SPECIFICATIONS

EQUIPMENT & PIPING IDENTIFICATION

1. CONSULT THE OWNER AS TO ANY LABELING STANDARDS INCLUDING NAMING CONVENTIONS, STANDARD LABELING MATERIALS AND LABELING COLOR CONVENTIONS. ALL NEW VALVE AND EQUIPMENT TAGS SHALL MATCH THE BUILDING STANDARD, WHERE NO STANDARD EXISTS, PROVIDE THE FOLLOWING:

2. FURNISH AND ATTACH TO EACH VALVE A 2" DIAMETER TAG OF SOLID BRASS WITH NUMBER AND SERVICE ABBREVIATED AS NOTED ON CONTRACT DRAWINGS. NUMBERS TO CORRESPOND TO CONSECUTIVE NUMBERS ON VALVE CHART IDENTIFYING EACH INDIVIDUAL VALVE. ATTACH TAGS TO STEM OF VALVES WITH BRASS "S" HOOKS. PROVIDE ONE VALVE CHART MOUNTED IN EACH MECHANICAL ROOM & ONE COPY TO THE OWNER.

3. IDENTIFY ALL EQUIPMENT BY A PERMANENTLY ATTACHED MINIMUM 1-1/2" X 3-1/2" NAMEPLATE OF WHITE CORE LAMINATED BAKE LITE WITH BLACK SURFACE AND INCISED LETTERS. INCLUDE THE EQUIPMENT IDENTIFICATION NUMBER, MANUFACTURERS NAME, SERIAL AND MODEL NUMBER, AND RATED CAPACITY.

PIPING, FITTINGS & PIPING ACCESSORIES

1. REFER TO "HVAC PIPING/TUBING MATERIAL, JOINTS & FITTINGS" SCHEDULE FOR PIPE MATERIALS, APPLICATION, RATINGS & FITTINGS.

2. DIELECTRIC FITTINGS; MANUFACTURERS, HART INDUSTRIES INTERNATIONAL, INC., WATTS REGULATOR CO.; A DIVISION OF WATTS WATER TECHNOLOGIES, INC
   - A. DESCRIPTION: COMBINATION FITTING OF COPPER-ALLOY AND FERROUS MATERIALS WITH THREADED, SOLDER-JOINT, PLAIN, OR WELD-NECK END CONNECTIONS THAT MATCH PIPING SYSTEM MATERIALS.
   - B. INSULATING MATERIAL: SUITABLE FOR SYSTEM FLUID, PRESSURE, AND TEMPERATURE.
   - C. DIELECTRIC UNIONS: FACTORY-FABRICATED UNION ASSEMBLY, FOR 250-PSIG MINIMUM WORKING PRESSURE AT 180 DEG F.
   - D. DIELECTRIC FLANGES: FACTORY-FABRICATED COMPANION-FLANGE ASSEMBLY, FOR 150- OR 300-PSIG MINIMUM WORKING PRESSURE AS REQUIRED TO SUIT SYSTEM PRESSURES.
   - E. DIELECTRIC COUPLINGS: GALVANIZED-STEEL COUPLING WITH INERT AND NONCORROSIVE THERMOPLASTIC LINING, THREADED ENDS; AND 300-PSIG MINIMUM WORKING PRESSURE AT 225 DEG F.

3. PIPE JOINT CONSTRUCTION
   - A. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.
   - B. SOLDERED JOINTS: APPLY ASTM B 813, WATER-FLUSHABLE FLUX, UNLESS OTHERWISE INDICATED, TO TUBE END. CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK," USING LEAD-FREE SOLDER ALLOY COMPLYING WITH ASTM B 32.
   - C. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER, USING COPPER-PHOSPHORUS BRAZING FILLER METAL COMPLYING WITH AWS A5.8.
   - D. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
     - D.1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS DRY SEAL THREADING IS SPECIFIED.
     - D.2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN WELDS.
   - G. WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12/D10.12M, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO PART 1 "QUALITY ASSURANCE" ARTICLE.

4. Y-PATTERN STRAINERS:
   - A. BODY: ASTM A 126, CLASS B, CAST IRON WITH BOLTED COVER AND BOTTOM DRAIN CONNECTION.
   - B. END CONNECTIONS: THREADED ENDS FOR NPS 2 AND SMALLER; FLANGED ENDS FOR NPS 2-1/2 AND LARGER.
   - C. STRAINER SCREEN: UP TO 3", 1/16" MESH, 4" AND ABOVE, 1/8" MESH STARTUP STRAINER, AND PERFORATED STAINLESS-STEEL BASKET WITH 50 PERCENT FREE AREA.
   - D. CWP RATING: 125 PSIG.

5. MANUAL AIR VENTS: MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AMTROL, INC., ARMSTRONG PUMPS, INC., BELL & GOSSETT DOMESTIC PUMP; A DIVISION OF ITT INDUSTRIES., TACO.
   - A. BODY: BRONZE., INTERNAL PARTS: NONFERROUS., OPERATOR: SCREWDRIVER OR THUMBSCREW., INLET CONNECTION: NPS 1/2., DISCHARGE CONNECTION: NPS 1/8., CWP RATING: 150 PSIG., MAXIMUM OPERATING TEMPERATURE: 225 DEG F.

7. AUTOMATIC AIR VENTS: MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: AMTROL, INC., ARMSTRONG PUMPS, INC., BELL & GOSSETT DOMESTIC PUMP; A DIVISION OF ITT INDUSTRIES., TACO.
   - A. BODY: BRONZE OR CAST IRON., INTERNAL PARTS: NONFERROUS., OPERATOR: NONCORROSIVE METAL FLOAT., INLET CONNECTION: NPS 1/2., DISCHARGE CONNECTION: NPS 1/4., CWP RATING: 150 PSIG., MAXIMUM OPERATING TEMPERATURE: 240 DEG F.

8. PIPE HANGERS:
   - A. INSTALL THE FOLLOWING PIPE ATTACHMENTS:
     - A.1. ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL PIPING LESS THAN 20 FEET LONG.
     - A.2. ADJUSTABLE ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL PIPING 20 FEET OR LONGER.
     - A.3. PIPE ROLLER: MSS SP-58, TYPE 44 FOR MULTIPLE HORIZONTAL PIPING 20 FEET OR LONGER, SUPPORTED ON A TRAPEZE.
     - A.4. SPRING HANGERS TO SUPPORT VERTICAL RUNS.
     - A.5. PROVIDE COPPER-CLAD HANGERS AND SUPPORTS FOR HANGERS AND SUPPORTS IN DIRECT CONTACT WITH COPPER PIPE.
   - B. INSTALL HANGERS FOR STEEL PIPING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
     - B.1. NPS 3/4: MAXIMUM SPAN, 7 FEET; MINIMUM ROD SIZE, 1/4 INCH.
     - B.2. NPS 1: MAXIMUM SPAN, 7 FEET; MINIMUM ROD SIZE, 1/4 INCH.
     - B.3. NPS 1-1/2: MAXIMUM SPAN, 9 FEET; MINIMUM ROD SIZE, 3/8 INCH.
   - C. INSTALL HANGERS FOR DRAWN-TEMPER COPPER PIPING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
     - C.1. NPS 3/4: MAXIMUM SPAN, 5 FEET; MINIMUM ROD SIZE, 1/4 INCH.
     - C.2. NPS 1: MAXIMUM SPAN, 6 FEET; MINIMUM ROD SIZE, 1/4 INCH.
     - C.3. NPS 1-1/2: MAXIMUM SPAN, 9 FEET; MINIMUM ROD SIZE, 3/8 INCH.
     - C.4. NPS 2: MAXIMUM SPAN, 8 FEET; MINIMUM ROD SIZE, 3/8 INCH.

GENERAL DUTY VALVES

1. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN.
2. LOCATE VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.
3. INSTALL VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE.
4. INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.
5. INSTALL CHECK VALVES FOR PROPER DIRECTION OF FLOW AND AS FOLLOWS:
6. INSTALL SWING CHECK VALVES: IN HORIZONTAL POSITION WITH HINGE PIN LEVEL., CENTER-GUIDED AND PLATE-TYPE CHECK VALVES: IN HORIZONTAL OR VERTICAL POSITION, BETWEEN FLANGES. , LIFT CHECK VALVES: WITH STEM UPRIGHT AND PLUMB.
7. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS, IF VALVE APPLICATIONS ARE NOT INDICATED, USE THE FOLLOWING:
   - A. SHUTOFF SERVICE: FULL PORT BALL, BUTTERFLY, GATE, OR PLUG VALVES.
   - B. BALANCING VALVE: USE BELL & GOSSETT CIRCUIT SETTER OR APPROVED EQUAL.
   - C. BUTTERFLY VALVE DEAD-END SERVICE: SINGLE-FLANGE (LUG) TYPE.
   - D. THROTTLING SERVICE EXCEPT STEAM: GLOBE OR ANGLE, REGULAR PORT BALL, OR BUTTERFLY VALVES.
   - E. THROTTLING SERVICE, STEAM: GLOBE OR ANGLE OR BUTTERFLY VALVES.
   - F. PUMP-DISCHARGE CHECK VALVES:
     - F.1. NPS 2 AND SMALLER: BRONZE SWING CHECK VALVES WITH BRONZE DISC.
     - F.2. NPS 2-1/2 AND LARGER: IRON SWING CHECK VALVES WITH LEVER AND WEIGHT OR WITH SPRING OR IRON, CENTER-GUIDED, METAL-SEAT CHECK VALVES.
   - G. IF VALVES WITH SPECIFIED SWP CLASSES OR CWP RATINGS ARE NOT AVAILABLE, THE SAME TYPES OF VALVES WITH HIGHER SWP CLASSES OR CWP RATINGS MAY BE SUBSTITUTED.
   - H. SELECT VALVES, EXCEPT WAFER TYPES, WITH THE FOLLOWING END CONNECTIONS:
     - H.1. FOR COPPER TUBING, NPS 2 AND SMALLER: THREADED ENDS EXCEPT WHERE SOLDER-JOINT VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
     - H.2. FOR COPPER TUBING, NPS 2-1/2 TO NPS 4: FLANGED ENDS EXCEPT WHERE THREADED VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
     - H.3. FOR COPPER TUBING, NPS 5 AND LARGER: FLANGED ENDS.
     - H.4. FOR STEEL PIPING, NPS 2 AND SMALLER: THREADED ENDS.
     - H.5. FOR STEEL PIPING, NPS 2-1/2 TO NPS 4: FLANGED ENDS EXCEPT WHERE THREADED VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.
     - H.6. FOR STEEL PIPING, NPS 5 AND LARGER: FLANGED ENDS.

CONTROL VALVES

1. PROVIDE FACTORY FABRICATED CONTROL VALVE OF TYPE, BODY MATERIAL AND PRESSURE CLASS REQUIRED FOR MAXIMUM PRESSURE AND TEMPERATURE RATING OF PIPING SYSTEM.

2. PROVIDE VALVES WHICH MATE AND MATCH MATERIAL OF CONNECTING PIPE UNLESS OTHERWISE INDICATED.

3. EQUIP VALVES WITH CONTROL MOTORS AND PROPER SHUT-OFF RATING FOR EACH INDIVIDUAL APPLICATION. CONTROL MOTORS TO BE 24 VOLT OR 120 VOLT AS SUITS THE APPLICATION.

PIPE INSULATION

1. REFER TO "HVAC PIPING/TUBING INSULATION" FOR APPLICTIONS & VALUES.
2. COMPLY WITH THE REQUIREMENTS OF THE INTERNATIONAL ENERGY CONSERVATION CODE 2006.
3. PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.
4. ACCEPTABLE MANUFACTURERS INCLUDE: CERTAINTEED CORP.; COMMERCIAL BOARD., FIBREX INSULATIONS INC.; FBX., JOHNS MANVILLE; 800 SERIES SPIN-GLAS., KNAUF INSULATION; INSULATION BOARD., MANSON INSULATION INC.; AK BOARD., OWENS CORNING;, FIBERGLAS 700 SERIES.

COMPUTER ROOM AIR CONDITIONING

1. GENERAL
   - A. THE ENVIRONMENTAL CONTROL UNITS SHALL BE PROVIDED WITH A HIGH SENSIBLE COOLING SYSTEM, FACTORY ASSEMBLED, PIPED, WIRED, AND RUN TESTED PRIOR TO SHIPMENT AND DESIGNED FOR THE FOLLOWING AIR PATTERN:

2. CABINET AND FRAME
   - A. THE FRAME SHALL BE CONSTRUCTED OF 14 GAUGE WELDED TUBULAR STEEL AND COATED WITH A HEAVY CORROSION INHIBITING FINISH FOR LONG LIFE. ALL INTERNAL FANS SHALL BE OF HIGH-GRADE STEEL AND SHALL BE COATED AND SEALED FOR UTMOST PROTECTION AGAINST CORROSION. THE UNIT SHALL HAVE COMPLETE FRONT AND SIDE ACCESS BY MEANS OF HIGH QUALITY FURNITURE GRADE STEEL DOORS WITH HEAVY-DUTY HINGES. THE DOOR SHALL BE LINED WITH ONE INCH (1"), 1-1/2 POUND DENSITY FIBERGLASS INSULATION. EACH DOOR SHALL BE PROVIDED WITH SURE CLOSE LATCHES, WHICH SHALL BE QUICKLY REMOVABLE FOR EASY ACCESS AND A POLYURETHANE GASKET TO PREVENT AIR LEAKAGE. THE DOORS SHALL BE PAINTED TO MATCH OR CONTRAST WITH OTHER EQUIPMENT IN THE SPACE. BYPASS AIR SHALL BE PROVIDED AROUND THE COOLING COIL TO PREVENT SATURATED AIR FROM BEING DISTRIBUTED TO EQUIPMENT IN THE CONTROLLED SPACE. THE COOLING COIL SHALL SIT IN A STAINLESS STEEL DRAIN PAN.

3. ELECTRIC REHEAT
   - A. THE REHEAT SHALL BE OF THE FINNED ENCLOSED, SHEATH TYPE, FABRICATED OF STAINLESS STEEL CORE SHEATH WITH PLATED FINS TO WITHSTAND MOIST CONDITIONS. THE REHEAT SHALL BE INSTALLED ON THE AIR DISCHARGE SIDE OF THE COOLING COIL AND SHALL HAVE THREE (3) STAGES. EACH STAGE SHALL BE 5 KW. THE TOTAL KW SHALL BE 15 TO OPERATE ON A SUPPLY OF 460 VOLTS.

4. HUMIDIFIER
   - A. THE UNIT SHALL BE PROVIDED WITH STEAM GENERATOR TYPE HUMIDIFIER. THE STEAM GENERATING HUMIDIFIER SHALL BE SELF-CONTAINED WITH DISPOSABLE CYLINDER & ELECTRONIC CONTROLS.

5. WATER SENSOR
   - A. UNITS SHALL BE PROVIDED WITH ONE (1) WATER SENSOR. THE SOLID-STATE WATER SENSOR SHALL BE MOUNTED UNDER THE UNIT TO SENSE THE PRESENCE OF WATER. THE SENSOR SHALL BE CONNECTED TO THE MICROPROCESSOR PANEL AND ACTIVATE AN AUDIBLE ALARM. THE WATER DETECTOR SHALL BECOME AN INTEGRAL PART OF THE MICROPROCESSOR PANEL AND SHALL DISPLAY "WATER DETECTED IN UNDER FLOOR AREA" WHEN SENSOR IS ACTIVATED.

6. CONTROL PANEL
   - A. THE ENVIRONMENTAL CONTROL SYSTEM SHALL BE FURNISHED WITH A MICROPROCESSOR BASED DAPTM PANEL. THE PANEL SHALL INCLUDE UNIT CONTROL FUNCTIONS AND DISPLAY NORMAL FUNCTIONS AND SERVICE DIAGNOSTICS ON A BACKLIT LIQUID CRYSTAL DISPLAY (LCD). THE PANEL SHALL ALLOW RECALL AND DISPLAY OF THE HIGH AND LOW TEMPERATURE FOR THE LAST 24 HOURS, HIGH AND LOW HUMIDITY FOR THE LAST 24 HOURS, CURRENT PERCENT OF CAPACITY AND AVERAGE PERCENT OF CAPACITY FOR THE LAST HOUR OF OPERATION FOR COOL 1, COOL 2, REHEAT, HUMIDIFICATION, DEHUMIDIFICATION, COMPONENT RUNTIMES FOR FAN MOTOR(S), COOLING STAGES, REHEAT, HUMIDIFICATION, DEHUMIDIFICATION AND CHILLED WATER VALVE. PROGRAMMING SHALL HAVE MULTILEVEL PASSWORD ACCESS TO PREVENT UNAUTHORIZED ACCESS. PROGRAMMING SHALL BE ACCOMPLISHED ENTIRELY FROM THE FRONT OF THE UNIT WITHOUT THE NEED TO ACCESS, SET OR PROGRAM SWITCHES INSIDE THE UNIT (FRONT DOOR OF THE UNIT DOES NOT NEED TO BE OPENED). PROGRAMMABLE FUNCTIONS SHALL BE ENTERED ON FLASH MEMORY TO ENSURE PROGRAM RETENTION SHOULD POWER FAIL, THE HISTORICAL DATABASE SHALL BE MAINTAINED BY BATTERY BACKUP. MULTIPLE MESSAGES SHALL BE DISPLAYED BY AUTOMATICALLY SCROLLING FROM EACH MESSAGE TO THE NEXT. ALARM CONDITIONS SHALL BE DISPLAYED BY AUTOMATICALLY SCROLLING FROM EACH MESSAGE TO THE NEXT. ALARM CONDITIONS. IN ADDITION TO BEING DISPLAYED, SHALL ENUNCIATE AN AUDIBLE ALARM. FOUR PROGRAMMABLE SUMMARY CONTACTS SHALL BE AVAILABLE FOR REMOTE ALARM MONITORING. ADDITIONAL TEST OR SERVICE TERMINAL SHALL NOT BE REQUIRED FOR ANY FUNCTIONS. THE CONTROL SHALL INCLUDE TEMPERATURE ANTICIPATION, MOISTURE LEVEL HUMIDITY CONTROL AND AUTOMATIC FLUSH CYCLES.
   - B. AN ALARM CONDITION SHALL CONTINUE TO BE DISPLAYED UNTIL THE MALFUNCTION IS CORRECTED. MULTIPLE ALARMS SHALL BE DISPLAYED SEQUENTIALLY IN ORDER OF OCCURRENCE AND ONLY THOSE ALARMS, WHICH HAVE NOT BEEN ACKNOWLEDGED, SHALL CONTINUE TO SOUND AN AUDIBLE ALARM. THE DAP4 PANEL SHALL PERFORM AN AUTOMATIC SELF-TEST ON SYSTEM START-UP. A USER ACCESSIBLE DIAGNOSTIC PROGRAM SHALL AID IN SYSTEM COMPONENT TROUBLE SHOOTING BY DISPLAYING ON THE UNIT LCD SCREEN THE NAME OF THE CONTROLLED ITEM, OUTPUT RELAY NUMBER, TERMINAL PLUG AND PIN NUMBER FOR EACH CONTROLLED ITEM.
   - C. BUILDING MANAGEMENT SYSTEM INTERFACE: UNIT(S) SHALL BE FURNISHED WITH AN OPTIONAL INTERFACE CARD TO COMMUNICATE DIRECTLY WITH THE BUILDING AUTOMATION SYSTEM (BAS) THROUGH A RS-485, ETHERNET OR LONTALK PORT. ALL ALARMS, SET POINTS, AND OPERATING PARAMETERS THAT ARE ACCESSIBLE FROM THE UNIT MOUNTED CONTROL PANEL SHALL ALSO BE MADE AVAILABLE THROUGH THE BAS.

7. REMOTE TEMPERATURE AND HUMIDITY SENSORS
   - A. UNITS SHALL BE PROVIDED WITH REMOTE TEMPERATURE AND HUMIDITY SENSORS. SENSORS SHALL BE PROVIDED IN A PLASTIC CASE FOR REMOTE MOUNTING. 25 FEET OF SHIELDED CABLE SHALL BE PROVIDED FOR FIELD WIRING.

8. DISCONNECT
   - A. THE ENVIRONMENTAL CONTROL UNIT SHALL INCLUDE A NON-AUTOMATIC DISCONNECT SWITCH MOUNTED IN THE HIGH VOLTAGE SECTION OF THE ELECTRICAL PANEL. THE OPERATING MECHANISM SHALL PREVENT ACCESS TO THE HIGH VOLTAGE ELECTRICAL COMPONENTS UNTIL SWITCHED TO THE "OFF" POSITION. THE OPERATING MECHANISM SHALL PROTRUDE THROUGH THE DECORATIVE DOOR.

9. SMOKE DETECTOR
   - A. THE ENVIRONMENTAL CONTROL UNIT SHALL BE PROVIDED WITH A SMOKE DETECTOR. THE SMOKE DETECTOR SHALL BE MOUNTED WITH A SENSING ELEMENT IN THE RETURN AIR STREAM. WHEN THE SMOKE DETECTOR IS ACTIVATED, IT SHALL IMMEDIATELY SHUT DOWN THE UNIT.

10. UPFLOW PLENUM
   - A. UNITS WITH TOP (UPFLOW) DISCHARGE SHALL BE PROVIDED WITH A PLENUM. THE PLENUM SHALL HAVE A FRONT DISCHARGE AIR GRILLE AND BE FULLY INSULATED WITH ONE INCH (1") THICK, 1-1/2 POUND DENSITY INSULATION COATED WITH NEOPRENE. THE PLENUM HEIGHT SHALL BE 18 INCHES AND SHALL BE PAINTED TO MATCH THE UNIT COLOR.

11. CONDENSATE PUMP
   - A. EACH UNIT SHALL BE PROVIDED WITH A UNIT MOUNTED AND WIRED CONDENSATE PUMP. THE CONDENSATE PUMP SHALL BE COMPLETE WITH SUMP, MOTOR, AND AUTOMATIC CONTROL.

12. EXTENDED COMPRESSOR WARRANTY - 4YEAR
   - A. IN ADDITION TO THE MANUFACTURER'S STANDARD COMPRESSOR WARRANTY, THE COMPRESSORS SHALL BE PROVIDED WITH AN EXTENDED WARRANTY FOR A PERIOD OF FOUR (4) YEARS. THE WARRANTY SHALL BE FOR REPLACEMENT OF COMPRESSORS ONLY (LABOR IS NOT INCLUDED).

VIBRATION ISOLATION & SEISMIC CONTROL

1. PROVIDE VIBRATION ISOLATION DEVICES FOR ALL MECHANICAL EQUIPMENT FURNISHED UNDER THIS SECTION AS SUITS THE APPLICATION. REFER TO "HVAC VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE"

TEMPORARY OPENINGS

1. ALL TEMPORARY OPENINGS CUT IN WALLS, FLOORS OR CEILINGS FOR PIPE OR DUCTWORK SHALL BE CLOSED OFF WITH TRANSITE OR AN EQUALLY NON-COMBUSTIBLE MATERIAL EXCEPT WHEN MECHANICS ARE ACTUALLY WORKING AT THE PARTICULAR OPENING.

SHUTDOWN OF EXISTING BUILDING SYSTEMS

1. DO NOT INTERRUPT EXISTING SERVICES OR SYSTEMS IN THE BUILDING UNLESS ABSOLUTELY NECESSARY. SUCH INTERRUPTIONS AND INTERFERENCES MUST BE MADE AS BRIEF AS POSSIBLE AND ONLY AFTER COORDINATION WITH THE OWNER. THE OWNER REQUIRES A MINIMUM OF SEVEN (7) DAYS NOTICE. OBTAIN PRIOR PERMISSION, IN WRITING.

2. WHERE THE WORK MAKES TEMPORARY INTERRUPTIONS UNAVOIDABLE, THEY SHALL BE MADE DURING OFF HOURS OR AS OTHERWISE DIRECTED BY THE OWNER.

3. ARRANGE TO WORK CONTINUOUSLY, INCLUDING OVERTIME, IF REQUIRED. TO ASSURE THAT SYSTEMS WILL SHUT DOWN ONLY DURING THE TIME ACTUALLY REQUIRED TO MAKE THE NECESSARY CONNECTIONS TO EXISTING WORK.

ELECTRICAL WORK

1. ELECTRICAL POWER SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.

2. CONTROL WIRING SHALL BE BY THE HVAC CONTRACTOR. CONTROL WIRING SHALL BE DEFINED AS ANY 12V, 24V OR 120V WIRING INSTALLED FOR PURPOSED OTHER THAN PROVIDING PRIMARY ELECTRICAL POWER TO EQUIPMENT.

3. MOTOR STARTERS SHALL BE FURNISHED BY THE HVAC CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

EXECUTION

1. THE PLANS AND SPECIFICATIONS ARE INTENDED TO PROVIDE A GENERAL SCOPE OF WORK.

2. WORK COORDINATION AND JOB OPERATIONS: THE MECHANICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES, PROVIDING TIMELY INFORMATION ON HIS NEEDS AND RESPOND IN A TIMELY MANNER TO REQUESTS BY OTHERS.

3. MATERIALS AND WORKMANSHIP: ALL MATERIALS SHALL BE NEW AND WITHOUT DAMAGED PARTS. ALL WORK SHALL BE ACCOMPLISHED BY WORKMEN TRAINED IN THAT PARTICULAR FUNCTION OR TASK.

4. PROTECTION AND CLEANUP: ALL MATERIALS SHALL BE SUITABLY STORED DURING CONSTRUCTION TO PREVENT DAMAGE AND/OR DETERIORATION. KEEP THE SITE CLEAN OF DEBRIS DUE TO THESE OPERATIONS. CAPISEAL OR OTHERWISE PROTECT PIPING AND DUCTWORK FROM FOREIGN MATERIAL DURING CONSTRUCTION. AIR FILTERS UPSTREAM OF COILS SHALL BE CHANGED REGULARLY TO PREVENT BUILDUP OF MATERIAL ON COIL. FILTERS SHALL BE CHANGED AT LEAST WEEKLY OR WHEN FULLY LOADED.

5. SYSTEM STARTUP AND OPERATION: PROVIDE ALL LABOR, MATERIALS, AND EQUIPMENT TO PLACE THE HVAC SYSTEMS INTO OPERATION. MAINTAIN OPERATION DURING BALANCING AND INSTRUCTION PERIODS. INSURE ALL EQUIPMENT IS RUNNING PROPERLY WITH PROPER LUBRICATION. WITHOUT EXCESSIVE VIBRATION, AND PROPER ELECTRICAL CHARACTERISTICS. PROVIDE OWNER WITH ANY MANUALS, AIR BALANCE REPORTS PRODUCT MAINTENANCE SPECIFICATIONS, BROCHURES AND/OR DRAWINGS NEEDED FOR THE OPERATION AND MAINTENANCE OF NEW EQUIPMENT.

WARRANTY

1. THE CONTRACTOR SHALL WARRANTY ALL WORK FOR A PERIOD OF 12 MONTHS FROM ACCEPTANCE BY OWNER. DURING THIS WARRANTY PERIOD, CONTRACTOR SHALL RESPOND TO ALL CALLS FOR SERVICE, REPAIRS AND ADJUSTMENTS REQUIRED BY OWNER. CONTRACTOR SHALL INSTALL REPLACEMENT PARTS AND MATERIAL REQUIRED AT NO COST TO THE OWNER. ALL EQUIPMENT WARRANTIES SHALL BE TRANSFERRED TO OWNER AND SERVICED BY CONTRACTOR AS PART OF THIS CONTRACT.

HVAC INSTRUMENTATION & CONTROLS

1. QUALITY ASSURANCE
   - A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
   - B. COMPLY WITH ASHRAE 135 FOR DDC SYSTEM COMPONENTS.

3 COORDINATION
   - A. COORDINATE LOCATION OF THERMOSTATS, HUMIDISTATS, AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION.
   - B. COORDINATE EQUIPMENT WITH DIVISION 16 TO ACHIEVE COMPATIBILITY WITH EQUIPMENT THAT INTERFACES WITH THE LIGHTING SYSTEM.
   - C. COORDINATE EQUIPMENT WITH DIVISION 13 TO ACHIEVE COMPATIBILITY WITH EQUIPMENT THAT INTERFACES WITH THE FIRE ALARM SYSTEM.
   - D. COORDINATE SUPPLY OF CONDITIONED ELECTRICAL BRANCH CIRCUITS FOR CONTROL UNITS AND OPERATOR WORKSTATION.
   - E. COORDINATE EQUIPMENT WITH DIVISION 16 TO ACHIEVE COMPATIBILITY WITH STARTER COILS AND ANNUNCIATION DEVICES IN PANEL BOARDS.

MANUFACTURER:

1. JOHNSON CONTROLS., NO EXCEPTIONS
   - F. CONTROL SYSTEM SHALL CONSIST OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, OTHER APPARATUS, ACCESSORIES, AND SOFTWARE CONNECTED TO DISTRIBUTED CONTROLLERS OPERATING IN MULTIUSER, MULTITASKING ENVIRONMENT ON TOKEN-PASSING NETWORK AND PROGRAMMED TO CONTROL MECHANICAL SYSTEMS. AN OPERATOR WORKSTATION PERMITS INTERFACE WITH THE NETWORK VIA DYNAMIC COLOR GRAPHICS WITH EACH MECHANICAL SYSTEM, BUILDING FLOOR PLAN, AND CONTROL DEVICE DEPICTED BY POINT-AND-CLICK GRAPHICS.

SEQUENCE OF OPERATION:

1. SEQUENCE OF OPERATION - FAN COILS
   - A. FAN COIL UNITS OPERATION SHALL BE STARTED REMOTELY THROUGH THE DDC SYSTEM IN ACCORDANCE WITH THE PRE-DETERMINED OPERATING SCHEDULE.
   - B. ON A CALL FOR COOLING AS SENSED BY THE WALL MOUNTED TEMPERATURE SENSOR, THE BMS SHALL SEQUENCE FAN SPEED, COOLING COIL AND HEATING COIL CONTROL VALVES TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

2. SEQUENCE OF OPERATION - LEAK DETECTOR MONITORING
   - A. THE DDC SYSTEM SHALL MONITOR THE WATER LEAK DETECTOR(S) LOCATED IN ALL AUXILIARY DRAIN PANS.
   - B. UPON WATER DETECTION, AN ALARM SHALL BE INITIATED AT THE BMS, THE ASSOCIATED FAN COIL UNIT SHALL BE SHUT DOWN AND THE HOT WATER AND CHILLED WATER CONTROL VALVES SHALL BE CLOSED.

3. SEQUENCE OF OPERATION - SERVER ROOM
   - A. SPACE AIR CONDITIONING UNITS SHALL BE STARTED LOCALLY THROUGH UNIT SUPPLIED THERMOSTATS AND CONTROLS TO MAINTAIN SPACE SETPOINT. UNITS CONTROLS SHALL SEQUENCE EVAPORATOR FAN AND REFRIGERATION CYCLE TO MAINTAIN SPACE SETPOINT.
   - B. CRAC-2, CRAC-3 & CRAC-4 SHALL BE INTERLOCKED.
   - C. CRAC-2, CRAC-3 & CRAC-4 SHALL BE SEQUENCED BASED ON SPACE TEMPERATURE. CRAC-3/4 SHALL OPERATE IN LEAD/LAG FASHION & CRAC-2 SHALL ENERGIZE AS FIRST STAGE OF COOLING. UPON CALL FOR ADDITIONAL COOLING CRAC-3/4 SHALL ENERGIZE AND STAGE ADDITIONAL COMPRESSOR/CONDENSOR FANS BASED ON COOLING DEMAND. BMS SHALL MONITOR RUNTIME.
   - D. THE BMS SYSTEM SHALL MONITOR EACH CRAC UNIT RUNTIME. WHEN A CRAC UNIT HAS OPERATED FOR AN OWNER DEFINED TIME PERIOD, THE OPERATOR'S WORKSTATION SHALL NOTIFY MAINTENANCE PERSONNEL THAT SERVICE/INSPECTION IS REQUIRED.
   - E. BAS SHALL MONITOR SPACE TEMPERATURE/HUMIDITY OF EACH ROOM. REPORT AN ALARM IF SPACE TEMPERATURE/HUMIDITY RISES 3 F OR 3% RESPECTIVELY ABOVE SETPOINT (72 F ADJ.).

NO.	DATE	REVISION

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CLIENT

WESTERN CONNECTICUT STATE UNIVERSITY
VISIUAL AND PERFORMING ARTS CENTER
DANBURY, CONNECTICUT

PROJECT

SERVER ROOM COOLING

TITLE

SPECIFICATIONS - MECHANICAL

DRAWN BY:	FMD	DRAWING
CHECKED BY:	KR	M4.01
SCALE:	NOT TO SCALE	
DATE:	08/01/14	

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