Air System Sizing Summary for HP-3

Project Name: Absher Construction Replace HP-3
Prepared by: Air Systems Engineering

08/09/2023
09:45AM

PRMH20231183

Air System Information

Air System Name	**HP-3**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**1976.0**	ft²
Air System Type	**SZCAV**		Location	**Tacoma, Washington**	

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	**4.4**	Tons	Load occurs at	**Jun 1600**	
Total coil load	**52.4**	MBH	OA DB / WB	**84.3 / 64.8**	°F
Sensible coil load	**51.4**	MBH	Entering DB / WB	**77.1 / 64.9**	°F
Coil CFM at Jun 1600	**2815**	CFM	Leaving DB / WB	**60.0 / 58.8**	°F
Max block CFM	**2815**	CFM	Coil ADP	**58.1**	°F
Sum of peak zone CFM	**2815**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.981**		Resulting RH	**54**	%
CFM/Ton	**644.2**		Design supply temp.	**58.0**	°F
ft²/Ton	**452.1**		Zone T-stat Check	**1 of 1**	OK
BTU/(hr·ft²)	**26.5**		Max zone temperature deviation	**0.0**	°F
Water flow @ 10.0 °F rise	**N/A**				

Central Heating Coil Sizing Data

Max coil load	**29.8**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**2815**	CFM	BTU/(hr·ft²)	**15.1**	
Max coil CFM	**2815**	CFM	Ent. DB / Lvg DB	**65.3 / 75.2**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**2815**	CFM	Fan motor BHP	**0.00**	BHP
Standard CFM	**2783**	CFM	Fan motor kW	**0.00**	kW
Actual max CFM/ft²	**1.42**	CFM/ft²	Fan static	**0.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**231**	CFM	CFM/person	**15.40**	CFM/person
CFM/ft²	**0.12**	CFM/ft²			

Air System Design Load Summary for HP-3

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 84.3 °F / 64.8 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 18.0 °F / 14.8 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	320 ft²	20241	-	320 ft²	-	-
Wall Transmission	1352 ft²	2580	-	1352 ft²	4396	-
Roof Transmission	1976 ft²	4296	-	1976 ft²	3714	-
Window Transmission	320 ft²	1087	-	320 ft²	9784	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1976 ft²	0	-	1976 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	3162 W	10787	-	0	0	-
Task Lighting	1482 W	5056	-	0	0	-
Electric Equipment	988 W	3371	-	0	0	-
People	15	3675	3075	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	**-**	**51093**	**3075**	**-**	**17894**	**0**
Zone Conditioning	-	49502	3075	-	17103	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	2815 CFM	0	-	2815 CFM	0	-
Ventilation Load	231 CFM	1937	-2075	231 CFM	12710	0
Supply Fan Load	2815 CFM	0	-	2815 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**51439**	**1000**	**-**	**29813**	**0**
Central Cooling Coil	-	51439	1008	-	0	0
Central Heating Coil	-	0	-	-	29813	-
>> Total Conditioning	**-**	**51439**	**1008**	**-**	**29813**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

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	18.0	0.00098	231	400	-12710	0
Vent - Return Mixing	Outlet	65.3	0.00098	2815	511	-	-
Central Cooling Coil	Outlet	65.3	0.00098	2815	511	0	0
Central Heating Coil	Outlet	75.2	0.00098	2815	511	29813	-
Supply Fan	Outlet	75.2	0.00098	2815	511	0	-
Cold Supply Duct	Outlet	75.2	0.00098	2815	511	-	-
Zone Air	-	69.5	0.00098	2815	521	-17103	0
Return Plenum	Outlet	69.5	0.00098	2815	521	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.067 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4691.6 BTU/(hr-CFM)
Site Altitude = 322.0 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	-17894	Heating	-17103	69.5	2815	521	0	0