

Air System Sizing Summary for UMA P0-01(1)

Project Name: 20170721 - Centro de Salud El Coca
Prepared by: Innovatec&solutions

07/25/2017
03:50

Air System Information

Air System Name **UMA P0-01(1)**
Equipment Class **SPLT AHU**
Air System Type **1FDDVAV**

Number of zones **4**
Floor Area **2925.6** ft²
Location **El Coca, Ecuador**

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM **Peak zone sensible load**
Space CFM **Coincident space loads**

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Central Cooling Coil Sizing Data

Total coil load **11.9** Tons
Total coil load **143.0** MBH
Sensible coil load **75.6** MBH
Coil CFM at Dec 0000 **3341** CFM
Max block CFM **3700** CFM
Sum of peak zone CFM **3700** CFM
Sensible heat ratio **0.528**
ft²/Ton **245.4**
BTU/(hr-ft²) **48.9**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Dec 0000**
OA DB / WB **81.1 / 79.5** °F
Entering DB / WB **77.7 / 69.3** °F
Leaving DB / WB **56.1 / 55.5** °F
Coil ADP **53.7** °F
Bypass Factor **0.100**
Resulting RH **53** %
Design supply temp. **55.0** °F
Zone T-stat Check **4 of 4** OK
Max zone temperature deviation **0.0** °F

Central Heating Coil Sizing Data

No central heating coil loads occurred during this calculation.

Preheat Coil Sizing Data

No heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max CFM **3700** CFM
Standard CFM **3594** CFM
Actual max CFM/ft² **1.26** CFM/ft²

Fan motor BHP **0.00** BHP
Fan motor kW **0.00** kW
Fan static **0.00** in wg

Outdoor Ventilation Air Data

Design airflow CFM **1072** CFM
CFM/ft² **0.37** CFM/ft²

CFM/person **38.29** CFM/person

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Location **El Coca, Ecuador**

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM **Peak zone sensible load**
Space CFM **Coincident space loads**

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	54.3	2792	931	Dec 0000	0.0	2540.5	1.10
Zone 2	7.5	355	47	Dec 0000	0.0	128.8	2.76
Zone 3	7.5	355	47	Dec 0000	0.0	128.1	2.77
Zone 4	3.6	198	47	Jan 2300	0.0	128.2	1.54

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
P0 07 Emergencia	1	0.0	Des Htg	0	0.0	2540.5	0.00
Zone 2							
P0 08 Constl Urgen 1	1	0.0	Des Htg	0	0.0	128.8	0.00
Zone 3							
P0 09 Constl Urgen 2	1	0.0	Des Htg	0	0.0	128.1	0.00
Zone 4							
P0 10 Constl Cura/yeso	1	3.6	Jan 2300	198	0.0	128.2	1.54

Air System Design Load Summary for UMA P0-01(1)

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 0000 COOLING OA DB / WB 81.1 °F / 79.5 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 73.0 °F / 65.0 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	246 ft²	11572	-	246 ft²	-	-
Wall Transmission	1038 ft²	16497	-	1038 ft²	0	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	246 ft²	1660	-	246 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	64 ft²	4672	-	64 ft²	0	-
Floor Transmission	552 ft²	0	-	552 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	2200 W	7506	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	4900 W	16719	-	0	0	-
People	28	8260	12740	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	6000	3000	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	72884	15740	-	0	0
Zone Conditioning	-	70671	15740	-	696	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	3341 CFM	0	-	1072 CFM	0	-
Ventilation Load	968 CFM	4894	51736	311 CFM	-704	0
Supply Fan Load	3341 CFM	0	-	1072 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	75564	67476	-	-8	0
Central Cooling Coil	-	75564	67478	-	0	0
Central Heating Coil	-	0	-	-	0	-
Preheat Coil	-	0	-	-	0	-
>> Total Conditioning	-	75564	67478	-	0	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

System Psychrometrics for UMA P0-01(1)

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December DESIGN COOLING DAY, 0000

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	81.1	0.02212	968	400	4894	51736
Vent - Return Mixing	Outlet	77.7	0.01389	3341	803	-	-
Preheat Coil	Outlet	77.7	0.01389	3341	803	0	-
Supply Fan	Outlet	77.7	0.01389	3341	803	0	-
Central Cooling Coil	Outlet	56.1	0.00951	3341	803	75564	67478
Central Heating Coil	Outlet	77.7	0.01389	0	803	0	-
Cold Supply Duct	Outlet	56.1	0.00951	3341	803	-	-
Hot Supply Duct	Outlet	77.7	0.00951	0	803	0	-
Zone Air	-	76.3	0.01053	3341	968	70671	15740
Return Plenum	Outlet	76.3	0.01053	3341	968	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.049 BTU/(hr-CFM-F)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4611.0 BTU/(hr-CFM)

Site Altitude = 800.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	54256	Cooling	52350	76.2	2480	977	0	0
Zone 2	7496	Cooling	7334	76.4	344	916	0	0
Zone 3	7496	Cooling	7334	76.4	344	916	0	0
Zone 4	3637	Cooling	3652	76.2	173	1031	0	0

System Psychrometrics for UMA P0-01(1)

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WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	73.0	0.01175	311	400	704	0
Vent - Return Mixing	Outlet	71.5	0.01175	1072	418	-	-
Preheat Coil	Outlet	71.5	0.01175	1072	418	0	-
Supply Fan	Outlet	71.5	0.01175	1072	418	0	-
Central Cooling Coil	Outlet	71.5	0.01175	1072	418	0	0
Central Heating Coil	Outlet	71.5	0.01175	0	418	0	-
Cold Supply Duct	Outlet	71.5	0.01175	1072	418	-	-
Zone Air	-	70.8	0.01175	1072	426	-696	0
Return Plenum	Outlet	70.8	0.01175	1072	426	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.049 BTU/(hr-CFM-F)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4611.0 BTU/(hr-CFM)

Site Altitude = 800.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	0	Deadband	-597	70.8	931	426	0	0
Zone 2	0	Deadband	-42	70.6	47	426	0	0
Zone 3	0	Deadband	-42	70.6	47	426	0	0
Zone 4	0	Deadband	-15	71.2	47	426	0	0

Psychrometric Analysis for UMA P0-01(1)

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Location: El Coca, Ecuador

Altitude: 800.0 ft.

Data for: December DESIGN COOLING DAY, 0000

