

Air System Information

Air System Name **Constant System**
Equipment Class **PKG VERT**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **32.9** m²
Location **Guam, Guam**

Sizing Calculation Information

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

Zone L/s Sizing **Sum of space airflow rates**
Space L/s Sizing **Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load **89.2** kW
Sensible coil load **86.5** kW
Coil L/s at Jul 1500 **7757** L/s
Max block L/s **7757** L/s
Sum of peak zone L/s **7757** L/s
Sensible heat ratio? **0.970**
m²/kW **0.4**
W/m² **2711.7**
Water flow @ 5.0 °K rise **N/A**

Load occurs at **Jul 1500**
OA DB / WB **31.5 / 25.6** °C
Entering DB / WB **23.5 / 17.0** °C
Leaving DB / WB **14.0 / 13.4** °C
Coil ADP? **13.0** °C
Bypass Factor **0.100**
Resulting RH? **52** %
Design supply temp. **14.4** °C
Zone T-stat Check **1 of 1** OK
Max zone temperature deviation? **?0.0** °K

Central Heating Coil Sizing Data

No central heating coil loads occurred during this calculation.

Supply Fan Sizing Data

Actual max L/s **7757** L/s
Standard L/s **7588** L/s
Actual max L/(s-m²) **235.76** L/(s-m²)

Fan motor BHP **9.05** BHP
Fan motor kW **7.18** kW
Fan static **500** Pa

Outdoor Ventilation Air Data

Design airflow L/s **100** L/s
L/(s-m²) **3.04** L/(s-m²)

L/s/person **0.00** L/s/person

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Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	78.4	7757	7757	Jul 1600	0.2	32.9	235.76

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
ESS Room	1	78.4	Jul 1600	7757	0.2	32.9	235.76

Air System Design Load Summary for Constant System

Project Name: Guam ESS Project 1

05-11-2023

Prepared by: .

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 31.5 °C / 25.6 °C			HEATING OA DB / WB 18.7 °C / 18.4 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m²	0	-	0 m²	-	-
Wall Transmission	76 m²	594	-	76 m²	65	-
Roof Transmission	33 m²	434	-	33 m²	23	-
Window Transmission	0 m²	0	-	0 m²	0	-
Skylight Transmission	0 m²	0	-	0 m²	0	-
Door Loads	32 m²	171	-	32 m²	51	-
Floor Transmission	33 m²	-5	-	33 m²	37	-
Partitions	0 m²	0	-	0 m²	0	-
Ceiling	0 m²	0	-	0 m²	0	-
Overhead Lighting	49 W	49	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	70000	0	-	0	0
Safety Factor	10% / 10%	7124	0	10%	18	0
>> Total Zone Loads	-	78369	0	-	193	0
Zone Conditioning	-	78409	0	-	641	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	7657 L/s	0	-	7657 L/s	0	-
Ventilation Load	100 L/s	955	2653	100 L/s	463	-29
Supply Fan Load	7757 L/s	7182	-	7757 L/s	-7182	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	86546	2653	-	-6078	-29
Central Cooling Coil	-	86546	2670	-	-6078	0
Central Heating Coil	-	0	-	-	0	-
>> Total Conditioning	-	86546	2670	-	-6078	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 Constant System

Project Name: Guam ESS Project 1

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Prepared by: .

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July DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	31.5	0.01875	100	400	955	2653
Vent - Return Mixing	Outlet	23.5	0.00967	7757	795	-	-
Central Cooling Coil	Outlet	14.0	0.00955	7757	795	86546	2670
Central Heating Coil	Outlet	14.0	0.00955	7757	795	0	-
Supply Fan	Outlet	14.8	0.00955	7757	795	7182	-
Cold Supply Duct	Outlet	14.8	0.00955	7757	795	-	-
Zone Air	-	23.4	0.00955	7757	800	78409	0
Zone Direct Exhaust	Outlet	23.4	0.00955	100	800	-	-
Return Plenum	Outlet	23.4	0.00955	7657	800	0	-

????Air Density x Heat Capacity x Conversion Factor: At sea level = 1.207; At site altitude = 1.181 W/(L/s-K)

????Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947.6; At site altitude = 2883.6 W/(L/s)

????Site Altitude = 184.7 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	78369	Cooling	78409	23.4	7757	800	0	0

System Psychrometrics for Constant System

Project Name: Guam ESS Project 1

05-11-2023

Prepared by: .

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WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°C)	Specific Humidity (kg/kg)	Airflow (L/s)	CO2 Level (ppm)	Sensible Heat (W)	Latent Heat (W)
Ventilation Air	Inlet	18.7	0.01344	100	400	-463	29
Vent - Return Mixing	Outlet	22.6	0.01334	7757	795	-	-
Central Cooling Coil	Outlet	21.9	0.01334	7757	795	6078	0
Central Heating Coil	Outlet	21.9	0.01334	7757	795	0	-
Supply Fan	Outlet	22.7	0.01334	7757	795	7182	-
Cold Supply Duct	Outlet	22.7	0.01334	7757	795	-	-
Zone Air	-	22.6	0.01334	7757	800	-641	0
Zone Direct Exhaust	Outlet	22.6	0.01334	100	800	-	-
Return Plenum	Outlet	22.6	0.01334	7657	800	0	-

???Air Density x Heat Capacity x Conversion Factor: At sea level = 1.207; At site altitude = 1.181 W/(L/s-K)

???Air Density x Heat of Vaporization x Conversion Factor: At sea level = 2947.6; At site altitude = 2883.6 W/(L/s)

???Site Altitude = 184.7 m

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (W)	T-stat Mode	Zone Cond (W)	Zone Temp (°C)	Zone Airflow (L/s)	CO2 Level (ppm)	Terminal Heating Coil (W)	Zone Heating Unit (W)
Zone 1	-193	Deadband	-641	22.6	7757	800	0	0

System Psychrometrics for Constant System

Project Name: Guam ESS Project 1

05-11-2023

Prepared by: .

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Location: Guam, Guam

Altitude: 184.7 m.

Data for: July DESIGN COOLING DAY, 1500

