

Air System Sizing Summary for RTU 1

Project Name 1412
 Prepared by Coburn And Associates Inc

10/29/2014
 09 36AM

Air System Information

Air System Name	RTU 1	Number of zones	1
Equipment Class	UNDEF	Floor Area	1604.0 ft ²
Air System Type	SZCAV	Location	Jacksonville IAP, Florida

Sizing Calculation Information

Zone and Space Sizing Method.		Calculation Months	Jan to Dec
Zone CFM	Sum of space airflow rates	Sizing Data	Calculated
Space CFM	Individual peak space loads		

Central Cooling Coil Sizing Data

Total coil load	9.1 Tons	Load occurs at	Sep 1300
Total coil load	108.8 MBH	OA DB / WB	90.0 / 75.5 °F
Sensible coil load	93.8 MBH	Entering DB / WB	77.6 / 66.5 °F
Coil CFM at Sep 1300	5232 CFM	Leaving DB / WB	60.9 / 59.9 °F
Max block CFM	5232 CFM	Coil ADP	59.1 °F
Sum of peak zone CFM	5232 CFM	Bypass Factor	0.100
Sensible heat ratio	0.862	Resulting RH	56 %
ft ² /Ton	176.9	Design supply temp	58.0 °F
BTU/(hr-ft ²)	67.8	Zone T-stat Check	1 of 1 OK
Water flow @ 10 0 °F rise	21.77 gpm	Max zone temperature deviation	0.0 °F

Central Heating Coil Sizing Data

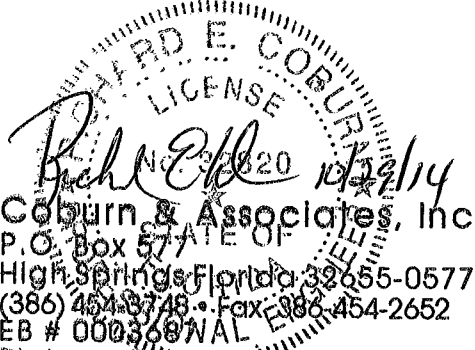
Max coil load	29.1 MBH	Load occurs at	Des Htg
Coil CFM at Des Htg	5232 CFM	BTU/(hr-ft ²)	18.1
Max coil CFM	5232 CFM	Ent DB / Lvg DB	69.7 / 74.9 °F
Water flow @ 20 0 °F drop	2.91 gpm		

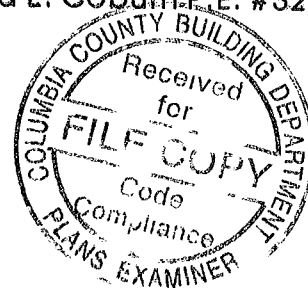
Supply Fan Sizing Data

Actual max CFM	5232 CFM	Fan motor BHP	0.00 BHP
Standard CFM	5226 CFM	Fan motor kW	0.00 kW
Actual max CFM/ft ²	3.26 CFM/ft ²	Fan static	0.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM	0 CFM	CFM/person	0.00 CFM/person
CFM/ft ²	0.00 CFM/ft ²		


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Zone Sizing Summary for RTU 1

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09 36AM

Air System Information

Air System Name	RTU 1	Number of zones	1
Equipment Class	UNDEF	Floor Area	1604.0 ft ²
Air System Type	SZCAV	Location	Jacksonville IAP, Florida

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM	Sum of space airflow rates	Calculation Months	Jan to Dec
Space CFM	Individual peak space loads	Sizing Data	Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	87.5	5232	5232	Sep 1400	29.3	1604.0	3.26

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 (ft ²)	Space CFM/ft ²
<i>Zone 1</i>							
1-Dining room	1	46.6	Nov 1400	2541	11.6	904.0	2.81
1-HALL	1	0.4	Jul 1600	21	0.4	51.0	0.40
1-MEN	1	0.5	Jul 1500	29	0.5	111.0	0.26
1-UTILITY	1	0.2	Jul 1400	10	0.1	41.0	0.24
1-WIFI	1	47.8	Jul 1000	2604	16.5	366.0	7.12
1-WOMEN	1	0.5	Jul 1400	27	0.2	131.0	0.20

Air System Design Load Summary for RTU 1

Project Name 1412
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10/29/2014
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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 90.0 °F / 75.5 °F			HEATING OA DB / WB 29.0 °F / 24.4 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	1059 ft²	39016	-	1059 ft²	-	-
Wall Transmission	1083 ft²	951	-	1083 ft²	2089	-
Roof Transmission	1604 ft²	4402	-	1604 ft²	2886	-
Window Transmission	1059 ft²	7159	-	1059 ft²	24318	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1604 ft²	0	-	1604 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	686 W	1924	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	86	16593	14970	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	17000	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	87046	14970	-	29293	0
Zone Conditioning	-	93832	14970	-	29094	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	5232 CFM	0	-	5232 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Supply Fan Load	5232 CFM	0	-	5232 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	93832	14970	-	29094	0
Central Cooling Coil	-	93832	14974	-	0	0
Central Heating Coil	-	0	-	-	29094	-
>> Total Conditioning	-	93832	14974	-	29094	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 RTU 1

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09 36AM

September DESIGN COOLING DAY, 1300

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	90.0	0.01565	0	400	0	0
Vent - Return Mixing	Outlet	77.6	0.01136	5232	4499	-	-
Central Cooling Coil	Outlet	60.9	0.01075	5232	4499	93832	14974
Central Heating Coil	Outlet	60.9	0.01075	5232	4499	0	-
Supply Fan	Outlet	60.9	0.01075	5232	4499	0	-
Cold Supply Duct	Outlet	60.9	0.01075	5232	4499	-	-
Zone Air	-	77.6	0.01136	5232	4499	93832	14970
Return Plenum	Outlet	77.6	0.01136	5232	4499	0	-

*Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080, At site altitude = 1.079 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6, At site altitude = 4741.5 BTU/(hr-CFM)
Site Altitude = 300 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	87046	Cooling	93832	77.6	5232	4499	0	0

System Psychrometrics for RTU 1

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09 36AM

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	29.0	0.00162	0	400	0	0
Vent - Return Mixing	Outlet	69.7	0.01425	5232	800	-	-
Central Cooling Coil	Outlet	69.7	0.01425	5232	800	0	0
Central Heating Coil	Outlet	74.9	0.01425	5232	800	29094	-
Supply Fan	Outlet	74.9	0.01425	5232	800	0	-
Cold Supply Duct	Outlet	74.9	0.01425	5232	800	-	-
Zone Air	-	69.7	0.01425	5232	800	-29094	0
Return Plenum	Outlet	69.7	0.01425	5232	800	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080, At site altitude = 1.079 BTU/(hr-CFM-F)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6, At site altitude = 4741.5 BTU/(hr-CFM)

Site Altitude = 300 ft

TABLE 2: ZONE DATA

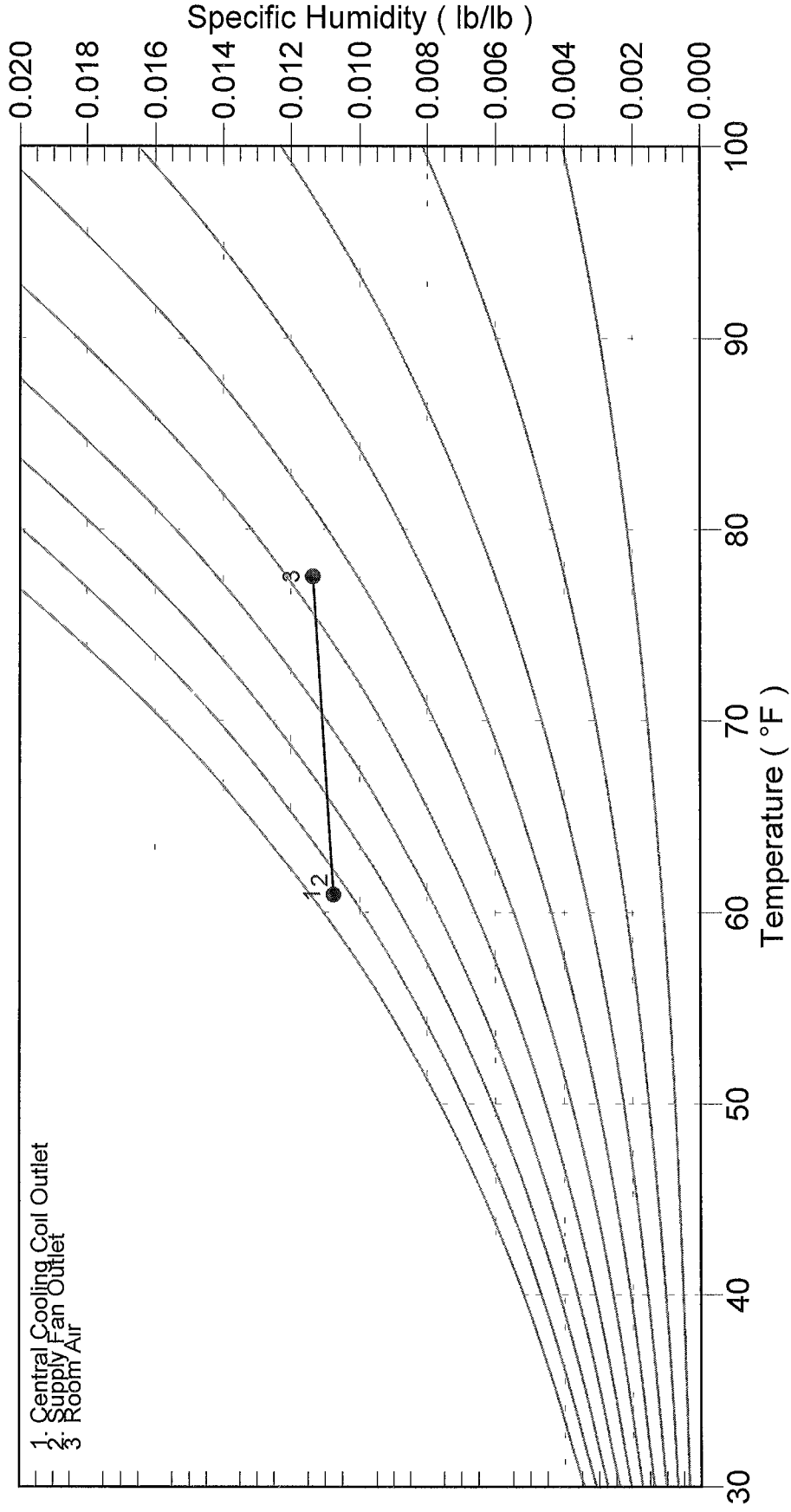
Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-29293	Heating	-29094	69.7	5232	800	0	0

Psychrometric Analysis for RTU 1

Project Name 1412
Prepared by: Coburn And Associates Inc

10/29/2014
09 36AM

Location: Jacksonville IAP, Florida
Altitude: 30.0 ft.
Data for: September DESIGN COOLING DAY, 1300



Air System Sizing Summary for RTU-2

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09:37AM

Air System Information

Air System Name	RTU-2	Number of zones	1
Equipment Class	UNDEF	Floor Area	1247.0 ft ²
Air System Type	SZCAV	Location	Jacksonville IAP, Florida

Sizing Calculation Information

Zone and Space Sizing Method.		Calculation Months	Jan to Dec
Zone CFM	Sum of space airflow rates	Sizing Data	Calculated
Space CFM	Individual peak space loads		

Central Cooling Coil Sizing Data

Total coil load	10.3 Tons	Load occurs at	Sep 1400
Total coil load	123.1 MBH	OA DB / WB	91.5 / 75.9 °F
Sensible coil load	109.9 MBH	Entering DB / WB	77.4 / 65.4 °F
Coil CFM at Sep 1400	5687 CFM	Leaving DB / WB	59.4 / 58.3 °F
Max block CFM	5687 CFM	Coil ADP	57.4 °F
Sum of peak zone CFM	5687 CFM	Bypass Factor	0.100
Sensible heat ratio	0.893	Resulting RH	53 %
ft ² /Ton	121.6	Design supply temp	58.0 °F
BTU/(hr-ft ²)	98.7	Zone T-stat Check	1 of 1 OK
Water flow @ 10.0 °F rise	24.63 gpm	Max zone temperature deviation	0.0 °F

Central Heating Coil Sizing Data

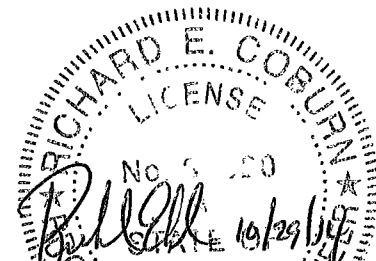
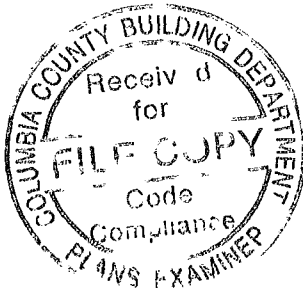
Max coil load	5.3 MBH	Load occurs at	Des Htg
Coil CFM at Des Htg	5687 CFM	BTU/(hr-ft ²)	4.2
Max coil CFM	5687 CFM	Ent DB / Lvg DB	69.9 / 70.8 °F
Water flow @ 20.0 °F drop	0.53 gpm		

Supply Fan Sizing Data

Actual max CFM	5687 CFM	Fan motor BHP	0.00 BHP
Standard CFM	5681 CFM	Fan motor kW	0.00 kW
Actual max CFM/ft ²	4.56 CFM/ft ²	Fan static	0.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM	0 CFM	CFM/person	0.00 CFM/person
CFM/ft ²	0.00 CFM/ft ²		



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Zone Sizing Summary for RTU-2

Project Name 1412
 Prepared by Coburn And Associates Inc

10/29/2014
 09:37AM

Air System Information

Air System Name	RTU-2	Number of zones	1
Equipment Class	UNDEF	Floor Area	1247.0 ft ²
Air System Type	SZCAV	Location	Jacksonville IAP, Florida

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM	Sum of space airflow rates	Calculation Months	Jan to Dec
Space CFM	Individual peak space loads	Sizing Data	Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	103.6	5687	5687	Sep 1500	5.3	1247.0	4.56

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 (ft ²)	Space CFM/ft ²
<i>Zone 1</i>							
2- COOKING	1	77.0	Jul 1600	4200	2.4	795.0	5.28
2- OFFICE	1	1.8	Sep 1600	96	0.3	65.0	1.48
2-ELECTRICAL	1	0.7	Aug 1800	38	0.4	42.0	0.91
2-JANITOR	1	0.7	Jul 1800	35	0.4	49.0	0.72
2-SERVING LINE	1	24.2	Oct 1500	1317	1.7	296.0	4.45

Air System Design Load Summary for RTU-2

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09 37AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 91.5 °F / 75.9 °F			HEATING OA DB / WB 29.0 °F / 24.4 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	31 ft²	1714	-	31 ft²	-	-
Wall Transmission	1395 ft²	1556	-	1395 ft²	2692	-
Roof Transmission	1247 ft²	2829	-	1247 ft²	1856	-
Window Transmission	31 ft²	232	-	31 ft²	718	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1247 ft²	0	-	1247 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1507 W	4286	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	300 W	948	-	0	0	-
People	15	6019	13155	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	85775	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	103360	13155	-	5266	0
Zone Conditioning	-	109947	13155	-	5297	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	5687 CFM	0	-	5687 CFM	0	-
Ventilation Load	0 CFM	0	0	0 CFM	0	0
Supply Fan Load	5687 CFM	0	-	5687 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	109947	13155	-	5297	0
Central Cooling Coil	-	109947	13159	-	0	0
Central Heating Coil	-	0	-	-	5297	-
>> Total Conditioning	-	109947	13159	-	5297	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 RTU-2

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09 37AM

September 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	91.5	0.01565	0	400	0	0
Vent - Return Mixing	Outlet	77.4	0.01061	5687	2745	-	-
Central Cooling Coil	Outlet	59.4	0.01012	5687	2745	109947	13159
Central Heating Coil	Outlet	59.4	0.01012	5687	2745	0	-
Supply Fan	Outlet	59.4	0.01012	5687	2745	0	-
Cold Supply Duct	Outlet	59.4	0.01012	5687	2745	-	-
Zone Air	-	77.4	0.01061	5687	2745	109947	13155
Return Plenum	Outlet	77.4	0.01061	5687	2745	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080, At site altitude = 1.079 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6, At site altitude = 4741.5 BTU/(hr-CFM)
 Site Altitude = 300 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	103360	Cooling	109947	77.4	5687	2745	0	0

System Psychrometrics for RTU-2

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09:37AM

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	29.0	0.00162	0	400	0	0
Vent - Return Mixing	Outlet	69.9	0.01135	5687	800	-	-
Central Cooling Coil	Outlet	69.9	0.01135	5687	800	0	0
Central Heating Coil	Outlet	70.8	0.01135	5687	800	5297	-
Supply Fan	Outlet	70.8	0.01135	5687	800	0	-
Cold Supply Duct	Outlet	70.8	0.01135	5687	800	-	-
Zone Air	-	69.9	0.01135	5687	800	-5297	0
Return Plenum	Outlet	69.9	0.01135	5687	800	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080, At site altitude = 1.079 BTU/(hr-CFM-F)

Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6, At site altitude = 4741.5 BTU/(hr-CFM)

Site Altitude = 300 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	-5266	Heating	-5297	69.9	5687	800	0	0

Psychrometric Analysis for RTU-2

Project Name 1412
Prepared by Coburn And Associates Inc

10/29/2014
09:37AM

Location: Jacksonville IAP, Florida
Altitude: 30.0 ft.
Data for: September DESIGN COOLING DAY, 1400

