

MECHANICAL SPECIFICATIONS:

PART 1 - GENERAL

- 1.1 SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
1.2 WARRANTY
A. WARRANT NEW AND MODIFIED DUCTWORK FOR PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF JOB, AGAINST NOISE AND VIBRATION UNDER FULL RANGE OF OPERATING CONDITIONS.

PART 2 - PRODUCTS

- 2.1 METAL DUCTS
A. CONTINUOUS HOT-DIP MILL GALVANIZED, MINIMUM COATING OF G60, LOCK-FORMING QUALITY STEEL SHEETS IN ACCORDANCE WITH ASTM A653.
B. GAUGES: SHEET METAL GAUGE AS SPECIFIED IN SMACNA - HVAC DUCT CONSTRUCTION STANDARDS BUT NOT LESS THAN THE FOLLOWING:
1. RECTANGULAR DUCT: 26 GAUGE FOR ALL SIZES.
2. ROUND DUCT: PRIME GRADE STEEL SHEET.
a. 14 INCH DIAMETER AND SMALLER: 26 GAUGE.
b. 15 INCH DIAMETER THRU 26 INCH DIAMETER: 24 GAUGE.
C. ROUND DUCT SHALL BE SPIRAL SEAM WHERE EXPOSED AND NOT INSULATED. IN ALL OTHER AREAS SPIRAL OR LONGITUDINAL SHALL BE USED.

2.2 TURNING VANES

- A. MANUFACTURED TURNING VANES FOR METAL DUCTS: CURVED BLADES OF GALVANIZED SHEET STEEL; SUPPORT WITH BARS PERPENDICULAR TO BLADES SET; SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
B. GENERAL REQUIREMENTS: COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 4-3 "VANES AND VANE RUNNERS," 4-4, "VANE SUPPORT IN ELBOWS."
C. VANE CONSTRUCTION: SINGLE WALL

2.3 SEALANT AND GASKET

- A. GENERAL SEALANT AND GASKET REQUIREMENTS: SURFACE-BURNING CHARACTERISTICS FOR SEALANTS AND GASKETS SHALL BE A MAXIMUM FLAME-SPREAD INDEX OF 25 AND A MAXIMUM SMOKE, DEVELOPED INDEX OF 50 WHEN TESTED ACCORDING TO UL 723, CERTIFIED BY AN NRTL.

2.4 HANGERS AND SUPPORTS

- A. HANGER RODS: CADMIUM-PLATED STEEL RODS AND NUTS.
B. STRAP AND ROD SIZES: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" TABLE 5-1, "RECTANGULAR DUCT HANGERS MINIM SIZE," AND TABLE 5-2 "MINIMUM HANGER SIZES FOR ROUND DUCT."
C. STEEL CABLES FOR GALVANIZED STEEL DUCTS: GALVANIZED STEEL COMPLYING WITH ASTM A 603.
D. STEEL CABLE END CONNECTIONS: CADMIUM PLATED STEEL ASSEMBLIES WITH BRACKETS, SWIVEL, AND BOLTS DESIGNED FOR DUCT HANGER SERVICE; WITH AN AUTOMATIC-LOCKING AND CLAMPING DEVICE.
E. DUCT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS, COMPATIBLE WITH DUCT MATERIALS.

2.5 MECHANICAL EQUIPMENT

- A. PROVIDE EQUIPMENT INDICATED ON DRAWINGS.
B. PRODUCTS REQUIRING ELECTRICAL CONNECTION: LISTED AND CLASSIFIED BY UNDERWRITERS LABORATORIES, INCORPORATED, AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE PURPOSE SPECIFIED AND INDICATED.
C. OPERATION AND MAINTENANCE DATA: INCLUDE MANUFACTURER'S DESCRIPTIVE LITERATURE, OPERATING INSTRUCTIONS, MAINTENANCE AND REPAIR DATA, AND PARTS LISTING FOR MECHANICAL EQUIPMENT.

2.6 CONTROLS

- A. PROVIDE COMPLETE CONTROLS SYSTEM INCLUDING STEP-DOWN TRANSFORMERS FOR 24 VAC CONTROL, RELAYS, RELAY BOARDS, RELAY BASES, PRINTED CIRCUIT BOARDS, THERMOSTATS, TIMERS, SENSORS, INDICATORS, ACTUATORS, AND OTHER NECESSARY DEVICES REQUIRED FOR COMPLETE INSTALLATION INCLUDING ENCLOSURES FOR EQUIPMENT. LOCATIONS AND TYPES OF THERMOSTATS, TIMERS, AND OTHER CONTROLS EQUIPMENT ARE INDICATED ON DRAWINGS.
B. POWER SUPPLIES: TRANSFORMERS WITH CLASS 2 CURRENT-LIMITING TYPE OR OVERCURRENT PROTECTION; LIMIT CONNECTED LOADS TO 80 PERCENT OF RATED CAPACITY. DC POWER SUPPLY SHALL MATCH OUTPUT CURRENT AND VOLTAGE REQUIREMENTS AND BE FULL WAVE RECTIFIER TYPE.
C. DEVICES
1. TEMPERATURE SENSORS
a. ACCURACY: PLUS OR MINUS 0.36 DEG F OR 0.2 PERCENT AT CALIBRATION POINT.
b. WIRE: TWISTED SHIELDED PAIR - CABLE.
c. OUTSIDE AIR SENSORS: WATERTIGHT INLET FITTING, SHIELDED FROM DIRECT SUNLIGHT.
2. PROGRAMMABLE THERMOSTAT
a. ELECTRIC, SOLID STATE, MICROCOMPUTER-BASED ROOM THERMOSTAT WITH REMOTE SENSOR.
b. AUTOMATIC SWITCHING FROM HEATING TO COOLING.
3. LOW VOLTAGE ON OFF THERMOSTATS
a. 24-VAC, BIMETAL-OPERATED, SNAP-ACTING, MERCURY FREE, WITH ANTICIPATION HEATER, SET-POINT ADJUSTMENT, AND 5 DEG F MAXIMUM DIFFERENTIAL.
D. LOW VOLTAGE CONTROL WIRING
1. JACKETED, INDIVIDUALLY SHIELDED TWISTED PAIRS OF STRANDED INSULATED TINNED COPPER CONDUCTORS.
2. STRANDED TINNED COPPER DRAIN WIRE.
3. PLENUM-RATED JACKET FOR PLENUM APPLICATIONS.
4. CONDUCTOR SIZES BASED ON 10% MAXIMUM VOLTAGE DROP.
5. MINIMUM WIRE SIZE: 22 AWG, MAXIMUM WIRE SIZE: 14 GAUGE.

MECHANICAL SPECIFICATIONS (CONT.):

PART 3 - EXECUTION

- 3.1 GENERAL
A. UNLESS OTHERWISE DICTATED BY APPLICABLE CODES OR THE AUTHORITY HAVING JURISDICTION, ALL MATERIALS WITHIN RETURN AIR PLENUM MUST BE NONCOMBUSTIBLE AND/OR HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX NOT MORE THAN 50 IN ACCORDANCE WITH ASTM E 84 TESTING.
B. PROTECT WORK, EQUIPMENT AND MATERIAL TO PREVENT OBSTRUCTION, DAMAGE OR BREAKAGE. CLOSE PIPE OPENINGS WITH CAPS OR PLUGS DURING INSTALLATION. COVER AND PROTECT EQUIPMENT AGAINST DIRT, WATER, CHEMICAL OR MECHANICAL INJURY. AT THE COMPLETION OF WORK, THOROUGHLY CLEAN ALL EQUIPMENT AND DELIVER THE ENTIRE SYSTEM IN AN UNBLEMISHED CONDITION.
C. MAKE CHANGES IN PULLEYS, BELTS, DUCTWORK, AND DAMPERS AS REQUIRED FOR CORRECT BALANCE AS RECOMMENDED BY AIR BALANCE AGENCY.
D. PROVIDE PENETRATION FIRESTOPPING THAT IS PRODUCED AND INSTALLED TO MAINTAIN ORIGINAL FIRE-RESISTANCE RATING OF CONSTRUCTION PENETRATED. PENETRATION FIRESTOPPING SYSTEMS SHALL BE COMPATIBLE WITH ONE ANOTHER, WITH THE SUBSTRATES FORMING OPENING, AND WITH PENETRATING ITEMS IF ANY.
1. COORDINATE SIZING OF SLEEVES, OPENINGS CORE-DRILLED HOLES, OR CUT OPENINGS TO ACCOMMODATE PENETRATION FIRESTOPPING.
2. INSTALL PENETRATION FIRESTOPPING TO COMPLY WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AND PUBLISHED DRAWINGS FOR PRODUCTS AND APPLICATIONS INDICATED.
3.2 DUCT INSTALLATION
A. INSTALL DUCTS ACCORDING TO SMACNA STANDARDS.
B. PROTECT DUCT INTERIORS FROM MOISTURE, CONSTRUCTION DEBRIS, AND OTHER FOREIGN MATERIALS.
C. FABRICATE, ERECT, AND INSTALL DUCTWORK FOR HEATING, VENTILATING, AND AIR CONDITIONING PER SMACNA STANDARDS AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
D. MAKE JOINTS AIR TIGHT ON ALL DUCTWORK. SEAL EXHAUST DUCTWORK WITH EXTERIOR SEAL AS REQUIRED TO ASSURE POSITIVE SEAL. COMPLY WITH SMACNA DUCT CLASS A.
E. INSTALL FACTORY FABRICATED FITTINGS FOR CHANGES IN DIRECTION, SIZE, AND SHAPE AND FOR BRANCH CONNECTIONS.
3.3 HANGERS AND SUPPORT INSTALLATION
A. COMPLY WITH SMACNA STANDARDS.
B. INSTALL HANGERS AND SUPPORTS WITHIN 24" OF EACH ELBOW AND WITH 48" OF EACH BRANCH INTERSECTION.
C. DO NOT USE FASTENERS THAT PENETRATE ROOF DECK.
3.4 MECHANICAL EQUIPMENT
A. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3.5 CONTROLS
A. COORDINATE LOCATION OF THERMOSTATS, HUMIDISTATS, AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION.
B. CONNECT AND CONFIGURE EQUIPMENT AND SOFTWARE TO ACHIEVE SEQUENCE OF OPERATIONS.
C. LOW VOLTAGE CONTROL WIRING.
1. COMPLY WITH NECA 1.
2. COMPLY WITH TIA/EIA-568-B.1.
3. BUNDLE AND HARNESS MULTICONDUCTOR INSTRUMENT CABLE IN PLACE OF SINGLE CABLES WHERE SEVERAL CABLES FOLLOW A COMMON PATH.
4. NUMBER-CODE OR COLOR-CODE CONDUCTORS FOR FUTURE IDENTIFICATION AND SERVICE OF CONTROL SYSTEM, EXCEPT LOCAL INDIVIDUAL ROOM CONTROL CABLES.
5. CONCEAL CABLE, EXCEPT IN MECHANICAL ROOMS AND AREAS WHERE OTHER CONDUIT AND PIPING ARE EXPOSED.
6. INSTALL PLENUM-RATED CABLE IN ENVIRONMENTAL AIR SPACES INCLUDING PLENUM CEILING.
7. WIRING WITHIN ENCLOSURES
a. BUNDLE, LACE, AND TRAIN CONDUCTORS TO TERMINAL POINTS WITH NO EXCESS.
b. INSTALL CONDUCTORS PARALLEL, WITH OR AT RIGHT ANGLES TO SIDES AND BACK OF ENCLOSURE.
D. AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER UNIT OPERATION. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST.
E. TEST EACH SYSTEM FOR COMPLIANCE WITH SEQUENCE OF OPERATION.
F. OCCUPANCY ADJUSTMENTS, WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO THREE VISITS TO PROJECT DURING OTHER THAN NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.
3.6 EQUIPMENT LABEL INSTALLATION
A. INSTALL OR PERMANENTLY FASTEN LABELS ON EACH MAJOR ITEM OF MECHANICAL EQUIPMENT.
B. LABEL ACCESS DOORS TO INDICATE THE PURPOSE OF ACCESS DOOR.
C. LOCATE EQUIPMENT LABELS WHERE ACCESSIBLE AND VISIBLE.
D. WHERE EQUIPMENT, SUCH AS A VAV BOX, IS CONCEALED BY ACCESSIBLE DROP OR LAY-IN CEILINGS OR OTHER ACCESSIBLE BARRIER, ATTACH LABEL TO CEILING GRID OR A VISIBLE LOCATION TO IDENTIFY LOCATION OF HIDDEN EQUIPMENT.
3.7 TESTING, ADJUSTING, AND BALANCING
A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THIS SECTION AND THE PROCEDURES CONTAINED IN ONE OF THE FOLLOWING:
1. AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE"
2. NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS."

MECHANICAL SPECIFICATIONS (CONT.):

- B. COMPLY WITH REQUIREMENTS IN ASHRAE 62.1 SECTION 7.2.2 - "AIR BALANCING."
C. AIRFLOW VALUES ARE TO BE ADJUSTED TO PLUS OR MINUS 5% OF DESIGN FLOW.
D. SET DAMPERS TO FAIL SAFE POSITION BEFORE TESTING, ADJUSTING, AND BALANCING.
E. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.
F. ADJUST FANS TO DELIVER DESIGN AIRFLOW WITHIN THE DESIGN FAN SPEED LISTED BY FAN MANUFACTURER.
G. AFTER TESTING AND BALANCING IS COMPLETE, OPERATE EACH SYSTEM AND RANDOMLY CHECK MEASUREMENTS TO VERIFY THAT THE SYSTEMS ARE OPERATING IN ACCORDING TO THE FINAL TEST AND BALANCE READINGS.
3.8 OPERATION PRIOR TO ACCEPTANCE
A. CONTRACTOR MAY OPERATE ANY EQUIPMENT PROVIDED THAT THE OPERATION IS SUPERVISED AND THE CONTRACTOR RETAINS FULL RESPONSIBILITY FOR PROPERLY MAINTAINING EQUIPMENT AND THE FULL MANUFACTURER'S WARRANTY REMAINS UNAFFECTED FROM THE TIME OF OWNER'S POSSESSION.

GENERAL NOTES:

- A. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
B. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
C. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
D. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
E. PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO AND WITHIN 50 FEET OF ISOLATED EQUIPMENT (EXCEPT AT BASE ELBOW SUPPORTS AND ANCHOR POINTS) THROUGHOUT MECHANICAL EQUIPMENT ROOMS.
F. THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PAY FOR AND REPAIR ALL DAMAGES CAUSED BY FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES UNLESS OTHERWISE INDICATED.
G. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
H. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
I. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
J. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
K. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.
L. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
M. REINFORCEMENT, DETAILING, AND PLACEMENT OF CONCRETE SHALL CONFORM TO ASTM 315 AND ACI 318. CONCRETE SHALL CONFORM TO ASTM C94. CONCRETE WORK SHALL CONFORM TO ACI 318, PART ENTITLED "CONSTRUCTION REQUIREMENTS." COMPRESSIVE STRENGTH IN 28 DAYS SHALL BE 3,000 PSI. TOTAL AIR CONTENT OF EXTERIOR CONCRETE SHALL BE BETWEEN 5 AND 7 PERCENT BY VOLUME. SLUMP SHALL BE BETWEEN 3 AND 4 INCHES. CONCRETE SHALL BE CURED FOR 7 DAYS AFTER PLACEMENT.
N. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
O. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND DIVISION 16 OF THE SPECIFICATION.
P. CONCRETE HOUSEKEEPING PADS TO SUIT MECHANICAL EQUIPMENT SHALL BE SIZED AND LOCATED BY THE MECHANICAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE 6 INCHES. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 6 INCHES ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE SIZE AND LOCATION OF CONCRETE HOUSEKEEPING PADS WITH GENERAL CONTRACTOR.
Q. WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS.

GENERAL NOTES: (CONT.)

- COORDINATION SHALL BE DONE PRIOR TO FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
R. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
S. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
T. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
U. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO GENERAL CONTRACTOR FOR INSTALLATION.
V. IN SOME CASES ACCESS PANELS MAY NOT BE SHOWN ON THE PLANS FOR DRAWING CLARITY OR OTHER REASONS, THE CONTRACTOR SHALL STILL BE RESPONSIBLE FOR INSTALLING ACCESS PANELS AS NEEDED AS PART OF THE ORIGINAL PROJECT SCOPE.
W. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED, AND REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.
X. ALL DUCTWORK, PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
Y. ALL MECHANICAL ROOM DOORS SHALL BE A MINIMUM OF 4'-0" WIDE. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM METAL DECK.
Z. ALL ROOF MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR. ALL ROOFING PENETRATIONS AND FLASHING IS TO BE DONE BY THE ROOFING CONTRACTOR.
AA. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
AB. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
AC. ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH ASSOCIATED UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, CLEAN OUT PORT, AND PROVIDED WITH CONDENSATE PUMP ROUTED TO APPROVED NEAREST DRAINAGE TERMINATION POINT. SEE DETAILS SHOWN ON THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR DEPTH OF AIR CONDITIONING CONDENSATE TRAP AND PUMP REQUIREMENTS.
AD. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
AE. INSTALL WORK AS INDICATED ON THE DRAWINGS. VERIFY EXACT LOCATION AND ELEVATIONS AT THE SITE. DO NOT SCALE THE DRAWINGS. MAKE NECESSARY CHANGES IN ELEVATION, FITTINGS OR OFFSETS TO ACCOMMODATE OBSTACLES OR INTERFERENCES. ALL DIMENSIONS ARE TO BE FIELD VERIFIED BEFORE START OF WORK.
AF. CONTRACTOR MUST REVIEW ALL CONSTRUCTION DOCUMENTS PRIOR TO BID. IF MODIFICATIONS TO THESE PLANS IS NECESSARY TO PROPERLY COORDINATE THE SYSTEM WITH OTHER TRADES IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL FOR THE CHANGES FROM BOTH THE AUTHORITY HAVING JURISDICTION AND THE OWNER'S DESIGNATED REVIEW CONSULTANT. THE CONTRACTOR MUST MAKE NOTE OF ANY FIELD OR COORDINATION CHANGES ON THE INSTALLATION DRAWINGS, AND PROVIDE A SET OF AS-BUILT DRAWINGS ONCE COMPLETE.
AG. CONTRACTOR TO VERIFY ALL MEASUREMENTS BEFORE ORDERING MATERIALS OR DOING ANY WORK. NO EXTRA COMPENSATION OR CHANGE ORDERS WILL BE ISSUED DUE TO DIFFERENCES BETWEEN THE ACTUAL MEASUREMENT AND THE DIMENSIONS ON THE DRAWINGS. CONTRACTOR SHALL LAY OUT ALL EQUIPMENT PRIOR TO FABRICATION OR INSTALLATION TO ASSURE PROPER FIT AND AVOIDANCE OF OBSTRUCTIONS, AND SHALL THOROUGHLY COORDINATE WORK WITH ALL TRADES AND DETERMINE EXACT ROUTE AND LOCATION OF EACH ELEMENT AND PIECE OF EQUIPMENT BEFORE FABRICATION AND INSTALLATION.
AH. ALL DEFECTS IN EQUIPMENT OR MATERIALS, OR ERRORS IN THE DRAWINGS DISCOVERED DURING THE PERFORMANCE OF THE WORK SHALL BE REPORTED PROMPTLY TO THE ARCHITECT. IN NO EVENT SHALL THE WORK PROCEED UNTIL DEFECTS AND/OR ERRORS HAVE BEEN RESOLVED.
AI. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC AUTHORITY BEARING ON THE PERFORMANCE OF THE WORK, BOTH ON AND OFF SITE. IF ANY OF THE CONTRACT DOCUMENTS ARE AT VARIANCE THEREWITH IN ANY RESPECT, CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT IN WRITING.

HVAC ABBREVIATIONS:

Table with 2 columns: Abbreviation and Full Name. Includes CFM, GPM, MBH, HP, DB, WB, RH, EAT, LAT, EWT, LWT, SP, ESP, TSP, FLA, LRA, MCA, MOP, FPM, RPM, APD, WPD, PRV, RV, PSIG, SA, RA, OA, EXH, RFA, CC, HC, PHC, RHC, AT, CHWS, CHWR, CW, CR, HWS, HWR, LPS, LPC, MPS, HPS, AIR FLOW RATE (CUBIC FEET PER MINUTE), WATER FLOW RATE (GALLONS PER MIN.), 1,000 BTU/H, HORSEPOWER, DRY BULB TEMPERATURE (°F), WET BULB TEMPERATURE (°F), RELATIVE HUMIDITY (%), ENTERING AIR TEMPERATURE (°F), LEAVING AIR TEMPERATURE (°F), ENTERING WATER TEMPERATURE (°F), LEAVING WATER TEMPERATURE (°F), STATIC PRESSURE (IN. W.G.), EXTERNAL STATIC PRESSURE (IN. W.G.), TOTAL STATIC PRESSURE (IN. W.G.), FULL LOAD AMPS, LOCKED ROTOR AMPS, MINIMUM CIRCUIT AMPS, MAXIMUM OVERCURRENT PROTECTION, FEET PER MINUTE, REVOLUTIONS PER MINUTE, AIR PRESSURE DROP (IN. W.G.), WATER PRESSURE DROP (FT. H2O), PRESSURE REDUCING VALVE (PSIG), RELIEF VALVE (PSIG), POUNDS PER SQUARE INCH, SUPPLY AIR, RETURN AIR, OUTSIDE AIR, EXHAUST AIR, RELIEF AIR, COOLING COIL, HEATING COIL, PREHEAT COIL, REHEAT COIL, DELTA T, TEMP. DIFFERENCE, °F, CHILLED WATER SUPPLY, CHILLED WATER RETURN, CONDENSER SUPPLY, CONDENSER RETURN, HEATING WATER SUPPLY, HEATING WATER RETURN, LOW PRESSURE STEAM, PSIG, LOW PRESSURE CONDENSATE, MEDIUM PRESSURE STEAM, PSIG, HIGH PRESSURE STEAM, PSIG.

APPLICABLE CODES:

- 2023 FLORIDA BUILDING CODE, BUILDING (8TH EDITION)
• 2023 FLORIDA BUILDING CODE, MECHANICAL (8TH EDITION)
• 2023 FLORIDA BUILDING CODE, ENERGY CONSERVATION (8TH EDITION)

MECHANICAL DRAWING LIST:

Table with 2 columns: SHEET and TITLE. Row 1: M - 0.1, MECHANICAL SPECIFICATIONS AND NOTES. Row 2: M - 1.1, MECHANICAL DETAILS, SCHEDULES AND PLAN.

Revision table with columns: No., Description, Date. Includes revision 1: ISSUE FOR PERMIT (02/07/2024) and revision 2: ISSUE FOR CLIENT REVIEW (07/28/2023).

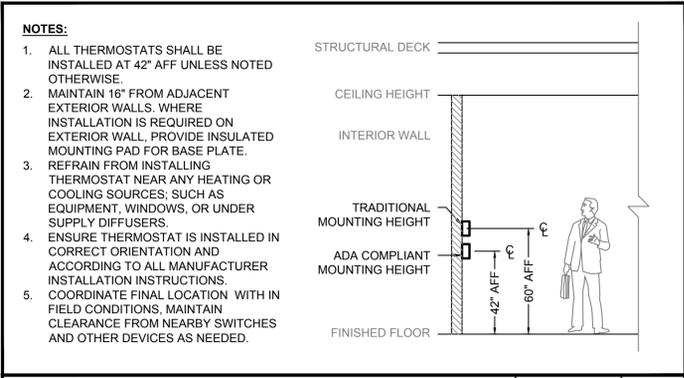
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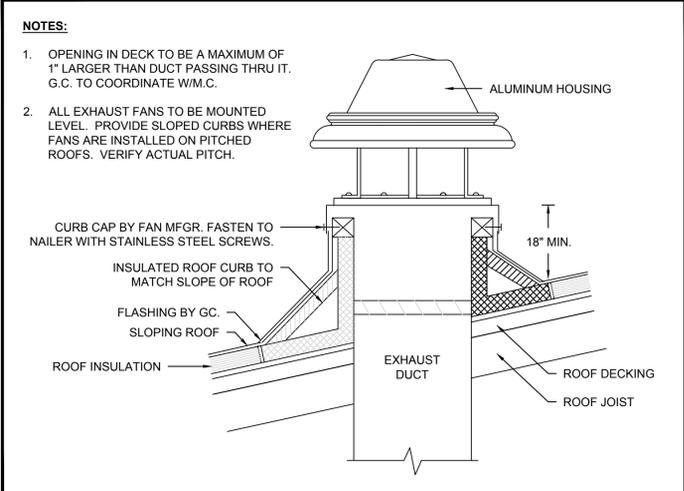
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THERMOSTAT MOUNTING DETAIL SCALE 1 N.T.S.



ROOF MOUNTED EXHAUST FAN INST. DETAIL SCALE 2 N.T.S.

HVAC LEGEND DOUBLE LINE:

- 12x6 INTERIOR DUCT DIMENSIONS (WIDTH X DEPTH)
- DUCT TURNED UP (RETURN)
- DUCT TURNED DOWN (SUPPLY)
- RISE IN ELEVATION DIRECTION OF AIRFLOW
- DROP IN ELEVATION DIRECTION OF AIRFLOW
- DUCT TURN WITH RADIUS ELBOW
- SQUARE TURN WITH VANE ELBOW
- FLEXIBLE CONNECTION
- DUCT WITH INTERNAL LINING
- TEE-BOOT ENTRY BRANCH WITH MANUAL VOLUME CONTROL DAMPER
- TEE-ROUND ENTRY BRANCH WITH MANUAL VOLUME CONTROL DAMPER
- MOTOR OPERATED DAMPER
- ACCESS PANELS
- SUPPLY AIR DUCT SECTION
- RETURN AIR DUCT SECTION
- OUTSIDE AIR DUCT SECTION
- EXHAUST AIR DUCT SECTION
- FLEXIBLE AIR DUCT
- RECTANGULAR TO ROUND DUCT TRANSITION
- FIRE DAMPER IN HORIZONTAL DUCT
- FIRE DAMPER IN VERTICAL DUCT
- COMBINATION FIRE AND SMOKE DAMPER
- DIFFUSER WITH SECTORIZING BAFFLE (EXAMPLE: THREE WAY SUPPLY DIFFUSER)
- HVAC DIFFUSER TAG REFER TO "GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE" FOR ADDITIONAL INFORMATION.

HVAC SYMBOLS:

- T THERMOSTAT CONTROL
- TS TEMPERATURE SENSOR
- AT AVERAGING TEMPERATURE SENSOR
- HS HUMIDITY SENSOR
- SD SMOKE DETECTOR
- C CARBON DIOXIDE (CO2) SENSOR
- EQUIPMENT DESIGNATION
- 1" DOOR UNDERCUT
- OPEN VAULT DOOR WITH BARS

SHEET NOTES:

EXISTING MECHANICAL CONDITIONS SUCH AS DUCTWORK AND PIPING WERE GATHERED FROM EITHER PARTIAL AVAILABLE AS-BUILTS OF PREVIOUS BUILDING PROJECTS OR LIMITED PHYSICAL VISIBILITY FROM FIELD/SITE VISITS.

MECHANICAL CONTRACTOR TO CONFIRM EXISTING DESIGN CONDITIONS ARE AS DRAWN AND PROVIDE MARKUPS OF ANY DISCREPANCIES ARE FOUND AND FOR FINAL CLIENT RECORD DRAWINGS.

ALL NEW DUCTWORK PENETRATIONS THROUGH EXISTING STRUCTURAL ROOF, FLOOR, OR WALL ARE TO BE CLOSELY COORDINATED WITH STRUCTURAL CONDITIONS. NEW DIMENSIONS NOTED ARE DUCTWORK SIZES, CUT AND SUPPORT ENVELOPE OPENING ACCORDINGLY. PERFORM GPR SCAN / X-RAY FLOOR SLAB PRIOR TO CORE-DRILLING. SUBMIT RESULTS FOR ENGINEER REVIEW PRIOR TO POKE THRU DEVICE SUBMITTAL REVIEW.

MECHANICAL CONTRACTOR TO PERFORM A PRE AND POST CONSTRUCTION TEST AND BALANCE REPORT TO CONFIRM PROPOSED DESIGN CONDITIONS ARE ABLE TO BE MET WHERE EXISTING MECHANICAL DUCTWORK IS TO BE REUSED. CONTRACTOR TO INFORM EOR OF ANY ISSUES WITH MEETING PROPOSED AIRFLOW.

NATURAL VENTILATION CALCULATION:

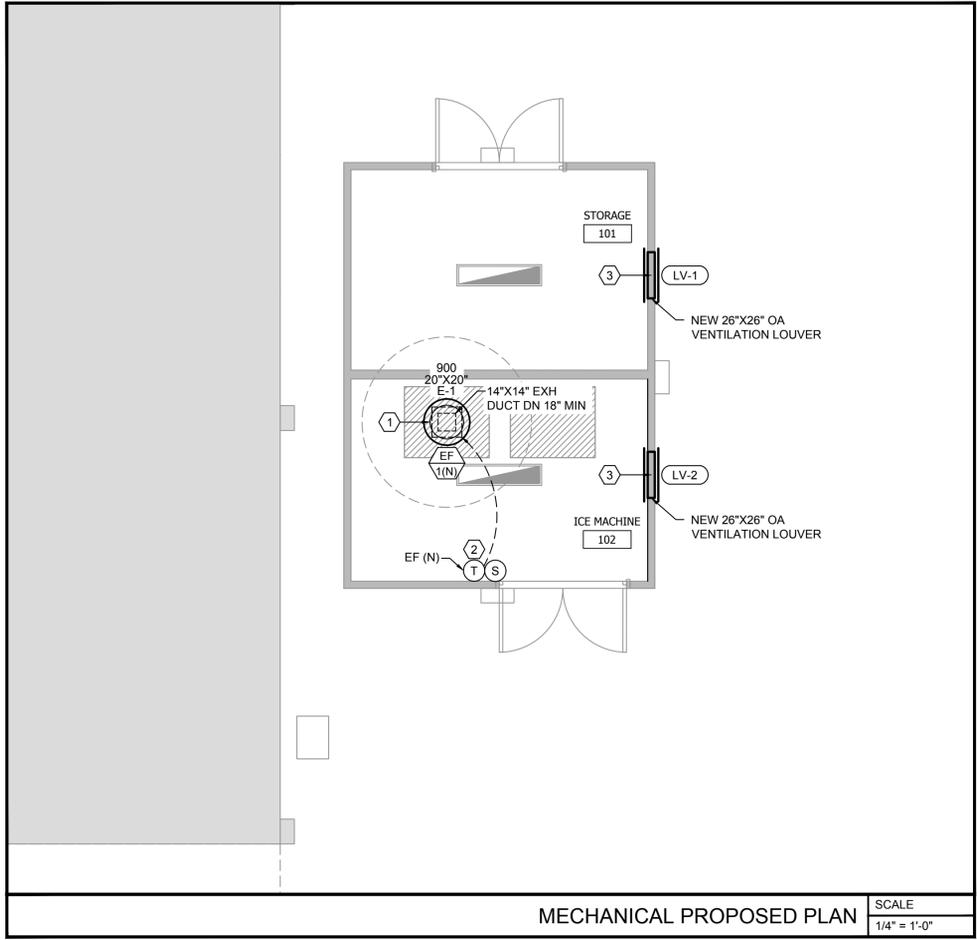
FLOOR/AREA NAME	FLOOR AREA (SF)
STORAGE ROOM 101	133 SF
ICE MACHINE ROOM 102	133 SF

DOOR NAME/TYPE	DOOR AREA (SF)	PERCENTAGE
STORAGE DOUBLE DOORS	42 SF	31.6 %
BREAK-ROOM BACK DOORS	42 SF	31.6 %

CODE REFERENCE: FMC 402.2 NATURAL VENTILATION VENTILATION AREA REQUIRED -THE MINIMUM OPERABLE AREA TO THE OUTDOORS SHALL BE 4 PERCENT OF THE FLOOR AREA BEING VENTILATED. AREA TO BE MAX 25' FROM DOORS TO OUTSIDE.

PLAN SHEET NOTES:

- NEW EXHAUST FAN:** INSTALL NEW ROOF MOUNTED EXHAUST FAN WITH SLOPED NOA CURB.
- THERMOSTAT AND SWITCH:** INSTALL WALL MOUNTED REVERSE-ACTING THERMOSTAT TO TURN ON ROOF MOUNTED EXHAUST FAN WHEN TEMPERATURE READINGS EXCEED 85 DEGREES F (ADJUSTABLE), PROVIDE WITH OVERRIDE SWITCH TO MANUALLY TURN ON/OFF.
- VENTILATION LOUVER:** INSTALL HURRICANE RATED FRESH AIR LOUVER, COORDINATE WITH ARCHITECT TO MATCH COLOR WITH SURROUNDING EXTERIOR.



MECHANICAL PROPOSED PLAN SCALE 1/4" = 1'-0"

EXHAUST FAN SCHEDULE

MARK	AREA SERVED	PRODUCT		MOUNTING TYPE	CFM	ESP	MOTOR DATA				NOTES	
		MFG.	MODEL				DRIVE	VOLT/PH/Hz	FLA	HP		RPM
EF-1	ICE MACHINE 102	CAPRIVEAIRE	DR33HFA	ROOF	900	0.25	DIRECT	115/60/1	5.6	0.33	1625	ALL

GENERAL NOTES: NOA # 21-0318.09

- ACCEPTABLE MANUFACTURERS: LOREN COOK, GREENHECK, OR CAPTIVEAIRE AND MUST MEET EQUIVALENT CHARACTERISTICS.
- PROVIDE FANS WITH FSC SPEED CONTROLLER, LOCATE WITHIN ACCESSIBLE LOCATION.
- INSTALL ROOF MOUNTED FANS WITH JACK RJ-6X9 AND BIRD SCREEN.
- PROVIDE 18" HIGH GALVANIZED ROOF CURB WITH 1" FACTORY INSULATION AND FULL PERIMETER NAILER SUITABLE FOR SLOPED ROOF.
- PROVIDE FANS WITH THE FOLLOWING: TYPICAL DISCONNECT SWITCH AND INTEGRAL GRAVITY BACKDRAFT DAMPER.
- EXHAUST FAN SHALL BE TIED TO WALL MOUNTED REVERSE -ACTING THERMOSTAT TO TURN ON WHEN READINGS EXCEED 85 DEGREES F (ADJUSTABLE).
- PROVIDE ANTI-BLOWING RAIN INTERNAL WIND BAND AND NEMA 3R EXTERNAL TYPE DISCONNECT SWITCH.

LOUVER SCHEDULE

MARK	AREA SERVED	PRODUCT		DIMENSIONAL DATA		NOMINAL CFM	MIN. FREE AREA	MAX. VELOCITY (FPM)	TYPE		NOTES
		MFG.	MODEL	WIDTH(IN)	HEIGHT(IN)				EXHAUST	INTAKE	
LV-1	ICE MACHINE 102	GREENHECK	ESD-635DE-26x26	26	26	900	2.1 SF	500 FPM	-	X	ALL
LV-2	STORAGE 101	GREENHECK	ESD-635DE-26x26	26	26	900	2.1 SF	500 FPM	-	X	ALL

NOTES:

- PROVIDE MIAMI DADE NOA HURRICANE RATED LOUVERS.

GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE

MARK	NECK	MAX CFM	DESCRIPTION
E-1	AS NOTED	AS NOTED	EGGCRATE RETURN AIR GRILLE - CORE OF 1/2"x1/2"x1" ALUMINUM GRID; TITUS 50F (PROVIDE SQUARE TO ROUND TRANSITION AS NEEDED)

NOTES:

- FURNISH WITH STANDARD WHITE BAKED ENAMEL FINISH (#26 WHITE), UNO.
- SIZE FOR MAXIMUM NOISE CRITERION <30 FOR DIFFUSERS, REGISTERS, AND GRILLES.

* BASIS OF DESIGN PRODUCTS ARE INDICATED FOR REFERENCE ONLY. COMPARABLE PRODUCTS WILL BE ACCEPTED PROVIDED COMPLIANCE WITH TECHNICAL SPECIFICATION REQUIREMENTS.

No.	Revision/Issue	Date
1	ISSUE FOR CLIENT REVIEW	07/28/2023
2	ISSUE FOR PERMIT	02/07/2024

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RICHARD KIMBALL, P.E.
FL REG. NO. 79067

Date
This item has been electronically signed and sealed by (Licensee, PE) on the date and/or time stamp shown using a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified by a 3rd Party Certificate Authority on any electronic copy. FAC 61G15-23.004

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Sheet Title
MECHANICAL DETAILS, SCHEDULES, AND PLAN

Project No. 230-83.00	Sheet M-1.1
Date AS NOTED	Scale AS NOTED