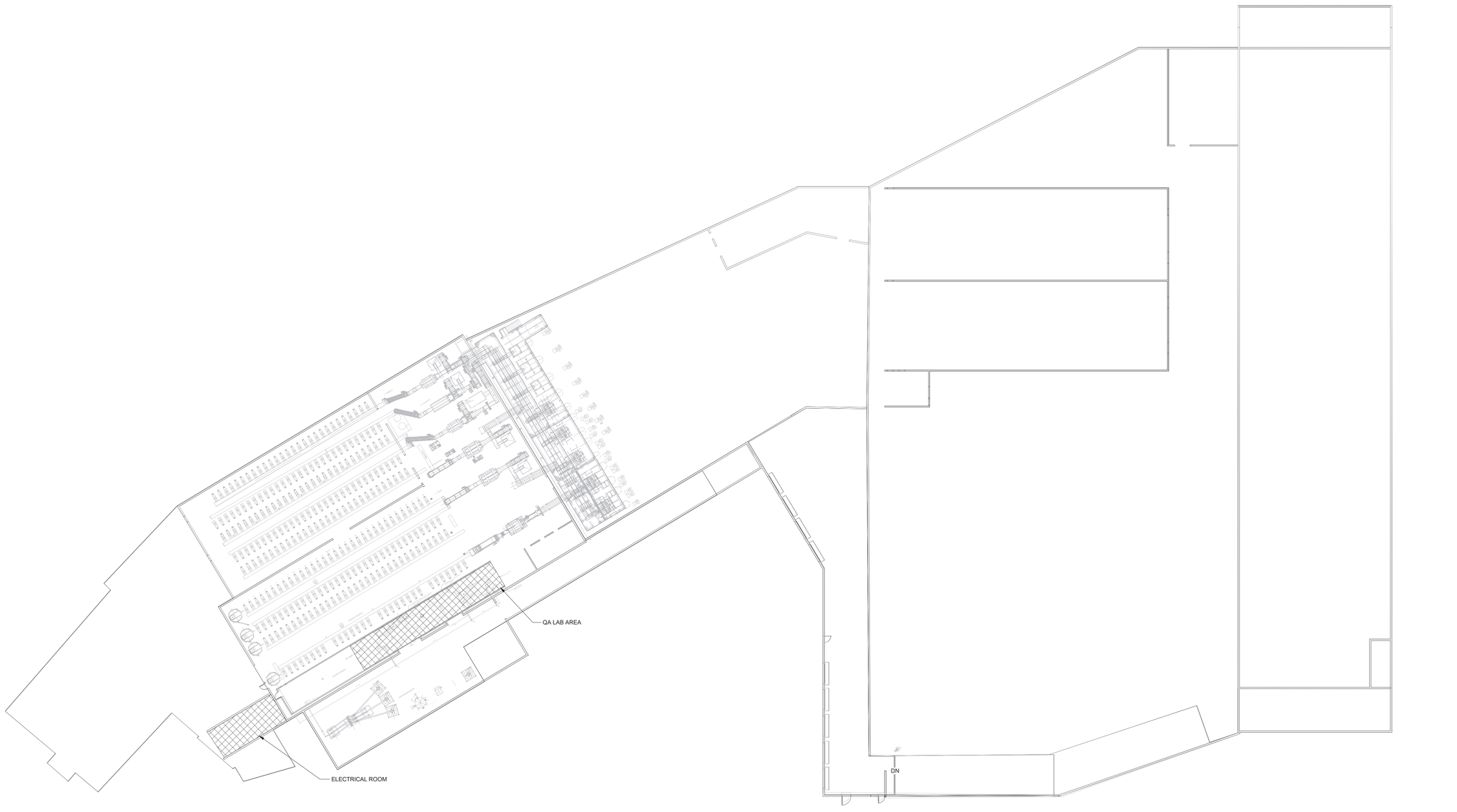

1 OVERALL FLOOR PLAN - AREAS OF WORK
1" = 20'-0"

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ISSUE	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	16 JULY 2021

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OVERALL FLOOR PLAN - AREAS OF WORK

DRAWN BY: CBC	CHECKED BY: JEM
PROJECT NUMBER: 21045	PROJECT ABBREVIATION: FLNA LIB QA LAB
ORIGINAL ISSUE: 16 JULY 2021	CURRENT DOCUMENT STAGE: IFC
FILE NAME: 21045.rvt	

MEP1.00
SHEET NUMBER

FILE NAME: C:_BIM_\Revit Files\21045_FLNA LIB QA LAB_C1S_Central_R20_Chris.Childress.C1S.rvt
DATE/TIME: 7/16/2021 5:20:09 AM

PLUMBING & HVAC PIPING LEGEND

(NOTE: ALL SYMBOLS MAY NOT APPEAR ON DRAWINGS)

OR	T&P VALVE
SD	SHOWER DRAIN
FD	FLOOR DRAIN
AD	AREA DRAIN
RD	ROOF DRAIN
D OR OFD	OVERFLOW ROOF DRAIN
	HOSE BIBB OR WALL HYDRANT
VTR OR VTR	VENT THRU ROOF
	PRESSURE GAUGE
FS	FLOW SWITCH
	POINT OF CONNECTION
	POINT OF DEMOLITION
T , S	THERMOSTAT, SENSOR
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
G	GAS PIPING
D	DRAIN LINE
	FLEXIBLE PIPE CONNECTION
CW	COLD WATER LINE
HWR	DOMESTIC HOT WATER RETURN
HWS	DOMESTIC HOT WATER SUPPLY
SS	SANITARY LINE
GW	GREASE WASTE LINE
	VENT LINE
RS/RL	REFRIGERANT SUCTION / LIQUID LINE
SD	STORM DRAIN LINE
SPD	SUMP PUMP DISCHARGE
SED	SEWAGE EJECTOR DISCHARGE
PR	PUMPED STEAM CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
	PITCH DOWN IN DIRECTION OF ARROW
	SQUARE HEAD COCK
	THERMOMETER
	COMBINATION PRESSURE & TEMPERATURE TAP (PETE'S PLUG)
&	STRAINER WITH BLOW OFF
	UNION OF FLANGED CONNECTION
B	BUCKET TRAP
CO	CLEANOUT IN LINE
FCO FCO	CLEANOUT IN FLOOR
WCO	WALL CLEANOUT
	OS & Y VALVE
	GATE VALVE
&	BUTTERFLY VALVE
	BALL VALVE
	CHECK VALVE
SOL	SOLENOID VALVE
	PRESSURE RELIEF VALVE
2W	AUTOMATIC, 2 WAY VALVE
3W	AUTOMATIC, 3 WAY VALVE
	CIRCULATION PUMP

HVAC LEGEND

(NOTE: ALL SYMBOLS MAY NOT APPEAR ON DRAWINGS)

	LINED DUCTWORK
	SUPPLY DUCT
	RETURN DUCT
	EXHAUST DUCT
	SUPPLY DUCT THROUGH ROOF
	RETURN DUCT THROUGH ROOF
	EXHAUST DUCT THROUGH ROOF
	DIRECTION OF EXHAUST RELIEF
	SUPPLY DIRECTION
SP	STATIC PRESSURE SENSOR
M	MOTORIZED VOLUME DAMPER
BD	BACKDRAFT DAMPER
	CONICAL TAP W/DAMPER
	ROUND DUCT SIZE
	OVAL DUCT SIZE
	FLEXIBLE DUCT RUNOUT
	FLEXIBLE DUCT CONNECTION
	MANUAL VOLUME DAMPER
FD	FIRE DAMPER IN DUCT
FSD	FIRE SMOKE DAMPER IN DUCT
(W×D)	DUCTWORK (SHEETMETAL) (WITH DEPTH IN VIEW OF PLAN)
	DUCTWORK, DIRECTION OF SLOPE
	EXISTING SUPPLY AIR GRILLE
(R)	EXISTING AIR DEVICE TO BE RELOCATED
	NEW SUPPLY AIR DIFFUSER
	EXISTING SLOT DIFFUSER TO REMAIN
(ER)	EXISTING SLOT DIFFUSER TO BE RELOCATED
	NEW SLOT DIFFUSER
S	DUCT MOUNTED SMOKE DETECTOR

GENERAL NOTES FOR ALL MECHANICAL AND PLUMBING WORK

DEMOLITION

1. EXISTING HVAC DUCTWORK, PLUMBING PIPING AND EQUIPMENT SHOWN IS BASED ON EXISTING PLANS AND FIELD OBSERVATION CURRENT DETAIL. AFTER DEMOLITION, ANY CLARIFICATION REQUIRED TO DETERMINE SCOPE OF WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OR OWNER'S REPRESENTATIVE IN WRITING.
2. THE CONTRACTOR SHALL VISIT THE JOB SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS PRIOR TO BEGINNING ANY WORK OR PURCHASING EQUIPMENT.
3. DRAWINGS DO NOT SHOW EVERY EXISTING PIPE, CONDUIT, DUCT, ETC. CONTRACTOR SHALL TAKE CARE TO REMOVE ONLY ITEMS REQUIRED TO BE REMOVED AND VERIFY OPERATION/FUNCTION PIPES, DUCTS, ETC., BEFORE REMOVAL.
4. REMOVAL OF ITEMS SHALL INCLUDE ASSOCIATED HANGERS, ANCHOR BOLTS AND OTHER APPURTENANCES. WHERE SUCH REMOVAL RESULTS IN OPEN HOLES, VOIDS OR EXPOSURE OF DAMAGED SURFACES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND FINISHING THE SURFACE TO MATCH ADJACENT CONDITIONS. THIS WORK SHALL BE COORDINATED WITH ARCHITECTURAL FINISH SCHEDULES WHERE APPLICABLE.
5. BUILDING IS TO REMAIN OCCUPIED DURING CONSTRUCTION. REMOVAL OR SHUT-DOWN OF EQUIPMENT THAT AFFECTS ANY OCCUPIED AREA'S AIR CONDITIONING OR HEATING SHALL ONLY BE DONE AS APPROVED OR TEMPORARY AIR CONDITIONING OR HEATING SHALL BE PROVIDED AT CONTRACTOR'S EXPENSE. THIS MAY REQUIRE NIGHT AND WEEKEND WORK TO KEEP BUILDING IN OPERATION.
6. REMOVE EXISTING DUCTWORK AND PIPING NOT TO BE REUSED.
7. ALL MATERIALS REMOVED UNDER DEMOLITION, NOT TO BE RELOCATED OR DESIGNATED TO BE TURNED OVER TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR, UNLESS OTHERWISE NOTED, AND SHALL BE REMOVED COMPLETELY FROM THE SITE.

GENERAL ITEMS

1. GENERAL NOTES ON THIS DRAWING ARE APPLICABLE TO EACH MECHANICAL DRAWING OF THIS SET. SEE EACH DRAWING FOR SPECIFIC NOTES APPLICABLE TO SPECIFIC SCOPE AREAS.
2. VERIFY ALL MEASUREMENTS. NO EXTRA COMPENSATION WILL BE ALLOWED BECAUSE OF DIFFERENCES BETWEEN WORK SHOWN ON THE DRAWINGS AND ACTUAL MEASUREMENTS AT THE SITE OF CONSTRUCTION. DO NOT SCALE THE DRAWINGS. DRAWINGS ARE A DIAGRAMMATIC REPRESENTATION AND INTENDED TO CONVEY INTENT.
3. UPON COMPLETION OF THE WORK, THOROUGHLY CLEAN ALL EXPOSED PORTIONS OF THE MECHANICAL AND ELECTRICAL EQUIPMENT PROVIDED AS WELL AS THE GENERAL SCOPE AREA. REMOVE ALL TRACES OF SOIL/DUST LABELS, GRADE, OIL, AND OTHER FOREIGN MATERIAL USING ONLY THE TYPE CLEANER RECOMMENDED BY THE MANUFACTURER OF ANY ITEM BEING CLEANED AND APPROVED BY OWNER FOR USE IN THE SCOPE AREA.
4. CONTRACTOR SHALL DESIGNATE ONE PERSON TO SERVE AS PRIMARY POINT OF COMMUNICATION WITH PROJECT TEAM.
5. WORK AMONG ALL TRADES SHALL BE FULLY COORDINATED AS REQUIRED IN THE FIELD TO AVOID SPACE CONFLICTS AND INTERRUPTION OF THE FLOW OF WORK. CONFLICTS SHALL BE IMMEDIATELY REPORTED IN WRITING TO ENGINEER AND OWNERS REPRESENTATIVE.
6. THE CONTRACTOR SHALL TAKE PROPER PRECAUTIONS TO PROTECT ANY EXISTING CONSTRUCTION AND ADJACENT PROPERTY, WITH WHICH WORK COMES IN CONTACT, AND OVER WHICH HE MAY TRANSPORT, HOIST OR MOVE MATERIALS, EQUIPMENT, DEBRIS, ETC., AND SHALL REPAIR SATISFACTORILY ALL DAMAGES CAUSED BY HIM DURING CONSTRUCTION.
7. ALL EQUIPMENT SHALL BE NEW, UNLESS NOTED OTHERWISE, AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED RECOMMENDATIONS FOR THE SERVICE INTENDED. PROVIDE ONLY PRODUCTS BEARING UNDERWRITERS LABORATORIES (UL) LABEL AS APPLICABLE.
8. WHEN EXISTING ITEMS ARE TO BE REUSED, REFURBISH AS NOTED ON THE DRAWINGS OR SPECIFIED. OTHERWISE, STORE AND MAINTAIN IN THE SAME OR BETTER CONDITION AS WHEN THE WORK WAS PLACED UNDER CONTRACT. REINSTALL THE ITEM IN A GOOD WORKMANLIKE MANNER. THE CONTRACTOR SHALL VERIFY THE WORKING CONDITION OF ALL EXISTING EQUIPMENT TO BE RE-USED AND NOTIFY THE OWNER/ENGINEER PRIOR TO THE START OF CONSTRUCTION OF ANY MISSING OR MALFUNCTIONING DEVICES.
9. CONFIRM OUTSIDE AIR INTAKE OPENINGS FOR VENTILATION AIR ARE LOCATED AT LEAST 10 FEET MEASURED IN ANY DIRECTION FROM ANY FLUES, VENTS, CHIMNEYS, GAS METERS, GAS REGULATORS, PLUMBING VENTS, ETC., UNLESS TOP OF SUCH INTAKE OPENING IS 3 FEET BELOW ANY OF THE LISTED ITEMS.
10. OVERHEAD PIPING IN SPACES WITHOUT HUNG CEILINGS SHALL BE RUN AS CLOSE TO ROOF DECK AS PRACTICAL, AS CLOSE TO PARALLEL JOISTS AS POSSIBLE, AND ABOVE LIGHTING FIXTURES TO CONCEAL PIPING.
11. OVERHEAD DUCTWORK AND PIPING IN SPACES WITH CEILINGS SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
12. PROVIDE PIPE SLEEVES LARGE ENOUGH TO ALLOW FOR REQUIRED LATERAL MOVEMENT OF PIPING.
13. EXERCISE CAUTION IN INSTALLING RUNOUTS AND BRANCH PIPING FROM MAINS ALLOWING FOR EXPANSION MOVEMENT.
14. MAINTAIN A MINIMUM CLEARANCE FOR LIGHTS OF 7" ABOVE FINISHED CEILING AND 1" MINIMUM BELOW ALL DUCTS, PIPES, CONDUIT OR ANY OTHER EQUIPMENT IN THE CEILING SPACE. MAINTAIN MANUFACTURER'S RECOMMENDED SERVICE ACCESS CLEARANCE AT ALL EQUIPMENT.
15. COORDINATE LOCATION OF GRILLES, REGISTERS, DIFFUSERS, THERMOSTATS AND OTHER WALL OR CEILING MOUNTED HVAC ACCESSORIES WITH REFLECTED CEILING PLAN, LIGHTING FIXTURE LAYOUT AND ACCESSORIES INSTALLED BY OTHER TRADES SO AS TO PRESENT A NEAT AND ATTRACTIVE INSTALLATION THROUGHOUT THE ENTIRE SCOPE. IT IS THE INTENT FOR GRILLES, REGISTERS AND DIFFUSERS TO BE INSTALLED IN THE CENTER OF CEILING PANELS.
16. EQUIPMENT ON THE ROOF SHALL BE INSTALLED TO MAINTAIN AT LEAST 10 FEET OF CLEARANCE BETWEEN EQUIPMENT AND THE ROOF EDGE.
17. ARRANGE PIPING AND DUCTWORK, PARTICULARLY ABOVE CEILING, AS REQUIRED TO CLEAR STRUCTURE, DUCTS, CONDUITS, ETC., ALLOWING SPACE FOR PIPE HANGERS, EXPANSION LOOPS AND ACCESS TO VALVES, FILTERS, AND MAINTENANCE OF EQUIPMENT.
18. COORDINATE LOCATION AND INSTALLATION OF EQUIPMENT WITH OTHER TRADES. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF DOORS, WINDOWS, ETC.
19. THERMOSTATS AND/OR TEMPERATURE SENSORS SHALL BE LOCATED IN THE ROOMS INDICATED. INSTALL TOP OF DEVICE NO MORE THAN 48" ABOVE FINISHED FLOOR TO MATCH THE HEIGHT OF WALL SWITCHES OR OTHER WALL MOUNTED DEVICES.
20. PIPING, DUCTWORK, VENTS, ETC., EXTENDING THROUGH EXTERIOR WALLS AND ROOF SHALL BE FLASHED AND COUNTER FLASHED IN A WEATHERPROOF MANNER.
21. VALVES AND SPECIALTIES SHALL BE LINE SIZE EXCEPT FOR CONTROL VALVES OR UNLESS NOTED OTHERWISE.
22. EXTEND DRAIN LINES TO NEAREST FLOOR DRAIN OR AS INDICATED. ROUTING SHALL NOT INTERFERE WITH PASSAGEWAYS AND MAINTENANCE. DRAINS FROM AIR CONDITIONING CONDENSATE DRAIN PANS SHALL BE TRAPPED. SLOPE CONDENSATE DRAIN PIPING AT 1/4" PER FOOT. VERIFY INVERT IS ESTABLISHED AFTER AIR HANDLING UNIT IS INSTALLED BUT PRIOR TO DUCTWORK INSTALLATION.
23. ROOFTOP UNITS AND OTHER EQUIPMENT CONTAINING AIR CONDITIONING COILS WHICH DO NOT HAVE A SECONDARY DRAIN OR AUXILIARY DRAIN PAN SHALL BE FITTED WITH A WATER LEVEL SENSOR IN THE PRIMARY DRAIN PAN. THE SENSOR SHALL BE WIRED TO DE-ENERGIZE THE EQUIPMENT IF WATER RISES ABOVE THE DRAIN OUTLET.
24. PIPING AND DUCTWORK INSULATION SHALL BE RUN CONTINUOUSLY THROUGH NON-RATED FLOORS, WALLS, ROOF AND PARTITIONS, UNLESS OTHERWISE INDICATED.
25. NO PIPING SHALL BE SMALLER THAN 1/2", UNLESS OTHERWISE NOTED.
26. RUNOUTS SHALL PITCH DOWN IN DIRECTION OF FLOW A MINIMUM OF 1" IN 3'-0".
27. FOR PIPE SIZES NOT INDICATED ON PLANS, SEE EQUIPMENT CONNECTION DETAILS, FLOW DIAGRAMS, RISER DIAGRAMS AND PIPE SIZING SCHEDULE.
28. PROPERLY SUPPORT ALL EQUIPMENT, DUCTWORK, AND PIPING WITHIN THE BUILDING AND PROVIDE ADEQUATE PROVISIONS FOR SLOPE AND ANCHORAGE. PROVIDE ALL MATERIALS REQUIRED FOR THE SUPPORT OF SUCH ITEMS INCLUDING RODS, ANGLES, ETC., TO PROPERLY SUPPORT ALL ITEMS IN A PROPER AND SAFE MANNER. CONTRACTOR SHALL USE HANGER'S RODS, INSERTS ETC. LISTED BY UNDERWRITERS' LABORATORIES FOR THE SERVICE INTENDED. HANGERS FOR COPPER PIPING SHALL BE COPPER PLATED. SECURELY SUPPORT ALL EQUIPMENT FROM STRUCTURAL MEMBERS PROVIDED AS NEEDED, WHICH IN TURN ARE TO BE SUPPORTED DIRECTLY FROM THE BUILDING STRUCTURE. ALL HANGERS SHALL HAVE A MINIMUM FACTOR OF SAFETY OF 5. PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE SPECIFICATIONS. ADDITIONAL SUPPORTS OR HANGERS SHALL BE ADJACENT TO ELBOWS, TO PREVENT WEIGHT OF PIPING BEING PLACED ON THE EQUIPMENT.
29. CORRECT SETTING ON BALANCING FITTINGS SHALL BE PERMANENTLY MARKED.
30. SUITABLE FLASHINGS FOR OPENINGS IN THE BUILDING WALLS, FLOOR OR ROOF SHALL BE FURNISHED BY THE CONTRACTOR PROVIDING THE PENETRATING ITEM. THE INSTALLATION OF THE FLASHING AND ITS WATERTIGHT INTEGRITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR THAT PROVIDES THE SEALING AND FINISHING OF THE FLASHING, IN ALL CASES. THE FLASHING MATERIAL AND ITS INSTALLATION SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR FLASHINGS FOR PENETRATIONS MAY ALSO BE PROVIDED ENTIRELY BY THE GENERAL CONTRACTOR. ALSO, REFER TO THE ARCHITECT'S SPECIFICATIONS TO COORDINATE THE COMPLETENESS OF THIS ITEM.
31. ACCESSIBILITY REQUIREMENTS. (REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION/REQUIREMENTS).
    A. THE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF REGULATIONS, CODES AND ORDINANCES REGARDING HANDICAPPED PERSONS. IT IS ASSUMED THAT THE CONTRACTOR IS ALSO KNOWLEDGEABLE OF SAME AND THEIR APPLICATION WITH REGARD TO HIS WORK.
    B. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE TYPE OF EQUIPMENT BEING INSTALLED AND ITS LOCATION, MOUNTING HEIGHT AND CLEARANCES AS PRESCRIBED BY ALL APPLICABLE HANDICAP REGULATIONS, CODES AND ORDINANCES PRIOR TO PLACING EQUIPMENT ORDERS AND PRIOR TO INSTALLATION OF ALL WORK.
    C. GENERAL LISTING OF MOUNTING HEIGHTS:

ITEM	HEIGHT TO CENTER LINE ABOVE FINISHED FLOOR
THERMOSTATES, SWITCHES, ETC.	48" MAXIMUM
RECEPTACLES	15" MINIMUM

32. CONTRACTOR SHALL PROVIDE ALL DIMENSIONS FOR BLOCK OUTS, SLEEVES, ETC., AND THE DIMENSIONED LOCATIONS OF SAME.
33. SEE ELECTRICAL DRAWINGS FOR LOCATION OF MOTOR STARTERS.

THROUGH-PENETRATION FIRESTOP ASSEMBLIES

1. PROVIDE UL LISTED THROUGH-PENETRATION ASSEMBLIES FOR FIREWALLS AND FLOORS. REVIEW ARCHITECTURAL DRAWINGS FOR FIRE PARTITION LOCATIONS AND UL LISTINGS.

SHEET METAL

1. DUCT DIMENSIONS ARE CLEAR INSIDE DUCT LINING DIMENSIONS.
2. PROVIDE ACCESS DOORS IN DUCTWORK WHERE INDICATED OR REQUIRED FOR ACCESS TO SYSTEM COMPONENTS INCLUDING THE FOLLOWING:
    A. DAMPER MOTORS AND/OR MOTOR OPERATED DAMPERS
3. HIGH SIDEWALL REGISTERS OR GRILLES SHALL BE LOCATED 6" FROM CEILING TO TOP OF REGISTER OR GRILLE, IF APPLICABLE.
4. INSTALL CEILING REGISTERS A MINIMUM OF 4" FROM EXTERIOR WALL.
5. PROVIDE A MINIMUM OF THREE TIMES THE FAN DIAMETER OF STRAIGHT DUCTWORK OFF THE SUPPLY AIR FAN DISCHARGE BEFORE ANY TAKEOFFS OR ELBOWS.
6. DUCTWORK SHALL BE CONSTRUCTED TO THE SMACNA STATIC PRESSURE CLASSIFICATION 2" W.G. AND SEAL CLASS "B".
7. PROVIDE EXTENDED VOLUME DAMPER CONTROL RODS SO THAT HANDLES ARE CLEAR OF DUCT INSULATION.

MAINTENANCE

1. EQUIPMENT WITH FILTERS SHALL BE INSTALLED SO THAT FILTERS CAN BE EASILY REMOVED AND REPLACED.
2. EQUIPMENT INSTALLED ABOVE CEILINGS SHALL BE MOUNTED APPROX. 12" ABOVE CEILING (UON) FOR MAINTENANCE ACCESS.
    INSTALL PIPE RUNS AT LEAST 6" ABOVE CEILING TILES. WHERE PRACTICAL INSTALL VALVES, AND OTHER MAINTAINABLE DEVICES LOW ENOUGH TO REACH WITH A 6'-0" OR 8'-0" LADDER.
3. PROVIDE ACCESS TO ANY INSPECTION OR MAINTAINABLE DEVICE, EQUIPMENT, ETC. - ACCESS OR ACCESS DOOR SHALL BE OF ADEQUATE SIZE TO WORK ON DEVICE.
4. EXAMINE MANUFACTURER'S LITERATURE TO DETERMINE RECOMMENDED CLEARANCES. THESE CLEARANCES SHALL BE ESTABLISHED AND MAINTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THESE REQUIREMENTS WITH ALL OTHER TRADES.

ABBREVIATIONS (NOTE: ALL ABBREVIATIONS MAY NOT APPEAR ON DRAWINGS)

A	AMPS, AMPERE
ABC	ABOVE COUNTER
ABV	ABOVE
A/C	AIR CONDITIONER
AC	ALTERNATING CURRENT
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AH	AIR HANDLER
AHU	AIR HANDLING UNIT
AMB	AMBIENT
AUX	AUXILIARY, AUXILIARIES
BLDG	BUILDING
BOP	BO
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CAT	CATALOGUE
CD	CONDENSATE DRAIN
CDA	CLEAN DRY AIR
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CI	CAST IRON
CLG	CEILING
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
COP	COEFFICIENT OF PERFORMANCE
CT	COOLING TOWER
CVO	COLD WATER VALVED OPENING
CW	DOMESTIC COLD WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DEPTH
DB	DRY BULB
DFU	DRAINAGE FIXTURE UNITS
DI	DEIONIZED (WATER)
DIA	DIAMETER
DIWR	DEIONIZED WATER RETURN
DIWS	DEIONIZED WATER SUPPLY
DIFF	DIFFUSER
DN	DOWN
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
EQ	EQUAL
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
°F	DEGREES FAHRENHEIT
FA	FIRE ALARM
FA	FREE AREA
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FD	FLOOR DRAIN
FF	FINISH FLOOR
FIXT	FIXTURE
FL	FLOW LINE
FPM	FEET PER MINUTE
FPW	FAN POWERED VARIABLE VOLUME TERMINAL UNIT
FT	FEET
F/A	FROM ABOVE
F/B	FROM BELOW
G	GROUND
GA	GAUGE
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
H	HEIGHT
HD	HUB DRAIN
HORIZ	HORIZONTAL
HP	HORSEPOWER
HTG	HEATING
HWR	DOMESTIC HOT WATER RETURN
HWS	DOMESTIC HOT WATER SUPPLY
HWHR	HEATING HOT WATER RETURN
HHWS	HEATINGHOT WATER SUPPLY
IFGC	INTERNATIONAL FUEL GAS CODE
IMC	INTERNATIONAL MECHANICAL CODE
IPC	INTERNATIONAL PLUMBING CODE
IN	INCHES
IN WC	INCHES WATER COLUMN
IWW	INDUSTRIAL WASTE WATER
KW	KILOWATT
KWH	KILOWATT - HOUR
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS (WEIGHT)
LIN	FT LINEAR FOOT
LN2	LIQUID NITROGEN GAS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCF	THOUSAND CUBIC FEET
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
MTR	MOTOR
MTRZD	MOTORIZED
MVD	MANUAL VOLUME DAMPER
N2	NITROGEN GAS
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO	NUMBER
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
ODS	OVERFLOW DOWNSPOUT
OZ	OUNCE
PD	PRESSURE DROP
PCWR	PROCESS CHILLED WATER RETURN
PCWS	PROCESS CHILLED WATER SUPPLY
PERF	PERFORATED
PLBG	PLUMBING
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH-ABSOLUTE
PSIG	POUNDS PER SQUARE INCH-GAUGE
PVC	POLYVINYL CHLORIDE PWR POWER
QTY	QUANTITY
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN
RCP	REFORCED CONCRETE PIPE
REF	REFERENCE
REFR	REFRIGERATOR
REQ'D	REQUIRED
RLA	RUNNING LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RQMT	REQUIREMENT
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SD	STORM DRAIN
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SENS	SENSIBLE (BTU)
SFU	SUPPLY FIXTURE UNITS
SHT	SHEET
SHTMTL	SHEET METAL
SIH4	SILANE
SMACNA	SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPECS	SPECIFICATIONS
SQ	SQUARE
SQFT	SQUARE FEET
SS, SAN	SANITARY SEWER
STD	STANDARD
SURF	SURFACE
SYM	SYMMETRICAL
T-STAT	THERMOSTAT
TC	TIMECLOCK
TOT	TOTAL (BTU)
TYP	TYPICAL
UF	UNDERFLOOR
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VALVE
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VENTIL	VENTILATION
VERT	VERTICAL
VIF	VERIFY IN FIELD
VPO	VENT PLUGGED OPENING
VT	VENT
VTR	VENT THRU THE ROOF
VV	VARIABLE VOLUME TERMINAL UNIT
W	WATTS
W	WIDTH
WB	WET BULB
WH	WATER HEATER
WP	WEATHERPROOF
WPO	WASTE PLUGGED OPENING
WT	WEIGHT

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PROFESSIONAL SEALS

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GENERAL NOTES AND LEGENDS

DRAWN BY	CHECKED BY
CBC	JEM
PROJECT NUMBER	PROJECT ABBREVIATION
21045	FLNA LIB QA LAB
ORIGINAL ISSUE	CURRENT DOCUMENT STAGE
16 JULY 2021	IFC
FILE NAME	21045.rvt

M0.00

SHEET NUMBER

MECHANICAL SPECIFICATIONS

PART 1 – GENERAL

1. CODES AND STANDARDS: THE LATEST EFFECTIVE PUBLICATIONS OF ALL APPLICABLE STANDARDS, CODES, ETC., AS THEY APPLY, FORM PART OF THESE SPECIFICATIONS AS IF WERE WRITTEN FULLY HEREIN AND CONSTITUTE MINIMUM REQUIREMENTS. THE FOLLOWING WILL BE REFERRED TO THROUGHOUT IN ABBREVIATED FORMS.
   - A. NATIONAL ELECTRICAL CODE, (NFPA 70) (NEC).
   - B. AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE).
   - C. RULES AND REGULATIONS OF LOCAL GAS UTILITY COMPANY.
   - D. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA).
   - E. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
   - F. APPLICABLE LOCAL CODAES.
   - G. UNDERWRITER'S LABORATORIES, INC. (UL).
   - H. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA).
   - I. INTERNATIONAL MECHANICAL CODE (IMC)
2. SCOPE OF WORK: PROVIDE ALL WORK REQUIRED FOR THIS DIVISION INCLUDING LABOR, MATERIALS, EQUIPMENT, APPURTENANCES AND SERVICES TO PROVIDE COMPLETE MECHANICAL SYSTEMS AS SHOWN ON THE DRAWINGS AND SPECIFIED IN THIS DIVISION OF THE SPECIFICATIONS. THE WORD "PROVIDE" SHALL MEAN "FURNISH, TRANSPORT, INSTALL, CONNECT, WARRANT, START-UP, AND READY FOR USE", INCLUSIVELY.
   - A. THE INSTALLATION OF ALL SYSTEMS SHALL BE MADE BY EXPERIENCED CRAFTSMEN IN A NEAT WORKMANLIKE MANNER. ALL MATERIALS, TOOLS, PERMITS AND INSPECTIONS AND ALL OTHER COSTS AND SERVICES NECESSARY TO PROVIDE ALL NEEDED MECHANICAL AND ELECTRICAL ITEMS SHALL BE FURNISHED AND PAID FOR IN FULL BY THE CONTRACTOR.
   - B. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND ALL CURRENT APPLICABLE CODES AND STANDARDS. SHOULD THE CONTRACTOR PROVIDE ANY ITEM OR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE CURRENT APPLICABLE CODES AND STANDARDS, HE SHALL BEAR ALL COSTS ARISING FROM CORRECTING ANY DEFICIENCIES. CURRENT APPLICABLE AND ADOPTED CODES AND STANDARDS SHALL INCLUDE ALL ORDINANCES, UTILITY COMPANY REGULATIONS, OSHA REGULATIONS AND APPLICABLE REQUIREMENTS OF CITY AND NATIONALLY ACCEPTED CODES AND STANDARDS.
   - C. IN THE CASE WHERE TWO OR MORE TRADES OR CONTRACTORS ARE INVOLVED IN THE INSTALLATION OF ANY ITEM, ALL SUCH PERSONS SHALL BE RESPONSIBLE FOR COORDINATING THEIR WORK AMONG THEMSELVES TO PROVIDE A FULLY COMPLETED, FUNCTIONING INSTALLATION.
   - D. WORK INCLUDES BUT IS NOT NECESSARILY LIMITED TO:
     - 1. HVAC EQUIPMENT
     - 2. DUCTWORK, GRILLES, AND ALL ACCESSORIES
     - 3. PIPING SYSTEMS
     - 4. PLUMBING FIXTURES, EQUIPMENT, AND PIPING
     - 5. INSULATION
     - 6. CONTROLS
3. SITE REVIEW: THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID TO DETERMINE THE EXTENT OF THE WORK AND COORDINATE WITH ALL EXISTING CONDITIONS TO BE ENCOUNTERED BY ALL TRADES. CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD, INCLUDE ANY COSTS RELATED IN HIS BID, AND SHALL NOTE IN WRITING, ANY EXCEPTIONS TAKEN WHEN BIDDING THE WORK. LACK OF KNOWLEDGE OF EXISTING CONDITIONS WILL NOT BE CONSIDERED A BASIS FOR CHANGE ORDERS. PRIOR TO ORDERING EQUIPMENT, VERIFY THAT EQUIPMENT TO BE PROVIDED UNDER THIS CONTRACT IS ACCEPTABLE AND CAN FIT INTO BUILDING AREA PROPOSED. EXPENSE INCURRED BY THE CONTRACTOR, WHICH IN THE ENGINEER'S OPINION COULD HAVE BEEN AVOIDED BY THIS STEP, SHALL NOT BE A BASIS FOR CHANGE ORDERS.
4. DRAWINGS AND SPECIFICATIONS: THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT, CHARACTER, AND ARRANGEMENT OF EQUIPMENT, FIXTURES AND PIPING SYSTEMS. THEIR DRAWINGS SHALL NOT BE SCALED AND THEIR ABSOLUTE ACCURACY IS NOT WARRANTED. BRANCH CIRCUITS, PIPING ARRANGEMENTS, MECHANICAL AND ELECTRICAL COMPONENT LOCATION, AND LIKE HAVE BEEN DESIGNED FOR ECONOMY CONSISTENT WITH GOOD PRACTICE AND OTHER CONSIDERATIONS. MAJOR CHANGES TO THE SYSTEMS ARRANGED AS SHOWN ON THE DRAWINGS, IF ACCEPTED, MUST BE APPROVED IN WRITING BY THE ENGINEER, PRIOR TO PROCEEDING. ALL SUCH CHANGES SHALL BE INCORPORATED INTO THE "AS-BUILT" DRAWINGS AS SPECIFIED. IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO FULLY COVER ALL WORK AND MATERIALS FOR A COMPLETE, FIRST-CLASS MECHANICAL INSTALLATION. ANY DEVICES USUALLY EMPLOYED IN THIS CLASS OF WORK NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS OR IN THIS SPECIFICATION, BUT WHICH MAY BE NECESSARY FOR THE SATISFACTORY COMPLETION OF THE WORK, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AS A PART OF HIS TOTAL WORK UNDER THIS DIVISION. CONSULT THE SPECIFICATIONS AND DRAWINGS OF ALL OTHER TRADES AND PERFORM ALL MECHANICAL WORK REQUIRED THEREIN. COOPERATE WITH ALL OTHER CONTRACTORS OR SUBCONTRACTORS TO FURNISH COMPLETE WORKABLE SYSTEMS.
5. WARRANTY: PROVIDE A WRITTEN WARRANTY FOR A PERIOD OF NOT LESS THAN 12 MONTHS AGAINST DEFECTIVE WORKMANSHIP AND MATERIAL AFTER FINAL ACCEPTANCE AT NO ADDITIONAL COST TO THE OWNER.
   - A. FOR ALL EQUIPMENT HAVING AN EXTENDED WARRANTY AVAILABLE, THE CONTRACTOR SHALL INCLUDE THE FULL ADDITIONAL COST IN HIS BASE BID.
   - B. ALL WARRANTY CERTIFICATES AND EXTENDED WARRANTY CERTIFICATES ISSUED FOR EQUIPMENT SHALL BE TRANSMITTED TO THE OWNER.
   - C. ALL REFRIGERANT MOTOR-COMPRESSORS PROVIDED ON THIS PROJECT SHALL BE PROVIDED WITH A FIVE (5) YEAR COMPRESSOR WARRANTY.
6. AS-BUILTS: DURING CONSTRUCTION, CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK AS SHOWN ON THE CONTRACT DRAWINGS AND THAT WHICH IS ACTUALLY INSTALLED ON A SET OF PRINTS OF THE MECHANICAL DRAWINGS, AND NOTE CHANGES THEREON WITH RED MARKS, IN A NEAT AND ACCURATE MANNER. WHEN ALL REVISIONS HAVE BEEN SHOWN ON THESE PRINTS TO INDICATE THE WORK AS FINALLY INSTALLED, THE PRINTS SHALL BE DELIVERED TO THE ENGINEER BEFORE FINAL PAYMENT.
7. TESTS: THE RIGHT IS RESERVED TO INSPECT AND TEST ANY PORTION OF THE INSTALLATION/EQUIPMENT DURING THE PROGRESS OF ITS ERECTION. THE CONTRACTOR SHALL TEST THE ENTIRE HVAC SYSTEM FOR A PERIOD OF 72 HOURS PRIOR TO OCCUPANCY. TEST, ADJUST AND BALANCE SYSTEMS AS REQUIRED AND RECOMMENDED BY MANUFACTURERS.
   - A. PROVIDE PERSONNEL AND EQUIPMENT, MAKE REQUIRED TESTS, AND SECURE REQUIRED APPROVALS FROM THE ARCHITECT AND GOVERNMENTAL AGENCIES HAVING JURISDICTION.
   - B. MAKE WRITTEN NOTICE TO THE ARCHITECT/ENGINEERS ADEQUATELY IN ADVANCE OF EACH OF THESE:
     - 1. WHEN ROUGH-INS ARE COMPLETE BUT NOT COVERED.
     - 2. AT COMPLETION OF THE WORK.
   - C. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND TO NOT COMPLY WITH THE SPECIFIED REQUIREMENTS: WITHIN THREE DAYS AFTER RECEIPT OF NOTICE OF NON-COMPLIANCE, REMOVE THE NON-COMPLYING ITEMS FROM THE JOB SITE AND REPLACE THEM WITH ITEMS THAT COMPLY WITH THE SPECIFIED REQUIREMENTS, ALL AT NO ADDITIONAL COST TO THE OWNER.
   - D. IN THE ARCHITECT'S/ENGINEER'S PRESENCE: TEST ALL PARTS OF ALL SYSTEMS AND DEMONSTRATE THAT ALL SUCH ITEMS PROVIDED UNDER THIS SECTION FUNCTION IN THE REQUIRED MANNER.
8. PERMITS AND INSPECTIONS: SECURE AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS. INSPECTION CERTIFICATES FROM LOCAL AUTHORITIES HAVING JURISDICTION SHALL BE DELIVERED TO THE OWNER BEFORE FINAL PAYMENT.
9. SUBMITTALS: SUBMIT CLEARLY MARKED SHOP DRAWINGS IN PDF FORMAT, INCLUDING PRODUCT DATA AND SAMPLES WITHIN THIRTY (30) DAYS OF AWARD OF CONTRACT AND IN ACCORDANCE WITH THE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS. SUBMITTALS ARE REQUIRED FOR ALL ITEMS PROVIDED UNDER THIS SPECIFICATION. REVIEW OF SUBMITTALS BY THE ENGINEER AND ANY ASSOCIATED ACTION TAKEN BY THE ENGINEER DOES NOT RELIEVE THE CONTRACTOR OF ANY REQUIREMENTS SET FORTH BY THE CONTRACT DOCUMENTS. INCOMPLETE SUBMITTALS SHALL NOT BE REVIEWED. SUBMITTALS/SHOP DRAWING SUBMISSIONS IN EXCESS OF THREE (3) TRANSMISSIONS MAY BE CONSIDERED ADDITIONAL SERVICES.
   - A. SHOP DRAWINGS AND PRODUCT DATA: OBTAIN APPROVED SHOP DRAWINGS SHOWING EQUIPMENT ON THE FOLLOWING ITEMS AS REQUESTED BY THE ENGINEER, CAPACITY, MANUFACTURER'S RECOMMENDATIONS AND HOOKUP DETAILS, FROM OTHER INVOLVED CONTRACTORS FOR ALL EQUIPMENT AND COMPLY THEREWITH.
     - 1. HVAC EQUIPMENT
     - 2. FANS
     - 3. AIR DEVICES
     - 4. PLUMBING EQUIPMENT, FIXTURES & TRIM
   - B. TESTS AND REPORTS: PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT TESTING, ADJUSTING AND BALANCING REPORT TO ENGINEER FOR REVIEW. AN APPROVED TAB REPORT MUST BE RECEIVED BY THE ENGINEER PRIOR TO SUBSTANTIAL COMPLETION.
   - C. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER OF ALL MAJOR ITEMS OF EQUIPMENT PRIOR TO PLACING ORDERS. SHOULD THE CONTRACTOR SUPPLY EQUIPMENT DIFFERING FROM THE SCHEDULED OR SPECIFIED ITEMS IN THE CONTRACT DOCUMENTS WITHOUT NOTIFICATION TO THE ENGINEER, HE SHALL BEAR ALL COST TO REMEDY ANY DEFICIENCIES OR CONFLICTS ARISING FROM DEVIATION FROM BASIS OF DESIGN.
10. EQUIPMENT SUBSTITUTIONS: TO THE NAMED SPECIFIED PRODUCTS MAY BE PROPOSED AND BID BY THE CONTRACTOR IF REQUESTED AND APPROVED BY THE ENGINEER IN WRITING A MINIMUM OF FIVE (5) DAYS BEFORE BID DUE DATE. OTHERWISE, THE CONTRACTOR SHALL BASE HIS BID ON THE NAMED ITEMS. THE CONTRACTOR SHALL DEMONSTRATE TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE THAT THE QUALITY, CAPACITY, AND SUITABILITY OF THE PROPOSED ITEM EQUALS OR EXCEEDS THAT OF THE NAMED ITEM.
    - A. COORDINATE EQUIPMENT SUBSTITUTIONS FOR THE SCHEDULED OR SPECIFIED ITEM WITH ALL OTHER TRADES. COMPENSATION TO OTHER TRADES DUE TO CHANGES IN RATED VOLTAGE, PHASE, PHYSICAL SIZE, ARRANGEMENTS, SHAPE, COLOR, AND ALL OTHER CHARACTERISTICS INCLUDING THE RELATED EFFECTS ARISING FROM EQUIPMENT SUBSTITUTIONS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR MAKING THE CHANGE.
11. SCHEDULE OF WORK: THE SCHEDULE OF THE MECHANICAL WORK SHALL BE ARRANGED TO SUIT THE PROGRESS OF WORK BY THE OTHER TRADES AND SHALL IN NO WAY RETARD PROGRESS OF CONSTRUCTION OF THE PROJECT. REFER TO ARCHITECTURAL PLANS FOR PHASING PLAN. THE CONTRACTOR SHALL COORDINATE WITH AND NOTIFY THE OWNER'S REPRESENTATIVE FOR APPROVAL AND SCHEDULING OF ANY BUILDING SYSTEM INTERRUPTIONS OR EXISTING TENANT INTERRUPTIONS (INCLUDING NOISE, DUST, ETC.) THE CONTRACTOR SHALL COORDINATE ANY EXISTING BUILDING EQUIPMENT WARRANTIES PRIOR TO MODIFICATION OR CONNECTION TO SAME.
12. STORAGE AND MATERIAL: SPACE WILL BE ASSIGNED TO THE CONTRACTOR BY THE OWNER FOR THE STORAGE OF MATERIALS. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE PROTECTION AND SAFEKEEPING OF MATERIALS, TOOLS, AND EQUIPMENT. ALL MATERIALS AND EQUIPMENT SHALL BE KEPT IN ITS ASSIGNED PLACE UNTIL THE TIME OF ITS INSTALLATION. EXCESS MATERIALS, DIRT, AND REFUSE SHALL BE PROMPTLY REMOVED FROM THE WORK SITE.
13. PROVIDE ALL MATERIALS, TOOLS, LABOR, AND OTHER RELATED ITEMS TO COMPLETE ALL WORK, INCLUDING CONNECTIONS TO ALL EQUIPMENT IN ACCORDANCE WITH THE LOCAL CODES. IN THE EVENT THAT ANY ITEM PROVIDED UNDER THIS CONTRACT IS DAMAGED PRIOR TO FINAL ACCEPTANCE THE CONTRACTOR SHALL REPLACE, NOT REPAIR, THE ITEM WITH NEW. IF AN EXISTING ITEM IS DAMAGED DURING THE CONSTRUCTION, THE CONTRACTOR SHALL RESTORE THE ITEM TO NEAR ORIGINAL CONDITION OR PRIOR OPERATING CONDITION TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.
14. LABELING OF EQUIPMENT: ALL HVAC EQUIPMENT SHALL BE IDENTIFIED BY MACHINE ENGRAVED LAMINATED PLASTIC DESIGNATION PLATES PERMANENTLY ATTACHED WITH SELF-TAPPING SCREWS OR RIVETS. ALL PARTS OF EACH ITEM OF EQUIPMENT OR DEVICE SHALL BEAR THE MANUFACTURER'S NAMEPLATE, GIVING NAME OF MANUFACTURER, DESCRIPTION, SIZE, TYPE, SERIAL, AND MODEL NUMBER, AND ELECTRICAL CHARACTERISTICS IN ORDER TO FACILITATE MAINTENANCE OR REPLACEMENT.
15. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR, AND BE REQUIRED TO MAKE GOOD AT HIS OWN EXPENSE, ANY AND ALL DAMAGES TO ANY WORK OR MATERIALS IN PLACE ON THE PREMISES, OR INCLUDED IN THIS CONTRACT, DURING THE EXECUTION OF HIS CONTRACT. CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN-UP OF OCCUPIED SPACE AT THE COMPLETION OF EACH WORK PERIOD, COMPLETING CLEAN-UP IN TIME TO NOT CAUSE INTERFERENCE WITH NORMAL OPERATIONS.
16. OPERATIONS AND MAINTENANCE MANUALS: PROVIDE TO OWNER IN 3-RING BINDER AT PROJECT COMPLETION: MANUFACTURER'S OPERATION AND MAINTENANCE MANUALS, WARRANTIES (EQUIPMENT), WARRANT (CONTRACTOR), TAB REPORT, RECORD DRAWINGS. INDICATE DATE OF INSTALLATION, NAMES AND PHONE NUMBERS OF GENERAL CONTRACTOR, INSTALLING CONTRACTOR, LOCAL MANUFACTURER'S REPRESENTATIVE, AND CONTACT FOR SERVICE. PROVIDE ONE HOUR OF FORMAL TRAINING TO OWNER'S PERSONNEL FOR NEW SYSTEMS/ EQUIPMENT INCLUDED IN SCOPE OF WORK.
17. IN THE EVENT OF A CONFLICT WITHIN THE DRAWINGS AND/OR SPECIFICATIONS, PROVIDE THE GREATER QUANTITY OR HIGHER QUALITY.
18. DOCUMENTATION OF ANY TEST AND "AS-BUILT" RECORD DRAWINGS SHALL BE PROVIDED TO THE BUILDING OWNER UPON COMPLETION.

PART 2 - PRODUCTS

1. MANUFACTURING STANDARDS: MATERIALS SHALL BE NEW, APPROVED AND LABELED BY ASME, ASHRAE, UL, ETC., WHEREVER STANDARDS HAVE BEEN ESTABLISHED BY THAT AGENCY. DEFECTIVE EQUIPMENT OR EQUIPMENT DAMAGED IN THE COURSE OF INSTALLATION OR TEST SHALL BE REPLACED OR REPAIRED IN A MANNER MEETING THE APPROVAL OF THE OWNER. ALL ITEMS OF THE SAME TYPE SHALL BE IDENTICAL IN MAKE, MODEL, AND ACCESSORIES.
2. TRADE NAMES: UNLESS SPECIFICALLY IDENTIFIED OTHERWISE, MANUFACTURERS' NAMES AND CATALOG NUMBERS INDICATED HEREIN AND ON THE DRAWINGS ARE NOT INTENDED TO BE PROPRIETARY DESIGNATIONS. THEY ARE TO INDICATE GENERAL TYPE AND QUALITY OF MATERIALS AND EQUIPMENT REQUIRED. EQUIPMENT AND MATERIALS BY OTHER MANUFACTURERS WHICH IN THE OPINION OF THE ENGINEER ARE OF EQUAL QUALITY AND WHICH WILL PRODUCE THE SAME RESULTS WILL BE CONSIDERED ACCEPTABLE. INSTALL ALL EQUIPMENT AS RECOMMENDED BY EACH MANUFACTURER. INSTALL ALL PAD/GRADE MOUNTED EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS IN EXPOSED INTERIOR SPACES, UNLESS OTHERWISE NOTED OR INDICATED.
3. DUCT INSULATION: INSULATE ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK WITH ITEMS BELOW.
   - A. FACED FLEXIBLE GLASS FIBER DUCT INSULATION SHALL HAVE A FIRE RETARDANT, REINFORCED FOIL/KRAFT VAPOR BARRIER FACING AND SHALL BE EQUAL TO OWENS-CORNING FIBERGLASS FACED DUCT WRAP SOFTR SERIES TYPE 100. INSULATION SHALL HAVE A NOMINAL THICKNESS OF 2 INCHES AND A THERMAL CONDUCTIVITY OF APPROXIMATELY 0.27 AT 75° F.
   - B. FACED RIGID GLASS FIBER DUCT INSULATION SHALL HAVE A FIRE RETARDANT, REINFORCED FOIL/KRAFT VAPOR BARRIER FACING AND SHALL BE EQUAL TO JOHNS MANVILLE 800 SERIES SPIN-GLASS. INSULATION SHALL HAVE A NOMINAL THICKNESS OF 1-1/2 INCHES, A THERMAL CONDUCTIVITY OF APPROXIMATELY 0.23 AT 75° F, AND A DENSITY OF 2 - 3 POUNDS PER CUBIC FOOT.
4. FLEXIBLE DUCTWORK: SHALL HAVE 1" THICK INSULATION WITH FOIL JACKET AND VAPOR BARRIER LINER. DUCT SHALL MEET CLASS, UL-181, CLASS I AND NFPA 90A, FACTORY APPLIED INSULATION, VAPOR BARRIER AND END CONNECTIONS. FLAME SPREAD = 25, SMOKE DEVELOPED = 50, SECURE WITH ADHESIVES AND METAL CLAMP. INNER CORE SHALL BE HELICALLY CORRUGATED.
5. DUCTWORK: SUPPLY AND RETURN DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED AND SEALED ACCORDING TO SMACNA STANDARDS FOR 4" W.C. POSITIVE AND 2" NEGATIVE PRESSURE. SHEET METAL GAUGES SHALL BE IN ACCORDANCE WITH LOCAL MECHANICAL CODE. PROVIDE FLEXIBLE GLASS FIBER DUCT INSULATION FOR CONCEALED LOCATIONS AND RIGID GLASS FIBER DUCT INSULATION FOR EXPOSED AREAS.
6. FLEXIBLE DUCT CONNECTORS: PROVIDE AIRTIGHT FLEXIBLE DUCT CONNECTORS AT DUCT CONNECTIONS TO EACH AIR-HANDLING UNIT, EXHAUST FAN, AND VENTILATING FAN. SUPPORT CONNECTORS AT EACH END WITH METAL ANGLE FRAME BANDS AND SECURELY BOLT IN PLACE. PROVIDE NOT LESS THAN 20-OUNCE GLASS FABRIC DUCT CONNECTORS COATED ON BOTH SIDES WITH NEOPRENE.
7. TURNING VANES: PROVIDE FABRICATED TEES AND SQUARE ELBOWS IN ACCORDANCE WITH SMACNA DCS FOR VANE ELBOWS.
8. DAMPERS: PROVIDE OPPOSED BLADE ADJUSTABLE MANUAL DAMPERS WHERE INDICATED. PROVIDE DAMPER SHAFTS WITH 2-INCH STANDOFFS TO CLEAR 2 INCHES OF DUCT INSULATION WITH BEARINGS AT BOTH ENDS OF THE SHAFTS. PROVIDE ADJUSTMENT QUADRANT WITH INDICATOR AND LOCKING DEVICES. PROVIDE GALVANIZED STEEL DAMPERS ONE GAGE HEAVIER THAN DUCT IN WHICH DAMPERS ARE INSTALLED.
9. DIFFUSERS, REGISTERS, AND GRILLES: PROVIDE FACTORY-FABRICATED METAL UNITS WITH EDGES ROLLED OR ROUNDED WHERE EXPOSED TO VIEW, AND FACTORY PRIMED WITH WHITE ENAMEL FINISH. PROVIDE WITH FRAMES COMPATIBLE WITH EACH CEILING TYPE. PROVIDE EACH DIFFUSER AND REGISTER WITH FACTORY-FABRICATED, GROUP-OPERATED, ADJUSTABLE, OPPOSED-BLADE, AIR-VOLUME-CONTROL DAMPERS, KEY OR SCREWDRIVER OPERATED FROM THE FACE OF UNIT. PROVIDE EACH UNIT WITH RUBBER OR PLASTIC INSTALLATION GASKETS. CONTRACTOR SHALL COORDINATE ALL DIFFUSER LOCATIONS AND FRAMES TYPES WITH FINAL APPROVED REFLECTED CEILING PLAN FOR LIGHT FIXTURES AND ALL OTHER CEILING MOUNTED DEVICE LOCATIONS. COORDINATE SIDEWALL GRILLES WITH FINAL APPROVED INTERIOR ELEVATIONS.
   - A. PROVIDE AIR DEVICES AS MANUFACTURED BY:
     - 1. TITUS
     - 2. KRUEGER
     - 3. METALAIRE
     - 4. PRICE
10. VALVES AND PIPING SPECIALTIES:
    - A. ACCEPTABLE MANUFACTURERS
      - 1. GATE, GLOBE, ANGLE, CHECK, DRAIN AND BALL VALVES
        - A. STOCKHAM
        - B. LUNKENHEIMER
        - C. CRANE
        - D. NIBCO
        - E. MILWAUKEE VALVE CO., INC.
        - F. HAMMOND CO.
      - 2. BALANCING VALVES
        - A. BELL & GOSSETT
        - B. ARMSTRONG
        - C. TACO
    - B. VALVE CONNECTIONS
      - 1. PROVIDE VALVES SUITABLE TO CONNECT TO ADJOINING PIPING AS SPECIFIED FOR PIPE JOINTS. USE PIPE SIZE VALVES.
      - 2. THREAD OR SWEAT PIPE SIZES 2 INCHES AND SMALLER. THREAD PIPE SIZES 2-1/2 AND 3 INCHES.
      - 3. FLANGE PIPE SIZES 4 INCHES AND LARGER.
      - 4. PROVIDE BUTTERFLY VALVE WITH TAPPED LUG BODY WHEN USED FOR ISOLATING SERVICE.
    - C. GATE VALVES
      - 1. BRONZE, NON-RISING STEM, INSIDE SCREW, DOUBLE WEDGE OR DISC, SCREWED ENDS.
      - 2. IRON BODY, BRONZE TRIM, RISING STEM, O.S. & Y., SOLID WEDGE FLANGED ENDS.
    - D. GLOBE OR ANGLE VALVES
      - 1. BRONZE, RISING STEM, INSIDE SCREW, RENEWABLE COMPOSITION DISC, SCREWED ENDS.
      - 2. IRON BODY, BRONZE TRIM, RISING STEM O.S. & Y., RENEWABLE COMPOSITION DISC, FLANGED ENDS.
    - E. CHECK VALVES
      - 1. BRONZE, SWING DISC, SCREWED ENDS.
      - 2. IRON BODY, BRONZE TRIM, SWING DISC, RENEWABLE DISC AND SEAT, FLANGED ENDS.
      - 3. IRON BODY, BRONZE TRIM, SPRING LOADED, RENEWABLE COMPOSITION DISC, FLANGED ENDS.
    - F. BUTTERFLY VALVES
      - 1. IRON BODY, BRONZE DISC, RESILIENT REPLACEABLE LINER SEAT, TAPPED LUG BODY.
      - 2. PROVIDE WITH MINIMUM SEVEN POSITION LEVER HANDLE FOR BALANCING SERVICE.
    - G. DRAIN VALVES
      - 1. BRONZE COMPRESSION STOP WITH HOSE THREAD CONNECTION.
    - H. BALL VALVES
      - 1. BRASS BODY, BRASS OR STAINLESS STEEL BALL AND STEM.
      - 2. BALL VALVES COMBINED WITH STRAINERS, BALANCING, OR FLOW CONTROL VALVES TO HAVE UNIONS TO PERMIT REMOVAL OF ALL COMPONENTS WITHOUT REMOVING VALVE BODY.
11. EXHAUST FANS: ALL FANS SHALL CARRY THE CERTIFIED RATING SEAL AUTHORIZED BY AMCA. PROVIDE CENTRIFUGAL TYPE EXHAUST FANS WITH ALUMINUM HOUSING, FAN WHEEL, AND BIRD SCREEN. PROVIDE EXHAUST OPENING AND GRAVITY CLOSING TYPE AUTOMATIC BACKDRAFT DAMPERS.
12. HOT WATER, COLD WATER, AND CONDENSATE DRAIN PIPING: INSULATE ALL CONDENSATE PIPING, DOMESTIC HOT WATER AND COLD WATER PIPING WITH 1/2" THICK OWENS CORNING FIBERGLASS ASJ SSL-II OR APPROVED EQUAL, SEALED TO PREVENT SWEATING AND CONTINUOUS THROUGH WALLS, FLOOR, CEILING AND AT HANGERS PROVIDE BLOCKS AND INSULATION SHIELDS TO PREVENT CRUSHING OF INSULATION AT HANGERS.
    - A. CLOSED CELL INSULATION RATED 25/50 MAY BE SUBSTITUTED IN EQUIVALENT THICKNESS, FOR FIBERGLASS INSULATION, ARMAFLEX OR APPROVED EQUAL.
    - B. PROVIDE ALL INSULATION AND JACKET MATERIALS SPECIFICALLY APPROVED FOR AIR PLENUM USE WHERE EXPOSED TO PLENUM AIR.
    - C. PROVIDE ALUMINUM WEATHERPROOF JACKET AND SELF-REGULATING HEAT TAPE FOR ANY PIPING EXPOSED TO OUTDOOR CONDITIONS.
13. WIRING AND ELECTRICAL EQUIPMENT: FROM SOURCE UP TO AND INCLUDING JUNCTION BOX OR CIRCUIT BREAKER SHALL BE BY ELECTRICAL CONTRACTOR.
14. VIBRATION ISOLATOR: FOR ALL MOTOR DRIVEN MECHANICAL EQUIPMENT PER MANUFACTURERS' RECOMMENDATIONS AND AS SHOWN.
    - A. TYPE 1: SPRING TYPE MOUNT: SPRING TYPE ISOLATORS SHALL BE FREE STANDING AND LATERALLY STABLE WITHOUT ANY HOUSING AND COMPLETE WITH 1/4" NEOPRENE ACOUSTICAL FRICTION PADS BETWEEN THE BASEPLATE AND THE SUPPORT. ALL MOUNTINGS SHALL HAVE LEVELING BOLTS THAT MUST BE RIGIDLY BOLTED TO THE EQUIPMENT. SPRING DIAMETERS SHALL BE NO LESS THAN 0.8 OF THE COMPRESSED HEIGHT OF THE SPRING AT RATED LOAD. SPRINGS SHALL HAVE A MINIMUM ADDITIONAL TRAVEL TO SOLID EQUAL TO 50% OF THE RATED DEFLECTION. BASED ON MASON MODEL 5LF.
15. DOMESTIC HOT AND COLD WATER. RELIEF VALVE AND CONDENSATE DRAINAGE PIPING SHALL BE TYPE "L" COPPER WITH WROUGHT COPPER FITTINGS. NO JOINT SHALL BE CONCEALED IN SLABS. JOIN ALL WATER PIPING WITH LEAD FREE SOLDER. SANITIZE POTABLE WATER SYSTEMS PER LOCAL HEALTH DEPARTMENT REQUIREMENTS.
16. SANITARY SEWER DRAIN WASTE AND VENT PIPING SHALL BE SERVICE WEIGHT CAST IRON WITH PROPER CAST IRON FITTINGS. PROVIDE PIPING FOR ALL DRAIN AND RELIEF VALVES. SCHEDULE 40 PVC MAY BE USED ABOVE GRADE WHERE LOCAL CODES ALLOW ITS USE IN THE TYPE OF BUILDING WHERE WORK IS BEING DONE.
17. ALL WATER SERVICE VALVES SHALL BE BUTTERFLY TYPE OR BALL VALVE TYPE ONLY, RATED FOR 200 PSIG WOG.
18. PLUMBING FIXTURES AND EQUIPMENT SHALL BE FURNISHED AS SCHEDULED OR INDICATED AND INSTALLED COMPLETE WITH STOP KITS, ESCUTCHEONS, TRIM, AND ALL OTHER APPURTENANCES REQUIRED TO CONNECT ROUGH-IN PIPING AT FLOORS AND WALLS UNLESS SPECIFIED OTHERWISE.
    - A. PROVIDE PLUMBING EQUIPMENT AS MANUFACTURER BY:
      - 1. AMERICAN STANDARD
      - 2. KHOLER
      - 3. ELJER
      - 4. JOSAM
      - 5. WADE
      - 6. ELKAY
19. FLOW BALANCING OF ALL SYSTEMS PROVIDED SHALL BE INCLUDED UNDER THIS CONTRACT BALANCE AIR FLOW AT ALL AIR DEVICES TO ± 10% OF VALUE SHOWN ON DRAWINGS, PROVIDE WRITTEN BALANCE REPORT.
20. PROVIDE ENGRAVED NAMEPLATE ATTACHED WITH SCREWS FOR ALL MAJOR EQUIPMENT PROVIDED. USE NOMENCLATURE FROM EQUIPMENT SCHEDULES.
21. PROVIDE SNAP-ON TYPE PIPE MARKERS EACH 10'-0" THAT INDICATE BOTH DIRECTION AND PIPE CONTENT. ADHESIVE TYPE MARKERS ARE PROHIBITED FROM LABELING.
22. HVAC CONTROLS
    - A. FOR EACH HVAC SYSTEM, PROVIDE 7- DAY ELECTRONIC PROGRAMMABLE THERMOSTAT/HUMIDISTAT AS PROVIDED BY THE ROOFTOP UNIT MANUFACTURER. PROVIDE INITIAL PROGRAMMING BASED ON DESIRED OPERATING CONDITIONS OBTAINED FROM OWNER'S REPRESENTATIVE.
23. FIRE SPRINKLER SYSTEM REVISIONS SHALL BE PROVIDED IN ACCORDANCE WITH ALL APPLICABLE NFPA ARTICLES AND COORDINATED WITH THE SYSTEM FURNISHED UNDER THE BASE BUILDING CONSTRUCTION.

PART 3 – EXECUTION

1. FIELD INSPECTION AND TESTS
   - A. PRESSURE PIPING TESTS: TEST PRESSURE SHALL BE 1.5 TIMES MAXIMUM WORKING PRESSURE, BUT IN NO CASE LESS THAN 50 PSIG. DO NOT TEST UNTIL EVERY JOINT HAS SET AND COOLED AT LEAST 8 HOURS AT TEMPERATURES ABOVE 50° F. DO ALL TESTING BEFORE BACKFILLING; HOWEVER, PLACE SUFFICIENT BACKFILL MATERIAL BETWEEN FITTINGS TO HOLD PIPE IN PLACE DURING TESTS. TEST SYSTEM GAS-TIGHT PER ANSI B31. USE CLEAN DRY AIR OR INERT GAS (E.G. NITROGEN OR CARBON DIOXIDE) FOR TESTING. SYSTEMS WHICH MAY BE CONTAMINATED BY GAS SHALL FIRST BE PURGED AS SPECIFIED HEREIN. MAKE TESTS ON ENTIRE SYSTEM OR ON SECTIONS THAT CAN BE ISOLATED BY VALVES. AFTER PRESSURIZATION, ISOLATE ENTIRE PIPING SYSTEM FROM ALL SOURCES OF AIR DURING TEST PERIOD. MAINTAIN TEST PRESSURE FOR AT LEAST 8 HOURS BETWEEN TIMES OF FIRST AND LAST READING OF PRESSURE AND TEMPERATURE. TAKE FIRST READING AT LEAST ONE HOUR AFTER TEST PRESSURE HAS BEEN APPLIED. DO NOT TAKE TEST READINGS DURING RAPID WEATHER CHANGES. TEMPERATURE SHALL BE SAME AS ACTUAL TRENCH CONDITIONS. THERE SHALL BE NO REDUCTION IN THE APPLIED TEST PRESSURE OTHER THAN THAT DUE TO A CHANGE IN AMBIENT TEMPERATURE. ALLOW FOR AMBIENT TEMPERATURE CHANGE IN ACCORDANCE WITH THE RELATIONSHIP PF + 14.7 = (P1 + 14.7) (T2 + 460) / TA + 460), IN WHICH T AND PF REPRESENT FAHRENHEIT TEMPERATURE AND GAUGE PRESSURE, RESPECTIVELY, SUBSCRIPTS 1 AND 2 DENOTE INITIAL AND FINAL READINGS, AND "PF" IS THE CALCULATED FINAL PRESSURE. IF "PF" EXCEEDS THE MEASURED FINAL PRESSURE (FINAL GAUGE READING) BY 0.5 PSI OR MORE, ISOLATE SECTIONS OF THE PIPING SYSTEM, RETEST EACH SECTION INDIVIDUALLY, AND APPLY A SOLUTION OF WARM SOAPY WATER TO ALL JOINTS OF EACH SECTION FOR WHICH A REDUCTION IN PRESSURE OCCURS AFTER ALLOWING FOR AMBIENT TEMPERATURE CHANGE. REPAIR LEAKING JOINTS AND REPEAT TEST UNTIL NO REDUCTION IN PRESSURE OCCURS. A TEST GAUGE CALIBRATED IN 1 PSI INCREMENTS AND READABLE TO 0.5 PSI SHALL BE USED IN PERFORMING THE TESTS.
   - B. SYSTEM PURGING: AFTER PRESSURE TESTS, AND BEFORE TESTING A GAS CONTAMINATED LINE, PURGE LINE WITH NITROGEN AT JUNCTION WITH MAIN LINE TO REMOVE ALL AIR OR GAS. CLEAR COMPLETED LINE BY ATTACHING A TEST PILOT FIXTURE AT CAPPED STUB-IN LINE AT BUILDING LOCATION AND LET GAS FLOW UNTIL TEST PILOT IGNITES. ALL PROCEDURES SHALL CONFORM TO ANSI B31.
     - • -CAUTION- FAILURE TO PURGE MAY RESULT IN EXPLOSION WITHIN LINE WHEN AIR-TO-GAS IS AT CORRECT MIXTURE.
2. SCHEDULING: WORK UNDER THIS DIVISION SHALL PROCEED IN ADVANCE OF THE WORK OF OTHERS WHENEVER POSSIBLE, ELIMINATING ALL CUTTING AND PATCHING. WHEN SUCH PROCEDURE IS IMPOSSIBLE, CUTTING AND PATCHING SHALL BE DONE IN A MANNER APPROVED IN ADVANCE BY OWNER. CUTTING SHALL NOT ENDANGER STRUCTURAL INTEGRITY IN ANY WAY. PATCHING SHALL EXACTLY MATCH CONTIGUOUS WORK. ACTUAL WORK OF CUTTING AND PATCHING OF EXISTING SURFACES SHALL BE PERFORMED BY THE SUBCONTRACTOR WHO ORIGINALLY PREPARED THESE SURFACES, E.G., CUTTING AND PATCHING OF MASONRY WALL WILL BE PERFORMED BY THE MASONRY SUBCONTRACTOR. COSTS OF SUCH CUTTING AND PATCHING SHALL BE BORNE BY THE MECHANICAL SUBCONTRACTOR. CUTTING SHALL BE CAREFULLY DONE AND DAMAGE TO BUILDING, PIPING, WIRING OR EQUIPMENT AS A RESULT OF CUTTING SHALL BE REPAIRED BY SKILLED MECHANICS OF TRADE INVOLVED.
3. COORDINATION: COOPERATE AND COORDINATE EFFORTS WITH ALL CONTRACTORS ON THE PROJECT. THIS IS ESPECIALLY IMPORTANT IN DETERMINING EXACT LOCATIONS OF ALL DIFFUSERS, REGISTERS, GRILLES, DUCTWORK AND FANS. ARRANGE AIR INLETS AND OUTLETS IN ACCORDANCE WITH THE ARCHITECTURAL REFLECTED CEILING PLANS UNLESS OTHERWISE INDICATED. COORDINATE LIGHTING FIXTURE LOCATIONS WITH GRILLES, DIFFUSERS, ACCESS PANELS, ETC. VERIFY CEILING AND WALL CONSTRUCTION AND MATERIAL PRIOR TO ORDERING EQUIPMENT OR OTHER DEVICES TO ENSURE PROPER DEVICE IS FURNISHED TO MATCH CONSTRUCTION. THIS VERIFICATION MUST BE EXECUTED REGARDLESS OF INFORMATION PLACED ON THE DRAWINGS. ANY COST INCURRED WHICH IN THE OPINION OF THE OWNER, COULD HAVE BEEN AVOIDED BY THIS STEP SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.
4. GUARANTEE OF WORK: CONTRACTOR GUARANTEES BY HIS ACCEPTANCE OF THE CONTRACT THAT ALL WORK INSTALLED IS FREE FROM ANY AND ALL DEFECTS IN WORKMANSHIP AND/OR MATERIALS, AND THAT THE APPARATUS WILL DEVELOP CAPACITIES AND CHARACTERISTICS SPECIFIED, AND THAT IF, DURING THE PERIOD OF ONE YEAR OR AS OTHERWISE SPECIFIED, FROM DATE OF CERTIFICATE OF COMPLETION AND ACCEPTANCE OF THE WORK ANY SUCH DEFECTS IN WORKMANSHIP MATERIAL OR PERFORMANCE APPEAR, HE WILL, WITHOUT COST TO THE OWNER, REMEDY SUCH DEFECTS WITHIN A REASONABLE TIME TO BE SPECIFIED IN NOTICE. IN DEFAULT THEREOF, THE OWNER MAY HAVE SUCH WORK DONE AND CHARGE COST TO CONTRACTOR. EQUIPMENT GUARANTEES FROM DATE OF "START-UP" WILL NOT BE RECOGNIZED.
5. INSULATION: INSTALL DUCT AND PIPE INSULATION AFTER TESTING IS COMPLETE.
6. FIELD COORDINATION: THE EXACT LOCATION OF PIPES WILL BE DETERMINED BY THE CONTRACTOR AFTER THE WORKING PLANS ARE MADE TO AVOID INTERFERENCE WITH DUCTS, LIGHTING FIXTURES AND PIPING.
7. PERFORMANCE TESTING: BEFORE FINAL ACCEPTANCE OF THE WORK, TEST EACH SYSTEM AS IN SERVICE TO DEMONSTRATE COMPLIANCE WITH THESE DRAWINGS AND TESTING AS SPECIFIED IN THE LOCAL MECHANICAL CODE.
8. TAB: BALANCE AIR SIDE SYSTEMS RELATED TO SCOPE OF WORK. CERTIFIED BALANCE REPORTS SHALL BE FURNISHED TO THE ENGINEER FOR REVIEW AND APPROVAL. REPORT FORMAT AND PROCEDURE SHALL BE IN ACCORDANCE WITH AABC OR NEEB REQUIREMENTS BY AN AABC OR NEBB CERTIFIED PROFESSIONAL AND SHALL BE PERFORMED BY A THIRD PARTY TESTING AGENCY.
9. CODE INSTALLATION: EQUIPMENT WHICH IS REQUIRED BY CODE OR IS SPECIFIED TO HAVE UL OR SIMILAR LISTING, SHALL BE INSTALLED AS REQUIRED TO MEET THAT LISTING.
10. PIPE SLEEVES: PROVIDE PIPE SLEEVES AT WALL PENETRATIONS. PIPE SLEEVE SHALL BE FIRE RATED WHERE REQUIRED.
11. ROOF PENETRATIONS AND EQUIPMENT INSTALLATIONS SHALL BE IN ACCORDANCE WITH ROOFING MANUFACTURER SO AS NOT TO VOID ROOF WARRANTY.
12. SMOKE DETECTORS: PROVIDE SMOKE DETECTORS AT AIR HANDLING UNITS AS REQUIRED BY LOCAL MECHANICAL CODES.
13. CONDENSATE TRAPS: PROVIDE TRAPPED CONDENSATE DRAINS ON AIR HANDLING UNITS.
14. CONCEAL INSTALLATIONS: RUN PIPES AND DUCTWORK ABOVE CEILINGS IN ROOMS WITH CEILINGS. RUN EXPOSED PIPES AS HIGH AS POSSIBLE, IN STRAIGHT LINES PARALLEL OR PERPENDICULAR TO STRUCTURE AND/OR WALLS.
15. VIBRATION ISOLATION: INSTALLATION OF ALL VIBRATION ISOLATION MATERIALS AND SUPPLEMENTAL EQUIPMENT BASES SPECIFIED IN THIS SPECIFICATION SHALL BE ACCOMPLISHED FOLLOWING THE MANUFACTURERS WRITTEN INSTRUCTIONS. ON COMPLETION OF INSTALLATION OF ALL ISOLATION MATERIALS AND BEFORE STARTUP OF ISOLATED EQUIPMENT ALL DEBRIS SHALL BE CLEARED FROM AREAS SURROUNDING AND FROM BENEATH ALL ISOLATED EQUIPMENT, LEAVING EQUIPMENT FREE TO MOVE ON THE ISOLATION SUPPORTS. NO RIGID CONNECTIONS BETWEEN EQUIPMENT AND BUILDING STRUCTURE SHALL BE MADE THAT DEGRADES THE NOISE AND VIBRATION ISOLATION SYSTEM HEREIN SPECIFIED. ELECTRICAL CONDUIT CONNECTIONS TO ISOLATED EQUIPMENT SHALL BE LOOPED TO ALLOW FREE MOTION OF ISOLATED EQUIPMENT.

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REVISION HISTORY

ISSUE	DESCRIPTION	DATE
0	ISSUE FOR CONSTRUCTION	16 JULY 2021

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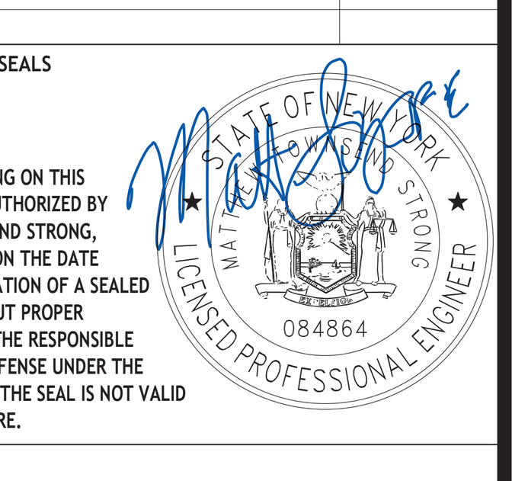


MECHANICAL SPECIFICATIONS

DRAWN BY	CHECKED BY
CBC	JEM
PROJECT NUMBER: 21045	PROJECT ABBREVIATION: FLNA LIB QA LAB
ORIGINAL ISSUE: 16 JULY 2021	CURRENT DOCUMENT STAGE: IFC
FILE NAME	21045.rvt

M0.01
SHEET NUMBER

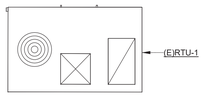
FILE NAME: C:_BIM_\RevitFiles\21045_FLNA LIB QA LAB_C1S_Central_R20_Chris.Childress.C1S.rvt
DATE STAMP: 7/16/2021 5:11:44 AM

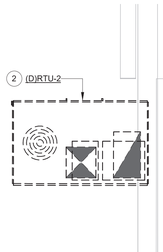
ROOF WARRANTY NOTE

PROVIDE THE SERVICES OF AN INSTALLER AUTHORIZED BY THE MANUFACTURER OF THE EXISTING ROOFING SYSTEM. PROVIDE EXISTING ROOFING MANUFACTURER'S WRITTEN CERTIFICATION THAT MODIFICATIONS ARE COMPATIBLE WITH AND WILL MAINTAIN THE WARRANTY OF THE EXISTING ROOF AND THAT THE MODIFICATIONS ARE INCLUDED IN THE WARRANTY. CONTRACTOR TO CONTACT BUILDING OWNER FOR DETERMINING ROOF WARRANTY INFORMATION.

KEYED NOTES

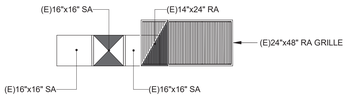
MARK	COMMENT
1	REMOVE EXISTING DUCTWORK, INSULATION, HANGERS AND SUPPORTS AS INDICATED. REMOVE CEILING AS REQUIRED FOR DUCTWORK DEMOLITION. CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO ENSURE NO CONTAMINANTS ENTER ADJACENTAREAS.
2	REMOVE EXISTING DIRECT EXPANSION ROOFTOP PACKAGED UNIT, EXISTING ROOF CURB AND ALL ASSOCIATED APPURTENANCES.





2 ROOF PLAN - MECHANICAL DEMO
3/8" = 1'-0"

NORTH



1 FIRST FLOOR PLAN - MECHANICAL DEMO
3/8" = 1'-0"

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MECHANICAL DEMO PLANS

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M1.01
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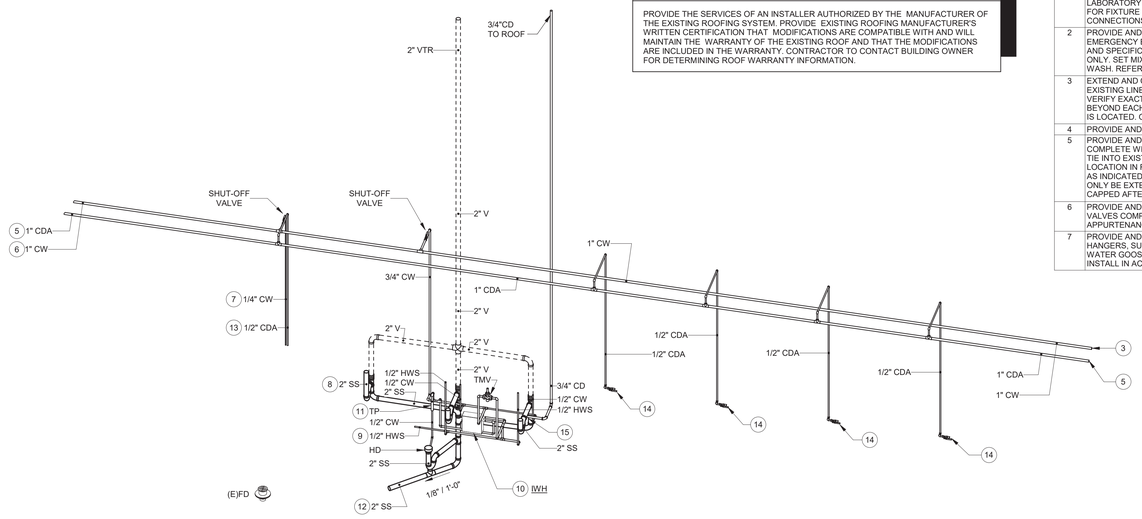
KEYED NOTES

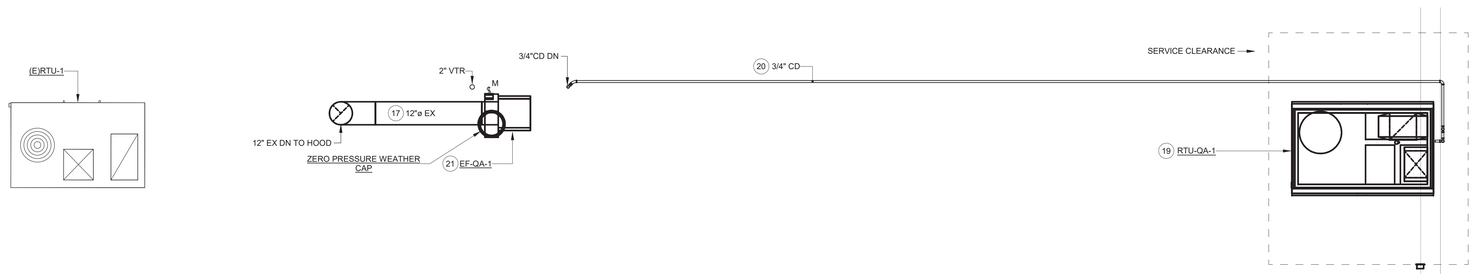
MARK	COMMENT
1	PROVIDE AND INSTALL DOMESTIC PLUMBING SERVICE TO CONTRACTOR PROVIDED LABORATORY SINK AND ASSOCIATED FAUCET. SEE VWR FURNITURE DRAWINGS FOR FIXTURE DESIGN AND SPECIFICATIONS. REFERENCE PIPING ISOMETRIC FOR CONNECTIONS.
2	PROVIDE AND INSTALL DOMESTIC PLUMBING SERVICE TO CONTRACTOR PROVIDED EMERGENCY EYE WASH. SEE VWR FURNITURE DRAWINGS FOR FIXTURE DESIGN AND SPECIFICATIONS. PROVIDE THERMOSTATIC MIXING VALVE FOR EYE WASH ONLY. SET MIXED TEMPERATURE TO PROVIDE TEPID WATER FOR EMERGENCY EYE WASH. REFERENCE PIPING ISOMETRIC FOR CONNECTIONS.
3	EXTEND AND CONNECT NEW DOMESTIC COLD WATER LINE, SIZE AS NOTED, TO EXISTING LINE IN THIS AREA. PROVIDE SHUT-OFF VALVE AT CONNECTION. FIELD VERIFY EXACT LOCATION OF SERVICES PRIOR TO BID. PIPING IS SHOWN EXTENDED BEYOND EACH WALL, BUT SHOULD ONLY BE EXTENDED WHERE EXISTING SERVICE IS LOCATED. OTHER END SHALL BE CAPPED AFTER LAST PIPING TAKEOFF.
4	PROVIDE AND INSTALL VENT LINE UP THROUGH ROOF, SIZE AS NOTED.
5	PROVIDE AND INSTALL ALUMINUM COMPRESSED AIR PIPING AND FITTINGS COMPLETE WITH HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES. TIE INTO EXISTING COMPRESSED AIR PIPING IN THIS AREA. VERIFY EXACT TIE-IN LOCATION IN FIELD. PROVIDE WITH ISOLATION VALVE AT NEW CONNECTION. ROUTE AS INDICATED. PIPING IS SHOWN EXTENDED BEYOND EACH WALL, BUT SHOULD ONLY BE EXTENDED WHERE EXISTING SERVICE IS LOCATED. OTHER END SHALL BE CAPPED AFTER LAST PIPING TAKEOFF.
6	PROVIDE AND INSTALL DOMESTIC COLD WATER LINE WITH LEAD FREE SHUT-OFF VALVES COMPLETE WITH INSULATION, HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES. ROUTE AS INDICATED.
7	PROVIDE AND INSTALL DOMESTIC COLD WATER LINE COMPLETE WITH INSULATION, HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES TO HOOD COLD WATER GOOSENECK. ROUTE COMPRESSED AIR LINE TO HOOD CONNECTION. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

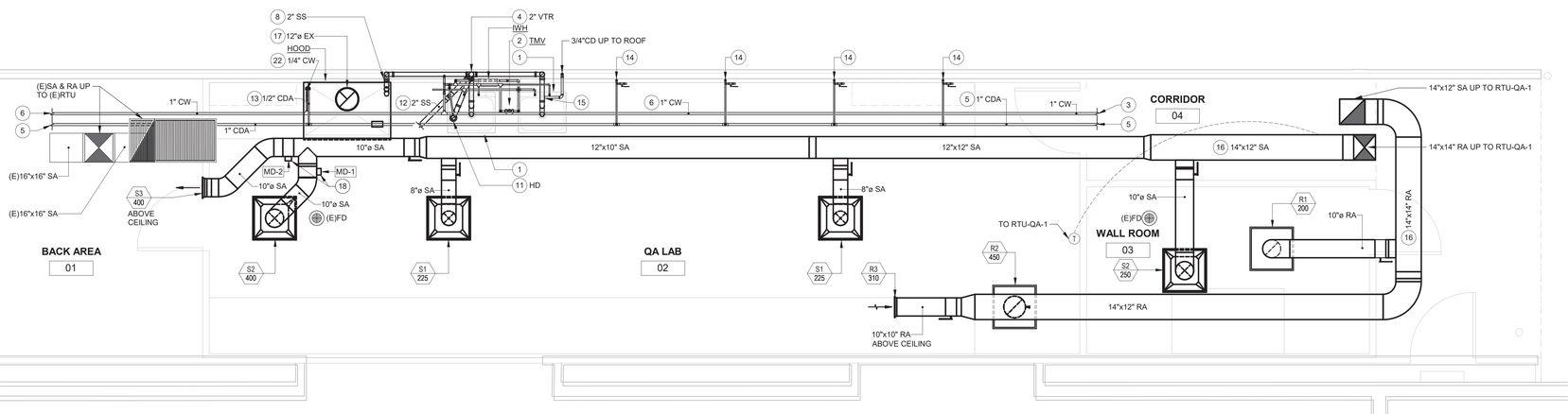
KEYED NOTES

MARK	COMMENT
8	PROVIDE AND INSTALL PVC SCHEDULE 40 SANITARY LINE TO HOOD COMPLETE WITH SUPPORTS AND ALL ASSOCIATED APPURTENANCES. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
9	PROVIDE AND INSTALL DOMESTIC HOT WATER LINE COMPLETE WITH INSULATION, HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES TO DISHWASHER. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
10	PROVIDE AND INSTALL ELECTRIC TANKLESS INSTANTANEOUS WATER HEATER BELOW COUNTER. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. SEE MECHANICAL SCHEDULE/DETAIL SHEETS.
11	PROVIDE AND INSTALL PVC SCHEDULE 40 SANITARY LINE WITH P-TRAP AND TRAP PRIMER, UP. SIZE DRAIN AS NOTED.
12	EXTEND AND CONNECT NEW SANITARY SEWER LINE, SIZE AND SLOPE AS NOTED, TO EXISTING LINE. FIELD VERIFY EXACT LOCATION OF SERVICES PRIOR TO BID.
13	PROVIDE AND INSTALL ALUMINUM COMPRESSED AIR PIPING AND FITTINGS COMPLETE WITH HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES. TIE INTO CONTRACTOR PROVIDED HOOD. SEE VWR FURNITURE DRAWINGS FOR FIXTURE DESIGN AND SPECIFICATION.
14	PROVIDE AND INSTALL 1/2" COMPRESSED AIR DROP COMPLETE WITH ISOLATION SHUTOFF VALVE AND QUICK-CONNECT FITTING. TERMINATE APPROXIMATELY 6" ABOVE COUNTERTOP.
15	ROUTE CONDENSATE DRAIN TO TIE INTO TAILPIECE OF P-TRAP OF SINK.
16	PROVIDE AND INSTALL EXTERNALLY INSULATED, LOW PRESSURE, SUPPLY/RETURN DUCTWORK COMPLETE WITH SUPPORTS, HANGERS AND ALL ASSOCIATED APPURTENANCES.
17	PROVIDE AND INSTALL SCHEDULE 40 PVC CHEMICAL/FUME EXHAUST DUCTWORK COMPLETE WITH FITTINGS, HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES. REFERENCE ROOF PLAN FOR CONTINUATION.
18	PROVIDE AND INSTALL LOW-LEAK MOTORIZED DAMPERS AS SHOWN. WHEN FUME HOOD AND ITS ASSOCIATED EXHAUST FAN ARE ENERGIZED, MD-2 SHALL CLOSE AND MD-1 SHALL OPEN. REFERENCE CONTROL SEQUENCES FOR OPERATION. WHEN FUME HOOD AND ITS ASSOCIATED EXHAUST FAN ARE DE-ENERGIZED, MD-1 SHALL CLOSE AND MD-2 SHALL OPEN. PROVIDE MOTORIZED DAMPERS AT 120-VOLT WITH CONTROL TRANSFORMER(S).
19	INSTALL GENERAL CONTRACTOR-PROVIDED DIRECT EXPANSION/ELECTRIC HEAT ROOFTOP PACKAGED UNIT COMPLETE WITH MANUFACTURER'S ROOF CURB AND ALL ASSOCIATED APPURTENANCES. SEE MECHANICAL SCHEDULE/DETAIL SHEETS.
20	PROVIDE AND INSTALL PVC CONDENSATE DRAIN PIPING AND ROOF SUPPORTS. ROUTE AS INDICATED. INTERIOR LOCATIONS SHALL BE INSULATED. PROVIDE CONDENSATE DRAIN TRAP. SEE MECHANICAL DETAIL SHEETS.
21	PROVIDE AND INSTALL EXHAUST FAN COMPLETE WITH MANUFACTURER'S EQUIPMENT RAILS, DISCHARGE DUCT FITTING, ZERO PRESSURE WEATHER CAP AND ALL ASSOCIATED APPURTENANCES. SEE MECHANICAL SCHEDULE/DETAIL SHEETS. EXHAUST FAN SHALL BE MATCHED WITH FUME HOOD PROVIDED IN QA LAB.
22	PROVIDE AND INSTALL DOMESTIC COLD WATER PIPING AND FITTINGS COMPLETE WITH HANGERS, SUPPORTS AND ALL ASSOCIATED APPURTENANCES. TIE INTO CONTRACTOR PROVIDED HOOD. SEE VWR FURNITURE DRAWINGS FOR FIXTURE DESIGN AND SPECIFICATION.



3 PIPING ISOMETRIC





2 ROOF PLAN - MECHANICAL
3/8" = 1'-0"

NORTH

1 FIRST FLOOR PLAN - MECHANICAL
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MECHANICAL & PLUMBING NEW PLANS

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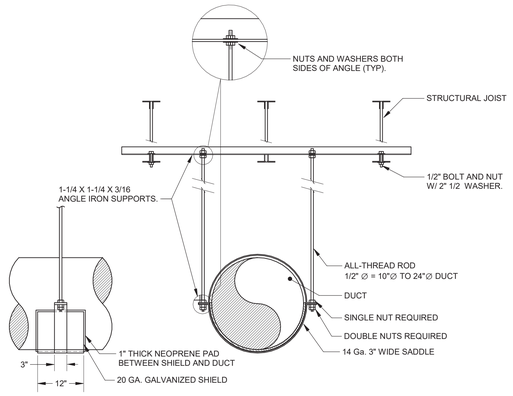
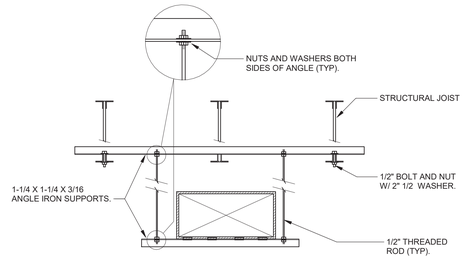
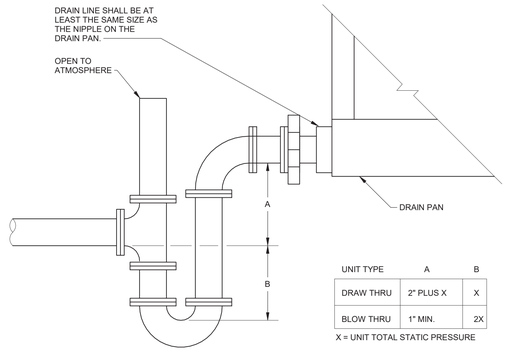


NOTE: MAXIMUM SPACING BETWEEN SUPPORTS SHALL BE ACCORDANCE WITH SMACNA.

10 ROUND DUCT SUPPORT (STRUCTURAL JOIST) DETAIL
NTS



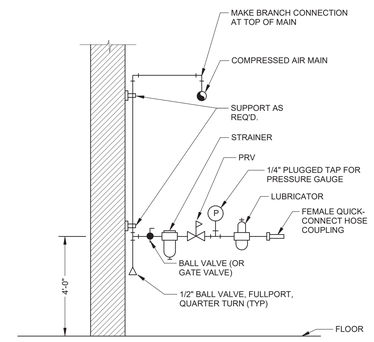
9 DUCT SUPPORT (STRUCTURAL JOIST) DETAIL
NTS



UNIT TYPE	A	B
DRAW THRU	2" PLUS X	X
BLOW THRU	1" MIN.	2X

X = UNIT TOTAL STATIC PRESSURE

7 CONDENSATE DRAIN TRAP DETAIL
NTS



6 COMPRESSED AIR TOOL STATION
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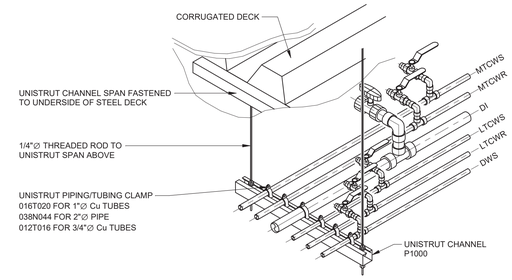
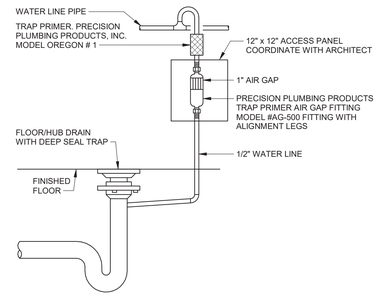
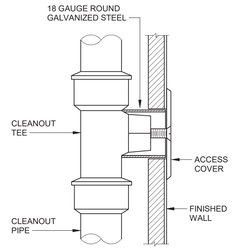


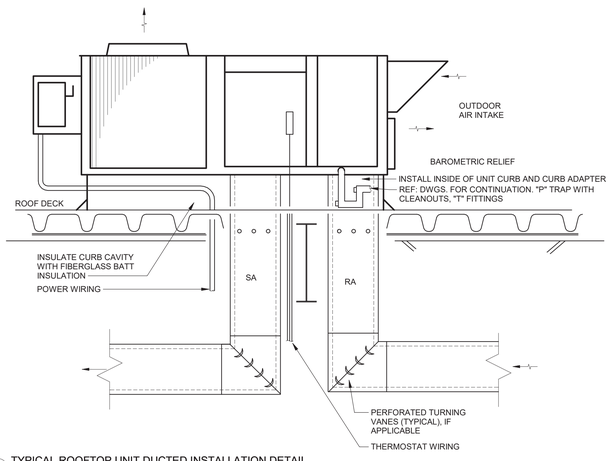
4 PIPING TRAPEZE MOUNTING DETAIL
NTS



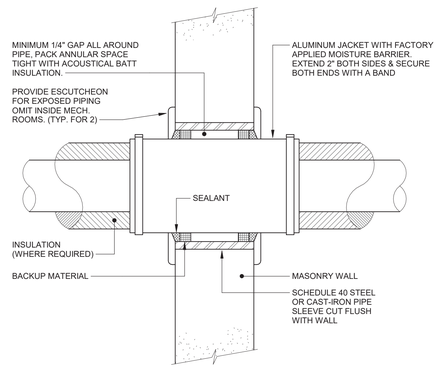
3 TRAP PRIMER DETAIL
NTS



2 WALL CLEAN OUT DETAIL
NTS

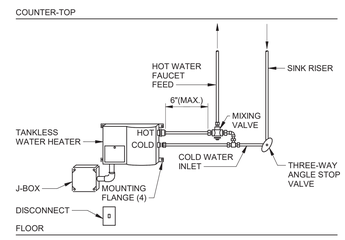


8 TYPICAL ROOFTOP UNIT DUCTED INSTALLATION DETAIL
NTS



NOTES:
1. FOR GYP. BOARD WALLS PROVIDE MIN. 16 GAUGE GALV. STEEL SLEEVE W/ LOCK-TYPE LONGITUDINAL SEAM.
2. OMIT ALUMINUM JACKET IF PIPING IS UNINSULATED.

5 WALL PIPE PENETRATION DETAIL
NTS



GENERAL NOTES:
1. SEE WATER HEATER SCHEDULE.

1 ELECTRIC TANKLESS WATER HEATER DETAIL
NTS

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REVISION HISTORY

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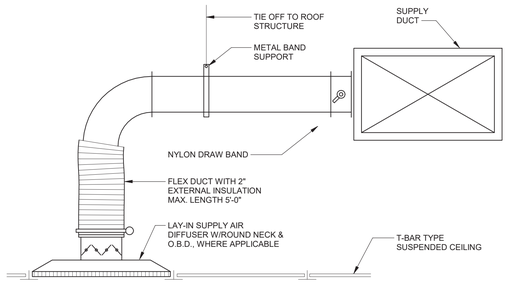
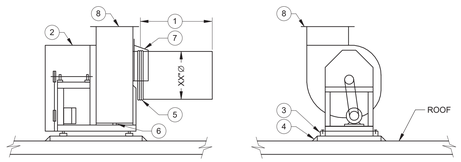
ORIGINAL ISSUE	CURRENT DOCUMENT STAGE
16 JULY 2021	IFC
FILE NAME	21045.rvt

MP4.01
SHEET NUMBER

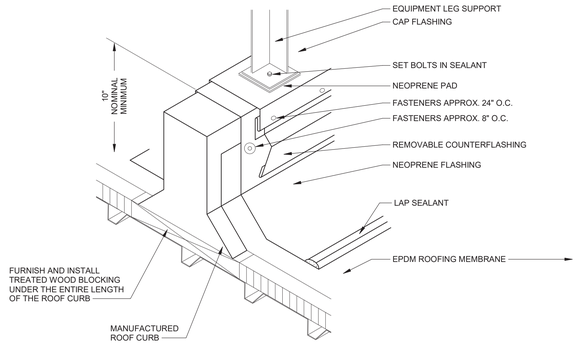


8 SUPPLY AIR DIFFUSER DETAIL
NTS

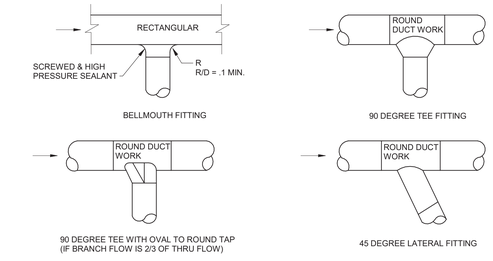


KEYED NOTES:
1. PROVIDE MINIMUM 3 DIAMETERS OF STRAIGHT DUCT RUN INTO FAN.
2. WEATHER COVER.
3. VIBRATION ISOLATOR.
4. MANUFACTURER PROVIDED EQUIPMENT BASE.
5. FLEXIBLE DUCT CONNECTION.
6. SCROLL DRAIN.
7. WEATHER SHIELD OVER FLEXIBLE DUCT CONNECTION FASTEN TO FAN HOUSING.
8. FLANGED CONNECTION FOR DUCT CONNECTION.

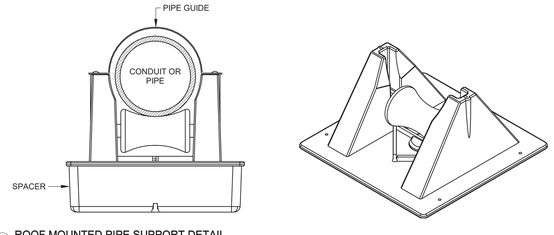
7 UTILITY SET FAN DETAIL
NTS



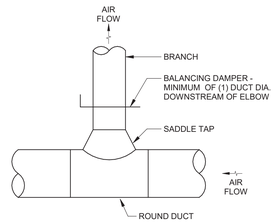
6 ROOF EQUIPMENT SUPPORT CURB DETAIL
NTS



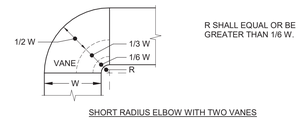
5 ROUND DUCTWORK FITTINGS DETAIL
NTS



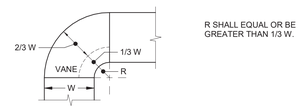
9 ROOF MOUNTED PIPE SUPPORT DETAIL
NTS



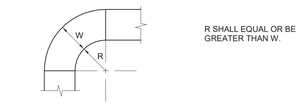
4 ROUND DUCT CONNECTION DETAIL
NTS



SHORT RADIUS ELBOW WITH TWO VANES



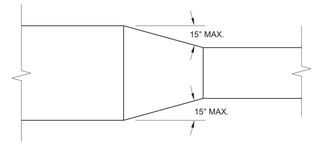
SHORT RADIUS ELBOW WITH ONE VANES



STANDARD RADIUS ELBOW

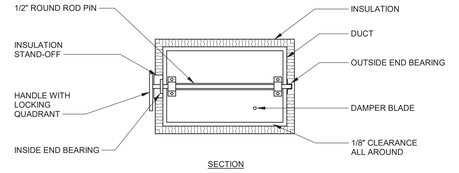
NOTES:
1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS SHOWN ON PLANS MAY BE MADE SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

3 RADIUS ELBOWS DETAIL
NTS

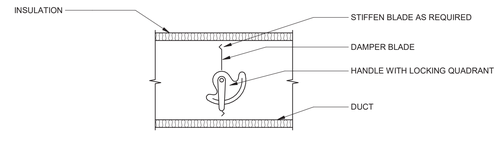


PLAN OR SIDE VIEW

2 DUCTWORK TRANSITION DETAIL
NTS



SECTION



SIDE ELEVATION

NOTE:

DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.

1 VOLUME DAMPER DETAIL
NTS

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ORIGINAL ISSUE: 16 JULY 2021	CURRENT DOCUMENT STAGE: IFC
FILE NAME: 21045.rvt	

MP4.02
SHEET NUMBER

PACKAGED ROOFTOP UNIT SCHEDULE - DX COOLING/ELECTRIC HEAT

	SUPPLY FAN DATA				ELECTRICAL DATA			DX COIL DATA						ELECTRIC HEATING COIL DATA						DIMENSIONAL DATA				BASIS OF DESIGN		
TAG	SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	ESP (IN WG)	HP	FAN DRIVE	VOLTS	PHASE	TOTAL CAPACITY (MBH)	SENS CAPACITY (MBH)	EDB (°F)	EWB (°F)	LDB (°F)	LWB (°F)	TONS	TOTAL CAPACITY (MBH)	EDB (°F)	LDB (°F)	ELEC HEAT (KW)	MCA	MOCP	UNIT HEIGHT (IN)	UNIT WIDTH (IN)	UNIT LENGTH (IN)	UNIT WEIGHT (LBS)	MANUFACTURER	MODEL NO	REMARKS
RTU-QA-1	1,100	140	1.0	2.4	BELT	460	3	32.9	24.1	78.6	64.5	56.1	53.6	3	39.2	57.5	90.5	11.5	23.2	25	33	49	74	568	JCI	ZQE04A2C1AA1B322A3	SEE NOTES

NOTES:

1. UNIT PROVIDED BY GENERAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR.
2. SUMMER DESIGN CONDITIONS: 93dF DRY BULB/73dF WET BULB. WINTER DESIGN CONDITIONS: 6dF DRY BULB.
3. PROVIDE UNIT WITH DRY-BULB ECONOMIZER WITH BAROMETRIC RELIEF AND HOODS WITH ECONOMIZER FAULT DETECTION AND DIAGNOSTIC. PROVIDE UNIT WITH RAIN HOOD AND WATER ELIMINATOR/FILTERS ON OUTDOOR AIR INTAKE. PROVIDE RAIN HOOD ON BAROMETRIC RELIEF OUTLET.
4. PROVIDE UNIT WITH 2" PLEATED MERV-8 FILTERS AND SPARE FILTERS. UNIT SHALL BE EQUIPPED WITH A DIRTY FILTER SWITCH.
5. PROVIDE UNIT WITH POWERED CONVENIENCE OUTLET (120-VOLT/15-AMP) AND HACR CIRCUIT BREAKER/DISCONNECT.
6. PROVIDE UNIT WITH SAFETY MONITORING FOR HIGH- AND LOW-PRESSURE SWITCHES, FREEZESTATS AND TEMPERATURE LIMIT SWITCH FOR ELECTRIC HEAT.
7. PROVIDE UNIT WITH SMART EQUIPMENT CONTROLLER INCLUDING DISCHARGE AIR, RETURN AIR AND OUTDOOR AIR TEMPERATURE SENSORS.
8. PROVIDE UNIT WITH ONE (1) YEAR LIMITED WARRANTY ON THE COMPLETE UNIT AND FIVE (5) YEAR WARRANTY ON COMPRESSORS AND ELECTRIC HEATER ELEMENTS.
9. UNIT IS RATED AT 14.70 SEER/12.20 EER AND IS PROVIDED WITH R-410A REFRIGERANT.
10. PROVIDE UNIT WITH PROGRAMMABLE THERMOSTAT FOR 24/7 OPERATION AND AUTOMATIC SWITCHOVER CAPABILITIES.
11. PROVIDE UNIT WITH MANUFACTURER'S ROOF CURB.

SEQUENCE OF OPERATION:

THE UNIT SHALL BE LOCALLY CONTROLLED AND OPERATE IN CONSTANT VOLUME MODE FOR SUPPLY AND RETURN AIR.

COOLING MODE: UPON A RISE IN SPACE TEMPERATURE ABOVE 75dF (ADJ), THE COMPRESSOR SHALL ENERGIZE TO MAINTAIN A SPACE TEMPERATURE OF 75dF (ADJ). UPON A FALL IN SPACE TEMPERATURE BELOW THE COOLING SETPOINT, THE COMPRESSOR SHALL DE-ENERGIZE.

HEATING MODE: UPON A FALL IN SPACE TEMPERATURE BELOW 70dF (ADJ), THE ELECTRIC HEATING ELEMENT SHALL ENERGIZE TO MAINTAIN A SPACE TEMPERATURE OF 70dF (ADJ). UPON A RISE IN SPACE TEMPERATURE ABOVE THE HEATING SETPOINT, THE HEATING ELEMENT SHALL DE-ENERGIZE.

ECONOMIZER MODE: THE ECONOMIZER MODE SHALL BE INITIATED WHEN THE OUTDOOR AIR DRY-BULB TEMPERATURE RANGE IS BETWEEN 50dF AND 58dF (ADJ). CHANGEOVER FROM COMPRESSOR TO ECONOMIZER OPERATION SHALL BE PROVIDED BY AN INTEGRAL ELECTRONIC ENTHALPY CONTROL.

FUME HOOD CLOSED/MOTORIZED DAMPER FOR FUME HOOD OPERATION: WHILE THE FUME HOOD IS CLOSED AND IN THE FUME HOOD EXHAUST FAN IS DE-ENERGIZED, MD-1 SHALL BE CLOSED AND MD-2 SHALL BE OPEN TO PROVIDE SUPPLY AIR TO THE ADJACENT SPACE OF THE QA LAB.

FUME HOOD OPEN/MOTORIZED DAMPER FOR FUME HOOD OPERATION: WHILE THE FUME HOOD IS OPEN (18" MAX PER FLNA STANDARDS) AND THE FUME HOOD EXHAUST FAN IS ENERGIZED, MD-1 SHALL BE OPEN TO SUPPLY MAKE-UP AIR TO THE QA LAB AND MD-2 SHALL BE CLOSED.

FUME HOOD EXHAUST FAN SCHEDULE (BY OTHERS-INFO ONLY)

				ESP					BASIS OF DESIGN		
TAG	LOCATION	FAN TYPE	CFM	(IN WG)	DRIVE	HP	VOLTS	PHASE	MANUFACTURER	MODEL NO	REMARKS
EF-QA-1	ROOF	UTILITY SET	450 / 725	0.88	BELT	3/4	120	1	LABCONCO	82006-752	SEE NOTES

NOTES:

1. FUME HOOD EXHAUST FAN SHALL BE PROVIDED WITH THE FUME HOOD.
2. PER FLNA STANDARDS, THE MAXIMUM SASH HEIGHT OF OPERATION SHALL BE 18", EQUATING TO 450 CFM AT 100 FPM FOR THE 4' FUME HOOD.
3. EXHAUST FAN SHALL BE COATED STEEL BLOWER WITH IMPELLER AND HOUSING HAVING A PHENOLIC COATING.
4. EXHAUST FAN SHALL HAVE ADJUSTABLE SHEAVES FOR PERFORMANCE ADJUSTMENTS AND A POWDER-COATED BASE AND WEATHER COVER.
5. PROVIDE A POWDER-COATED STEEL BLOWER TRANSITION ADAPTER (30186-002) AND ZERO PRESSURE WEATHERCAP (30185-000) WITH FAN/BLOWER.

SEQUENCE OF OPERATION:

THE BLOWER SHALL OPERATE BASED ON THE HOOD POSITION OF OPEN (18" SASH OPENING) OR CLOSED (SASH FULLY CLOSED).

THE FUME HOOD SHALL SEND A SIGNAL TO THE BLOWER TO ENERGIZE UPON OPENING THE SASH AND DE-ENERGIZE UPON CLOSING THE SASH.

GRILLE, REGISTER & DIFFUSER SCHEDULE

TAG	TYPE	SERVICE	CFM RANGE	NECK SIZE (IN)	MAX PD	MANUFACTURER/ MODEL NO	DESCRIPTION	REMARKS
S1	CEILING	SUPPLY	225	8	0.1	PRICE / SCD	SQUARE CONE DIFFUSER WITH 360-DEGREE AIR PATTERN	SEE NOTES
S2	CEILING	SUPPLY	250 - 400	10	0.1	PRICE / SCD	SQUARE CONE DIFFUSER WITH 360-DEGREE AIR PATTERN	SEE NOTES
S3	SIDEWALL	SUPPLY	400	10 X 10	0.1	PRICE / 610	SIDEWALL SUPPLY GRILLE/0-DEGREE/3/4" BLADE SPACING	SEE NOTES
R1	CEILING	RETURN	200	10	0.1	PRICE / 610Z	SIDEWALL RETURN GRILLE/0-DEGREE/3/4" BLADE SPACING	SEE NOTES
R2	CEILING	RETURN	450	12	0.1	PRICE / 610Z	SIDEWALL RETURN GRILLE/0-DEGREE/3/4" BLADE SPACING	SEE NOTES
R3	SIDEWALL	RETURN	310	10 X 10	0.1	PRICE / 610Z	SIDEWALL RETURN GRILLE/0-DEGREE/3/4" BLADE SPACING	SEE NOTES

NOTES:

1. PROVIDE ALUMINUM GRILLES AND DIFFUSERS WITH BAKED ENAMEL COATING.
2. SIDEWALL GRILLES (SUPPLY AND RETURN) ARE DUCT-MOUNTED ONLY. GRILLES ARE NOT MOUNTED IN A WALL FACE.
3. CEILING SUPPLY GRILLES (SCD) SHALL HAVE INSULATION OVER COVER.

WATER HEATER SCHEDULE

TAG	LOCATION	PRESET WATER TEMP (°F)	VOLTS / PHASE	HEATING ELEMENT KW	MANUFACTURER	MODEL	REMARKS
IWH	BELOW COUNTER	120	480 / 3	24	CHRONOMITE	ER-50L	SEE NOTES

NOTES:

1. MOUNT WATER HEATER UNDER COUNTER.
2. WATER HEATER TO HAVE A DEDICATED ANGLE VLAVE.
3. WATER HEATER SHALL BE HARD WIRED WITH CUTOFF SWITCH OR DISONNECT.
4. PROVIDE WATER HAMMER ARRESTOR.
5. PROVIDE LEONARD MODEL 170-LF MIXING VALVE, OR APPROVED EQUAL, TO PROVIDE TEPID WATER FOR EMERGENCY EYE WASH.

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