0.2         116       0.42       0.42       0.42       0.44       No       eler.metal frame with break       Type:       Skylight       Skylight       Skylight       Skylight       Internal Shading         118       Single pane window, fixed sash       116       Single pane window fixed sash       Type:       Drave:       50         116       Double pane expetible window or sliding glass door       116       Insect Screen       Type:       Outs         117       Triple pane window, fixed sash       116       Double pane expetible window or sliding glass door       Type:       Outs         120       Double pane lowe (e = 0.60), fixed sash       3A       Double pane lowe (e = 0.60), fixed sash       Stade       Coverage:       50 <td< th=""><th>ן ח 🗖</th><th>Favorites Recent (</th><th>Custom</th><th></th><th></th><th>Glass Options</th><th>B</th></td<>	ן ח 🗖	Favorites Recent (	Custom			Glass Options	B
10A-bo       0.97       0.53       No       single pone clear glass, metal frame with break.       Type:       Flat         No.       18-cbo       10.8       0.75       No       operable window, clear, metal frame with break.       Ground Refi:       0.2         No.       18-cbo       10.7       17.8       No       clear, metal frame with break.       Ground Refi:       0.2         No.       18-cbo       10.7       0.78       No       e=0.10       on suftce 2, wood frame       V         How       e=0.10       nsuftce 2, wood frame       V       V       Skylight Tilt:       0         Bo       Vindows, Glaes Doors, Glaes Block       Skylight Skylights       Internal Shading       Type:       Drage Stading         Bo       Stelgeov       Description thindow with stom       Double pane window with stom       0       Amt Drawn:       50         10       Double pane window with stom       Double pane window or sliding glass door       Insect Screen       Type:       Outer pane         16       Triple pane window freed sash       16       Couble pane window crest dialing glass door       V       V       External Shade       Coverage:       50         16       Triple pane window cres 1600, operable window crest siding glass door       V </th <th></th> <th>Const. No. U-Value</th> <th>SHGC SI</th> <th>vyLight Description</th> <th>^</th> <th>General</th> <th></th>		Const. No. U-Value	SHGC SI	vyLight Description	^	General	
No.       IP-CD-0       100       0.78       No       operable window, clear, metal frame with break.         No.       IP-CD-0       100       0.78       No       operable window, clear, metal frame with break.         No.       IP-CD-0       100       0.78       No       e-0110 on surface 2, wood frame       v         IP-CD-0       100       0.78       No       e-0110 on surface 2, wood frame       v       Skylight Titl:       0         IP-CD-0       100       0.45       0.47       No       e-0110 on surface 2, wood frame       v       Skylight Titl:       0         IP-CD-0       100       0.45       0.47       No       e-0110 on surface 2, wood frame       v       Internal Shading         IP-CD-0       100       Description of this Category       Category       Description of this Category       Am       Single pane window residing glass door       Am.       Type:       Outer and the state and the stat	« »	10A-b 0.97	0.53 N	o single pane clear glass, metal frame with break		Type:	Flat
MA       49-3w       0.45       0.47       No       e=0.10 on surface 2 wood frame       v         Solution       Addition       Skylight 1       0	<u>N</u> o.	1B-cb 1.08	0.75 N	o operable window, clear, metal frame with break o clear, metal frame with break		Ground Befl	0.2
Bit       Windows, Glass Doors, Glass Black, Skylights       Skylight int.       •         Bit       Statest a category from the 1st list below, then select a glass in that category from the 2nd list.       •       Internal Shading         Category       Description of this Category       •       •       •       •         IA       Single pane window with storm       •       •       •       •         ID       Outple pane window with storm       •       •       •       •       •         ID       Double pane window with storm       •	n/a	4B-3w 0.45	0.47 N	o e=0.10 on surface 2, wood frame	*	Chudiaha Tila	0
Selects a category from the 1st list below, then select a glass in that category from the 2nd list.       Internal Shading         Category       Description of this Category       Internal Shading         Type:       Description of this Category       Internal Shading         Type:       Dirace pore mindow with storm       Internal Shading         TD       Double pone window with storm       Internal Shading         TD       Double pone window fixed sash       Internal Shading         TF       Triple pane window fixed sash       Internal Shading         ZA       Double pone low-e (e = 0.60), fixed sash       Internal Shade Scr         ZB       Double pone low-e (e = 0.60), fixed sash       Internal Shade Scr         ZA       Double pone low-e (e = 0.60), fixed sash       Internal Shade Scr         ZA       Double pone low-e (e = 0.60), fixed sash       Internal Shade Scr         ZA       Double pone low-e (e = 0.60), fixed sash       Internal Shade Scr         ZA       Double pone low-e (e = 0.60), fixed sash	Ele	Windows Glass Doo	re Glass B	Inck Skylights		Skylight Lift:	U
Cetegory       Description of this Cetegory       Type:		Solost a cotogon (for	n the 1st liv	the low the select a class in that estagen from the 2nd li		-Internal Shad	ina
Codegory       Description use Codegory       Type:       Drapes Lor Markowski Stars         Ro       18       Single pane operable window or sliding glass door       Amt Drawn:       50         10       Double pane operable window or sliding glass door       Insect Screen       Insect Screen         11       Tripe:       Double pane window, ixed assin       Insect Screen       Type:       Outside pane window, ixed assin         12       Double pane window, ixed assin       Insect Screen       Type:       Outside pane window, ixed assin         14       Triple pane window, ixed assin       Insect Screen       Type:       Outside pane bank (ixed window or sliding glass door         2A       Double pane low-e(e = 0.60), fored sesh       Bank (ixed assh)       Type:       Outside come to the sesh         3A       Double pane low-e(e = 0.60), fored sesh       Bank (ixed assh)       External Shade Scr         1A-cmo-o       1.07       Orso the operable window, clear, metal frame no break       Coefficient       1         1A-cmo-o       1.08       Operable window, clear, metal frame with break       Coefficient       1         1A-cmo-o       1.08       0.084       operable window, clear, insulted fiberglass frame       1       Coverage:       100         1A-cmo-o       0.84       operable window, met		Category Des	cription of thi	e Catagony	ы. 		
B0       HB       single pane window, tax's samily for an window with stam       50         H0       Double pane window, tax's samily for an window with stam		1A Sinc	le pane ope	rable window or sliding glass door		Type: Drap	es Low
IC       Single pane window with storm         ID       Double pane window with storm         IE       Double pane window to rolliding glass door         IF       Triple pane window to rolliding glass door         IS       Double pane window to rolliding glass door         IS       Double pane operable window rolliding glass door         28       Double pane low-refe = 0.60, poreble window rolliding glass door         20       Const No.         UValue       SHGC         Description       External Shade Sci         Const No.       UValue         IA-croo       0.8         IA-croo       0.8         IA-croo       0.9         IA-croo       0.9         IA-croo       0.9         IA-croo       0.8         IA-croo       0.8         IA-croo       0.9         IA-croo       0.9         IA-croo       0.8	Ro	1B Sing	ie pone win	duw, fixed sasir		Amt. Drawn:	50
D       Duble pare window or siding glass door         TE       Duble pare window residing glass door         TF       Tripic pare window residing glass door         2A       Double pare low-e (e = 0.60), boerable window or sliding glass door         2A       Double pare low-e (e = 0.60), boerable window or sliding glass door         3A       Double pare low-e (e = 0.60), boerable window or sliding glass door         Const. No.       U-Value         1A-croo       1.27         0.50       operable window. clear. metal frame no break.         1A-croo       0.9         1A-croo       0.9         1A-croo       0.9         1A-croo       0.84         1A-croo       0.9		1C Sing	le pane wini bla pana an	dow with storm arable window as aliding along door			
Vec       IF       Triple pane window or sliding glass door       Type:       Outs         Vec       Triple pane window or sliding glass door       Type:       Outs         A       Double pane low-e (e = 0.60), operable window or sliding glass door       Type:       Su         B       Double pane low-e (e = 0.60), operable window or sliding glass door       Type:       Su         Const. No.       U-Value       SHGC       Description       Type:       Coverage:       Su         Accmo-       1.27       0.75       operable window. clear, metal frame no break       Type:       Coverage:       Su         IA-cmo-       0.84       operable window. clear, metal frame with break       Type:       Coverage:       100         IA-cmo-       0.84       operable window. clear, insulted fiberglass frame       Type:       Coverage:       100         IA-cmo-       0.864       operable window, clear, insulted fiberglass frame       Type:       Coverage:       100         IA-cmo-       0.864       operable window, clear, insulted fiberglass frame       Type:       Coverage:       100         IA-cmo-       0.864       operable window, heat-absorbing, moded thrame       Type:       Coverage:       100         IA-cmo-       0.864       operable window, heat-absor		1E Dou	ble pane op ble pane wir	idow, fixed sash		- Insect Screen	I
Wet     16     Triple pane window, fixed sash (or any double pane with storm)     19pe:     Use       2A     Double pane low-e (e = 0.60), percluble window or sliding glass door     Coverage:     50       3A     Double pane low-e (e = 0.40), percluble window or sliding glass door     Image: Sliding slid		1F Trip	le pane winc	low or sliding glass door	_	-	Outoi
CA       Double panel lowe (g = 0.60), toperable window or studing glass doub       Coverage:       50         2B       Double panel lowe (g = 0.60), toperable window or sliding glass doub       Coverage:       50         Const. No.       U-Value       SHGC       Description       Coverage:       100         Locate toperable window.       Coverage:       100       Description       Coverage:       100         Const. No.       U-Value       SHGC       Description       Coverage:       100         Laccoro       127       Orsonable window, clear, metal frame no break.       Coverage:       100         Laccoro       0.9       0.84       operable window, clear, wood with metal clead frame       Laccoro       1.4c-bo       0.84       operable window, clear, insultat fiberglass frame         Laccoro       0.9       0.84       operable window, clear, insultat fiberglass frame       1.4c-bo       1.8c-bo       1	we	1G Trip	le pane winc	low, fixed sash (or any double pane with storm)		Type:	Outsi
3A       Double panelowe (e = 0.40), operable window or sliding glass door       Image: Const. No. UV-Value       SHGC       Description         Gl       1.4cmoo       1.22       0.75       operable window. clear. metal frame no break.       Image: Const. No. UV-Value       SHGC       Description         1.4cmoo       1.22       0.75       operable window. clear. metal frame no break.       Image: Const. No. UV-Value       Coefficient:       Image: Coefficient: <td< td=""><td></td><td>2B Dou</td><td>ble pane lov</td><td>v-e (e = 0.60), fixed sash</td><td></td><td>Coverage:</td><td>50</td></td<>		2B Dou	ble pane lov	v-e (e = 0.60), fixed sash		Coverage:	50
Const No.       U-Value       SHGC       Description         Git       IA-chro       1.27       0.75       operable window, clear, metal frame no break       Coefficient       1         IA-chro       1.80       0.75       operable window, clear, metal frame with break       IA-chro       1.80       Coefficient       1       Coverage:       100         IA-chro       0.9       0.64       operable window, clear, would mame       IA-chro       0.9       0.64       operable window, clear, would mame       IA-chro       0.9       0.64       operable window, clear, would mame       IA-chro       1.8       Operable window, clear, would mame       IA-chro       0.9       0.62       operable window, clear, would mame       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       IA-chro       IA-chro       0.9       0.52       operable window, heet-bascring, wood frame       IA-chro       IA-chro		3A Dou	ble pane lov	v-e (e = 0.40), operable window or sliding glass door	*		
Gr         14-cm-o         122         0.75         operable window, clear, metal frame no break         Coefficient         I           14-cb-o         1.08         0.75         operable window, clear, metal frame with break         Income		Const. No. U-Value	SHGC	Description	~	External Sha	ie Scre
IA-cb-o         1.08         0.75         operable window, clear, wood hit metal rame with break.         Image: Coverage: 100           IA-cb-o         0.9         0.64         operable window, clear, wood with metal cled frame         IA-cb-o         0.9         0.64         operable window, clear, wood with metal cled frame         IA-cb-o         0.9         0.64         operable window, clear, wood with metal cled frame         IA-cb-o         0.9         0.84         operable window, clear, wood with metal cled frame         IA-cb-o         0.9         0.84         operable window, clear, wood with metal cled frame         IA-cb-o         0.8         0.62         operable window, clear, insulated fiberglass frame         IA-tb-o         1.8         0.52         operable window, heet-absorbing, wood frame         IA-tb-o         1.4         IA-cb-o         0.9         0.52         operable window, heet-absorbing, wood frame         IA-tb-o         0.9         0.52         operable window, heet-absorbing, wood frame         IA-tb-o         IA-tb-o         0.9         0.52         operable window, heet-absorbing, wood frame         IA-tb-o         IA-tb-o         IA-tb-o         0.9         IA-tb-o	Gla	1A-cm-0 1.27	0.75	operable window, clear, metal frame no break		Coefficient:	1
De     1A-cx-o     0.9     0.64     operable window, clear, wood with metal clad frame       1A-cx-o     0.9     0.64     operable window, clear, wood with metal clad frame       1A-cx-o     0.9     0.64     operable window, clear, wood with metal clad frame       1A-cx-o     0.9     0.64     operable window, clear, wood with metal clad frame       1A-cx-o     0.9     0.64     operable window, clear, wood with metal clad frame       1A-cx-o     0.9     0.64     operable window, heat-absorbing, metal frame with breek       1A-hm-o     0.9     0.52     operable window, heat-absorbing, wood frame		1A-cb-o 1.08	0.75	operable window, clear, metal frame with break			100
1A-cy-o     0.9     0.64     operable window, clear, viny frame       1A-cy-o     0.81     0.64     operable window, clear, insulted tiberglass frame       1A-thro     1.81     0.64     operable window, teat-subscripting, metal frame with break       1A-thro     1.82     operable window, heat-absorbing, metal frame with break       1A-thro     0.9     0.52     operable window, heat-absorbing, wood frame       1A-thro     0.9     0.52     operable window, heat-absorbing, wood frame       1A-thro     0.9     0.52     operable window, heat-absorbing, wood frame       1A-thro     0.9     0.52     operable window, heat-absorbing, wood with metal cled frame       1A-thro     0.9     0.52     operable window, heat-absorbing, wood with metal cled frame		1A-ca-0 0.9	0.64	operable window, clear, wood with metal clad frame		Coverage:	1.00
Do     14-cho     0.81     0.64     operable window, clear, insulated fiberglass frame       14-hm-o     1.27     0.52     operable window, heat-absorbing, metal frame no break       1A-hho-o     1.08     0.52     operable window, heat-absorbing, metal frame with break       1A-hho-o     0.9     0.52     operable window, heat-absorbing, wood frame       1A-hho-o     0.9     0.52     operable window, heat-absorbing, wood with metal clad frame       1A-hho-o     0.9     0.52     operable window, heat-absorbing, wood with metal clad frame       1A-hho-o     0.9     0.52     operable window, heat-absorbing, wood with metal clad frame		1A-cv-o 0.9	0.64	operable window, clear, vinyl frame			
IA-htroo     1.02     0.02     operable window, heat-absorbing, metal trame into break       IA-htroo     1.08     0.52     operable window, heat-absorbing, metal trame with break       IA-htroo     0.9     0.52     operable window, heat-absorbing, wood frame	Do	1A-cf-0 0.81	0.64	operable window, clear, insulated fiberglass frame			
1A-two     0.9     0.52     operable window, heat-absorbing, wood frame       1A-two     0.9     0.52     operable window, heat-absorbing, wood with metal clad frame       1A-two     0.9     0.52     operable window, heat-absorbing, wood with metal clad frame       1A-two     0.9     0.52     operable window, heat-absorbing, word frame	-	1A-nm-0 1.27 1A-hb-0 1.08	0.52	operable window, neat-absorbing, metal frame no break operable window, heat-absorbing, metal frame with break			
1A-ha-o         0.9         0.52         operable window, heat-absorbing, wood with metal clad frame           1A-hv-o         0.9         0.52         operable window, heat-absorbing, virryl frame		1A-hw-o 0.9	0.52	operable window, heat-absorbing, wood frame			
14-hv-o U.9 U.52 operable window, heat-absorbing, vinvl frame		1A-ha-o 0.9	0.52	operable window, heat-absorbing, wood with metal clad frame	~		
		1A-hv-o 0.9	0.52	operable window, heat-absorbing, vinvl frame	× -		

The Glass Material dialog box contains the complete Manual-J fenestration database. Glass is one of the building's major contributors to heat loss and heat gain. So it is very important to include only the most accurate glass data in the calculation. Things like internal shading, insect screens, and external shading screens must be considered. For unoccupied (or "spec") homes, system designers almost always assume the worst case for window shading (none) and site shading (none) during sizing. This assumption can unnecessarily add one-half ton of installed cooling capacity to a 2,500 sq ft home. MJ8 stipulates that drapes and blinds be assumed unless there is specific information to the contrary.

For this home we will be using "1A, Single pane operable window or sliding glass door", "1A-cb-o, operable window, clear metal frame with break".

- <b>\</b>	Default Room Data		
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	No. Name n/a ✔ Default Room	System Zone Width Length He	ight Check Errors ▼ n/a ✓
	Coor Material     U-Value     Width     Length       1     22A-pl     y     0.989 y     0     y     0       Slab on grade, No edge insulation, no insulation below floor, carp     Slab on grade, No edge insulation, no insulation below floor, carp     1     16B-19     y     0     y     y     0     y     y     0     y     0     y     y     0	Perimeter ↓ 0 ↓ pet covering, passive, light dry soil ↓ UP ↓ sphalt Shingles or Dark Metal, Tar and Gravel or Dir STD WTD ↓ N ↓ 0 ↓ 0 ↓ ing finish	Opple & Equip.           Ppl:         0         v           S.Eq:         0         v           LEq:         0         v           Other         v         v           Infil:         0         v           Vent:         0         v           Light:         0         v
	Glass Material     U-Value     SHGC     Width       1     IA-cb-o     10.8     0.75     0        Single pane, operable window, clear, metal frame with breek, out reflective color drapes with tight weave with 50% coverage         Door Meterial     U-Value     Worm     Height       1     11P     U-Value     Worm     0       Metal - Polyurethane Core     0     0     0	Height Ref Occ. 0.Proj 0.Off	occ: 1 v lode: Both v ad.F:0 v

Select a door material.

Doo	r Mat	eri	als				
Y	🗖 Default Ro	om Data					
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	<u>No.</u> Name	Door	Materi	al			
			Marcell	al			
	Eloor Material	Favorites	Recent (	Custom			
	1 22A-pl	Conct No.	LI-Veluo	Description			
	Slab on grade N	111	0.6	Motel - Fiborglass	Core		
	ciab on grade, r	11D	0.39	Wood - Solid Con	9		
		11L	0.56	Paper Honevcom	b Core		
	<u>R</u> oof Material	11A	0.47	Hollow Core			
	1 16B-19	SDI-3	0.33	Steel door insulat	ed w/R-3		
	Under attic or kne	Const No	U-Value	Description		[	
	Membrane, R-19	11A	0.47	Wood - Hollow C	ne		
	Well Metorial	11B	0.3	Wood - Hollow C	ore With Wood Storm		
	1 13A-5ocs	11C	0.32	Wood - Hollow C	ore With Metal Storm		
	1 134 3069	11D	0.39	Wood - Solid Cor	e		
	Block, board insu	11E	0.26	Wood - Solid Cor	e With Wood Storm		
		111F	0.28	Wood - Solid Cor	e With Metal Storm		
	Glass Material	11G	0.54	Wood - Panel			
	1 1A-cb-o		0.32	wood - Panel Wi	n vvood Storm		
		11.1	0.50	Motal - Fiberalea	n metar atorni : Core		
	Single pane, ope	11K	0.36	Metal - Fiberglas	Core With Storm		
	retiective color di	11L	0.56	Metal - Paper Ho	nevcomb Core		
	Door Material	11M	0.34	Metal - Paper Ho	nevcomb Core With		
	1 11P	11N	0.35	Metal - Polystyrer	ie Core		
	I Debuurt	110	0.21	Metal - Polystyrer	e Core With Storm		
tttt	Metai - Polyureth	11P	0.29	Metal - Polyuretha	ane Core		_
		nu -	0.17	Metal - Polyuretha	ane Core with Storm		
		CustomDoo.	. 0.5	My first example o	sustom door		
		LL'ustomDoo	0.36	My second even	nie custom door		
			-	reate Custom	Organiza	Add to Eevorite	Cancel
				Jedie Odstolli	organize		 Cancer

Select a door material.

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	Room Data - Room 1 of 1	
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	No.         Name         System Zone         Width         Length           1         ✓         1         ✓         1         ✓         0         ✓         0         ✓	
	Floor Material U-Value Width Length Perimeter	
	Roof Material U-Value Width Length Direction	
	Wall Material U-Value Length Height Dir STD WTD	
	4     Y     Y     Y     Y     Y       Glass Material     U-Value     SHGC     Width     Height     Ref     Occ.     O.Proj     O.Off	
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Starting with Bedroom 1



Any good room x room ACCA approved program will allow the designer to look at the individual room in it's entirety. When filling out the "Room Data" window it forces the designer to look at every heat transferable building material in that room; you begin to understand how the building will be put together.

Room Data -	Room 1 of 1				
Image: System of the system	U-Value         Width           0         0         0         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         -           0         0         0         -         0           0         0         0         -         0           0         0         0         -         0         0           0         0         0         -         0         -         0           0         0         0         0         -         0         -         0           0         0         0         0         -         0         -	C         R2         Width           System Zone         Width           1         1         1           0         0         1           0         0         -           0         0         -           0         -         -           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         -         0           0         0         -           0         0         -           0         0         -           1         0         -           0         0         -           0         0         -           0         0         -	Length 13.5 9 4 9 4 9 4 9 9 9 9 9 9 9 9 9 9 9 9 9	ght Check Errors V Ves V People & Equip. Ppl: 0 V S.Eq: 0 V LEq: 0 V Other Regs: 0 V Infil: 0 V Vent 0 V Light: 0 V Occ: 1 V Mode: Both V Rad.F; 0 V	

Enter the width and length of the room. The height was set up in the default screen so it appears on this screen. Move to the "Floor Material" box

No.       Name       System Zone       Width       Length       Height       Check Errors         1       v       Bedroom 1       v       1       v       1       v       13.5       v       9       v       Yes       v         1       v       0.889       v       11.5       v       0       v       v       v       Pople & Equip       Ppl:       0       v         2       v       0       v       0       v       v       v       SEq:       0       v         1       V-Value       Width       Length       Direction       v       v       V       SEq:       0       v         2       v       0       v       0       v       VP       v       V       SEq:       0       v         2       v       0       v       0       v       VP       v       V       V       V       V       SEq:       0       v       V <th></th>	
4       x       0	

In this software program hitting the F5 key with the curser in the "Floor Material" box will enter the floor material that was set up in the default screen. The floor area dimensions are also copied to the width and length screen. But since our floor is slab on grade with no edge insulation no load will be calculated until the length is entered into the "Perimeter" box. This program tracks the perimeter as you enter walls. We will now move to the "Roof Material" box.

Room Data	a - Room 1 of 1 8	:o ba % ea ∎ X			
Name           Bedroon           Joor Material           1           22A-pl           2           3           4           5           2000 Material           1           10B-19           2           3           4           5           100 Material           1	U-Value         Width           0         989         11.5           0         0         0           U-Value         Width           0         0         0           U-Value         Width           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0           0         0         0         0           10         0         0         0         0           10         0         0         0         0           10         0         0         0         0           10         0         0         0         10	$\begin{tabular}{ c c c c c } \hline System Zone & Width \\ \hline $1$ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $$	A Length Hei 13.5 v 9 13.5 v 9 V V V V V V V V V V V V V	ght Check Errors Ves V People & Equip. Ppl: 0 V S.Eq: 0 V LEq: 0 V Infil: 0 V Vent: 0 V Light: 0 V Mode: Both V Rad.F; 0 V	
2					

In the "Roof Material" box again hit the F5 key and the roof materiel we set up in the default room will appear, so will the width and length which is copied from the room width and length. If the room has a flat ceiling and no kneewalls the "Roof Material" section is completed and we can move on to the "Wall Material" section.

Room Data - >> @ 含 % 常 o. Name _ Bedroom 1	<mark>े Room 1 of 1</mark> े ि । अ ≫ ि े ि ⊡ @ । अ ०	Ben t% Ben En X System Zone Width I ▼ 1 ▼ 1 ▼ 111.5 ▼	ength Height Check Error 13.5 y 9 y Yes - People & Equip.	S
1         22A-pl           2         1           3corf Material         1           1         16B-19           2         2           Wall Material         1           1         13A-5ocs           2         3           3         4           1         2           3         4           5         5	▼         0.989         ▼         11.5         ▼         1           ▼         0.989         ▼         11.5         ▼         0           ▼         0.949         ▼         11.5         ▼         0           ▼         0.949         ▼         11.5         ▼         17.           ▼         0.949         ▼         11.5         ▼         17.           ▼         0.125         ▼         11.5         ▼         17.           ▼         0.125         ▼         11.5         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0           ▼         0         ▼         0         ▼         0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	▲ *     Ppl:     0	
1 2				

In the "Wall Material" box hit the F5 key and the wall material previously set up in the default room appears. The room height is copied but the length is set to zero, direction is North and there is something called STD and WTD. Enter the length of the front facing wall for Bedroom 1 and move to the "Dir" box.

Ro	om Data -	Room	1 of 1	1 29 0 1	b BV Pb -	~							
»	Nama	<b>२</b> ∣%88 <b>२</b> २ ६		( <sub>6</sub> ¥ ↔  ⊎	8 % ® ©	×	A.G.deb	Longth	Hoight	Chook			
<u>.</u>	- Bedroom 1					• 1 •	11.5 -	13.5	+ 9	- Yes	-IIUIS 		
loor	Metorial	LL-Valı	io Width	Long	ath Do	rimotor				epole & Equ	in	2-0 11	
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lass	Material	U-Valu	Je SHGC	Width	Heigh	Ref Oc	c. O.			Ц	· · · ·		
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1		• 0	• 0	• 0	- 0	-		-			~ -		+
2		<b>-</b> 0	- O	- O	+ 0	-			-				

The orientation arrow on the plan shows that the back of the home is to the North, so the front is south, enter a S in this box for "South".

loom Data -	Room 1 of 1	N Parts X			
Name           Pedroom 1           22           of Material           1           122A-pi           2           of Material           1           16B-19           2           all Material           1           13A-Socs           2           a           4           5	U-Value         Width         Lend           v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v	System         Zone         Width           v         1         v         11.5           th         Perimeter         v         11.5           v         11.5         v         v           th         UP         v         v           v         UP         v         v           th         Dir         STD         WTD           v         N         0         v         0           v         N         0         v         0           v         N         0         v         0           v         N         0         v         0           v         N         v         0         v         0           v         N         v         0         v         0           v         N         v         0         v         0           v         0         0         v         0         0           v         0         0         v         1         v         0           v         0         0         v         1         v         0	Length   Heig 13.5 v 9 	ht       Check Errors         Yes       Yes         People & Equip.         Ppl:       0         S.Eq:       0         LEq:       0         Other       -         Regs:       0         Unifi:       0         Vent:       0         Light:       0         Occ:       1         Mode:       Both         Rad.F       0	
1 2	U-Value         Width         Height           +         0         +         0           +         0         +         0           +         0         +         0	ht Ref v 0 v v 0 v	▲ <u>+</u> - ▼		

STD (summer temperature difference) and WTD (winter temperature difference) are used when the wall is adjacent to an un-conditioned space such as a garage. Move to the first empty box under "Wall Material" to enter in the East wall for Bedroom 1.

Room Data	- Room 1 of 1				
No.         Name           1         -         Bedroom 1           2007         Bedroom 1           22A-pl         2           Roof Material         1           1         16B-19           2         3           4         3           6         4           5         5           Door Material         1	U-Value         Width         Leng           -         0.989         -         11.5         -         13.5           -         0         -         0         -         13.5           -         0         -         0         -         13.5           -         0         -         0         -         13.5           -         0         -         0         -         0           -         0.049         11.5         -         13.5         -         13.5           -         0         0         -         0         -         0         -         0           -         0.125         11.5         -         9         -         0         -         0           -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         0         0         0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Length Height 13.5 y 9 Per SE SE LE V 0 V 0 V 0 V 0 V 0 V 0 V 0 V 0	Check Errors ↓ Yes ↓ optie & Equip. : 0 ↓ : 0	

In this software program hitting the F5 key will copy Wall 1 into Wall 2 which is OK, all we will need to do is edit the Length and Direction

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Room Data -	Room 1 of 1	vall Mate		
	Mo.         Name           1         -         Bedroom 1           Floor Material         1         122-pl           2         -         166-19           2         -         13A-5ocs           2         -         13A-5ocs           3         -         -           4         -         -           2         -         -           3         -         -           4         -         -           5         Door Material         -           1         2         -           3         -         -           4         -         -           5         -         -	U-Value         Width         Len           v         0.989         v         11.5         v         13.3           v         0         v         0         v         0           v         0.49         v         11.5         v         13.3           v         0         v         0         v         0           v         0.125         v         13.5         v         9           v         0         v         0         v         0           v         0         v         0         v         0         v           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	gh     Height     Check Err       5     9     Ves       9     People & Equip       Pol     0       2     Equip       4     Equip       4     Equip       0     Equip       1     Equip <th></th>	

Once this has been done and we have accounted for all of the exterior walls we can move to the box under Glass Material.



Hopefully some place on the plans there will be a window schedule. It is always important to use the correct window size and just as important to know the U-values and SHGC (solar heat gain coefficient). If this information is not on the plans it may take a few telephone calls to get it but as glass is one of the major transmittance factors of heat gain and loss it is worth the effort.

		b <b>n X</b>		<u> </u>
No.         Name           No.         Bedroom 1           2         Bedroom 1           1         22A-pl           2         Image: Second Seco	U-Value         Width         Length           v         0.989         11.5         v         13.5           v         0         v         0         v         0           U-Value         Width         Length         13.5         v         0         v           U-Value         Width         Length         13.5         v         0         v         0           v         0.049         v         11.5         v         13.5         v         0           v         0.125         v         11.5         v         9         v         0           v         0.125         v         13.5         v         9         v         0         v         0           v         0.125         v         13.5         v         9         v         0         v         0           v         0         v         0         v         0         v         v         0         v         10         v         10         v         10         v         v         10         v         10         v         10         v         10         v         10         v         10 </th <th>System Zone         Width         Ler           1         1         1         11.5         v         13.           25         -         -         13.         v         13.           25         -         -         11.5         v         13.           0         -         -         15.         v         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         0         -           0         -         -         0         -         0           0         -         -         0         -         0         -           0         -         1         0         -         0<!--</th--><th>ngh Height Check 5 ↓ 9 ↓ Yes People &amp; Eq Pp: 0 S.Eq: 0 LEq: 0 0 0 0 0 0 0 0 0 0 0 0 0 0</th><th>Emors site. vi</th></th>	System Zone         Width         Ler           1         1         1         11.5         v         13.           25         -         -         13.         v         13.           25         -         -         11.5         v         13.           0         -         -         15.         v         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         -         13.           0         -         -         0         -           0         -         -         0         -         0           0         -         -         0         -         0         -           0         -         1         0         -         0 </th <th>ngh Height Check 5 ↓ 9 ↓ Yes People &amp; Eq Pp: 0 S.Eq: 0 LEq: 0 0 0 0 0 0 0 0 0 0 0 0 0 0</th> <th>Emors site. vi</th>	ngh Height Check 5 ↓ 9 ↓ Yes People & Eq Pp: 0 S.Eq: 0 LEq: 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Emors site. vi

Again hitting the F5 key will enter the glass material that was set up in the default room data we originally set up. This is a bedroom so we can safely assume that there will be some kind of window covering. Enter in the width and the height of the glass. Opening the glass material window will allow you to ad drapes to this window.

Glass Materia	
Room Data - Room 1 of 1	
《》 @ \$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$\\$	
No.         Name         System Zone         Width         Length         H           1         +         Bedroom 1         +         1         +         11.5         +         13.5         +         9	eight Check Errors
Floor Material U-Value Width Length Perimeter	People & Equip.
1 22A-p1 - 0.989 - 11.5 - 13.5 - 25 - 4.5	
Roof Material U-Value Width Length Direction	
	Other
Wall Material U-Value Length Height Dir STD WTD	Regs: 0 V
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Infil: 0 V
	Vent: 0 Vent: 0
	Light: 0 -
Glass Material         U-Value         SHGC         Width         Height         Ref         Occ.         U.Proj         0.0ff           1         1A-cb-o         •         1.08         •         0.75         •         4.4         •         3.2         •         1         •         0         •         •         •	Mode Both
The overhang projection represents the maximum horizontal distance	ce in feet that the overhang
projects out from the glass. The overhang offset represents the dis	stance that the overhang is
zero.	ndow, the onset should be
Note that these inputs will be graved out and upavailable if a skylig	ht material code (one
starting with 8 or 9) has been entered in the Glass Material input.	
	33
CALCS-PLUS	

After we enter the width and height the next box is the "Ref" (reference) box. This is where you tell this software what wall the window is attached to. "Occ" is the number of (occurrences) windows of this same size and type are in this wall; in this case 1. "O.Proj" and "O.Off" is the overhang projection and overhang offset.



Table 3E-1 from ACCA MJ8 (to the right) is a calculation for the HTM adjustment factor. The adjustment procedures for shade by an overhang and foreground reflectance apply to generic and rated fenestration. All of the ACCA approved MJ8 software will do these calculations in the background.

Room Data	- Room 1 of 1	
lo. Name Bedroom Floor Material 1 22A-pl	Syst U-Value Width Length Pe ↓ 0.989 ↓ 11.5 ↓ 13.5 ↓ 25	tem Zone Width Length Height Check Errors v 1 v 11.5 v 13.5 v 9 v No v erimeter 5 v + PpI: 0 v
2 Roof Material 1 16B-19 2 2 Wall Material 1 13A-5ocs	V         V	▼     ▼     ▼       P     ▼     ▼       r     STD     WTD       v     0       I     0       I     0
2 13A-5ocs 3 4 Glass Material 1 1A-cb-o	v         0.125         v         13.5         v         9         v         E           v         0         v         0         v         0         v         N           v         0         v         0         v         0         v         N           v         0         v         0         v         0         v         N           v        Value         SHGC         Width         Heighth         Heighth	•         0         •         0         •
2 1A-cb-o 3 4 5	v         1.08         v         0.75         v         4.4         v         3.2           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0           v         0         v         0         v         0         v         0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Door Material 1 2	U-Value Width Height Ra 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

Enter 2 in O.Proj and 1 in O.Off. Hitting the enter key will bring us to the Glass Material 2 box. Hitting the F5 key will copy the glass from 1 to 2.

Change the reference wall (Ref) to wall 2 which is the East wall.



We have entered all the information relating to this bedroom and now we can move on to the next room. In this software package you can hit the F2 key which will bring up the second room. Move to Bedroom 2 and repeat the same procedures as in Bedroom 1. Following the schematic, also complete Bedroom 3, Bathroom Powder Area, Bathroom Tub Area, and I will meet you in the great room.



The Great Room has several different features to it that make it unique to other rooms such as bedrooms and bathrooms. Not only is the occupant type different but this room also has a cathedral ceiling that incorporates pre-manufactured trusses which makes the space above the cathedral a vented space. The room also has two kneewall areas that we must include in the calculation. We also have a different glass type instead of windows they are sliding glass doors.



The Great Room has a cathedral ceiling so the average room height is higher than 9' as set up in the default room. The draftsman has drawn a section of the cathedral on the floor plan which makes it easer to figure the average room height.



Enter the floor material and the roof material. This room has two kneewalls, one to the east and the other to the west. MJ8 considers any wall that is adjacent to a vented attic as a kneewall



When it comes to HVAC load calculations the building envelope is the air barrier (in contact with the thermal barrier) that separates the conditioned space from the unconditioned space. Basically all we are doing is calculating the heat transfer across the building materials that make up the building envelope. But sometimes it's hard to decide if a certain part of the envelope is a wall or part of the ceiling.





Calculate the area of the east kneewall and enter it as Roof Material #2.



In this program hitting the F5 key will return a copy of Roof Material 1. You would normally have to just edit the width and length. The area of the east kneewall is 30.6 SQ FT. This can be entered as a Width of 1 and a length of 30.6. Change the direction from UP to E for east. Typically we assume that kneewalls are insulated with the same R value but that's not always true, Some times kneewalls will be insulated with a slightly lower R values. So the "Roof Material may have to be edited.

If your software is capable of exporting data as an ENB file into EnergyGauge USA® it helps to give all kneewalls a "Roof Material" number slightly different than the one we used in the default setup. This will help to identify the kneewalls after file transfer to insure that the kneewalls were labeled properly in EnergyGauge USA® (more on this later).



The area of this kneewall is about 20.5 SQ FT.

				V	VCC	זנ	1 \		50		va							
Ro	om Data - I	20	om é	5 C	f 6					}	~ ~ ~ ~ ~ ~ ~ ~ ~					1		
<	Q ( 4 %   *	4	18 🗙 P <sub>R</sub>	æ	L 	ି 🗟	勝軸	tΧ										
<u>4</u> 0. 6	Name Great Room						s • 1	ystem •	Zone 1 -	Width 26.3	Lengt	h Hei – 10.9	ght 5 –	Check Yes	Errors •	~ *		
Eloor	Material		U-Valu	e	Width	Length	<u> </u>	Perim	eter				Peop	le & Eq	uip.			
1	22A-pl	-	0.989	•	26.3 -	14	-	0	-			<b></b>	Ppl:	2	-			
2		•	0	•	0 _	] 0	-	0	•			-	S.Eq:	400	-			
Roof	Material 16B-19		U-Valu 0.049	e v	Width 26.3	Length	<u>ן</u> ד	Directi UP	ion 🚽				L.Eq:	0	•			
2	16B-19	-	0.049	•	1 .	30.6		E					-Other					
3	16B-19	-	0.049	•	1	20.5		w				-	Bene	. 0	1			
<u>W</u> all I	Material	_	U-Valu	e	Length	Henh	<u> </u>	Dir	STE	w.	D,		Infil	0				
1		-	0	•	0	0		N	• 0	- 0		_ <u></u>	Vort	0				
2		-	0	-	0		<b>\</b> A	N	• 0	<b>-</b>  0			Vent.	0				
3		-	0	-	U -			N	• U	- U			Light	1				
4 Glass	Meterial	_	<sup>0</sup>   -\/alu	_	The a	area	of t	he V	Vest		T Proi 0.0	<b>▼</b>	Ucc:	Path				
1		-	0	•	knoo	woll			0000	•   0	• 0		Mode					
2		-	0	-		vail	out (	uidl	00	<b>-</b> 0	• 0		Rad.I	-10	<u> </u>			
3		-	0	-		ab	out 4	20.5	30	• 0	- 0							
4		-	0	-	FI.E	:ntei		or tr	ie	<b>-</b> 0	- 0							
5		•	0	•	width	ı, 30	).6 fo	or th	ne	-  0	- 0	-						
Door 1	Material	- -	U-Valu 0	e v	engt	h an	d ch	ang	je									
2		-	0	•	the d	irect	tion	fron	n									
	1 	-		-	"I IP"	to "I	E″ fo	r M	lact									

The West kneewall can be entered and edited the same way.

						ļ										-		
Roc	om Data - F	loc	om 6	of	5													
× »   @	16% R R	488	🗙 🖁	<b></b> (e		%°⊖ R	5,%8,≣		_						_	~.		
<u>N</u> o. 6 ·	Great Room	_					•	Systen	1 Zone	Width 26.3	Length ↓ 14	Heiq	gnt 5 v	Yes	Errors			
Eloor M	 Anterial	- 1	l-Value	wi	dth	Lenc	th	Perin	eter				- <u>P</u> eop	e & Equ	iip. —			
1	22A-pl	-	0.989	- 26	.3	▼ 14		- 0	•			<b>A</b>	Ppl:	2	-			
2		-	0	- 0		• 0		- 0	•			-	S.Eq:	400	•			
Roof M	laterial	L	J-Value	Wi	dth	Lenc	th	Direc	tion				L.Eq:	0	-			
1	168-19	- 1	U.U49	- 26	.1	▼ 14 20 €	_							,				
2	168-19	-	0.049 n nat			- 20 5							-O <u>t</u> her					
3 Wall M	aterial	۲ ا	I-Value		ath	Lein		Dir	<u>_</u>	) wr	1		Regs:	0				
1	atorital	-	) 0	- 0				- N	• 0	- 0	•	▲ <u>+</u>	Infil:	0	_			
2		•	0	• 0		- 0		■ N	• 0	• 0	•		Vent	0	_			
3		- (	D	• 0		• 0		N	• 0	• 0	-		Light:	0	•			
4		- (	D	- 0		• 0		- N	0	- 0	-	•	Occ:	1	-			
Glass   1	Material	ں ال	J-Value N	SH • 0	IGC	Width	H J	leight F	<u>tef</u> ju	<u>с 0.</u> Р	roj <u>0.0ff</u>		Mode	Both	•			
2		-	0	• 0	<u> </u>		-   0	То	chai	nge th	e "Root	f Mate	erial"	' [	•			
3		- (	0 -	- 0		0	- 0	in	this s	oftwa	re prod	ram (	click	- 1				
4		- (	0	- 0	•	0	- 0	the	e dov	vn arr	ow.			- 1				
5		- (	0	- 0	•	0	- 0							_				
Door M	laterial	L.	J-Value	Wi	dth	Heig	ht	Ref	- 1									
1		- 0	U _	- U		- U		• U	-									

As I mentioned above, if you are using EnergyGauge USA® for your rating software, slightly lowering your R-value for the kneewalls will help you to identify them after exporting from your MJ8 software into USA. In most software programs its easy to change from one material type to another by doing a "Global Material" change. To change the "Roof Material" in this software program click the down arrow.

As raters we know what happens to kneewalls, the insulation doesn't always stay in place.

	<b>\</b>	אור	ang	li ič	JINUUI	IVIC		
R	oom Data - I	Room	6 of 6					
( »	·   🗨 🖆 🌾   🏋 🎠	( 488 🏹 §	. 📾 🔍 🗊	43° ↔ 🖻	5 🐝 🖻 💼 🗙			
<u>1</u> 0.	Name		n Roof	/Ceiling	z Material			
6	- Great Room		Favorites	Recent	Custom			
Elo	or Material	U-Val	Const No.	L I-Veluo	Cetogony CLTD Indox	Ontions D	Description	
	1 22A-pl	• 0.989	17A-34	0.027	17 - On Exp 13	1	1.5" wood plus R-33 to R-35 insulation	
	2	• 0	16B-19	0.049	16 - Under 1	F	R-19 insulation	_
<u>R</u> oo	of Material	U-Val	BU-B10	0.049	16-Under 0 18-Below 31	F	R-19 insulation Built up roof, tar, and gravel W/R-10 (avg) board insulatio	n 🔽
	1 16B-19	• 0.049	10 11 1			1		
	2 16B-19	• 0.049	16 - Undei	Attic or Kn	eewall   17 - On Exposed B	eams   18 - I	Below Roof Joists	
	3 16B-19	• 0.049	Select a c	ategory from	m the 1st list below, then se	lect a roof in	n that category from the 2nd list.	
<u>W</u> a	II Material	U-Val	Category	Descriptio	n of this Category	6 11 1 I		<u>^</u>
	1	• 0	16A 16B	Vented Att	Attic, No Hadiant Barrier, Any Ri ic: No Badiant Barrier, Dark Asr	boting Materia halt Shingles i	al, Any Root Color or Dark Metal. Tar and Gravel or Membrane	=
	2	• 0	16BR	Unvented	Attic with Radiant Barrier, Any R	oofing Materia	al, Any Roof Color	
	3	• 0	16C	Vented Att	ic, No Radiant Barrier, White or iowith Radiant Barrior, Dark Acr	Light Color Shi	ingles, Any Wood Shake, Light Metal, Tar and Gravel or or Dark Motal. Tar and Gravel or Mombrano	Mer
	4	- 0	16D	Vented Att	ic. No Radiant Barrier. Dark Tile	. Slate or Coni	crete	~
Gla	uss Material	U-Val	<					>
	1	- O	Const. No.	U-Value	CLTD Index Description			~
	2	• 0	16B-0	0.408	1 R-0 insulation			
	3	- 0	16B-7 16B-11	0.112	1 R-7 insulation 1 B-11 insulation		Lets identify all kneewalls	_
	4	<b>v</b> 0	16B-13	0.07	1 R-13 insulation		by using the "16B-15"	
	5	- 0	16B-15 16B-19	0.061	1 R-15 insulation		which changes the Durchu	
De	• j	°	16B-19	0.049	1 R-13 insulation		which changes the R-value	9
000	1	-Val	16B-25	0.038	1 R-25 insulation		to 15.	
	2		16B-28	0.034	1 R-28 insulation			×
	2	- U						

Lets identify all kneewalls by using the "16B-15" which changes the R-value to 15.



This is typically what we find in the field a few years after the home is built. So what do you think the average R-value of the insulation on this knee wall is?

		Wa	lls		
Room Data -	Room 6 of 6				
« »   🍳   🖄 🌿   🐂 🎙	R   488 🊧 🗽 🎘 👘 🖓	# 이 🖻 % 🖻 💼 🗙			
No. Name 6 - Great Room		System Zone         Wid           ▼         1         ▼         26.	dth Length Hei .3 → 14 → 10.	ght Check Errors 5 - No -	
Eloor Material 1 22A-pl 2	U-Value         Width           ▼         0.989         ▼         26.3           ▼         0         ▼         0	Length         Perimeter           ▼         14         ▼         0         ▼           ▼         0         ▼         0         ▼		People & Equip.           Ppl:         0           S.Eq:         0	
Boof Material           1         168-19           2         168-15           3         168-15	U-Value Width U.049 V 26.3 U.061 V 1 U.061 V 1 U.061 V 1	Length         Direction           14         V         UP         V           30.6         V         E         V           20.5         V         W         V		23 DOUB	LE 23 LF CR ABOVE
Wall Material 1 13A-5ocs 2	U-Value Length ▼ 0.125 ▼ 0 ▼ 0 ▼ 0	Height Dir STD • 9 • N • 0 • • 0 • N • 0 •	WTD 0 • • • • • 0 •		FRENCH DOOR
4 Glass Material	•         •         •         •         •           •         0         •         0         •         0           •         0         •         0         •         0         •           •         0         •         0         •         0         •	V         V         N         V         V         V           V         0         V         N         V         0         V           Width         Height         Ref         Occ.         0         V         1         V			N N
2					WE
4 5					Ś `
1 2				GREAT ROOM	
				2-3x6*8* SGD	23x6*8* SGD
CALCS-PLU	JS				

Now that the roof & knee walls for this room are completed we can move on to walls. In this program hitting the F5 key while in the "Wall Material" box will enter the default wall. All we have to do is enter the length of the wall and the direction (Dir). Enter in the length of the South wall.



Adjacent walls are those walls that are adjacent to unconditioned spaces. Those unconditioned spaces could very well be at a different temperature than outdoor conditions. In this case the Great Room has an adjacent wall that separates it from the garage. The adjacent wall is a wood frame wall with R-11 batt insulation.

		Wall /	Material			
	R¢	Favorites	Recent Cust	om		
«	»	Const. No.	U-Value Gr	oup Cate	gory Description Abv.Gri	1.U-Value
No	.	12B-0sw 12BA.0feu	0.097 B	12-F	Frame no board insulation, siding finish, wood studs 0	
6		15D16-4	0.000 H	15-E	Base foam-concrete matrix ASTM certified B-15 t 0.052	
1		12D-6bw	0.058 K	12-F	Frame R-6 board insulation, brick finish, wood studs 0	
E	00					
	1	10 5				In the Wall Material dialog
	- 1	12 - Fran	ne 13-t	Block	14 - Alternative   15 - Basement	
B	00	Select a ca	tegory from the	e 1st list b	elow, then select a wall in that category from the 2nd li	box click on "12-Frame",
	۱I	Category	Descript	ion of this Ca	ategory	then on "12B" for "R-11
	- 11	12A	No Insula	ation In Stud	Cavity	
		12B	R-11 Inst	ulation In 2 x	4 Stud Cavity	Insulation in 2x4 Stud
	_1	12C	R-13 Inst	ulation In 2 x	4 Stud Cavity	Cavity" and then "12B-0sw
Ν	<u>/ali</u>	12D 12E	R-19 Inst R-19 Inst	Cavity and them 120 com		
	-11	12F	R-21 Inst	ulation In 2 x	6 Stud Cavity	for " no board insulation,
	- 11	Custom	Frame W	/all, User-D	efined	siding finish wood stude"
	- 1					siding infish, wood stads .
	- 1					
G	las	Const No	U-Value	Group	Description	
	- 11	12B-0bw	0.097	Н	no board insulation, brick finish, wood studs	
	-1	12B-0bm	0.112	Н	no board insulation, brick finish, metal studs 🛛 📕	
		12B-0sw	0.097	8	no board insulation, siding finish, wood studs	
	1	12B-2bw	0.112		no board insulation, siding tinish, metal studs R-2 hoard insulation, brick finish wood studs	
	1	12B-2bm	0.106	i	R-2 board insulation, brick finish, metal studs	
		12B-2sw	0.086	С	R-2 board insulation, siding finish, wood studs	
		12B-2sm	0.106	C	R-2 board insulation, siding finish, metal studs	
	~~	12B-3bw	0.079	J	R-3 board insulation, brick tinish, wood studs	× 1
				-	E E	

Click the down arrow to enter the wall material box and select the wall that will match the great room's adjacent wall.
Room Da	ta - Room 6 of 6		
No. Name 6 - Great Eloor Material 1 22A-pl	Room U-Value Width V 0.989 V 26.3	System Zone Width - 1 - 1 - 26.3 Length Perimeter 14 - 12 -	Length Height Check Errors V 14 V 10.5 V No V People & Equip.
2 <u>Roof Material</u> 1 16B-19 2 16B-15 3 16B-15	v         0         v         0           U-Value         Width           v         0.049         v         26.3           v         0.061         v         1           v         0.061         v         1	r 0 v 0 v Length Direction 14 v UP v 30.6 v E v 20.5 v W v	Edit the "Length", "Height", "Direction", "STD" and "WTD" for w 2; the adjacent wall.
Wall Material           1         13A-50cs           2         12B=0sw           3         4	U-Value         Length           •         0.125         •         12           •         0.097         0         •           •         0         •         0           •         0         •         0           •         0         •         0	Height         Dir         STD         WI           9         V         S         0         0         0           10.5         V         V         0         V         0         0           0         V         N         -         0         -         0         0           0         V         N         -         0         -         0         0         0	D v v v v v v v v v v v v v
Glass Material 1 2 3 4 5	U-Value         SHGC           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v           v         0         v         0         v	Width         Height         Per (         Occ.         Occ.         Occ.         O         I         V         I         I         V         I         V         I         V         I         V         I         V         I         V         I         V         I         V	Proj 0.0ff v 0 0 ↓ ↓ v 0 0 ↓ ↓ v 0 0 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Door Material	U-Value Width U-Value Vidth	Height Ref	

After the wall material type has been selected we will need to enter the length of the wall, the wall height (the software program automatically copied the average room height as the wall height), the direction, the "STD" and the "WTD". It is the "STD" and the "WTD" that makes this an adjacent wall. The "STD" is the summer temperature difference and the "WTD" is the winter temperature difference.



Enter the fenestration for the Great Room. Notice that the glass area consists of sliding glass doors which is a little different than operable windows.

Favorites       Recent       Custom       Gass Options       Recent         Const. No.       U-Value       SHGC       SkyLight       Description       Image: Const. No.       Image: Const. No.       Gass Options       Reset         1D-hb-d       0.65       0.44       No       silding gless door, heat-absorbing, metal frame with break.       Image: Const. No.       Image: Const. N	🖪 Glass	Mater	rial				
Const. No.       U-Value       SHgC SkyLight       Description         1D-hb-d       0.65       0.44       No       silding glass door, heat-absorbing, metal frame with break       Type:       Flat       -         1A-bb-d       1.08       0.75       No       silding glass door, heat-absorbing, metal frame with break       V         Windows, Glass Doors, Glass Block       Skylights       Skylight Tilt:       0       -         Select a category from the 1st list below, then select a glass in that category from the 2nd list.       Internel Shading       -         Category       Description of this Category       -       -       -       -         1B       Single pane window, fixed sash       -       -       -       -       -         1C       Single pane window, fixed sash       -	Favorites	Recent	Custom			Glass Options	<u>R</u> eset
10-bod       0.55       0.44       No       silding glass door, heat-basching, metal frame with break.         4B-3r       0.43       0.47       No       e=010 on surface 2, insulated fiberglass frame         1A-bod       10.8       0.52       No       silding glass door, heat-basching, metal frame with break.         1A-bod       10.8       0.75       No       silding glass door, heat-basching, metal frame with break.         Windows, Glass Doors, Glass Block       Skylights        Skylight Tilt:       0         Select a category from the 1st list below, then select a glass in that category from the 2nd list.       Internal Shading         Type:       None        Amt. Drawn:       100         10       Single pane window, fixed sash         Amt. Drawn:       100         10       Double pane window, fixed sash         Amt. Drawn:       100          10       Double pane window, fixed sash         Insect Screen       Type:       Outside          12A       Double pane low-e (e = 0.60), operable window or sliding glass door          Coverage:       100          2A       Double pane low-e (e = 0.60), operable window or sliding glass door <th>Const. No.</th> <th>U-Value</th> <th>SHGC</th> <th>SkyLight Description</th> <th>~</th> <th><u>G</u>eneral</th> <th></th>	Const. No.	U-Value	SHGC	SkyLight Description	~	<u>G</u> eneral	
4B-3t       0.43       0.47       No       e=0.10 on surface 2, insulated fiberglass trame         1A-bb-d       108       0.52       No       siding gless door, head-boothing, metal frame with break.       Inchester 10.00000000000000000000000000000000000	1D-hb-d	0.65	0.44	No sliding glass door, heat-absorbing, metal frame with break		Type: Elat	-
1A-bb-d       1.08       0.52       No       silding glass door, lear-absorbing, metal frame with break.       Image: Construction of the constructio	4B-3f	0.43	0.47	No e=0.10 on surface 2, insulated fiberglass frame		rype. riac	
1A-cb-d       108       0.75       No       stiding glass door, clear, metal frame with break.       ✓         Windows, Glass Doors, Glass Block       Skylights         Select a category from the 1st list below, then select a glass in that category from the 2nd list.         Category Description of this Category         1A       Single pone window, fixed sash       ✓         1B       Single pone window, fixed sash       ✓         1D       Double pane window, fixed sash       ✓         1D       Double pane window, fixed sash       ✓         1G       Triple pane window, fixed sash       ✓         2A       Double pane low-e (e = 0.60), operable window or sliding glass door       ✓         2B       Double pane low-e (e = 0.40), operable window or sliding glass door       ✓         1A-cro       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-cro       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-cro       0.9       0.3       operable window, ceflective, insulated fiberglass frame	1A-hb-d	1.08	0.52	No sliding glass door, heat-absorbing, metal frame with break		Ground Refl: 0.2	-
Windows: Glass Doors: Glass Block     Skylights       Select a category from the 1st list below, then select a glass in that category from the 2nd list.     Internal Shading       Category     Description of this Category     And Drawn:       18     Single pane window with storm     And Drawn:       10     Double pane window, fixed sesh     Internal Shading       11     Double pane window, fixed sesh     Internal Shading       12     Double pane window, fixed sesh     Internal Shading       13     Triple pane window, fixed sesh     Internal Shading       14     Double pane window, fixed sesh     Internal Shading       16     Triple pane window, fixed sesh     Intercet Screen       16     Triple pane window, fixed sesh     Intercet Screen       17     Double pane lowe (e = 0.60), operable window or sliding glass door     Intercet Screen       2A     Double pane lowe (e = 0.60), operable window or sliding glass door     Intercet Screen       2B     Double pane lowe (e = 0.60), operable window or sliding glass door     Intercet Screen       2A+do 0.9     0.3     operable window, reflective, wood with metal clad frame     Intercet Screen       1A-croo     0.9     0.64     sliding glass door, clear, wood frame no break     Intercet Screen       1A-croo     0.9     0.64     sliding glass door, clear, wood frame     Intercet Scre	1A-cb-d	1.08	0.75	No sliding glass door, clear, metal frame with break	*	Skylight Tilt: 0	
Select a category from the 1st list below, then select a glass in that category from the 2nd list.         Internet Shading         Category         1A       Single pane operable window or sliding glass door         1B       Single pane window with storm         1D       Double pane window, fixed sash         1E       Double pane window, fixed sash         1F       Triple pane window, fixed sash         1F       Triple pane window, fixed sash         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2B       Double pane lowe (e = 0.60), operable window or sliding glass door         2B       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A+to       0.81       0.3       operable window, reflective, word frame no break.         1A-co-d       <	Windows,	Glass Do	ors, Glass	Block Skylights		orgingin the p-	
Category       Description of this Category         IA       Single pane operable window or sliding glass door         IB       Single pane window with storm         IC       Single pane window with storm         ID       Double pane window, fixed sesh         IE       Double pane window, fixed sesh         IF       Triple pane window, fixed sesh         IF       Double pane window, fixed sesh         IG       Triple pane window, fixed sesh (or any double pane window or sliding glass door         IG       Triple pane lowe (e = 0.60), perable window or sliding glass door         IA       Double pane lowe (e = 0.60), perable window or sliding glass door         ZA       Double pane lowe (e = 0.60), perable window or sliding glass door         ZA       Double pane lowe (e = 0.60), perable window or sliding glass door         ZA       Double pane lowe (e = 0.60), perable window or sliding glass door         ZA       Double pane lowe (e = 0.60), perable window or sliding glass door         ZA+too       0.9       0.3       operable window, reflective, wood with metal clad frame         IA-to-d       0.8       operable window, cellective, wood rime no break       Coverage:         IA-co-d       0.9       0.4       sliding glass door, clear, wood rime       Coverage:         IA-co-d       0.9	Select a c	ategory fro	om the 1st	list below, then select a glass in that category from the 2nd list.	1	Internal Shading —	
1A       Single pane operable window or sliding glass door         1B       Single pane window, fixed sesh         1C       Single pane window, fixed sesh         1D       Double pane operable window or sliding glass door         1D       Double pane operable window or sliding glass door         1E       Double pane operable window or sliding glass door         1E       Double pane window, fixed sesh         1F       Triple pane window or sliding glass door         2A       Double pane low-e (e = 0.60), fixed sesh         3A       Double pane low-e (e = 0.60), fixed sesh         3A       Double pane low-e (e = 0.60), fored sesh         1A-rco 0.9       0.3       operable window reflective, insulted fiberglass frame         1A-rco 0.9       0.3       operable window, reflective, insulted fiberglass frame         1A-rco 0.9       0.3       operable window, reflective, insulted fiberglass frame         1A-rco 0.9       0.3       operable window, reflective, insulted fiberglass frame         1A-rcord       1.00       0.75       sliding glass door, clear, wood frame         1A-rcord       0.8       sliding glass door, clear, wood frame         1A-rcord       0.8       sliding glass door, clear, wood frame         1A-rcord       0.8       sliding glass door, clear, wood frame	Category	De	escription of	this Category	^	Tune: None	
1B       Single pane window, fixed sash         1C       Single pane window, fixed sash         1D       Double pane window, fixed sash         1D       Double pane window, fixed sash         1B       Triple pane window, fixed sash         1B       Triple pane window, fixed sash         1G       Triple pane window, fixed sash         2A       Double pane low- (e = 0.60), operable window or sliding glass door         2B       Double pane low- (e = 0.60), operable window or sliding glass door         2B       Double pane low- (e = 0.60), operable window or sliding glass door         1A-ra-o       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-ra-o       0.9       0.3       operable window, reflective, insulated fiberglass frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9 <t< td=""><td>1A</td><td>Sir</td><td>ngle pane o</td><td>perable window or sliding glass door</td><td></td><td>Type. None</td><td></td></t<>	1A	Sir	ngle pane o	perable window or sliding glass door		Type. None	
1C       Single pane window with storm         1D       Double pane operable window or sliding glass door         1E       Double pane window, fixed sash         1F       Triple pane window, fixed sash door         1G       Triple pane window, fixed sash door         1G       Triple pane window, fixed sash door         1G       Triple pane window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2B       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.40), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         2A       Double pane lowe (e = 0.40), operable window or sliding glass door         2A       Double pane lowe (e = 0.60), operable window or sliding glass door         1Arcro 0.9       0.3       operable window, reflective, wood with metal clad frame         1Arcro 1.09       0.75       sliding glass door, clear, metal frame with break         1Accrd 0.9       0.64       sliding glass door, clear, wood frame         1Accrd 0.9       0.64       sliding glass door, clear, wood frame         1Accrd 0.9       0.64       sliding glass door, clear, wood frame         1Accrd 0.9       0.64       sliding gl	18	Sir	ngle pane w	indow, fixed sash		Amt. Drawn: 100	-
1D       Double pane operable window or sliding glass door         1E       Double pane window, foreid sash         1F       Triple pane window foreiding glass door         1G       Triple pane window foreiding glass door         2A       Double pane low-e (e = 0.60), perable window or sliding glass door         2B       Double pane low-e (e = 0.60), perable window or sliding glass door         2A       Double pane low-e (e = 0.60), perable window or sliding glass door         2A       Double pane low-e (e = 0.60), perable window or sliding glass door         2A       Double pane low-e (e = 0.60), perable window or sliding glass door         2A       Double pane low-e (e = 0.60), perable window or sliding glass door         Const No.       U-Value       SHGC       Description         1A-rco       0.9       0.3       operable window, reflective, insultated fiberglass frame       Coercage:       100         1A-rco       0.8       0.3       operable window, reflective, insultated fiberglass frame       Coercage:       100       •         1A-rcor       0.9       0.3       operable window, reflective, wood firme       •       Coercage:       100       •         1A-rcor       0.8       0.64       sliding glass door, clear, wood firme       •       •       Coverage:       100       • <td>1C</td> <td>Sir</td> <td>ngle pane w</td> <td>indow with storm</td> <td>Ξ.</td> <td></td> <td>_</td>	1C	Sir	ngle pane w	indow with storm	Ξ.		_
IE       Double panel window, iteld safe         IF       Triple pane window or sliding glass door         IG       Triple pane window, fixed safe (or any double pane with storm)         2A       Double pane low-e (e = 0.60), operable window or sliding glass door         2B       Double pane low-e (e = 0.60), operable window or sliding glass door         3A       Double pane low-e (e = 0.60), operable window or sliding glass door         1A-ra-0       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-ra-0       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-ra-0       0.8       0.3       operable window, reflective, wood with metal clad frame         1A-ra-0       0.8       0.3       operable window, reflective, wood with metal clad frame         1A-ra-0       0.8       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.8       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear, wood frame         1A-ca-d       0.9       0.64       sliding glass door, clear,	1D	Do	ouble pane (	operable window or sliding glass door		Insect Screen	
IG       Triple pane window. Eval desk for any double pane with storm)         IG       Triple pane window. Eval desk for any double pane with storm)         2A       Double pane low-e (e = 0.60), fored sach         2B       Double pane low-e (e = 0.60), fored sach         3A       Double pane low-e (e = 0.60), fored sach         3A       Double pane low-e (e = 0.40), operable window or sliding glass door         Const No.       U-Velue         SHGC       Description         IA-roo       0.9       0.3       operable window, reflective, wood with metal clad frame         IA-roo       0.9       0.3       operable window, reflective, wood with metal clad frame         IA-roo       0.81       0.3       operable window, reflective, wood with metal clad frame         IA-roo       0.9       0.84       sliding glass door, clear, wood time         IA-cord       0.9       0.64       sliding glass door, clear, wood time         IA-cord       0.9       0.64       sliding glass door, clear, wood time         IA-cord       0.9       0.64       sliding glass door, clear, wood time         IA-cord       0.9       0.64       sliding glass door, clear, wood time         IA-cord       0.9       0.64       sliding glass door, clear, wood time         IA-cord	16	Tri	iubie pane v iplo peno wi	ntaow, ixea sash ndow or cliding glace door			
2A       Double pane low-e (e = 0.60), operable window or sliding glass door         2B       Double pane low-e (e = 0.60), fixed sash         3A       Double pane low-e (e = 0.60), fixed sash         1A       Double pane low-e (e = 0.60), fixed sash         1A       Double pane low-e (e = 0.60), fixed sash         1A       Double pane low-e (e = 0.60), fixed sash         1A       Double pane low-e (e = 0.60), parable window or sliding glass door         1A       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-rbo       0.81       0.3       operable window, reflective, wood with metal clad frame         1A-rbo       0.81       0.3       operable window, reflective, windel frame with treak         1A-rbo       0.81       0.3       operable window, reflective, windel frame         1A-rbo       0.81       0.3       operable window, reflective, windel frame no break         1A-rbo       0.81       sliding glass door, clear, metal frame with treak       Coverage:         1A-rbo       0.81       sliding glass door, clear, wood frame         1A-rbo       0.81       sliding glass door, clear, winyl frame         1A-rbo       0.81       sliding glass door, clear, wood frame         1A-rbo       0.81       slididing glass door, clear, wood frame	ig	Tri	iple pane wi	ndow fixed sash (or any double pane with storm)		Type: Outs	side 👻
28       Double pane low-e (e = 0.60), fixed sash       Coverage:       100         3A       Double pane low-e (e = 0.40), operable window or sliding glass door       ✓         Const. No.       U-Velue       SHGC       Description         1A-rao       0.9       0.3       operable window, reflective, wood with metal clad frame         1A-rao       0.9       0.3       operable window, reflective, insulated fiberglass frame         1A-rao       0.9       0.3       operable window, reflective, insulated fiberglass frame         1A-rao       0.9       0.4       sliding glass door, clear, metal frame with break.         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.9       0.64       sliding glass door, clear, wood frame         1A-co-d       0.8       slididididididididididididididididididid	2A	Do	uble pane l	ow-e (e = 0.60), operable window or sliding glass door		100	
3A       Double pane low- (e = 0.40), operable window or sliding glass door <ul> <li>Const No.</li> <li>U-Value</li> <li>SHGC</li> <li>Description</li> <li>Araco</li> <li>0.9</li> <li>0.3</li> <li>operable window, reflective, wood with metal clad frame</li> <li>IA-roo</li> <li>0.81</li> <li>0.3</li> <li>operable window, reflective, insultad fiberglass frame</li> <li>IA-cod</li> <li>0.81</li> <li>0.75</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.9</li> <li>0.64</li> <li>sliding glass door, clear, wood frame</li> <li>IA-cod</li> <li>0.16.44</li> <li>sliding glass door,</li></ul>	2B	Do	ouble pane l	ow-e (e = 0.60), fixed sash		Coverage: 100	
Const No.       U-Velue       SHGC       Description         1Arta-o       0.9       0.3       operable window, reflective, wood with metal clad frame         1Arta-o       0.9       0.3       operable window, reflective, winyl frame         1Arta-o       0.81       0.33       operable window, reflective, insulted fiberglass frame         1Arta-o       0.81       0.33       operable window, reflective, insulted fiberglass frame         1Arta-o       0.81       0.81       sliding glass door, clear, metal frame no break.         1Arcad       0.9       0.64       sliding glass door, clear, wood frame         1Acard       0.9       0.64       sliding glass door, clear, wood frame         1Acard       0.9       0.64       sliding glass door, clear, wood frame         1Acard       0.81       0.64       sliding glass door, clear, winyl frame         1Acard       0.81       of44       sliding glass door, clear, winyl frame         1Acard       0.81       sliding glass door, clear, winyl frame         1Acard       0.81       sliding glass door, clear, winyl frame         1Ached       1.06       0.52       sliding glass door, clear, winyl frame         1Arbod       1.06       0.52       sliding glass door, clear, winyl frame	3A	De	uble pane l	ow-e (e = 0.40), operable window or sliding glass door	*		
1Artoro       0.9       0.3       operable window, reflective, wood with metal clad frame         1Artoro       0.9       0.3       operable window, reflective, wind frame         1Artoro       0.81       0.3       operable window, reflective, wind frame         1Artoro       0.81       0.3       operable window, reflective, wind frame         1Arctord       1.27       0.75       sliding glass door, clear, metal frame in break         1Arctord       0.80       0.75       sliding glass door, clear, metal frame inb break         1Arctord       0.9       0.64       sliding glass door, clear, wood frame         1Accard       0.9       0.64       sliding glass door, clear, wood frame         1Accard       0.9       0.64       sliding glass door, clear, wood frame         1Accard       0.81       sliding glass door, clear, winy! frame         1Accard       0.81       sliding glass door, clear, wood frame         1Accard       0.81       sliding glass door, clear, wood frame         1Achord       1.08       o.52       slidin	Const. No.	U-Value	SHGC	Description	^	-External Shade Sci	/een
IA-ro-o       0.9       0.3       operable window, reflective, vinyl frame         IA-rho       0.81       0.3       operable window, reflective, insulated fibergless frame         IA-cm-d       1.27       0.75       sliding glass door, clear, metal frame no break.         IA-cm-d       1.08       0.75       sliding glass door, clear, metal frame with break         IA-cm-d       0.9       0.64       sliding glass door, clear, wood frame         IA-cm-d       0.9       0.64       sliding glass door, clear, wood frame         IA-cm-d       0.9       0.64       sliding glass door, clear, wood frame         IA-cm-d       0.9       0.64       sliding glass door, clear, wood frame         IA-cm-d       0.81       0.64       sliding glass door, clear, insulated fiberglass frame         IA-cm-d       0.81       0.64       sliding glass door, clear, insulated fiberglass frame         IA-cm-d       1.27       0.52       sliding glass door, heat-absorbing, metal frame no break         IA-hb-d       1.08       0.52       sliding qlass door, heat-absorbing, metal frame with break         <	1A-ra-o	0.9	0.3	operable window, reflective, wood with metal clad frame		Coefficient: 1	-
1Artho     0.81     0.3     operable window, reflective, insulated therglass frame       1Arcmd     1.27     0.75     sliding glass door, clear, metal frame no break.       1Arcmd     0.8     0.75     sliding glass door, clear, metal frame no break.       1Arcmd     0.9     0.64     sliding glass door, clear, wood frame       1Arcmd     0.9     0.64     sliding glass door, clear, wood frame       1Arcmd     0.9     0.64     sliding glass door, clear, wood frame       1Arcmd     0.81     0.64     sliding glass door, clear, wood with metal clad frame       1Archd     0.81     0.64     sliding glass door, clear, wood with metal clad frame       1Archd     0.81     0.64     sliding glass door, clear, wood with metal clad frame       1Archd     0.81     0.64     sliding glass door, clear, wood with metal clad frame       1Archd     0.81     0.64     sliding glass door, clear, wood there glass frame       1Archd     0.81     0.64     sliding glass door, clear, wood there glass frame       1Archd     1.08     0.52     sliding glass door, heat-absorbing, metal frame with break       1Archd     1.08     0.52     sliding glass door, heat-absorbing, metal frame with break	1A-rv-o	0.9	0.3	operable window, reflective, vinyl frame		- 100	
1A-ctr-d     1.08     0.75     sliding glass door, deer, metal trame vib IPB4K       1A-ctr-d     0.9     0.64     sliding glass door, clear, wood trame       1A-ctr-d     0.9     0.64     sliding glass door, clear, wood trame       1A-ctr-d     0.9     0.64     sliding glass door, clear, wood trame       1A-ctr-d     0.9     0.64     sliding glass door, clear, wood trame       1A-ctr-d     0.9     0.64     sliding glass door, clear, wood trame       1A-ctr-d     0.81     0.64     sliding glass door, clear, winyl trame       1A-ctr-d     0.81     0.64     sliding glass door, clear, wood trame       1A-tr-d     1.27     0.52     sliding glass door, clear, winyl trame       1A-thr-d     1.06     0.52     sliding glass door, clear, winyl trame       1A-thr-d     1.06     0.52     sliding glass door, clear, winyl trame       1A-thr-d     1.08     0.52     sliding glass door, heat-absorbing, metal frame with break	IA-rt-o	0.81	0.3	operable window, reflective, insulated fiberglass frame		Coverage: 100	•
IA-coved     0.9     0.64     sliding glass door, clear, wood frame       IA-coved     0.9     0.64     sliding glass door, clear, wood frame       IA-coved     0.9     0.64     sliding glass door, clear, wood frame       IA-coved     0.9     0.64     sliding glass door, clear, wood frame       IA-coved     0.81     0.64     sliding glass door, clear, insulated fiberglass frame       IA-coved     0.81     0.64     sliding glass door, clear, insulated fiberglass frame       IA-toved     1.80     0.52     sliding glass door, heat-absorbing, metal frame no break	1A-cm-d	1.47	0.75	siluring grass door, clear, metal trame no break			
1A-ca-d     0.9     0.64     sliding glass door, clear, wood with metal clad frame       1A-cx-d     0.9     0.64     sliding glass door, clear, wood with metal clad frame       1A-cx-d     0.9     0.64     sliding glass door, clear, wood with metal clad frame       1A-cx-d     0.9     0.64     sliding glass door, clear, wood with metal clad frame       1A-cx-d     0.9     0.64     sliding glass door, clear, insulted fiberglass frame       1A-hr-d     1.27     0.52     sliding glass door, heat-absorbing, metal frame with break       1A-hb-d     1.06     0.52     sliding glass door, heat-absorbing, metal frame with break	1A-cw-d	0.9	0.64	sliding glass door, clear, wood frame			
1A-cy-d     0.9     0.64     stilling glass door, clear, vinyl frame       1A-cy-d     0.81     0.64     stilling glass door, clear, vinyl frame       1A-cy-d     0.81     0.64     stilling glass door, clear, vinyl frame       1A-hy-d     1.27     0.52     stilling glass door, heat-absorbing, metal frame no break       1A-hy-d     1.08     0.52     stilling glass door, heat-absorbing, metal frame with break	1A-ca-d	0.9	0.64	sliding glass door, clear, wood with metal clad frame			
1A-cH-d     0.81     0.64     sliding glass door, clear, insulated fiberglass frame       1A-hrmd     1.27     0.52     sliding glass door, heat-absorbing, metal frame no break       1A-hb-d     1.08     0.52     sliding glass door, heat-absorbing, metal frame no break	1A-cv-d	0.9	0.64	sliding glass door, clear, vinyl frame			
1A-hm-d     1.27     0.52     sliding glass door, heat-absorbing, metal frame no break       1A-hb-d     1.08     0.52     sliding glass door, heat-absorbing, metal frame with break	1A-cf-d	0.81	0.64	sliding glass door, clear, insulated fiberglass frame			
IA-mo-a 1.06 U.52 sliping glass door, near-absorbing, metal frame with break	1A-hm-d	1.27	0.52	sliding glass door, heat-absorbing, metal frame no break	~		
	IA-hb-d	1.08	0.52	sliging glass goor, heat-absorbing, metal frame with break			
	<b>`</b>						

In the glass material dialog box we will choose "1A" for "Single pane operable window or sliding glass door" then "1A-cd-d" for "sliding glass door, clear, metal frame with break". Since this glass is in the great room we will assume no internal shading, because the glass is surrounded by a lanai with an insect screen we can take 100% "Insect Screen" shading.

	Room Data - R	oom 6 of 6				
	> @ 6 % 8 %	#*!®	健 G   Ba K Ba Fa X			
			Protect Zees	6-44 I4 II:	alta Ohaali Faaaa	
6	Great Room			6.3 - 14 - 10.	5 VINO VINO	
÷-++					People & Equip.	
E	Floor Material 1 22A-ol	U-Value Width	Length Perimeter		Pnl: 0 v	
	2	- 0 - 0			S Eat 0	
The second se		U-Value Width	Length Direction	<u>`</u>		
	1 16B-19 ·	- 0.049 - 26.3	• 14 • UP •	▲ <u>+</u>	L.Ed: 0	
	2 16B-15	- 0.061 - 1	▼ 30.6 ▼ E ▼		Other	
	3 16B-15	• 0.061 • 1	▼ 20.5 ▼ ₩ ▼	-	Regs: 0 +	
	Wall Material	U-Value Length	Height Dir STD	WTD	Infil: 0 v	
	1 13A-50CS	- 0.125 - 12	<u>• 9 • S • 0 ·</u>		Vent 0 v	
	2 12B-0sw	- 0.097 - 6.4	<u> </u>	- 20 -		
	3	• 0 • 0				
	<u>4</u>	•  U •  U			Occ:	
2	Glass Material	U-Value SHGC 1.08 - 0.75	Width Height Ref Occ.	0.Proi 0.0ff ▼ 12 ▼ 1 ▲ *	Mode: Both -	
	2	- 0 - 0		▼ 0 ▼ 0	Rad.F:0 -	
	3	. 0 . 0		<b>▼</b> 0 <b>▼</b> 0		
	4	- 0 - 0		- 0 - 0		
	5	- 0 - 0	• 0 • 0 0 • 1	- 0 - 0 -		
ſ	Door Material	U-Value Width	HeightRef			
	1	- 0 - 0	- 0 - 0 -	▲ <u>+</u>		
	2	- 0 - 0	- 0 - 0 -	-		
		<b></b> ,,				
0.11						
CAL	CS-PLUS					

There are two sets of sliding glass doors or four doors total; each is 3' wide by 6'8" high. Enter 3 for the "Width", 6.7 for the "Height", leave the "Ref" (reference wall) to 1, enter 4 in "Occ" (occurances, the number of times this piece of glass is in the wall). The lanai goes out 12' so the "O.Proj" is 12 and the top of the glass is 1' under the lanai ceiling so use 1 for the "O.Off"

🗖 Ro	om Data -	Rc	om 6	of 6
« » <u>N</u> o. 6	Name	<b>२</b>   ऽ	88 <b>7</b> 9 ( <sub>R</sub> 6	an      (µ) (# 0    an vis lea n × System Zone Width Length Height Check Errors ↓ 1 ↓ 1 ↓ 26.3 ↓ 14 ↓ 10.5 ↓ No ↓
Eloon 1	r Material 22A-pl	-	U-Value 0.989	Width         Length         Perimeter           126.3         -         14         -         Perimeter           0         -         0         -         Perimeter
Roof 1	Material 16B-19	•	U-Value 0.049	Width     Length     Direction       26.3     114     UP       1     38.6
3 Wall	16B-15 Material	•	0.061	Length Height Dir STD WTD
1	12B-0sw	• • •	0.097	$1^{12}$ $1^{3}$ $1^{5}$ $1^{0}$ $1^{$
4 Glas	s Material 1A-cb-d	•	U-Value	SHGC Width Height Ref Occ. 0.Proj 0.0ff 1075 + 3 + 16.7 1 + 14 + 112 + 11
2		•		0     0     0     0     1     0     0     0     Rad/F;0     •       0     •     0     •     1     •     0     •     0
4 5 <u>D</u> oor	Material	•	0 <u>-</u> 0 -	v  0 v  0 v  0 0 v  1 v  0 v  0 v  0 v  0 0 v  1 v  0 v  0 v  0 v  0 v
1		•		

Before we move on to the next room we should add some internal heat gain to this room. Internal heat gain loads consist of people and appliances. The number of people is based on the number of bedrooms in the home plus 1. People are never put in bedrooms, they are put in the rooms that will be occupied around 5 PM. We will put 2 people in the "Ppl:" box. We will also enter 400 BTUH in "S.Eq:" (sensible heat of equipment) to cover an appliance such as a television.



The Kitchen/Dining Room has most of the same characteristics as the great room relating to kneewalls and adjacent walls. It will also have 2 people and both sensible and latent heat added for appliances and cooking.

 Room Data	Room 8 of 8			
« » 🗟 🛸 👫 🕅	🐂 🕬 🖗 💼 🛄 🗊 🐗 ତା 🗞	% 🗈 💼 🗙		
 No. Name 8 - Laundry		System Zone     Width     Ler       ▼     1     ▼     16     ▼     7.5	ngth Height Check Errors 5 ▼ 9 ▼ No ▼	
Eloor Material 1 22A-ph	U-Value Width Lengt V 1.358 V 16 V 7.5	h Perimeter v 39.5 v	People & Equip.	
2 <u>Roof Material</u> 1 16B-19	▼         0         ▼         0           U-Value         Width         Length           ▼         0.049         ▼         16         ▼         7.5		▼         S.Eq:  400         ▼           ▲ *         L.Eq:  400         ▼	
2 3		VP VP	▼ Other Regs: 0 ▼	
Wall Material 1 13A-5ocs 2 13A-5ocs	U-Value Length Heigh U-Value Length 9 U-Value Jack 16 U-Value Jack 16	t Dir STD WTD S 0 0 0 - W 0 0 0 -	▲ + Infil: 0 ▼ Vent: 0 ▼	
3 12B-0s <del>w</del>	•     0.097     •     16     •     9       •     0     •     0     •     0	•         N         •         15         •         20         •           •         N         •         0         •         0         •	Light:         0         ▼           Occ:         1         ▼	
Glass Material 1 1A-cb-o 2	U-Value SHGC Width v 1.08 v 0.75 v 3 v 0 v 0 v 0	Height         Ref         Occ.         O.Proj         O           *         3.2         1         *         1         *         2         *         1           *         0         0         *         1         *         0         *         0	D.Off Mode: Both Rad.F:0	
3		•     0     •     1     •     0     •     0       •     0     0     •     1     •     0     •     0		
5 Door Material	▼ 0 ▼ 0 ▼ 0 U-Value Width Heigh	▼ 0 0 ▼ 1 ▼ 0 ▼ 0 t Ref		
1 11J 2 11D	▼         0.6         ▼         3         ▼         6.7           ▼         0.39         ▼         3         ▼         6.7	 ▼ 1 ▼ ▼ 3 ▼		

The laundry is the last room, enter in all the pertinent data including some sensible and latent for cloths washing equipment.



System information can be inputted before you start the take-off or after. In this software package "Duct Load Factors" is part of the system information along with indoor conditions, infiltration/ventilation, system airflow, etc. "Duct load Factors" cannot be completed until all of the room data has been completed because duct loads are a calculation in itself and is based on duct surface area.

Design conditions are easy, just use MJ8 suggested conditions, 70° for indoor winter temperature, 75° for indoor summer temperature. Use 50% for the design relative humidity.

The "Lvg. Coil-Rm DT" stands for the temperature difference between the conditioned room ambient temperature and the leaving coil temperature. This value represents the difference in degrees Fahrenheit between the air entering the rooms which are in the system and the inside design temperature of the system. For example, if 140 degree air (winter heating) enters the room which is in a system with a 70° indoor temperature, the leaving coil-room  $\Delta T$  would be 70°. For summer a typical  $\Delta T$  would be 20°; 75° room temperature and 55° leaving coil temperature.

_(	1,		111	C	alion	U	VE		
7	System Data -	Syst	em 1 o	f 1			MANU	Ĵ	Addendum D to ACCA Manual J <sub>&amp;</sub>
N	p: 1 Vame: Sys	stem 1			-		Reside Calcul	ential Load ation	Calculation Eighth Edition ANSLACCA Man J 2-2004
	Indoor Temperature: Relative Humidity:	Winte 70 50	er Sum v 75 v 50	mer 	Do Winter Humid.: System Air Type:	No Auto	_ _	4	ISBN# 1-892765-27-6 This addendum updates Version 1.10 of Manua Eighth Edition (AUS <sup>®</sup> ) and addresses <i>Infiltrati</i> <i>Gain / Loss Revisions</i> to the MJS procedures.
	Infiltration:	0	• 20 • 0 • 0	•	System CFM: Pct. Sens. Capacity: Radiater Btuh/ft.: Radiater Text Outloop	75 0		Infiltratio guessed	on rates can be I at by using the
	Do Heat Recovery: Heat Recovery SER: Blower Power:	0 No 60	• No • 60	- - - -	Duct Load Factors: Heating Duct Loads: Use CV if Multizone:	(Dete) Yes No		informat ACCA M	tion in Addendum D to anual J.
	Hot Water Piping:	0	•			1		arrow b	utton.

There has been a lot of talk on which to use, we don't want to use both. As energy raters we can test the building and enter the actual tested natural infiltration rate for winter and summer. The results of a Blower Door Test can be entered into the boxes to the right of "Infiltration". But typically in new construction HVAC load calculations are performed from plans before the home is built.

If we want to use the suggested infiltration rates in Addendum D then click the down arrows in the two infiltration boxes.

Instead of using infiltration we can input ventilation, if doing so we should use the criteria in ASHRAE Standard 62-2; 7.5 CFM per person + .01 CFM/SQ FT.



Addendum D gives suggested infiltration rates. But remember this is a leap of faith; if you know the builders construction practices then you can make an educated guess.



One of the nice things about computer programs is the ability to do "what if" calculations. If we used the "Loose" construction, .94 ACH for winter and .49 for summer we can see the results. The winter heat loss from 190 CFM of natural infiltration will be 5,222 BTUH; the summer heat gain will be 3,998 BTUH sensible and 1,741 BTUH latent, totaling out to 5,739 BTUH heat gain.



If we use a "Tight" construction scenario the winter heat loss reduces to only 888 BTUH and the summer heat gain reduces to 939 BTUH



Typically we never use both infiltration and ventilation together. If you decide to use ventilation then follow the guide lines in ASHRAE Standard 62-2, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Basically the Standard says 7.5 CFM per person plus .01 CFM per SQ FT.

If you are going to export data into EnergyGauge USA® then you will want to use only infiltration otherwise USA will get confused and not run properly. For this calculation we will use infiltration and select the "Semi Tight" construction Scenario.

No: 1 Name: Sy Design Equipment System Design Condi Indoor Temperature: Relative Humidity: Lvg. Coil-Rm DT: Infiltration: Exhaust: Do Heat Recovery: Heat Recovery SER: Blower Power: Hot Water Piping:	stem 1 Winter Summer 70 v 75 v Do Winter Humid.: No v 50 v 50 v System Air Type: Auto v 70 v 20 v System CFM: v 70 v 20 v System CFM: v 10.31 v 0.16 v Pct. Sens. Capacity: 75 v 0 v 0 v Radiator Btuh/tt: 0 v 0 v 0 v Radiator Btuh/tt: 0 v 10 v 0 v Radiator Text Option: Foot v No v No v Duct Load Factors: (Date) v 60 v 60 v Heating Duct Loads: Yes v 0 v 0 v	The "Semi Tight" scenario giv us a winter infiltration rate of 65 CFM and a summer infiltration of 33 CFM.
Infiltration: Win Ventilation: Win	ter CFM: 65, Summer CFM: 33	1,780 1,350 588 1,938 0 0 0 0

The "Semi Tight" scenario gives us a winter infiltration rate of 65 CFM and a summer infiltration of 33 CFM.



Now that all of the rooms have been entered and the system design conditions are completed we can calculate the duct loads associated with duct systems located in unconditioned spaces.



The author and his committees recognized the need to more accurately calculate the gain and loss due to duct leakage.



The engine the author developed to do the calculation is very comprehensive and it must be used by all ACCA certified software.

System Data - Ø ⊗ ≪ ≫ № ®	System 1 of 1				
No: 1 Vame: Sys	stem 1	•	1		
Indoor Temperature: Relative Humidity: Lvg. Coil-Rm DT: Infiltration: Ventilation: Exhaust: Do Heat Recovery: Heat Recovery SER: Blower Power: Hot Water Piping:	Winter         Summer           70         v         75         v           50         v         50         v           70         v         20         v           10.31         v         0.16         v           0         v         0         v           0         v         0         v           0         v         0         v           0         v         0         v           0         v         0         v           0         v         0         v           0         v         0         v           0         v         0         v	Do Winter Humid.: System Air Type: System CFM: Pct. Sens. Capacity: Radiator Btuh/ft.: Radiator Text Option: Duct Load Factors: Heating Duct Loads: Use CV if Multizone:	No         v           Auto         v           75         v           0         v           Foot         v           Yes         v           No         v	Click the dow button next to labeled "Duct Factors".	n arrow ) the box Load

To start the duct heat gain/loss calculation in this software program click the down arrow button next to the box labeled "Duct Load Factors".

* * * *
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nt of Manual .oad Override 
other er below and Ital).
Return
<u> </u>

In the "Duct Load Factors" dialog box, the "Duct Location", "Attic Ceiling Type", "Duct Leakage Rate", "Duct System R-Value", and "Duct Surface Area" must be filled in for Supply and Return to calculate duct loads for ducts in un-conditioned spaces. Duct load calculations are based on Addendum C to ACCA Manual J version 8, the procedure is compatible with ASHRAE Standard 152.

Duct Load Prope	erties
System 1 Duct Load Factors - Scenario 1 of 5         System 1 Duct Properties       Supply       Return         Duct Location:       Attic       +         Attic Ceiling Type:       16B       +         Duct Location:       Attic       +         Attic Ceiling Type:       16B       +         Duct Location:       0.12       0.24       +         Duct Insulation R-Value:       6       6       6         Duct Surface Area:       0       -       -         Update SA from MDD:       No       No       v         Results       System 1       Percent of Menual Total Load Override         Sensible Cass:       0       0       -         Latent Gain:       0       0       -         Latent Gain:       0       -       -         Multiple Duct Scenarios (Optional)       It the ducts in this system are in more than one location or have other properties that differ, you can change the Duct Scenario Number below and enter "Duct Properties" data for additional scenarios (up to 5 total).         Duct Scenario No:       1       Desc: Main       -         Scenario 1 Percentage:       0%       -       -         Scenario 1 Percentage:       0%       0%       -   <	To calculate the sensible loss/gain and latent gain you must first enter in the "Duct Load Properties. Note: before doing this calculation all of the room data must be entered. The SQ FT of duct surface area is based on the SQ FT of conditioned space.
QK Cancel CALCS-PLUS	

In this particular software the down arrow key for each item will give us the information we need to complete the input; this would be typical of most ACCA approved programs. But the duct load calculation cannot be completed until all the rooms of the building have been entered into the program



Pick out the location of the duct system; "Attic", "Open Crawl A", "Open Crawl B Basement", "Under Slab", "Outside Wall", "Cond Space".

If the duct system is located in the attic pick out the type of attic; vented, un-vented roof color type, roof cover and material, etc. Remember in this case that whether the attic is vented or unvented the thermal barrier is located on the ceiling.

	ad Factors - So	enario 1 <u>of 5</u>		Supply	Return	Description
vstem 1 Duct Properties	Supply	Return		0.03	0.03	Duct below slab (some surface area above grade)
uct Location:	Attic	Attic		0.06	0.06	Extremely sealed (seal shall be verified by leakage test)
ttic Ceiling Type: uct Leakage Bate:	0.06	0.06	<u> </u>	0.09	0.15	Notably sealed (verification by leakage test recommended)
uct Insulation B Value:	6			0.12	0.24	Average sealed system (MJ8 default)
uct Insulation A-value: uct Surface Area:		. 0	<ul> <li>▲</li> <li>▲</li></ul>	0.24	0.47	Partially sealed (fabrication conforms to standards)
pdate SA from MDD:	No	No	🔺 👘	0.35	0.70	Unsealed system
Sensible Ga	ain:   n:			areas. If yo own values	for SA and RA	ace areas or want to use a dimerent method, enter
Sensible G Latent Gai ultiple Duct Scenarios (Optio he ducts in this system are i operties that differ, you can ter "Duct Properties" data fo	n: n: onal) in more than one locati change the Duct Scen or additional scenarios	0 0 v 0 0 v on or have other ario Number below ar 6 (up to 5 total).		areas. If yo own values Surface are Surface are Note: The v five returns.	a of supply rur a of supply rur a for return run alue for the nu Surface Area	scale areas or want to use a dimerent memod, ener s: SA = 0.27 x Floor Area s: FA = 0.05 x Number of Returns x Floor Area mber of returns defaults to 5 when there are more th (SA)
Sensible G Latent Gai altiple Duct Scenarios (Optio he ducts in this system are i operties that differ, you can ter "Duct Properties" data f uct Scenario No.: 1	n: n more than one locati change the Duct Scen or additional scenarios - Desc.: Main	0 0 • • • • • • • • • • • • • • • • • •	d 	areas. If yo own values Surface are Surface are Note: The v five returns. -Supply Duct Floor Area 1285	a of supply run a of supply run a for return run alue for the nu Surface Area x 0.27 =	SA = 0.27 x Floor Area s: SA = 0.27 x Floor Area s: FA = 0.05 x Number of Returns x Floor Area mber of returns defaults to 5 when there are more th (SA) SA 347
Sensible G Latent Gai altiple Duct Scenarios (Optio he ducts in this system are i operties that differ, you can ter "Duct Properties" data f uct Scenario No.: 1	n: n more than one locati n more than one locati change the Duct Scen r additional scenarios v Desc.: Main Supp	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	d 1 1	areas. If yo own values Surface are Surface are Note: The v five returns. Supply Duct Floor Area 1285 - Return Duct	a vitow die son for SA and RA a of supply rur a for return run alue for the nu Surface Area × 0.27 = v × 0.27 = Surface Area (	SA = 0.27 x Floor Area s: SA = 0.27 x Floor Area s: FA = 0.05 x Number of Returns x Floor Area mber of returns defaults to 5 when there are more th SA SA 347 - RA)
Itiple Duct Scenarios (Optionella Galactica) Itiple Duct Scenarios (Optionella Galactica) ne ducts in this system are in porties that differ, you can ter 'Duct Properties' data for uct Scenario No.: 1 Scenario	n: n more than one locati n more than one locati change the Duct Scen r additional scenarios v Desc.: Main Supp ystem 1: 0	0 0	d 	areas. If yo own values Surface are Note: The v five returns. Supply Duct Floor Area 1205 Return Duct Floor Area	a vitow die son for SA and PA a of supply rur a for return run alue for the nu Surface Area v 0.27 = v x 0.27 = Surface Area ( x 0.05 x	SA - 0.27 x Floor Area S: SA - 0.27 x Floor Area B: FA - 0.05 x Number of Returns x Floor Area mber of returns defaults to 5 when there are more th SA 347 RA No. Returns = RA
Sensible Gr Latent Gai tiple Duct Scenarios (Optio e ducts in this system are i perties that differ, you can er "Duct Properties" data fr ct Scenario No.: 1	ain: n: nore than one locati change the Duct Scene or additional scenarios v Desc.: Main ystem 1: 0 0%	0 0	d 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	areas. If yo own values Surface are Note: The v five returns. Supply Duct Floor Area 1285 Return Duct Floor Area 1285	a of supply rur a for return run alue for the nu Surface Area × 0.27 = V × 0.27 = Surface Area ( × 0.05 × V × 0.05 ×	SA = 0.27 x Floor Area s: RA = 0.05 x Number of Returns x Floor Area mber of returns defaults to 5 when there are more th SA 347 RA No. Returns = RA A 257 y

Choose the duct sealing category. If the calculation is done from plans before construction has been started assume that the duct system is going to be tight to prevent over sizing. If the building has been completed duct test results can be entered here.

Calculate the duct surface area, this program calculates a duct surface area based on the SQ FT of the building which may or may not be correct. Typically I find that the actual duct area calculates out to less than ASHRAE 152

System 1 Duct Loa	ad Factors - Scenario 1 of 5	
System 1 Duct Properties	Supply Return	
Duct Location:	Attic - Attic -	Sharman A street of the
Attic Ceiling Type:	16B <u>▼</u> 16B <u>▼</u>	
Duct Leakage Rate:	0.06 • 0.06 •	
Duct Insulation R-Value:		
Duct Surface Area:	347 • 257 •	
Update SA from MDD:		
Celculate Sensible Lo Sensible Ga Latent Gai Multiple Duct Scenarios (Open If the ducts in this system are i properties that differ, you can enter *Duct Properties* data for Duct Scenario No.: 1 Cuct Scenario No.: 1 Cuct Surface Area for St	System 1 Duct Load Verride Total Load Verride Total Load Override Total Load Override Total	After you choose or change any of the "Duct Properties" inputs above, the "Calculate" button performs a recalculation and shows the results in the boxes to the right.

When all of the proper information has been filled in for the "Duct location", "Attic Ceiling Type" (if applicable), "Duct Leakage Rate", "Duct Insulation R-Value", "Duct Surface Area", clicking the "Calculate" button in this program will calculate the sensible loss, sensible gain, and latent gain that is associated with the environment where the duct system is located and the anticipated or measured duct leakage.

Sy D	ystem 1 Duct Properties	Current v					
D		Supply	Return		System 1 Duct Properties	Supply	Return
	ouct Location:	Attic	Attic	•	Duct Location:	Attic	Attic
	Mie Ceiling Type:	160	160	J 🔼	Attic Colling Type:	160	160
D	ouct Leakage Rate:	0.06	0.06	• •••	Duct Leakage Rate:	0.12	0.24
D	uct Insulation R-Value:	b _	b	<u>.</u>	Duct Insulation R-Value:	b _	Ь
D	ouct Surface Area:	347	257	-	Duct Surface Area:	347 -	257
U	Ipdate SA from MDD:	No	No	<b>_</b>	Update SA from MDD:	No	No
Results System 1 Percent of Manual				nual	Results	System 1	Percent of Man
	Calculate	Duct Load	Total Load Ove	erride	Calculate	Duct Load	Total Load Oven
	Sensible Los	s: 4,7		-	Sensible Los	3S: 5,3	
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ob		d by look			properties that c enter "Duct Proc		foult)
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Duct Scenario No.: 1 v Desc.: Main v					Duct Scenario No.: 1	Desc.: Main	
<	« » 🖻 💼	Supp	y Return		« » 🖻 🖻	Suppl	y Return
Т	otal Duct Surface Area for Sy	stem 1: 347	▼ 257 ▼	·	Total Duct Surface Area for Sy	vstem 1: 347	▼ 257 ▼

One of the benefits of computer based HVAC load calculation programs is the ability to play "what if" scenarios with quick results.

The duct leakage rate has a huge impact on the calculation. As can be seen by this slide