

HVAC LOAD CALCULATIONS

Design Weather Parameters & MSHGs		
18-41-031 Soft Surroundings Biltmore Asheville NC M Engineering	03/27/2018 03:58 PM	
Design Parameters:		
City Name	Nashville	
Location	Tennessee	
Latitude	36.1 Deg.	
Longitude	88.7 Deg.	
Elevation	591.0 ft.	
Summer Design Dry-Bulb	94.0 °F	
Summer Coincident Wet-Bulb	76.0 °F	
Summer Daily Range	19.1 °F	
Winter Design Dry-Bulb	10.0 °F	
Winter Design Wet-Bulb	7.6 °F	
Atmospheric Clearness Number	0.95	
Average Ground Reflectance	0.20	
Soil Conductivity	0.800 BTU/(hr ft. °F)	
Local Time Zone (GMT +/- N hours)	6.0 hours	
Consider Daylight Savings Time	No	
Simulation Weather Data	(TMD)	
Current Data is	2001 ASHRAE Handbook	
Design Cooling Months	January to December	

Air System Sizing Summary for Soft Surroundings	
Project Name: 18-41-031 Soft Surroundings Biltmore Asheville NC Prepared by: M Engineering	03/27/2018 10:23 AM

Air System Information	
Air System Name	Soft Surroundings
Equipment Class	UNDEF
Air System Type	SZCAV
Number of zones	1
Floor Area	4338.0 sq ft
Location	Nashville, Tennessee
Sizing Calculation Information	
Calculation Months	Jan to Dec
Sizing Data	Calculated
Central Cooling Coil Sizing Data	
Total coil load	13.9 Tons
Test coil load	186.3 MBH
Sensible coil load	128.3 MBH
Coil CFM at Aug 1600	5000 CFM
Max in-let CFM	5000 CFM
Sum of peak zone CFM	5000 CFM
Sensible heat ratio	0.723
CFM/Ton	368.8
R7/Ton	327.4
BTU/(hr ft²)	36.6
Water flow @ 10.0 °F rise	33.38 gpm

Central Heating Coil Sizing Data	
Max coil load	118.5 MBH
Coil CFM at Des Htg	5000 CFM
Max coil CFM	5000 CFM
Water flow @ 20.0 °F drop	11.85 gpm
Load occurs at	Des Htg
DB (hr-ft²)	26.3
Ent. DB / Lv. DB	58.2 / 77.8 °F

Supply Fan Sizing Data	
Actual max CFM	5000 CFM
Standard CFM	4884 CFM
Actual max CFM/Hr	1.10 CFM/Hr
Fan motor BHP	0.92 BHP
Fan motor kW	0.72 kW
Fan static	1.00 in w.g.

Outdoor Ventilation Air Data	
Design airflow CFM	1201 CFM
CFM/person	19.40 CFM/person
CFM/R²	0.25 CFM/R²

Space Loads and Airflows							
Zone Name / Space Name	Mult.	Cooling Sensible Load (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/R²
Zone 1							
Z1 - Sales	1	53.4	Aug 1900	3174	32.0	3052.0	1.04
Z2 - Filing Room	1	5.8	Jul 1800	345	3.6	475.0	0.73
Z3 - BOH	1	24.9	Jul 2000	1481	10.4	1011.0	1.46

Air System Design Load Summary for Soft Surroundings	
Project Name: 18-41-031 Soft Surroundings Biltmore Asheville NC Prepared by: M Engineering	03/27/2018 10:23 AM

DESIGN COOLING			
COOLING DATA AT Avg 1500			
COOLING O.A. DB / WB 84.0 °F / 76.0 °F			
Details	Sensible (BTU/hr)	Latent (BTU/hr)	Total (BTU/hr)
Window & Skylight Solar Loads	72.8	1250	1322.8
Wall Transmission	3998.8	11073	15071.8
Roof Transmission	0	0	0
Window Transmission	72.8	886	958.8
Skylight Transmission	0	0	0
Door Loads	0	0	0
Floor Transmission	4133.8	2504	6637.8
Partitions	0	0	0
Ceiling	0	0	0
Overhead Lighting	1508 W	0	0
Task Lighting	14827	0	0
Electric Equipment	8560 W	27385	35945
People	62	11277	11339
Infiltration	0	0	0
Miscellaneous	2000	0	0
Safety Factor	10% / 10%	7401	7500
Sys Totals Zone Loads	81469	14252	95721
Zone Conditioning	81469	14252	95721
Plenum Wall Load	0	0	0
Plenum Roof Load	0	0	0
Plenum Lighting Load	10303	0	10303
Return Fan Load	0	0	0
Ventilation Load	2442	31678	34120
Supply Fan Load	5000	2502	7502
Duct & Gain/Loss	0	0	0
System Loads	129384	46603	175987
Cooling Coil	129384	46603	175987
Coil Heating Coil	0	0	0
Zone Conditioning	129384	46603	175987

FAN SCHEDULE

MARK	SERVICE	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	POWER WATTS	ELECTRICAL VOLTS/PH	DRIVE	NOTE
EF-1	RESTROOM	GREENHECK	CEILING	SP-B110	100	0.25	80	120/1	DIRECT	1-6
EF-2	RESTROOM	GREENHECK	CEILING	SP-B110	100	0.25	80	120/1	DIRECT	1-6
EF-3	FITTING ROOM	GREENHECK	CEILING	SP-B110	130	0.25	80	120/1	DIRECT	1,2,4-7

- NOTES:
- VIBRATION ISOLATORS
 - ROUND OUTLET COLLAR WITH INTEGRAL BACKDRAFT DAMPER
 - CONTROL WITH ROOM OCCUPANCY SWITCH
 - DISCONNECT SWITCH
 - AMCA SEAL AND U.L. LISTED
 - FACTORY WIRED FAN SPEED CONTROLLER
 - CONTROL VIA TIMECLOCK

LANDLORD PROVIDED AIR HANDLING UNIT SCHEDULE

QUANTITY	UNIT NUMBER	MANUFACTURER / MODEL #	NOM. TONS	EER	BHP	CFM	ESP	RPM	VOLTAGE	HEATING KW@ 480V	HTG CFM	TOTAL CLG. MBH	SENS. CLG. MBH	O.A. CFM	WEIGHT (LBS.)	NOTES
1	AHU-1	CARRIER 40RUA008	7.5	11.8	2.4	2620	1.0	853	480 / 3	13.8	NA	92.6	68.6	600	601	1, 2
1	AHU-2	CARRIER 40RUA008	7.5	11.8	2.4	2550	1.0	853	480 / 3	13.8	NA	92.6	68.6	600	601	1, 2

- NOTES:
- LANDLORD INSTALLED ACCESSORIES AND OPTIONS
 - PROVIDE HI EFFICIENCY AIR HANDLER
 - UNIT TO BE PROVIDED WITH FIELD INSTALLED SPRING ISOLATORS
 - UNITS TO HAVE INTEGRAL HEATER
 - PROVIDE WITH ECONOMIZER SECTION
 - THIS CONTRACTOR SHALL PROVIDE ALL POWER AND LOW VOLTAGE WIRING.

LANDLORD PROVIDED CONDENSING UNIT SCHEDULE

QUANTITY	UNIT NUMBER	MANUFACTURER / MODEL #	NOM. TONS	EER	REF TYPE	NOM. COMP	TYP	VOLTAGE	NO.	HP EACH	TOTAL CLG. MBH	SENS. CLG. MBH	O.A. TEMP	WEIGHT (LBS.)	NOTES
1	ACCU-1	CARRIER 38AUZ008	7.5	11.2	410A	2	DIGITAL SCROLL	460/3	2	1/4	92.6	68.6	94	353	1, 2
1	ACCU-2	CARRIER 38AUZ008	7.5	11.2	410A	2	DIGITAL SCROLL	460/3	2	1/4	92.6	68.6	94	353	1, 2

- NOTES:
- LANDLORD PROVIDED ACCESSORIES/OPTIONS
 - LOW AMBIENT CONTROLLER FOR 17 DEGREE OPERATION
 - PROVIDE E-COATING ON EXTERIOR COILS, HAIL GUARD AND HANGAR STRAPPING FOR THE CONDENSING UNIT
 - SINGLE CIRCUIT, DUAL STAGE COMPRESSOR OPERATION
 - CONVENIENCE OUTLET
 - INSTALLING CONTRACTOR SHALL PROVIDE ALL LOW VOLTAGE WIRING, START CONTROLLER AND 1ST YEAR LABOR WARRANTY.

THERMOSTAT SETTINGS		
MONDAY TO SATURDAY		
SUNDAY		
CYCLE # 1 COOL 72°F	7:00 AM - 8:00 PM	11:00 AM - 7:00 PM
CYCLE # 2 COOL 85°F	8:00 AM - 7:00 PM	7:00 AM - 7:00 PM
CYCLE # 1 HEAT 70°F	7:00 AM - 10:00 PM	11:00 AM - 7:00 PM
CYCLE # 2 HEAT 58°F	10:00 AM - 7:00 AM	7:00 PM - 7:00 AM

OWNER RESPONSIBILITIES (SUBSTITUTIONS):

THE THERMOSTAT IS HONEYWELL VISION PRO 8000 MODEL #TH820R1003 PROVIDE TEMPERATURE CONTROL FOR GAS, OIL, ELECTRIC AND HEAT PUMPS FOR UP TO 3 HEAT, 2 COOLING SYSTEMS INCLUDING DUAL FUEL OPERATIONS.

HONEYWELL SENSORS: WIRELESS INDOOR SENSOR MODEL #C7169R104

INTERFACE MODULE: HONEYWELL EQUIPMENT INTERFACE MODULE #THM5421R1021

PROVIDE PLASTIC LOCKING COVERS FOR THERMOSTATS

Ventilation Sizing Summary for Soft Surroundings														
Project Name: 18-41-031 Soft Surroundings Biltmore Asheville NC		03/27/2018												
Prepared by: M Engineering		10:23 AM												
1. Summary														
Ventilation Sizing Method		ASHRAE Std 62.1-2013												
Design Condition		Heating operation												
Occupant Diversity (D)		1.000												
Unrecorated Outdoor Air Intake (UOI)		996 CFM												
System Ventilation Efficiency (E _{vt})		0.830												
Outdoor Air Intake (OAI)		1200 CFM												
2. Space Ventilation Analysis														
Zone Name / Space Name	Mult.	Supply (CFM)	Space Floor Area (Sq Ft)	Area Outdoor Rate (CFM/R²)	Zone Outdoor Rate (CFM/R²)	Average Occupancy (Occupants)	People Outdoor Air Rate (CFM/person)	Air Distribution Effectiveness (E _a)	Space Outdoor Air (CFM)	Zone Outdoor Air (CFM)	Breathing Zone Ventilation (Vbz)	Space Ventilation Efficiency (E _v)		
Zone 1														
Z1 - Sales	1	3174	3052.0	0.12	50.9	7.50	0.6	935	281	0.905				
Z2 - Filing Room	1	345	475.0	0.12	6.0	7.50	0.6	128	40	0.830				
Z3 - BOH	1	1481	1011.0	0.12	5.1	5.00	0.6	185	167	1.076				
Totals (incl. Space Multipliers)		5000												

MECHANICAL/PLUMBING RESPONSIBILITY SCHEDULE

ITEM	FURNISHED BY			INSTALLED BY		REUSE EXISTING	N/A	REMARKS
	OWNER	LL	CONTR.	LL	CONTR.			
SPLIT DX INDOOR UNIT	●			●				FURNISHED UNDER SEPARATE PERMIT
STRUCTURAL SUPPORTS FOR SPLIT DX UNITS AS REQUIRED	●			●				FURNISHED UNDER SEPARATE PERMIT
AHU MIXING BOX AND MIXING BOX MOTOR OPERATED DAMPERS	●			●				FURNISHED UNDER SEPARATE PERMIT
AHU MIXING BOX MOTOR OPERATED DAMPER ACTUATOR	●			●				FURNISHED UNDER SEPARATE PERMIT
CONDENSING UNITS	●			●				FURNISHED UNDER SEPARATE PERMIT
CURB AND/OR STRUCTURAL SUPPORTS FOR COND. UNITS AS REQUIRED	●			●				FURNISHED UNDER SEPARATE PERMIT
HVAC START UP POWER				●				SEE CODED NOTES
DIFFUSERS AND GRILLES				●				SEE CODED NOTES
WALL FIRE DAMPERS AND/OR COMBINATION SMOKE/FIRE DAMPERS				●				SEE CODED NOTES
LOW PRESSURE DUCTWORK				●				SEE CODED NOTES
TEMPERATURE CONTROL SYSTEM				●				SEE CODED NOTES
ECONOMIZER AIR MOTOR OPERATED DAMPER				●				SEE CODED NOTES
ECONOMIZER MOTOR OPERATED DAMPER ACTUATORS				●				SEE CODED NOTES
SMOKE DETECTOR RETURN AIR MOTOR SUPPLY AIR UNIT				●				SEE CODED NOTES
ZONE DAMPERS				●				SEE CODED NOTES
DUCT WATER(S)				●				SEE CODED NOTES
UNIT/BASIN HEATER(S)				●				SEE CODED NOTES
REFRESH AIR LOUVER				●				SEE CODED NOTES
OUTSIDE AIR INTAKE DUCTWORK				●				SEE CODED NOTES
OUTSIDE AIR LOUVER				●				SEE CODED NOTES
TOILET EXHAUST FAN(S)				●				SEE CODED NOTES
TOILET EXHAUST DUCTWORK				●				SEE CODED NOTES
AIR BALANCE REPORT				●				SEE CODED NOTES
AS-BUILT DRAWINGS				●				SEE CODED NOTES
PLUMBING FIXTURES				●				SEE CODED NOTES
BEAUTY AREA SINK AND FAUCET	●							
SAN. CW. HW. PIPING AND WATER METER				●				SEE CODED NOTES
SPRINKLER PIPING AND HEADS				●				SEE CODED NOTES
FIRE EXTINGUISHERS				●				SEE CODED NOTES
GENERAL NOTE								
THIS SCHEDULE IS INTENDED AS A "QUICK" REFERENCE. ALL ITEMS LISTED HERE ARE SPECIFIED AND DETAILED ON THESE DRAWINGS. IF THE CONTRACTOR ENCOUNTERS ITEMS THAT ARE CONTRADICTORY THEN IT IS HIS RESPONSIBILITY TO INFORM TENANT'S CONSTRUCTION MANAGER SO THAT THESE ITEMS CAN BE CLARIFIED FOR THE CONTRACTOR.								

AIR DEVICE SCHEDULE

NOTES:										
1. SYMBOL KEY - FIRST LETTER: S-SUPPLY, R-RETURN, E-EXH, T-TRANSFER SECOND LETTER: D-DIFFUSER, R-REGISTER, G-GRILLE					4. VOLUME DAMPER - FACTORY FURNISHED. MODEL D-75. ADJUSTABLE FROM FACE.					
2. PROVIDE OPTIONAL DIRECTIONAL THROW FEATURE FOR OTHER THAN 4-WAY					5. BORDER STYLE - "A" SURFACE MOUNTED "B" LAY-IN, PROVIDE WITH PLASTER FRAME FOR DRYWALL CEILING MOUNTING "C" LAY-IN FRAME FOR T-BAR CEILING.					
3. FINISH - "A" WHITE "B" WHITE - G.C. TO FIELD PAINT TO MATCH CEILING OR WALL WITH ENAMEL FINISH.					6. PROVIDE BOOT FOR DUCT MOUNTING.					
SYMBOL (1/2)	MANUFACTURER / CATALOG NUMBER	NOMINAL SIZE MOD. NECK	MOUNTING CLG. OTHER	MATERIAL STEEL ALUM.	FINISH (3)	DPR. (4)	BORDER (5)	REMARKS		
SD-1	TITUS OMNI	24"x24"	SEE PLAN ●	●	A	●	B	1, 2		
SD-2	TITUS OMNI	12"x12"	SEE PLAN ●	●	A	●	B	1, 2		
SG-1	TITUS 300RS	14"x6" 12"x6"	●	●	A	●	A	2 DUCT MOUNTED		
RG-1	TITUS 50F	24"x24"	SEE PLAN ●	●	A	●	B	2, 3		
RG-2	TITUS 50F	12"x12"	SEE PLAN ●	●	A	●	B	2, 3		
TG-1	TITUS 350RL	24"x24" 22"x22"	●	●	A	●	A	2 HSW MOUNTED		

- DIRECTION BLOW CLIPS (DB) AS REQUIRED BY SHADING IN DIFFUSER ON MECHANICAL PLAN (NO PATTERN INDICATES 4-WAY)
- THE CONTRACTOR SHALL PLACE THE AIR DEVICE ORDER IMMEDIATELY AFTER THE AWARD OF CONTRACT TO ENSURE THE DELIVERY TIME DOES NOT DELAY THE CONSTRUCTION SCHEDULE.
- 1/2" x 1/2" x 1/2" ALUMINUM GRID CORE



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Certification:



04/06/2018

Consultants:
RETAL DESIGN CONSULTANT



1-218-082



Soft Surroundings
BILTMORE VILLAGE
10 BROOK STREET
SPACE #160
ASHEVILLE, NC 28803
4,740 SQUARE FEET

DRAWINGS ISSUED FOR:

- programming
- schematic des.
- design dev.
- bidding
- permit/LI review
- construction

04-06-18

REVISIONS: