Air System Sizing Summary for SALA ESPERA ADULTOS

Project Name: UMI SAN RAFAEL TUNJA 01/10/2024
Prepared by: TERMICA 03:00p. m.

Air System Information

Air System Name	**SALA ESPERA ADULTOS**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**1002.0**	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	**2.5**	Tons	Load occurs at	**Jun 1400**	
Total coil load	**30.6**	MBH	OA DB / WB	**62.9 / 55.8**	°F
Sensible coil load	**24.7**	MBH	Entering DB / WB	**72.2 / 65.4**	°F
Coil CFM at Jun 1400	**3530**	CFM	Leaving DB / WB	**63.1 / 62.4**	°F
Max block CFM	**3530**	CFM	Coil ADP	**62.1**	°F
Sum of peak zone CFM	**3530**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.810**		Resulting RH	**73**	%
CFM/Ton	**1386.5**		Design supply temp.	**62.0**	°F
ft²/Ton	**393.5**		Zone T-stat Check	**1 of 1**	OK
BTU/(hr·ft²)	**30.5**		Max zone temperature deviation	**0.0**	°F
Water flow @ 10.0 °F rise	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**3530**	CFM	Fan motor BHP	**0.00**	BHP
Standard CFM	**2513**	CFM	Fan motor kW	**0.00**	kW
Actual max CFM/ft²	**3.52**	CFM/ft²	Fan static	**0.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**270**	CFM	CFM/person	**6.43**	CFM/person
CFM/ft²	**0.27**	CFM/ft²			

Zone Sizing Summary for SALA ESPERA ADULTOS

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Air System Information

Air System Name ..... **SALA ESPERA ADULTOS**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **1002.0** 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	3530	3530	3.52	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	27.1	Jun 1200	7.8	1002.0

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							
P1 SALA ESPERA ADULTOS	1	27.1	Jun 1200	3530	7.8	1002.0	3.52

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1400 COOLING OA DB / WB 62.9 °F / 55.8 °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	192 ft²	7874	-	192 ft²	-	-
Wall Transmission	189 ft²	-481	-	189 ft²	1693	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	192 ft²	-2599	-	192 ft²	6075	-
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	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1503 W	5128	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1503 W	5128	-	0	0	-
People	42	11760	11340	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	**-**	**26810**	**11340**	**-**	**7767**	**0**
Zone Conditioning	-	26843	11340	-	-542	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	3530 CFM	0	-	3530 CFM	0	-
Ventilation Load	270 CFM	-2099	-5531	270 CFM	670	0
Supply Fan Load	3530 CFM	0	-	3530 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**24745**	**5809**	**-**	**129**	**0**
Central Cooling Coil	-	24745	5812	-	0	0
>> Total Conditioning	**-**	**24745**	**5812**	**-**	**0**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

TABLE 1.1.A. Component Loads For Space "P1 SALA ESPERA ADULTOS" In Zone "Zone 1"						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1200 COOLING OA DB / WB 59.3 °F / 54.7 °F OCCUPIED T-STAT 72.0 °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	192 ft²	8894	-	192 ft²	-	-
Wall Transmission	189 ft²	-577	-	189 ft²	1693	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	192 ft²	-3188	-	192 ft²	6075	-
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	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1503 W	5128	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1503 W	5128	-	0	0	-
People	42	11760	11340	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	**-**	**27145**	**11340**	**-**	**7767**	**0**

TABLE 1.1.B. Envelope Loads For Space "P1 SALA ESPERA ADULTOS" 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	189	0.309	-	-577	-	1693
WINDOW 1	192	1.093	0.733	-3188	8894	6075

June DESIGN COOLING DAY, 1400

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	62.9	0.01177	270	400	-2099	-5531
Vent - Return Mixing	Outlet	72.2	0.01737	3530	2158	-	-
Central Cooling Coil	Outlet	63.1	0.01688	3530	2158	24745	5812
Supply Fan	Outlet	63.1	0.01688	3530	2158	0	-
Cold Supply Duct	Outlet	63.1	0.01688	3530	2158	-	-
Zone Air	-	73.0	0.01783	3530	2304	26843	11340
Return Plenum	Outlet	73.0	0.01783	3530	2304	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	26810	Cooling	26843	73.0	3530	2304	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	270	400	-670	0
Vent - Return Mixing	Outlet	39.0	0.00314	3530	512	-	-
Central Cooling Coil	Outlet	39.0	0.00314	3530	512	0	0
Supply Fan	Outlet	39.0	0.00314	3530	512	0	-
Cold Supply Duct	Outlet	39.0	0.00314	3530	512	-	-
Zone Air	-	39.2	0.00314	3530	521	542	0
Return Plenum	Outlet	39.2	0.00314	3530	521	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	-7767	Deadband	542	39.2	3530	521	0	0