

Air System Sizing Summary for RTU-1-2 VALLEYBALL COURT #1-#2

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
Prepared by: Michael Bassford, P.E.

01/31/2022
06:47PM

Air System Information

Air System Name RTU-1-2 VALLEYBALL COURT #1-#2
Equipment Class PKG ROOF
Air System Type SZCAV

Number of zones 1
Floor Area 10500.0 ft²
Location West Palm Beach, Florida

Sizing Calculation Information

Calculation Months Jan to Dec
Sizing Data User-Modified

Zone CFM Sizing Peak zone sensible load
Space CFM Sizing Coincident space loads

Central Cooling Coil Sizing Data

Total coil load 58.0 Tons
Total coil load 696.4 MBH
Sensible coil load 441.2 MBH
Coil CFM at Jun 1500 15000 CFM
Max block CFM 15000 CFM
Sum of peak zone CFM 15000 CFM
Sensible heat ratio 0.634
ft²/Ton 180.9
BTU/(hr-ft²) 66.3
Water flow @ 10.0 °F rise N/A

Load occurs at Jun 1500
OA DB / WB 90.0 / 78.0 °F
Entering DB / WB 76.5 / 65.1 °F
Leaving DB / WB 49.3 / 48.5 °F
Coil ADP 46.2 °F
Bypass Factor 0.100
Resulting RH 50 %
Design supply temp. 58.0 °F
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0.0 °F

Central Heating Coil Sizing Data

Max coil load 258.9 MBH
Coil CFM at Jan 0900 15000 CFM
Max coil CFM 15000 CFM
Water flow @ 20.0 °F drop N/A

Load occurs at Jan 0900
BTU/(hr-ft²) 24.7
Ent. DB / Lvg DB 49.3 / 65.3 °F

Supply Fan Sizing Data

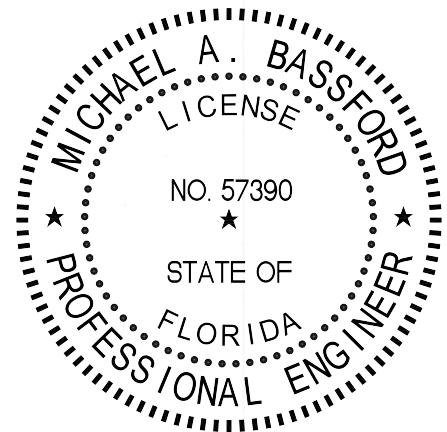
Actual max CFM 15000 CFM
Standard CFM 14989 CFM
Actual max CFM/ft² 1.43 CFM/ft²

Fan motor BHP 2.05 BHP
Fan motor kW 1.63 kW
Fan static 0.50 in wg

Outdoor Ventilation Air Data

Design airflow CFM 3250 CFM
CFM/ft² 0.31 CFM/ft²

CFM/person 7.93 CFM/person



Zone Sizing Summary for RTU-1-2 VALLEYBALL COURT #1-#2

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Air System Information

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Equipment Class **PKG ROOF**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **10500.0** ft²
Location **West Palm Beach, Florida**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone CFM Sizing **Peak zone sensible load**
Space CFM Sizing **Coincident space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	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	15000	15000	1.43	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 (ft ²)
Zone 1	178.0	Jul 1500	43.3	10500.0

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 (ft ²)	Space CFM/ft ²
Zone 1							
RTU-1 GYM STORAGE #2	1	1.4	Jul 1500	119	0.7	146.0	0.82
RTU-1 VOLLEYBALL COURT#1	1	88.8	Jul 1500	7486	22.8	5104.0	1.47
RTU-2 VOLLEYBALL COURT#2	1	87.8	Jul 1500	7395	19.7	5250.0	1.41

Air System Design Load Summary for RTU-1-2 VALLEYBALL COURT #1-#2

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
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01/31/2022
06:47PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 90.0 °F / 78.0 °F			HEATING OA DB / WB 43.0 °F / 36.1 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	231 ft²	4747	-	231 ft²	-	-
Wall Transmission	9616 ft²	15208	-	9616 ft²	15091	-
Roof Transmission	10500 ft²	19265	-	10500 ft²	14001	-
Window Transmission	231 ft²	3763	-	231 ft²	6488	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	103 ft²	1457	-	103 ft²	2513	-
Floor Transmission	10500 ft²	0	-	10500 ft²	5163	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	10500 W	29674	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	410	90197	110700	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	12600	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	176912	110700	-	43255	0
Zone Conditioning	-	173636	110700	-	37998	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	15000 CFM	0	-	15000 CFM	0	-
Ventilation Load	3250 CFM	60303	144490	3250 CFM	93365	0
Supply Fan Load	15000 CFM	5560	-	15000 CFM	-5560	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	239499	255190	-	125802	0
Central Cooling Coil	-	441213	255190	-	0	0
Central Heating Coil	-	-201714	-	-	125802	-
>> Total Conditioning	-	239499	255190	-	125802	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for AHU-1 FELLOWSHIP-WARMING

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
Prepared by: Michael Bassford, P.E.

02/16/2022
10:16PM

Air System Information

Air System Name **AHU-1 FELLOWSHIP-WARMING**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1476.0** ft²
Location **West Palm Beach, Florida**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone CFM Sizing **Peak zone sensible load**
Space CFM Sizing **Coincident space loads**

Central Cooling Coil Sizing Data

Total coil load **7.9** Tons
Total coil load **94.8** MBH
Sensible coil load **60.4** MBH
Coil CFM at Aug 1500 **2700** CFM
Max block CFM **2700** CFM
Sum of peak zone CFM **2700** CFM
Sensible heat ratio **0.637**
ft²/Ton **186.8**
BTU/(hr-ft²) **64.2**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Aug 1500**
OA DB / WB **91.0 / 78.0** °F
Entering DB / WB **78.4 / 68.0** °F
Leaving DB / WB **57.7 / 56.8** °F
Coil ADP **55.4** °F
Bypass Factor **0.100**
Resulting RH **58** %
Design supply temp. **58.0** °F
Zone T-stat Check **0 of 1** OK
Max zone temperature deviation **0.5** °F

Central Heating Coil Sizing Data

Max coil load **34.2** MBH
Coil CFM at Des Htg **2700** CFM
Max coil CFM **2700** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr-ft²) **23.2**
Ent. DB / Lvg DB **62.8 / 74.5** °F

Supply Fan Sizing Data

Actual max CFM **2700** CFM
Standard CFM **2698** CFM
Actual max CFM/ft² **1.83** CFM/ft²

Fan motor BHP **0.37** BHP
Fan motor kW **0.29** kW
Fan static **0.50** in wg

Outdoor Ventilation Air Data

Design airflow CFM **700** CFM
CFM/ft² **0.47** CFM/ft²

CFM/person **4.32** CFM/person

Zone Sizing Summary for AHU-1 FELLOWSHIP-WARMING

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Air System Information

Air System Name **AHU-1 FELLOWSHIP-WARMING**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1476.0** ft²
Location **West Palm Beach, Florida**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone CFM Sizing **Peak zone sensible load**
Space CFM Sizing **Coincident space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft ²	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	2700	2700	1.83	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 (ft ²)
Zone 1	49.5	Aug 1500	15.4	1476.0

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 (ft ²)	Space CFM/ft ²
Zone 1							
AHU-1 FELLOWSHIP AREA	1	46.6	Aug 1500	2540	14.4	1275.0	1.99
AHU-1 PREP KITCHEN	1	2.9	Aug 1500	160	1.0	201.0	0.79

Air System Design Load Summary for AHU-1 FELLOWSHIP-WARMING

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
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02/16/2022
10:16PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 91.0 °F / 78.0 °F			HEATING OA DB / WB 43.0 °F / 36.1 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	363 ft²	7404	-	363 ft²	-	-
Wall Transmission	1302 ft²	1963	-	1302 ft²	2174	-
Roof Transmission	1476 ft²	2503	-	1476 ft²	1825	-
Window Transmission	363 ft²	6295	-	363 ft²	10203	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1476 ft²	0	-	1476 ft²	1166	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1624 W	4588	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	162	25531	10115	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	1200	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	49485	10115	-	15367	0
Zone Conditioning	-	46568	10115	-	15039	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	2700 CFM	0	-	2700 CFM	0	-
Ventilation Load	700 CFM	12857	24256	700 CFM	20156	0
Supply Fan Load	2700 CFM	1001	-	2700 CFM	-1001	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	60425	34371	-	34195	0
Central Cooling Coil	-	60425	34376	-	0	0
Central Heating Coil	-	0	-	-	34194	-
>> Total Conditioning	-	60425	34376	-	34194	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for AHU-2 RESTROOMS-GYM STORAGE

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
Prepared by: Michael Bassford, P.E.

01/31/2022
06:46PM

Air System Information

Air System Name **AHU-2 RESTROOMS-GYM STORAGE**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1072.0** ft²
Location **West Palm Beach, Florida**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone CFM Sizing **Peak zone sensible load**
Space CFM Sizing **Coincident space loads**

Central Cooling Coil Sizing Data

Total coil load **1.8** Tons
Total coil load **21.7** MBH
Sensible coil load **15.7** MBH
Coil CFM at Aug 1500 **800** CFM
Max block CFM **800** CFM
Sum of peak zone CFM **800** CFM
Sensible heat ratio **0.725**
ft²/Ton **593.2**
BTU/(hr-ft²) **20.2**
Water flow @ 10.0 °F rise **N/A**

Load occurs at **Aug 1500**
OA DB / WB **91.0 / 78.0** °F
Entering DB / WB **75.9 / 65.7** °F
Leaving DB / WB **57.7 / 56.7** °F
Coil ADP **55.6** °F
Bypass Factor **0.100**
Resulting RH **58** %
Design supply temp. **58.0** °F
Zone T-stat Check **0 of 1** OK
Max zone temperature deviation **0.2** °F

Central Heating Coil Sizing Data

Max coil load **6.0** MBH
Coil CFM at Des Htg **800** CFM
Max coil CFM **800** CFM
Water flow @ 20.0 °F drop **N/A**

Load occurs at **Des Htg**
BTU/(hr-ft²) **5.6**
Ent. DB / Lvg DB **66.3 / 73.3** °F

Supply Fan Sizing Data

Actual max CFM **800** CFM
Standard CFM **799** CFM
Actual max CFM/ft² **0.75** CFM/ft²

Fan motor BHP **0.11** BHP
Fan motor kW **0.09** kW
Fan static **0.50** in wg

Outdoor Ventilation Air Data

Design airflow CFM **100** CFM
CFM/ft² **0.09** CFM/ft²

CFM/person **10.00** CFM/person

Zone Sizing Summary for AHU-2 RESTROOMS-GYM STORAGE

Project Name: HOBE SOUND BIBLE COLLEGE GYM-REVISED OA
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01/31/2022
06:46PM

Air System Information

Air System Name **AHU-2 RESTROOMS-GYM STORAGE**
Equipment Class **SPLT AHU**
Air System Type **SZCAV**

Number of zones **1**
Floor Area **1072.0** ft²
Location **West Palm Beach, Florida**

Sizing Calculation Information

Calculation Months **Jan to Dec**
Sizing Data **User-Modified**

Zone CFM Sizing **Peak zone sensible load**
Space CFM Sizing **Coincident 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	800	800	0.75	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	14.9	Aug 1500	3.6	1072.0

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							
AHU-2 JANITOR CLOSET	1	0.7	Aug 1500	39	0.0	28.0	1.40
AHU-2 MENS RR	1	4.9	Aug 1500	264	0.7	316.0	0.84
AHU-2 WOMENS RR	1	4.8	Aug 1500	256	0.4	326.0	0.79
AHU-2 GYM STORAGE #2	1	4.5	Aug 1500	241	2.4	402.0	0.60

Air System Design Load Summary for AHU-2 RESTROOMS-GYM STORAGE

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 91.0 °F / 78.0 °F			HEATING OA DB / WB 43.0 °F / 36.1 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	945 ft²	1619	-	945 ft²	1682	-
Roof Transmission	1072 ft²	1866	-	1072 ft²	1367	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1072 ft²	0	-	1072 ft²	558	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1072 W	3030	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	10	1807	1200	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	6600	1200	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14922	2400	-	3608	0
Zone Conditioning	-	13570	2400	-	3394	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	800 CFM	0	-	800 CFM	0	-
Ventilation Load	100 CFM	1865	3553	100 CFM	2880	0
Supply Fan Load	800 CFM	297	-	800 CFM	-297	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	15732	5953	-	5977	0
Central Cooling Coil	-	15732	5954	-	0	0
Central Heating Coil	-	0	-	-	5977	-
>> Total Conditioning	-	15732	5954	-	5977	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		