Administrativa
HVAC Load Analysis

for

Alpharma

Bogotá.

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

martes, 12 de diciembre de 2017

General Project Data Input

General Project Information

Project file name:	Administrativa.CH8
Project title:	Administrativa
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Project date:	martes, 12 de diciembre de 2017
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	132	0	0.00	0	922	922	14.75
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	922	922	14.75
Lighting	185	0	0.00	0	637	637	10.19
Equipment	132	0	0.00	0	455	455	7.28
Pool Latent	0	0	0.00	0	0	0	0.00
People	7	0	0.00	1,944	1,944	3,889	62.21
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	85	85	1.36
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	211	211	3.37
Return Duct	0	0	0.00	0	53	53	0.84
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,944	4,306	6,251	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,944	3,958	5,903	94.43
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	348	348	5.57
Building Totals	0	0.00	1,944	4,306	6,251	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	199	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	132	Sq.ft
Supply Air Per Unit Area:	1.5065	CFM/Sq.ft
Area Per Cooling Capacity:	253.4	Sq.ft/Ton
Cooling Capacity Per Area:	0.0039	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.52	Tons

Air Handler #1 - Administrativa - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Administrativa	132	0	3,958	1,944	50/P	None
	6pm August	7	0	199	0	0	0
		1,320	0.00	1.51	0	0	0
	Room Peak Totals:	132	0	3,958	1,944		
	Total Rooms: 1	7	0	199	0	0	0
	Unique Rooms: 1	1,320	0.00	1.51	0	0	0

Air Handler #1 - Administrativa - Total Load Summary

Air Handler Description:	Administrativa Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.03 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.69

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	3,958 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	85 Btuh		
Supply duct sensible gain:	211 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			4,254 Btuh
Cooling Supply Air: 4,254 / (.963 X 1.1 X 20) =		199 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	53 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			53 Btuh
Total sensible gain on air handling system:			4,306 Btuh
Room space latent gain:	1,944 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,944 Btuh
Total system sensible and latent gain:			6,251 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	199 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	132 Sq.ft
Supply Air Per Unit Area:	1.5065 CFM/Sq.ft
Area Per Cooling Capacity:	253.4 Sq.ft/Ton
Cooling Capacity Per Area:	0.0039 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.52 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Administrativa - Air Handler 1 (Administrativa), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	132	1.00	69.2	0.100	913		2.880	380
Lights-Prof=3	185	1.000			631			
Equipment-Prof=2	132	1.000			450	0		
People-Prof=1	7.0	1.000			1,925	1,925		
Sub-total					3,919	1,925		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					3,958	1,944		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Administrativa peaks (sensible) in August at 6pm, Air Handler 1 (Administrativa), Zone 1, 12.0 x 11.0, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	132	1.00	69.2	0.100	913		2.880	380
Lights-Prof=3	185	1.000			631			
Equipment-Prof=2	132	1.000			450	0		
People-Prof=1	7.0	1.000			1,925	1,925		
Sub-total					3,919	1,925		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					3,958	1,944		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Administrativa) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.713		55.000	
Draw-Thru Fan			85	0.403	4
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			211	1.000	10
Room Loads	1,944	14.937	3,958	18.798	185
Sensible Reserve			0	0.000	0
Room Condition	1,944	67.649	4,254	75.200	199
Return Air Duct			53	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,944	67.649	4,306	75.450	199

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	199	x (	75.5	-	55.0	) =	4,306	Btuh
TLH	=	0.963	x	0.68	x	199	x (	67.6	-	52.7	) =	1,944	Btuh

SUM	=											6,250	Btuh
GTH	=	0.963	x	4.50	x	199	x (	28.7	-	21.4	) =	6,299	Btuh
Total System Load											=	6,251	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	6,299	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.39	
Relative humidity:	79.03	
Enthalpy:	21.38	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Administrativa) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.713		55.000	
Draw-Thru Fan			85	0.403	4
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			211	1.000	10
Room Loads	1,944	14.937	3,958	18.798	185
Sensible Reserve			0	0.000	0
Room Condition	1,944	67.649	4,254	75.200	199
Return Air Duct			53	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,944	67.649	4,306	75.450	199

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	199	x (	75.5	-	55.0	) =	4,306	Btuh
TLH	=	0.963	x	0.68	x	199	x (	67.6	-	52.7	) =	1,944	Btuh

SUM	=											6,250	Btuh
GTH	=	0.963	x	4.50	x	199	x (	28.7	-	21.4	) =	6,299	Btuh
Total System Load											=	6,251	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	6,299	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

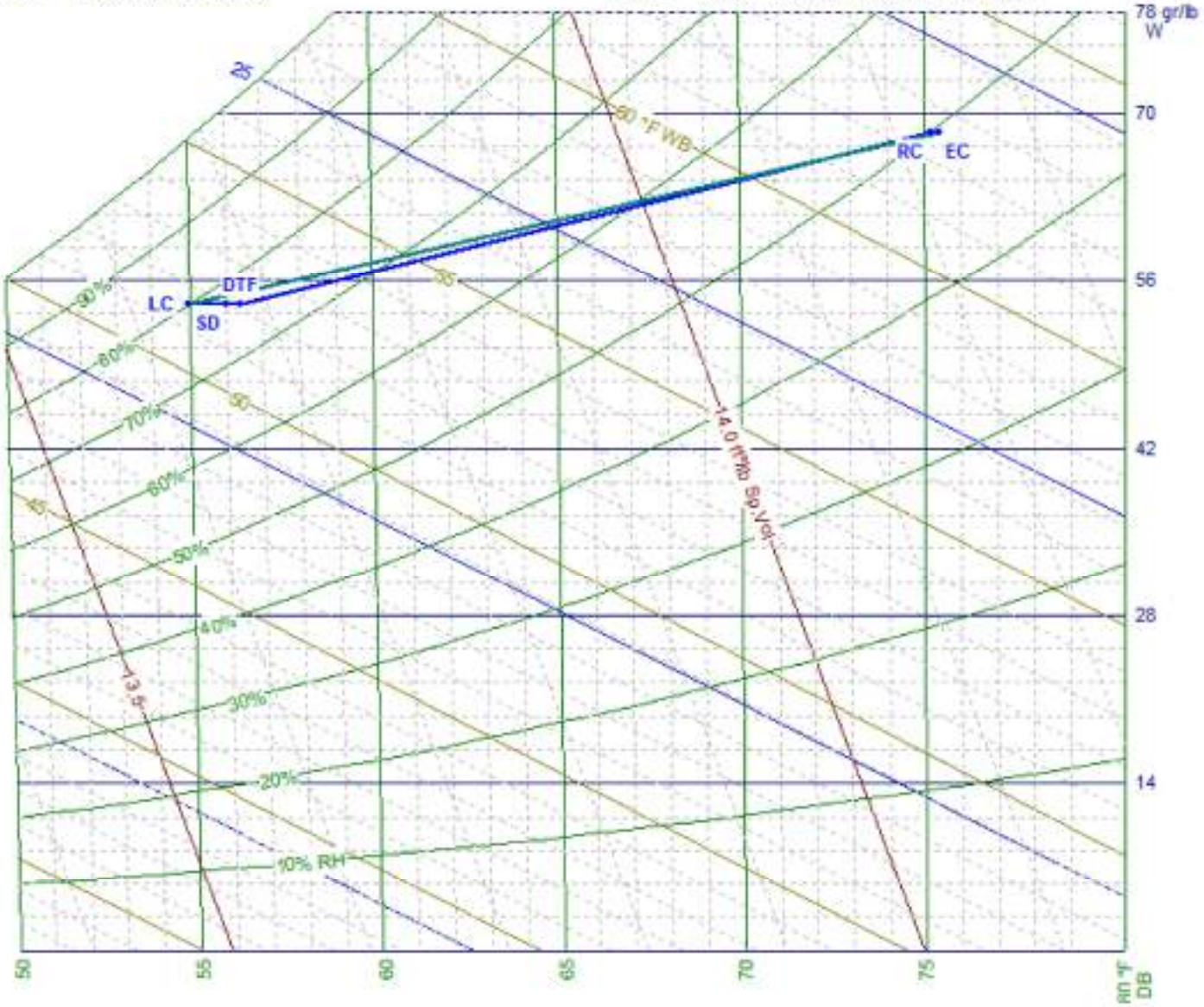
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.39	
Relative humidity:	79.03	
Enthalpy:	21.38	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

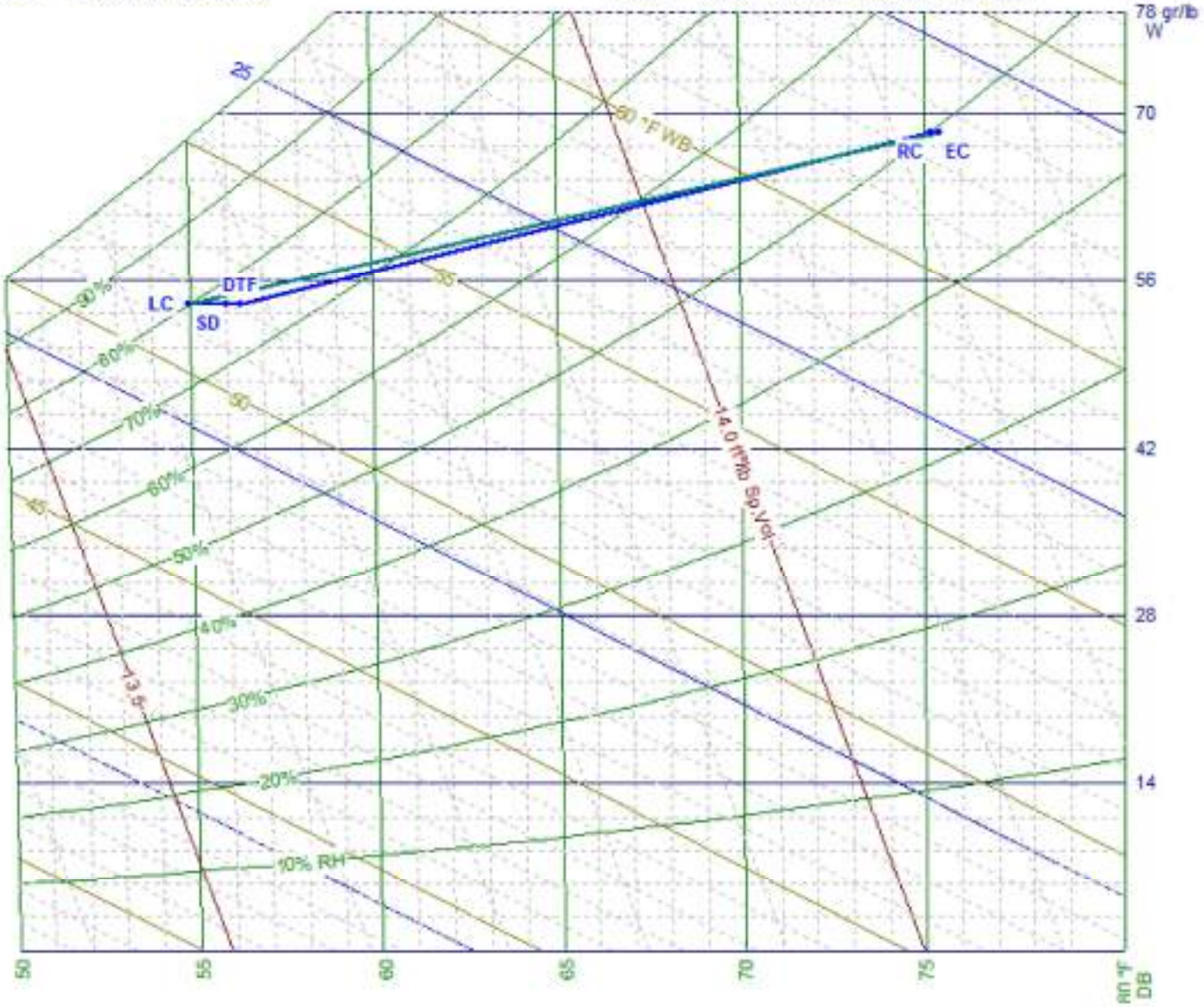
Air System #1 (Administrativa) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Administrativa) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb
Building	August 6pm	132	1,320	4,306	1,944	6,251	0.52	0	199	0		
System 1	August 6pm	132	1,320	4,306	1,944	6,251	0.52	0	199	0	0 in. dia	55
Zone 1	August 6pm	132	1,320	3,958	1,944	5,903		0	199	0	0 in. dia	
1-Administrativa	August 6pm	132	1,320	3,958	1,944	5,903		0	199	0	1-0 in. dia	

Load Preview (cont'd)

Scope	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building									
System 1	51.39	79.03	21.38	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1									
1-Administrativa									

Almacen Y Empaque
HVAC Load Analysis

for

Alpharma

Bogotá.

Elite Software

CHVAC COMMERCIAL HVAC LOADS

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

General Project Data Input

General Project Information

Project file name:	oncologia.CH8
Project title:	Almacen Y Empaque
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

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August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	86	0	0.00	0	604	604	13.93
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	604	604	13.93
Lighting	121	0	0.00	0	417	417	9.62
Equipment	86	0	0.00	0	298	298	6.87
Pool Latent	0	0	0.00	0	0	0	0.00
People	5	0	0.00	1,389	1,389	2,778	64.09
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	58	58	1.34
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	144	144	3.31
Return Duct	0	0	0.00	0	36	36	0.83
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,389	2,945	4,333	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,389	2,707	4,096	94.52
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	238	238	5.48
Building Totals	0	0.00	1,389	2,945	4,333	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	136	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	86	Sq.ft
Supply Air Per Unit Area:	1.5734	CFM/Sq.ft
Area Per Cooling Capacity:	239.3	Sq.ft/Ton
Cooling Capacity Per Area:	0.0042	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.36	Tons

Air Handler #1 - Almacen Y Empaque - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Almacen Y Empaque	86	0	2,707	1,389	50/P	None
	6pm August	5	0	136	0	0	0
		864	0.00	1.57	0	0	0
	Room Peak Totals:	86	0	2,707	1,389		
	Total Rooms: 1	5	0	136	0	0	0
	Unique Rooms: 1	864	0.00	1.57	0	0	0

Air Handler #1 - Almacen Y Empaque - Total Load Summary

Air Handler Description:	Almacen Y Empaque Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.02 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.68

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	2,707 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	58 Btuh		
Supply duct sensible gain:	144 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			2,909 Btuh
Cooling Supply Air: 2,909 / (.963 X 1.1 X 20) =		136 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	36 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			36 Btuh
Total sensible gain on air handling system:			2,945 Btuh
Room space latent gain:	1,389 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,389 Btuh
Total system sensible and latent gain:			4,333 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	136 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	86 Sq.ft
Supply Air Per Unit Area:	1.5734 CFM/Sq.ft
Area Per Cooling Capacity:	239.3 Sq.ft/Ton
Cooling Capacity Per Area:	0.0042 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.36 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Almacen Y Empaque - Air Handler 1 (Almacen Y Empaque), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	86	1.00	69.2	0.100	598		2.880	249
Lights-Prof=3	121	1.000			413			
Equipment-Prof=2	86	1.000			295	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Sub-total					2,680	1,375		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					2,707	1,389		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Almacen Y Empaque peaks (sensible) in August at 6pm, Air Handler 1 (Almacen Y Empaque), Zone 1, 12.0 x 7.2, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	86	1.00	69.2	0.100	598		2.880	249
Lights-Prof=3	121	1.000			413			
Equipment-Prof=2	86	1.000			295	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Sub-total					2,680	1,375		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,707	1,389		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Almacen Y Empaque) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.048		55.000	
Draw-Thru Fan			58	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			144	1.000	7
Room Loads	1,389	15.607	2,707	18.806	127
Sensible Reserve			0	0.000	0
Room Condition	1,389	67.654	2,909	75.200	136
Return Air Duct			36	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,389	67.654	2,945	75.450	136

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	136	x (	75.5	-	55.0	) =	2,944	Btuh
TLH	=	0.963	x	0.68	x	136	x (	67.7	-	52.0	) =	1,389	Btuh

SUM	=											4,332	Btuh
GTH	=	0.963	x	4.50	x	136	x (	28.7	-	21.3	) =	4,367	Btuh
Total System Load											=	4,333	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	4,367	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.21	
Relative humidity:	78.05	
Enthalpy:	21.27	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Almacen Y Empaque) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.048		55.000	
Draw-Thru Fan			58	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			144	1.000	7
Room Loads	1,389	15.607	2,707	18.806	127
Sensible Reserve			0	0.000	0
Room Condition	1,389	67.654	2,909	75.200	136
Return Air Duct			36	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,389	67.654	2,945	75.450	136

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	136	x (	75.5	-	55.0	) =	2,944	Btuh
TLH	=	0.963	x	0.68	x	136	x (	67.7	-	52.0	) =	1,389	Btuh

SUM	=											4,332	Btuh
GTH	=	0.963	x	4.50	x	136	x (	28.7	-	21.3	) =	4,367	Btuh
Total System Load											=	4,333	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	4,367	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

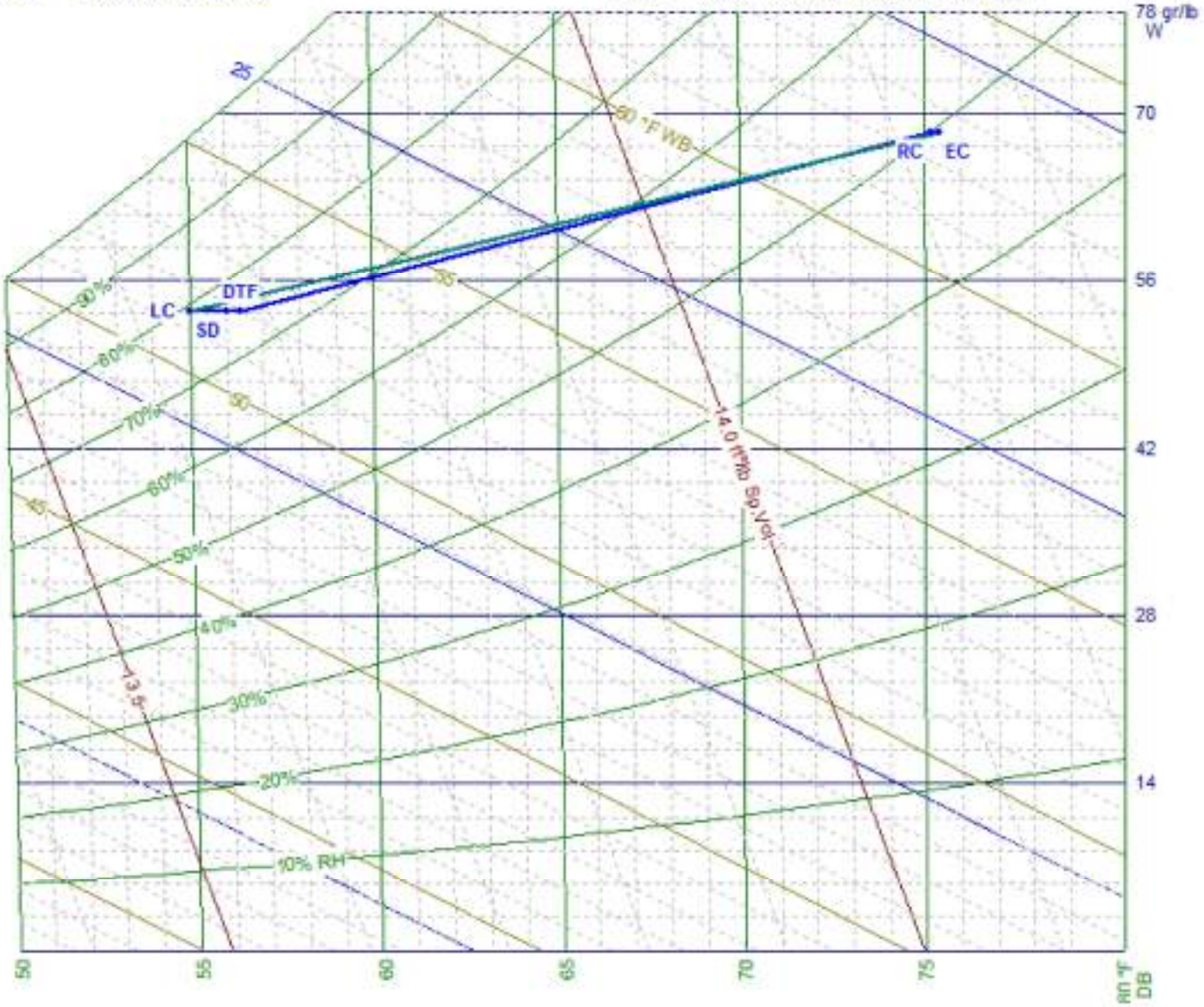
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.21	
Relative humidity:	78.05	
Enthalpy:	21.27	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

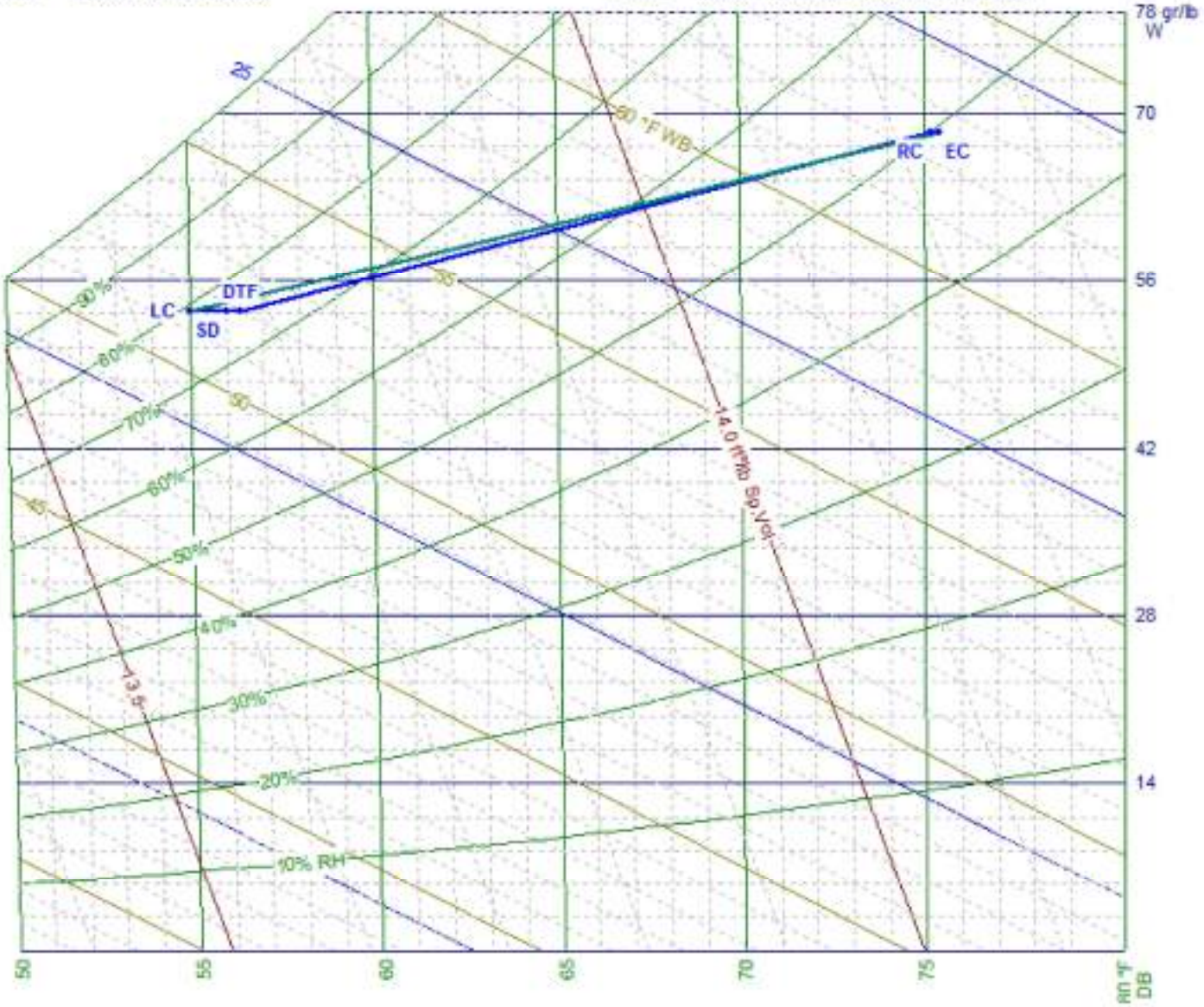
Air System #1 (Almacen Y Empaque) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Almacen Y Empaque) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb
Building	August 6pm	86	864	2,945	1,389	4,333	0.36	0	136	0		
System 1	August 6pm	86	864	2,945	1,389	4,333	0.36	0	136	0	0 in. dia	55
Zone 1	August 6pm	86	864	2,707	1,389	4,096		0	136	0	0 in. dia	
1-Almacen Y Empaque	August 6pm	86	864	2,707	1,389	4,096		0	136	0	1–0 in. dia	

Load Preview (cont'd)

Scope	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building									
System 1	51.21	78.05	21.27	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1									
1-Almacen Y Empaque									

Esteriles Generales
HVAC Load Analysis

for

Alpharma

Bogotá.

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

martes, 12 de diciembre de 2017

General Project Data Input

General Project Information

Project file name:	ESTERILES GENERALES.CH8
Project title:	Esteriles Generales
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Project date:	martes, 12 de diciembre de 2017
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 5pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	96	0	0.00	0	652	652	7.11
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	652	652	7.11
Lighting	134	0	0.00	0	463	463	5.05
Equipment	96	0	0.00	0	331	331	3.61
Pool Latent	0	0	0.00	0	0	0	0.00
People	5	0	0.00	1,389	1,389	2,778	30.30
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	50	0	0.00	3,617	989	4,606	50.25
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	82	82	0.90
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	204	204	2.22
Return Duct	0	0	0.00	0	51	51	0.56
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	5,006	4,161	9,167	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	3,617	989	4,606	50.25
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,389	2,835	4,223	46.07
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	337	337	3.68
Building Totals	0	0.00	5,006	4,161	9,167	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	193	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	96	Sq.ft
Supply Air Per Unit Area:	2.0054	CFM/Sq.ft
Area Per Cooling Capacity:	125.7	Sq.ft/Ton
Cooling Capacity Per Area:	0.0080	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.76	Tons

Air Handler #1 - Esteriles Generales - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Esteriles Generales	96	0	3,834	4,955	400/P	None
	4pm August	5	0	193	0	0	0
		960	0.00	2.01	0	0	0
	Room Peak Totals:	96	0	3,834	4,955		
	Total Rooms: 1	5	0	193	0	0	0
	Unique Rooms: 1	960	0.00	2.01	0	0	0

Air Handler #1 - Esteriles Generales - Total Load Summary

Air Handler Description:	Esteriles Generales Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.03 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.45

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	5pm in August.
Outdoor Conditions:	Clg: 94° DB, 85° WB, 177.07 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Because of the diversity in room, plenum and ventilation loads, the room sensible peak time in August at 4pm is different from the total system peak time, hence the air system CFM was computed using a room sensible load of 3,834.

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	2,835 Btuh		
Infiltration sensible gain:	989 Btuh		
Draw-thru fan sensible gain:	82 Btuh		
Supply duct sensible gain:	204 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			4,110 Btuh
Cooling Supply Air: 4,120 / (.963 X 1.1 X 20) =		193 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	51 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			51 Btuh
Total sensible gain on air handling system:			4,161 Btuh
Room space latent gain:	1,389 Btuh		
Infiltration latent gain:	3,617 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			5,006 Btuh
Total system sensible and latent gain:			9,167 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	193	CFM
Total Air Handler Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	96	Sq.ft
Supply Air Per Unit Area:	2.0054	CFM/Sq.ft
Area Per Cooling Capacity:	125.7	Sq.ft/Ton
Cooling Capacity Per Area:	0.0080	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.76	Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Esteriles Generales - Air Handler 1 (Esteriles Generales), Zone 1 peaks (sensible) in August at 4pm.								
Roof-1-6-No.Clg-D	96	1.00	63.2	0.100	607		2.880	277
Lights-Prof=3	134	1.000			459			
Equipment-Prof=2	96	1.000			328	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Cool. Infil.CFM/person	50				1,028	3,531		
Heat. Infil.AC/hr	0						0.000	0
Sub-total					3,796	4,906		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					3,834	4,955		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Esteriles Generales peaks (sensible) in August at 4pm, Air Handler 1 (Esteriles Generales), Zone 1, 9.8 x 9.8, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	96	1.00	63.2	0.100	607		2.880	277
Lights-Prof=3	134	1.000			459			
Equipment-Prof=2	96	1.000			328	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Cool. Infil.CFM/person	50				1,028	3,531		
Heat. Infil.AC/hr	0						0.000	0
Sub-total					3,796	4,906		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					3,834	4,955		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Esteriles Generales) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		27.959		55.000	
Draw-Thru Fan			82	0.403	4
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			204	1.000	10
Room Loads	5,006	39.703	3,834	18.798	179
Sensible Reserve			0	0.000	0
Room Condition	5,006	67.662	4,120	75.200	193
Return Air Duct			51	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	5,006	67.662	4,171	75.450	193

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	193	x (	75.5	-	55.0	) =	4,171	Btuh
TLH	=	0.963	x	0.68	x	193	x (	67.7	-	28.0	) =	5,006	Btuh
SUM	=											9,176	Btuh
GTH	=	0.963	x	4.50	x	193	x (	28.7	-	17.5	) =	9,305	Btuh
Total System Load											=	9,167	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,305	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.61	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	44.37	
Relative humidity:	42.16	
Enthalpy:	17.54	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Esteriles Generales) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		27.959		55.000	
Draw-Thru Fan			82	0.403	4
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			204	1.000	10
Room Loads	5,006	39.703	3,834	18.798	179
Sensible Reserve			0	0.000	0
Room Condition	5,006	67.662	4,120	75.200	193
Return Air Duct			51	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	5,006	67.662	4,171	75.450	193

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	193	x (	75.5	-	55.0	) =	4,171	Btuh
TLH	=	0.963	x	0.68	x	193	x (	67.7	-	28.0	) =	5,006	Btuh
SUM	=											9,176	Btuh
GTH	=	0.963	x	4.50	x	193	x (	28.7	-	17.5	) =	9,305	Btuh
Total System Load											=	9,167	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	9,305	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.61	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

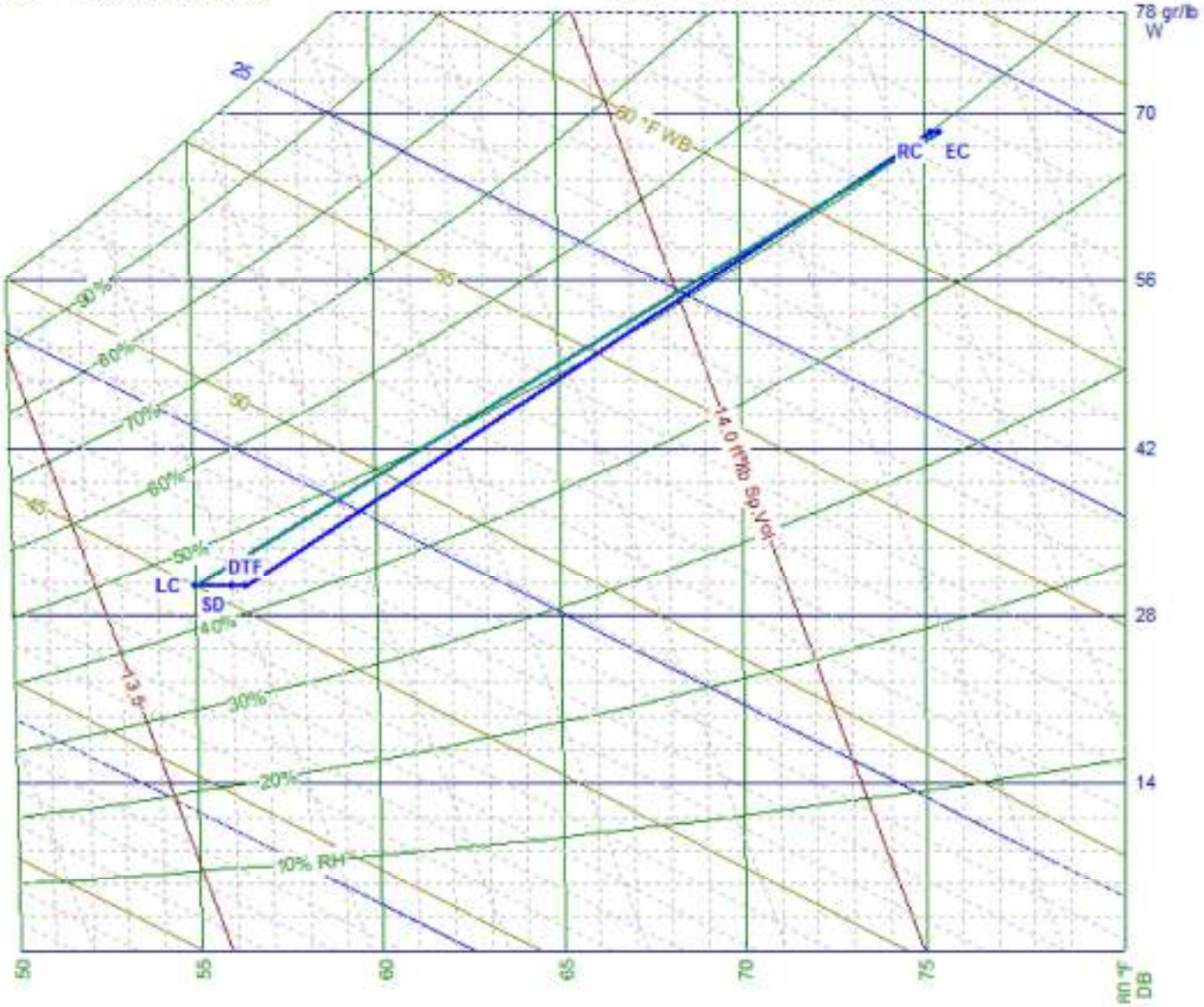
Dry bulb temperature:	55.00	
Wet bulb temperature:	44.37	
Relative humidity:	42.16	
Enthalpy:	17.54	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

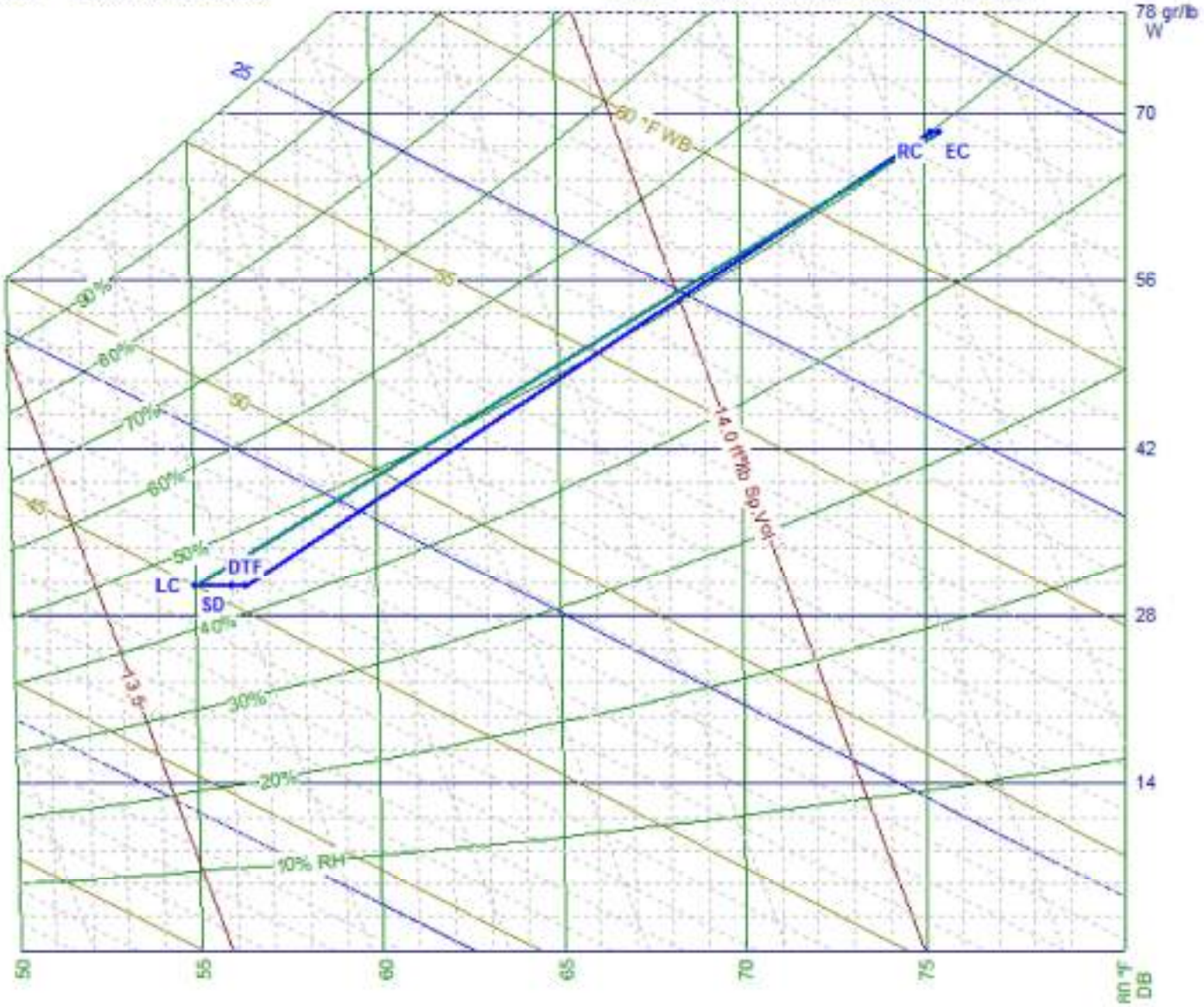
Air System #1 (Esteriles Generales) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Esteriles Generales) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb
Building	August 5pm	96	960	4,161	5,006	9,167	0.76	0	193	0		
System 1	August 5pm	96	960	4,161	5,006	9,167	0.76	0	193	0	0 in. dia	55
Zone 1	August 4pm	96	960	3,834	4,955	8,789		0	193	0	0 in. dia	
1-Esteriles Generales	August 4pm	96	960	3,834	4,955	8,789		0	193	0	1–0 in. dia	

Load Preview (cont'd)

Scope	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building									
System 1	44.37	42.16	17.54	75.45	62.63	49.61	28.69	75.2	75.2
Zone 1									
1-Esteriles Generales									

Nutricion
HVAC Load Analysis

for

Alpharma

Bogotá.

Elite Software

CHVAC COMMERCIAL HVAC LOADS

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

General Project Data Input

General Project Information

Project file name:	PASILLO AREAS.CH8
Project title:	Nutricion
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	96	0	0.00	0	671	671	14.93
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	671	671	14.93
Lighting	134	0	0.00	0	463	463	10.31
Equipment	96	0	0.00	0	331	331	7.37
Pool Latent	0	0	0.00	0	0	0	0.00
People	5	0	0.00	1,389	1,389	2,778	61.81
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	61	61	1.36
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	151	151	3.37
Return Duct	0	0	0.00	0	38	38	0.84
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,389	3,105	4,493	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,389	2,854	4,243	94.42
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	251	251	5.58
Building Totals	0	0.00	1,389	3,105	4,493	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	143	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	96	Sq.ft
Supply Air Per Unit Area:	1.4924	CFM/Sq.ft
Area Per Cooling Capacity:	256.5	Sq.ft/Ton
Cooling Capacity Per Area:	0.0039	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.37	Tons

Air Handler #1 - Esteriles Generales - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Nutricion	96	0	2,854	1,389	50/P	None
	6pm August	5	0	143	0	0	0
		960	0.00	1.49	0	0	0
	Room Peak Totals:	96	0	2,854	1,389		
	Total Rooms: 1	5	0	143	0	0	0
	Unique Rooms: 1	960	0.00	1.49	0	0	0

Air Handler #1 - Esteriles Generales - Total Load Summary

Air Handler Description:	Esteriles Generales Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.03 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.69

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	2,854 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	61 Btuh		
Supply duct sensible gain:	151 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			3,067 Btuh
Cooling Supply Air: 3,067 / (.963 X 1.1 X 20) =		143 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	38 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			38 Btuh
Total sensible gain on air handling system:			3,105 Btuh
Room space latent gain:	1,389 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,389 Btuh
Total system sensible and latent gain:			4,493 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	143 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	96 Sq.ft
Supply Air Per Unit Area:	1.4924 CFM/Sq.ft
Area Per Cooling Capacity:	256.5 Sq.ft/Ton
Cooling Capacity Per Area:	0.0039 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.37 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Nutricion - Air Handler 1 (Esteriles Generales), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	96	1.00	69.2	0.100	664		2.880	277
Lights-Prof=3	134	1.000			459			
Equipment-Prof=2	96	1.000			328	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Sub-total					2,826	1,375		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					2,854	1,389		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Nutricion peaks (sensible) in August at 6pm, Air Handler 1 (Esteriles Generales), Zone 1, 9.8 x 9.8, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	96	1.00	69.2	0.100	664		2.880	277
Lights-Prof=3	134	1.000			459			
Equipment-Prof=2	96	1.000			328	0		
People-Prof=1	5.0	1.000			1,375	1,375		
Sub-total					2,826	1,375		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,854	1,389		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Esteriles Generales) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.850		55.000	
Draw-Thru Fan			61	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			151	1.000	7
Room Loads	1,389	14.802	2,854	18.806	133
Sensible Reserve			0	0.000	0
Room Condition	1,389	67.653	3,067	75.200	143
Return Air Duct			38	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,389	67.653	3,105	75.450	143

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	143	x (	75.5	-	55.0	) =	3,104	Btuh
TLH	=	0.963	x	0.68	x	143	x (	67.7	-	52.9	) =	1,389	Btuh
SUM	=											4,492	Btuh
GTH	=	0.963	x	4.50	x	143	x (	28.7	-	21.4	) =	4,527	Btuh
Total System Load											=	4,493	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	4,527	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.43	
Relative humidity:	79.27	
Enthalpy:	21.40	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Esteriles Generales) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.850		55.000	
Draw-Thru Fan			61	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			151	1.000	7
Room Loads	1,389	14.802	2,854	18.806	133
Sensible Reserve			0	0.000	0
Room Condition	1,389	67.653	3,067	75.200	143
Return Air Duct			38	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,389	67.653	3,105	75.450	143

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	143	x (	75.5	-	55.0	) =	3,104	Btuh
TLH	=	0.963	x	0.68	x	143	x (	67.7	-	52.9	) =	1,389	Btuh
SUM	=											---	
												4,492	Btuh
GTH	=	0.963	x	4.50	x	143	x (	28.7	-	21.4	) =	4,527	Btuh
Total System Load											=	4,493	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	4,527	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

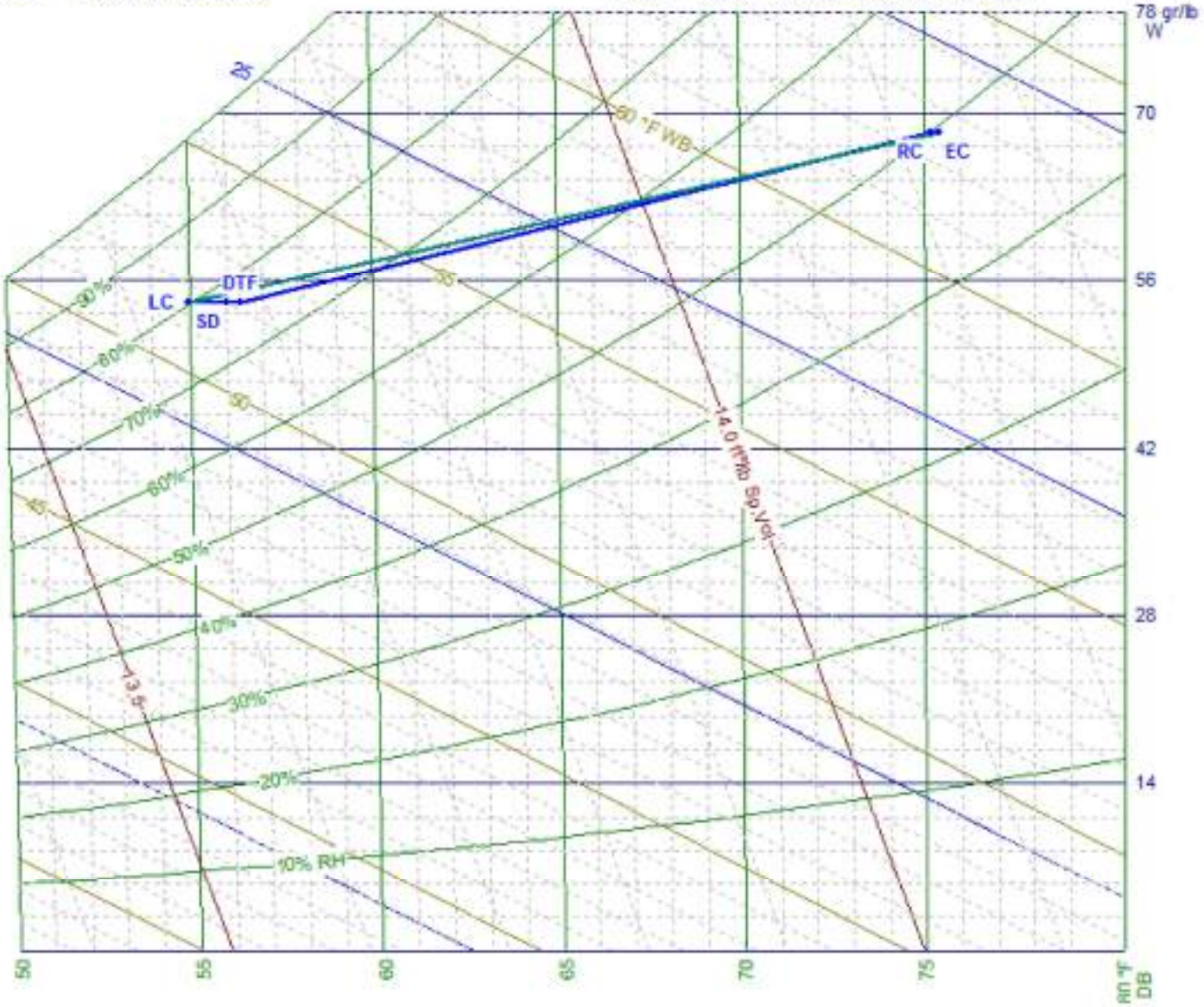
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.43	
Relative humidity:	79.27	
Enthalpy:	21.40	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

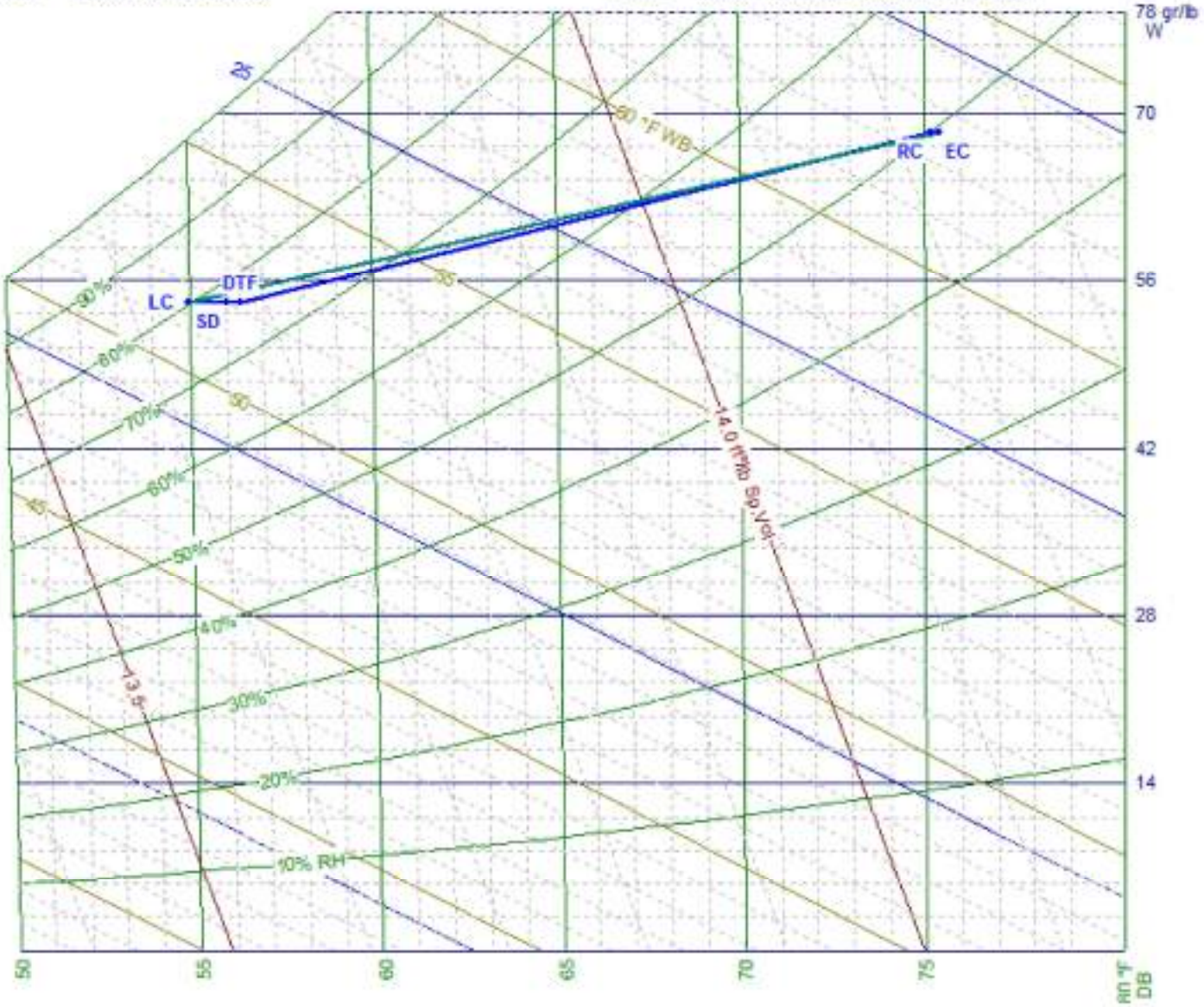
Air System #1 (Esteriles Generales) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Esteriles Generales) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb	Leaving Cooling Coil Wet Bulb
Building	August 6pm	96	960	3,105	1,389	4,493	0.37	0	143	0			
System 1	August 6pm	96	960	3,105	1,389	4,493	0.37	0	143	0	0 in. dia	55	51.43
Zone 1	August 6pm	96	960	2,854	1,389	4,243		0	143	0	0 in. dia		
1-Nutricion	August 6pm	96	960	2,854	1,389	4,243		0	143	0	1-0 in. dia		

Load Preview (cont'd)

Scope	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building								
System 1	79.27	21.4	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1								
1-Nutricion								

Oncologia
HVAC Load Analysis

for

Alpharma

Bogotá.

Elite Software

CHVAC COMMERCIAL HVAC LOADS

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

martes, 12 de diciembre de 2017

General Project Data Input

General Project Information

Project file name:	oncologia.CH8
Project title:	Oncologia
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Project date:	martes, 12 de diciembre de 2017
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 5pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	226	0	0.00	0	1,532	1,532	2.41
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	1,532	1,532	2.41
Lighting	316	0	0.00	0	1,090	1,090	1.71
Equipment	226	0	0.00	0	778	778	1.22
Pool Latent	0	0	0.00	0	0	0	0.00
People	12	0	0.00	3,333	3,333	6,666	10.47
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	565	0	0.00	40,839	11,170	52,010	81.65
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	396	396	0.62
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	981	981	1.54
Return Duct	0	0	0.00	0	245	245	0.38
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	44,172	19,525	63,697	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	40,839	11,170	52,010	81.65
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	3,333	6,733	10,066	15.80
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	1,622	1,622	2.55
Building Totals	0	0.00	44,172	19,525	63,697	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	926	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	226	Sq.ft
Supply Air Per Unit Area:	4.1018	CFM/Sq.ft
Area Per Cooling Capacity:	42.5	Sq.ft/Ton
Cooling Capacity Per Area:	0.0235	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	5.31	Tons

Air Handler #1 - Oncologia - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Oncologia	226	0	18,437	43,363	50/P	None
	3pm August	12	0	926	0	0	0
		2,258	0.00	4.10	0	0	0
	Room Peak Totals:	226	0	18,437	43,363		
	Total Rooms: 1	12	0	926	0	0	0
	Unique Rooms: 1	2,258	0.00	4.10	0	0	0

Air Handler #1 - Oncologia - Total Load Summary

Air Handler Description:	Oncologia Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.16 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.31

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	5pm in August.
Outdoor Conditions:	Clg: 94° DB, 85° WB, 177.07 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Because of the diversity in room, plenum and ventilation loads, the room sensible peak time in August at 3pm is different from the total system peak time, hence the air system CFM was computed using a room sensible load of 18,437.

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	6,733 Btuh		
Infiltration sensible gain:	11,170 Btuh		
Draw-thru fan sensible gain:	396 Btuh		
Supply duct sensible gain:	981 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			19,280 Btuh
Cooling Supply Air: 19,814 / (.963 X 1.1 X 20) =		926 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	245 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			245 Btuh
Total sensible gain on air handling system:			19,525 Btuh
Room space latent gain:	3,333 Btuh		
Infiltration latent gain:	40,839 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			44,172 Btuh
Total system sensible and latent gain:			63,697 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	926	CFM
Total Air Handler Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	226	Sq.ft
Supply Air Per Unit Area:	4.1018	CFM/Sq.ft
Area Per Cooling Capacity:	42.5	Sq.ft/Ton
Cooling Capacity Per Area:	0.0235	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	5.31	Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Oncologia - Air Handler 1 (Oncologia), Zone 1 peaks (sensible) in August at 3pm.								
Roof-1-6-No.Clg-D	226	1.00	56.2	0.100	1,269		2.880	650
Lights-Prof=3	316	1.000			1,079			
Equipment-Prof=2	226	1.000			771	0		
People-Prof=1	12.0	1.000			3,300	3,300		
Cool. Infil.AC/hr	565				11,837	39,634		
Heat. Infil.AC/hr	0						0.000	0
Sub-total					18,255	42,934		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					18,437	43,363		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Oncologia peaks (sensible) in August at 3pm, Air Handler 1 (Oncologia), Zone 1, 13.9 x 16.2, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	226	1.00	56.2	0.100	1,269		2.880	650
Lights-Prof=3	316	1.000			1,079			
Equipment-Prof=2	226	1.000			771	0		
People-Prof=1	12.0	1.000			3,300	3,300		
Cool. Infil.AC/hr	565				11,837	39,634		
Heat. Infil.AC/hr	0						0.000	0
Sub-total					18,255	42,934		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					18,437	43,363		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Oncologia) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		20.069		62.000	
Draw-Thru Fan			396	0.403	18
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			981	1.000	46
Room Loads	44,172	72.849	18,437	18.797	862
Sensible Reserve			0	0.000	0
Room Condition	44,172	92.918	19,814	75.200	926
Return Air Duct			245	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	44,172	92.918	20,059	75.450	926

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	926	x (	75.5	-	62.0	) =	13,193	Btuh
TLH	=	0.963	x	0.68	x	926	x (	92.9	-	20.1	) =	44,172	Btuh

SUM	=											57,365	Btuh
GTH	=	0.963	x	4.50	x	926	x (	32.6	-	18.0	) =	58,736	Btuh
Total System Load											=	63,697	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	58,736	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	67.65	
Relative humidity:	67.72	
Enthalpy:	32.64	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	62.00	
Wet bulb temperature:	45.32	
Relative humidity:	23.58	
Enthalpy:	18.00	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Oncologia) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		20.069		62.000	
Draw-Thru Fan			396	0.403	18
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			981	1.000	46
Room Loads	44,172	72.849	18,437	18.797	862
Sensible Reserve			0	0.000	0
Room Condition	44,172	92.918	19,814	75.200	926
Return Air Duct			245	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	44,172	92.918	20,059	75.450	926

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	926	x (	75.5	-	62.0	) =	13,193	Btuh
TLH	=	0.963	x	0.68	x	926	x (	92.9	-	20.1	) =	44,172	Btuh

SUM	=											57,365	Btuh
GTH	=	0.963	x	4.50	x	926	x (	32.6	-	18.0	) =	58,736	Btuh
Total System Load											=	63,697	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	58,736	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	67.65	
Relative humidity:	67.72	
Enthalpy:	32.64	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

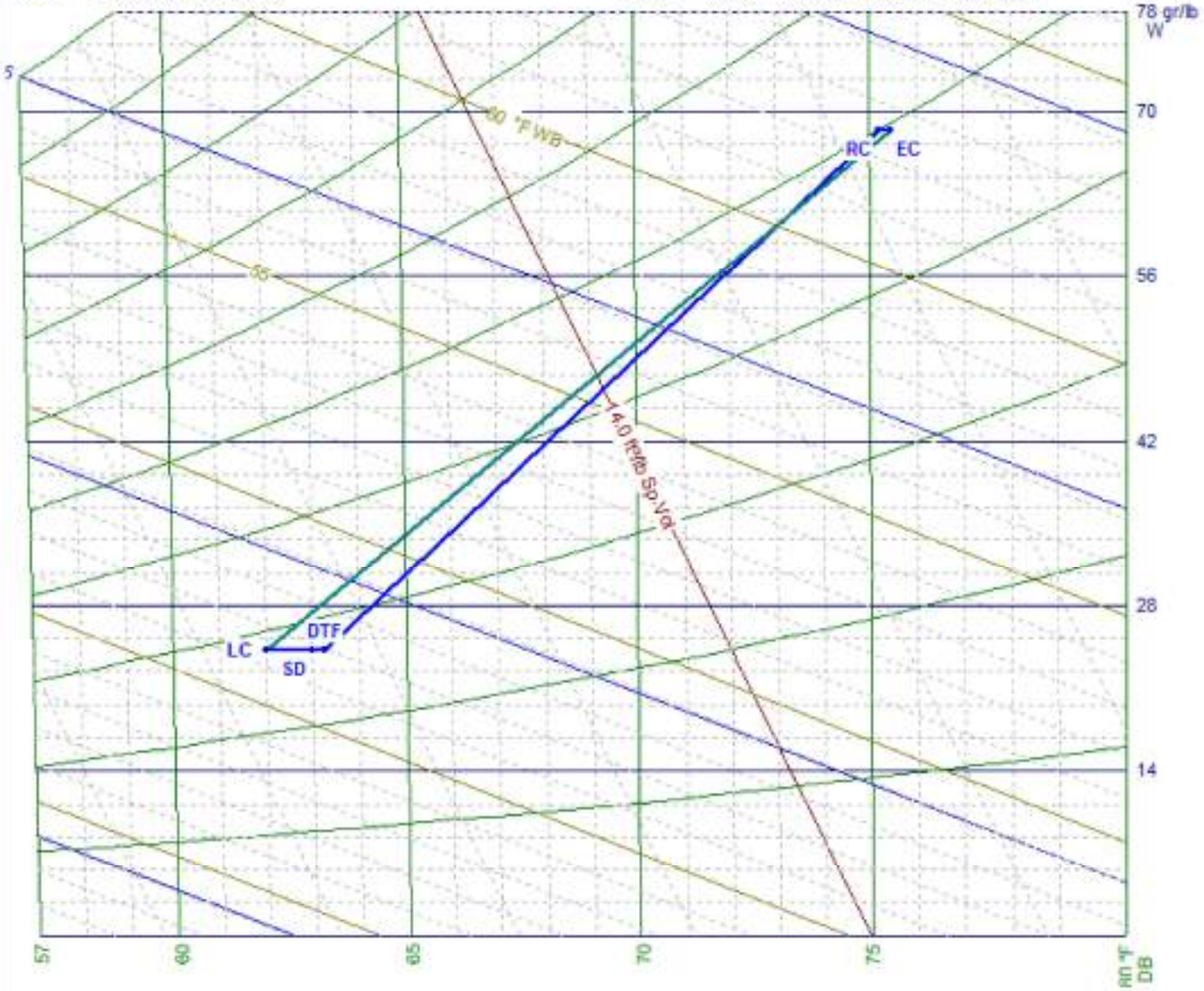
Dry bulb temperature:	62.00	
Wet bulb temperature:	45.32	
Relative humidity:	23.58	
Enthalpy:	18.00	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

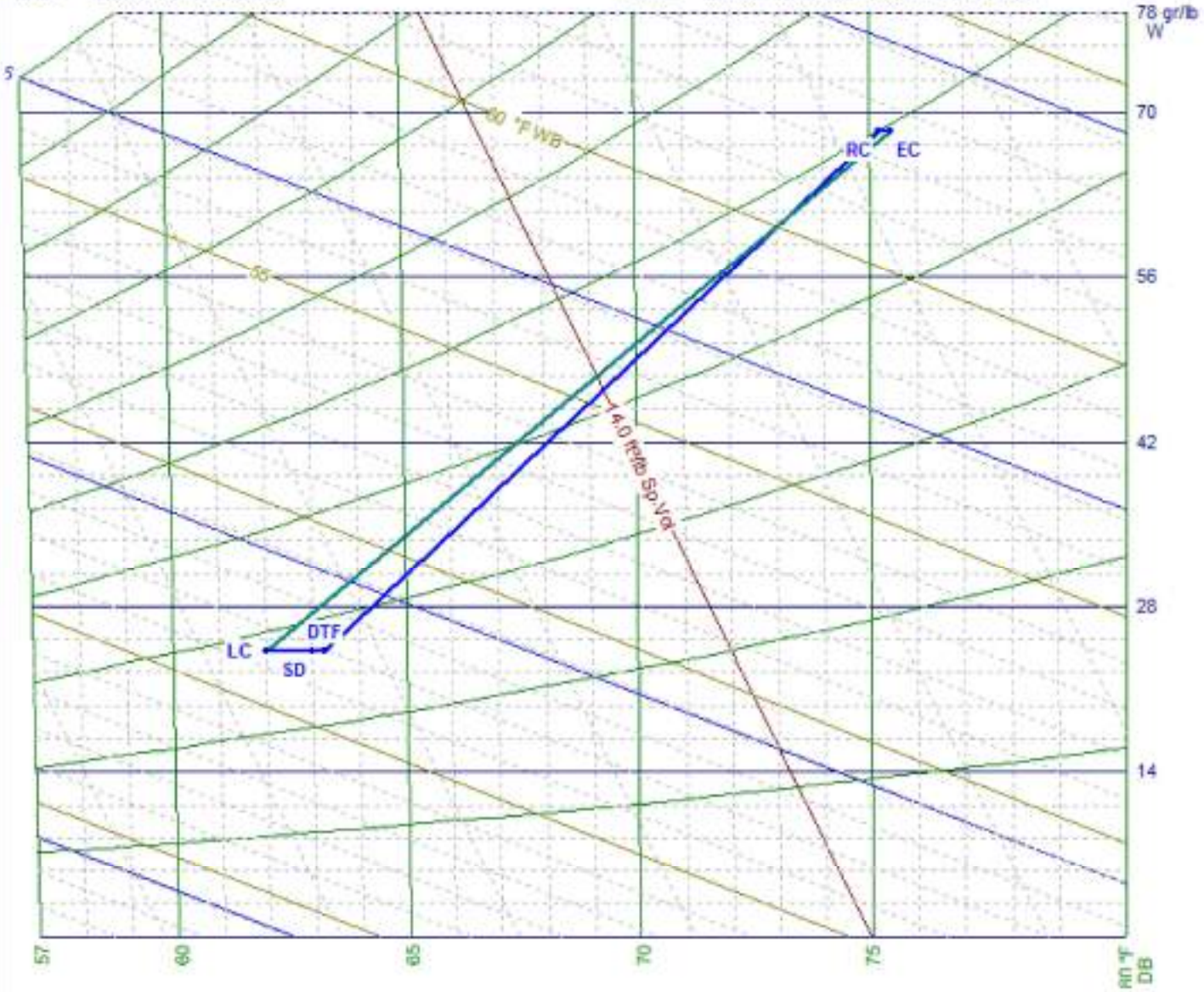
Air System #1 (Oncologia) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Oncologia) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb	Leaving Cooling Coil Wet Bulb
Building	August 5pm	226	2,258	19,525	44,172	63,697	5.31	0	926	0			
System 1	August 5pm	226	2,258	19,525	44,172	63,697	5.31	0	926	0	0 in. dia	62	45.32
Zone 1	August 3pm	226	2,258	18,437	43,363	61,801		0	926	0	0 in. dia		
1-Oncologia	August 3pm	226	2,258	18,437	43,363	61,801		0	926	0	1–0 in. dia		

Load Preview (cont'd)

Scope	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building								
System 1	23.58	18	75.45	67.65	67.72	32.64	75.2	75.2
Zone 1								
1-Oncologia								

Pasillo Areas
HVAC Load Analysis

for

Alpharma

Bogotá.

Elite Software

CHVAC COMMERCIAL HVAC LOADS

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

martes, 12 de diciembre de 2017

General Project Data Input

General Project Information

Project file name:	PASILLO AREAS.CH8
Project title:	Pasillo Areas
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Project date:	martes, 12 de diciembre de 2017
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	72	0	0.00	0	504	504	14.33
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	504	504	14.33
Lighting	101	0	0.00	0	348	348	9.90
Equipment	72	0	0.00	0	249	249	7.07
Pool Latent	0	0	0.00	0	0	0	0.00
People	4	0	0.00	1,111	1,111	2,222	63.18
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	47	47	1.35
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	117	117	3.34
Return Duct	0	0	0.00	0	29	29	0.84
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,111	2,406	3,517	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,111	2,212	3,323	94.48
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	194	194	5.52
Building Totals	0	0.00	1,111	2,406	3,517	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	111	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	72	Sq.ft
Supply Air Per Unit Area:	1.5394	CFM/Sq.ft
Area Per Cooling Capacity:	246.2	Sq.ft/Ton
Cooling Capacity Per Area:	0.0041	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.29	Tons

Air Handler #1 - Pasillo Areas - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Pasillo Areas	72	0	2,212	1,111	50/P	None
	6pm August	4	0	111	0	0	0
		722	0.00	1.54	0	0	0
	Room Peak Totals:	72	0	2,212	1,111		
	Total Rooms: 1	4	0	111	0	0	0
	Unique Rooms: 1	722	0.00	1.54	0	0	0

Air Handler #1 - Pasillo Areas - Total Load Summary

Air Handler Description:	Pasillo Areas Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.02 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.68

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	2,212 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	47 Btuh		
Supply duct sensible gain:	117 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			2,377 Btuh
Cooling Supply Air: 2,377 / (.963 X 1.1 X 20) =		111 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	29 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			29 Btuh
Total sensible gain on air handling system:			2,406 Btuh
Room space latent gain:	1,111 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,111 Btuh
Total system sensible and latent gain:			3,517 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	111 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	72 Sq.ft
Supply Air Per Unit Area:	1.5394 CFM/Sq.ft
Area Per Cooling Capacity:	246.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.29 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Pasillo Areas - Air Handler 1 (Pasillo Areas), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	72	1.00	69.2	0.100	499		2.880	208
Lights-Prof=3	101	1.000			345			
Equipment-Prof=2	72	1.000			246	0		
People-Prof=1	4.0	1.000			1,100	1,100		
Sub-total					2,190	1,100		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,212	1,111		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Pasillo Areas peaks (sensible) in August at 6pm, Air Handler 1 (Pasillo Areas), Zone 1, 3.3 x 22.0, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	72	1.00	69.2	0.100	499		2.880	208
Lights-Prof=3	101	1.000			345			
Equipment-Prof=2	72	1.000			246	0		
People-Prof=1	4.0	1.000			1,100	1,100		
Sub-total					2,190	1,100		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,212	1,111		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Pasillo Areas) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.374		55.000	
Draw-Thru Fan			47	0.403	2
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			117	1.000	5
Room Loads	1,111	15.279	2,212	18.806	103
Sensible Reserve			0	0.000	0
Room Condition	1,111	67.654	2,377	75.200	111
Return Air Duct			29	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,111	67.654	2,406	75.450	111

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	111	x (	75.5	-	55.0	) =	2,405	Btuh
TLH	=	0.963	x	0.68	x	111	x (	67.7	-	52.4	) =	1,111	Btuh

SUM	=											3,516	Btuh
GTH	=	0.963	x	4.50	x	111	x (	28.7	-	21.3	) =	3,544	Btuh
Total System Load											=	3,517	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	3,544	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.30	
Relative humidity:	78.57	
Enthalpy:	21.32	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Pasillo Areas) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.374		55.000	
Draw-Thru Fan			47	0.403	2
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			117	1.000	5
Room Loads	1,111	15.279	2,212	18.806	103
Sensible Reserve			0	0.000	0
Room Condition	1,111	67.654	2,377	75.200	111
Return Air Duct			29	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,111	67.654	2,406	75.450	111

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	111	x (	75.5	-	55.0	) =	2,405	Btuh
TLH	=	0.963	x	0.68	x	111	x (	67.7	-	52.4	) =	1,111	Btuh

SUM	=											3,516	Btuh
GTH	=	0.963	x	4.50	x	111	x (	28.7	-	21.3	) =	3,544	Btuh
Total System Load											=	3,517	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	3,544	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

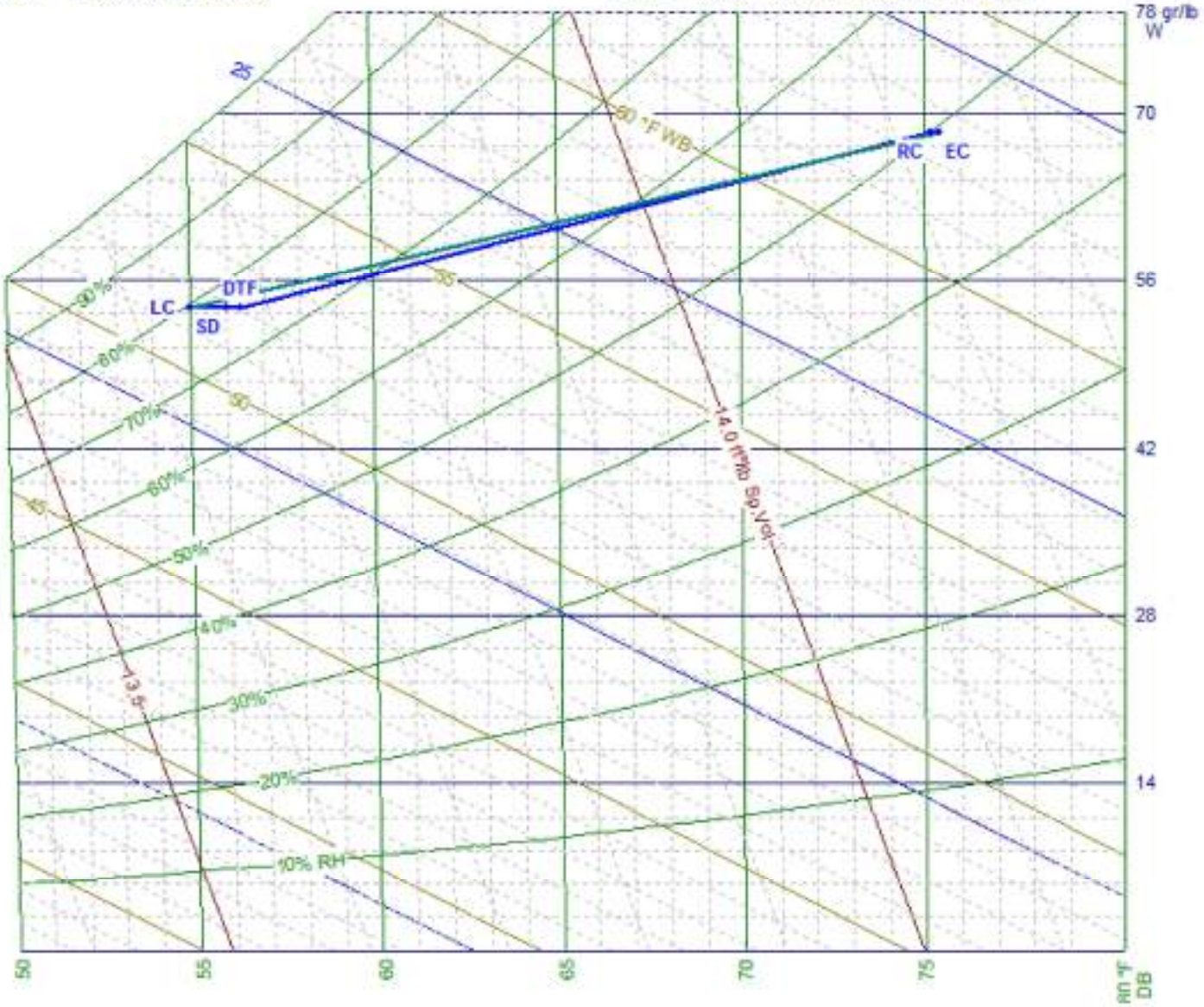
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.30	
Relative humidity:	78.57	
Enthalpy:	21.32	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

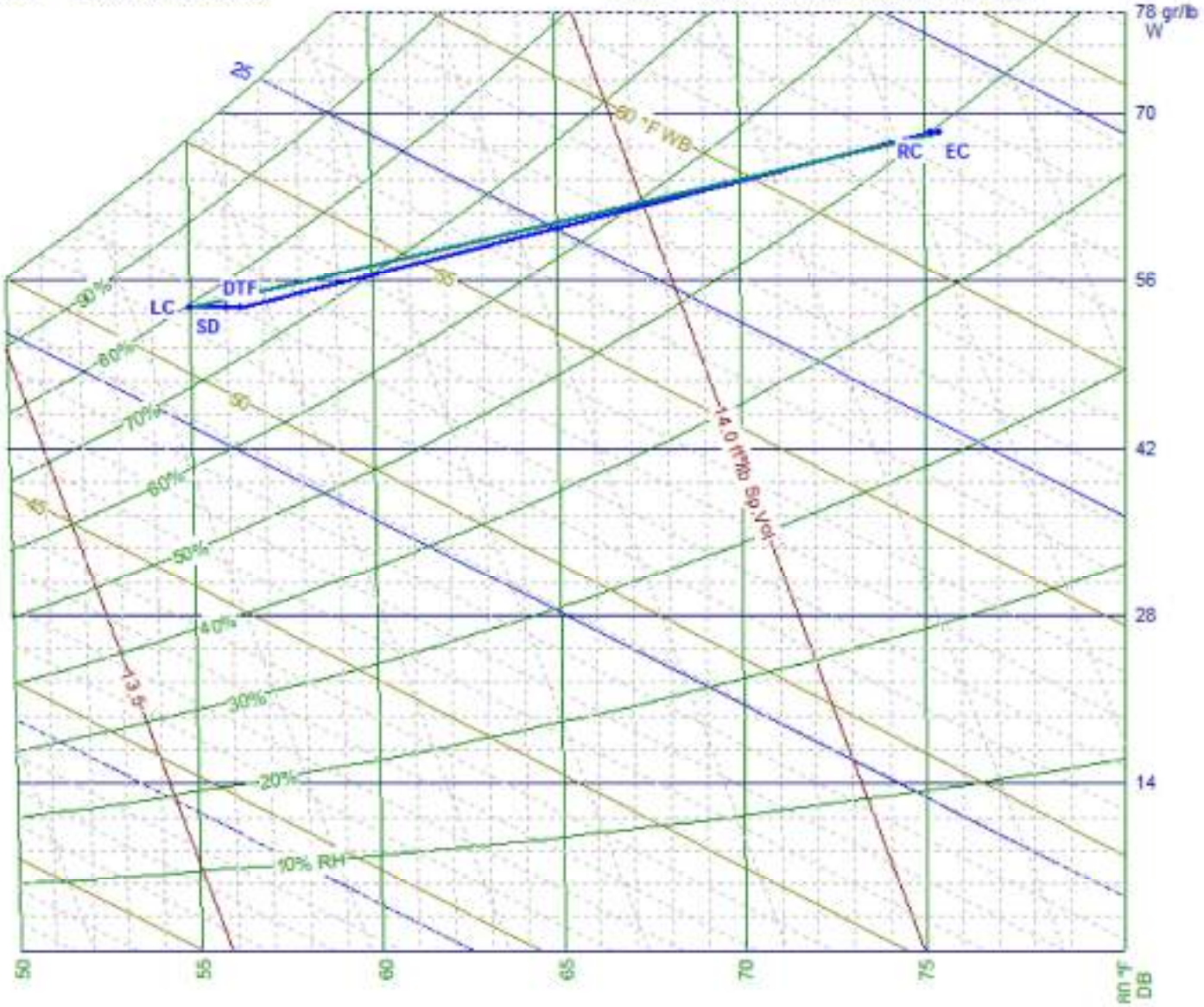
Air System #1 (Pasillo Areas) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Pasillo Areas) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb
Building	August 6pm	72	722	2,406	1,111	3,517	0.29	0	111	0		
System 1	August 6pm	72	722	2,406	1,111	3,517	0.29	0	111	0	0 in. dia	55
Zone 1	August 6pm	72	722	2,212	1,111	3,323		0	111	0	0 in. dia	
1-Pasillo Areas	August 6pm	72	722	2,212	1,111	3,323		0	111	0	1–0 in. dia	

Load Preview (cont'd)

Scope	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building									
System 1	51.3	78.57	21.32	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1									
1-Pasillo Areas									

Pasillo Externo
HVAC Load Analysis

for

Alpharma

Bogotá.

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

martes, 12 de diciembre de 2017

General Project Data Input

General Project Information

Project file name:	PASILLO externo.CH8
Project title:	Pasillo Externo
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Project date:	martes, 12 de diciembre de 2017
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	72	0	0.00	0	504	504	14.33
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	504	504	14.33
Lighting	101	0	0.00	0	348	348	9.90
Equipment	72	0	0.00	0	249	249	7.07
Pool Latent	0	0	0.00	0	0	0	0.00
People	4	0	0.00	1,111	1,111	2,222	63.18
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	47	47	1.35
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	117	117	3.34
Return Duct	0	0	0.00	0	29	29	0.84
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,111	2,406	3,517	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,111	2,212	3,323	94.48
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	194	194	5.52
Building Totals	0	0.00	1,111	2,406	3,517	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	111	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	72	Sq.ft
Supply Air Per Unit Area:	1.5394	CFM/Sq.ft
Area Per Cooling Capacity:	246.2	Sq.ft/Ton
Cooling Capacity Per Area:	0.0041	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.29	Tons

Air Handler #1 - Pasillo Externo - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Pasillo Externo	72	0	2,212	1,111	50/P	None
	6pm August	4	0	111	0	0	0
		722	0.00	1.54	0	0	0
	Room Peak Totals:	72	0	2,212	1,111		
	Total Rooms: 1	4	0	111	0	0	0
	Unique Rooms: 1	722	0.00	1.54	0	0	0

Air Handler #1 - Pasillo Externo - Total Load Summary

Air Handler Description:	Pasillo Externo Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.02 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.68

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	2,212 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	47 Btuh		
Supply duct sensible gain:	117 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			2,377 Btuh
Cooling Supply Air: 2,377 / (.963 X 1.1 X 20) =		111 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	29 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			29 Btuh
Total sensible gain on air handling system:			2,406 Btuh
Room space latent gain:	1,111 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,111 Btuh
Total system sensible and latent gain:			3,517 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	111 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	72 Sq.ft
Supply Air Per Unit Area:	1.5394 CFM/Sq.ft
Area Per Cooling Capacity:	246.2 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.29 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Pasillo Externo - Air Handler 1 (Pasillo Externo), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	72	1.00	69.2	0.100	499		2.880	208
Lights-Prof=3	101	1.000			345			
Equipment-Prof=2	72	1.000			246	0		
People-Prof=1	4.0	1.000			1,100	1,100		
Sub-total					2,190	1,100		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,212	1,111		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Pasillo Externo peaks (sensible) in August at 6pm, Air Handler 1 (Pasillo Externo), Zone 1, 3.3 x 22.0, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	72	1.00	69.2	0.100	499		2.880	208
Lights-Prof=3	101	1.000			345			
Equipment-Prof=2	72	1.000			246	0		
People-Prof=1	4.0	1.000			1,100	1,100		
Sub-total					2,190	1,100		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					2,212	1,111		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Pasillo Externo) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.374		55.000	
Draw-Thru Fan			47	0.403	2
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			117	1.000	5
Room Loads	1,111	15.279	2,212	18.806	103
Sensible Reserve			0	0.000	0
Room Condition	1,111	67.654	2,377	75.200	111
Return Air Duct			29	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,111	67.654	2,406	75.450	111

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	111	x (	75.5	-	55.0	) =	2,405	Btuh
TLH	=	0.963	x	0.68	x	111	x (	67.7	-	52.4	) =	1,111	Btuh

SUM	=											3,516	Btuh
GTH	=	0.963	x	4.50	x	111	x (	28.7	-	21.3	) =	3,544	Btuh
Total System Load											=	3,517	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	3,544	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.30	
Relative humidity:	78.57	
Enthalpy:	21.32	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Pasillo Externo) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.374		55.000	
Draw-Thru Fan			47	0.403	2
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			117	1.000	5
Room Loads	1,111	15.279	2,212	18.806	103
Sensible Reserve			0	0.000	0
Room Condition	1,111	67.654	2,377	75.200	111
Return Air Duct			29	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,111	67.654	2,406	75.450	111

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	111	x (	75.5	-	55.0	) =	2,405	Btuh
TLH	=	0.963	x	0.68	x	111	x (	67.7	-	52.4	) =	1,111	Btuh
SUM	=											---	
												3,516	Btuh
GTH	=	0.963	x	4.50	x	111	x (	28.7	-	21.3	) =	3,544	Btuh
Total System Load											=	3,517	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	3,544	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

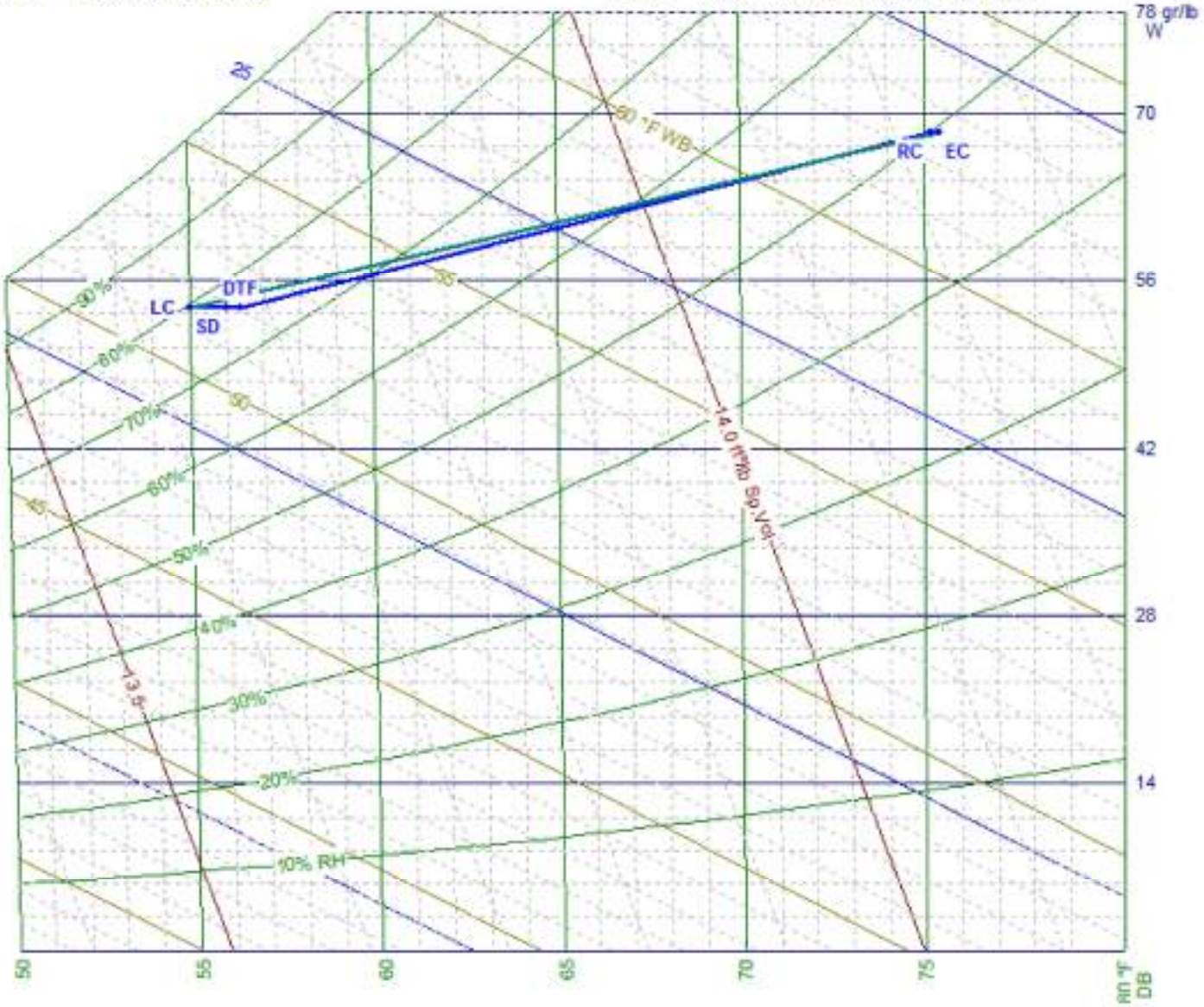
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.30	
Relative humidity:	78.57	
Enthalpy:	21.32	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

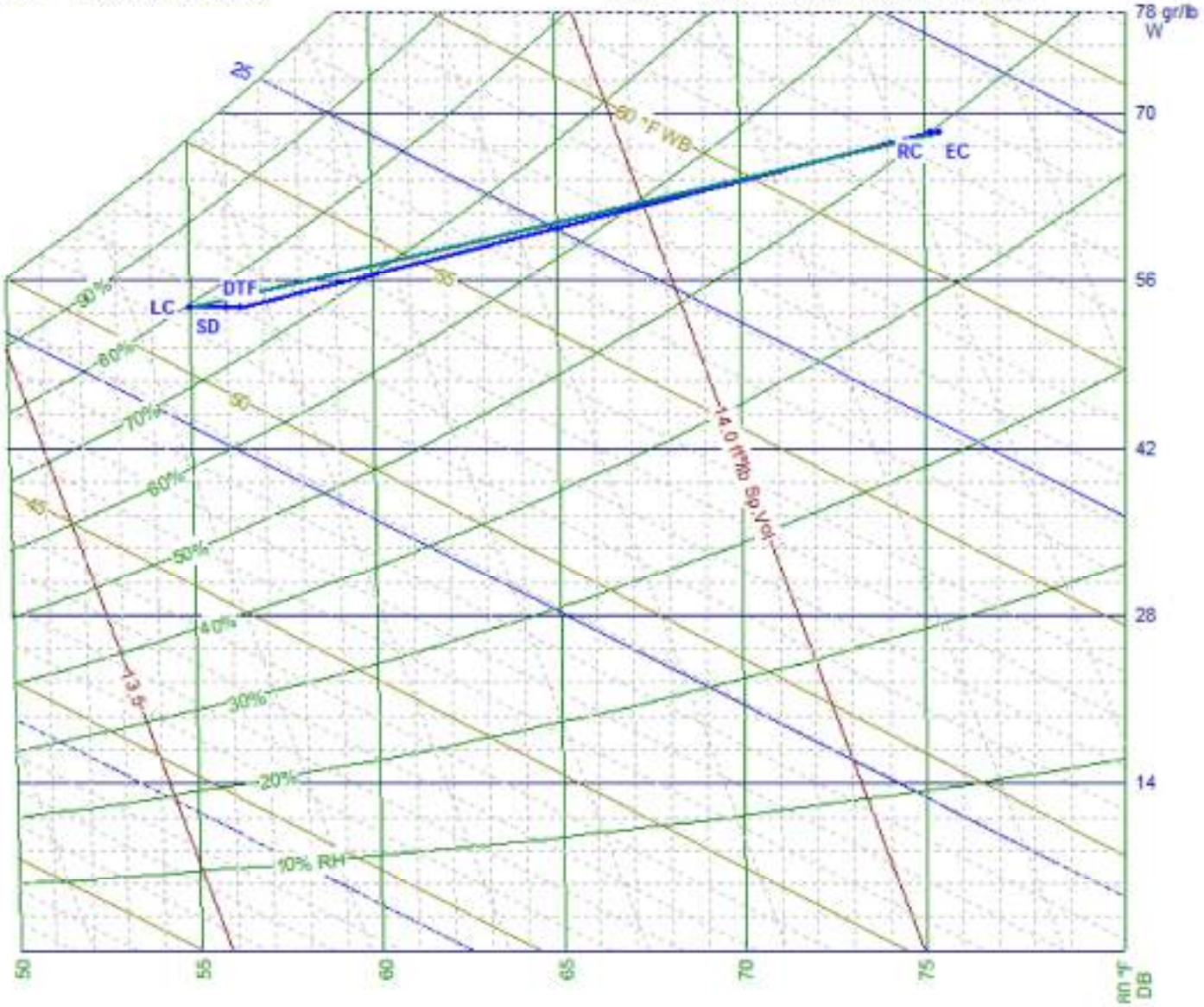
Air System #1 (Pasillo Externo) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Pasillo Externo) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size	Leaving Cooling Coil Dry Bulb
Building	August 6pm	72	722	2,406	1,111	3,517	0.29	0	111	0		
System 1	August 6pm	72	722	2,406	1,111	3,517	0.29	0	111	0	0 in. dia	55
Zone 1	August 6pm	72	722	2,212	1,111	3,323		0	111	0	0 in. dia	
1-Pasillo Externo	August 6pm	72	722	2,212	1,111	3,323		0	111	0	1–0 in. dia	

Load Preview (cont'd)

Scope	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building									
System 1	51.3	78.57	21.32	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1									
1-Pasillo Externo									

Vestier Mas Pasillo Baños
HVAC Load Analysis

for

Alpharma

Bogotá.

Elite Software

CHVAC COMMERCIAL HVAC LOADS

Prepared By:

Arq Jairo Gonzalez
Arc Constructores

Bogotá

General Project Data Input

General Project Information

Project file name:	VESTIER MAS PASILLO DE BAÑOS.CH8
Project title:	Vestier Mas Pasillo Baños
Project address:	Hospital Erasmo Meoz
Project city, state, ZIP:	Cucuta
Designed by:	Henry Villarreal
Weather reference city:	CUCUTA
Client name:	Alpharma
Client city:	Bogotá.
Company name:	Arc Constructores
Company representative:	Arq Jairo Gonzalez
Company city:	Bogotá

Barometric pressure:	28.803	in.Hg.
Altitude:	1050	feet
Latitude:	7	Degrees
Mean daily temperature range:	13	Degrees
Starting & ending time for HVAC load calculations:	1am - 12am	
Number of unique rooms in this project:	1	

Building Default Values

Calculations performed:	Cooling loads only	
Lighting requirements:	1.40	Watts per square foot
Equipment requirements:	1.00	Watts per square foot
People sensible load multiplier:	275	Btuh per person
People latent load multiplier:	275	Btuh per person
Room sensible safety factor:	2	%
Room latent safety factor:	2	%
Room heating safety factor:	0	%
People diversity factor:	100	%
Lighting profile number:	3	
Equipment profile number:	2	
People profile number:	1	
Building default ceiling height:	9.00	feet
Building default wall height:	10.00	feet

Internal Operating Load Profiles (C = 100)

	hr 1	hr 2	hr 3	hr 4	hr 5	hr 6	hr 7	hr 8	hr 9	hr 10	hr 11	hr 12	hr 13	hr 14	hr 15	hr 16	hr 17	hr 18	hr 19	hr 20	hr 21	hr 22	hr 23	hr 24
1	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

General Project Data Input (cont'd)

Building-Level Design Conditions

Design Month	Outdoor Dry Bulb	Outdoor Wet Bulb	Indoor Rel.Hum	Indoor Dry Bulb	Grains Diff	In/Outdoor Correction
August	95	85	50%	75	107.25	6
Winter	46			75		

Master Roofs

Roof No.	ASHRAE Roof#	Roof U-Fac	Dark Color	Susp. Ceil
1	6	0.100	Yes	No

Roof #1 Description: Flat roof, 6" lightweight concrete deck with 1" insulation, no ceiling below

Building Summary Loads

Building peaks in August at 6pm.

Bldg Load Descriptions	Area Quan	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	107	0	0.00	0	747	747	14.21
Wall	0	0	0.00	0	0	0	0.00
Glass	0	0	0.00	0	0	0	0.00
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		0	0.00	0	747	747	14.21
Lighting	150	0	0.00	0	516	516	9.81
Equipment	107	0	0.00	0	368	368	7.01
Pool Latent	0	0	0.00	0	0	0	0.00
People	6	0	0.00	1,667	1,667	3,333	63.44
Partition	0	0	0.00	0	0	0	0.00
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	0	0	0.00	0	0	0	0.00
Heat. Vent.	0	0	0.00	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	71	71	1.35
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	0	0	0.00
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	0	0.00	0	175	175	3.34
Return Duct	0	0	0.00	0	44	44	0.83
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		0	0.00	1,667	3,587	5,253	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	0	0.00	0	0	0	0.00
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Room Loads	0	0.00	1,667	3,297	4,963	94.48
Plenum Loads	0	0.00	0	0	0	0.00
Fan/Duct/Misc Loads	0	0.00	0	290	290	5.52
Building Totals	0	0.00	1,667	3,587	5,253	100.00

Check Figures

Total Building Supply Air (based on a 20° TD):	166	CFM
Total Building Vent. Air (0.00% of Supply):	0	CFM
Total Conditioned Air Space:	107	Sq.ft
Supply Air Per Unit Area:	1.5500	CFM/Sq.ft
Area Per Cooling Capacity:	244.1	Sq.ft/Ton
Cooling Capacity Per Area:	0.0041	Tons/Sq.ft
Heating Capacity Per Area:	0.00	Btuh/Sq.ft
Total Heating Required With Outside Air:	0	Btuh
Total Cooling Required With Outside Air:	0.44	Tons

Air Handler #1 - Vestier Mas Pasillo Baños - Summary Loads

Rm No	Description Room Peak Time	Area People Volume	Htg.Loss Htg.CFM CFM/Sqft	Sen.Gain Clg.CFM CFM/Sqft	Lat.Gain S.Exh W.Exh	Htg.O.A. Req.CFM Act.CFM	Clg.O.A. Req.CFM Act.CFM
1	Vestier Mas Pasillo Baños 6pm August	107 6 1,069	0 0 0.00	3,297 166 1.55	1,667 0 0	50/P 0 0	None 0 0
	Room Peak Totals: Total Rooms: 1 Unique Rooms: 1	107 6 1,069	0 0 0.00	3,297 166 1.55	1,667 0 0	0 0	0 0

Air Handler #1 - Vestier Mas Pasillo Baños - Total Load Summary

Air Handler Description:	Vestier Mas Pasillo Baños Constant Volume - Proportion
Supply Air Fan:	Draw-Thru with program estimated horsepower of 0.03 HP
Fan Input:	90% motor and fan efficiency with 1 in. water across the fan
Sensible Heat Ratio:	0.68

--- This system occurs 1 time(s) in the building. ---

Air System Peak Time:	6pm in August.
Outdoor Conditions:	Clg: 92° DB, 84° WB, 174.26 grains
Indoor Conditions:	Clg: 75° DB, 50% RH

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

Room Space sensible loss:	0 Btuh		
Infiltration sensible loss:	0 Btuh	0 CFM	
Outside Air sensible loss:	0 Btuh	0 CFM	
Supply Duct sensible loss:	0 Btuh		
Return Duct sensible loss:	0 Btuh		
Return Plenum sensible loss:	0 Btuh		
Total System sensible loss:			0 Btuh
Heating Supply Air: 0 / (.963 X 1.08 X 0) =		0 CFM	
Winter Vent Outside Air (0.0% of supply) =		0 CFM	
Room space sensible gain:	3,297 Btuh		
Infiltration sensible gain:	0 Btuh		
Draw-thru fan sensible gain:	71 Btuh		
Supply duct sensible gain:	175 Btuh		
Reserve sensible gain:	0 Btuh		
Total sensible gain on supply side of coil:			3,543 Btuh
Cooling Supply Air: 3,543 / (.963 X 1.1 X 20) =		166 CFM	
Summer Vent Outside Air (0.0% of supply) =		0 CFM	
Return duct sensible gain:	44 Btuh		
Return plenum sensible gain:	0 Btuh		
Outside air sensible gain:	0 Btuh	0 CFM	
Blow-thru fan sensible gain:	0 Btuh		
Total sensible gain on return side of coil:			44 Btuh
Total sensible gain on air handling system:			3,587 Btuh
Room space latent gain:	1,667 Btuh		
Infiltration latent gain:	0 Btuh		
Outside air latent gain:	0 Btuh		
Total latent gain on air handling system:			1,667 Btuh
Total system sensible and latent gain:			5,253 Btuh

Check Figures

Total Air Handler Supply Air (based on a 20° TD):	166 CFM
Total Air Handler Vent. Air (0.00% of Supply):	0 CFM
Total Conditioned Air Space:	107 Sq.ft
Supply Air Per Unit Area:	1.5500 CFM/Sq.ft
Area Per Cooling Capacity:	244.1 Sq.ft/Ton
Cooling Capacity Per Area:	0.0041 Tons/Sq.ft
Heating Capacity Per Area:	0.00 Btuh/Sq.ft
Total Heating Required With Outside Air:	0 Btuh
Total Cooling Required With Outside Air:	0.44 Tons

Zone Detailed Loads (At Zone Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Vestier Mas Pasillo Baños - Air Handler 1 (Vestier Mas Pasillo Baños), Zone 1 peaks (sensible) in August at 6pm.								
Roof-1-6-No.Clg-D	107	1.00	69.2	0.100	739		2.880	308
Lights-Prof=3	150	1.000			510			
Equipment-Prof=2	107	1.000			365	0		
People-Prof=1	6.0	1.000			1,650	1,650		
Sub-total					3,264	1,650		0
Safety factors:					+1%	+1%		+0%
Total w/ safety factors:					3,297	1,667		0

Room Detailed Loads (At Room Peak Times)

Load Description	Unit Quan	-SC- CFAC	CLTD SHGF	U.Fac -CLF-	Sen. Gain	Lat. Gain	Htg. Mult.	Htg. Loss
Room 1-Vestier Mas Pasillo Baños peaks (sensible) in August at 6pm, Air Handler 1 (Vestier Mas Pasillo Baños), Zone 1, 13.7 x 7.8, Construction Type: 20 (Light)								
Roof-1-6-No.Clg-D	107	1.00	69.2	0.100	739		2.880	308
Lights-Prof=3	150	1.000			510			
Equipment-Prof=2	107	1.000			365	0		
People-Prof=1	6.0	1.000			1,650	1,650		
Sub-total					3,264	1,650		0
Safety factors:					+1%	+1%		+0%
					---	---		---
Total w/ safety factors:					3,297	1,667		0

Notes about Room 1:
End of notes about Room 1

Air System #1 (Vestier Mas Pasillo Baños) Psychrometric Analysis

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.279		55.000	
Draw-Thru Fan			71	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			175	1.000	8
Room Loads	1,667	15.371	3,297	18.798	154
Sensible Reserve			0	0.000	0
Room Condition	1,667	67.650	3,543	75.200	166
Return Air Duct			44	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,667	67.650	3,587	75.450	166

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	166	x (	75.5	-	55.0	) =	3,587	Btuh
TLH	=	0.963	x	0.68	x	166	x (	67.6	-	52.3	) =	1,667	Btuh

SUM	=											5,253	Btuh
GTH	=	0.963	x	4.50	x	166	x (	28.7	-	21.3	) =	5,295	Btuh
Total System Load											=	5,253	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	5,295	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

Dry bulb temperature:	55.00	
Wet bulb temperature:	51.27	
Relative humidity:	78.39	
Enthalpy:	21.31	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

Air System #1 (Vestier Mas Pasillo Baños) Psychrometric Analysis (Z)

System Load Analysis	Latent	Grains	Sensible	Temp	CFM
Leaving Coil Condition		52.279		55.000	
Draw-Thru Fan			71	0.403	3
Misc Load on Supply Side	0	0.000	0	0.000	0
Supply Air Duct			175	1.000	8
Room Loads	1,667	15.371	3,297	18.798	154
Sensible Reserve			0	0.000	0
Room Condition	1,667	67.650	3,543	75.200	166
Return Air Duct			44	0.250	
Return Air Plenum			0	0.000	
Misc Load on Return Side	0	0.000	0	0.000	
Vent Air 0 CFM	0	0.000	0	0.000	
Blow-Thru Fan			0	0.000	
Entering Coil Condition	1,667	67.650	3,587	75.450	166

Air-Side Check Figure Psychrometric Equations:

PR = (Barometric pressure of site / Standard ASHRAE pressure of 29.921)
TSH = PR x 1.10 x CFM x (DB entering - DB leaving)
TLH = PR x 0.68 x CFM x (Grains entering - Grains leaving)
GTH = PR x 4.50 x CFM x (Enthalpy entering - Enthalpy leaving)

TSH	=	0.963	x	1.10	x	166	x (	75.5	-	55.0	) =	3,587	Btuh
TLH	=	0.963	x	0.68	x	166	x (	67.6	-	52.3	) =	1,667	Btuh

SUM	=											5,253	Btuh
GTH	=	0.963	x	4.50	x	166	x (	28.7	-	21.3	) =	5,295	Btuh
Total System Load											=	5,253	Btuh

Chilled and Hot Water Flow Rates and Steam Requirement

Cooling GPM	=	5,295	/ (	0.00	x	500	)	=	0.0	GPM
Heating GPM	=	0	/ (	0.00	x	500	)	=	0.0	GPM
Steam Req.	=	0	/	0				=	0.0	lb./hr

Entering Cooling Coil Conditions

Dry bulb temperature:	75.45	
Wet bulb temperature:	62.63	
Relative humidity:	49.59	
Enthalpy:	28.69	Btu/lbm

Entering Heating Coil Conditions

Dry bulb temperature:	75.20

Leaving Cooling Coil Conditions

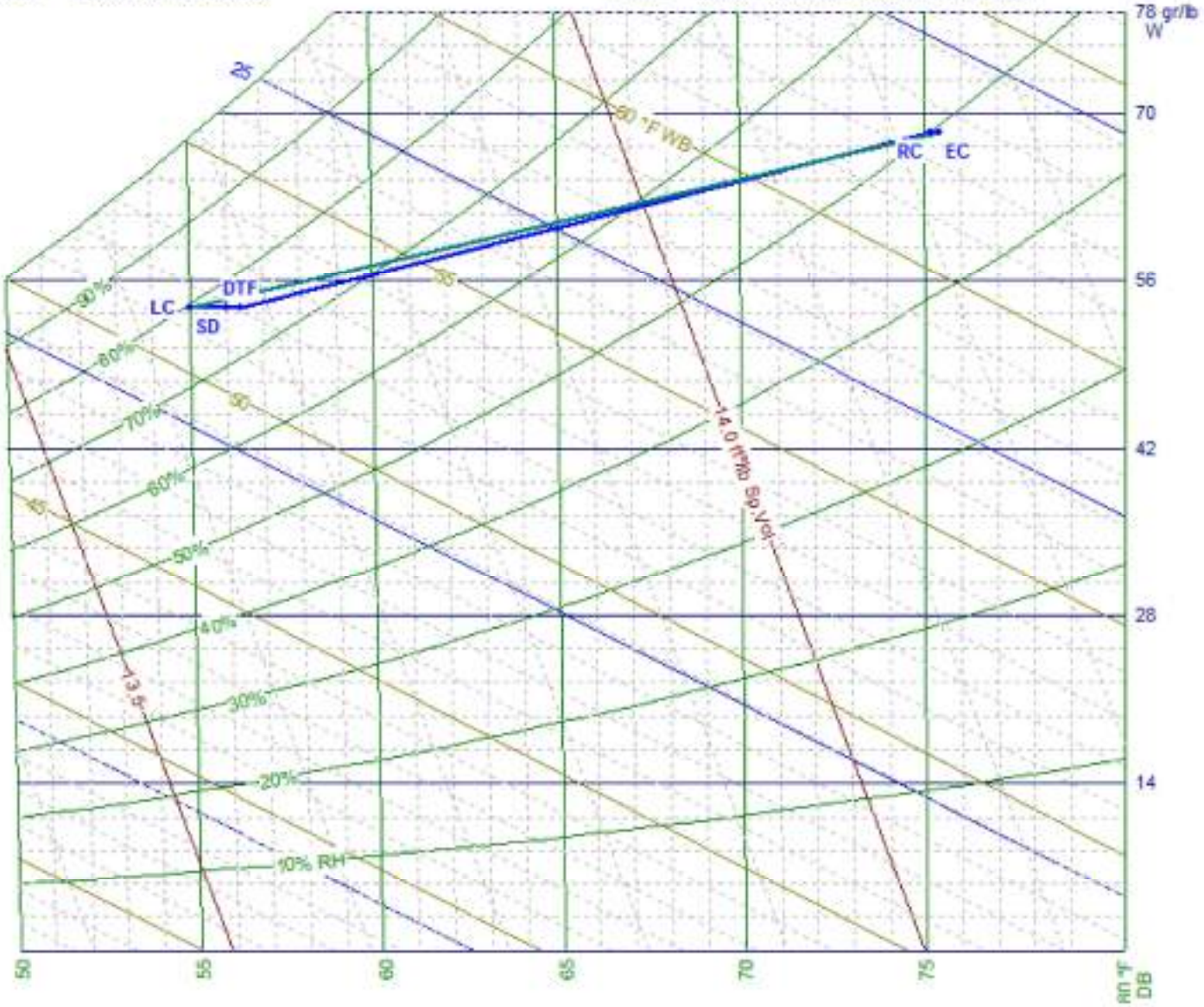
Dry bulb temperature:	55.00	
Wet bulb temperature:	51.27	
Relative humidity:	78.39	
Enthalpy:	21.31	Btu/lbm

Leaving Heating Coil Conditions

Dry bulb temperature:	75.20

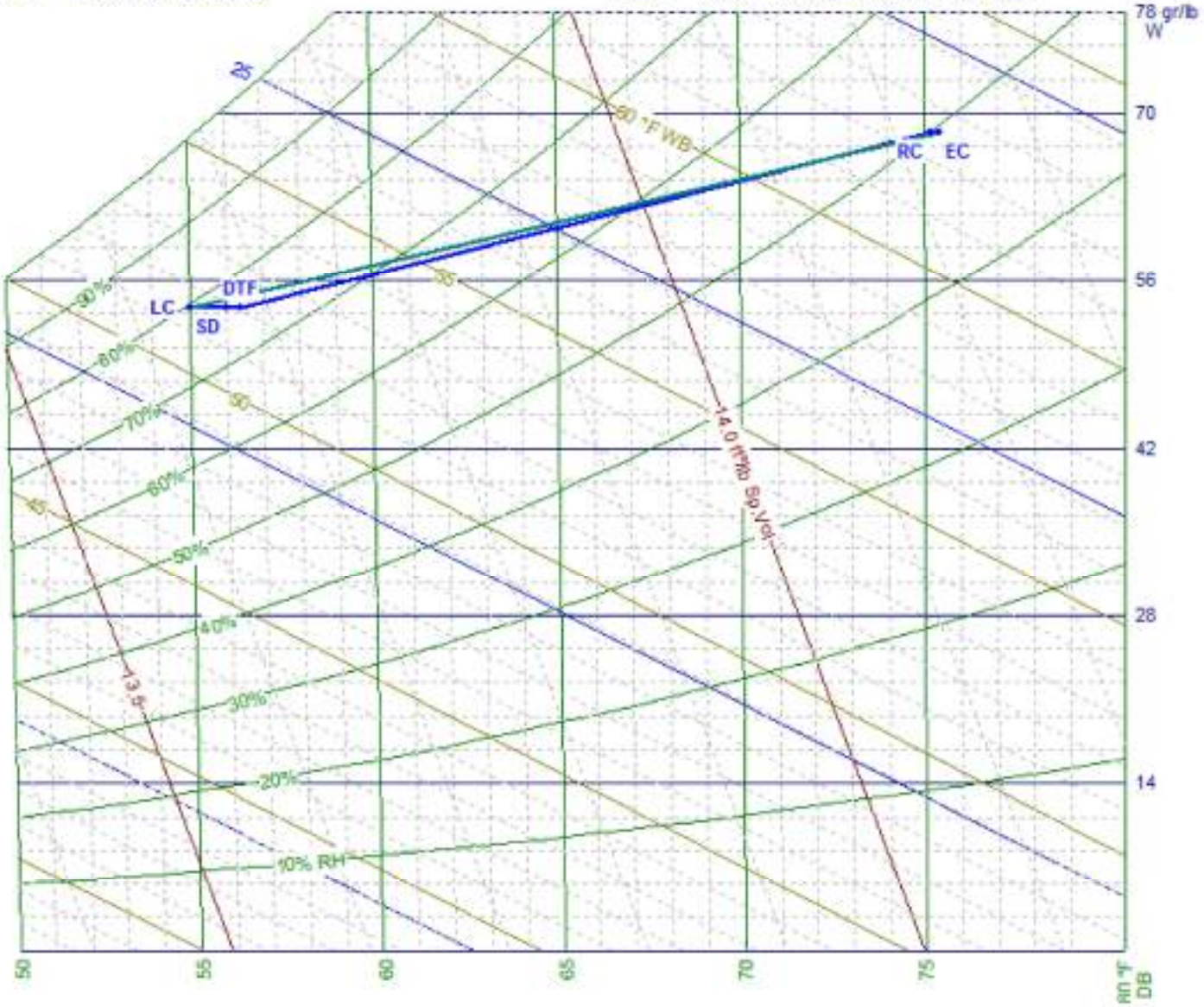
Air System #1 (Vestier Mas Pasillo Baños) Psychrometric Chart

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Air System #1 (Vestier Mas Pasillo Baños) Psychrometric Chart (Z)

RC	Room Condition	OC	Outdoor Condition
LC	Leaving Coil Condition	EC	Entering Coil Condition
SD	Supply Duct Temperature Rise	RD	Return Duct Temperature Rise
DTF	Draw Through Fan Sensible Gain	BTF	Blow Through Fan Sensible Gain
RE	Reserve or Reheat Sensible Gain	PL	Return Air Plenum Sensible Gain
SM	Supply Side Miscellaneous Sensible Gain	MR	Return Side Miscellaneous Gain
PRE	Pretreated Air Condition	HRV	Heat Recovery Ventilator Condition
MIX	Mixed Air Condition	RML	Return Miscellaneous Latent Gain



Load Preview

Scope	Peak Time	Area	Volume	Sensible Gain	Latent Gain	Net Gain	Net Tons	Sensible Loss	Cooling Supply Airflow	Heating Supply Airflow	Duct Size
Building	August 6pm	107	1,069	3,587	1,667	5,253	0.44	0	166	0	
System 1	August 6pm	107	1,069	3,587	1,667	5,253	0.44	0	166	0	0 in. dia
Zone 1	August 6pm	107	1,069	3,297	1,667	4,963		0	166	0	0 in. dia
1-Vestier Mas Pasillo Baños	August 6pm	107	1,069	3,297	1,667	4,963		0	166	0	1-0 in. dia

Load Preview (cont'd)

Scope	Leaving Cooling Coil Dry Bulb	Leaving Cooling Coil Wet Bulb	Leaving Cooling Coil Relative Humidity	Leaving Cooling Coil Enthalpy	Entering Cooling Coil Dry Bulb	Entering Cooling Coil Wet Bulb	Entering Cooling Coil Relative Humidity	Entering Cooling Coil Enthalpy	Leaving Heating Coil Dry Bulb	Entering Heating Coil Dry Bulb
Building										
System 1	55	51.27	78.39	21.31	75.45	62.63	49.59	28.69	75.2	75.2
Zone 1										
1-Vestier Mas Pasillo Baños										