

# System Psychrometrics for Packaged Rooftop AHU

Project Name: Example Problem  
Prepared by: Carrier Corporation

08/27/2002  
03:25PM

**August DESIGN COOLING DAY, 1600**

**TABLE 1: SYSTEM DATA**

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	91.0	0.01458	3142	24784	77129
Vent - Return Mixing	Outlet	86.5	0.01141	7815	-	-
Preheat Coil	Outlet	86.5	0.01141	7815	0	-
Central Cooling Coil	Outlet	53.1	0.00838	7815	275238	109628
Supply Fan	Outlet	55.0	0.00838	7815	15559	-
Cold Supply Duct	Outlet	55.0	0.00838	7815	0	-
Zone Air	-	76.5	0.00928	7815	177342	32513
Return Plenum	Outlet	83.5	0.00928	7815	57554	-
Return Fan	Outlet	83.5	0.00928	7815	0	-

*Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.054 BTU/(hr-CFM-F)*

*Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4632.3 BTU/(hr-CFM)*

*Site Altitude = 673.0 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)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
D101 - Classroom	16715	Cooling	17736	76.6	781	0	0
D102 - Classroom	16715	Cooling	17736	76.6	781	0	0
D103 - Classroom	16715	Cooling	17736	76.6	781	0	0
D104 - Classroom	17196	Cooling	18319	76.6	804	0	0
D106 - Classroom	19165	Cooling	20046	76.4	887	0	0
D107 - Classroom	18495	Cooling	19226	76.4	852	0	0
D108-111 Music Room	34364	Cooling	36001	76.5	1587	0	0
D113 - West Corridor	9032	Cooling	9837	76.8	429	0	0
D114 - South Corridor	7884	Cooling	8586	76.8	374	0	0
D105 - South Vestibule	5592	Cooling	5609	76.1	252	0	0
D112 - West Vestibule	6591	Cooling	6509	76.4	289	0	0

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## WINTER DESIGN HEATING

**TABLE 1: SYSTEM DATA**

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	-6.0	0.00029	3136	-248251	0
Vent - Return Mixing	Outlet	-6.0	0.00029	3136	-	-
Preheat Coil	Outlet	52.0	0.00029	3136	191700	-
Central Cooling Coil	Outlet	52.0	0.00029	3136	0	0
Supply Fan	Outlet	53.0	0.00029	3136	3245	-
Cold Supply Duct	Outlet	53.0	0.00029	3136	0	-
Zone Air	-	69.1	0.00029	3136	-132516	0
Return Plenum	Outlet	69.1	0.00029	3136	0	-
Return Fan	Outlet	69.1	0.00029	3136	0	-

*Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.054 BTU/(hr-CFM-F)*

*Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4632.3 BTU/(hr-CFM)*

*Site Altitude = 673.0 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)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
D101 - Classroom	-12458	Heating	-12125	69.1	611	18405	0
D102 - Classroom	-12458	Heating	-12125	69.1	611	18405	0
D103 - Classroom	-12458	Heating	-12125	69.1	611	18405	0
D104 - Classroom	-16135	Heating	-15722	69.1	681	21970	0
D106 - Classroom	-17273	Heating	-16834	69.1	703	23072	0
D107 - Classroom	-12458	Heating	-12125	69.1	611	18405	0
D108-111 Music Room	-23576	Heating	-22800	69.1	1227	35896	0
D113 - West Corridor	-5499	Heating	-5315	69.1	157	6170	0
D114 - South Corridor	-4800	Heating	-4639	69.1	137	5385	0
D105 - South Vestibule	-9736	Heating	-9471	69.1	188	9455	0
D112 - West Vestibule	-9492	Heating	-9233	69.1	184	9217	0