

HVAC NOTES - FLORIDA BUILDING CODE 6TH EDITION - EFFECTIVE 12/31/2017

COMPLIES WITH 6TH EDITION FLORIDA COMMERCIAL CODES - BUILDING, ENERGY, AND MECHANICAL.

COMMERCIAL BASIS OF DESIGN / CONTRACTOR NOTES:

These HVAC drawings, heat load calculations, and energy calculations are based on the architectural drawings provided for permit application. This HVAC design and specifications are in accordance with ACCA183 room by room heat load calculation procedure. The hvac systems are designed to operate continuously during climatic design conditions - outdoor climatic design conditions are listed in ACCA 183 (cooling season outdoor temperature examples: Tampa=91, Sarasota=92, St. Petersburg=93) and the indoor temperatures are fixed by the energy code section C302 at 72 degrees for winter / 75 degrees for summer. Single stage cooling equipment will have no reserve equipment capacity included for record breaking outdoor temperatures, unusually low indoor temperatures, or any other item not listed on the "Total Building Summary Loads" page - shown on these hvac drawings. For equipment selection designed to neutralize outdoor weather conditions, that can include the highest site recorded outdoor temperature, a lower than 75 degree indoor temperature, and occupancy quantities larger than shown, see FEC section C403.2.2 for selection of staged cooling equipment. The lowest operating stage of staged cooling equipment can be no greater than 15% of the heat load calculations performed at the climatic design conditions (or the closest equipment capacity match available that neutralizes both the sensible and latent heat loads). The highest stage of staged cooling equipment has no sizing limitations.

Using the architectural construction drawings, the following design procedures were performed: (1) room by room heat load calculations are performed to determine the buildings thermal zones and room by room demands in accordance with ACCA183 heat load calculation procedure (2) the heat load calculations were used to select the HVAC equipment capacities in compliance with manual S equipment selection procedure (3) the room by room demand calculations were used to design the duct system in accordance with manual D duct design (4) room air device type, size, and location were based on the rooms required cfm demand, the duct type, and room geometry, in accordance with manual T room air distribution selection procedure (5) Florida energy calculations were performed based on the hvac design procedures shown above. Note: If a duct zoning control system is shown with multiple thermostats that are served from a single hvac system, Manual 2R was used for the thermal zone grouping and bypass duct design. All calculations performed are data linked to the 3D CAD energy modeling software program that is specific only to this building.

For detailed building envelope information (component layers, insulation R values, NFRC glass values, component types and colors, quantity, etc.) see "Total Building Summary Loads" page shown on these hvac drawings. HVAC installer must field inspect the building envelope component types and sizes prior to any HVAC installation - be sure the building constructed matches the "Total Building Summary Loads" page, the room by room floor plan layout, and the energy code forms. Building envelope construction practice "semi tight" was used in the building infiltration calculations, field verify the building envelope (air barrier in contact with the thermal barrier) fully encapsulates the conditioned space. HVAC installer must field verify sealed draft stops exist that are isolating the wall cavities from the exterior and/or hot vented attic spaces. Buildings with hot vented attic spaces require the air and thermal barriers to be located at the ceiling plane. Buildings with unvented attics / or single assembly roofs (solid flat, low slope, sealed pitched, open web flat truss) require the air and thermal layer be located at the roof plane. Note: acoustical tile ceilings are not air barriers, paper faced insulation is not an air barrier - thermal layers in contact with a grid ceiling are ignored in the heat load and energy code calculations.

The room air devices, air cfm values, and branch duct sizes shown per room are based on the peak cooling season design conditions with hvac equipment capacities based on manual S equipment selection procedure for the buildings specific site location. This peak demand makes up approximately 15% of the cooling season, the remaining 85% of the cooling season (part load conditions) requires dedicated dehumidification equipment if year round control of indoor moisture content is expected. Year round moisture control is not part of this construction drawing and requires the latent heat load calculations are performed at part load design conditions, resulting in latent demands at least 20% higher when compared to the peak design conditions. Dedicated dehumidification equipment is required to control moisture content year round in Florida. Dehumidification equipment (Honeywell DH-90 or Ultra-Air XT150H) will monitor and control moisture content year round using a humidistat or dew point sensor. Provide ducted dedicated dehumidifier(s) for buildings that contain an unvented "sealed attic" space (example: spray foam insulation at roof deck underside or roof is insulated above the roof deck). Mount the dehumidifier(s) in the sealed attic near the roof peak. For buildings with a hot vented attic space, the dehumidification equipment is ducted to the conditioned space and controls the moisture content inside the conditioned space using a humidistat or dew point sensor. For healthier and cleaner indoor air, install a Plasma Air Model 7000 Ionizer + a large capacity HEPA filter as shown on the HVAC equipment schedule.

HVAC INSTALLING CONTRACTOR:

These HVAC drawings, heat load calculations, and energy code forms were based on the architectural drawings provided for permit application. Any modifications to the building room layout, occupancy amount, building use or classification, building compass orientation, or building envelope component material type or size must be communicated to the original HVAC designer. HVAC Installer should red line sketch on these HVAC drawings any field changes made during construction and submit the "as built" red line sketch to the original HVAC designer for redesign prior to any HVAC installation. Alternate air ducts sizes and air device sizes must be equal to the listed size shown, don't exceed a 3/1 aspect ratio on alternate duct sizes. Don't install a cooling system into a building that is missing a full building envelope. Installing HVAC contractor must provide a copy of the permit set HVAC drawings, HVAC calculations (Manual S ACCA183, D, T, ZR), and energy code forms to the building owner for approval. Installing HVAC contractor must perform the "building envelope survey" as shown in ACCA183, Appendix 1, to discuss desired indoor temperatures, filtration, indoor air quality, year round moisture control, health issues that require special indoor conditions, interior mounted heat producing equipment (both latent and sensible heat outputs), occupancy amounts other than shown, and any information not shown on the "Total Building Summary Loads" page - shown on these HVAC drawings.

CODE OFFICIAL + HVAC CONTRACTOR NOTES:

Florida code section abbreviations: FBC = Building, FMC = Mechanical, FEC = Energy

These HVAC drawings are not intended to show exact detail of every item required to meet the code requirements, see the isometric details for code section compliance references. The proposed duct routing is general in nature, field conditions and building structure may dictate the exact mounting configuration of the HVAC system(s). Florida building code sections are listed for each HVAC drawing symbol to be used by the installing HVAC contractor and code official(s). Installer should reference the code sections prior to fabrication or installation of any HVAC system component. These HVAC drawings comply with the Florida Building Codes edition (2017-2020) sections FBC101.4.2, FBC101.4.6, FBC105.3.1.2, FBC107.3.5 "Mechanical" Plan review criteria.

- HVAC installation must comply with the 6th edition Florida building codes, energy conservation codes, and mechanical codes effective 12/31/2017. Obtain all required permits and inspections per code sections FBC105, FBC107, and FBC110.
- Ventilation air provided per FBC1203 + FMC401.2 + Table 403.3.1.1. This design includes mechanically induced controlled ventilation for commercial buildings that contain a forced air duct system, pressurizing the building interior during air handler operation, provided by a ventilation air duct and motorized damper as shown. See HVAC floor plan drawings for the buildings ventilation air duct, motorized damper, and approved exterior location termination point. See "Total Building Summary Loads" page for ventilation air cfm amount. A blower door test may be performed to quantify the building's natural infiltration air cfm rate and determine the design ventilation air cfm amount will successfully pressurize the building's interior. The motorized ventilation air damper is controlled by a "run-time" control cycle during occupancy; ventilation air duct is closed when no occupants are present. Interlock the ventilation air damper motor with the air handler fan motor for "run time" cycling. The building interior pressure relief may occur by motorized relief air, continuous exhaust fan operation, or intermittent exhaust fan operation with some reasonable allowance for exfiltration - see HVAC drawings for building specific air balance schedule, ventilation air schedule, and exhaust air schedule.
- Coordinate location of all equipment, fans, air devices, and building penetrations with the general contractor. The HVAC installer must field verify clearances and accessibility prior to fabrication or installation of the HVAC components. Protect the building structure per FMC302. Provide accessibility for elevated equipment per FMC305.5. Fabricate and install HVAC system components per FMC403 + FBC107.2.4, and product manufacturers envelope penetration detail, FBC107 wind data for wall and roof penetrations, HVAC product installation instructions, HVAC equipment manufacturers installation instructions, and AHRI energy + equipment manufacturers expanded capacity ratings must be available on the construction site at time of code official inspections per FBC110.
- All exterior building penetrations and exterior mounted HVAC equipment, wall vent caps, roof vent caps, intake air vents, and relief air caps, etc. must comply with FBC1609 wind loads. HVAC installing contractor must supply engineered product or equipment ANSI/AMCA 540 test information for attachment to the building envelope component per section FBC1609.1.2. A structural engineer's sealed drawing detail may be required for exterior equipment mounted above ground level per FBC1510.10. This hvac design does not provide structural, equipment, or hood tie down details. See structural engineer's drawings and details for equipment support and tie down info when equipment manufacturers engineered data is not available.
- All duct sizes shown are clear interior "free area" duct dimensions based on FMC603.2 manual D duct design. Add 3" to listed sizes for R-6 exterior duct dimensions - add 4" to listed sizes for R-8 exterior duct dimensions. Fiberglass duct board shown is equal to Knauf 1.5", R-6, fabricate and install per SMACNA standards. Flexible ducts shown are equal to Alcoa 36 series R-6 class one air duct, not limited in length per FMC603.6.1.1. Construct all ducts per manufacturer's installation instructions and SMACNA standards for a maximum 1" w.g. Suspend and support the ducts from the building structure per FMC603.10. Mastic seal all ducts installed outside the building's thermal envelope per UL-181 and FMC603.9. Provide accessible volume control dampers in branch ducts per FMC603.18. General exhaust ducts used for exhaust fan duct, clothes dryer duct, make up air duct, are constructed from 28 gauge sheet metal "snap lock pipe", use SMACNA standards for required gauge of larger metal ducts, mastic seal ducts per table FMC603.9. Use flexible air ducts or 28 gauge sheet metal "snap lock pipe" for ventilation air ducts of smaller sizes.
- Provide a condensate drain piping system per FMC307, and a refrigerant piping system per FMC1107. Extend condensate drain discharge 12" minimum from the building exterior wall, discharge to grass or other approved location, a condensate drywell may be required. Provide piping and supports for both condensate and refrigerant piping per FMC305.
- Provide a balanced return air system per FMC601.6. All enclosable rooms require a 1" undercut on the interior door, allowing about 30 cfm of air relief per 30" wide door. Habitable spaces require door undercut plus a means for air transfer or a ducted return air. Pressure differentials across the restricted room can't exceed .01 inch w.g. Enclosable rooms located on the building exterior envelope should be balanced slightly positive. Size ducted transfer air ducts free area 1.5 times larger than the supply air delivered to the enclosed room(s). Size direct through wall or door grilles at 50 square inches of grille free area to 100 cfm.
- HVAC equipment mounted in a hot vented attic is forbidden on commercial buildings. Air handlers may mount inside the conditioned space, a warehouse, or a sealed attic that contains a thermal and air barrier at the roof plane / or may mount above an acoustical drop ceiling when the roof deck contains an air and thermal barrier that connects to the building envelope walls. Provide an access panel, a safe workers access deck, a light fixture with switch, and an electrical plug outlet.
- This design complies with climate zone 2A of the Florida energy conservation code design conditions FEC302, 72 degree heating set point and 75 degree cooling set point. Compliance demonstration is provided by energy conservation code form C402 prescriptive or C405 performance depending on construction type. The building envelope details are shown on the HVAC drawings basis of design (see "Total Building Summary Loads") as required by FEC303.1.1. HVAC heat load calculations and HVAC equipment capacity selection per section FEC403.2.1 and FEC403.2.2. Air distribution thermal insulation layer as required by FEC table C403.2.9.1. Duct sealing as required by FEC403.2.9.3. Refrigerant piping insulation per FEC403.2.10. And HVAC equipment controls per FEC403.2.4.
- Upon completion of the HVAC system installation, per manual D chapter 16, test equipment operating capacities for both cooling and heating to verify the equipment is functioning to the listed capacity. Verify the air handler total air flow cfm matches the HVAC equipment schedule or heat load calculation minimum system airflow rate. No duct system is self-balancing, adjust each room's branch duct volume damper to achieve the listed air flow values shown or to meet the building owner's needs. Use the air device volume damper for the last 10% of air balance to avoid noise at the air device face. Room air flow balance for buildings with concealed ducts can be accomplished during the "rough in" stage of construction, prior to concealment of ducts. With the building air barrier fully intact, install and operate the air handler until proper air flow is adjusted per room, a balanced return air path must also be present. Use a self-compensating air flow hood for airflow measurements, perform air balance procedure in accordance with manual B or NEBB standards. When required by code section FEC408.2.2, for buildings with thermal zones larger than 5,000 square feet or served by HVAC equipment capacities larger than 65,000 btuh, provide the air balance report to the building owner and code official. A blower door test may be performed to verify that the building envelope natural leakage rate does not exceed the infiltration or ventilation cfm rate shown on the "Total Building Summary Loads" page, shown on these drawings.

HVAC SYMBOLS - FLORIDA BUILDING CODE 6TH EDITION (2017-2020)

<p>CEILING REGISTER 1 WAY THROW SHOWN FMC 603.18 HVAC NOTES 3.5.7.9</p>	<p>RECTANGULAR DUCTWORK FMC 603.9 HVAC NOTES 3.5.9</p>	<p>CONDENSING UNIT ON SLAB, RAISED FLOOR OR ROOF FMC SECTIONS 303.304.306 HVAC NOTES 3.5.8.10</p>	<p>HORIZONTAL AIR HANDLER MOUNT FROM STRUCTURE FMC SECTIONS 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>FLOOR REGISTER 2 WAY THROW FMC NOTES 3.5.9</p>	<p>FLEXIBLE DUCTWORK FMC NOTES 3.5.9</p>	<p>VERTICAL AIR HANDLER ON STAND OR ATTIC FMC SECTIONS 303.304.306 HVAC NOTES 3.5.8.10</p>	<p>DUCTLESS AIR HANDLER HIGH WALL OR CEILING MOUNT FMC SECTIONS 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>FLOOR OR CEILING FILTER GRILLE FMC 603.18 HVAC NOTES 3.5.7.9</p>	<p>REFRIGERANT CONTROL PIPING FMC 305 + 1107 HVAC NOTES 3.5.8.10</p>	<p>DEDICATED ENERGY RECOVERY VENTILATOR (ERV) FLEXIBLE DUCTS SEE FLOOR PLAN FOR CONFIGURATION FMC 303.304.306 HVAC NOTES 3.5.8.10</p>	<p>AFF = ABOVE FINISH FLOOR AHU = AIR HANDLING UNIT BP = BYPASS DAMPER BD = BAROMETRIC DAMPER CFM = CUBIC FEET / MINUTE CU = CONDENSING UNIT DH = DE-HUMIDIFIER EA = EXHAUST AIR EER = ENERGY EFFICIENCY RATIO EF = EXHAUST FAN FPM = FEET PER MINUTE HSPF = HEATING SEASON PERFORMANCE FACTOR HP = HORSE POWER MOP = MAXIMUM OVER CURRENT PROTECTION MTR = MOTORIZED DAMPER MUA = MAKE UP AIR KW = KILO WATTS O/A = OUTSIDE AIR PKG = PACKAGE UNIT R/A = RETURN AIR RTU = ROOFTOP UNIT S/A = SUPPLY AIR SEER = SEASONAL ENERGY EFFICIENCY RATIO SF = SUPPLY FAN SP = STATIC PRESSURE T/A = TRANSFER AIR TSP = TOTAL STATIC PRESSURE TVP = TYPICAL V/A = VENTILATION AIR V/DH = VENTILATING DEHUMIDIFIER VTE = VENT TO EXTERIOR ZD = ZONE DAMPER</p>
<p>CEILING GRILLE DUCTED T/A FMC 603.18 + 603.18 HVAC NOTES 3.5.7.9</p>	<p>CONDENSATE DRAIN DRIPWELL FMC 305 + 307 HVAC NOTES 3.5.8.9</p>	<p>DEDICATED VENTILATING DEHUMIDIFIER CONTROL SEE FLOOR PLAN FOR CONFIGURATION FMC 303.304.306 HVAC NOTES 3.5.8.10</p>	<p>PACKAGE UNIT ON SLAB OR ROOF CONCEALED WITH FINISH FLOOR FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>WALL GRILLE FMC 603.18 HVAC NOTES 3.5.7.9</p>	<p>EQUIP. CONTROLS FEC302.4 + FEC303.1 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>1" UNDERCUT DOOR TYPICAL ALL INTERIOR DOORS FMC 601.6 HVAC NOTE 7</p>	<p>DUCT MOUNTED SMOKE DETECTOR FMC 306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>BRANCH DUCT VOLUME CONTROL DAMPER FMC 603.18 HVAC NOTES 3.5.10</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>DUCT MOUNTED SMOKE DETECTOR FMC 306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>EXHAUST VENT ROOF WALL FMC 307 HVAC NOTES 3.5.4</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>INTAKE VENT ROOF WALL FMC 307 HVAC NOTES 3.5.4</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>
<p>EQUIPMENT ACCESS PANEL FMC NOTE 8</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>ZONE / BYPASS AIR DAMPER FMC 303.304.306 HVAC NOTE 9</p>	<p>EXHAUST FAN EF 1 or 84 NOTED FMC 303.304.306 HVAC NOTES 3.5.8.10</p>

HVAC BASIS OF DESIGN - BUILDING ENVELOPE COMPONENTS - FECC103.2 + FECR103.2

BUILDING ENVELOPE COMPONENTS SHOWN ON THIS REPORT ARE DATA LINKED TO THE 3D SMART CAD HVAC FLOOR PLAN(S) SMART FIGURES. ANY CHANGES TO THE BUILDING ENVELOPE COMPONENT TYPES, COMPONENT AMOUNTS, BUILDING USAGE, INTERIOR ROOM LAYOUTS, OR BUILDING COMPASS ORIENTATION (NORTH ARROW) MUST BE COMMUNICATED TO THE ORIGINAL DESIGNER. CONDUCT AN OWNER SURVEY PER APPENDIX 1 "SURVEY", PAGE A1-1 TO ESTABLISH THE LISTED ITEMS ON THIS SUMMARY PAGE MEETS THE BUILDING OWNERS NEEDS. SEE "PROJECT REPORT" FOR BUILDING SITE CLIMATIC CONDITIONS AND INDOOR DESIGN CONDITIONS. ALSO SEE MANUAL D DUCT DESIGN REPORT(S) + "MANUAL S EQUIPMENT SELECTION" REPORT(S) FOR MORE DETAILED INFORMATION. SEE ENERGY FORMS FOR MINIMUM REQUIREMENTS OF ALL ITEMS.

DOOR U VALUES USED IN THE CALCULATIONS = 11D WOOD .39 (R=2.564) 11N METAL .35 (R=2.857) 11J FIBERGLASS .40 (R=2.5)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
GSF: Glazing-Glass Storefront Single Pane Clear, ground reflectance = 0.1, light color blinds at 45° with 100% coverage, U-value 1.07, SHGC 0.78	112	2,995	0	5,495	5,495
GED: Glazing-Glass Entry Door, ground reflectance = 0.1, U-value 1.07, SHGC 0.78	21	562	0	1,810	1,810
11N: Door-Metal - Polystyrene Core, U-value 0.35	48	420	0	487	487
WCB4: Wall-Block, Custom, R-4 continuous + any finish, U-value 0.143	484.9	1,733	0	1,268	1,268
WMF11: Part-Frame, Custom, metal + R-11 + any finish, U-value 0.112	1791.8	2,006	0	1,004	1,004
BUR10-zd: Roof/Ceiling-Roof Joists Between Roof Deck and Ceiling or Foam Encapsulated Roof Joists, Custom, Flat Deck / Memb Roof + R-10 (min) Insulation at deck, dark membrane, U-value 0.083	1440	2,988	0	4,780	4,780
FSOG0: Floor-Slab on grade, Custom, R-0 edge insulation + any finish, U-value 1.18	54	1,592	0	0	0
Subtotals for structure:		12,296	0	14,844	14,844
People:	12		1,860	2,940	4,800
Equipment:			360	3,560	3,920
Lighting:	1540		5,251	5,251	5,251
Ductwork:		1,794	1,659	637	2,297
Infiltration: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Ventilation: Winter CFM: 140, Summer CFM: 140		3,848	5,973	2,771	8,744
AED Excursion:		0	0	5,085	5,085
Total Building Load Totals:		17,938	9,853	35,089	44,941

Check Figures	Value	CFM Per Square ft.:	Value
Total Building Supply CFM:	1,600		1.111
Square ft. of Room Area:	1,440		379
Volume (ft³):	13,679		

Building Loads	Total Heating Required Including Ventilation Air:	17,938 Btuh	17,938 MBH
Total Sensible Gain:	35,089 Btuh	78 %	
Total Latent Gain:	9,853 Btuh	22 %	
Total Cooling Required Including Ventilation Air:	44,941 Btuh	3.80 Tons (Based On 77% Sensible Capacity)	

Notes

Rhvac is an ACCA approved Manual J, D and S computer program. Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D. All computed results are estimates as building use and weather may vary. Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

INTELLIGENT CAD DUCT FIGURES - GRAPHIC MANUAL D DUCT FITTINGS

<p>MAIN SUPPLY AIR PLENUMS</p>	<p>MAIN RETURN AIR PLENUMS</p>	<p>INTRINSIC AIR SIDE DEVICES</p>	<p>INTRINSIC EQUIPMENT DEVICES</p>
<p>SUPPLY BRANCH DUCT TAKEOFF</p>	<p>SUPPLY BRANCH DUCT TAKEOFF</p>	<p>SUPPLY AIR REGISTER BOXES</p>	<p>SUPPLY TRUNK JUNCTION FITTINGS</p>
<p>RETURN BRANCH DUCT TAKEOFF</p>	<p>RETURN BRANCH DUCT TAKEOFF</p>	<p>RETURN AIR REGISTER BOXES</p>	<p>RETURN TRUNK JUNCTION FITTINGS</p>
<p>SUPPLY + RETURN ELBOWS</p>	<p>S/A + R/A DIVERGING TRANSITIONS</p>	<p>S/A + R/A CONVERGING TRANSITIONS</p>	<p>SUPPLY TRUNK JUNCTION FITTINGS</p>

DUCT VELOCITY SHOWN IN FEET PER MINUTE	SUPPLY AIR SIDE		RETURN AIR SIDE	
	RIGID	FLEX	RIGID	FLEX
TRUNK DUCT	700 - 900	600 - 700	600 - 700	600 - 700
BRANCH DUCT	600 - 700	600 - 700	400 - 700	600 - 700

SCALE 1/4" = 1'-0"
36"x24" ARCH D

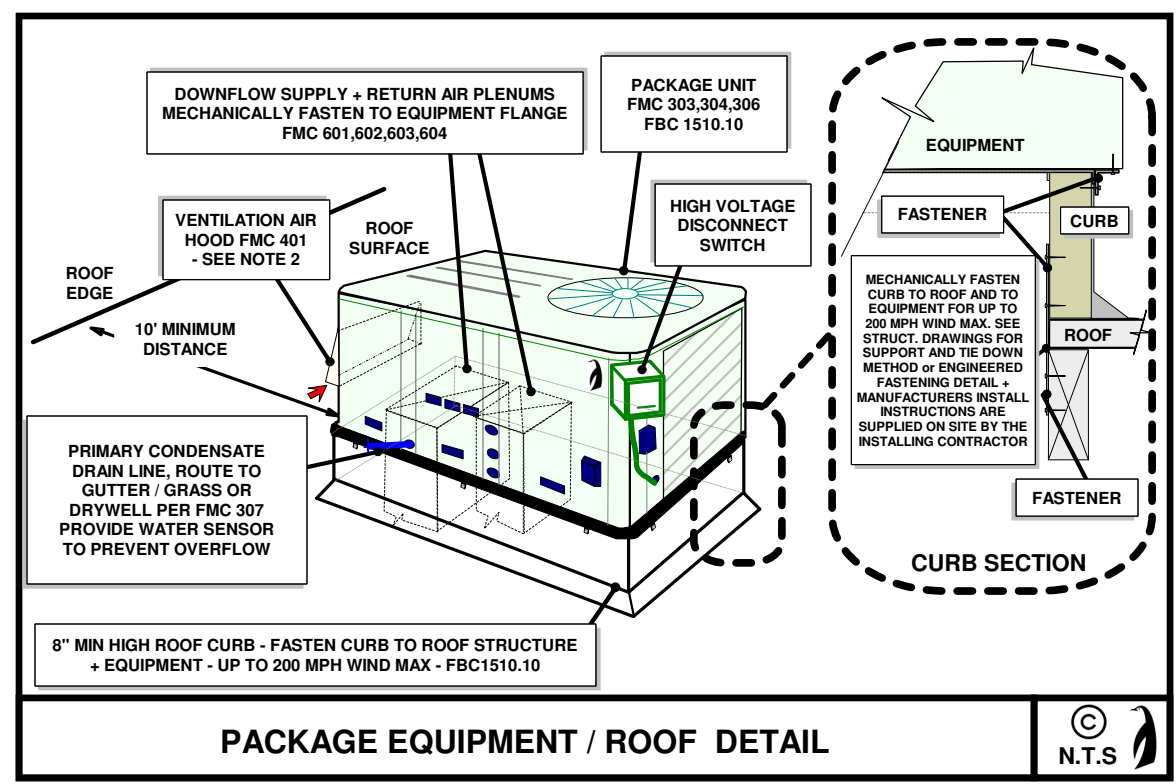
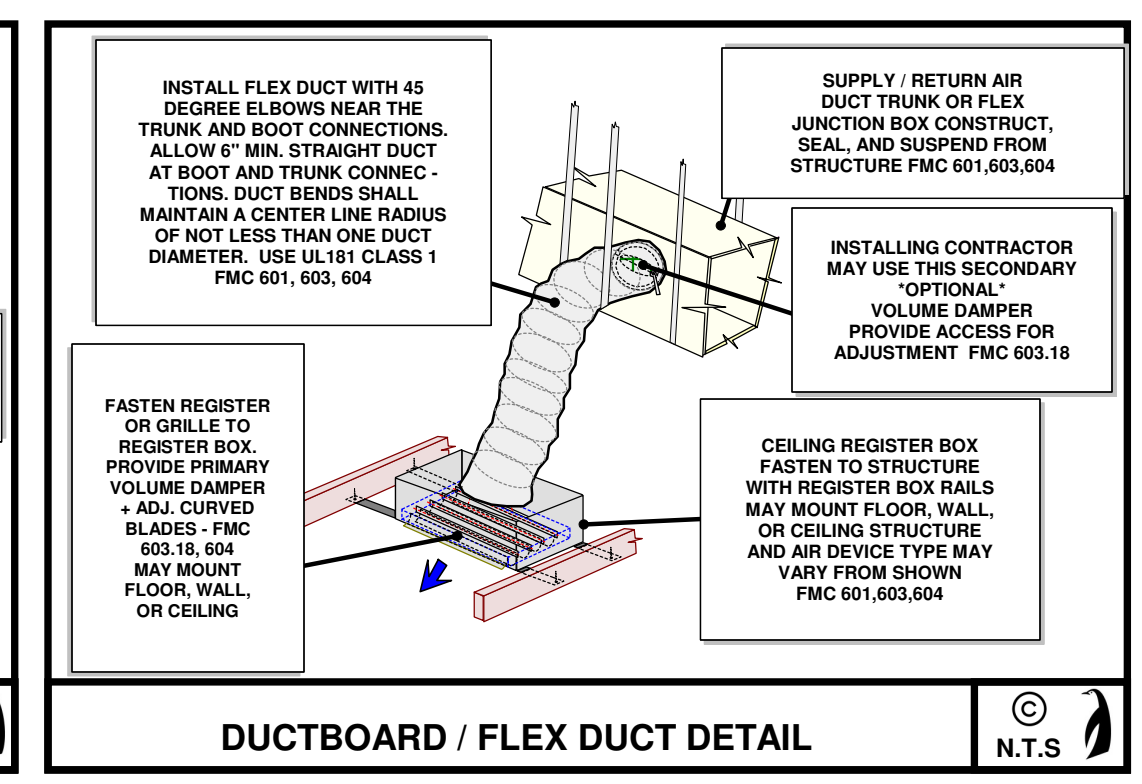
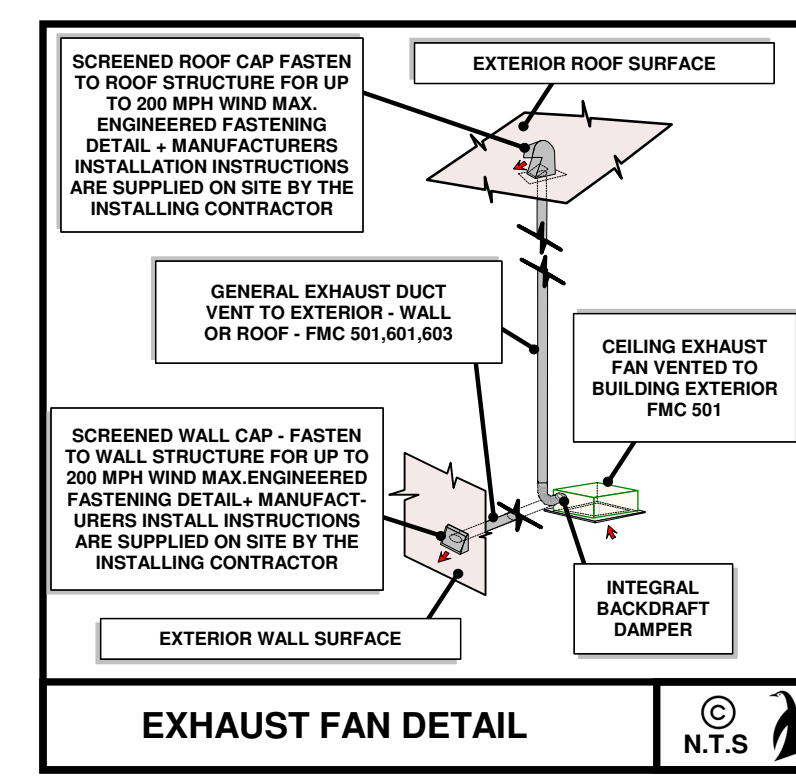
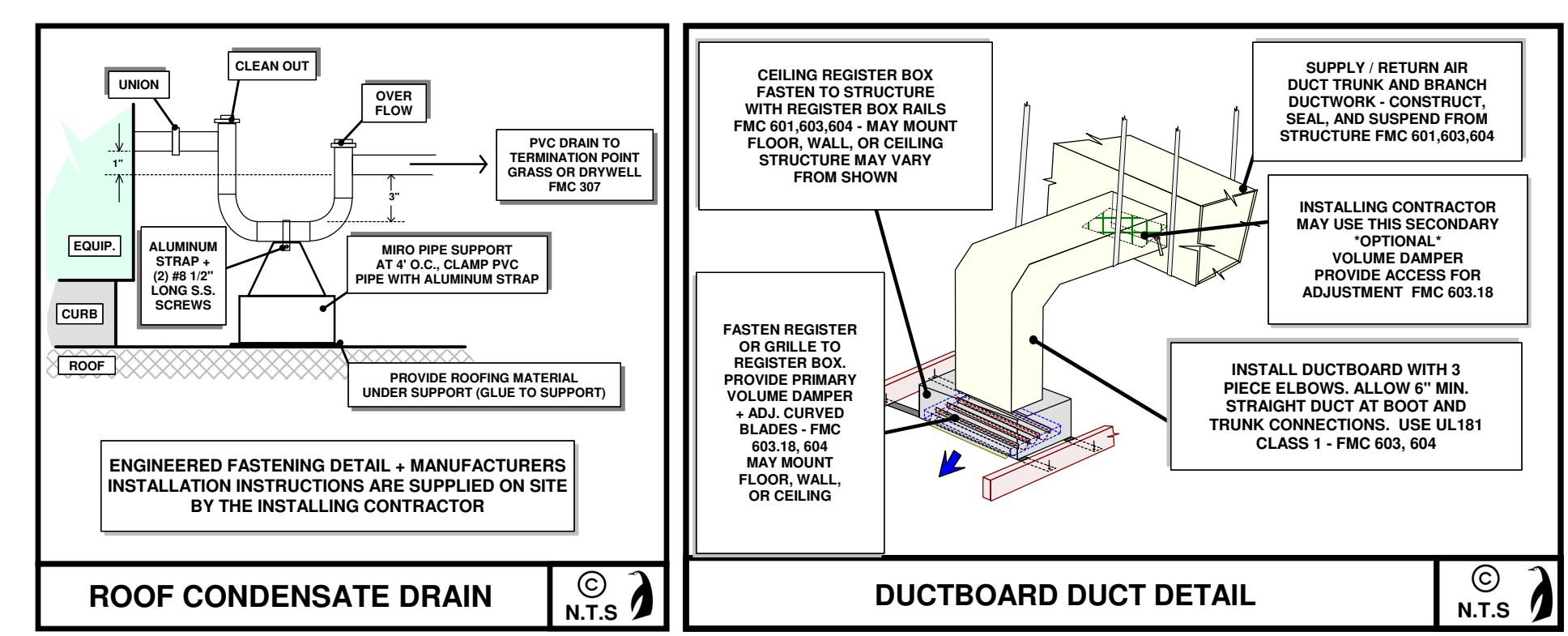
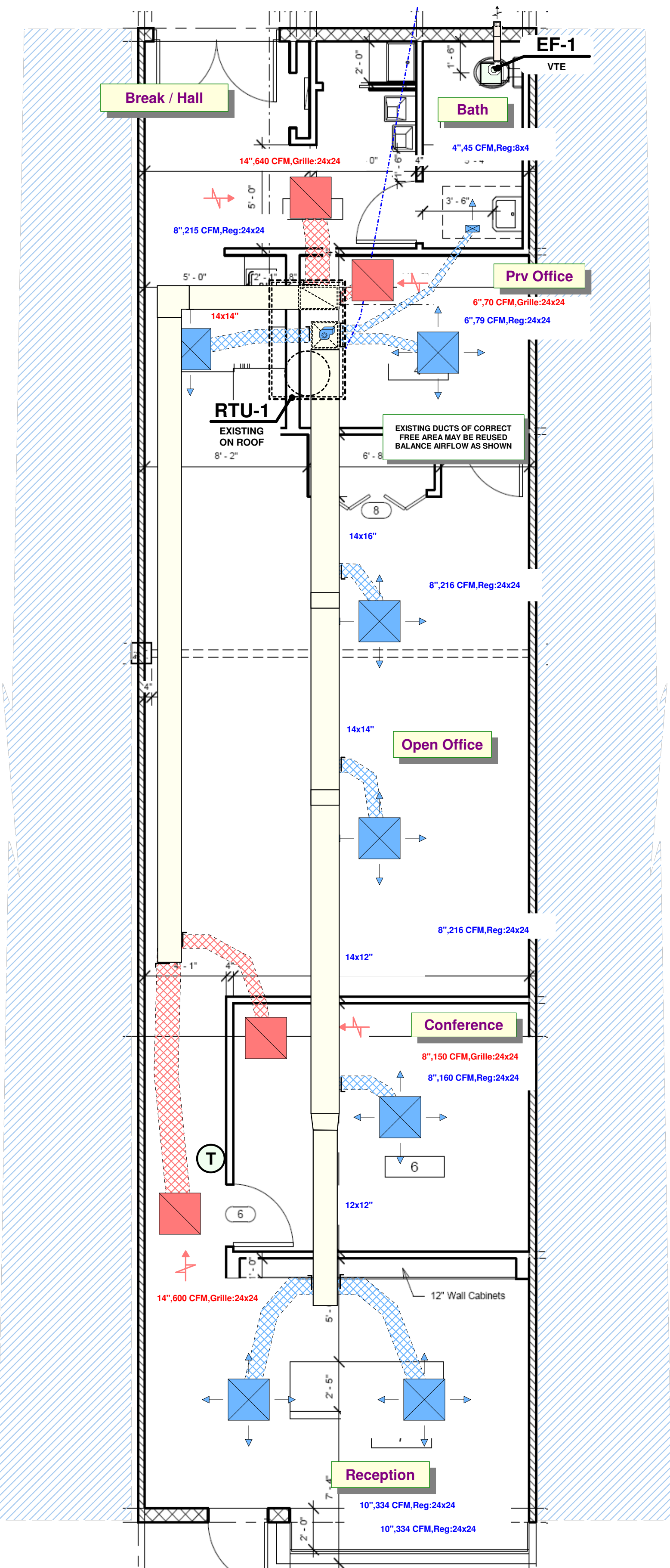
DUCT SECTION SHOWN IS DATA LINKED TO THE MANUAL D DUCT DESIGN REPORTS. EVERY DUCT SECTION + FITTING SHOWN ARE INCLUDED IN THE CALCULATIONS TO DETERMINE THE MOST RESTRICTIVE AIR PATH. MANUAL D DUCT DESIGN DATA IS USED FOR AIR HANDLING EQUIPMENT SELECTION. THE MAXIMUM VELOCITIES USED ARE BASED ON MANUAL D SECTION 3 (PAGE 3-6) OF ACCA MANUAL D DUCT DESIGN.

EQUIPMENT SCHEDULE

PACKAGE UNIT MARK:	RTU-1
UNIT MANUFACTURER:	BRYANT
UNIT MODEL NUMBER:	EXISTING RE USED
NOMINAL A/C TONS :	4
UNIT CONFIGURATION:	DOWNFLOW
UNIT DIMEN H/W/D:	41.4x61x46
UNIT WEIGHT:	479
SUPPLY PLENUM SIZE :	18x15
RETURN PLENUM SIZE :	18x15
SUPPLY FAN CFM / SP :	1600 / 509
SUPPLY FAN H/P :	3/4
OUTDOOR AIR CFM:	140
UNIT PHASE / HERTZ:	1/60
UNIT VOLTAGE:	208 / 230
UNIT MCA:	33.8
HEATER KW:	11.27 / 15
HEATER MCA:	68 / 78
UNIT + HEAT MCA / MOP:	87 / 90
TOTAL COOLING BTUH:	48,000
SENS. COOLING BTUH:	36,000
LAT. COOLING BTUH:	12,000
TOTAL HEATING BTUH:	51,180
SENS. HEAT %	0.75
COOLING EFFICIENCY:	14.2
THERMOSTAT MODEL:	PROGRAM

EXHAUST FAN SCHEDULE

FAN MARK:	EF-1
MANUFACTURER:	NUTONE
MODEL NUMBER:	QT-150
FAN TYPE:	CEILING
FAN CFM:	140
TOTAL PRESSURE:	.25
FAN VOLTAGE:	120/160
FAN AMPERAGE:	1.0
FAN DIMEN LWH:	14X10X9
DUCT OUTLET SIZE:	3.25X10 TO 7
DUCT INLET SIZE:	15X11
FAN WEIGHT:	14
NOTES:	1,2,5



BUILDING AIR BALANCE SCHEDULE

ZONE	ROOM NAME	AREA	OCCUPANTS	DURATION	SUPPLY AIR CFM	RETURN AIR CFM	EXHAUST AIR CFM	VENT AIR CFM
1	BATH	66	0	N/A	45	0	140	0
1	PRV OFFICE	110	1	> 3 HRS	79	70	0	14
1	OPEN OFFICE	536	4	> 3 HRS	432	640	0	41
1	CONFERENCE	185	4	VARIES	160	150	0	41
1	RECEPTION	328	2	VARIES	668	0	0	30
1	BREAK / HALL	215	1	VARIES	216	600	0	14
BUILDING TOTALS		1440	12	VARIES	1600	1460	140	140

THIS BUILDING COMPLIES WITH THE 6th EDITION (12/31/2017) FLORIDA MECHANICAL CODE SECTION 403 AND TABLE 403.3.1.1
 THE VENTILATION AIR SHOWN ON THIS SCHEDULE IS DELIVERED TO THE OCCUPANT BREATHING ZONE DURING OCCUPANCY
 THE OCCUPANTS SHOWN ARE ACTUAL EXPECTED OCCUPANTS AND MAY DIFFER FROM THE OCCUPANCY SHOWN FOR EGRESS / FIRE CODE (GENERALLY 1/2 OF EGRESS)
 THE TEST AND BALANCE CONTRACTOR SHOULD ADJUST THE INTERIOR BUILDING PRESSURE SLIGHTLY POSITIVE
 THIS AIR BALANCE SCHEDULE SHOWS NEUTRAL INTERIOR PRESSURE, THE BUILDING ENVELOPE EXFILTRATION CFMS ARE INCLUDED

BUILDING VENTILATION CALCULATION

+	SQ FT	CLASSIFY	OCCUPANTS	OCCUPANT VA	AREA VA	MAX. VENT AIR	DURATION *	TOTAL AIR	CFM - PERSON
	185	Conference (2-6,4AVG)	4	4	0.06	27.1	1	27.1	6.78
	861	Office	6	5	0.06	81.66	1	81.66	13.61
	328	Reception (1-2 VARIES)	2	5	0.06	29.68	1	29.68	14.84
BUILDING VENT TOTALS			12				VARIES	138	140 PROVIDED

THIS BUILDING COMPLIES WITH THE 6th EDITION (12/31/2017) FLORIDA MECHANICAL CODE SECTION 403 AND TABLE 403.3.1.1
 THE OCCUPANTS SHOWN ARE ACTUAL EXPECTED OCCUPANTS AND MAY DIFFER FROM THE OCCUPANCY SHOWN FOR EGRESS / FIRE CODE
 VENTILATION AIR RATES ARE ADJUSTED FOR VARIABLE OCCUPANCY BASED ON THE ACTUAL TIME THE OCCUPANT OCCUPIES THE SPACE

BUILDING EXHAUST CALCULATION

-	QTY	CLASSIFY	NOTE	MINIMUM EXHAUST AIR RATE	SQ FT TOTAL	FIXTURE TOTAL	TOTAL AIR
	1	Toilet (continuous / intermittent)	per fixture	50	n/a	140	140
BUILDING EXHAUST TOTALS						140	140 PROVIDED

THIS BUILDING COMPLIES WITH THE 6th EDITION (12/31/2017) FLORIDA MECHANICAL CODE SECTION 403 AND TABLE 403.3
 MINIMUM EXHAUST RATES SHOWN, RATES MAY BE INCREASED TO MATCH VENTILATION RATE FOR A NEUTRAL OR SLIGHTLY POSITIVE INTERIOR BUILDING PRESSURE

Comfort System Designed By:
Neil Fimmel
 HVAC Designs Inc.
 813-885-2258
 FL BERS 884/959
 neil@hvacdsgns.com
 Designing HVAC in Florida 32+ Years
 "Home of the complete HVAC + Energy Design"

HVAC Company Information
 Company Name: _____
 Address: _____
 Contractor Name: _____
 License No: _____
 Signature: _____

SCALE 1/4"=1'-0"
 36"x24" ARCH D

SAMPLE COMMERCIAL OFFICE

PROJECT NAME:
 PROJECT ADDRESS:
 PROJECT CITY, ZIP:
 CONDITIONED SQ. FT.:
 CLIMATE ZONE 2 CLASS:

Orientation
 North

DRAWING DATE
 3/8/2019
 PERMIT SET

HVAC
 DRAWING
 2 OF 2

Florida Building Code, Sixth Edition (2017) - Energy Conservation

EnergyGauge Summit® Fla/Com-2017, Effective Date: Dec 31, 2017

IECC 2015 - Total Building Performance Compliance Option

Check List

Applications for compliance with the Florida Building Code, Energy Conservation shall include:

- This Checklist
- The full compliance report generated by the software that contains the project summary, compliance summary, certifications and detailed component compliance reports.
- The compliance report must include the full input report generated by the software as contiguous part of the compliance report.
- Boxes appropriately checked in the Mandatory Section of the compliance report.

PROJECT SUMMARY

Short Desc: bor

Description: commercial sample office ren

Owner:

Address1: 1555 N Arcturas Ave

City: Clearwater

Address2: s face glass doors

State: Florida

Zip: 0

Type: Office

Class: Renovation to existing buildi

Jurisdiction: CLEARWATER, PINELLAS COUNTY, FL (621500)

Conditioned Area: 1646 SF

Conditioned & UnConditioned Area: 1646 SF

No of Stories: 1

Area entered from Plans 1646 SF

Permit No:

Max Tonnage 4


If different, write in: _____

Compliance Summary

Component	Design	Criteria	Result
Gross Energy Cost (in \$)	1,039.0	1,469.0	PASSED
LIGHTING CONTROLS			PASSES
EXTERNAL LIGHTING			PASSES
HVAC SYSTEM			PASSES
PLANT			No Entry
WATER HEATING SYSTEMS			PASSES
PIPING SYSTEMS			PASSES
Met all required compliance from Check List?			Yes/No/NA
<p><i>IMPORTANT MESSAGE</i> <i>Info 5009 -- -- -- An input report of this design building must be submitted along with this Compliance Report</i></p>			

CERTIFICATIONS

I hereby certify that the plans and specifications covered by this calculation are in compliance with the Florida Energy Code

Prepared By:  BERS 959 Building Official: _____
Date: sample only Date: _____

I certify that this building is in compliance with the FLorida Energy Efficiency Code

Owner Agent: _____ Date: _____

If Required by Florida law, I hereby certify () that the system design is in compliance with the Florida Energy Efficiency Code*

Architect: Alvaro Rodriguez	Reg No: AR 95835
Electrical Designer: Alvaro Rodriguez	Reg No: AR 95835
Lighting Designer: Alvaro Rodriguez	Reg No: AR 95835
Mechanical Designer: Neil Fimbel HVAC Designs	Reg No: BERS # 959
Plumbing Designer: Alvaro Rodriguez	Reg No: AR 95835

() Signature is required where Florida Law requires design to be performed by registered design professionals. Typed names and registration numbers may be used where all relevant information is contained on signed/sealed plans.*

Project: bor
 Title: commercial sample office renovation
 Type: Office
 (WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)

Building End Uses

	1) Proposed	2) Baseline
Total	66.30	109.40
	\$1,039	\$1,728
ELECTRICITY(MBtu/kWh/\$)	66.30	109.40
	19428	32062
	\$1,039	\$1,728
AREA LIGHTS	16.90	18.50
	4961	5427
	\$265	\$293
MISC EQUIPMT	18.30	18.30
	5349	5349
	\$286	\$288
PUMPS & MISC	0.10	0.10
	19	16
	\$1	\$1
SPACE COOL	19.90	28.80
	5841	8447
	\$312	\$455
SPACE HEAT	1.30	1.10
	381	332
	\$20	\$18
VENT FANS	9.80	42.60
	2877	12491
	\$154	\$673

Credits Applied: None

PASSES

Passing Criteria = 1469

Design (including any credits) = 1039

Passing requires Proposed Building cost to be at most 85% of Baseline cost. This Proposed Building is at 60.1%

Project: bor Title: commercial sample office renovation Type: Office (WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)						
External Lighting Compliance						
Description	Category	Tradable?	Allowance (W/Unit)	Area or Length or No. of Units (Sqft or ft)	ELPA (W)	CLP (W)
Ext Light 1	Main entries	Yes	30.00	9.0	270	180
Ext Light 2	Other (doors) than main entries	Yes	20.00	9.0	180	180
Ext Light 3	Internally illuminated exit signs	No	5.00	3.0	15	9
Tradable Surfaces: 360 (W) Allowance for Tradable: 1200 (W)						PASSES
All External Lighting: 369 (W)						
Compliance check includes a excess/Base allowance of 750.00(W)						

Project: bor Title: commercial sample office renovation Type: Office (WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)						
Lighting Controls Compliance						
Acronym	Ashrae ID	Description	Area (sq.ft)	Design CP	Min CP	Compliance
WAIT / REC HAL	12	Lobby (General) - Reception and Waiting	355	2	1	PASSES
W R R	6	Toilet and Washroom	95	1	1	PASSES
M R R	6	Toilet and Washroom	57	1	1	PASSES
OFFICE 9	17	Office - Enclosed	158	1	1	PASSES
OFFICE 10	17	Office - Enclosed	143	1	1	PASSES
OFFICE 1	17	Office - Enclosed	167	1	1	PASSES
BREAK	17	Office - Enclosed	115	1	1	PASSES
CONFERENCE	15	Conference/meeting (Multiple Functions)	228	1	1	PASSES
MECH / STG	1	Electrical Mechanical Equipment Room - General	70	1	1	PASSES
OFFICE 6	16	Office - Open Plan	258	2	1	PASSES
PASSES						

Project: bor
 Title: commercial sample office renovation
 Type: Office
 (WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)

System Report Compliance

Pr0Sy1	System 1	Constant Volume Air Cooled Split System < 65000 Btu/hr	No. of Units 1
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Component	Category	Capacity	Design Eff	Eff Criteria	Design IPLV	IPLV Criteria	Compliance
Cooling System	Air Conditioners Air Cooled Split System < 65000 Btu/h Cooling Capacity	48200	14.00	13.00			PASSES
Heating System	Electric Furnace	34120	1.00	1.00			PASSES
Air Handling System -Supply	Air Handler (Supply) - Constant Volume	1550	0.23	0.82			PASSES
Air Handling System - Return	Air Handler (Return) - Constant Volume	1550	0.23	0.82			PASSES
Air Distribution System (Sup)	ADS System (Sup)		6.00	4.20			PASSES
Air Distribution System (Ret)	ADS System (Ret)		6.00				PASSES

PASSES

Plant Compliance

Description	Installed No	Size	Design Eff	Min Eff	Design IPLV	Min IPLV	Category	Compliance

None

Project: bor
Title: commercial sample office renovation
Type: Office
(WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)

Water Heater Compliance

Description	Type	Category	Design Eff	Min Eff	Design Loss	Max Loss	Compliance
Water Heater 1	Electric water heater	<= 12 [kW]	0.94	0.93			PASSES

PASSES

Project: bor
Title: commercial sample office renovation
Type: Office
(WEA File: FL_TAMPA_INTERNATIONAL_AP.tm3)

Piping System Compliance

Category	Pipe Dia [inches]	Is Runout?	Operating Temp [F]	Ins Cond [Btu-in/hr .SF.F]	Ins Thick [in]	Req Ins Thick [in]	Compliance
Domestic and Service Hot Water Systems	0.25	False	105.00	0.28	1.00	0.50	PASSES

PASSES

Mandatory Requirements (as applicable)

Mandatory requirements compiled by US Department of Energy and Pacific Northwest National Laboratory. Adopted with permission

Topic	Section	Component	Description	Yes	N/A	Exempt
1. To be checked by Designer or Engineer						
Insulation	C303.2	Envelope	Below-grade wall insulation installed per manufacturer's instructions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.2	Envelope	Slab edge insulation installed per manufacturer's instructions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.2	Envelope	Above-grade wall insulation installed per manufacturer's instructions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.3	Envelope	High-albedo roofs satisfy one of the following: 3-year-aged solar reflectance ≥ 0.55 and thermal emittance ≥ 0.75 or 3-year-aged solar reflectance index ≥ 64.0 .	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fenestration	C402.4.4	Envelope	U-factor of opaque doors associated with the building thermal envelope meets requirements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.12.1	Mechanical	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.12.2	Mechanical	HVAC fan motors not oversized beyond allowable limits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.3(8) Table	Mechanical	Heat Rejection Equipment: Minimum Efficiency Requirement meet those listed in Table C403.2.3(8)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.7	Mechanical	Exhaust air energy recovery on systems meeting Table C403.2.7(1) and C403.2.7(2).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.3	Mechanical	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.3.2	Mechanical	Economizer operation will not increase heating energy use during normal operation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.3.4, C403.3.4.1, C403.3.4.2, C403.3.1	Mechanical	Water economizers provided where required, meet the requirements for design capacity, maximum pressure drop and integrated economizer control.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.1	Mechanical	Three-pipe hydronic systems using a common return for hot and chilled water are not used.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.3.1	Mechanical	Hydronic heat pump systems connected to a common water loop meet heat rejection and heat addition requirements.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.3.4	Mechanical	Open-circuit cooling towers having water cooled chiller systems and multiple or variable speed condenser pumps, are designed so that tower cells can run in parallel with larger of flow criteria.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.2	Mechanical	Service water heating equipment meets efficiency requirements.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wattage	C405.3	Interior Lighting	Exit signs do not exceed 5 watts per face.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. To be checked by Plan Reviewer						
Plan Review	C103.2	Envelope	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plan Review	C103.2	Mechanical	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering st	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan Review	C103.2	Mechanical	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan Review	C103.2	Interior Lighting	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided shoul	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan Review	C103.2	Exterior Lighting	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided shoul	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.2.5	Envelope	Slab edge insulation depth/length. Slab insulation extending away from building is covered by pavement or ≥ 10 inches of soil.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.2.6	Project	Radiant heating systems panels insulated to $\geq R-3.5$ on face opposite space being heated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C402.2.6	Mechanical	Thermally ineffective panel surfaces of sensible heating panels have insulation $\geq R-3.5$.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.2.6	Envelope	Radiant panels and associated components, designed for heat transfer from the panel surfaces to the occupants or indoor space are insulated with a minimum of R-3.5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.7	Envelope	Vestibules are installed on all building entrances. Doors have self-closing devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.12.3	Mechanical	Fans have efficiency grade (FEG) ≥ 67 . The total efficiency of the fan at the design point of operation $\leq 15\%$ of maximum total efficiency of the fan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.13	Mechanical	Unenclosed spaces that are heated use only radiant heat.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.2	Mechanical	Each zone equipped with setback controls using automatic time clock or programmable control system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.4.4	Mechanical	Zone isolation devices and controls installed where applicable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.4.7	Mechanical	Fault detection and diagnostics installed with air-cooled unitary DX units having economizers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.5	Mechanical	Hot water boilers supplying heat via one- or two-pipe systems include outdoor setback control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.6.1	Mechanical	Demand control ventilation provided for spaces >500 ft ² and >25 people/1000 ft ² occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow $>3,000$ cfm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.1.1	Mechanical	Hydronic and multizone HVAC system controls are VAV fans driven by mechanical or electrical variable speed drive per Table C403.4.1.1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.1.3	Mechanical	Reset static pressure setpoint for DDC controlled VAV boxes reporting to central controller based on the zones requiring the most pressure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2	Mechanical	Temperature reset by representative building loads in pumping systems for chiller and boiler systems $>500,000$ Btu/h.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SYSTEM_SPECIFIC	C403.4.2.3.2.1	Mechanical	Closed-circuit cooling tower within heat pump loop have either automatic bypass valve or lower leakage positive closure dampers. Open-circuit tower within heat pump loop have automatic valve to bypass all heat pump water flow around the tower. Open- or cl	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.4	Mechanical	Hydronic systems greater than 500,000 Btu/h designed for variable fluid flow.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.5	Mechanical	System turndown requirement met through multiple single-input boilers, one or more modulating boilers, or a combination of single-input and modulating boilers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.6	Mechanical	Boiler input between 1.0 MBtu/h and 5 MBtu/h has 3:1 turndown ratio, boiler input between 5.0 Chilled water plants with multiple chillers have capability to reduce flow automatically through the chiller plant when a chiller is shut down. Boiler plants with multiple boilers have the capability to reduce flow automatically through the boiler plant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.3, C403.4.3.2	Mechanical	Fan systems with motors >=7.5 hp associated with heat rejection equipment to have capability to operate at 2/3 of full-speed and auto speed controls to control the leaving fluid temperature or condensing temp/pressure of heat rejection device.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.4.5	Mechanical	Multiple zone HVAC systems have supply air temperature reset controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.4.6	Mechanical	Multiple zone VAV systems with DDC of individual zone boxes have static pressure setpoint reset controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.2.1	Mechanical	Gas-fired water-heating equipment installed in new buildings: where a singular piece of water-heating equipment >= 1,000 kBtu/h serves the entire building, thermal efficiency >= 90 Et. Where multiple pieces of water-heating equipment serve the building wi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.4	Mechanical	All piping insulated in accordance with section details and Table C403.2.10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.5, C404.5.1, C404.5.2	Mechanical	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.6.3	Mechanical	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.7	Mechanical	Water distribution system that pumps water from a heated-water supply pipe back to the heated-water source through a cold-water supply pipe is a demand recirculation water system. Pumps within this system have controls that start the pump upon receiving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wattage	C405.5.1	Exterior Lighting	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan Review	C405.6	Project	Group R-2 dwelling units have separate electrical meters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan Review	C406	Project	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C408.2.2.2	Mechanical	HVAC hydronic heating and cooling coils have means to balance and have pressure test connections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C408.2.2.2	Mechanical	HVAC hydronic heating and cooling coils have means to balance and have pressure test connections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. To be checked by Inspector

Insulation	C303.1	Envelope	Roof insulation installed per manufacturer's™s instructions. Blown or poured loose-fill insulation is installed only where the roof slope is <=3 in 12.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.1	Envelope	Building envelope insulation is labeled with R-value or insulation certificate providing R-value and other relevant data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fenestration	C303.1.3	Envelope	Fenestration products rated in accordance with NFRC.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fenestration	C303.1.3	Envelope	Fenestration products are certified as to performance labels or certificates provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.2, C402.2.4	Envelope	Floor insulation installed per manufacturer's instructions. Cavity or structural slab insulation installed in permanent contact with underside of decking or structural slabs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.2.1	Envelope	Exterior insulation protected against damage, sunlight, moisture, wind, landscaping and equipment maintenance activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C303.2.1	Envelope	Exterior insulation is protected from damage with a protective material. Verification for exposed foundation insulation may need to occur during Foundation Inspection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.1.3	Envelope	Non-swinging opaque doors have R-4.75 insulation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.2.2	Envelope	Skylight curbs are insulated to the level of roofs with insulation above deck or R-5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insulation	C402.2.2	Envelope	Insulation intended to meet the roof insulation requirements cannot be installed on top of a suspended ceiling. Mark this requirement compliant if insulation is installed accordingly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5	Envelope	Building envelope contains a continuous air barrier that has been tested and deemed to limit air leakage <= 0.40 cfm/ft2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.1	Envelope	The building envelope contains a continuous air barrier that is sealed in an approved manner and either constructed or tested in an approved manner. Air barrier penetrations are sealed in an approved manner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.1.1	Envelope	All sources of air leakage in the building thermal envelope are sealed, caulked, gasketed, weather stripped or wrapped with moisture vapor-permeable wrapping material to minimize air leakage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.1.2.1	Envelope	The building envelope contains a continuous air barrier that is sealed in an approved manner and material permeability <= 0.004 cfm/ft2. Air barrier penetrations are sealed in an approved manner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.1.2.2	Envelope	The building envelope contains a continuous air barrier that is sealed in an approved manner and average assembly air leakage <= 0.04 cfm/ft2. Air barrier penetrations are sealed in an approved manner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.2, C402.5.4	Envelope	Factory-built fenestration and doors are labeled as meeting air leakage requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.3	Envelope	Where open combustion air ducts provide combustion air to open combustion fuel burning appliances, the appliances and combustion air opening are located outside the building thermal envelope or enclosed in a room, isolated from inside the thermal envelope	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.5, C403.2.4.3	Envelope	Stair and elevator shaft vents have motorized dampers that automatically close.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.5, C403.2.4.3	Envelope	Outdoor air and exhaust systems have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Check gravity dampers where allowed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Leakage	C402.5.6	Envelope	Weatherseals installed on all loading dock cargo doors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Air Leakage	C402.5.8	Envelope	Recessed luminaires in thermal envelope to limit infiltration and be IC rated and labeled. Seal between interior finish and luminaire housing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.1	Mechanical	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.10	Mechanical	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.3	Mechanical	HVAC equipment efficiency verified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.3	Mechanical	PTAC and PTHP with sleeves 16 in. by 42 in. labeled for replacement only as per Footnote b to Table C403.2.3(3).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.4.1	Mechanical	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.4.1.1	Mechanical	Heat pump controls prevent supplemental electric resistance heat from coming on when not needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.1.2	Mechanical	Thermostatic controls have a 5 Å °F deadband.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.1.2	Mechanical	Thermostatic controls have a 5 Å °F deadband.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.1.3	Mechanical	Temperature controls have setpoint overlap restrictions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.2.1, C403.2.4.2.2	Mechanical	Automatic Controls: Setback to 55 °F (heat) and 85 °F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.4.2.3	Mechanical	Systems include optimum start controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.4.5, C403.2.4.6	Mechanical	Snow/ice melting system sensors for future connection to controls. Freeze protection systems have automatic controls installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.6.2	Mechanical	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C403.2.9	Mechanical	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.2.9.1.3	Mechanical	Ductwork operating >3 in. water column requires air leakage testing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.1.2	Mechanical	VAV fans have static pressure sensors located so controller setpoint ≤1.2 w.c..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.2	Mechanical	Two-pipe hydronic systems using a common distribution system have controls to allow a deadband ≥15°F, allow operation in one mode for at least 4 hrs before changeover, and have rest controls to limit heating and cooling supply temperature to ≤30 °F.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.2.3.3	Mechanical	Two-position automatic valve interlocked to shut off water flow when hydronic heat pump with pumping system >10 hp is off.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.4.5, C403.4.4.5.1-4	Mechanical	Zone controls can limit simultaneous heating and cooling and sequence heating and cooling to each zone.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.5	Mechanical	Condenser heat recovery system that can heat water to 85°F or provide 60% of peak heat rejection is installed for preheating of service hot water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C403.4.6	Mechanical	Hot gas bypass limited to: ≤240 kBtu/h - 50% capacity, >240 kBtu/h - 25% capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.3	Mechanical	Heat traps installed on non-circulating storage water tanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SYSTEM_SPECIFIC	C404.3	Mechanical	Heat traps installed on supply and discharge piping of non-circulating systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.3	Mechanical	Heat traps installed on supply and discharge piping of non-circulating systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.6.1	Mechanical	Controls are installed that limit the operation of a recirculation pump installed to maintain temperature of a storage tank. System return pipe is a dedicated return pipe or a cold water supply pipe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.6.1, C404.6.2	Mechanical	Automatic time switches installed to automatically switch off the recirculating hot-water system or heat trace.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.9.1	Mechanical	Pool heaters are equipped with on/off switch and no continuously burning pilot light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.9.2	Mechanical	Time switches are installed on all pool heaters and pumps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.9.2	Mechanical	Time switches are installed on all pool heaters and pumps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYSTEM_SPECIFIC	C404.9.3	Mechanical	Vapor retardant pool covers are provided for heated pools and permanently installed spas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.1	Interior Lighting	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.1	Interior Lighting	Occupancy sensors installed in required spaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.1, C405.2.2.3	Interior Lighting	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.2.1	Interior Lighting	Automatic controls to shut off all building lighting installed in all buildings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.3	Interior Lighting	Daylight zones provided with individual controls that control the lights independent of general area lighting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.3, C405.2.3.1, C405.2.3.2	Interior Lighting	Primary sidelighted areas are equipped with required lighting controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.3, C405.2.3.1, C405.2.3.3	Interior Lighting	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.4	Interior Lighting	Separate lighting control devices for specific uses installed per approved lighting plans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wattage	C405.2.4	Interior Lighting	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controls	C405.2.5	Exterior Lighting	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wattage	C405.4.1	Interior Lighting	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mandatory Additional	C406.4	Project	Enhanced digital lighting controls efficiency package: Interior lighting has following enhanced lighting controls in accordance with Section C405.2.2: Luminaires capable of continuous dimming and being addressed individually, <= 8 luminaires controlled in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mandatory Additional	C406.6	Project	Dedicate outdoor air system efficiency package: Buildings with hydronic and/or multiple-zone HVAC systems are equipped with an independent ventilation system designed to provide >= 100-percent outdoor air to each individual occupied space, as specified by	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mandatory Additional	C406.7, C406.7.1	Project	Enhanced Service Water Heat System efficiency package. One of the following SWH system enhancements must satisfy 60 percent of hot water requirements, or 100 percent if the building otherwise complies with heat recovery per Section C403.4.5: Waste heat re	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C408.2.2.1	Mechanical	Air outlets and zone terminal devices have means for air balancing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC	C408.2.2.1	Mechanical	Air outlets and zone terminal devices have means for air balancing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Testing	C408.2.3.2	Mechanical	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. To be checked by Inspector at Project Completion and Prior to Issuance of Certificate of Occupancy						
Post Construction	C303.3, C408.2.5.2	Interior Lighting	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C303.3, C408.2.5.3	Mechanical	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fenestration	C402.4.2.2	Envelope	Skylights in office, storage, automotive service, manufacturing, non-refrigerated warehouse, retail store, and distribution/sorting area have a measured haze value > 90 percent unless designed to exclude direct sunlight.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.1	Mechanical	Commissioning plan developed by registered design professional or approved agency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.3.1	Mechanical	HVAC equipment has been tested to ensure proper operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.3.3	Mechanical	Economizers have been tested to ensure proper operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.4	Mechanical	Preliminary commissioning report completed and certified by registered design professional or approved agency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.5.1	Mechanical	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.5.1	Interior Lighting	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.5.3	Mechanical	An air and/or hydronic system balancing report is provided for HVAC systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.2.5.4	Mechanical	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post Construction	C408.3	Interior Lighting	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Input Data Report

Project Information

Project Name: bor

Project Title: commercial sample office renovation

Address: 1555 N Arcturas Ave

State: Florida

Zip: 0

Owner:

Building Type: Office

Building Classification: Renovation to existing building

No.of Stories: 1

GrossArea (SF): 1,646

Bldg. Rotation: None

Zones

No	Acronym	Description	Type	Area [sf]	Multi	Total Area [sf]	
1	Pr0Zo1	Zone 1	CONDITIONED	1646.0	1	1646.0	<input type="checkbox"/>

Spaces

No	Acronym	Description	Type	Depth [ft]	Width [ft]	Height [ft]	Multi	Total Area [sf]	Total Vol[cf]	
In Zone: Pr0Zo1										
1	WAIT / REC H	WAIT / REC HALL	Lobby (General) - Reception and Waiting	20.00	17.75	10.33	1	355.0	3667.2	<input type="checkbox"/>
2	W R R	W R R	Toilet and Washroom	10.00	9.50	10.33	1	95.0	981.4	<input type="checkbox"/>
3	M R R	M R R	Toilet and Washroom	10.00	5.70	10.33	1	57.0	588.8	<input type="checkbox"/>
4	OFFICE 9	OFFICE 9	Office - Enclosed	10.00	15.80	10.33	1	158.0	1632.1	<input type="checkbox"/>
5	OFFICE 10	OFFICE 10	Office - Enclosed	10.00	14.30	10.33	1	143.0	1477.2	<input type="checkbox"/>
6	OFFICE 1	OFFICE 1	Office - Enclosed	10.00	16.70	10.33	1	167.0	1725.1	<input type="checkbox"/>
7	BREAK	BREAK	Office - Enclosed	10.00	11.50	10.33	1	115.0	1188.0	<input type="checkbox"/>
8	CONFERENCE	CONFERENCE	Conference/meeting (Multiple Functions)	10.00	22.80	10.33	1	228.0	2355.2	<input type="checkbox"/>
9	MECH / STG	MECH / STG	Electrical Mechanical Equipment Room - General	10.00	7.00	10.33	1	70.0	723.1	<input type="checkbox"/>
10	OFFICE 6	OFFICE 6	Office - Open Plan	10.00	25.80	10.33	1	258.0	2665.1	<input type="checkbox"/>

Lighting

No	Type	Category	No. of Luminaires	Watts per Luminaire	Power [W]	Control Type	No. of Ctrl pts	
In Zone: Pr0Zo1								
In Space: WAIT / REC HALL								
1	Recessed Fluorescent - No vent	General Lighting	6	60	360	Manual On/Off	2	<input type="checkbox"/>
In Space: W R R								
1	Recessed Fluorescent - No vent	General Lighting	1	60	60	Manual On/Off	1	<input type="checkbox"/>
In Space: M R R								
1	Recessed Fluorescent - No vent	General Lighting	1	60	60	Manual On/Off	1	<input type="checkbox"/>
In Space: OFFICE 9								
1	Recessed Fluorescent - No vent	General Lighting	2	80	160	Manual On/Off	1	<input type="checkbox"/>
In Space: OFFICE 10								
1	Recessed Fluorescent - No vent	General Lighting	2	80	160	Manual On/Off	1	<input type="checkbox"/>
In Space: OFFICE 1								
1	Recessed Fluorescent - No vent	General Lighting	2	80	160	Manual On/Off	1	<input type="checkbox"/>
In Space: BREAK								
1	Recessed Fluorescent - No vent	General Lighting	2	60	120	Manual On/Off	1	<input type="checkbox"/>
In Space: CONFERENCE								
1	Recessed Fluorescent - No vent	General Lighting	4	60	240	Manual On/Off	1	<input type="checkbox"/>
In Space: MECH / STG								
1	Recessed Fluorescent - No vent	General Lighting	1	60	60	Manual On/Off	1	<input type="checkbox"/>
In Space: OFFICE 6								
1	Recessed Fluorescent - No vent	General Lighting	4	60	240	Manual On/Off	2	<input type="checkbox"/>

Walls (Walls will be rotated clockwise by building rotation value)

No	Description	Type	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Orient ation	Cond- uctance [Btu/h.sf.F]	Heat Capacity [Btu/sf.F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu]	
In Zone: Pr0Zo1												
1	S Exterior	Block + R-4 Insulation + GWB	44.58	8.00	1	356.6	South	0.1857	5.515	37.58	5.4	<input type="checkbox"/>
2	E Exterior	Block + R-4 Insulation + GWB	38.42	8.00	1	307.4	East	0.1857	5.515	37.58	5.4	<input type="checkbox"/>
3	W Partition	Partition GWB + R-11 Insulation + GWB	38.42	20.50	1	787.6	West	0.0774	0.848	13.11	12.9	<input type="checkbox"/>
4	N Partition	Partition GWB + R-11 Insulation + GWB	44.58	20.50	1	913.9	North	0.0774	0.848	13.11	12.9	<input type="checkbox"/>
5	S Upper MTL	Metal Building Wall R-19 Insulation + GWB	44.58	12.50	1	557.3	South	0.0488	0.682	9.99	20.5	<input type="checkbox"/>
6	E Upper MTL	Metal Building Wall R-19 Insulation + GWB	38.42	12.50	1	480.3	East	0.0488	0.682	9.99	20.5	<input type="checkbox"/>

Windows (Windows will be rotated clockwise by building rotation value)

No	Description	Orientation	Shaded	U [Btu/hr sf F]	SHGC	Vis.Tra	W [ft]	H (Effec) [ft]	Multi plier	Total Area [sf]	
In Zone: Pr0Zo1											
In Wall: Pr0Zo1Wa1											
1	S Glass Doors	South	No	1.0700	0.78	0.75	3.00	6.67	3	60.0	<input type="checkbox"/>

Doors

No	Description	Type	Shade?	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Cond. [Btu/h.sf.F]	Dens. [lb/cf]	Ht Cap. [Btu/sf. F]	R [h.sf.F/ Btu]
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In Zone: Pr0Zo1

In Wall: Pr0Zo1Wa3

1	W Partition Door	Polystyrene core (18 ga steel)	No	3.00	6.67	2	20.0	0.4982	0.00	0.00	2.01	<input type="checkbox"/>
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In Wall: Pr0Zo1Wa2

1	N Partition Door	Polystyrene core (18 ga steel)	No	3.00	6.67	1	20.0	0.4982	0.00	0.00	2.01	<input type="checkbox"/>
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Roofs

No	Description	Type	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Tilt [deg]	Cond. [Btu/h.Sf. F]	Heat Cap [Btu/sf. F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu]
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In Zone: Pr0Zo1

1	Roof	Metal Bldg Roof + drop R-19 Insulation + GWB	32.92	50.00	1	1646.0	0.00	0.0463	0.79	10.87	21.6	<input type="checkbox"/>
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Skylights

No	Description	Type	U [Btu/hr sf F]	SHGC	Vis.Trans	W [ft]	H (Effec) [ft]	Multi- plier	Area [Sf]	Total Area [Sf]
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In Zone:

In Roof:

Floors

No	Description	Type	Width [ft]	H (Effec) [ft]	Multi plier	Area [sf]	Cond. [Btu/h.sf.F]	Heat Cap. [Btu/sf. F]	Dens. [lb/cf]	R-Value [h.sf.F/Btu]
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In Zone: Pr0Zo1

1	Floor	Slab on Grade	32.92	50.00	1	1646.0	0.2488	2.66	40.00	4.02 <input type="checkbox"/>
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Systems

Pr0Sy1	System 1	Constant Volume Air Cooled Split System < 65000 Btu/hr	No. Of Units 1
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Component	Category	Capacity	Efficiency	IPLV	<input type="checkbox"/>
1	Cooling System	48200.00	14.00		<input type="checkbox"/>
2	Heating System	34120.00	1.00		<input type="checkbox"/>
3	Air Handling System -Supply	1550.00	0.23		<input type="checkbox"/>
4	Air Handling System - Return	1550.00	0.23		<input type="checkbox"/>
5	Air Distribution System (Sup)		6.00		<input type="checkbox"/>
6	Air Distribution System (Ret)		6.00		<input type="checkbox"/>

Plant

Equipment	Category	Size	Inst.No&Eff.	IPLV
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Water Heaters

W-Heater Description	Capacity	Cap.Unit	I/P Rt.	Efficiency	Loss
1 Electric water heater	30 [Gal]		4 [kW]	0.9400 [Ef]	[Btu/h] <input type="checkbox"/>

Ext-Lighting

Description	Category	No. of Luminaires	Watts per Luminaire	Area/Len/No [sf/ft/No]	Control Type	Wattage [W]
1 Ext Light 1	Main entries	3	60	9.00	Photo Sensor contr	##### <input type="checkbox"/>
2 Ext Light 2	Other (doors) than main entries	3	60	9.00	Photo Sensor contr	##### <input type="checkbox"/>
3 Ext Light 3	Internally illuminated exit signs	3	3	3.00	Other Independent	9.00 <input type="checkbox"/>

Piping

No	Type	Operating Temp [F]	Insulation Conductivity [Btu-in/h.sf.F]	Nomonal pipe Diameter [in]	Insulation Thickness [in]	Is Runout?
1	Domestic and Service Hot Water Systems	105.00	0.28	0.25	1.00	No <input type="checkbox"/>

Fenestration Used

Name	Glass Type	No. of Panes	Glass Conductance [Btu/h.sf.F]	SHGC	VLT
ApLbWnd1	User Defined	1	1.0700	0.7800	0.7500

Materials Used

Mat No	Acronym	Description	Only R-Value Used	RValue [h.sf.F/Btu]	Thick [ft]	Conductivity [Btu/h.ft.F]	Density [lb/cf]	Sp. Heat [Btu/lb.F]	
1003	ApLbMat1003	4 in. Lightweight concrete	No	3.3300	0.3330	0.1000	40.00	0.2000	<input type="checkbox"/>
1005	ApLbMat1005	8 in. Lightweight concrete block	No	2.0212	0.6670	0.3300	38.00	0.2000	<input type="checkbox"/>
1010	ApLbMat1010	Steel siding	No	0.0002	0.0050	26.0000	480.00	0.1000	<input type="checkbox"/>
1015	ApLbMat1015	GYP OR PLAS BOARD,1/2IN	No	0.4533	0.0417	0.0920	50.00	0.2000	<input type="checkbox"/>
1016	ApLbMat1016	GYP OR PLAS BOARD,5/8IN	No	0.5663	0.0521	0.0920	50.00	0.2000	<input type="checkbox"/>
284	Matl284	Polystyrene core (18 ga steel) 1	Yes	2.0071					<input type="checkbox"/>
1044	ApLbMat1044	0.3 in. Insulation	No	1.0000	0.0250	0.0250	5.70	0.2000	<input type="checkbox"/>
1045	ApLbMat1045	Outside surface resistance	Yes	0.3300					<input type="checkbox"/>
1046	ApLbMat1046	Inside surface resistance	Yes	0.6900					<input type="checkbox"/>
1047	ApLbMat1047	AIR LAYER, 3/4IN TO 4IN, VERT. WALLS	Yes	0.8900					<input type="checkbox"/>
1048	ApLbMat1048	Ceiling air space	Yes	1.0000					<input type="checkbox"/>
1055	ApLbMat1055	R-11 Generic Insulation	No	11.0000	0.2401	0.0218	0.30	0.2000	<input type="checkbox"/>
1058	ApLbMat1058	R-19 Generic Insulation	No	19.0000	0.4147	0.0218	0.30	0.2000	<input type="checkbox"/>

Constructs Used

No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	<input type="checkbox"/>
1041	Slab on Grade	No	No	0.25	2.66	40.00	4.0	<input type="checkbox"/>
Layer	Material No.	Material	Thickness [ft]	Framing Factor				
1	1003	4 in. Lightweight concrete	0.3330	0.000	<input type="checkbox"/>			
2	1046	Inside surface resistance		0.000	<input type="checkbox"/>			
No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	<input type="checkbox"/>
1045	Block + R-4 Insulation + GWB	No	No	0.19	5.51	37.58	5.4	<input type="checkbox"/>
Layer	Material No.	Material	Thickness [ft]	Framing Factor				
1	1045	Outside surface resistance		0.000	<input type="checkbox"/>			
2	1005	8 in. Lightweight concrete block	0.6670	0.000	<input type="checkbox"/>			
3	1047	AIR LAYER, 3/4IN TO 4IN, VERT. WALLS		0.000	<input type="checkbox"/>			
4	1044	0.3 in. Insulation	0.0250	0.000	<input type="checkbox"/>			
5	1015	GYP OR PLAS BOARD,1/2IN	0.0417	0.000	<input type="checkbox"/>			
6	1046	Inside surface resistance		0.000	<input type="checkbox"/>			
No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	<input type="checkbox"/>
1047	Polystyrene core (18 ga steel)	No	Yes	0.50			2.0	<input type="checkbox"/>
Layer	Material No.	Material	Thickness [ft]	Framing Factor				
1	284	Polystyrene core (18 ga steel) 1		0.000	<input type="checkbox"/>			

No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	
1053	Partition GWB + R-11 Insulation + GWB	No	No	0.08	0.85	13.11	12.9	<input type="checkbox"/>
	Layer	Material No.	Material	Thickness [ft]		Framing Factor		
	1	1045	Outside surface resistance			0.000		<input type="checkbox"/>
	2	1015	GYP OR PLAS BOARD,1/2IN	0.0417		0.000		<input type="checkbox"/>
	3	1055	R-11 Generic Insulation	0.2401		0.000		<input type="checkbox"/>
	4	1015	GYP OR PLAS BOARD,1/2IN	0.0417		0.000		<input type="checkbox"/>
	5	1046	Inside surface resistance			0.000		<input type="checkbox"/>
No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	
1054	Metal Bldg Roof + drop R-19 Insulation + GWB	No	No	0.05	0.79	10.87	21.6	<input type="checkbox"/>
	Layer	Material No.	Material	Thickness [ft]		Framing Factor		
	1	1045	Outside surface resistance			0.000		<input type="checkbox"/>
	2	1010	Steel siding	0.0050		0.000		<input type="checkbox"/>
	3	1058	R-19 Generic Insulation	0.4147		0.000		<input type="checkbox"/>
	4	1048	Ceiling air space			0.000		<input type="checkbox"/>
	5	1016	GYP OR PLAS BOARD,5/8IN	0.0521		0.000		<input type="checkbox"/>
	6	1046	Inside surface resistance			0.000		<input type="checkbox"/>
No	Name	Simple Construct	Massless Construct	Conductance [Btu/h.sf.F]	Heat Cap [Btu/sf.F]	Density [lb/cf]	RValue [h.sf.F/Btu]	
1055	Metal Building Wall R-19 Insulation + GWB	No	No	0.05	0.68	9.99	20.5	<input type="checkbox"/>
	Layer	Material No.	Material	Thickness [ft]		Framing Factor		
	1	1045	Outside surface resistance			0.000		<input type="checkbox"/>
	2	1010	Steel siding	0.0050		0.000		<input type="checkbox"/>
	3	1058	R-19 Generic Insulation	0.4147		0.000		<input type="checkbox"/>
	4	1015	GYP OR PLAS BOARD,1/2IN	0.0417		0.000		<input type="checkbox"/>
	5	1046	Inside surface resistance			0.000		<input type="checkbox"/>



Project Report

General Project Information

Project Title: 2019 SAMPLE COMMERCIAL Office 1440ren w
Project Date: Saturday, January 12, 2019
Project Comment: Semi Tight Const. Practice - Mastic Seal Ducts
Company Name: HVAC Designs Inc
Company Representative: Neil Fimbel
Company Address: 7701 W Hanna Ave
Company City: Tampa FL 33615
Company Phone: (813) 885-2258
Company E-Mail Address: neil@hvacdsgns.com
Company Website: <http://www.hvacdsgns.com/>

Design Data

Reference City: Clearwater, Florida
Building Orientation: Front Door faces West
Daily Temperature Range: Medium
Latitude: 28 Degrees
Elevation: 11 ft.
Altitude Factor: 1.000

	Outdoor <u>Dry Bulb</u>	Outdoor <u>Wet Bulb</u>	Outdoor <u>Rel.Hum</u>	Indoor <u>Rel.Hum</u>	Indoor <u>Dry Bulb</u>	Grains <u>Difference</u>
Winter:	47	44.1	n/a	n/a	72	n/a
Summer:	93	79	54%	50%	75	63

Check Figures

Total Building Supply CFM:	1,600	CFM Per Square ft.:	1.111
Square ft. of Room Area:	1,440	Square ft. Per Ton:	379
Volume (ft ³):	13,679		

Building Loads

Total Heating Required Including Ventilation Air:	17,938 Btuh	17.938 MBH
Total Sensible Gain:	35,089 Btuh	78 %
Total Latent Gain:	9,853 Btuh	22 %
Total Cooling Required Including Ventilation Air:	44,941 Btuh	3.80 Tons (Based On 77% Sensible Capacity)

Notes

Rhvac is an ACCA approved Manual J, D and S computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



Manual D Ductsize Data - Duct System 1 - Supply

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-100, Supplies: Prv Office, Fittings: 11-B, 11-B, 4-AA, Effective Length: 15.6				
Runout	0.01	6	402	0.006
Up: SMT-100	55	4.7	0.105	0.010
Rnd	5.8	6.6	9.8	0.016
Schedule	79	9.1	0.068	0.441
---Duct Name: SR-110, Supplies: Break / Hall, Fittings: 11-B, 4-AA, 11-B, Effective Length: 20.4				
Runout	0.01	8	616	0.011
Up: SMT-100	55	6.2	0.163	0.023
Rnd	6.6	8.7	13.8	0.033
Schedule	215	13.7	0.051	0.458
---Duct Name: ST-110, Feeds Into: Open Office, Fitting: 12-Q2, Effective Length: 15.0				
Trunk	0.003	16.4	810	0.010
Up: SMT-100	55	14	0.088	0.003
Rect	11.3	16	3.7	0.013
Schedule	1,260	56.7	0.071	0.438
---Duct Name: SR-120, Supplies: Bath, Fittings: 11-B, 11-B, 11-B, 4-AA, Effective Length: 14.9				
Runout	0.01	4	516	0.029
Up: SMT-100	55	3.1	0.301	0.016
Rnd	9.6	4.4	5.4	0.045
Schedule	45	10	0.040	0.469
---Duct Name: SR-130, Supplies: Open Office, Fittings: 11-B, 11-B, 4-AA, 11-B, Effective Length: 22.0				
Runout	0.01	8	619	0.007
Up: ST-110	55	6.2	0.165	0.029
Rnd	4.3	8.7	17.7	0.036
Schedule	216	9	0.035	0.474
---Duct Name: SR-140, Supplies: Open Office, Fittings: 11-B, 11-B, 4-AA, 11-B, Effective Length: 23.2				
Runout	0.01	8	619	0.009
Up: ST-130	55	6.2	0.165	0.029
Rnd	5.3	8.7	17.9	0.038
Schedule	216	11.1	0.022	0.487
---Duct Name: ST-120, Feeds Into: Conference, Fitting: 12-R, Effective Length: 18.4				
Trunk	0.003	14.2	710	0.013
Up: ST-130	55	14	0.082	0.002
Rect	15.3	12	3.0	0.015
Schedule	828	66.4	0.045	0.464
---Duct Name: ST-130, Feeds Into: Open Office, Fitting: 12-R, Effective Length: 12.9				
Trunk	0.003	15.3	767	0.008
Up: ST-110	55	14	0.086	0.003
Rect	9.5	14	3.4	0.011
Schedule	1,044	44.3	0.060	0.449
---Duct Name: SR-150, Supplies: Conference, Fittings: 11-B, 11-B, 4-AA, 11-B, Effective Length: 18.6				
Runout	0.01	8	458	0.004
Up: ST-120	55	6.2	0.091	0.013
Rnd	4.5	8.7	14.1	0.017
Schedule	160	9.4	0.028	0.481



Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-140, Feeds Into: Reception, Effective Length: 9.8				
Trunk	0.003	13.1	668	0.008
Up: ST-120	55	12	0.080	0.000
Rect	9.8	12	0.0	0.008
Schedule	668	39.3	0.037	0.472
---Duct Name: SR-160, Supplies: Reception, Fittings: 11-B, 11-B, 4-AA, 11-B, Effective Length: 31.4				
Runout	0.01	10	612	0.010
Up: ST-140	55	7.3	0.119	0.028
Rnd	8.2	11.8	23.2	0.037
Schedule	334	21.5	0.000	0.509
---Duct Name: SR-170, Supplies: Reception, Fittings: 11-B, 11-B, 4-AA, 11-B, Effective Length: 31.4				
Runout	0.01	10	612	0.009
Up: ST-140	55	7.3	0.119	0.028
Rnd	7.6	11.8	23.9	0.037
Schedule	334	19.8	0.000	0.509
---Duct Name: SMT-100, Feeds Into: Prv Office, Fitting: 1-C, Effective Length: 32.3				
Trunk	0.003	17.5	899	0.004
Up: Fan	55	16	0.099	0.028
Rect	4.0	16	28.3	0.342
Schedule	1,599	21.3	0.085	0.425

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	5	
Number of active runouts:	8	
Total runout outlet airflow:	1,599	
Main trunk airflow:	1,599	
Largest trunk diameter:	17.5	SMT-100
Largest runout diameter:	10	SR-160
Smallest trunk diameter:	13.1	ST-140
Smallest runout diameter:	4	SR-120
Supply fan external static pressure:	0.509	
Supply fan device pressure losses:	0.310	
Supply fan static pressure available:	0.199	
Runout maximum cumulative static pressure loss:	0.509	SR-170
Return loss added to supply:	0.083	
Total effective length of return (ft.):	201.9	RR-100
Total effective length of supply (ft.):	119.9	SR-170
Overall total effective length (ft.):	321.8	RR-100 to SR-170
Design overall friction rate per 100 ft.:	0.062	(Available SP x 100 / TEL)
System duct surface area (Scenario 1):	331.7	In Bld Envelope (Linked to duct load)



Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

Summary

Total system duct surface area: 331.7



Manual D Ductsize Data - Duct System 1 - Return

---Duct Name, etc.					
Type	Roughness	Diameter	Velocity	SPL.Duct	
Upstream	Temperature	Width	Loss/100	SPL.Fit	SPL.Tot
Shape	Length	Height	Fit.Eq.Len	SPL.Cumul	
Sizing	CFM	Area	SP.Avail		
---Duct Name: RMT-100, Feeds From: Prv Office, Fitting: 5-A, Effective Length: 74.8					
Trunk	0.003	22.1	554		0.001
Up: Fan	75	26	0.028		0.020
Rect	4.0	16	70.8		0.021
Schedule	1,600	28	-0.062		0.083
---Duct Name: V/A, Returns From: Prv Office, Fitting: 2-D, Effective Length: 10.2					
Runout	0.003	6.6	560		0.001
Up: RMT-100	75	6	0.135		0.012
Rect	1.0	6	9.2		0.014
Schedule	140	2	-0.048		0.014
---Duct Name: RT-110, Feeds From: Open Office, Fitting: 8-D2, Effective Length: 93.3					
Trunk	0.003	15.3	551		0.017
Up: RMT-100	75	14	0.044		0.024
Rect	38.3	14	55.0		0.041
Schedule	750	178.9	-0.021		0.042
---Duct Name: RR-100, Returns From: Reception, Fittings: 11-B, 6-N, 11-B, Effective Length: 33.8					
Runout	0.01	14	561		0.008
Up: RT-110	75	11.4	0.062		0.013
Rnd	13.2	14.6	20.6		0.021
Schedule	600	48.4	0.000		0.021
---Duct Name: RR-110, Returns From: Conference, Fittings: 11-B, 11-B, 11-B, 6-N, 11-B, Effective Length: 23.6					
Runout	0.01	8	430		0.006
Up: RT-110	75	6.3	0.077		0.012
Rnd	7.7	8.7	15.9		0.018
Schedule	150	16.2	-0.003		0.018
---Duct Name: RR-120, Returns From: Break / Hall, Fittings: 11-B, 6-N, 11-B, Effective Length: 25.8					
Runout	0.01	14	599		0.003
Up: RMT-100	75	11.1	0.070		0.015
Rnd	4.9	14.9	20.9		0.018
Schedule	640	17.8	-0.044		0.018
---Duct Name: RR-130, Returns From: Prv Office, Fittings: 11-B, 11-B, 6-N, Effective Length: 7.3					
Runout	0.01	6	357		0.002
Up: RMT-100	75	4.7	0.079		0.004
Rnd	2.9	6.6	4.4		0.006
Schedule	70	4.5	-0.056		0.006

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	2
Number of active runouts:	5
Total runout outlet airflow:	1,600



Manual D Ductsize Data - Duct System 1 - Return (cont'd)

Summary

Main trunk airflow:	1,600		
Largest trunk diameter:	22.1	RMT-100	
Largest runout diameter:	14	RR-100	
Smallest trunk diameter:	15.3	RT-110	
Smallest runout diameter:	6	RR-130	
Runout maximum cumulative static pressure loss:	0.021	RR-100	
Return loss added to supply:	0.083		
Total effective length of return (ft.):	201.9	RR-100	
System duct surface area (Scenario 1):	295.8	In Bld Envelope	(Linked to duct load)
Total system duct surface area:	295.8		

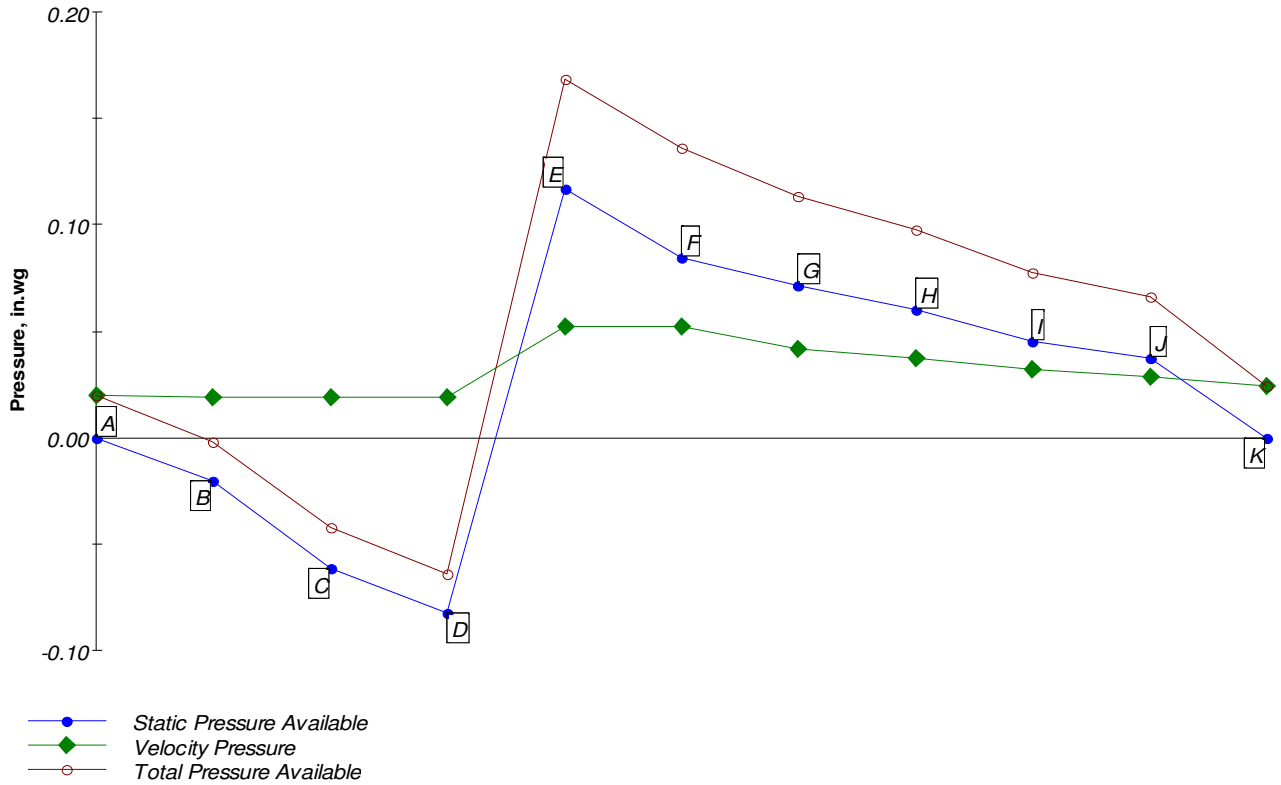
Notes

Rhvac is an ACCA approved Manual J, D and S computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



Manual D Ductsize - Pressure Changes Graph - System 1

Pressure Changes Through Route with Highest Static Pressure Loss



Notes: Return side point values are at entrance of duct, while supply side points are at exit. When a return system is present, an additional return side point named [Fan Entrance] is drawn in the graph to show the static pressure available at the entrance of the fan. When a supply system is present, and an additional supply side point named [Fan Exit] is drawn to show the static pressure available at the exit of the fan. Any device pressure losses entered for the supply main trunk are accounted for between the fan entry and exit points.

Point	Name	Static Pressure Available	Total Pressure Available
A	RR-100	0.000	0.019
B	RT-110	-0.021	-0.002
C	RMT-100	-0.062	-0.043
D	[Fan Entrance]	-0.083	-0.064
E	[Fan Exit]	0.116	0.168
F	SMT-100	0.085	0.136
G	ST-110	0.071	0.113
H	ST-130	0.060	0.098
I	ST-120	0.045	0.078
J	ST-140	0.037	0.066
K	SR-170	0.000	0.024



Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
GSF: Glazing-Glass Storefront Single Pane Clear, ground reflectance = 0.1, light color blinds at 45° with 100% coverage, U-value 1.07, SHGC 0.78	112	2,995	0	5,495	5,495
GED: Glazing-Glass Entry Door, ground reflectance = 0.1, U-value 1.07, SHGC 0.78	21	562	0	1,810	1,810
11N: Door-Metal - Polystyrene Core, U-value 0.35	48	420	0	487	487
WCB4: Wall-Block, Custom, R-4 continuous + any finish, U-value 0.143	484.9	1,733	0	1,268	1,268
WMF11: Part-Frame, Custom, metal + R-11 + any finish, U-value 0.112	1791.8	2,006	0	1,004	1,004
BUR10-zd: Roof/Ceiling-Roof Joists Between Roof Deck and Ceiling or Foam Encapsulated Roof Joists, Custom, Flat Deck / Memb Roof + R-10 (min) Insulation at deck, dark membrane, U-value 0.083	1440	2,988	0	4,780	4,780
F SOG0: Floor-Slab on grade, Custom, R-0 edge insulation + any finish, U-value 1.18	54	1,592	0	0	0
Subtotals for structure:		12,296	0	14,844	14,844
People:	12		1,860	2,940	4,800
Equipment:			360	3,560	3,920
Lighting:	1540			5,251	5,251
Ductwork:		1,794	1,659	637	2,297
Infiltration: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Ventilation: Winter CFM: 140, Summer CFM: 140		3,848	5,973	2,771	8,744
AED Excursion:		0	0	5,085	5,085
Total Building Load Totals:		17,938	9,853	35,089	44,941

Check Figures

Total Building Supply CFM:	1,600	CFM Per Square ft.:	1.111
Square ft. of Room Area:	1,440	Square ft. Per Ton:	379
Volume (ft³):	13,679		

Building Loads

Total Heating Required Including Ventilation Air:	17,938 Btuh	17.938 MBH
Total Sensible Gain:	35,089 Btuh	78 %
Total Latent Gain:	9,853 Btuh	22 %
Total Cooling Required Including Ventilation Air:	44,941 Btuh	3.80 Tons (Based On 77% Sensible Capacity)

Notes

Rhvac is an ACCA approved Manual J, D and S computer program.
 Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
 All computed results are estimates as building use and weather may vary.
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



System 1 Room Load Summary

Room No	Room Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---										
1	Bath	66	809	18	4	-	911	60	41	45
2	Prv Office	110	391	9	6	-	1,597	155	73	79
3	Open Office	536	2,084	47	8,8	-	8,732	620	397	432
4	Conference	185	616	14	8	-	3,234	620	147	160
5	Reception	328	6,665	152	10,10	-	13,494	310	614	668
6	Break / Hall	214	3,117	71	8	-	4,350	455	198	215
	Ventilation		3,848				2,771	5,973		
	Duct Latent							134		
	Return Duct		407				0	1,526		
System 1 total		1,440	17,938	311			35,089	9,853	1,470	1,600

System 1 Main Trunk Size: 16x16 in.
 Velocity: 899 ft./min
 Loss per 100 ft.: 0.099 in.wg

Duct size results above are from Manual D Ductsize.
 Runout duct velocities are not printed with duct size results from Manual D Ductsize since they can vary within the room. See the Manual D Ductsize report for duct velocities and other data.

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Recommended:	3.80	77% / 23%	35,089	10,481	45,570
Actual:	4.00	77% / 23%	36,960	11,040	48,000

Equipment Data

	Heating System	Cooling System
Type:	Electric Resistance	Standard Air Conditioner
Model:		EXISTING RE USED
Indoor Model:		
Brand:		BRYANT
Efficiency:	0%	14 SEER
Comment :	10 KW 2 STAGE	0
Sound:	0	0
Capacity:	34,120 Btuh	48,000 Btuh
Sensible Capacity:	n/a	36,960 Btuh
Latent Capacity:	n/a	11,040 Btuh

This system's equipment was selected in accordance with ACCA Manual S.
 Manual S equipment sizing data: SODB: 93F, SOWB: 79F, WODB: 47F, SIDB: 75F, SIRH: 50%, WIDB: 72F, Sen. gain: 35,089 Btuh, Lat. gain: 9,853 Btuh, Sen. loss: 17,938 Btuh, Entering clg. coil DB: 76.6F, Entering clg. coil WB: 64.2F, Entering htg. coil DB: 69.6F, Clg. coil TD: 20F, Htg. coil TD: 40F, Req. clg. airflow: 1470 CFM, Req. htg. airflow: 311 CFM