

## HVAC SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	-CEILING DIFFUSER, ROUND OR RECTANGULAR NECK (CEILING DIFFUSERS ARE 4-WAY THROW UNO)		-FIRE DAMPER (WITH ACCESS PANEL)
	-CEILING RETURN		-FIRE & SMOKE DAMPER (WITH ACCESS PANEL)
	-CEILING EXHAUST		-SMOKE DAMPER (WITH ACCESS PANEL)
	-SUPPLY REGISTER OR GRILLE (RETURN MOUNT, SIDEWALL)		-DUCT SECURITY BARS (WITH ACCESS PANEL)
	-RETURN/EXHAUST REGISTER OR GRILLE (VERTICAL MOUNT, SIDEWALL)		-MOTOR OPERATED CONTROL DAMPER (MOD)
	-ENDOCAP		-AIR FLOW MEASURING STATION
	-REVISION REFERENCE		-MANUAL BALANCING DAMPER
	-DETAIL REFERENCE: TOP-DETAIL#, BOTTOM-DRAWING SHOWN ON		-DOOR GRILLE
	-THERMOSTAT/TEMPERATURE SENSOR		-UNDERCUT DOOR
	-HUMIDISTAT/HUMIDITY SENSOR		-ACCESS DOORS, VERTICAL OR HORIZONTAL
	-DUCT SMOKE DETECTOR		-FLEXIBLE CONNECTION
	-CONNECT TO EXISTING		-NEW DUCTWORK, FIRST DIMENSION IS SIDE SHOWN
	-DEMOLISH TO POINT INDICATED		-DUCT ELBOW, POSITIVE PRESSURE (SUPPLY), FIRST SUPPLY OR OUTSIDE AIR
	-MOTORIZED CONTROL DAMPER		-DUCT ELBOW, EXHAUST
	-TEMPERATURE SENSOR		-DUCT ELBOW, NEGATIVE PRESSURE, RETURN
	-PRESSURE SENSOR		-DUCT ELBOW UP THROUGH ROOF OR SLAB ABOVE
	-BACKDRAFT DAMPER		-RECTANGULAR DUCT SECTION UP, POSITIVE PRESSURE
	-SHEET NOTE CALLOUT		-RECTANGULAR DUCT SECTION UP, NEGATIVE PRESSURE, RETURN
	-CEILING MOUNTED ACCESS DOOR		-RECTANGULAR DUCT SECTION UP, EXHAUST
			-ROUND DUCT SECTION UP

## HVAC PIPING SYMBOL LEGEND

SYMBOL	DESCRIPTION
	-REFRIGERANT LIQUID
	-REFRIGERANT SUCTION
	-CONDENSATE

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT

## HVAC ABBREVIATIONS

SYMBOL	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
AIR	AIR HANDLING UNIT
AP	ACCESS PANEL
BOP	BOTTOM OF PIPE
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
CL	CENTER LINE
CFM	CUBIC FEET PER MINUTE
CD	CEILING DIFFUSER
CY	CONSTANT VOLUME
CH	CHANGE IN PRESSURE
ΔT	CHANGE IN TEMPERATURE
DDC	DIRECT DIGITAL CONTROLS
DN	DOWN
ENT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
FFU	FAN COIL UNIT
FD	FIRE DAMPER
FO	FINAL FILTERS
FLM	FULL LOAD AMPS
FPM	FEET PER MINUTE
GPM	GALLONS PER MINUTE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
LD	LINEAR DIFFUSER
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MCCP	MAXIMUM OVER CURRENT PROTECTION
MCD	MOTOR OPERATED CONTROL DAMPER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAL	OUTSIDE AIR LOUVER
PSI	POUNDS PER SQUARE INCH
PSIG	PSI GAUGE
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RHC	REHEAT COIL
RP	REVOLUTIONS PER MINUTE
RSL	REFRIGERANT SUCTION & LIQUID
SA	SUPPLY AIR
SP	STATIC PRESSURE
STP	TOTAL STATIC PRESSURE
UNO	UNLESS NOTED OTHERWISE
VFD	VOLTS/PHASE
VAV	VARIABLE AIR VOLUME
VPH	VARIABLE FREQUENCY DRIVE

## HVAC GENERAL NOTES

- GENERAL
1. ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND STANDARDS, INCLUDING THE LATEST FLORIDA MODEL JAIL STANDARDS.
  2. PRIME CONTRACTOR IS RESPONSIBLE TO HAVE LICENSED AND QUALIFIED SUBCONTRACTORS PERFORMING ALL WORK.
  3. ALL WORK SHALL BE CONSTRUCTED TO MEET THE PHASING REQUIREMENTS OF THE PROJECT AS OUTLINED IN THE DRAWINGS AND SPECIFICATIONS, OR AS DICTATED BY THE OWNER AND/OR ARCHITECT.
  4. PRIOR TO BID, CHECK LEAD TIMES OF ALL EQUIPMENT IN THE PROJECT. IF NECESSARY TO MEET THE PROJECT SCHEDULE, BID SHALL INCLUDE THE COST TO ACCELERATE DELIVERY OF CRITICAL MATERIALS AND EQUIPMENT. ALLOW TIME FOR NONCAL SHOP DRAWING PREPARATION AND REVIEW.
  5. CONTRACTOR SHALL NOT CONCEAL ANY WORK UNTIL INSPECTED BY MECHANICAL INSPECTOR. CONTRACTOR SHALL NOTIFY ENGINEER OF A SCHEDULED INSPECTION TIME WITHIN 72 HOURS. GENERAL CONTRACTOR SHALL NOT CONCEAL WORK UNTIL APPROVED, REGARDLESS OF SCHEDULE.
  6. ALL CHANGES MADE IN THE FIELD SHALL BE RECORDED BY THE CONTRACTOR(S) ON AS-BUILT DRAWINGS, SHOP DRAWINGS, AND IN MAINTENANCE MANUALS.
  7. DRAWINGS ARE DIAGRAMMATIC IN NATURE. COORDINATE EXACT LOCATION OF ALL EQUIPMENT MOUNTED IN CEILING CAVITY SO ALL SERVICEABLE COMPONENTS CAN BE EASILY ACCESSED BY REMOVING CEILING TILES ONLY. REMOVAL OR RELOCATION OF LIGHTING FIXTURES FOR SERVICE ACCESS IS NOT ACCEPTABLE. THE CONTRACTOR SHALL REINSTALL EQUIPMENT THAT HAS INADEQUATE OR UNSAFE ACCESSIBILITY. LOCATE ALL EQUIPMENT WITH MANUFACTURER RECOMMENDED ACCESS FOR OPERATION AND MAINTENANCE.
  8. PROVIDE ACCESS PANELS IN DUCTWORK, WALLS AND CEILING WHERE REQUIRED FOR OPERATION, BALANCING, INSPECTION AND MAINTENANCE OF ALL EQUIPMENT. ACCESS PANELS IN SECURE AREAS SHALL BE SECURITY TYPE ACCESS DOORS, KEYS TO MATCH SECURITY DOOR KEYTYPE.
  9. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS PRIOR TO PURCHASING OR INSTALLING EQUIPMENT AND SYSTEMS INDICATED ON CONTRACT DOCUMENTS. SUBMIT IN STRICT ACCORDANCE WITH THE SPECIFICATIONS. PRIOR TO SUBMITTAL, CONTRACTOR SHALL VERIFY THAT ADEQUATE SPACE EXISTS FOR THE SUBMITTED EQUIPMENT. SHOP DRAWINGS SHALL BE REVIEWED BY THE GENERAL CONTRACTOR, ENGINEER AND ARCHITECT.
  10. PRIOR TO BID, COORDINATE ALL MECHANICAL WORK WITH ELECTRICAL WORK AND OTHER TRADES. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
  11. THE SIZE, LOCATION, WEIGHT, ELECTRICAL REQUIREMENTS AND SERVICE CLEARANCES OF EQUIPMENT INSTALLED BY MECHANICAL SHALL BE COORDINATED WITH ALL OTHER TRADES.
  12. CONTRACTOR SHALL MAKE COMPOSITE DRAWINGS SHOWING THE EXACT LOCATION OF PIPES, DUCTS, CONDUIT AND EQUIPMENT. DRAWINGS SHALL BE BASED ON FIELD MEASUREMENTS AND, AFTER CONSULTATION AND AGREEMENT BETWEEN THE TRADES, SHALL BE REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION OF THE WORK.
  13. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT AND GENERAL CONTRACTOR THE REQUIREMENTS FOR STRUCTURAL SUPPORTS AND FRAMING FOR ALL MECHANICAL EQUIPMENT AND SYSTEMS. MECHANICAL AND GENERAL CONTRACTOR SHALL COORDINATE FABRICATION AND INSTALLATION OF ALL STRUCTURAL SUPPORTS AND FRAMING. MECHANICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY STRUCTURAL SUPPORTS AND FRAMING FOR SUPPORT OF NEW DUCTWORK, PIPING AND MECHANICAL EQUIPMENT. PROVIDE SUPPORTS AS REQUIRED TO PROVIDE A VIBRATION-FREE, RIGID INSTALLATION.
  14. NOTIFY ENGINEER OF ANY CONFLICTS PRIOR TO PURCHASING EQUIPMENT AND PRIOR TO CUTTING OPENINGS.
  15. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS INCURRED BY HIS OR OTHER TRADES DUE TO SUBSTITUTION OF OTHER THAN SCHEDULED EQUIPMENT. WHEN EQUIPMENT FURNISHED IS DIFFERENT THAN INDICATED, THE COST OF ADDITIONAL ELECTRICAL SERVICE, STRUCTURAL AND RELATED WORK SHALL BE PAID BY THIS CONTRACTOR. WHEN EQUIPMENT FURNISHED IS DIFFERENT THAN INDICATED, THIS CONTRACTOR IS RESPONSIBLE FOR RESOLVING ALL RELATED FITMENT ISSUES AND SPACE CONSIDERATIONS.
  16. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION AND ALL REQUIREMENTS NOT INDICATED ON THE DRAWINGS. IF THERE ARE ANY APPARENT CONFLICTS BETWEEN THE SPECIFICATIONS, DRAWINGS AND CODE REQUIREMENTS, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.
  17. ALL EQUIPMENT, PIPING AND VALVES SHALL HAVE IDENTIFICATION LABELS AND TAGS PER SPECIFICATIONS AND AS INDICATED.
  18. ALL BARE METAL SURFACES SHALL BE PRIMED AND PAINTED TO PREVENT ANY RUST, INCLUDING, BUT NOT LIMITED TO, UNLESS FRAMING, UNIT SUPPORTS, MOUNTING HARDWARE, ETC.
  19. LOCATE THERMOSTATS, TEMPERATURE SENSORS, HUMIDISTATS, AND HUMIDITY SENSORS AT 4" ABOVE FINISHED FLOOR UNLESS NOT OTHERWISE COORDINATE LOCATIONS WITH OTHER EQUIPMENT, FURNITURE, AND DOOR SWINGS. THERMOSTATS IN STRUCTURED AREAS SHALL HAVE STAINLESS STEEL TAMPER PROOF COVERS, ANCHORED WITH TAMPER PROOF STAINLESS STEEL HARDWARE.
  20. CONTRACTOR SHALL PROVIDE 4" THICK REINFORCED CONCRETE PADS FOR ALL INTERIOR SUB-MOUNTED EQUIPMENT. ALL OUTDOOR EQUIPMENT SHALL BE MOUNTED ON MINIMUM 6" THICK REINFORCED CONCRETE PADS ON GRADE. ALL PADS SHALL EXTEND A MINIMUM 6" BEYOND EACH SIDE OF EQUIPMENT. FOR EQUIPMENT PADS INSTALLED ADJACENT TO BUILDING, PAD SHALL EXTEND TO THE BUILDING.
  21. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
  22. ALL MATERIALS AND EQUIPMENT INSTALLED IN RETURN AIR PLENUMS SHALL BE NON-COMBUSTIBLE AND UL APPROVED FOR USE IN A RETURN AIR PLENUM SPACE. ALL WIRING SHALL BE NON-COMBUSTIBLE OR SHALL BE ENCLOSED IN METAL CONDUIT OR PROTECTED BY A SHEET METAL COVER SECURED WITH METAL FASTENERS.
  23. INSULATION, FITTINGS, COVERS AND FINISHES IN RETURN AIR PLENUM SHALL HAVE A MAXIMUM FLAME SPREAD RATING OF 25 AND A MAXIMUM SMOKE DEVELOPED RATING OF 50.
  24. TEST AND BALANCE ALL NEW AIR DEVICES, SYSTEMS AND EQUIPMENT.
  25. PROVIDE COMMISSIONING IN ACCORDANCE WITH FLORIDA ENERGY CONSERVATION CODE 2017.
- AIR-HANDLING UNITS, DUCTWORK AND AIR DISTRIBUTION:
26. COORDINATE DIFFUSER, GRILLE AND REGISTER LOCATIONS, WITH ARCHITECTURAL REFLECTED CEILING PLANS AND EQUIPMENT OF ALL TRADES.
  27. TRAPPED CONDENSATE DRAINS FROM ALL COOLING EQUIPMENT SHALL BE PROVIDED FOR PROPER DRAINAGE, TO SUIT EQUIPMENT FURNISHED. SEE CONDENSATE TRAP DETAILS.
  28. PROVIDE AN AUXILIARY DRAIN PAN AND DRAIN LINE UNDER ALL AIR HANDLING UNITS OR FAN COIL UNITS LOCATED ABOVE THE CEILING. PROVIDE FLOAT SWITCH TO SHUT DOWN UNIT.
  29. DUCT SIZES AND ALL OPENINGS THROUGH BUILDING CONSTRUCTION SHALL SUIT EQUIPMENT FURNISHED.
  30. DAMPERS AND INSIDE OF DUCTS VISIBLE THROUGH GRILLES, REGISTERS AND DIFFUSERS SHALL BE PAINTED FLAT BLACK.
  31. ALL DUCTWORK IS SHOWN SCHEMATICALLY PROVIDE ALL TRANSITIONS, TURNING VANES, ELBOWS, FITTINGS, ETC., TO ALLOW SMOOTH FLOWS. ALL SPLIT DUCT FITTINGS SHALL TRANSITION TO FULL SIZE OF THE SUM OF BOTH BRANCHES UPSTREAM OF SPLIT.
  32. VERIFY FINISH WITH ARCHITECT PRIOR TO PURCHASING GRILLES, REGISTERS, DIFFUSERS, LOUVERS AND OTHER AIR DISTRIBUTION DEVICES.
  33. DUCT RUNOUTS TO DIFFUSERS SHALL MATCH THE SIZE OF THE DIFFUSER NECK.
  34. MAINTAIN 6" CLEARANCE BETWEEN DUCTWORK, PIPING, EQUIPMENT, ETC., AND ALL FIRE, SMOKE AND FIRE/SMOKE RATED PARTITIONS, TO ALLOW FOR INSPECTIONS OF RATED WALLS.
  35. LOCATE ALL OUTSIDE AIR INTAKES A MINIMUM OF 10'-0" CLEAR FROM ALL PLUMBING VENTS AND EXHAUST AIR DISCHARGE LOCATIONS. LOWEST POINT OF EACH OUTSIDE AIR INTAKE SHALL BE A MINIMUM OF 24" ABOVE GROUND, PAVEMENT OR GRADE.
  36. ALL DUCTWORK SHALL BE CONSTRUCTED AND SUPPORTED (AS A MINIMUM AS SPECIFIED IN THE SMOAC MANUAL "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," LATEST EDITION. MORE STRINGENT REQUIREMENTS OF THESE DRAWINGS AND/OR SPECIFICATIONS SHALL PREVAIL. REFER TO SMOKE CONTROL NOTES FOR DUCT CONSTRUCTION REQUIREMENTS FOR DUCTWORK ASSOCIATED WITH THE SMOKE CONTROL SYSTEMS.
  37. SUPPLY AIR, RETURN AIR, TRANSFER AIR, OUTDOOR AIR AND EXHAUST AIR (NON-GREASE, NON-CORROSIVE) DUCTS SHALL BE CONSTRUCTED OF 60# (SINGLE-WALL) GALVANIZED STEEL UNLESS NOTED OTHERWISE.
  38. FLEXIBLE DUCT SHALL BE PROVIDED WHERE INDICATED ON DRAWINGS. ALL FLEXIBLE DUCT SHALL BE SUITABLE FOR THE SERVICE INTENDED. NO LENGTH OF FLEXIBLE DUCT SHALL TURN MORE THAN A TOTAL OF 180 DEGREES. FLEXIBLE DUCT SHALL ONLY BE USED IN CONCEALED SPACES (ABOVE CEILINGS) AND NOT PASS THROUGH ANY WALL, FLOOR OR CEILING.
  39. ALL HORIZONTAL, SUSPENDED RECTANGULAR DUCTS SHALL BE SUPPORTED WITH GALVANIZED STEEL TRAPPEZ VANGERS OR STRAP HANGERS UNDER BOTTOM OF DUCTS. SECURELY FASTEN SUPPORTS TO THE BUILDING CONSTRUCTION IN AN APPROVED MANNER. DUCTS SHALL BE SUPPORTED PER SMOAC "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".
  40. ROUND AND OVAL DUCT SHALL BE SUPPORTED AS SHOWN ON THE DRAWINGS OR AS RECOMMENDED BY SMOAC MANUAL.
  41. NO CEILINGS, PIPING OR EQUIPMENT SHALL BE SUPPORTED FROM THE DUCTWORK OR DUCT HANGERS.
  42. THE DUCT SEALING MATERIAL SHALL BE OF LIQUID, MASTIC AND GASKET TYPES AND APPLIED PER THE MANUFACTURER'S WRITTEN RECOMMENDATIONS. HEAT AND PRESSURE SENSITIVE TAPES ARE NOT ACCEPTABLE WITH A FINAL CLOSURE. SEAL ALL JOINTS.
  43. ALL FIBROUS GLASS DUCT INSULATION JOINTS, SEAMS AND CONNECTIONS (RIGID BOARD INSULATION OR DUCT WRAP) SHALL BE CLOTHED WITH STAPLES, AND SEALED WITH GLASS FIB IMBEDDED IN MASTIC. HEAT AND PRESSURE SENSITIVE TAPES ARE NOT ACCEPTABLE AS A FINAL CLOSURE.
  44. DUCT INSULATION: AS A MINIMUM, DUCT INSULATION SHALL MEET ALL OF THE CRITERIA PRESCRIBED IN FBC – MECHANICAL SECTION 604, AND FBC – ENERGY CONSERVATION. INSULATION FOR DUCTS (SA, RA, OA) AND FROM EXHAUST INSULATION DAMPERS AND EXHAUST LOUVER: INTERIOR DUCTS LOCATED BELOW ROOF INSULATION SHALL BE INSULATED TO A MINIMUM INSTALLED R-VALUE OF R-4.2. DUCTS LOCATED IN ATTIC SPACES SHALL BE INSULATED TO A MINIMUM INSTALLED R-VALUE OF R-6. EXTERIOR DUCTS SHALL BE INSULATED TO A MINIMUM INSTALLED R-VALUE OF R-4. DUCTS IN CONDITIONED SPACES SHALL BE INSULATED TO PREVENT CONDENSATION.
  45. ALL HORIZONTAL OR VERTICAL DUCT BENDS AND ANGLED TURNS OF DUCTWORK SHALL BE RADIUS ED ELBOWS WHEREVER POSSIBLE. WHERE A RADIUS ELBOW WILL NOT FIT, MITERED ELBOWS IN EXCESS OF 45' SHALL HAVE TURNING VANS INSTALLED.

## HVAC EQUIPMENT TAGS

Diagram illustrating the components of an Air Handling Unit (AHU):

- AIR DISTRIBUTION DEVICE**: A component labeled "A" with a "200" inside a circle, connected to "TAG" and "CFM".
- AIR HANDLING UNIT**: A component labeled "AHU-1" connected to "AHU NUMBER".

## HVAC THERMAL DESIGN BASIS

1. OUTDOOR COOLING DESIGN TEMPERATURE: 96.44° DB / 77.9° FV (ASHRAE 0.4% ROUNDED).
2. OUTDOOR HEATING DESIGN TEMPERATURE: 29.36° DB (ASHRAE 60% ROUNDED).
3. INDOOR COOLING DESIGN TEMPERATURE: 74° F / 50% RH (60% RH MAX).
4. INDOOR HEATING DESIGN TEMPERATURE: 70° F.
5. AVERAGE HEAT GAIN PER PERSON: 250 BTU/H (SENSIBLE / 250 BTU LATENT).
6. LIGHTING HEAT GAIN: 1.0 W/SF; 0% TO PLENUM.
7. ELECTRICAL ROOMS: TRANSFORMER WATTAGE / 250 BTU PER ELECTRICAL TRANSFORMER SIZING.
8. ROOF ASSEMBLY: ASSEMBLY R-VALUE OF R-30.
9. GLAZING: U-FAC 70; SHGC = 0.25
10. WALL: ASSEMBLY R-VALUE OF R-19.

## BUILDING AIR BALANCE

AIR CONDITIONING SYSTEMS	SYSTEM SERVICE	DESIGN VENTILATION RATE (CFM)	EXHAUST SYSTEM	DESIGN EXHAUST RATE (CFM)
AHL-1	HOUSING POD	6,650	AHL-1 EA FAN	5,700
AHL-2	HOUSING POD	6,825	AHL-2 EA FAN	6,075
			EF-1	100
			EF-2	100
TOTAL		13,675		11,975
SUMMARY: BUILDING IS POSITIVE (1,700 CFM) REALTIVE TO AMBIENT CONDITIONS.				

## HVAC DRAWING INDEX

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