Air System Sizing Summary for P2 SALA DE PARTO-02

Project Name: UMI SAN RAFAEL TUNJA
Prepared by: TERMICA

06/13/2024
02:09p. m.

Air System Information

Air System Name	**P2 SALA DE PARTO-02**	Number of zones	**1**
Equipment Class	**SPLT AHU**	Floor Area	**180.8** ft²
Air System Type	**SZCAV**	Location	**Tunja, Colombia**

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone CFM Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**	Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**1.8**	Tons	Load occurs at	**Jun 1500**	
Total coil load	**21.8**	MBH	OA DB / WB	**63.4 / 56.0**	°F
Sensible coil load	**19.6**	MBH	Entering DB / WB	**69.4 / 57.0**	°F
Coil CFM at Jun 1500	**1422**	CFM	Leaving DB / WB	**51.5 / 50.3**	°F
Max block CFM	**1422**	CFM	Coil ADP	**49.5**	°F
Sum of peak zone CFM	**1422**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.896**		Resulting RH	**50**	%
CFM/Ton	**781.9**		Design supply temp.	**54.0**	°F
ft²/Ton	**99.4**		Zone T-stat Check	**0 of 1**	OK
BTU/(hr·ft²)	**120.7**		Max zone temperature deviation	**0.0**	°F
Water flow @ 10.0 °F rise	**N/A**				

Central Heating Coil Sizing Data

Max coil load	**4.9**	MBH	Load occurs at	**Jan 2000**	
Coil CFM at Jan 2000	**1422**	CFM	BTU/(hr·ft²)	**27.2**	
Max coil CFM	**1422**	CFM	Ent. DB / Lvg DB	**51.9 / 56.4**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**1422**	CFM	Fan motor BHP	**0.00**	BHP
Standard CFM	**1012**	CFM	Fan motor kW	**0.00**	kW
Actual max CFM/ft²	**7.86**	CFM/ft²	Fan static	**0.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**148**	CFM	CFM/person	**21.14**	CFM/person
CFM/ft²	**0.82**	CFM/ft²			

Zone Sizing Summary for P2 SALA DE PARTO-02

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Air System Information

Air System Name ..... **P2 SALA DE PARTO-02**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **180.8** ft²
Location ..... **Tunja, Colombia**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	1422	1422	7.86	0.0	-	0.0	-	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	17.5	Jun 1500	1.8	180.8

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
P2 SALA DE PARTO 2	1	17.5	Jun 1500	1422	1.8	180.8	7.86

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 63.4 °F / 56.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 36.0 °F / 29.2 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	21 ft²	733	-	21 ft²	-	-
Wall Transmission	106 ft²	-172	-	106 ft²	953	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	21 ft²	-139	-	21 ft²	411	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	104 ft²	-390	-	104 ft²	480	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	542 W	1851	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	4000 W	13648	-	0	0	-
People	7	1960	1890	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**17491**	**1890**	**-**	**1843**	**0**
Zone Conditioning	-	17602	1890	-	-298	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	1422 CFM	0	-	1422 CFM	0	-
Ventilation Load	148 CFM	-763	378	148 CFM	341	0
Supply Fan Load	1422 CFM	0	-	1422 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**16839**	**2268**	**-**	**43**	**0**
Central Cooling Coil	-	19552	2268	-	0	0
Central Heating Coil	-	-2713	-	-	0	-
>> Total Conditioning	**-**	**16839**	**2268**	**-**	**0**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

Zone Design Load Summary for P2 SALA DE PARTO-02

Project Name: UMI SAN RAFAEL TUNJA 06/13/2024
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Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 63.4 °F / 56.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 36.0 °F / 29.2 °F		
	OCCUPIED T-STAT 70.0 °F			OCCUPIED T-STAT 65.0 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	21 ft²	733	-	21 ft²	-	-
Wall Transmission	106 ft²	-172	-	106 ft²	953	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	21 ft²	-139	-	21 ft²	411	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	104 ft²	-390	-	104 ft²	480	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	542 W	1851	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	4000 W	13648	-	0	0	-
People	7	1960	1890	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**17491**	**1890**	**-**	**1843**	**0**

TABLE 1.1.A. Component Loads For Space "P2 SALA DE PARTO 2" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 63.4 °F / 56.0 °F OCCUPIED T-STAT 70.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 36.0 °F / 29.2 °F OCCUPIED T-STAT 65.0 °F		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	**Details**	**(BTU/hr)**	**(BTU/hr)**	**Details**	**(BTU/hr)**	**(BTU/hr)**
Window & Skylight Solar Loads	21 ft²	733	-	21 ft²	-	-
Wall Transmission	106 ft²	-172	-	106 ft²	953	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	21 ft²	-139	-	21 ft²	411	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	104 ft²	-390	-	104 ft²	480	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	542 W	1851	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	4000 W	13648	-	0	0	-
People	7	1960	1890	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**17491**	**1890**	**-**	**1843**	**0**

TABLE 1.1.B. Envelope Loads For Space "P2 SALA DE PARTO 2" In Zone "Zone 1"						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(ft²)	(BTU/(hr·ft²·°F))	Coeff.	(BTU/hr)	(BTU/hr)	(BTU/hr)
NNE EXPOSURE						
WALL	106	0.309	-	-172	-	953
WINDOW 1	21	0.661	0.648	-139	733	411

June DESIGN COOLING DAY, 1500

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	63.4	0.01178	148	400	-763	378
Vent - Return Mixing	Outlet	69.4	0.01110	1422	939	-	-
Central Cooling Coil	Outlet	51.5	0.01063	1422	939	19552	2268
Central Heating Coil	Outlet	54.0	0.01063	1422	939	2713	-
Supply Fan	Outlet	54.0	0.01063	1422	939	0	-
Cold Supply Duct	Outlet	54.0	0.01063	1422	939	-	-
Zone Air	-	70.1	0.01102	1422	1002	17602	1890
Return Plenum	Outlet	70.1	0.01102	1422	1002	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.769 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 3379.3 BTU/(hr-CFM)
Site Altitude = 9104.3 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	17491	Cooling	17602	70.1	1422	1002	0	0

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	36.0	0.00314	148	400	-341	0
Vent - Return Mixing	Outlet	38.7	0.00314	1422	486	-	-
Central Cooling Coil	Outlet	38.7	0.00314	1422	486	0	0
Central Heating Coil	Outlet	38.7	0.00314	1422	486	0	-
Supply Fan	Outlet	38.7	0.00314	1422	486	0	-
Cold Supply Duct	Outlet	38.7	0.00314	1422	486	-	-
Zone Air	-	39.0	0.00314	1422	496	298	0
Return Plenum	Outlet	39.0	0.00314	1422	496	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.769 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 3379.3 BTU/(hr-CFM)
Site Altitude = 9104.3 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	-1843	Deadband	298	39.0	1422	496	0	0