HVAC LOAD CALCULATIONS AND THE ENERGY RATER

RESNET 2009

Dennis J Stroer

CALCS-PLUS

Venice Florida

Building AMERICA SM
U.S. Department of Energy
Research Toward Zero Energy Homes

Accu-Size Heating & Cooling Hor

Cooling load (heat gain) - 95 degree day

SQUARE FOOTAGE OF WINDOWS			HEAT GAIN
North (single)	X 26	=	
North (double)	X 21	=	
NE & NW (single)	X 45	=	
NE & NW (double)	X 35	=	
East & West (single)	X 60	=	
East & West (double)	X 49	=	
SE & SW (single)	X 50	=	
SE & SW (double)	X 40	=	
South (single)	X 36	=	
South (double)	X 25	=	

SQUARE FOOTAGE OF DOORS			HEAT GAIN
Wood (no storm door)	X 13	=	
Wood (w/storm door)	X 9	=	
Insulated metal door	X 6	=	

SQUARE FOOTAGE OF NET WALLS			HEAT GAIN
Wall perimeter ____ X __height ____ less ____ glass and door area = net wall ____			
No insulation	X 8	=	
R-13 (3.5" insulation)	X 3	=	
R-19 (6" insulation)	X 2	=	

SQUARE FOOTAGE OF CEILING			HEAT GAIN
No insulation	X 22	=	
R-11 (3" insulation)	X 4.1	=	
R-19 (6" insulation)	X 2.6	=	
R-30 (10" insulation)	X 1.6	=	

SQUARE FOOTAGE OF FLOOR			HEAT GAIN
No insulation	X 3	=	
Carpet (no insulation)	X 2	=	
R-11 (3"+ insulation)	X 1	=	
Floor on slab	X 0	=	0

INFILTRATION / VENTILATION			HEAT GAIN
Home square feet	X 3.5	=	

INTERNAL GAINS			HEAT GAIN
Number of people	X 530	=	
Kitchen & bath allowance			1250
Subtotal BTU/h heat gain		=	

GAINS FROM DUCTWORK	HEAT GAIN
In crawl space - (subtotal BTU/h X .09)	
In attic - (subtotal BTU/h X .13)	
Total BTU/h heat gain =	

Heating load (h

SQUARE FOOTAGE C
Single glass ____
Double glass ____

SQUARE FOOTAGE C
Single glass patio _
Double glass patio _
Wood (no storm do
Wood (w/storm doc
Insulated metal doo

SQUARE FOOTAGE C
Frame (no insulatio
Frame (3.5" insulati
Frame (6" insulatior
Masonry (no insulat
Masonry (1" insulat

SQUARE FOOTAGE C
No insulation ____
R-11 (3" insulation)
R-19 (6" insulation)
R-30 (10" insulation)

SQUARE FOOTAGE C
No insulation ____
Carpet (no insulatio
R-11 (3"+ insulation)

SQUARE FOOTAGE C
No insulation ____
Carpet or insulation

PERIMETER OF SLAE		
Slab (no insulation)	X 57	=
Slab (edge insulation)	X 22	=

INFILTRATION / VENTILATION		HE
Home square feet	X 4.9	=
Subtotal BTU/h heat loss		=

LOSSES FROM DUCTWORK	HE
In crawl space - (subtotal BTU/h X .10)	
In attic - (subtotal BTU/h X .08)	
Total BTU/h heat loss =	
80% furnace efficiency loss X .25 =	
90% furnace efficiency loss X .12 =	
Total BTU/h input needed =	

Accu-Size Heating

Cooling load (heat gain) - 95 degree day

SQUARE FOOTAGE OF WINDOWS			HEAT G
North (single)	X 26	=	
North (double)	X 21	=	
NE & NW (single)	X 45	=	
NE & NW (double)	X 35	=	
East & West (single)	X 60	=	
East & West (double)	X 49	=	
SE & SW (single)	X 50	=	
SE & SW (double)	X 40	=	
South (single)	X 36	=	
South (double)	X 25	=	

OR, Just do the old stand-by!

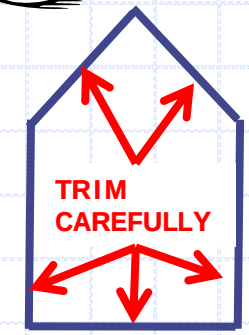
X SQ FT PER TON

BUBBA'S PROFESSIONAL HVAC LOAD CALCULATION

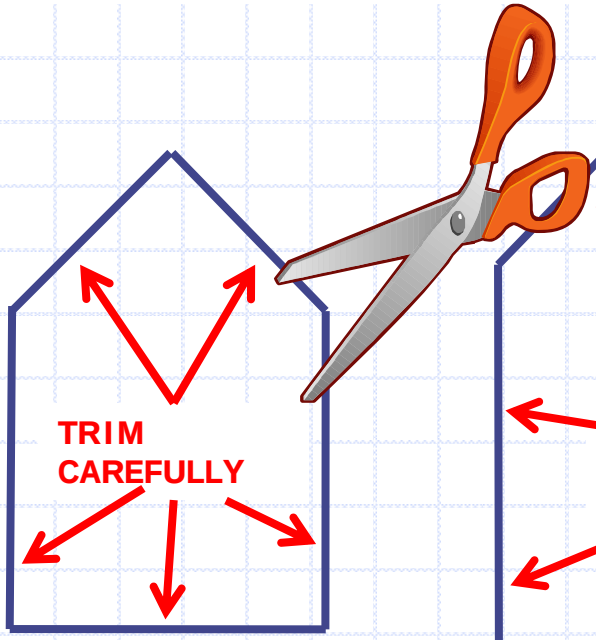
SIZING CHART

AIR CONDITIONING OR HEAT PUMP

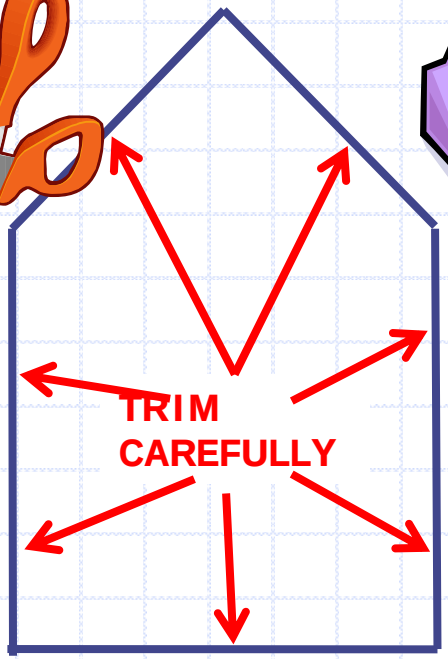
FROM DESIGN TO INSTALATION



1.5 TO
2-TON



2.5 TO
3.5-TON



4 TO
5-TON

TRIM OUT VERY CAREFULLY ON DASHGED LINES, THEN FOLLOW INSTRUCTIONS BELOW

Stand on curb across from the home you are performing the calculation on. Look through the sizing holes locating the best match. For larger homes and or zoning use multiple Sizing Holes.

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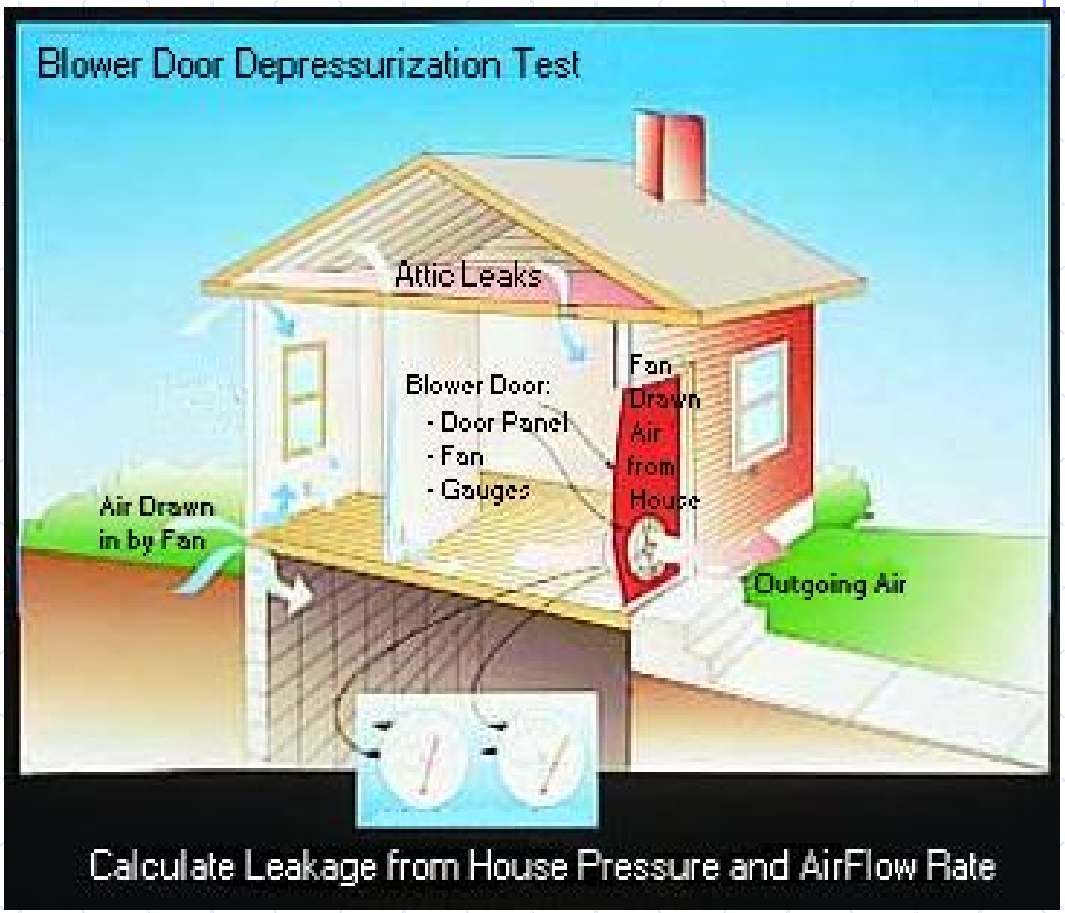
HVAC Load Calculations.

- Why should an Energy Rater perform HVAC Load Calculations?
- What is meant by a Room x Room calculation?
- Why use ACCA Manual J Version 8?
- MJ8 Sensitivities.
- How can an Energy Rater benefit?

Energy Raters and Air Flow

Energy raters are already familiar with airflow.
We use air flow as a tool to do energy ratings.

CALCS-PLUS



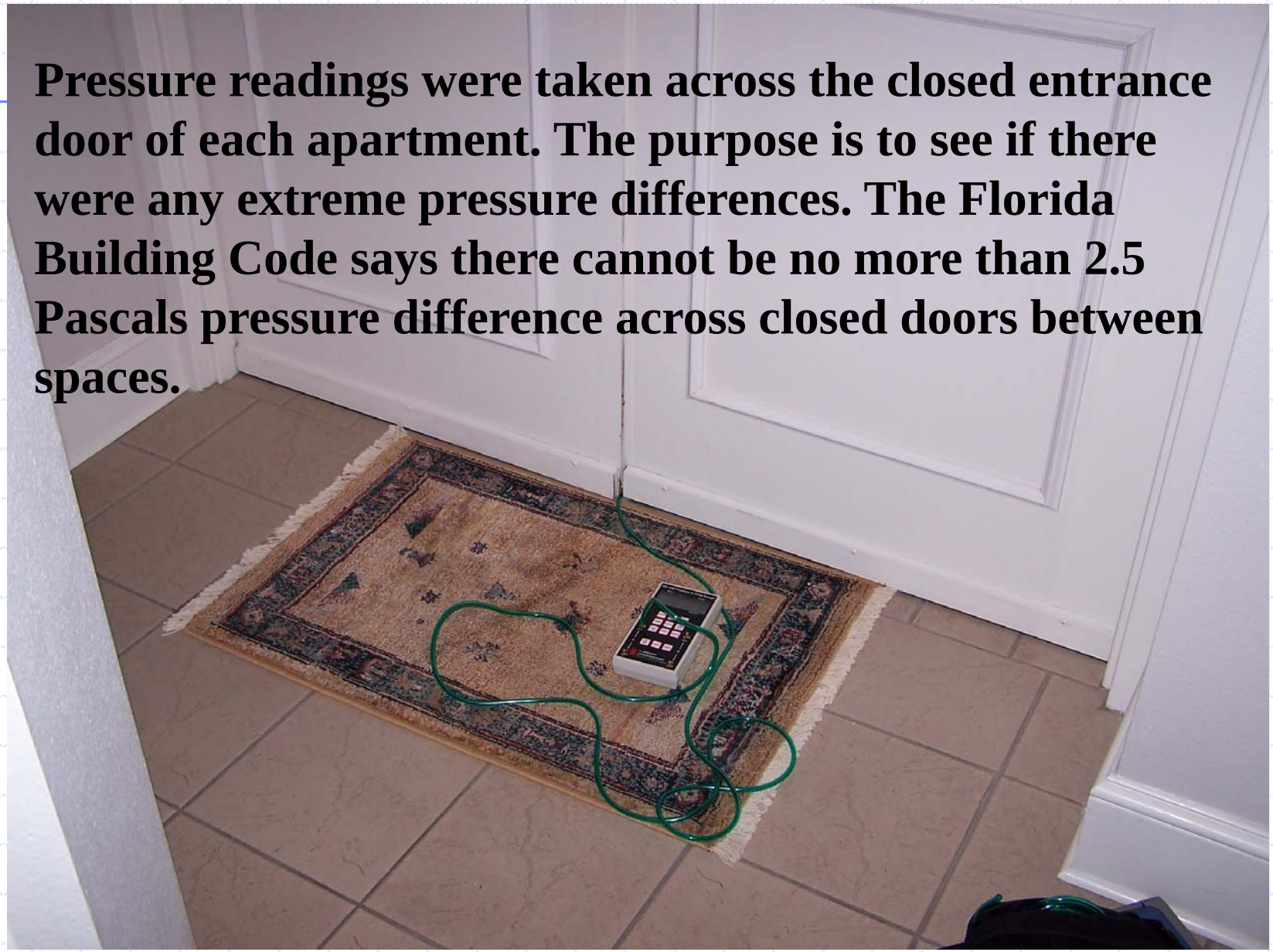
Two types of Airflow.

With respect to residential and commercial construction there are two kinds of airflow.

Controlled and Uncontrolled

Energy Raters use controlled airflow to estimate the amount of uncontrolled airflow.

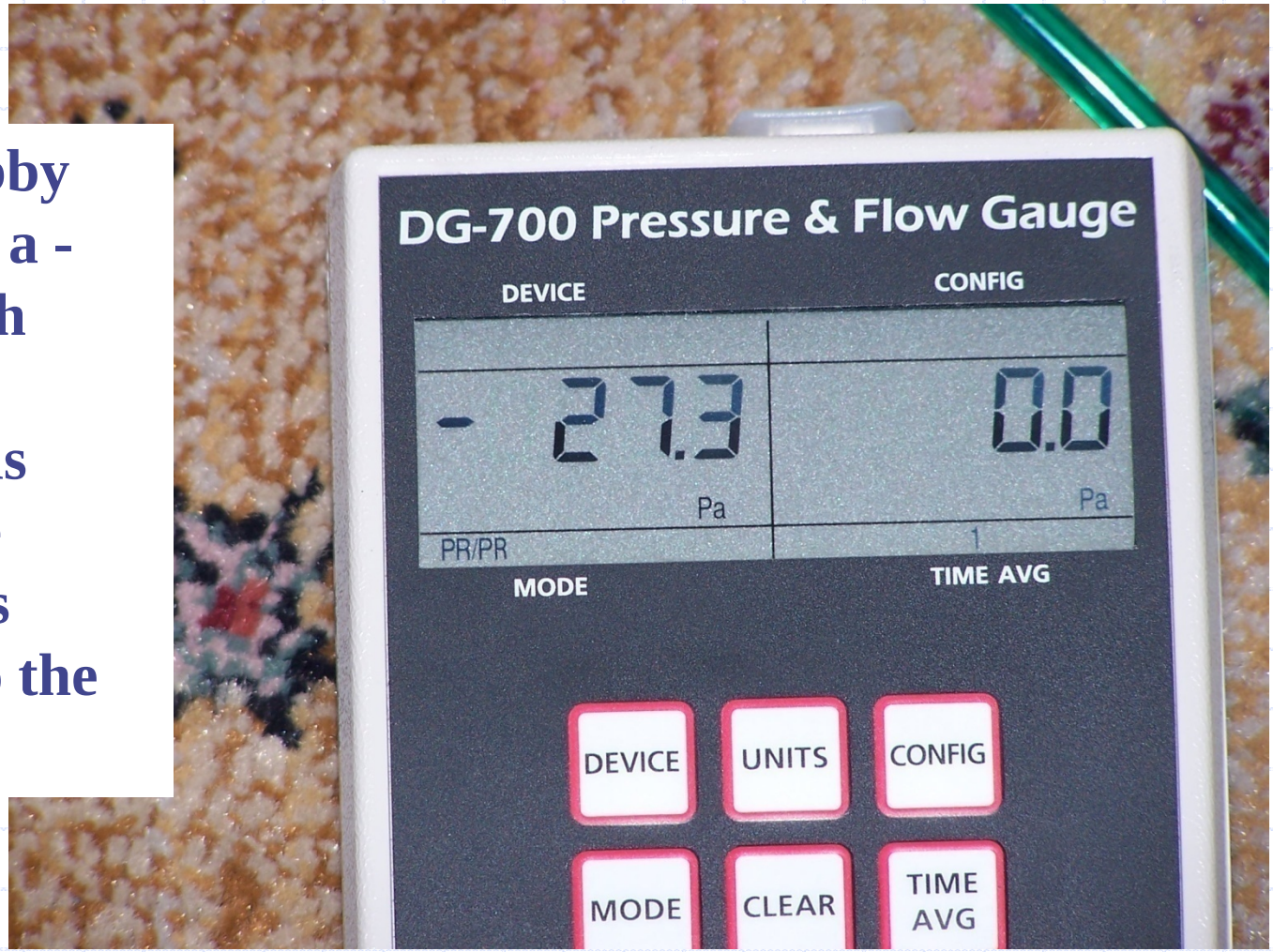
Uncontrolled Airflow



Pressure readings were taken across the closed entrance door of each apartment. The purpose is to see if there were any extreme pressure differences. The Florida Building Code says there cannot be no more than 2.5 Pascals pressure difference across closed doors between spaces.

Uncontrolled Airflow

The elevator lobby was found to be a -27.3 Pascals with respect to the apartments. This means air in the elevator lobby is trying to go into the apartment.

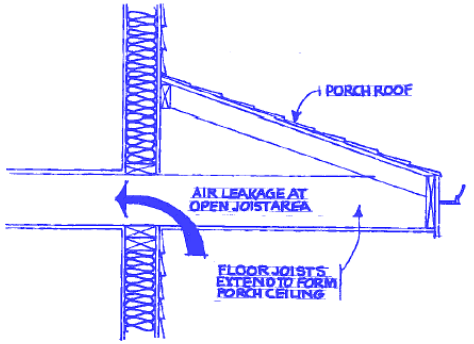


Uncontrolled Airflow

Leaky buildings

Leaky Duct Systems

Unbalanced building pressures.



Uncontrolled Airflow = Infiltration

Infiltration influences how the building reacts in terms of health, safety, durability, comfort, and energy efficiency.

- Can be estimated with a high degree of accuracy.
- Can be tested with a high degree of accuracy.
- Can be eliminated or controlled.

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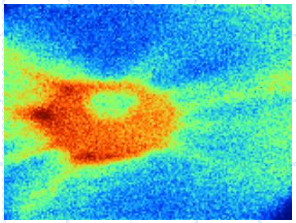
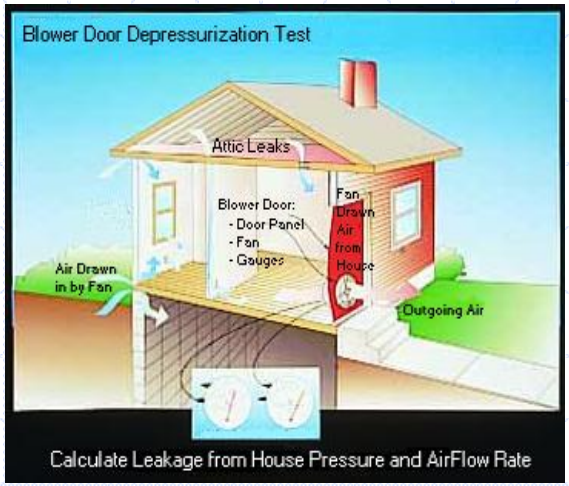




Duct Leakage

Influences how the building reacts in terms of health, safety, durability, comfort, and energy efficiency.

- Can be estimated with a high degree of accuracy.
- Can be tested with a high degree of accuracy.
- Can be eliminated.

As Energy Raters we understand uncontrolled airflow.

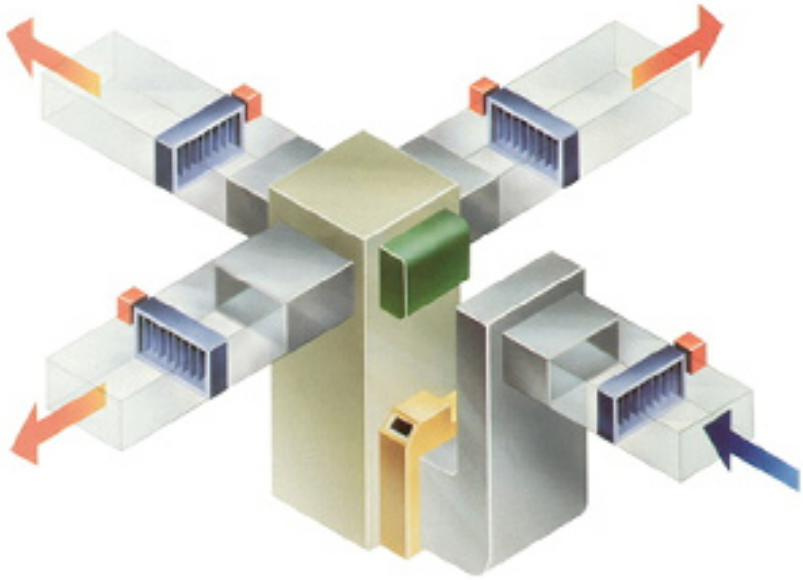
So lets talk about controlled airflow.

Controlled Airflow

Open and closing windows

Table fan

Air conditioning systems.



The Building is a System

- **Air Conditioning is a Sub System**
- **Air Conditioning Conditions Air, duh!**
- **Air Conditioning Moves Air**
- **Air Conditioning Blows and Sucks**
- **Air Conditioning Affects Building Pressure**
- **Air Conditioning Makes the Building Come Alive**

Room Airflow

Relating to Air Conditioning Systems

Determined by the estimated Heat Gain/Loss; Cooling or heating which ever has been chosen to dominate the system design.

HVAC Load calculations should be performed on a Room x Room basis.

Based on the Heat Loss/Gain through the building envelope and internal gains relative to each room.

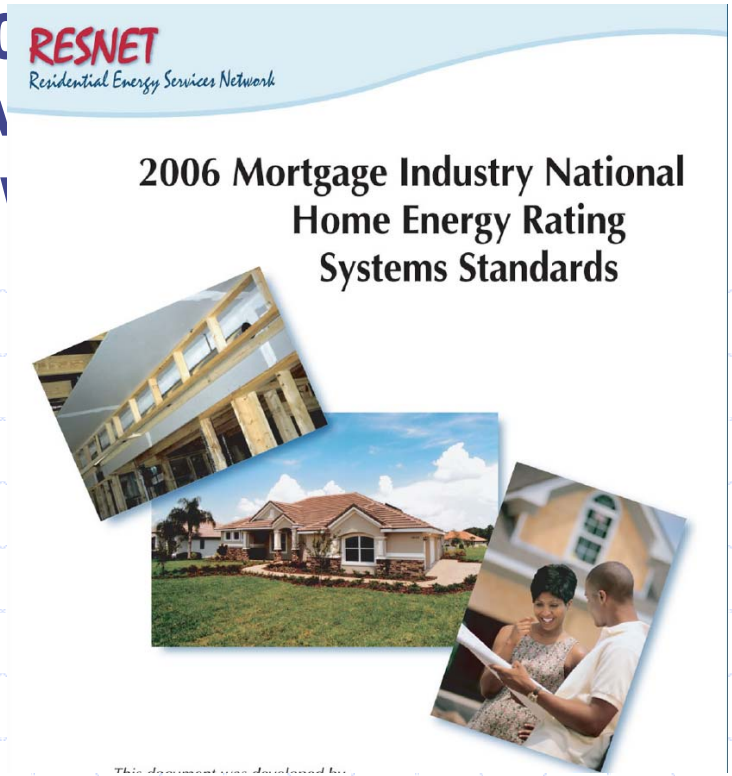
Room x Room Loads

If the HVAC system is the backbone of the house as a system. The HVAC load calculation is the backbone of the HVAC system

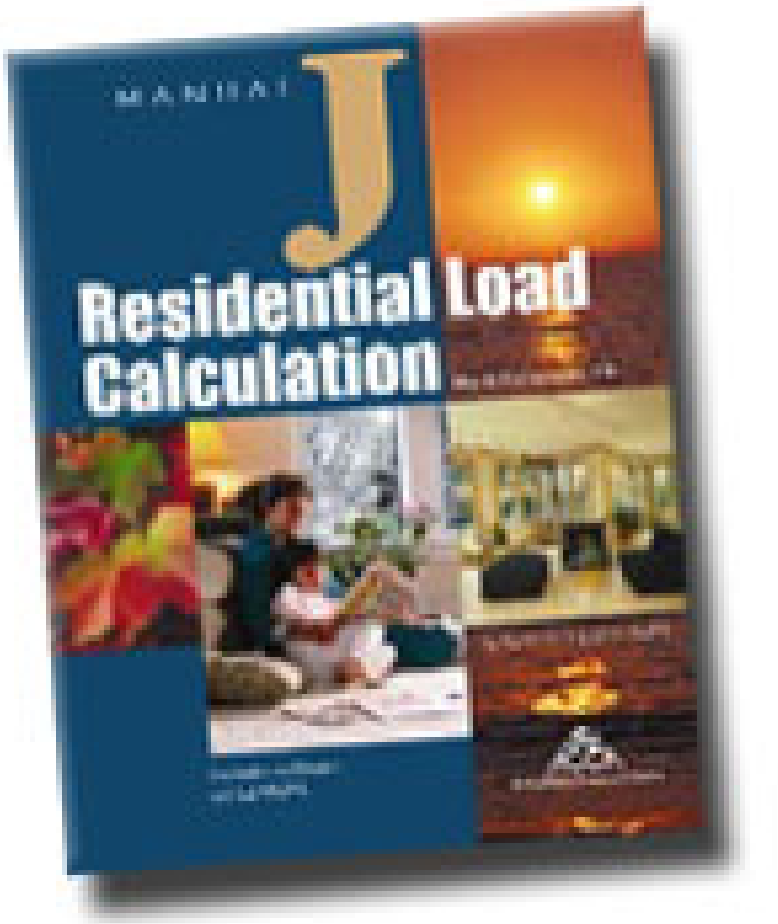
- **Required to determine supply CFM for each room**
- **Required to select Supply Outlets**
- **Required to select Return Inlets**
- **Required to design a Duct System**
- **Required to diagnose comfort problems**

303.5.1.5 Manufacturer's Equipment Performance Ratings (e.g., HSPF, SEER, AFUE) shall be corrected for local climate conditions and mis-sizing of equipment. To determine equipment mis-sizing, the capacity of heating and cooling vapor compression equipment shall be calculated in accordance with ACCA Manual J, Eighth Edition, ASHRAE 20 Fundamentals, or an equiv procedure, using the follo .

Recognize This?

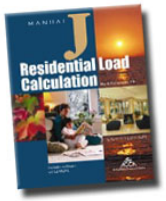


ACCA Manual J V8



The Standard in the Industry

Why Use MJ8

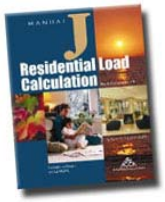


The heating and cooling load estimates affect every aspect of the system design procedure

- **From system selection**
- **To equipment selection procedures**
- **To placement and selection of air distribution hardware**
- **To duct routing and airway sizing or pipe layout and sizing**

Because of this the load calculation must be as accurate as possible

Value of Manual J



- Eliminate Under-sizing of Heating & Cooling Equipment
- Eliminate Over-sizing of Heating & Cooling Equipment
- Humidity Control During the Cooling Season
- Eliminate Comfort Problems

Relating to Cooling
Under Sizing Equipment

The obvious problem with undersized equipment is that it will not maintain the desired temperature. However, slightly undersized cooling equipment (by a margin of 10% or less) may actually provide more comfort at a lower cost.

Oversized Equipment Causes

- short-cycles
- marginalized temperature control
- pockets of stagnate air
- degrades humidity control during the cooling season
- requires larger duct runs

Oversized Equipment Causes

- increases the installed cost
- increases the operating cost
- increases the demand on our utilities
- adds unnecessary stress on equipment

Humidity Control

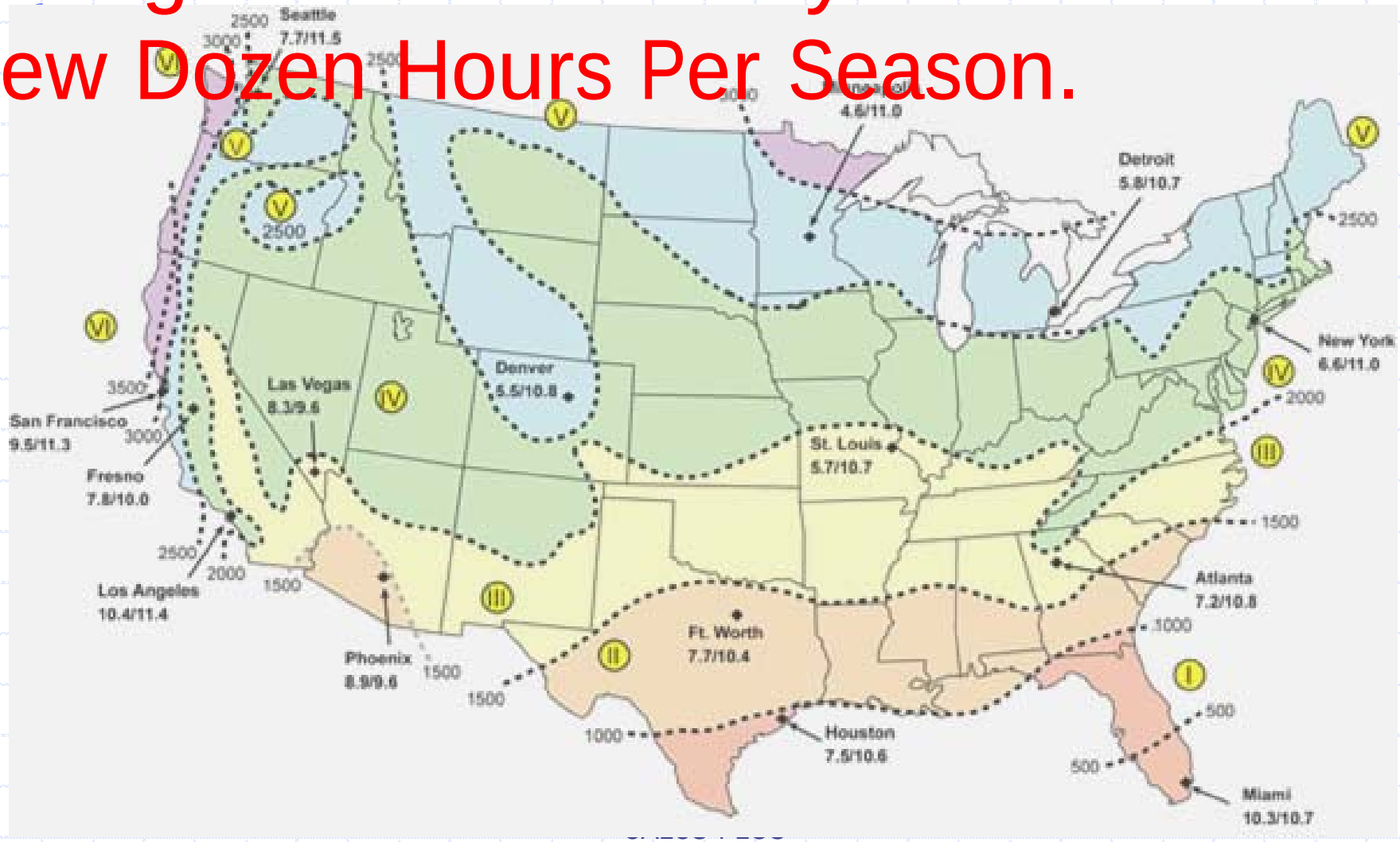
The Next Subdivision

Must be a Florida Thing

Humidity Control During The Cooling Season

- Sensible and latent cooling loads are imposed on buildings located in hot humid climates.
- When the summer design condition occurs, properly sized equipment will operate continuously or almost continuously, both loads will be neutralized, and the occupants will be comfortable.

BUT,
Design Conditions Only Occur For A Few Dozen Hours Per Season.



Design Conditions

Table 1A

Outdoor Design Conditions For the United States and Canada

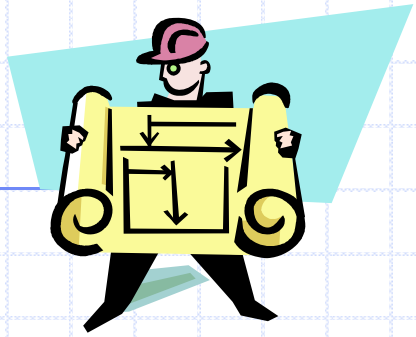
Location	Elevation	Latitude	Winter	Summer					
	Feet	Degrees North	Heating 99% Dry Bulb	Cooling 1% Dry Bulb	Coincident Wet Bulb	Design Grains 55% RH	Design Grains 50% RH	Design Grains 45% RH	Daily Range (DR)
St. Augustine	10	29	35	89	78	59	66	72	M
St. Petersburg	11	28	47	93	79	59	66	72	M
Sanford	55	28	38	93	76	39	46	52	M
Sarasota/Bradenton	30	27	43	92	79	61	68	74	M
Tallahassee AP	55	30	28	93	76	39	46	52	M
Tampa AP	19	28	40	91	77	49	56	62	M
Valparaiso, Eglin AFB	85	30	33	90	78	57	64	70	M
Vero Beach	13	27	43	90	78	57	64	70	M
West Palm Beach AP	15	26	47	90	78	57	64	70	M



Outdoor design conditions used to estimate heating and cooling loads do not represent the most severe weather conditions experienced at a particular location.

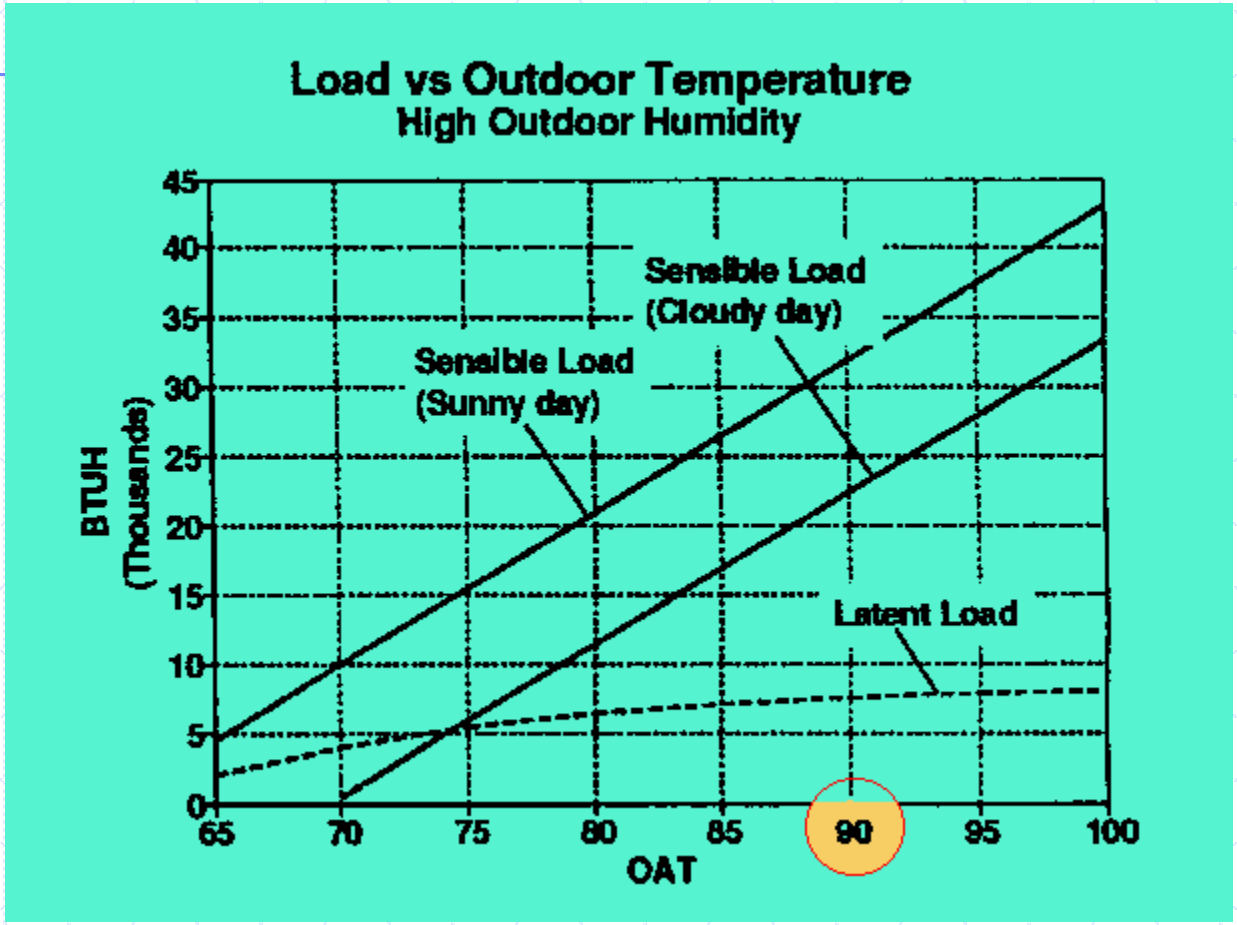
However, they do represent extremes that, on average, will not be exceeded for more than a few dozen hours per season.

This means that when heating and cooling loads are based on Table 1, recommended design conditions, comfort and performance are optimized for thousand of hours per season.

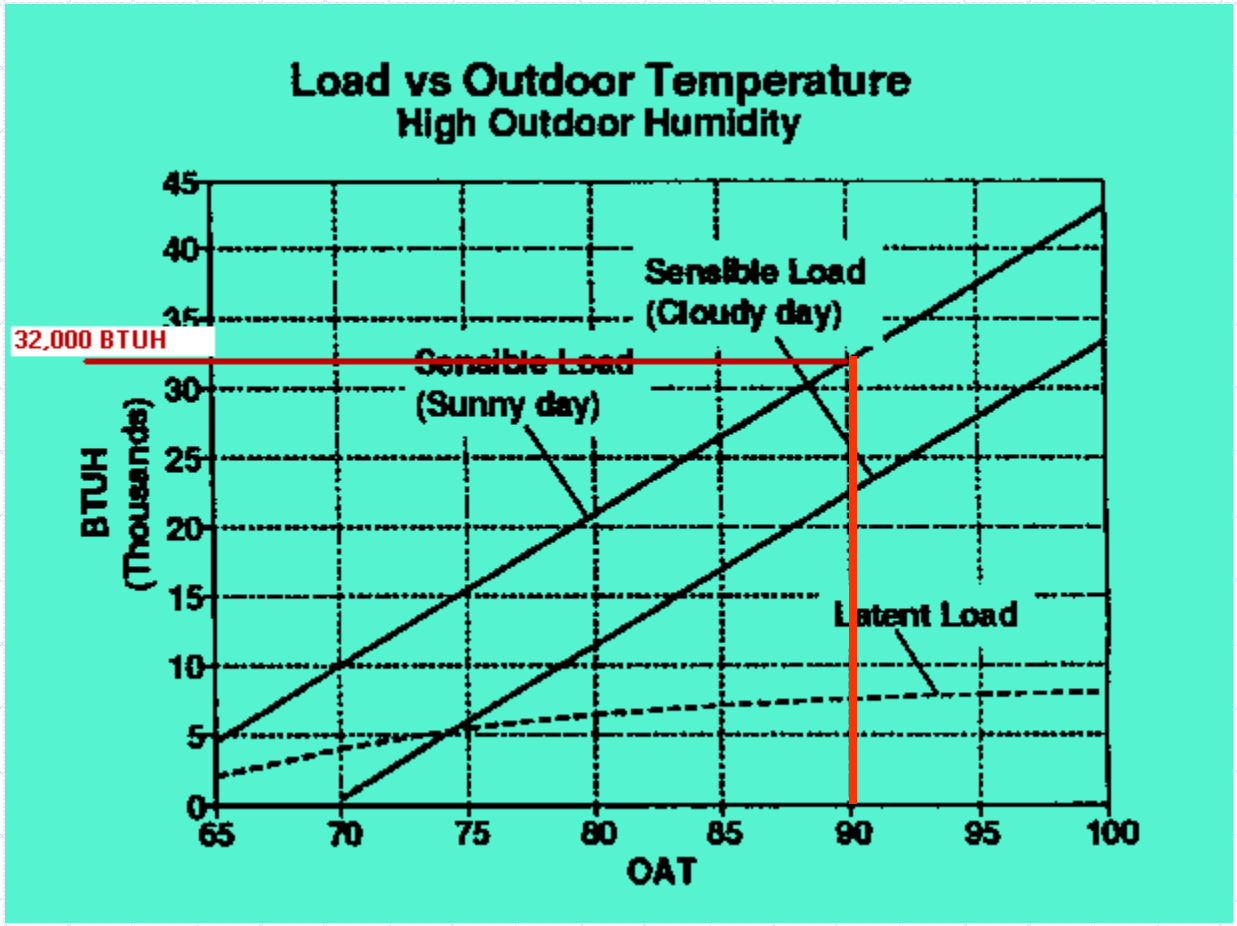


Load estimating and equipment sizing concepts must be explained to the builders and home owners because they do not understand that installation and operating cost increase and long term comfort decreases when load estimates are based on record-setting weather conditions (MJ8, A3-2)

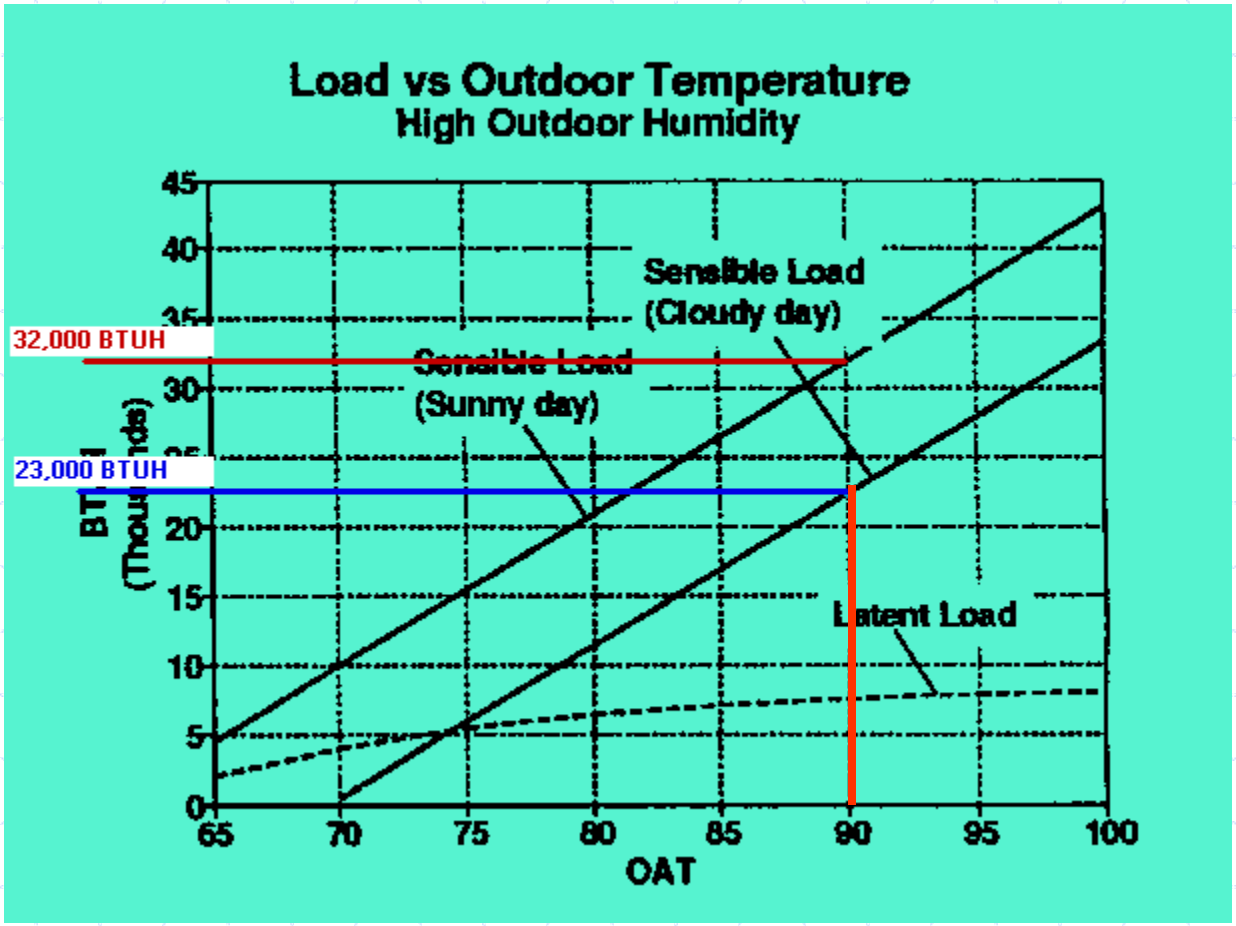
Using Table 1 from ACCA Manual J for West Palm Beach the summer outdoor dry bulb temperature is 90º



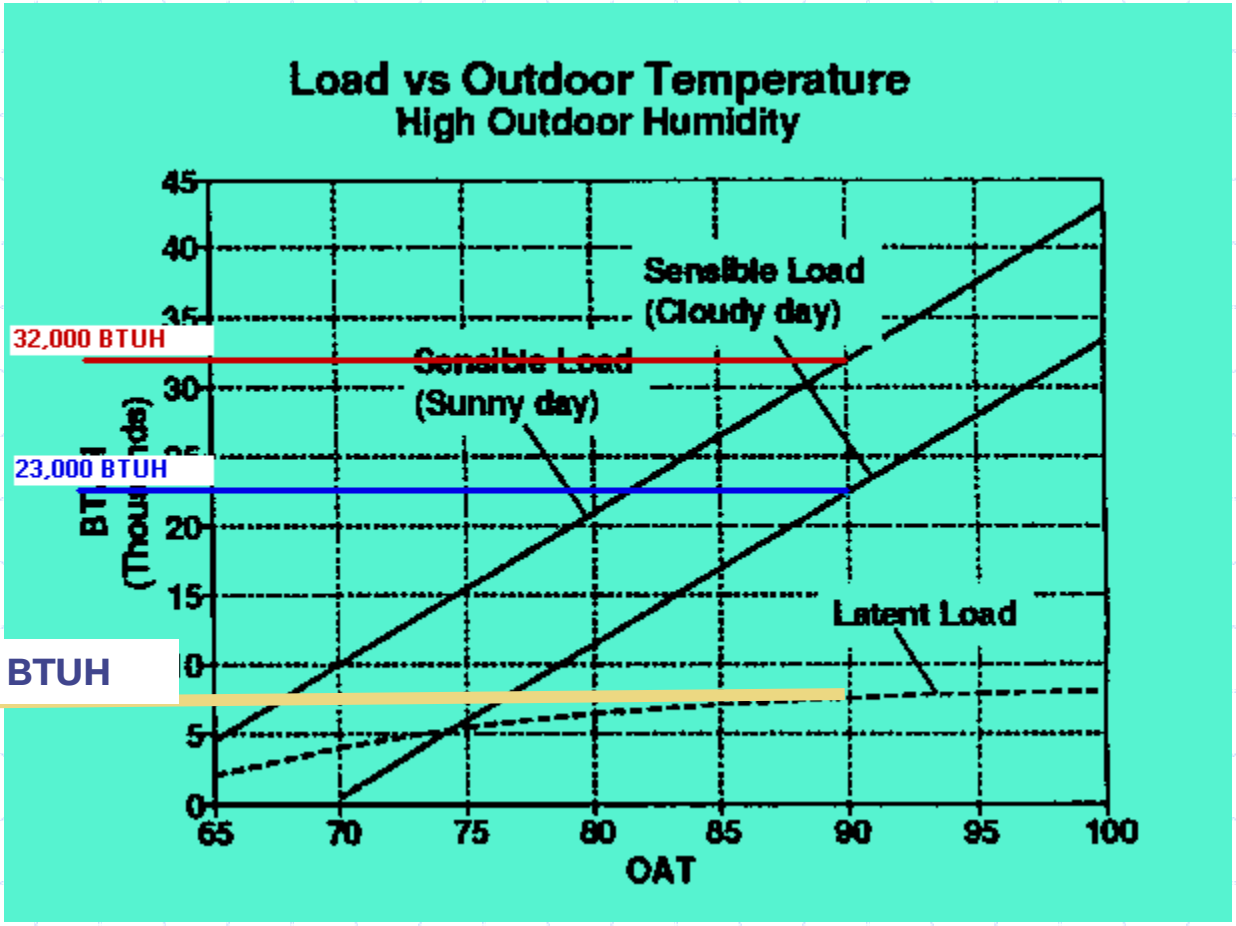
At peak load conditions, the HVAC load calculations shows the net gain on the building is 32,000 BTUH total.



50% of the time our temperatures range is in the moderate temperature zone. The net gain could drop to 23,000 BTU/H on a 90° day if the sun is behind the clouds.



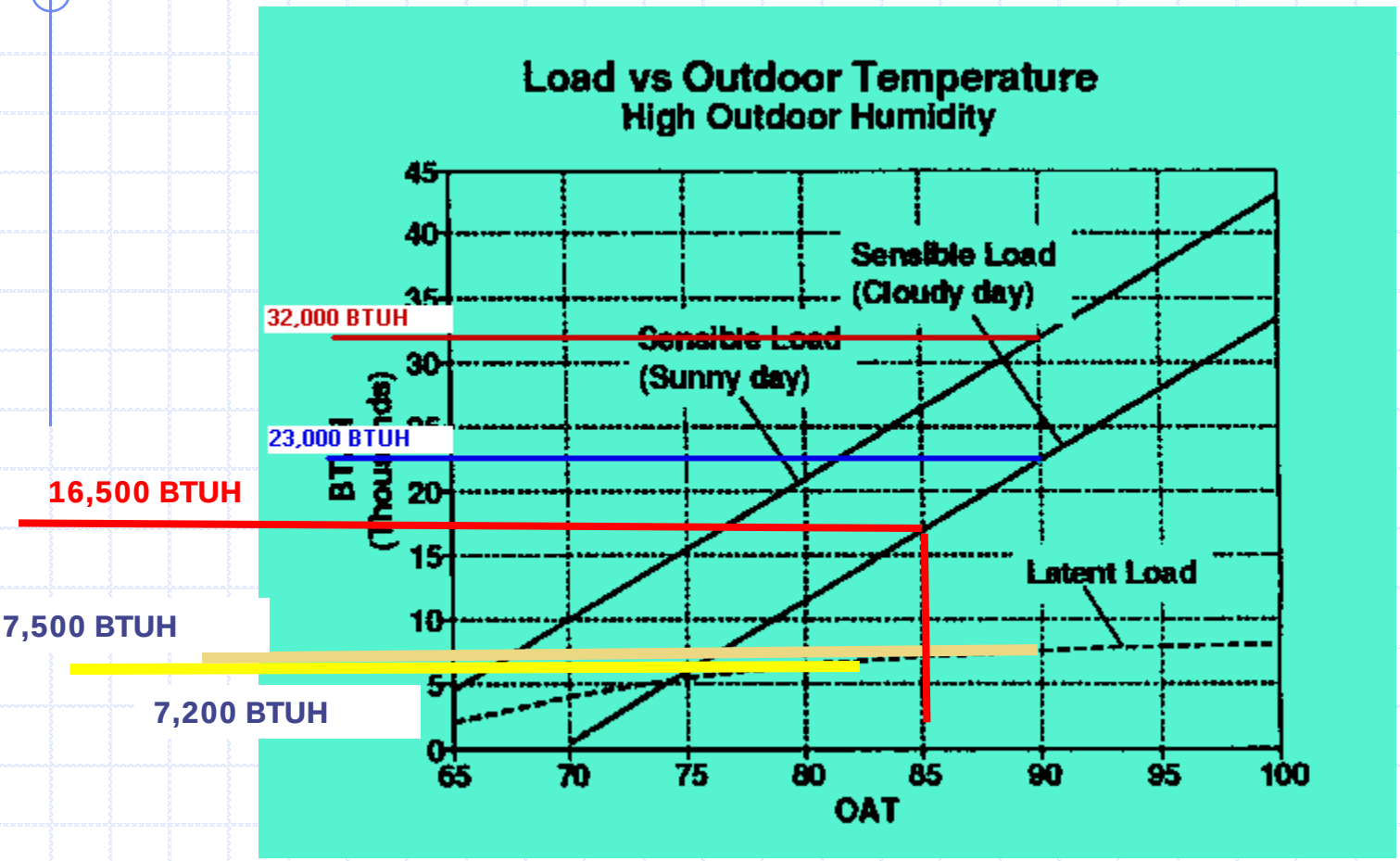
Sensible load variation shows a difference of 9000 BTUH while our latent load remains the same!



NO CHANGE IN LATENT LOAD

Lets say the temperature dropped to 85 when the sun went behind the clouds.

Sensible load drops to 16,500 BTU/H, a difference of 15,500 BTUH.

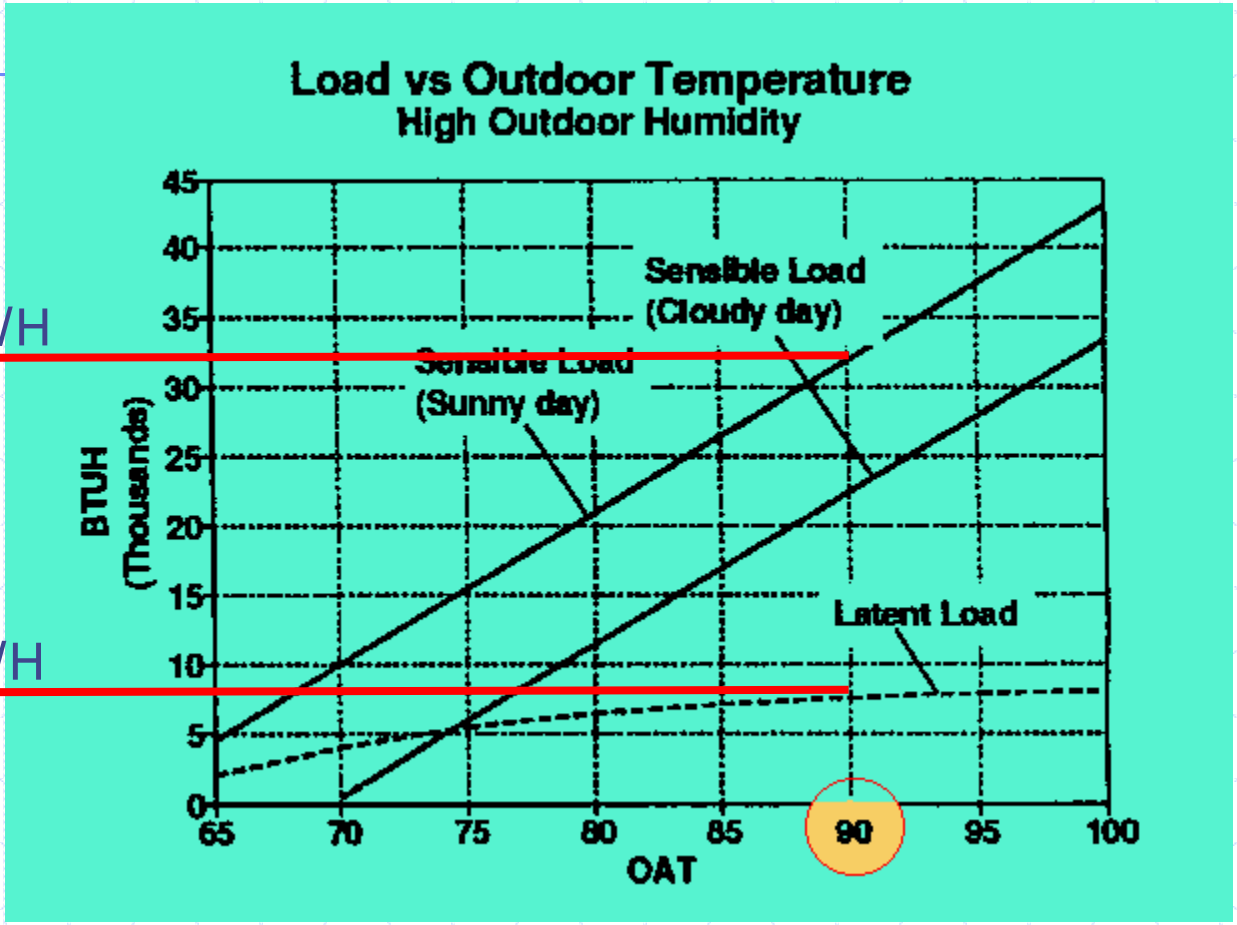


While our latent difference is barley 300 BTUH

If your load calculation came out to 39,500 NET BTUH, what size system would you install?

32,000 BTU/H Sensible

7,500 BTU/H Latent



39,500 BTU/H NET BTUH , 81% SHR

MJ8 Sensitivities

- Design conditions
- Building tightness
- Fenestration
- Air System Design & Installation

Table 1A
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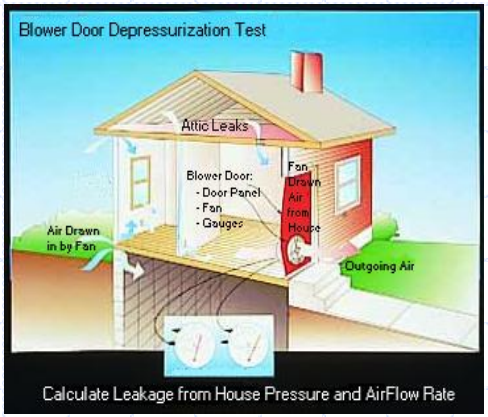


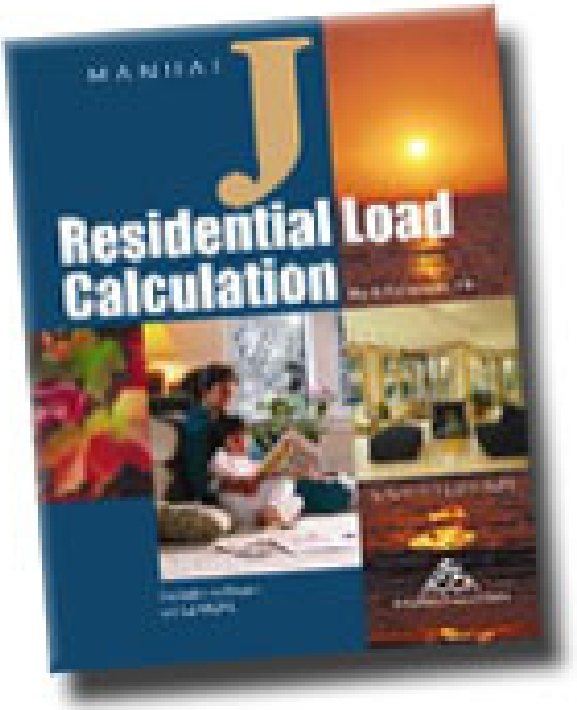
Guidelines

- Use outdoor design conditions recommended by Table 1 Manual J.
- Use the default indoor design conditions recommended by Manual J.
- Take full credit for all internal shading devices and external overhangs.
- Use internal shading devices that are compatible with the type of room.

Guidelines

- Do not use internal shade if the room is specifically used for day lighting.
- Use the tested performance coefficients when known.
- Take full credit for all insulation & sealing efforts.
- Take full credit for insulated & sealed duct runs located in unconditioned space.

ACCA Manual J V8



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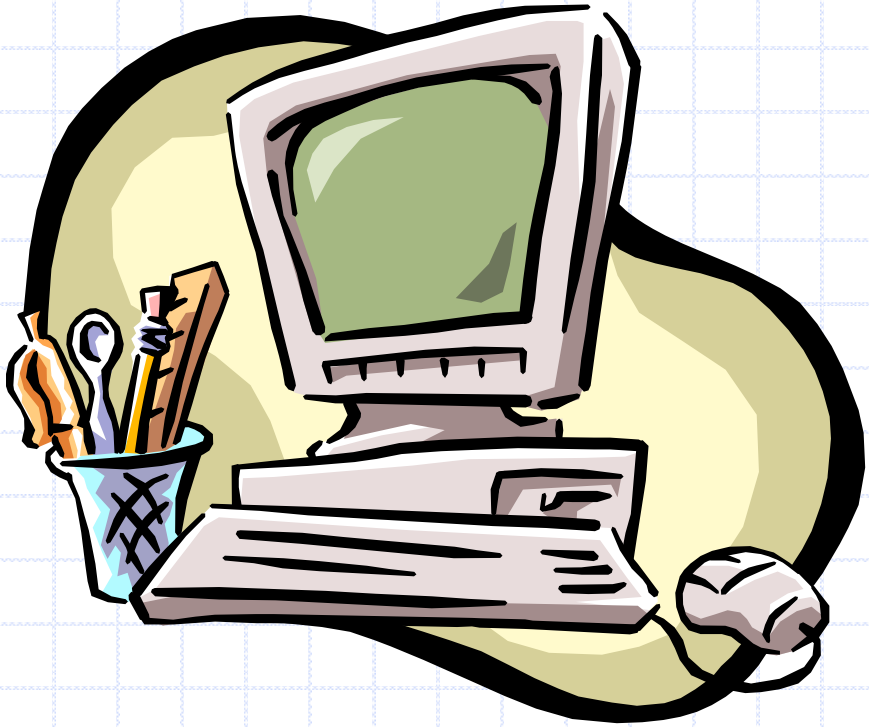


A Computer Only Procedure

From “Addendum B” from ACCA Manual J®

Addendum B to

ACCA Manual J®
Residential Load Calculation
Eighth Edition

ANSI/ACCA Man J 2-2004

ISBN# 1-892765-27-6

This addendum updates Version 1.10 of Manual J Eighth Edition (MJ8™) and addresses *AED Protocol Revisions* to the MJ8™ procedures.

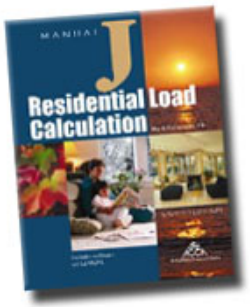
Executive Summary

Now that the industry and software houses have had time to work with the Eighth Edition of *Manual J*®, ACCA has determined that AED simplifications would ease implementation by third-party software vendors and improve the understanding and use of MJ8 by practitioners. This addendum revises the adequate exposure diversity (AED) approach on window/glass exposures in the following manners:

a) MJ8 shall become a computer-only procedure. (Note: A shorter, abridged version of MJ8 is under development that supports a hand calculation procedure aimed at single-family, detached dwellings with single-zone, constant-volume systems).
b) A computer-only, hourly fenestration gain (HFG) procedure shall be used for all application scenarios.
c) Calculations shall be made for midsummer, unless southerly-facing fenestration causes a peak gain in the fall.
d) Hand calculation procedures for applications other than single family detached dwellings served by a single zone, constant volume system shall be abandoned in favor of computerized solutions.

From Part of Section 1-16 ACCA Manual J 8th Edition

- Computerized method calculates load by month of year and time of day associated with each room load and with the equipment sizing load.
- Computer can generate solutions for 288 scenarios (12 month year and 24 hour day)



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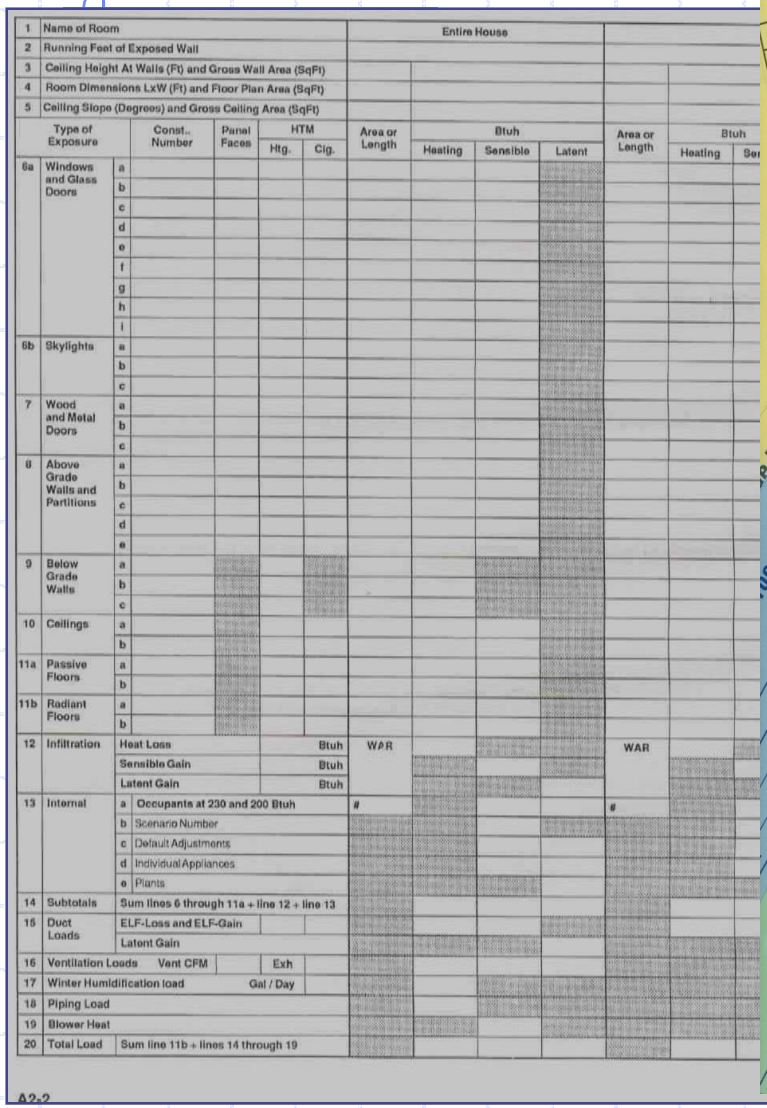
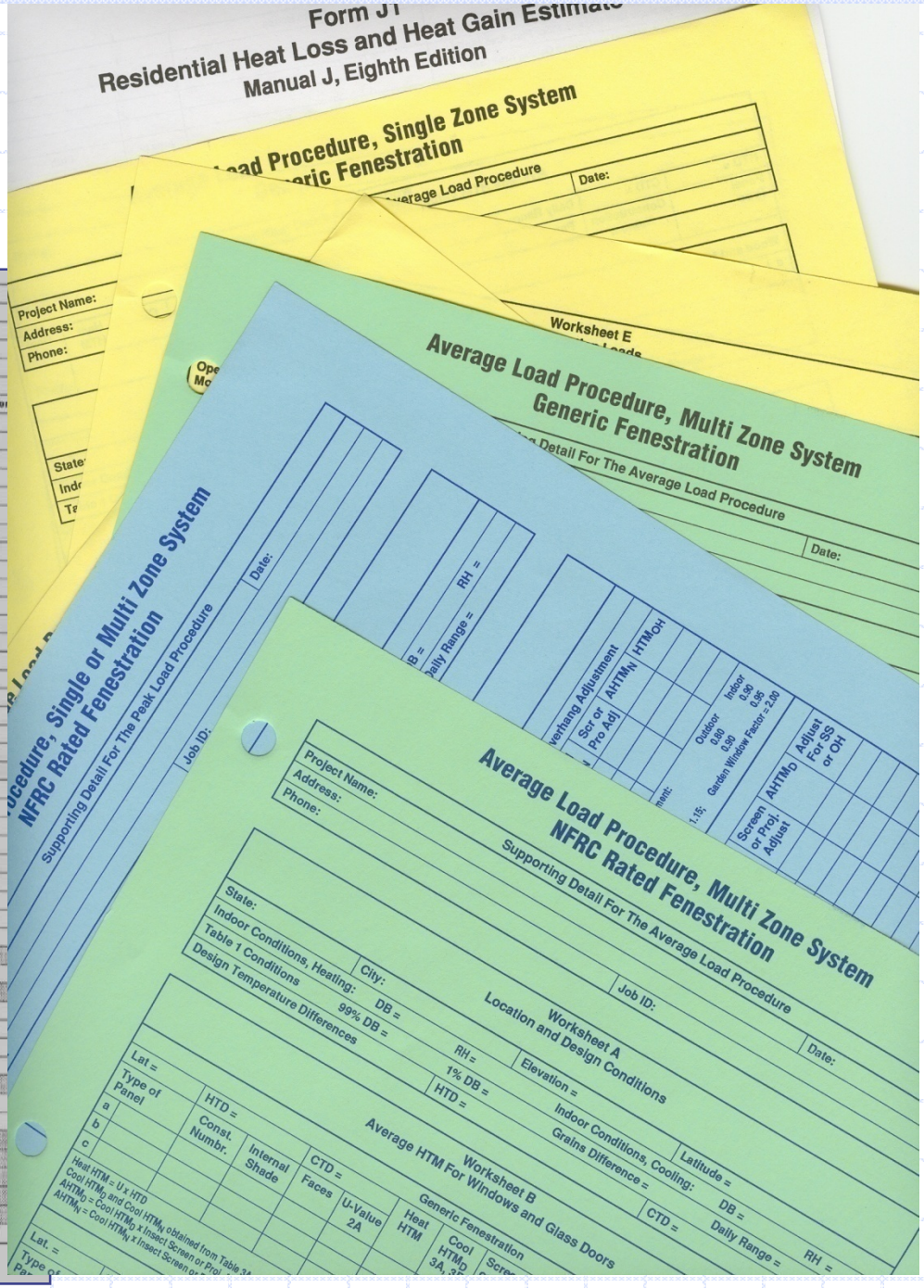
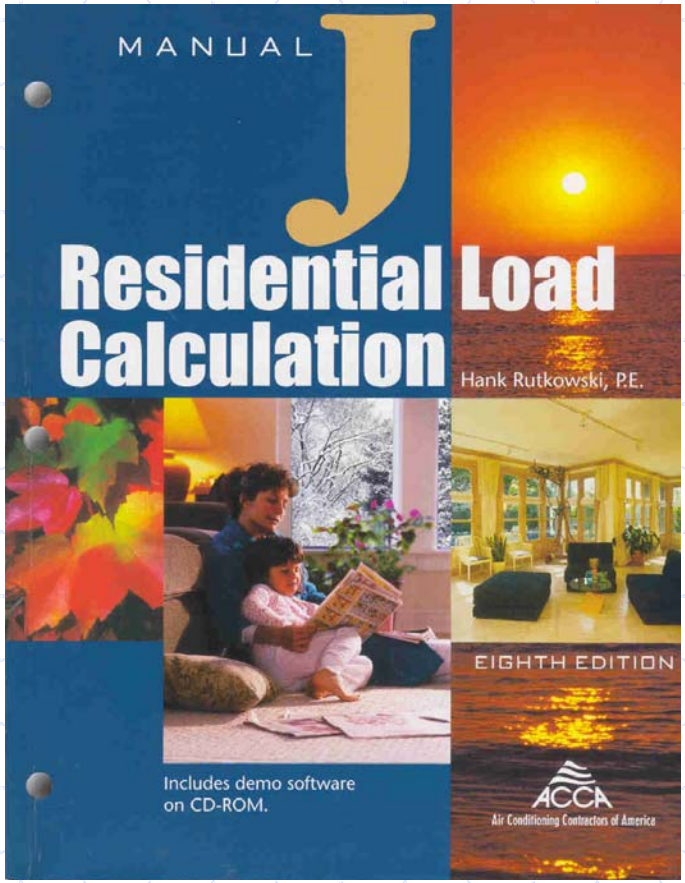
Forms & Worksheets

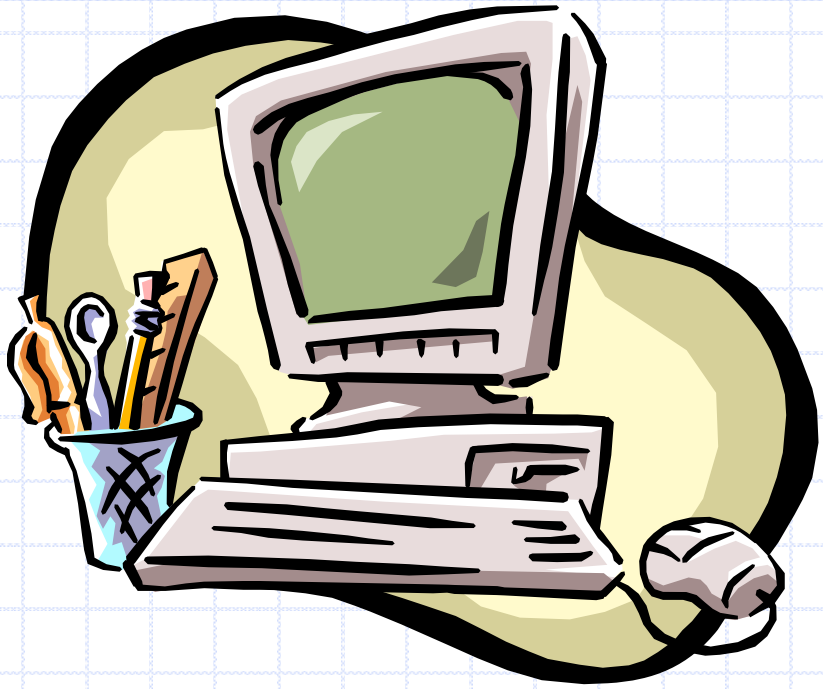


1	Name of Room					Entire House							
2	Running Feet of Exposed Wall												
3	Ceiling Height At Walls (Ft) and Gross Wall Area (SqFt)												
4	Room Dimensions LxW (Ft) and Floor Plan Area (SqFt)												
5	Ceiling Slope (Degrees) and Gross Ceiling Area (SqFt)												
	Type of Exposure		Const., Number	Panel Faces	HTM Htg.	HTM Clg.	Area or Length	Btuh Heating	Btuh Sensible	Btuh Latent	Area or Length	Btuh Heating	Btuh
6a	Windows and Glass Doors	a											
		b											
		c											
		d											
		e											
		f											
		g											
		h											
		i											
6b	Skylights	a											
		b											
		c											
7	Wood and Metal Doors	a											
		b											
		c											
8	Above Grade Walls and Partitions	a											
		b											
		c											
		d											
		e											
9	Below Grade Walls	a											
		b											
		c											
10	Ceilings	a											
		b											
11a	Passive Floors	a											
		b											
11b	Radiant Floors	a											
		b											
12	Infiltration	Heat Loss				Btuh	WAR				WAR		
		Sensible Gain				Btuh							
		Latent Gain				Btuh							
13	Internal	a	Occupants at 230 and 200 Btuh				#				#		
		b	Scenario Number										
		c	Default Adjustments										
		d	Individual Appliances										
		e	Plants										
14	Subtotals	Sum lines 6 through 11a + line 12 + line 13											
15	Duct Loads	ELF-Loss and ELF-Gain											
		Latent Gain											
16	Ventilation Loads	Vent CFM			Exh								
17	Winter Humidification load				Gal / Day								
18	Piping Load												
19	Blower Heat												
20	Total Load	Sum line 11b + lines 14 through 19											

A2-2







Only three software programs are recognized by ACCA as meeting the standards of Manual J residential load calculations.

Powered by ACCA Air Conditioning Contractors of America MANUAL J

CALCS-PLUS

Elite Software

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Nitek

RHVAC

Right-J

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Remember, only these companies are authorized to display the "Powered by ACCA" logo and only their products meet the standards of Manual J residential load calculation.
UPDATED: As of November 12, 2004, Elite Software, Nitek and Wrightsoft have updated their software products to include all four addenda to Manual J 8th Edition.
Elite Software RHVAC
RHVAC Features
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Internet
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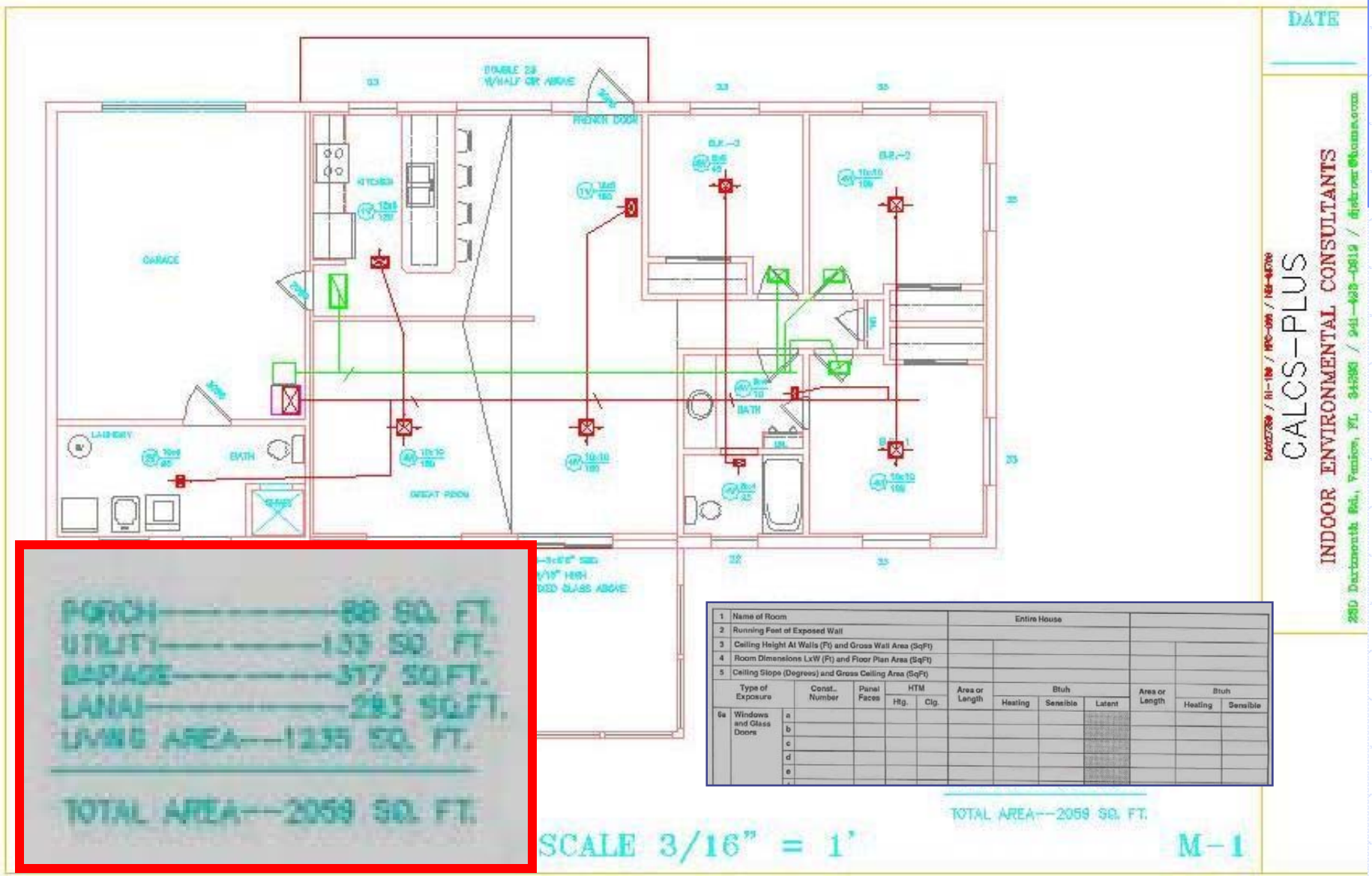
Floor Plan Required.



Room x Room Entry

			Const. Number	Panel Faces	HTM Htg.	HTM Clg.	Entire House: Area or Length	Btuh Heating	Btuh Sensible	Btuh Latent	Area or Length	Btuh Heating	Btuh Sensible
1	Name of Room						Entire House						
2	Running Feet of Exposed Wall												
3	Ceiling Height At Walls (Ft) and Gross Wall Area (SqFt)												
4	Room Dimensions LxW (Ft) and Floor Plan Area (SqFt)												
5	Ceiling Slope (Degrees) and Gross Ceiling Area (SqFt)												
	Type of Exposure												
6a	Windows and Glass Doors	a, b, c, d, e, f, g, h, i											
6b	Skylights	a, b, c											
7	Wood and Metal Doors	a, b, c											
8	Above Grade Walls and Partitions	a, b, c, d, e											
9	Below Grade Walls	a, b, c											
10	Ceilings	a, b											
11a	Passive Floors	a, b											
11b	Radiant Floors	a, b											
12	Infiltration	Heat Loss Btuh					WAR				WAR		
		Sensible Gain Btuh											
		Latent Gain Btuh											
13	Internal	a Occupants at 230 and 200 Btuh					#				#		
		b Scenario Number											
		c Default Adjustments											
		d Individual Appliances											
		e Plants											
14	Subtotals	Sum lines 6 through 11a + line 12 + line 13											
15	Duct Loads	ELF-Loss and ELF-Gain											
		Latent Gain											
16	Ventilation Loads	Vent CFM		Exh									
17	Winter Humidification load	Gal / Day											
18	Piping Load												
19	Blower Heat												
20	Total Load	Sum line 11b + lines 14 through 19											

A2-2

Area or Length	Btuh Heating	Btuh S-Clg.	Area or Length	Btuh Heating	Btuh S-Clg.	Area or Length	Btuh Heating	Btuh S-Clg.	Area or Length	Btuh Heating	Btuh S-Clg.
WAR			WAR			WAR			WAR		
#			#			#			#		

A2-3

Room Entry Data

Room Data - Room 1 of 1

No.	Name	System	Zone	Width
1	Bedroom 1	1	1	11.5

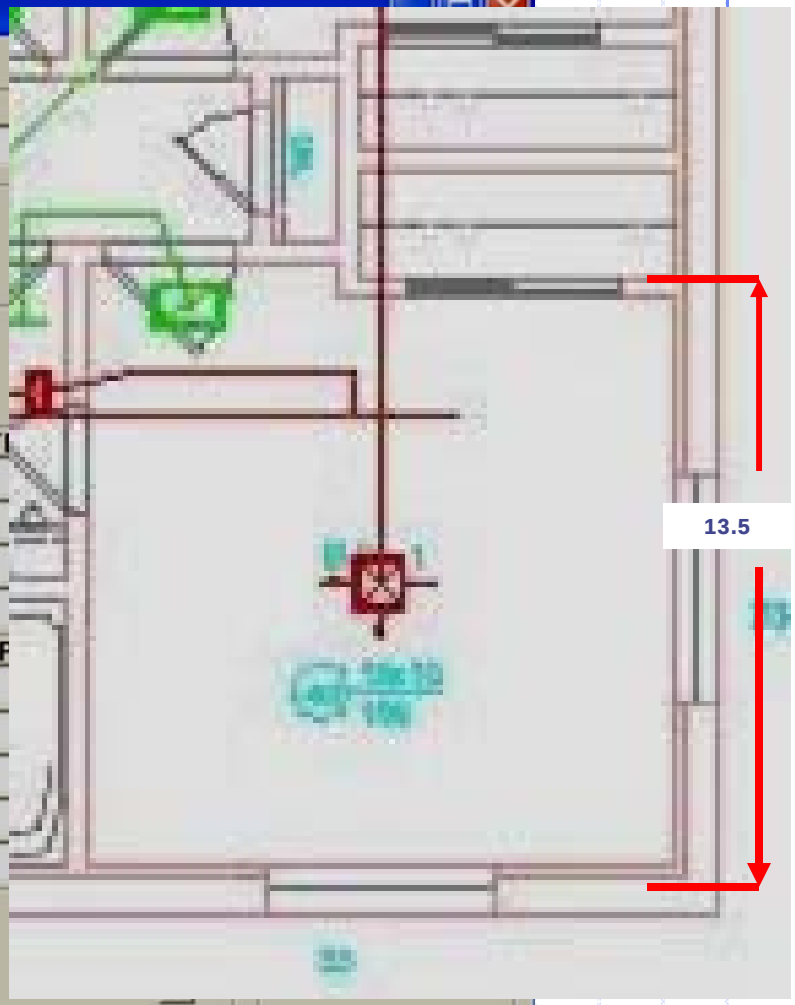
Floor Material	U-Value	Width	Length	Perimeter
1 22A-ph	1.358	11.5	13.5	25
2	0	0	0	0

Roof Material	U-Value	Width	Length	Direction
1 16B-19	0.049	11.5	13.5	UP
2	0	0	0	UP

Wall Material	U-Value	Length	Height	Dir	STD	WTI
1 13A-5ocs	0.125	11.5	9	S	0	0
2 13A-5ocs	0.125	13.5	9	E	0	0
3	0	0	0	N	0	0
4	0	0	0	N	0	0

Glass Material	U-Value	SHGC	Width	Height	Ref	Occ.	O.F
1 1A-cb-o	1.08	0.75	4.4	3.2	1	1	2
2 1A-cb-o	1.08	0.75	4.4	3.2	1	1	2
3	0	0	0	0	0	1	0
4	0	0	0	0	0	1	0
5	0	0	0	0	0	1	0

Door Material	U-Value	Width	Height	Ref
1	0	0	0	0
2	0	0	0	0



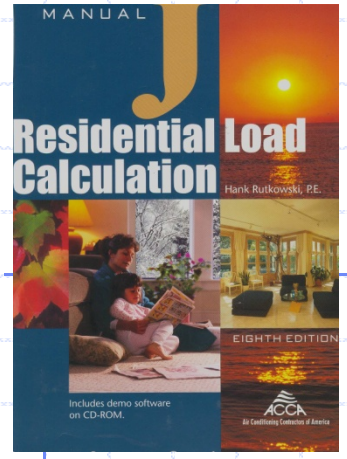


Table 1A

RHVAC weather data base comes directly from ACCA Manual J version 8 Table 1A & 1B(micro climates).

Table 1A

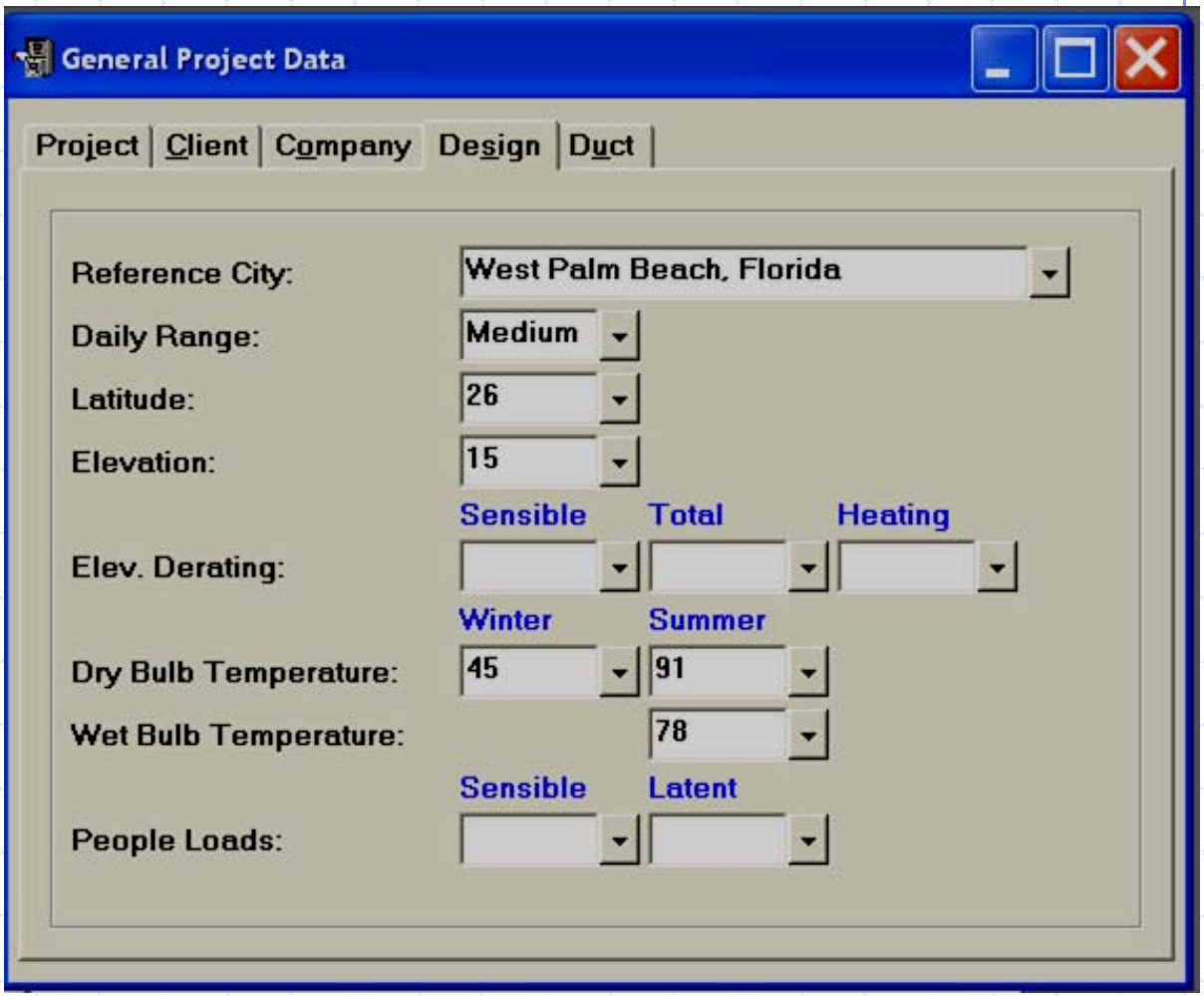
Outdoor Design Conditions For the United States and Canada

Location	Elevation Feet	Latitude Degrees North	Winter Heating 99% Dry Bulb	Summer Cooling 1% Dry Bulb	Coincident Wet Bulb	Design Grains 55% RH	Design Grains 50% RH	Design Grains 45% RH	Daily Range (DR)
St. Augustine	10	29	35	89	78	59	66	72	M
St. Petersburg	11	28	47	93	79	59	66	72	M
Sanford	55	28	38	93	76	39	46	52	M
Sarasota/Bradenton	30	27	43	92	79	61	68	74	M
Tallahassee AP	55	30	28	93	76	39	46	52	M
Tampa AP	19	28	40	91	77	49	56	62	M
Valparaiso, Eglin AFB	85	30	33	90	78	57	64	70	M
Vero Beach	13	27	43	90	78	57	64	70	M
West Palm Beach AP	15	26	47	90	78	57	64	70	M

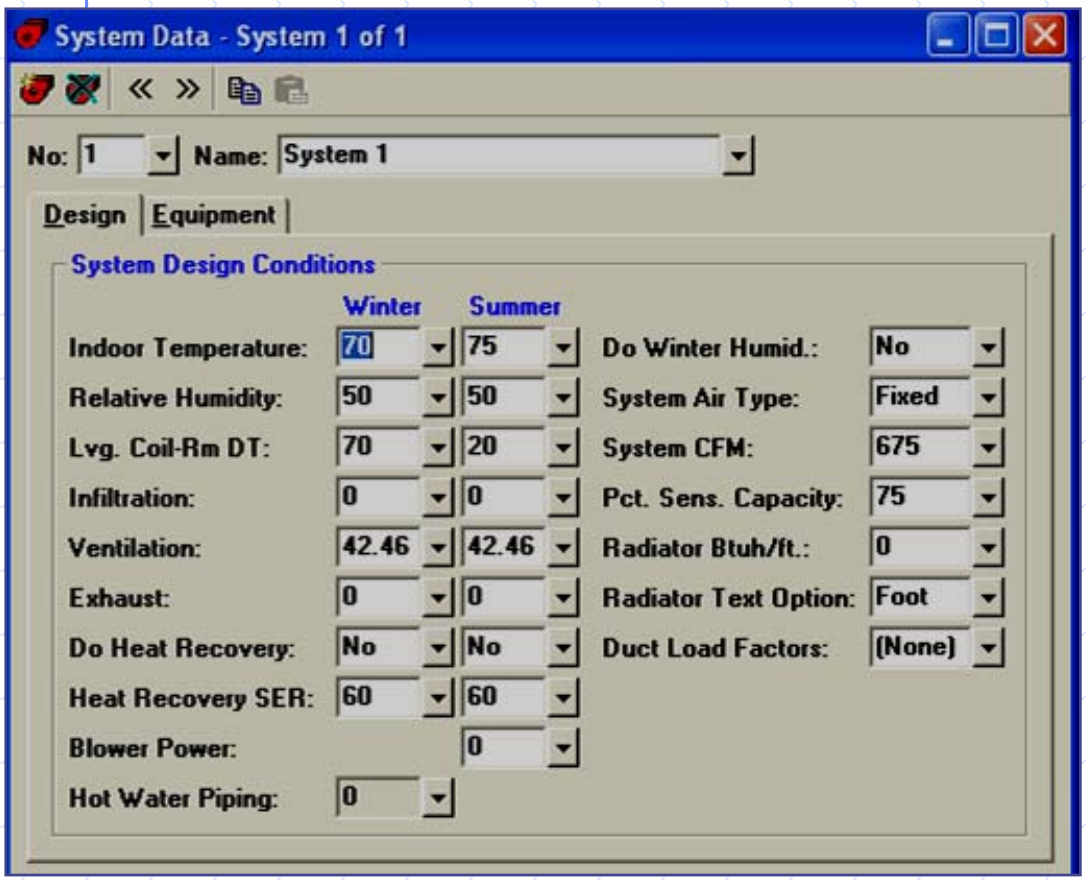
Outdoor Design Conditions

The Data that is automatically filled in comes from Table 1A in ACCA Manual J 8th edition.

Outdoor Design Conditions For the United States and Canada.

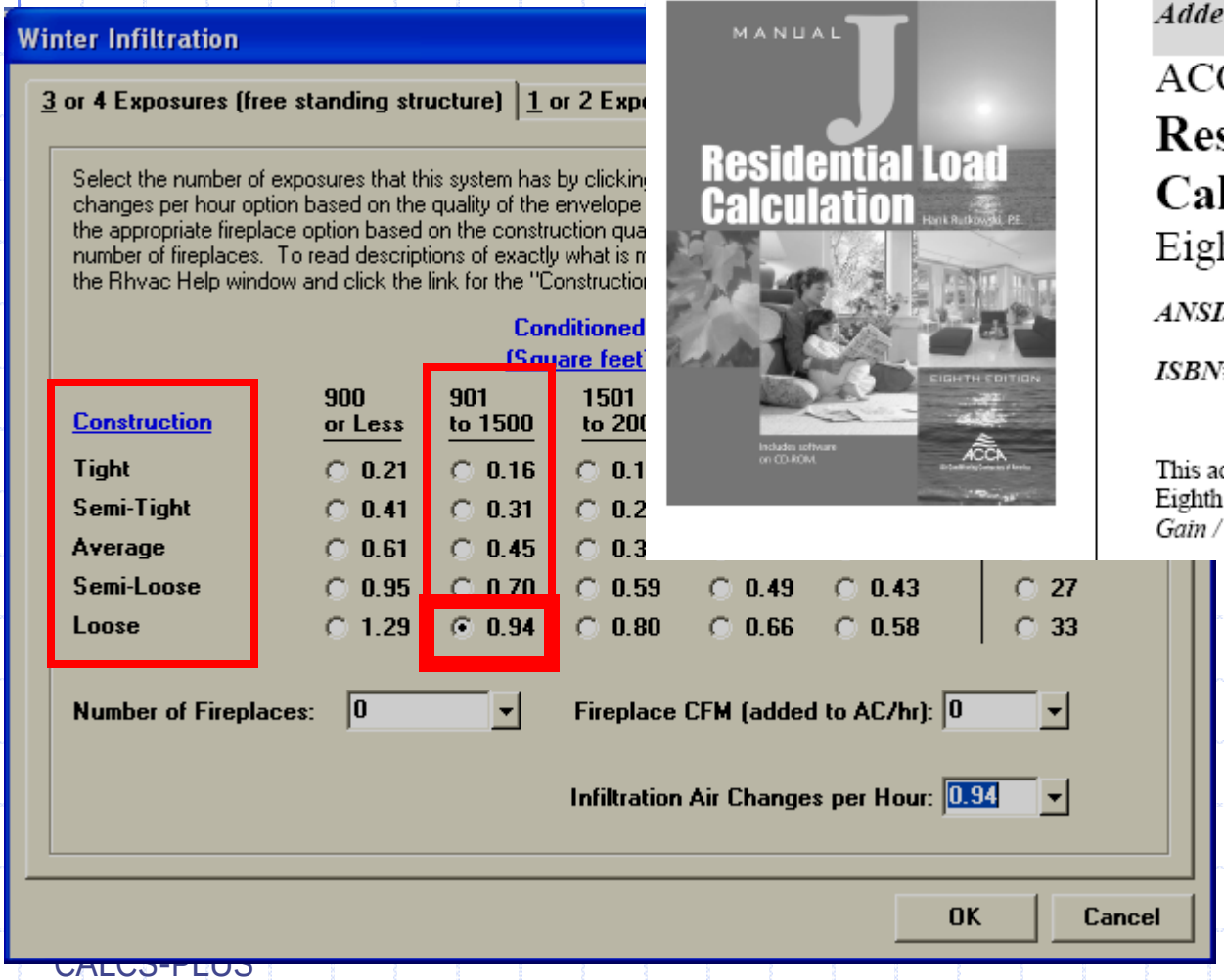


System Information



- Indoor Design Conditions
- Infiltration
- Ventilation

MJ8 & Infiltration For Winter



Addendum D to

ACCA Manual J®

Residential Load Calculation

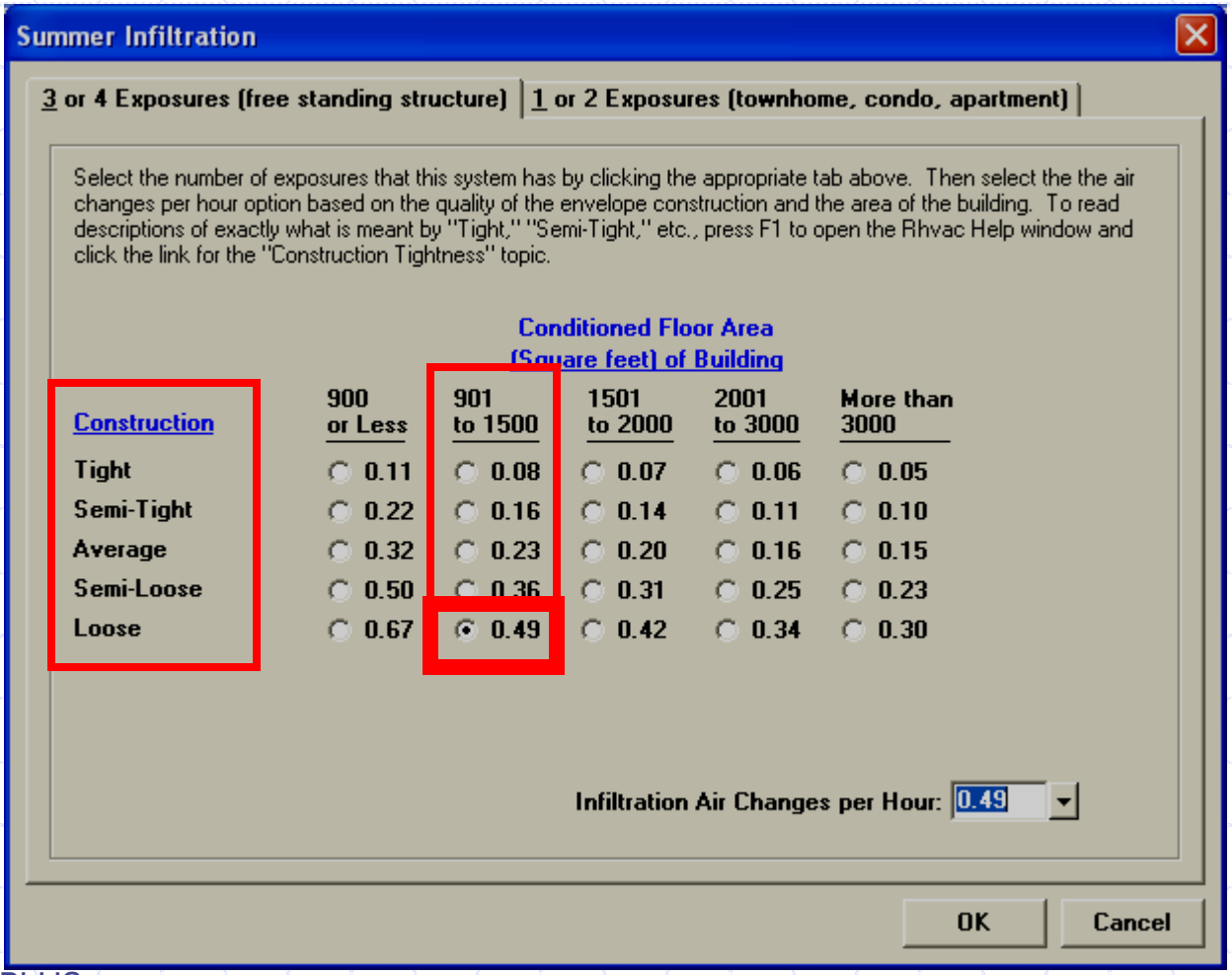
Eighth Edition

ANSI/ACCA Man J 2-2004

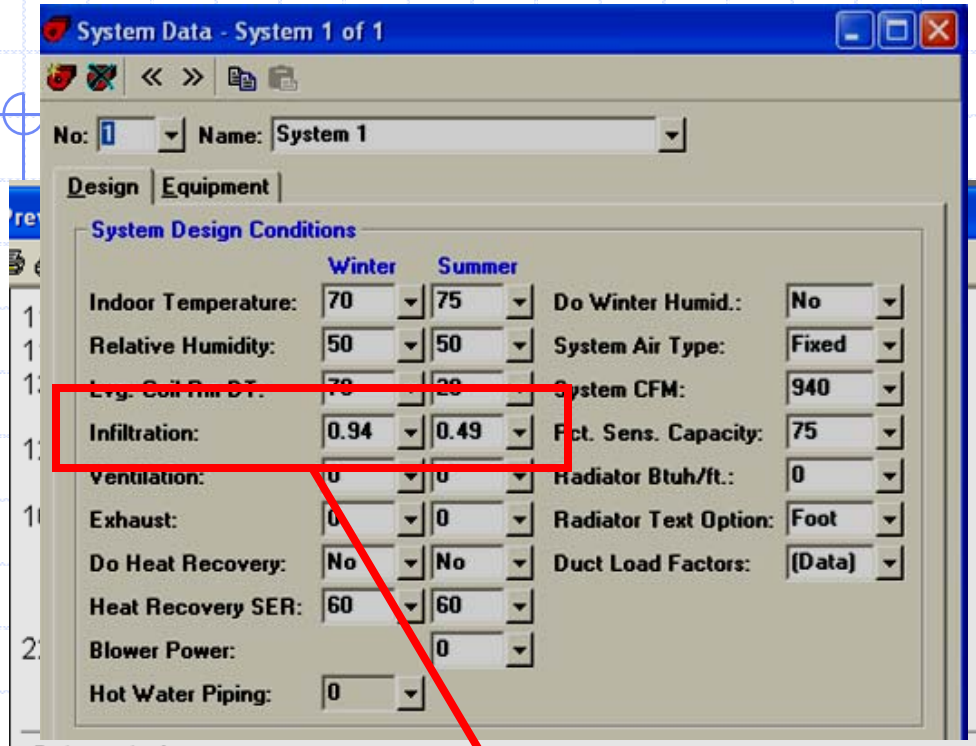
ISBN# 1-892765-27-6

This addendum updates Version 1.10 of Manual J Eighth Edition (MJ8™) and addresses *Infiltration Gain / Loss Revisions* to the MJ8 procedures.

MJ8 & Infiltration For Summer Loose Construction



MJ8 & Infiltration



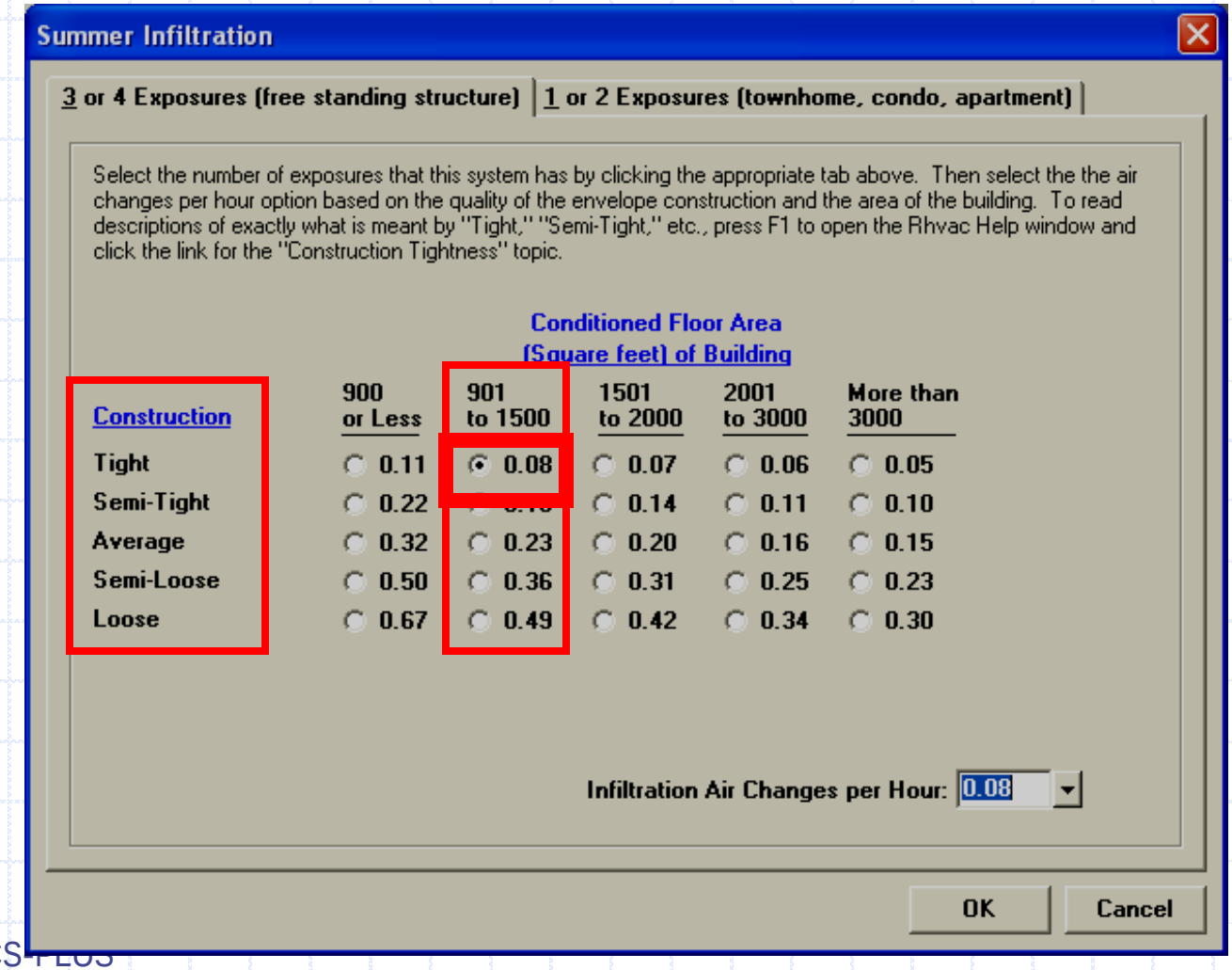
		5,908	0	0	0
Subtotals for structure:		17,491	0	11,924	11,924
People:	4		800	920	1,720
Equipment:			800	1,600	2,400
Lighting:	0			0	0
Ductwork:		5,660	999	5,162	6,161
Infiltration: Winter CFM: 190, Summer CFM: 99		5,222	3,998	1,741	5,739
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		28,373	6,597	21,347	27,944

Check Figures

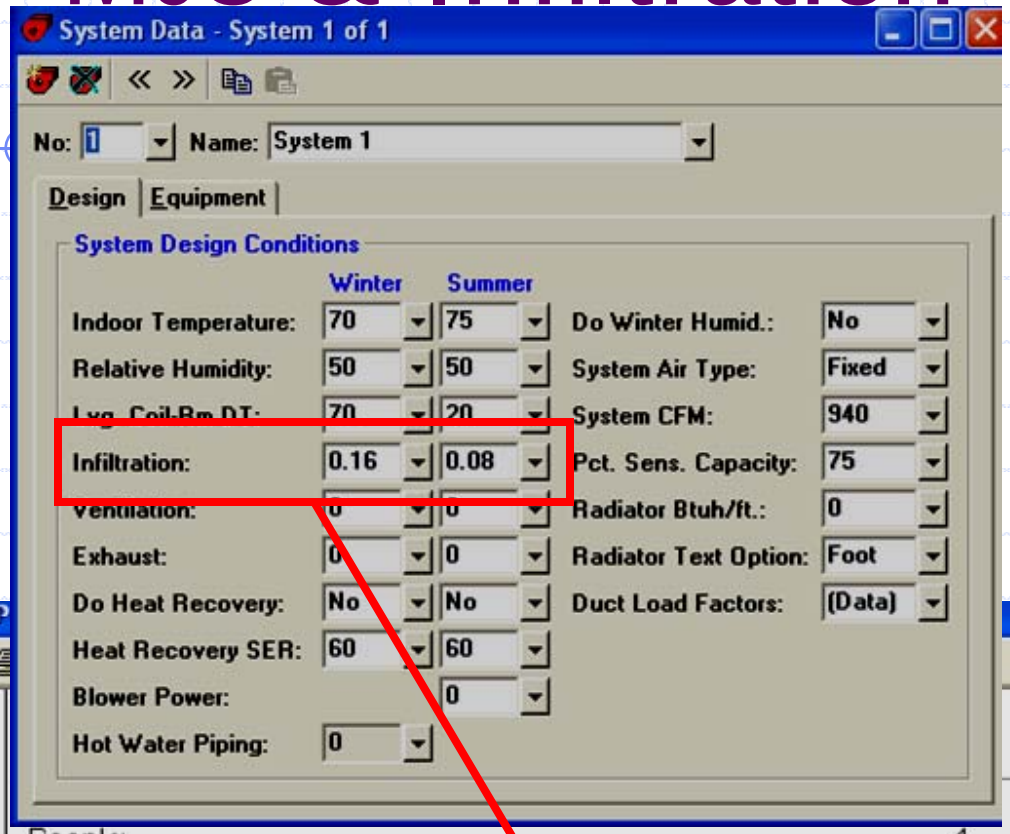
Total Building Supply CFM:	940	CFM Per Square ft.:	0.754
Square ft. of Room Area:	1,246	Square ft. Per Ton:	525
Volume (ft³) of Cond. Space:	12,124	Air Turnover Rate (per hour):	4.7

5,739 BTUH gain from a loosely built building by today's standards

MJ8 & Infiltration For Summer Tight Construction



MJ8 & Infiltration

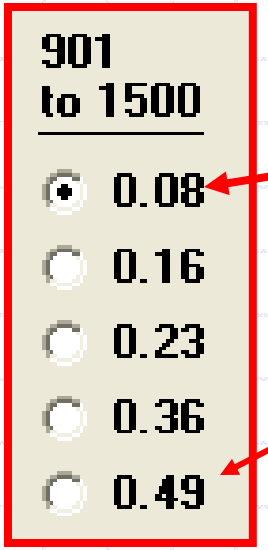


939 BTUH gain from a loosely built building by today's standards

		17,491	0	11,924	11,924
People:	4		800	920	1,720
Equipment:			800	1,600	2,400
Lighting:	0			0	0
Ductwork:		5,682	1,223	5,234	6,457
Infiltration: Winter CFM: 32, Summer CFM: 16		888	654	285	939
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		24,061	3,477	19,963	23,440

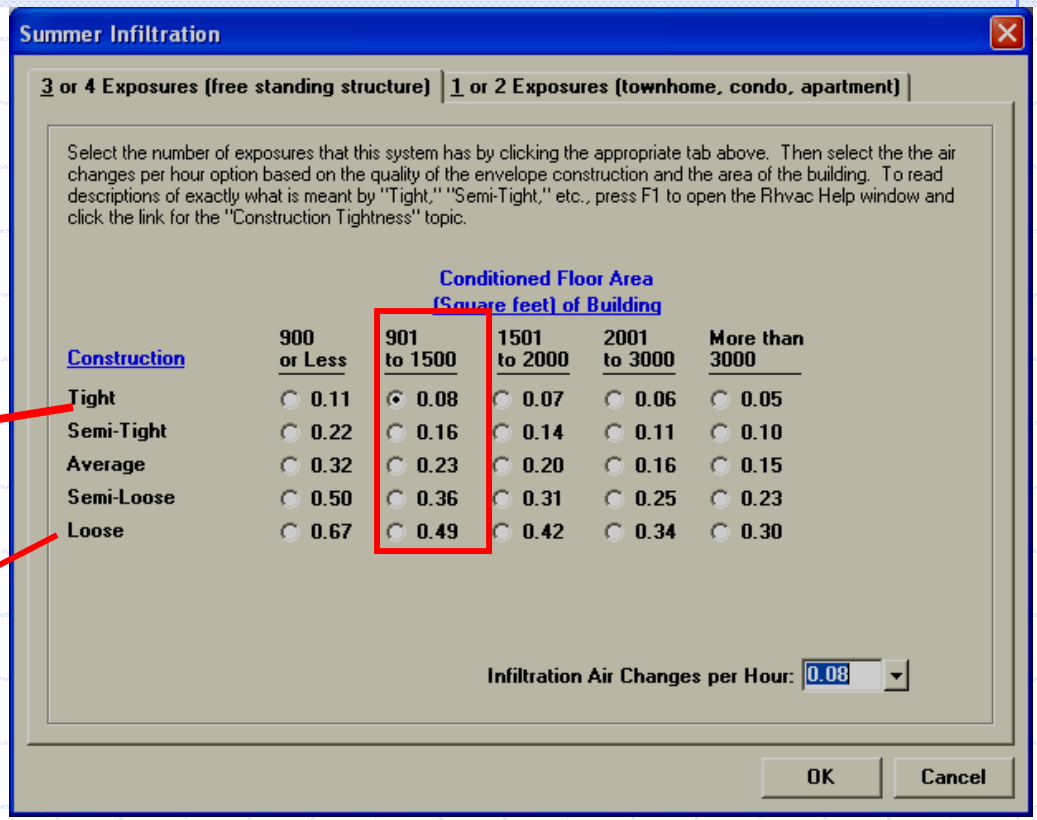
Check Figures

Infiltration Sensitivity



TIGHT

LOOSE



Loose Construction

Infiltration: Winter CFM: 190, Summer CFM: 99	5,222	3,998	1,741	5,739

Tight Construction

Infiltration: Winter CFM: 32, Summer CFM: 16	888	654	285	939

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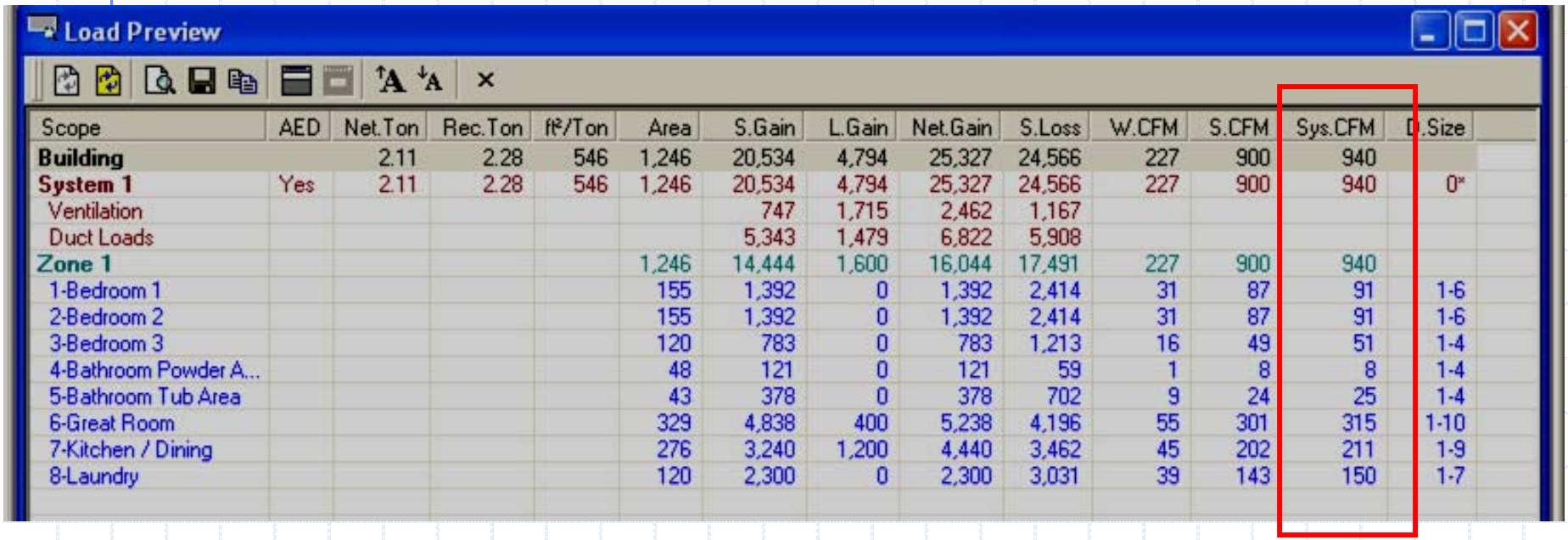
MJ8 & Duct Leakage

MJ8 & Duct Design



Scope	AED	Net.Ton	Rec.Ton	ft²/Ton	Area	S.Gain	L.Gain	Net.Gain	S.Loss	W.CFM	S.CFM	Sys.CFM	D.Size
Building		2.11	2.28	546	1,246	20,534	4,794	25,327	24,566	227	900	940	
System 1	Yes	2.11	2.28	546	1,246	20,534	4,794	25,327	24,566	227	900	940	0"
Ventilation						747	1,715	2,462	1,167				
Duct Loads						5,343	1,479	6,822	5,908				
Zone 1					1,246	14,444	1,600	16,044	17,491	227	900	940	
1-Bedroom 1					155	1,392	0	1,392	2,414	31	87	91	1-6
2-Bedroom 2					155	1,392	0	1,392	2,414	31	87	91	1-6
3-Bedroom 3					120	783	0	783	1,213	16	49	51	1-4
4-Bathroom Powder A...					48	121	0	121	59	1	8	8	1-4
5-Bathroom Tub Area					43	378	0	378	702	9	24	25	1-4
6-Great Room					329	4,838	400	5,238	4,196	55	301	315	1-10
7-Kitchen / Dining					276	3,240	1,200	4,440	3,462	45	202	211	1-9
8-Laundry					120	2,300	0	2,300	3,031	39	143	150	1-7

Design room CFM (airflow)

Duct Loads

Addendum C to

ACCA Manual J®

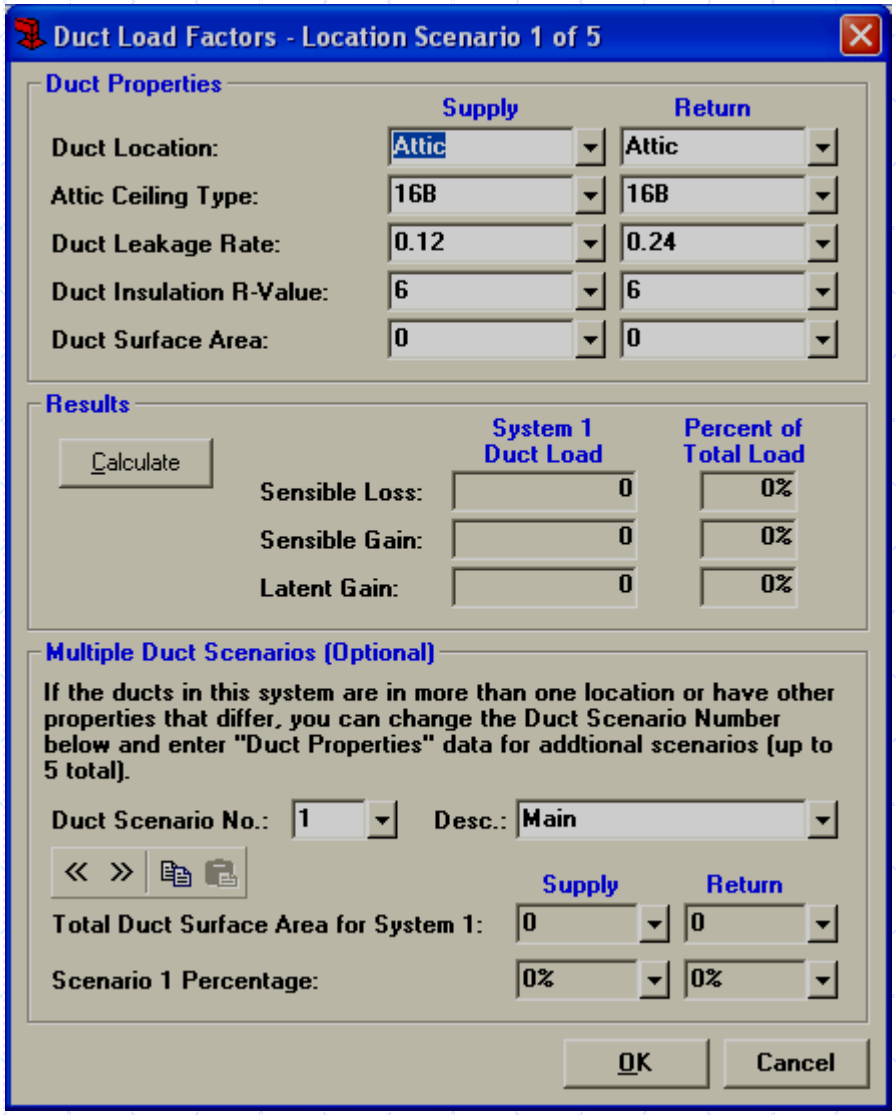
Residential Load Calculation

Eighth Edition

ANSI/ACCA Man J 2-2004

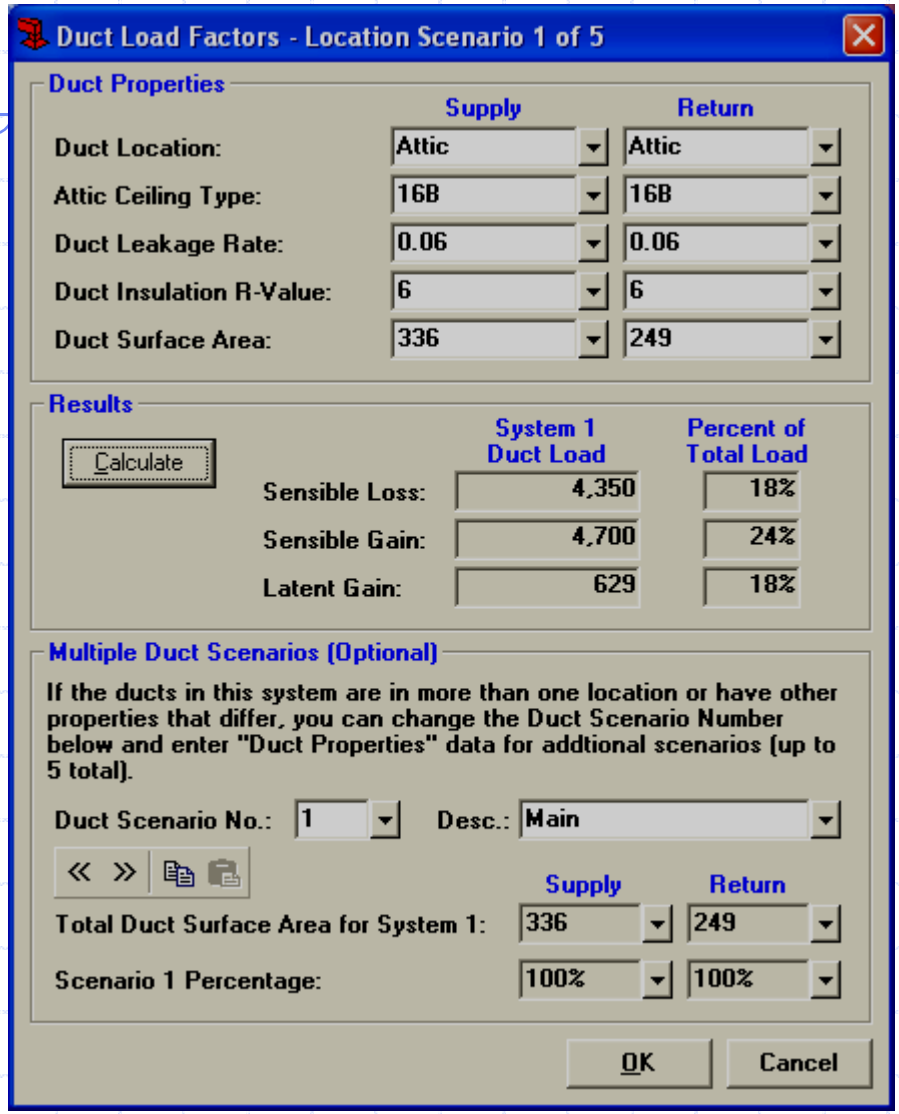
ISBN# 1-892765-27-6

This addendum updates Version 1.10 of Manual J Eighth Edition (MJ8™) and addresses *Duct Gain / Loss Revisions* to the MJ8 procedures.



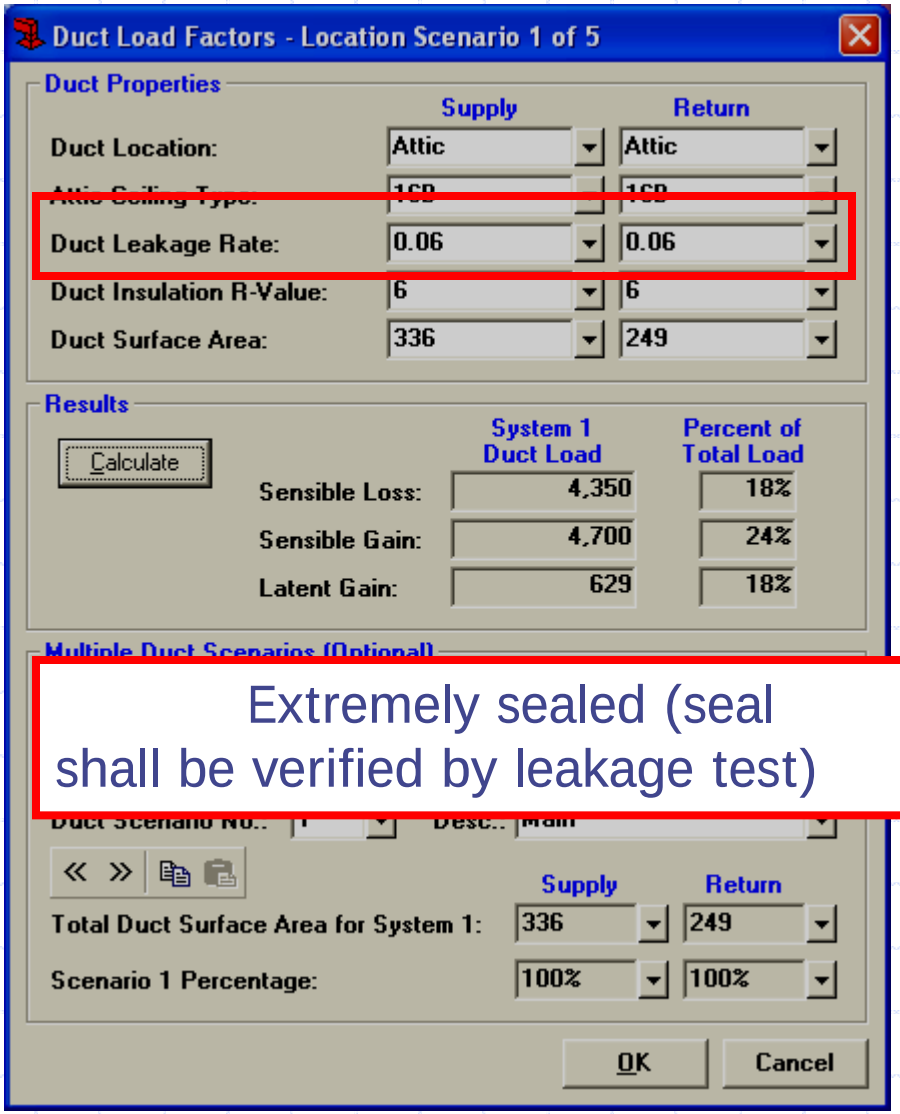
Ducts located in the unconditioned space also have a heat gain that adds to the cooling load of the building.

Calculate Duct Loads

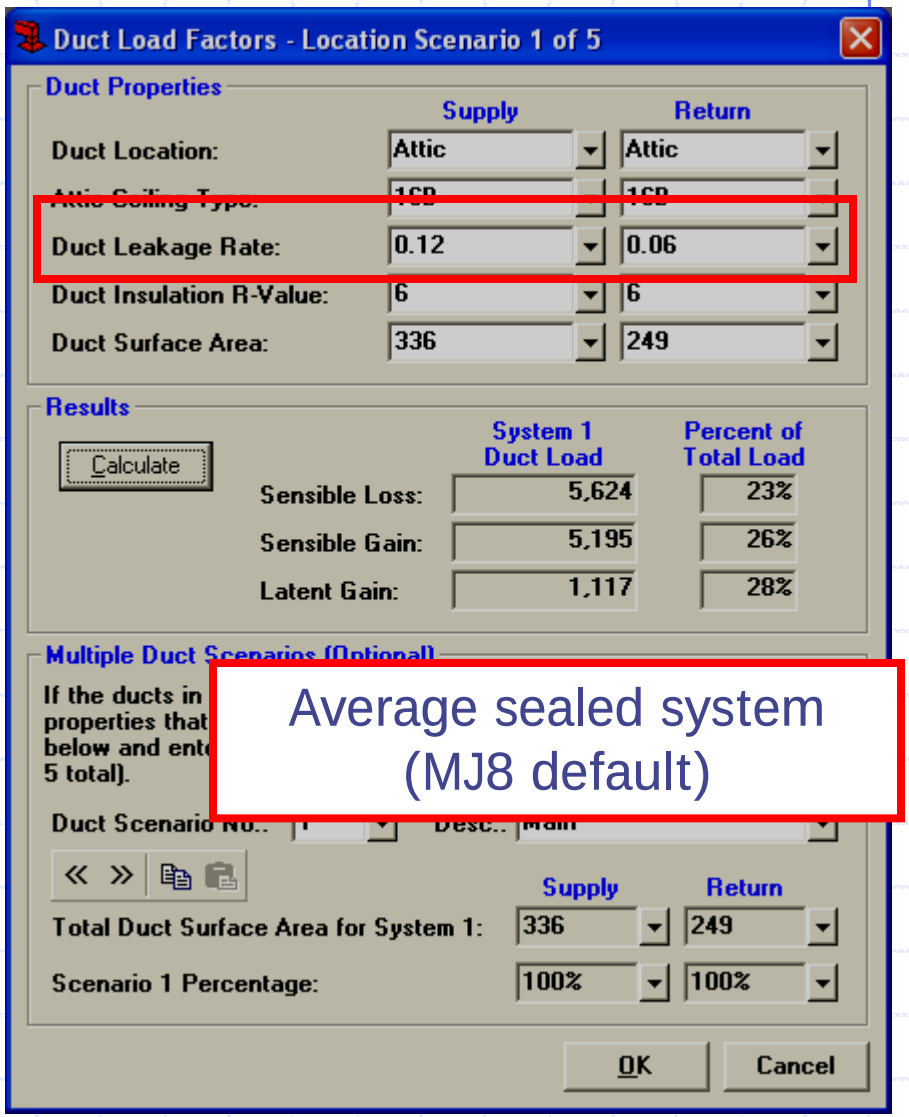


The Sensible Loss, Sensible Gain, and the Latent Gain are calculated for the duct system.

What If?

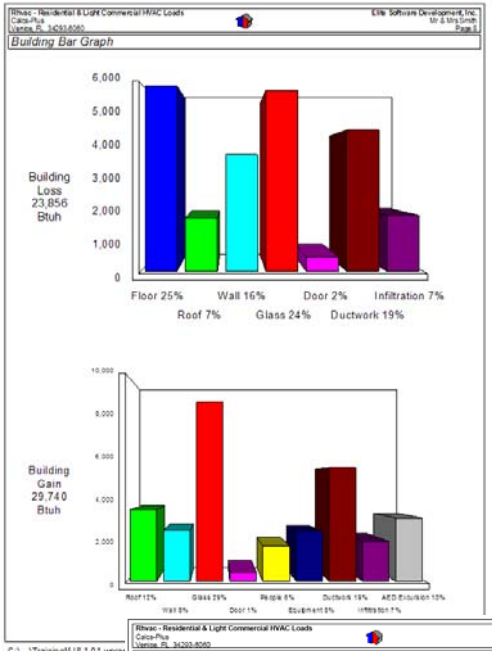


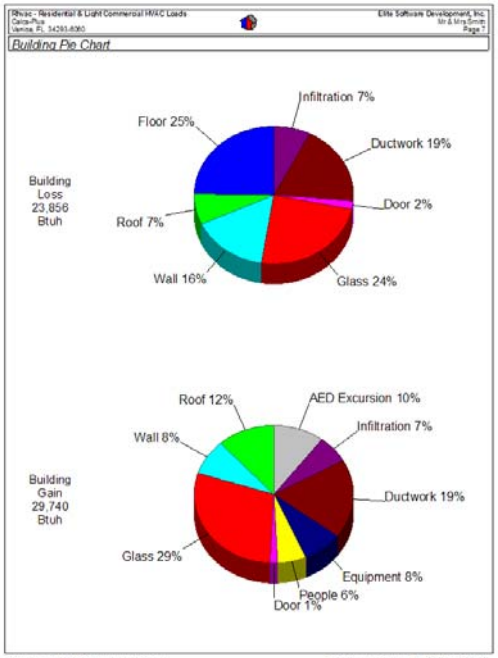
Extremely sealed (seal shall be verified by leakage test)

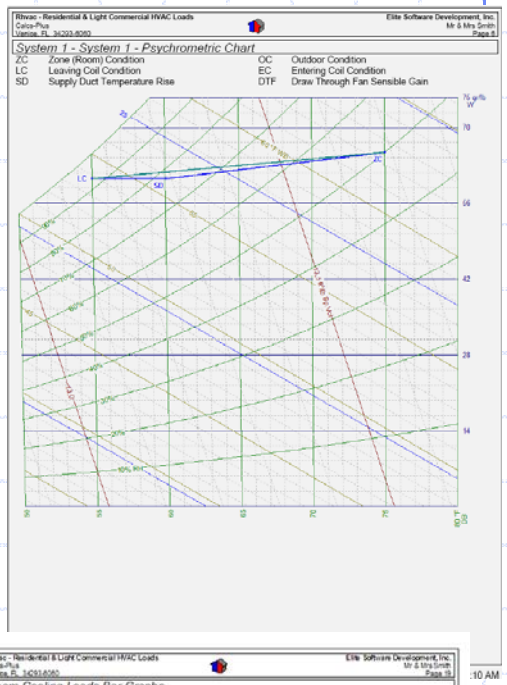


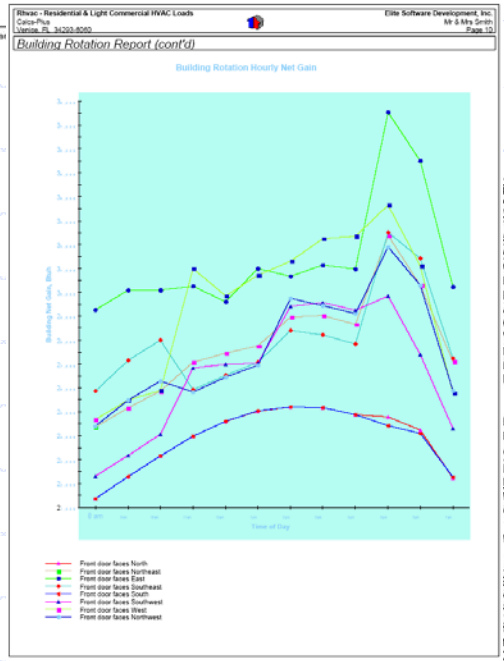
Average sealed system (MJ8 default)

REPORTS









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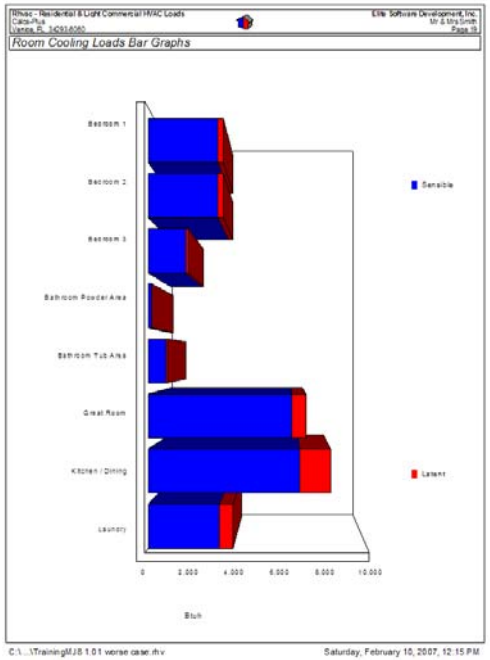
Calcs-Plus — Mr & Mrs Smith
Venice, FL 34293-8060 — Page 14

Detailed Room Loads - Room 6 - Great Room (Average Load Procedure)

General

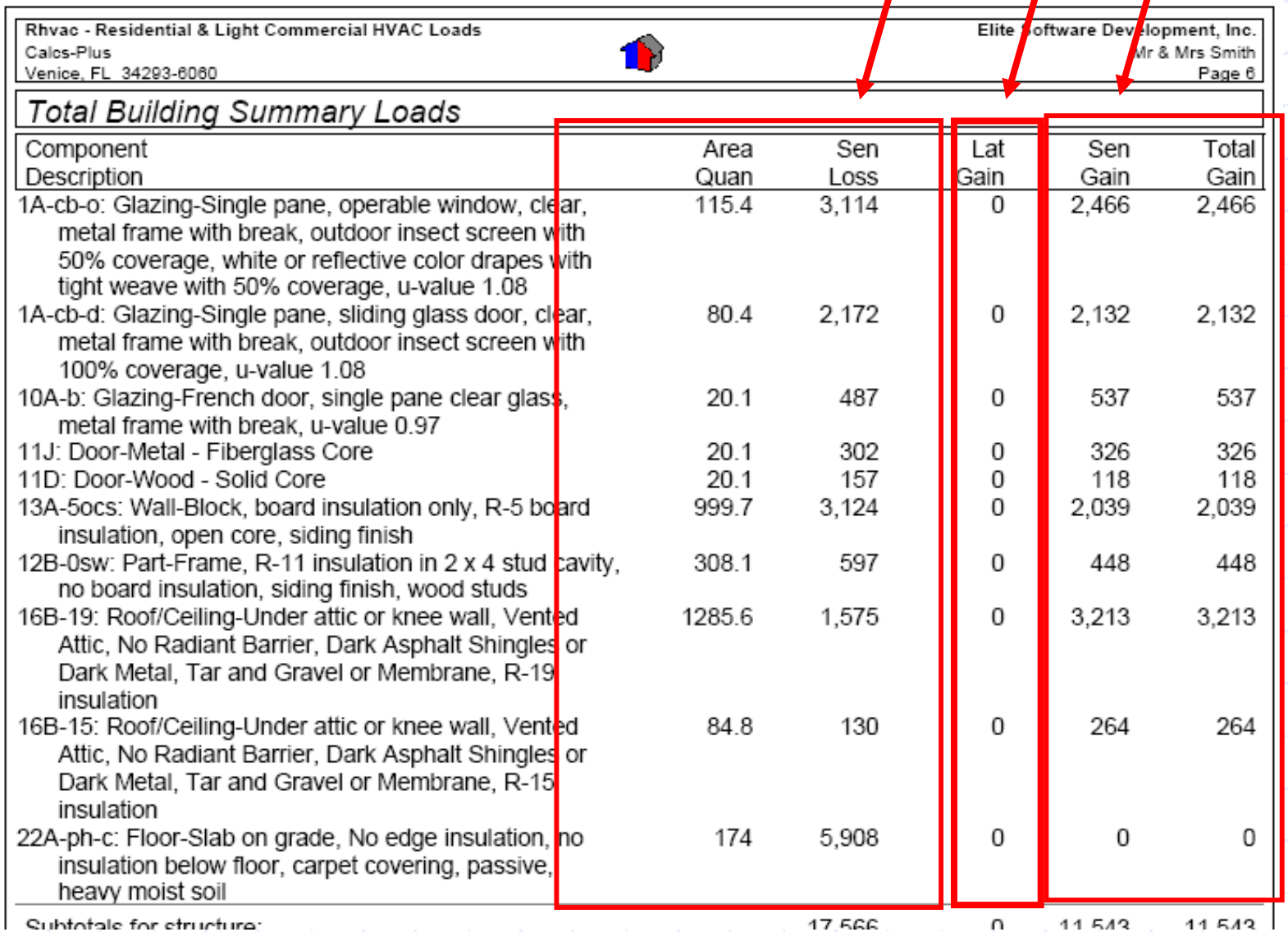
Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	14.0	ft.	System Number:	1	
Room Width:	26.3	ft.	Zone Number:	1	
Area:	368.0	sq.ft.	Supply Air:	298	CFM
Ceiling Height:	10.5	ft.	Supply Air Changes:	4.6	AC/hr
Volume:	3,866.0	cu.ft.	Required Vent.:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
Runout Air:	298	CFM	Percent of Supply.:	0	%
Runout Duct Size:	Runout Air: 298		CFM	in.	Actual Summer Vent.:
Runout Air Velocity:	547	ft./min.	Percent of Supply:	0	%
Design Loss:	0.100	in.wg./100 ft.	Actual Winter Infil.:	11	CFM
Actual Loss:	0.095	in.wg./100 ft.	Actual Summer Infil.:	6	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
W -Wall-13A-5ocs 23.5 X 9	131.1	0.125	3.1	410	2.0	0	267
W -Part-15*/20*-12B-0sw 6.4 X 10.5	67.2	0.097	1.9	130	1.5	0	98
W -Gls-1A-cb-d shgc-0.75 100%S (4)	80.4	1.080	27.0	2,172	26.5	0	2,132
FLOOR-Ceil-16B-19 14 X 26.3	368.2	0.049	1.2	451	2.5	0	920
Ceil -Ceil-16B-15 30.6 X 1	30.6	0.061	1.5	47	3.1	0	95
Ceil -Ceil-16B-15 20.5 X 1	20.5	0.061	1.5	31	3.1	0	64
Floor-22A-ph 30 ft. Per	30	1.358	34.0	1,019	0.0	0	0
Subtotals for Structure:				4,260		0	3,576
Infil.: Win.: 11.1, Sum.: 5.7	212		1.442	305	0.478	231	101
Ductwork:				1,064			1,241
AED Excursion:							782
People: 200 lat/per, 230 sen/per:	2					400	460
Equipment:						0	400
Room Totals:				5,629		631	6,560



CALCS-PLUS

Envelope Materials



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Mr & Mrs Smith
Page 6

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1A-cb-o: Glazing-Single pane, operable window, clear, metal frame with break, outdoor insect screen with 50% coverage, white or reflective color drapes with tight weave with 50% coverage, u-value 1.08	115.4	3,114	0	2,466	2,466
1A-cb-d: Glazing-Single pane, sliding glass door, clear, metal frame with break, outdoor insect screen with 100% coverage, u-value 1.08	80.4	2,172	0	2,132	2,132
10A-b: Glazing-French door, single pane clear glass, metal frame with break, u-value 0.97	20.1	487	0	537	537
11J: Door-Metal - Fiberglass Core	20.1	302	0	326	326
11D: Door-Wood - Solid Core	20.1	157	0	118	118
13A-5ocs: Wall-Block, board insulation only, R-5 board insulation, open core, siding finish	999.7	3,124	0	2,039	2,039
12B-0sw: Part-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	308.1	597	0	448	448
16B-19: Roof/Ceiling-Under attic or knee wall, Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-19 insulation	1285.6	1,575	0	3,213	3,213
16B-15: Roof/Ceiling-Under attic or knee wall, Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-15 insulation	84.8	130	0	264	264
22A-ph-c: Floor-Slab on grade, No edge insulation, no insulation below floor, carpet covering, passive, heavy moist soil	174	5,908	0	0	0
Subtotals for structure:		17,566	0	11,543	11,543

Internal and Other Gains
Check Figures
Net Results

Subtotals for structure:		17,566	0	11,543	11,543
People:	4		800	920	1,720
Equipment:			1,200	1,200	2,400
Lighting:	0			0	0
Ductwork:		4,510	647	4,818	5,465
Infiltration: Winter CFM: 65, Summer CFM: 33		1,780	1,350	588	1,938
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		23,856	3,997	19,069	23,066

Check Figures

Total Building Supply CFM:	867	CFM Per Square ft.:	0.675
Square ft. of Room Area:	1,285	Square ft. Per Ton:	606
Volume (ft³) of Cond. Space:	12,535	Air Turnover Rate (per hour):	4.2

Building Loads

Total Heating Required With Outside Air:	23,856 Btuh	23.856	MBH
Total Sensible Gain:	19,069 Btuh	83	%
Total Latent Gain:	3,997 Btuh	17	%
Total Cooling Required With Outside Air:	23,066 Btuh	1.92	Tons (Based On Sensible + Latent)
		2.12	Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.

Room Loads

Rhvac - Residential & Light Commercial HVAC Loads
Elite Software Development, In
College Station, TX 77845-4491

Elite Software Development, Inc.
Mr & Mrs Smith
Page 4

Load Preview Report

Scope	Has AED	Net Ton	Rec Ton	ft²/Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building		1.92	2.12	607	1,285	19,057	3,997	23,054	23,839	1,000	1,000	1,000	
System 1	Yes	1.92	2.12	607	1,285	19,057	3,997	23,054	23,839	1,000	1,000	1,000	0*
Duct Latent							647	647					
Zone 1					917	14,414	2,719	17,133	18,231	765	676	676	
1-Bedroom 1					155	2,343	246	2,589	3,377	142	110	110	1-6
2-Bedroom 2					155	2,343	246	2,589	3,377	142	110	110	1-6
3-Bedroom 3					120	1,278	113	1,391	1,680	70	60	60	1-4
4-Bathroom Powder Area					48	156	0	156	73	3	7	7	1-4
5-Bathroom Tub Area					43	627	77	704	990	42	29	29	1-4
7-Kitchen / Dining					276	4,944	1,406	6,350	4,619	194	232	232	1-9
8-Laundry					120	2,724	631	3,355	4,115	173	128	128	1-7
Zone 2					368	6,904	631	7,535	5,608	235	324	324	
6-Great Room					368	6,904	631	7,535	5,608	235	324	324	1-10

Sum of room airflows may be greater than system airflow because system has multiple zones.

Building Rotation Report

Building Rotation Report

All rotation degree values in this report are clockwise with respect to the project's original orientation.
Building orientation as entered (zero degrees rotation): Front door faces South

Individual Rooms

Rm. No.	Room Name	0° Rot. CFM	45° Rot. CFM	90° Rot. CFM	135° Rot. CFM	180° Rot. CFM	225° Rot. CFM	270° Rot. CFM	315° Rot. CFM	High Duct Size
System 1:										
Zone 1:										
1	Bedroom 1	91	104	*144	130	91	123	133	102	1-7
2	Bedroom 2	91	134	*144	100	91	95	133	132	1-7
3	Bedroom 3	51	72	*78	55	51	52	71	71	1-5
4	Bathroom Powder Area	7	8	*8	8	7	7	7	8	1-4
5	Bathroom Tub Area	25	27	*36	34	25	32	34	26	1-4
6	Great Room	276	296	298	*435	276	411	274	292	1-12
7	Kitchen / Dining	204	290	*315	236	204	223	289	286	1-10
8	Laundry	122	133	*147	138	122	131	135	131	1-7

* Indicates highest CFM of all rotations.

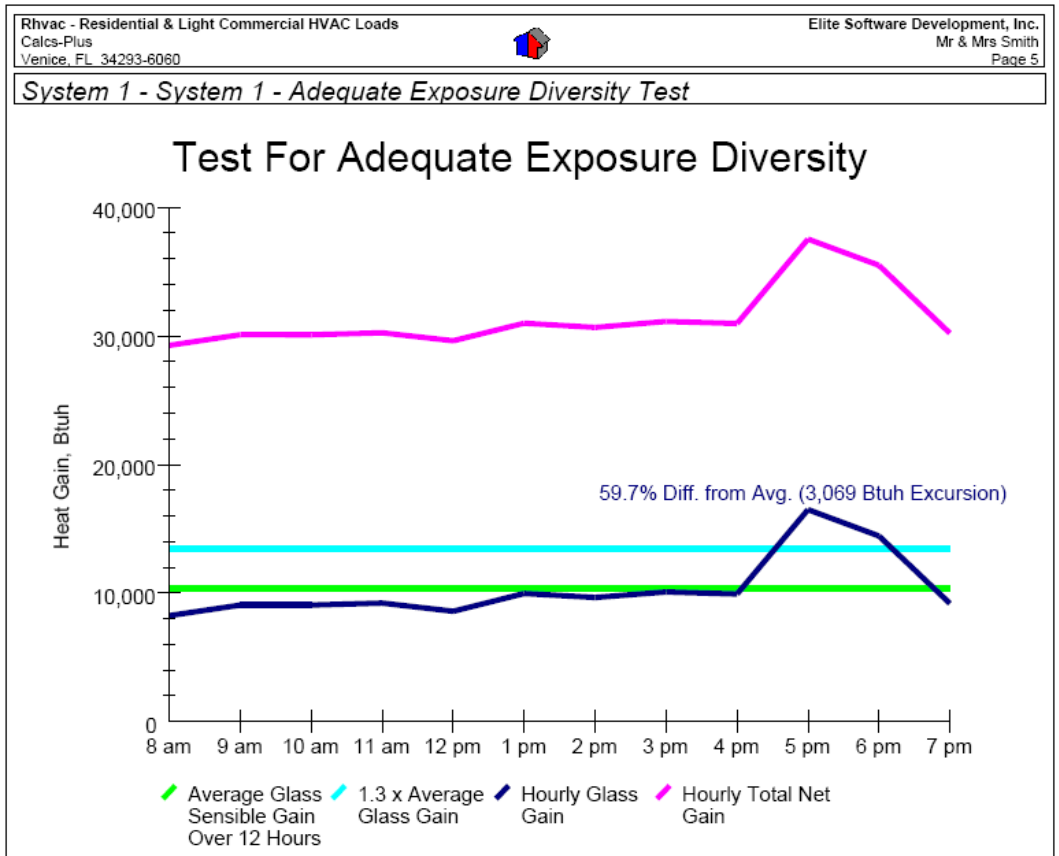
Whole Building

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Net Tons	Recommended Tons
0°	South	867	19,069	3,997	1.92	2.12
45°	Southwest	1,064	23,403	3,997	2.28	2.60
90°	West	*1,171	*25,742	3,997	*2.48	*2.86
135°	Northwest	1,136	24,981	3,997	2.41	2.78
180°	North	867	19,069	3,997	1.92	2.12
225°	Northeast	1,075	23,629	3,995	2.30	2.63
270°	East	1,075	23,631	3,995	2.30	2.63
315°	Southeast	1,050	23,081	*3,998	2.26	2.56

* Indicates highest value of all rotations.

AED for Worse Case Orientation

Front Facing West



22A-ph-c: Floor-Slab on grade, No edge insulation, no insulation below floor, carpet covering, passive, heavy moist soil	174	5,908	0	0	0
Subtotals for structure:		17,566	0	15,096	15,096
People:	4		800	920	1,720
Equipment:			1,200	1,200	2,400
Lighting:	0			0	0
Ductwork:		4,510	647	4,869	5,517
Infiltration: Winter CFM: 65, Summer CFM: 33		1,780	1,350	588	1,938
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
AED Excursion:		0	0	3,069	3,069
Total Building Load Totals:		23,856	3,997	25,742	29,740

Check Figures			
Total Building Supply CFM:	1,171	CFM Per Square ft.:	0.911
Square ft. of Room Area:	1,285	Square ft. Per Ton:	449
Volume (ft³) of Cond. Space:	12,535	Air Turnover Rate (per hour):	5.6

Building Loads		
Total Heating Required With Outside Air:	23,856 Btuh	23.856 MBH
Total Sensible Gain:	25,742 Btuh	87 %

'Y. ---

ntire conditioned space
percent.

Building Rotation Report

The Building Rotation Report calculates required cooling load for each of eight directions along with the required room CFM for each room.

This is very useful if the home does not have AED and it will be located in a subdivision and orientation is not known yet (worst-case direction).

Building Rotation Report

All rotation degree values in this report are clockwise with respect to the project's original orientation.
Building orientation as entered (zero degrees rotation): Front door faces South

Individual Rooms

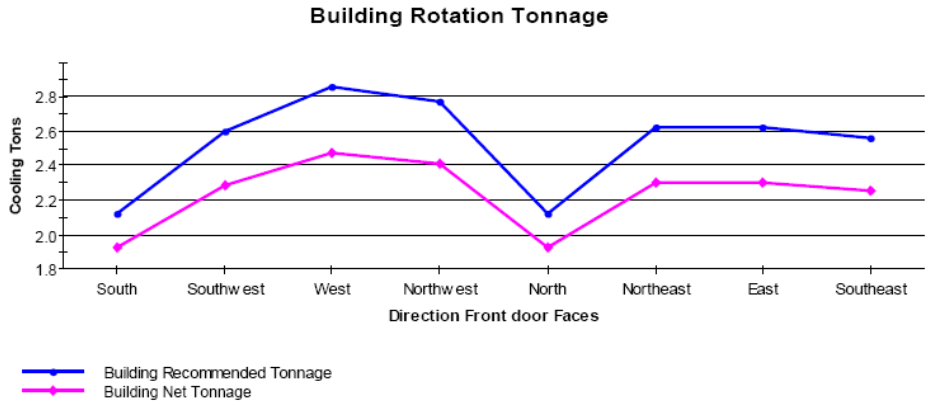
Rm. No.	Room Name	0° Rot. CFM	45° Rot. CFM	90° Rot. CFM	135° Rot. CFM	180° Rot. CFM	225° Rot. CFM	270° Rot. CFM	315° Rot. CFM	High Duct Size
System 1:										
Zone 1:										
1	Bedroom 1	91	104	*144	130	91	123	133	102	1-7
2	Bedroom 2	91	134	*144	100	91	95	133	132	1-7
3	Bedroom 3	51	72	*78	55	51	52	71	71	1-5
4	Bathroom Powder Area	7	8	*8	8	7	7	7	8	1-4
5	Bathroom Tub Area	25	27	*36	34	25	32	34	26	1-4
6	Great Room	276	296	298	*435	276	411	274	292	1-12
7	Kitchen / Dining	204	290	*315	236	204	223	289	286	1-10
8	Laundry	122	133	*147	138	122	131	135	131	1-7

* Indicates highest CFM of all rotations.

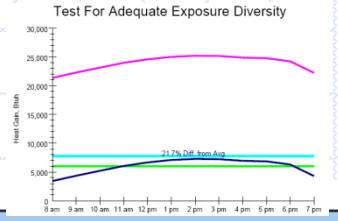
Whole Building

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Net Tons	Recommended Tons
0°	South	867	19,069	3,997	1.92	2.12
45°	Southwest	1,064	23,403	3,997	2.28	2.60
90°	West	*1,171	*25,742	3,997	*2.48	*2.86
135°	Northwest	1,136	24,981	3,997	2.41	2.78
180°	North	867	19,069	3,997	1.92	2.12
225°	Northeast	1,075	23,629	3,995	2.30	2.63
270°	East	1,075	23,631	3,995	2.30	2.63
315°	Southeast	1,050	23,081	*3,998	2.26	2.56

* Indicates highest value of all rotations.



Our home has AED so the load does not change much from when rotated.

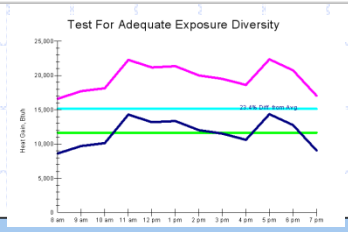


Whole Building

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Net Tons	Recommended Tons
0°	South	867	19,069	3,997	1.92	2.12
45°	Southwest	1,064	23,403	3,997	2.28	2.60
90°	West	*1,171	*25,742	3,997	*2.48	*2.86
135°	Northwest	1,136	24,981	3,997	2.41	2.78
180°	North	867	19,069	3,997	1.92	2.12
225°	Northeast	1,075	23,629	3,995	2.30	2.63
270°	East	1,075	23,631	3,995	2.30	2.63
315°	Southeast	1,050	23,081	*3,998	2.26	2.56

* Indicates highest value of all rotations.

If the home does not have AED!



Whole Building

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Net Tons	Recommended Tons
0°	West	612	14,225	*3,014	1.44	1.58
45°	Northwest	677	15,658	3,014	1.56	1.74
90°	North	518	12,168	3,014	1.27	1.35
135°	Northeast	708	16,338	3,014	1.61	1.82
180°	East	812	18,623	3,014	1.80	2.07
225°	Southeast	*819	*18,782	3,014	*1.82	*2.09
270°	South	527	12,358	3,014	1.28	1.37
315°	Southwest	735	16,939	3,014	1.66	1.88

* Indicates highest value of all rotations.

Equipment Selection

Rhvac - Residential & Light Commercial HVAC Loads
Calcs-Plus
Venice, FL 34293-6060

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1A-cb-o: Glazing-Single pane, operable window, clear, metal frame with break, outdoor insect screen with 50% coverage, white or reflective color drapes with tight weave with 50% coverage, u-value 1.08	115.4	3,114	0	2,466	2,466
1A-cb-d: Glazing-Single pane, sliding glass door, clear, metal frame with break, outdoor insect screen with 100% coverage, u-value 1.08	80.4	2,172	0	2,132	2,132
10A-b: Glazing-French door, single pane clear glass, metal frame with break, u-value 0.97	20.1	487	0	537	537
11J: Door-Metal - Fiberglass Core					
11D: Door-Wood - Solid Core					
13A-5ocs: Wall-Block, board insulation only, insulation, open core, siding finish					
12B-0sw: Part-Frame, R-11 insulation in 2 x no board insulation, siding finish, wood s					
16B-19: Roof/Ceiling-Under attic or knee wa Attic, No Radiant Barrier, Dark Asphalt S Dark Metal, Tar and Gravel or Membrane, R-19 insulation					
16B-15: Roof/Ceiling-Under attic or knee wall, Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-15 insulation	84.8	130	0	264	264
22A-ph-c: Floor-Slab on grade, No edge insulation, no insulation below floor, carpet covering, passive, heavy moist soil	174	5,908	0	0	0
Subtotals for structure:		17,566	0	11,543	11,543
People:	4		800	920	1,720
Equipment:			1,200	1,200	2,400
Lighting:	0			0	0
Ductwork:		4,510	647	4,818	5,465
Infiltration: Winter CFM: 65, Summer CFM: 33		1,780	1,350	588	1,938
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		23,856	3,997	19,069	23,066

Check Figures

Total Building Supply CFM:	867	CFM Per Square ft.:	0.675
Square ft. of Room Area:	1,285	Square ft. Per Ton:	606
Volume (ft³) of Cond. Space:	12,535	Air Turnover Rate (per hour):	4.2

Building Loads

Total Heating Required With Outside Air:	23,856 Btuh	23.856 MBH	
Total Sensible Gain:	19,069 Btuh	83 %	
Total Latent Gain:	3,997 Btuh	17 %	
Total Cooling Required With Outside Air:	23,066 Btuh	1.92	Tons (Based On Sensible + Latent)
		2.12	Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.

Matching the MJ8 Results to Manufacturer's Performance Data

TRANE RS — **PERFORMANCE DATA COOLING** — February 10, 2007

-- U.S. (ENGLISH) --
(Capacities are net in btuh/1000 - indoor fan heat deducted)

Outdoor Model	Indoor Model
2TTR3030A1	TWE031E13

tion Factors - Other Airflows

	875	1125
apacity	0.98	1.02
e Capacity	0.94	1.06
Compressor Kw	0.99	1.01

Indoor Fan Power = 236 watts
Outdoor Fan Power = 150 watts
S.E.E.R = 14.00

Rated with 25 feet of 3/4 suction and 5/16 liquid lines.

O.D. D.B	I.D. W.B.	TOTAL CAP	--SENSIBLE CAPACITY-- 72	75	78	80	SYSTEM KW
85	59	26.0	21.3	23.9	26.0	26.0	2.11
85	63	27.1	17.3	20.0	22.6	24.3	2.12
85	67	29.2	15.4	15.4	18.9	20.7	2.16
95	59	24.7	20.7	23.4	24.7	24.7	2.30
95	63	25.7	16.7	19.4	22.0	23.8	2.31
95	67	27.7	13.1	15.8	18.4	20.1	2.35
105	63	24.3	16.2	18.8	21.4	23.2	2.51
105	67	26.2	12.6	15.2	17.8	19.6	2.55
105	71	28.3	8.9	11.6	14.2	15.9	2.57
115	63	23.0	15.7	18.3	20.9	22.7	2.70
115	67	24.7	12.0	14.7	17.3	19.0	2.75
115	71	26.7	8.4	11.0	13.6	15.4	2.77
** 95	63	25.7	I.D.D.B = 75		19.4		2.31

nance at selected design conditions

* Dry coil condition (Total Capacity = Sensible Capacity)

Total capacity, compressor KW valid only for wetcoil

All temperatures in Degree °F

TRANE

CALCS-PL

1.92 Tons (Based On Sensible + Latent

16B-15: Roof/Ceiling-Under attic or knee wall, Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-15 insulation	84.8	130	0	264	264
22A-ph-c: Floor-Slab on grade, No edge insulation, no insulation below floor, carpet covering, passive, heavy moist soil	174	5,908	0	0	0
Subtotals for structure:		17,566	0	11,543	11,543
People:	4		800	920	1,720
Equipment:			1,200	1,200	2,400
Lighting:	0			0	0
Ductwork:		4,510	647	4,818	5,465
Infiltration: Winter CFM: 65, Summer CFM: 33		1,780	1,350	588	1,938
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		23,856	3,997	19,069	23,066

Check Figures

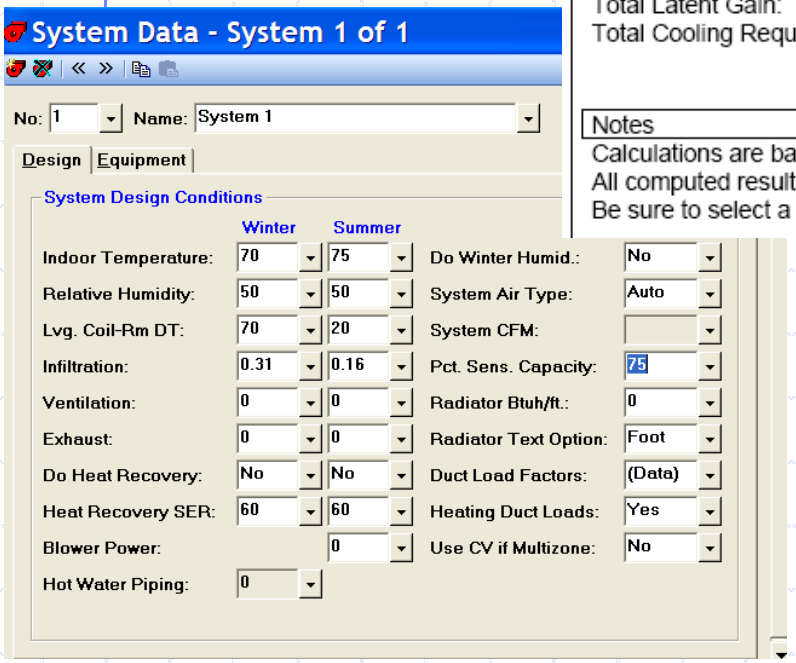
Total Building Supply CFM:	867	CFM Per Square ft.:	0.675
Square ft. of Room Area:	1,285	Square ft. Per Ton:	606
Volume (ft³) of Cond. Space:	12,535	Air Turnover Rate (per hour):	4.2

Building Loads

Total Heating Required With Outside Air:	23,856 Btuh	23.856	MBH
Total Sensible Gain:	19,069 Btuh	83	%
Total Latent Gain:	3,997 Btuh	17	%
Total Cooling Required With Outside Air:	23,066 Btuh	1.92	Tons (Based On Sensible + Latent)
		2.12	Tons (Based On 75% Sensible Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



2.12 Tons (Based on 75% Sensible Capacity)

?

Total Building Load Totals:		23,856	3,997

Check Figures			
Total Building Supply CFM:	867	CFM Per Square ft.:	
Square ft. of Room Area:	1,285	Square ft. Per Ton:	
Volume (ft³) of Cond. Space:	12,535	Air Turnover Rate (per hour):	

Building Loads			
Total Heating Required With Outside Air:	23,856 Btuh	23.856	MBH
Total Sensible Gain:	19,069 Btuh	83	%
Total Latent Gain:	3,997 Btuh	17	%
Total Cooling Required With Outside Air:	23,066 Btuh	1.92	Tons (Based On Ser
		2.12	Tons (Based On 75% Capacity)

Notes

Calculations are based on 8th edition of ACCA Manual J.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.

TRANE RS **PERFORMANCE DATA COOLING** February 10, 2007

-- U.S. (ENGLISH) --

(Capacities are net in btuh/1000 - indoor fan heat deducted)

Outdoor Model 2TTR3030A1

Indoor Model TWE031E13

Airflow = 1000

Values At ARI Rating Conditions

Total Net Capacity	= 27800	Btuh
Airflow	= 1020	CFM
Compressor Power	= 1970	watts
Indoor Fan Power	= 236	watts
Outdoor Fan Power	= 150	watts
S.E.E.R	= 14.00	

Correction Factors - Other Airflows

Airflow	875	1125
Total Capacity	0.98	1.02
Sensible Capacity	0.94	1.06
Compressor Kw	0.99	1.01

Rated with 25 feet of 3/4 suction and 5/16 liquid lines.

	O.D. D.B	I.D. W.B.	TOTAL CAP	--SENSIBLE CAPACITY-- 72	75	78	80	SYSTEM KW
	85	59	26.0	21.3	23.9	26.0	26.0	2.11
	85	63	27.1	17.3	20.0	22.6	24.3	2.12
	85	67	29.2	15.4	15.4	18.9	20.7	2.16
	95	59	24.7	20.7	23.4	24.7	24.7	2.30
	95	63	25.7	16.7	19.4	22.0	23.8	2.31
	95	67	27.7	13.1	15.8	18.4	20.1	2.35
	105	63	24.3	16.2	18.8	21.4	23.2	2.51
	105	67	26.2	12.6	15.2	17.8	19.6	2.55
	105	71	28.3	8.9	11.6	14.2	15.9	2.57
	115	63	23.0	15.7	18.3	20.9	22.7	2.70
	115	67	24.7	12.0	14.7	17.3	19.0	2.75
	115	71	26.7	8.4	11.0	13.6	15.4	2.77
***	95	63	25.7	I.D.D.B = 75		19.4		2.31

*** Performance at selected design conditions

* Dry coil condition (Total Capacity = Sensible Capacity)

Total capacity, compressor KW valid only for wet coil

All temperatures in Degree °F

TRANE

Manufacturers performance cooling data (like the one at the right) will give system performance at conditions other than ARI

For the area of the country this home is going to be located we will be interested in how the system will perform at or near MJ8 design conditions of 91°F outdoor and 75°F @ 50% RH.

Values At ARI Rating Conditions

Total Net Capacity	=	27800	Btuh
Airflow	=	1020	CFM
Compressor Power	=	1970	watts
Indoor Fan Power	=	236	watts
Outdoor Fan Power	=	150	watts
S.E.E.R	=	14.00	

O.D. D.B	I.D. W.B.	TOTAL CAP	--SENSIBLE CAPACITY-- 72	75	78	80	SYSTEM KW
85	59	26.0	21.3	23.9	26.0	26.0	2.11
85	63	27.1	17.3	20.0	22.6	24.3	2.12
85	67	29.2	15.4	15.4	18.9	20.7	2.16
95	59	24.7	20.7	23.4	24.7	24.7	2.30
95	63	25.7	16.7	19.4	22.0	23.8	2.31
95	67	27.7	13.1	15.8	18.4	20.1	2.35
105	63	24.3	16.2	18.8	21.4	23.2	2.51
105	67	26.2	12.6	15.2	17.8	19.6	2.55
105	71	28.3	8.9	11.6	14.2	15.9	2.57
115	63	23.0	15.7	18.3	20.9	22.7	2.70
115	67	24.7	12.0	14.7	17.3	19.0	2.75
115	71	26.7	8.4	11.0	13.6	15.4	2.77
* 95	63	25.7	I.D.D.B = 75		19.4		2.31

MJ8 & the Energy Rater

The information you gather to do a energy rating is the same as required for an HVAC Load Calculation.

Do it to set yourself apart from your competition.

Do it to become a better Energy Rater.

Do it to provide another avenue for income.

Larger Customer Base

AC Contractors know or at least had to have learned load calculations if they carry a licenses or certification.

AC contractors are busy running a company and don't have time to do room x room calculations.

If they were provided room x room calculations they would use them as a design tool.

Diagnostic Tool

Start every diagnostic investigation with a room x room HVAC load calculation.

You will understand the construction of the building much better.

You will have a better understanding of the results of all the data gathered.

A Plug for MJ8

- The possibility for experiencing comfort problems at part load conditions can be minimized by observing the guidelines set forth in Manual J.
- The Manual J calculation should take full advantage of legitimate opportunities to minimize the size of the estimated loads.

Thank You

Questions?