Air System Sizing Summary for mechanical hall

Project Name: mechanical hall cep
Prepared by: get

09/26/2023
11:49AM

Air System Information

Air System Name	**mechanical hall**	Number of zones	**1**
Equipment Class	**PKG ROOF**	Floor Area	**2400.0** ft²
Air System Type	**SZCAV**	Location	**mirpur, Pakistan**

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	**15.2**	Tons	Load occurs at	**Aug 1700**	
Total coil load	**182.9**	MBH	OA DB / WB	**99.3 / 73.8**	°F
Sensible coil load	**147.0**	MBH	Entering DB / WB	**81.7 / 67.7**	°F
Coil CFM at Aug 1700	**6655**	CFM	Leaving DB / WB	**60.2 / 58.9**	°F
Max block CFM	**6655**	CFM	Coil ADP	**57.8**	°F
Sum of peak zone CFM	**6655**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.804**		Resulting RH	**57**	%
ft²/Ton	**157.5**		Design supply temp.	**58.0**	°F
BTU/(hr-ft²)	**76.2**		Zone T-stat Check	**0 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.1**	°F

Supply Fan Sizing Data

Actual max CFM	**6655**	CFM	Fan motor BHP	**0.00**	BHP
Standard CFM	**6329**	CFM	Fan motor kW	**0.00**	kW
Actual max CFM/ft²	**2.77**	CFM/ft²	Fan static	**0.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1494**	CFM	CFM/person	**8.30**	CFM/person
CFM/ft²	**0.62**	CFM/ft²			

Zone Sizing Summary for mechanical hall

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Air System Information

Air System Name ..... **mechanical hall**
Equipment Class ..... **PKG ROOF**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **2400.0** ft²
Location ..... **mirpur, Pakistan**

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 Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	116.2	6655	6655	Jul 1700	0.0	2400.0	2.77

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 (ft²)	Space CFM/ft²
Zone 1							
MECHANICAL HALL	1	116.2	Jul 1700	6655	0.0	2400.0	2.77

Air System Design Load Summary for mechanical hall

Project Name: mechanical hall cep
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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1700 COOLING OA DB / WB 99.3 °F / 73.8 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 76.0 °F / 59.0 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	91 ft²	5950	-	91 ft²	-	-
Wall Transmission	1119 ft²	12769	-	1119 ft²	0	-
Roof Transmission	2400 ft²	10040	-	2400 ft²	0	-
Window Transmission	91 ft²	1090	-	91 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	68 ft²	426	-	68 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	4549 W	15521	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	350 W	1194	-	0	0	-
People	180	41400	21600	0	0	0
Infiltration	-	22247	4838	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	5% / 5%	5532	1322	5%	0	0
>> Total Zone Loads	**-**	**116168**	**27760**	**-**	**0**	**0**
Zone Conditioning	-	112122	27760	-	0	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	6655 CFM	0	-	6655 CFM	0	-
Ventilation Load	1494 CFM	34869	8121	1494 CFM	-9206	0
Supply Fan Load	6655 CFM	0	-	6655 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**146991**	**35881**	**-**	**-9206**	**0**
Central Cooling Coil	-	146991	35891	-	-9206	0
>> Total Conditioning	**-**	**146991**	**35891**	**-**	**-9206**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

August DESIGN COOLING DAY, 1700

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	99.3	0.01299	1494	400	34869	8121
Vent - Return Mixing	Outlet	81.7	0.01206	6655	931	-	-
Central Cooling Coil	Outlet	60.2	0.01086	6655	931	146991	35891
Supply Fan	Outlet	60.2	0.01086	6655	931	0	-
Cold Supply Duct	Outlet	60.2	0.01086	6655	931	-	-
Zone Air	-	76.6	0.01179	6655	1085	112122	27760
Return Plenum	Outlet	76.6	0.01179	6655	1085	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.027 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4513.8 BTU/(hr-CFM)
Site Altitude = 1385.0 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	116168	Cooling	112122	76.6	6655	1085	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	76.0	0.00730	1494	400	9206	0
Vent - Return Mixing	Outlet	71.3	0.00730	6655	431	-	-
Central Cooling Coil	Outlet	70.0	0.00730	6655	431	9206	0
Supply Fan	Outlet	70.0	0.00730	6655	431	0	-
Cold Supply Duct	Outlet	70.0	0.00730	6655	431	-	-
Zone Air	-	70.0	0.00730	6655	441	0	0
Return Plenum	Outlet	70.0	0.00730	6655	441	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.027 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4513.8 BTU/(hr-CFM)
Site Altitude = 1385.0 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	0	70.0	6655	441	0	0

Location: mirpur, Pakistan
Altitude: 1385.0 ft.
Data for: August DESIGN COOLING DAY, 1700