

GENERAL

- 1. WHEN A CONFLICT BETWEEN THE DRAWINGS, NOTES AND/OR SPECIFICATIONS OCCUR, THE MORE STRINGENT, AND/OR LARGER QUANTITY AND/OR MORE EXPENSIVE SHALL APPLY. THE REQUIREMENTS LISTED WITHIN NOTES OR SPECIFICATIONS SHALL BE REQUIRED, PROVIDED AND INSTALLED WHETHER SPECIFICALLY INDICATED ON THE DRAWINGS OR NOT.
2. IT IS THE INTENTION OF THE SPECIFICATIONS AND DRAWINGS TO PROVIDE FOR FINISHED WORK, TESTED AND READY FOR OPERATION.
3. ITEMS AND SERVICES NOT SHOWN ON DRAWINGS OR SPECIFICATIONS BUT REQUIRED TO RENDER THE WORK COMPLETE AND READY FOR OPERATION, SHALL BE PROVIDED WITHOUT ADDITIONAL COST.
4. WORK OF THIS SECTION SHALL BE GOVERNED BY THE CONTRACT DOCUMENTS. PROVIDE MATERIALS, LABOR, EQUIPMENT AND SERVICES NECESSARY TO FURNISH, DELIVER AND INSTALL ALL WORK AS SPECIFIED AND AS REQUIRED BY JOB CONDITIONS. WHERE A CONFLICT EXISTS BETWEEN THESE NOTES, THE DRAWINGS AND THE SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
5. DRAWINGS ARE DIAGRAMMATIC AND INDICATE A GENERAL ARRANGEMENT OF WORK AND ARE NOT TO BE CONSIDERED SUB-CONTRACTOR DOCUMENTS. IT IS THE INTENT OF THESE DOCUMENTS TO INCLUDE THE PROVISION AND INSTALLATION OF ALL NECESSARY WORK AND MATERIALS FOR COMPLETE, OPERATIONAL AND CODE COMPLIANT SYSTEMS BY THE CONTRACTOR. GENERAL DESIGN CONCEPTS INDICATED MUST BE FOLLOWED OR BETTERED. THE BID SHALL INCLUDE OFFSETS, HANGERS, INSERTS, ADDITIONAL PIPING, VALVES AND EQUIPMENT AND COMPONENTS AS REQUIRED TO MEET CONSTRUCTION CONDITIONS FOR PROPER OPERATION. ALL MATERIAL, WORK, INCIDENTAL ACCESSORIES OR OTHER DETAILS NOT SHOWN BUT NECESSARY TO MAKE THE WORK COMPLETE AND PERFECT, AND IN ALL RESPECTS READY FOR OPERATION, EVEN IF NOT PARTICULARLY SPECIFIED, SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER. DO NOT SCALE DRAWINGS. CONSULT ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR SPACE CONDITIONS AND ADDITIONAL REQUIREMENTS.
6. IF ANY ERRORS, OMISSIONS OR DISCREPANCIES APPEAR IN THE DRAWINGS, SPECIFICATIONS OR OTHER DOCUMENTS, THE CONTRACTOR SHALL WITHIN TEN (10) DAYS AFTER RECEIVING SUCH DOCUMENTS NOTIFY THE ARCHITECT IN WRITING OF SUCH OMISSIONS OR ERRORS. IN THE EVENT OF THE CONTRACTOR'S FAILURE TO GIVE SUCH NOTICE, ERRORS OR OMISSIONS, THE COST OF RECTIFYING SAME, SHALL BE BORNE BY THIS CONTRACTOR.
7. PERFORM THE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT GENERAL CONDITIONS AND WITH THE PROVISIONS OF ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES AND LAWS.
8. WORK SHALL INCLUDE ALL INCIDENTALS, LABOR, MATERIAL, EQUIPMENT, APPLIANCES, SERVICES, HOISTING, SCAFFOLDING, SUPPORTS, TOOLS, CONSUMABLE ITEMS, FEES, LICENSES, AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE WORK SHOWN ON THE DRAWINGS, SPECIFIED HEREIN AND AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM.
9. INSTALL WORK IN A NEAT WORKMANLIKE MANNER READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR.
10. STORE MATERIALS INSIDE AND PROTECTED FROM DEBRIS, WEATHER AND MOISTURE.
11. THIS CONTRACTOR SHALL PROVIDE AND INSTALL ALL POWER AND CONTROL WIRING REQUIRED FOR EQUIPMENT OPERATION NOT SPECIFICALLY PROVIDED BY OTHERS BUT REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. THIS CONTRACTOR SHALL PROVIDE MOTOR STARTERS. COORDINATE REQUIREMENTS WITH DIVISION 26.
12. PRIOR TO SUBMISSION OF HIS BID, THIS CONTRACTOR SHALL VISIT THE JOB SITE TO ASCERTAIN THE ACTUAL FIELD CONDITIONS AS THEY RELATE TO THE WORK AS INDICATED ON THE DRAWINGS AND DESCRIBED HEREIN. DISCREPANCIES, IF ANY, SHALL BE BROUGHT TO THE ARCHITECT'S AND ENGINEER'S ATTENTION PRIOR TO SUBMISSION OF HIS BID, AND IF NOT RESOLVED TO HIS SATISFACTION, SHALL BE A WRITTEN EXAMINATION OF HIS BID. THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED FOR DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE, WILL NOT BE RECOGNIZED.
13. PRIOR TO SUBMISSION OF HIS FORMAL BID, THIS CONTRACTOR SHALL REVIEW ALL DRAWINGS OF THE ENTIRE PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ELECTRICAL, MECHANICAL, PLUMBING, AND HE SHALL NOTIFY THE PROJECT COORDINATOR OF WORK REQUIRED IN HIS BID WHICH IS INDICATED OR IMPLIED IN OTHER SECTIONS OF THE WORK.
14. REFER TO PROJECT GENERAL CONDITIONS FOR WARRANTY AND GUARANTEE REQUIREMENTS. IN THE ABSENCE OF SAME, CONTRACTOR SHALL PROVIDE GUARANTEE OF ONE YEAR ON WORKMANSHIP AND MATERIALS FROM DATE OF OWNER ACCEPTANCE.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TOTAL COORDINATION BETWEEN THE DIFFERENT DIVISIONS OF THE CONTRACT. ITEMS FURNISHED UNDER ONE DIVISION AND REQUIRING WORK UNDER ANOTHER DIVISION IS PART OF THE CONTRACT AND NO ALLOWANCE WILL BE GIVEN TO THE CONTRACTOR'S CLAIM FOR EXTRA WORK.

ALTERATION WORK AND DEMOLITION

- 1. ALL EQUIPMENT, DUCTWORK, PIPING, CONTROL DEVICES, ETC. TO BE REMOVED, SHALL BE DISPOSED OF, TURNED OVER TO THE OWNER, OR SALVAGED AS DIRECTED BY THE OWNER. EQUIPMENT, DUCTWORK, PIPING, CONTROL DEVICES, ETC. SHALL NOT BE REMOVED FROM THE PREMISES WITHOUT THE OWNER'S APPROVAL.
2. UPON COMPLETION OF REMOVALS AND MODIFICATIONS, ALL DUCTWORK PIPING TO REMAIN SHALL BE PROPERLY PLUGGED, VALVED, CAPPED AND/OR BY PASSED SUCH THAT UPON COMPLETION OF WORK ALL SYSTEMS TO REMAIN, REMAIN OPERATIONAL.
3. NO DEAD ENDS SHALL BE LEFT ON ANY DUCTWORK PIPING SYSTEMS UPON COMPLETION OF WORK.
4. EXISTING EXPOSED PIPING SYSTEMS NOT TO BE REUSED, AND NOT SPECIFICALLY NOTED FOR REMOVAL SHALL BE COMPLETELY REMOVED.
5. ALL SYSTEMS SHALL BE LEFT IN WORKING ORDER TO THE SATISFACTION OF THE OWNER UPON COMPLETION OF ALL NEW WORK.
6. ALL EXISTING EXPOSED, UNNECESSARY DUCTWORK AND PIPING NOT RELATED TO NEW WORK SHALL BE COMPLETELY REMOVED.
7. RE-ROUTE OR REMOVE ALL EXISTING DUCTWORK, PIPING AND SYSTEMS WHERE NECESSARY TO AVOID NEW EQUIPMENT, STRUCTURAL, OR MASONRY WORK AS REQUIRED BY THE PROPOSED ALTERATIONS.
8. WHERE PORTIONS OF EXISTING DUCT SYSTEMS ARE TO REMAIN CONTRACTOR TO TAKE AIRFLOW READINGS AT ALL AIR TERMINALS ASSOCIATED WITH THE DUCT SYSTEM TO BE MODIFIED BEFORE COMMENCEMENT OF WORK AND AFTER ALTERATION WORK IS COMPLETE. AIR BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT NEEB CERTIFIED COMPANY, NOT ASSOCIATED WITH THE CONTRACTOR. REPORTS ARE TO BE ISSUED TO THE OWNER AND ENGINEER AT BOTH OCCURRENCES. IF AS BUILTS ARE AVAILABLE, DISCREPANCIES NOTED BETWEEN THE AS BUILT DRAWINGS AND THE INITIAL AIR FLOW READINGS ARE TO BE NOTED ON THE AIR FLOW REPORT. EXISTING AIR TERMINALS ARE TO BE BALANCED TO THE ORIGINAL READINGS AT COMPLETION OF WORK UNLESS OTHERWISE IDENTIFIED.

SHOP DRAWINGS

- 1. SUBMIT COORDINATED SCALE DRAWINGS OF EQUIPMENT INCLUDING INTERCONNECTING PIPING AND DUCTWORK. COORDINATE SPACE REQUIREMENTS FOR EQUIPMENT AND SERVICES, INCLUDE CONNECTIONS, ANCHORAGES AND FASTENINGS. MAKE ALLOWANCE FOR CLEARANCES FOR ACCESS TO AND MAINTENANCE OF EQUIPMENT
2. SUBMIT CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAMS. SUBMIT FOUR (4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE, ALL EQUIPMENT, DUCT SHOP STANDARDS INCLUDING DUCT ACCESSORIES, PIPING, VALVES, FITTINGS, TEMPERATURE CONTROLS, SEISMIC DEVICES, ANCHORING DEVICES, ETC.

COORDINATION DRAWINGS

- 1. DEVELOP AND SUBMIT COORDINATION DRAWINGS AS OUTLINED.
A. SHEET METAL, PLUMBING AND FIRE PROTECTION SHOP DRAWINGS THAT HAVE BEEN COORDINATED WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW. DRAWINGS MUST BE RETURNED FROM ENGINEER EITHER "REVIEWED" OR "FURNISH AS CORRECTED" PRIOR TO BEING USED AS BASIS FOR COORDINATION DRAWINGS. PRIOR TO THE SUBMISSION AND REVIEW OF SHEET METAL SHOP DRAWINGS, THE CONTRACTOR SHALL SUBMIT FOR REVIEW SHEET METAL SHOP STANDARDS. ANY SHEET METAL SHOP DRAWINGS SUBMITTED PRIOR TO THE SUBMISSION OF THE SHOP STANDARDS SHALL BE RETURNED "NOT REVIEWED".
B. AFTER SHEET METAL AND PIPING DRAWINGS HAVE BEEN REVISED PER ENGINEERS COMMENTS, REPRODUCIBLE COPIES SHALL BE SENT TO THE OTHER TRADES IN THE FOLLOWING SEQUENCE FOR THE INCLUSION OF THEIR WORK:
-MECHANICAL SHEET METAL
-PLUMBING CONTRACTOR
-ELECTRICAL WORK
-MECHANICAL PIPING
-SPRINKLER PIPING

- 2. AFTER ALL TRADES HAVE INCLUDED THEIR WORK ON THE COORDINATION DRAWING AND NOTED CONFLICTS, ALL TRADES SHALL MEET TO RESOLVE CONFLICTS AND AGREE TO ACCEPTABLE SOLUTIONS. EACH TRADE SHALL SIGN COORDINATION DRAWINGS. ITEMS NOT SHOWN ON COORDINATION DRAWING IS RESPONSIBILITY OF OMITTING CONTRACTOR AND CONTRACTOR IS SUBJECT TO ADDITIONAL COSTS INCURRED BY OTHER TRADES.
3. THE ARCHITECT AND ENGINEER ARE NOT PART OF THE COORDINATION DRAWING PROCESS. THE ENGINEER WILL PROVIDE ASSISTANCE FOR NOTED CONFLICTS ONLY. COORDINATION DRAWINGS ARE NOT TO BE CONSIDERED PIPING OR DUCT SHOP DRAWINGS. THE CONTRACTOR IS REQUIRED TO SUBMIT PIPING AND DUCTWORK SHOP DRAWINGS FOR REVIEW BY THE ENGINEER. PIPING AND DUCTWORK SHOP DRAWINGS SHALL FOLLOW THE DESIGN INTENT OF THE CONTRACT DOCUMENTS.
4. SUBMIT FINAL SIGNED COORDINATION DRAWING TO ENGINEER FOR REVIEW. ENGINEER WILL REVIEW FOR ACCEPTABILITY OF INSTALLATIONS.
5. ANY WORK FABRICATED OR INSTALLED PRIOR TO SIGN OFF BY ALL TRADES SHALL BE REMOVED AND RE-INSTALLED IN CONFORMANCE WITH COORDINATION DRAWINGS.
6. EACH CONTRACTOR (MENTIONED ABOVE) IS RESPONSIBLE FOR THE COORDINATION OF HIS SUB-CONTRACTORS.
7. THE OVERALL COORDINATION OF THE COORDINATION PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR. THE ENGINEER IS NOT RESPONSIBLE FOR THE COORDINATION PROCESS. THE ENGINEER WILL RESPOND TO QUESTIONS THAT ARISE FROM THE COORDINATION PROCESS. DRAWINGS SUBMITTED WILL BE REVIEWED FOR CLEARLY IDENTIFIED CONFLICTS ONLY. SOLUTIONS TO CONFLICTS WILL NOT BEAR ADDITIONAL COST.

AS BUILT DRAWINGS

- 1. PROVIDE A COMPLETE SET OF AS-BUILT DRAWINGS REFLECTING AS INSTALLED CONDITIONS. AS-BUILT DRAWINGS SHALL INDICATE ALL INSTALLED CONDITIONS OF SYSTEMS WITHIN THIS DISCIPLINE. DRAWINGS SHALL BE OF SIMILAR QUALITY AS THE CONSTRUCTION DOCUMENTS AND INCLUDE DETAILS AS NECESSARY TO CLEARLY REFLECT THE INSTALLED CONDITION. DRAWINGS SHALL BE BOUND IN A COMPLETE AND CONSECUTIVE SET. SUPPLEMENTAL SKETCHES AND LOOSE PAPERWORK WILL NOT BE ACCEPTABLE AND WILL BE RETURNED FOR REVISION. THE CONTRACTOR SHALL COMPLY WITH THE ENGINEERS COMMENTS TO PRODUCE A CLEAR AND CONCISE SET OF DRAWINGS. DRAWINGS SHALL BE SUBMITTED IN BOTH HARD COPY AND ELECTRONIC (AUTO-CAD VERSION AS REQUIRED BY THE OWNER) VERSION. NUMBER OF COPIES OF EACH AS REQUESTED BY THE OWNER.
2. PROVIDE "AS-BUILT DRAWINGS" INDICATING IN A NEAT AND ACCURATE MANNER A COMPLETE RECORD OF ALL REVISIONS OF THE ORIGINAL DESIGN OF THE WORK. INDICATE THE FOLLOWING INSTALLED CONDITIONS:
3. INCLUDE ALL CHANGES AND AN ACCURATE RECORD, ON REPRODUCTIONS OF THE CONTRACT DRAWINGS OR APPROPRIATE SHOP DRAWINGS, OF ALL DEVIATIONS, BETWEEN THE WORK SHOWN AND WORK INSTALLED.
4. MAINS AND BRANCHES OF PIPING SYSTEMS, WITH VALVES AND CONTROL DEVICES LOCATED AND NUMBERED, CONCEALED UNIONS LOCATED, AND WITH ITEMS REQUIRING MAINTENANCE LOCATED (IE., TRAPS, STRAINERS, EXPANSION COMPENSATORS, TANKS, ETC.). VALVE LOCATION DIAGRAMS, COMPLETE WITH VALVE TAG CHART.
5. EQUIPMENT LOCATIONS (EXPOSED AND CONCEALED), DIMENSIONED FROM PROMINENT BUILDING LINES.
6. APPROVED SUBSTITUTIONS, CONTRACT MODIFICATIONS, AND ACTUAL EQUIPMENT AND MATERIALS INSTALLED.
7. CONTRACT MODIFICATIONS, ACTUAL EQUIPMENT AND MATERIALS INSTALLED.
8. SUBMIT FOR REVIEW BOUND SETS OF THE REQUIRED DRAWINGS, MANUALS AND OPERATING INSTRUCTIONS.
9. SUBMIT A COMPLETE MAINTENANCE MANUAL OF ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT.

HANGERS AND SUPPORT

- 1. SEISMIC RESTRAINT: PROVIDE SEISMIC RESTRAINT AND EXPANSION OF ALL MECHANICAL EQUIPMENT AND SYSTEMS IN ACCORDANCE WITH STATE AND FEDERAL BUILDING CODE REQUIREMENTS. SUBMIT SHOP DRAWINGS SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT INDICATING ALL NECESSARY COMPONENT CUTS, PLAN LOCATIONS AND CALCULATIONS FOR A COMPLETE SYSTEM.
2. PROVIDE ALL NECESSARY STRUCTURAL MEMBERS INCLUDING ADDITIONAL STRUCTURAL SUPPORT TO SUPPORT PIPING AND EQUIPMENT. HANGERS AND SUPPORTS SHALL BE OF AN APPROVED DESIGN NECESSARY TO SUPPORT DUCTWORK, PIPING, EQUIPMENT AND TO KEEP IN PROPER ALIGNMENT AND PREVENT TRANSMISSION OF INJURIOUS THRUSTS AND VIBRATIONS. IN ALL CASES WHERE HANGERS, BRACKETS, ETC. ARE SUPPORTED FROM CONCRETE CONSTRUCTION, DO NOT WEAKEN CONCRETE OR PENETRATE WATERPROOFING. ALL HANGERS AND SUPPORTS SHALL BE CAPABLE OF SCREW ADJUSTMENT AFTER PIPING IS ERRECTED. HANGERS SUPPORTING PIPING EXPANDING INTO LOOPS, BENDS AND OFFSETS SHALL BE SECURED TO THE BUILDING STRUCTURE IN SUCH A MANNER THAT HORIZONTAL ADJUSTMENT PERPENDICULAR TO THE RUN OF PIPING SUPPORTED MAY BE MADE TO ACCOMMODATE DISPLACEMENT DUE TO EXPANSION. ALL SUCH HANGERS SHALL BE FINALLY ADJUSTED BOTH IN THE VERTICAL AND HORIZONTAL DIRECTION, AS REQUIRED. HANGERS IN CONTACT WITH COPPER OR BRASS PIPE SHALL BE DIELECTRIC, COMPATIBLE WITH COPPER AND BRASS ALLOY OR PROVIDED WITH FELT SLEEVE.
3. PROVIDE ADDITIONAL SUPPORT FOR DUCTWORK PIPING AND EQUIPMENT WHEN DECK IS NOT CAPABLE OF SUPPORT.
4. BEAM CLAMPS - HANGERS SUPPORTED FROM STEEL SHALL BE CENTER LOADING BEAM CLAMPS FOR HANGERS SUPPORTING PIPING 2 INCHES. FOR PIPING 2-1/2 INCHES AND LARGER, I BEAM CLAMPS SHALL BE FORGED STEEL. "C" CLAMPS ARE NOT TO BE USED.
5. PROVIDE AND INSTALL EXPANSION COMPENSATION FOR ALL PIPING. SUBMIT PLANS, CALCULATIONS AND EQUIPMENT DATA.

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 ATTACHE 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.

DUCTWORK

- 1. REFER TO "HVAC DUCT MATERIAL" SCHEDULE FOR DUCT MATERIALS PER APPLICATION. CONSTRUCT DUCTWORK OF SHEET STEEL OF LOCK-FORMING QUALITY
2. DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESSES, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS, ELBOWS, TURNING VANES, AND HANGERS AND SUPPORTS, SHALL COMPLY WITH SMACNAS "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" LATEST EDITION, AND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA BASED ON PRESSURE & LEAKAGE CLASSES INDICATED BELOW.

- PRESSURE CLASS
A. SUPPLY DUCTS (EXCEPT IN MECHANICAL ROOMS): 1-INCH WG.
B. SUPPLY DUCTS (UPSTREAM FROM AIR TERMINAL UNITS): 4-INCH WG.
C. SUPPLY DUCTS (DOWNSTREAM FROM AIR TERMINAL UNITS): 2-INCH WG.
D. SUPPLY DUCTS (IN MECHANICAL EQUIPMENT ROOMS): 2-INCH WG.
E. RETURN DUCTS (NEGATIVE PRESSURE): 1-INCH WG.
F. EXHAUST DUCTS (NEGATIVE PRESSURE): 1-INCH WG.
LEAKAGE CLASS:
A. ROUND SUPPLY-AIR DUCT: 3 CFM/100 SQ. FT. AT 1-INCH WG.
B. FLAT-OVAL SUPPLY-AIR DUCT: 3 CFM/100 SQ. FT. AT 1-INCH WG.
C. RECTANGULAR SUPPLY-AIR DUCT: 6 CFM/100 SQ. FT. AT 1-INCH WG.
D. FLEXIBLE SUPPLY-AIR DUCT: 6 CFM/100 SQ. FT. AT 1-INCH WG.
3. DUCT ACCESS DOORS SHALL BE CONSTRUCTED OF DOUBLE WOOD OF THE SAME OR GREATER GAUGE AS DUCTWORK. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. GASKET ALL EDGES AIRTIGHT, SIZE ACCESS DOORS TO PERMIT MAINTENANCE. MINIMUM SIZE 15" x 15" OR AS LARGE AS AVAILABLE DUCT SPACE WILL ALLOW. ACCESS DOORS LESS THAN 12 INCHES SQUARE: NO HINGES AND TWO SASH LOCKS. ACCESS DOORS UP TO 18 INCHES SQUARE: TWO HINGES AND TWO SASH LOCKS.

- 1. SOLVENT-BASED JOINT AND SEAM SEALANT: APPLICATION BRUSH ON, SYNTHETIC RUBBER RESIN BASE, SOLVENT: TOLUENE AND HEPTANE, SOLIDS CONTENT: MINIMUM 60 PERCENT, SHORE A HARDNESS: MINIMUM 60, WATER RESISTANT, MOL.D AND MIL.GREZ RESISTANT, VOC: MAXIMUM 666 G/L, MAXIMUM STATIC-PRESSURE CLASS: 16-INCH WG. POSITIVE OR NEGATIVE SERVICE. INDOOR OR OUTDOOR. SUBSTRATE: COMPATIBLE WITH GALVANIZED SHEET STEEL (BOTH PVC COATED AND BARE), STAINLESS STEEL, OR ALUMINUM SHEETS.
2. FLANGED JOINT SEALANT: COMPLY WITH ASTM C 920; GENERAL: SINGLE-COMPONENT, ACID-CURING, SILICONE, ELASTOMERIC, TYPE: S, GRADE: NS, CLASS: 25, USE: 0.
3. FLANGE GASKETS: BUTYL RUBBER, NEOPRENE, OR EPDM POLYMER WITH POLYISOBUTYLENE PLASTICIZER.
4. MAKE CONNECTIONS TO EQUIPMENT WITH FLEXIBLE CONNECTORS OF FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS. MANUFACTURERS: DUCTMATE INDUSTRIES, INC., DURO DYNE INC., VENTFABRICS, INC., WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.
5. VOLUME DAMPERS-GALVANIZED STEEL, PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS, LATEST EDITION, PROVIDE AXLES FULL LENGTH OF DAMPER BLADES AND BEARINGS AT BOTH ENDS OF OPERATING SHAFT.
6. SEAL OPENING AROUND DUCTS THROUGH WALLS WITH MINERAL WOOL OR OTHER NON-COMBUSTIBLE MATERIAL.
7. SEAL ALL PENETRATIONS THROUGH FIRE SEPARATION WITH AN APPROVED UL LISTED ASSEMBLY AND FIRE STOPPING MATERIALS.
8. CONSTRUCT FLEXIBLE CONNECTIONS OF NEOPRENE-COATED FLAMEPROOF FABRIC CRIMPED INTO DUCT FLANGES FOR ATTACHMENT TO DUCT AND EQUIPMENT. FLEXIBLE DUCT SHALL BE CONSTRUCTED OF TWO-PLY LAMINATE MECHANICALLY CORRUGATED BONDED ALUMINUM INNER CORE COVERED BY ONE INCH THICK FIBERGLASS INSULATION OF ONE POUND DENSITY. FIBERGLASS SHALL BE COVERED WITH A 2.5 MIL POLYETHYLENE VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET THE LATEST REQUIREMENTS OF UL STANDARD 181, CLASS 1, FLEXIBLE AIR DUCT. DUCT TO BE RATED FOR 10 INCHES POSITIVE OR NEGATIVE PRESSURE... MANUFACTURERS; FLEXMASTER U.S.A., INC., MCGILL AIRFLOW LLC, WARD INDUSTRIES, INC.; A DIVISION OF HART & COOLEY, INC.

DUCT LINING

- 1. REFER TO "HVAC DUCT INSULATION" SCHEDULE FOR APPLICATIONS & VALUES.
2. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: CERTAINTED CORPORATION INSULATION GROUP, JOHNS MANVILLE, OWENS CORNING.
3. MAXIMUM THERMAL CONDUCTIVITY: TYPE II, RIGID: 0.23 BTU x IN./H X SQ. FT. x DEG F AT 75 DEG F MEAN TEMPERATURE.
4. ANTIMICROBIAL EROSION-RESISTANT COATING: APPLY TO THE SURFACE OF THE LINER THAT WILL FORM THE INTERIOR SURFACE OF THE DUCT TO ACT AS A MOISTURE REPELLENT AND EROSION-RESISTANT COATING. ANTIMICROBIAL COMPOUND SHALL BE TESTED FOR EFFICACY BY AN NRLT AND REGISTERED BY THE EPA FOR USE IN HVAC SYSTEMS.
5. SOLVENT/WATER-BASED LINER ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B AND WITH ASTM C 916.
6. INSULATION PINS AND WASHERS:
A. CUPPED-HEAD, CAPACITOR-DISCHARGE-WELD PINS: COPPER OR ZINC-COATED STEEL PIN, FULLY ANNEALED FOR CAPACITOR-DISCHARGE WELDING, 0.135-INCH DIAMETER SHANK, LENGTH TO SUIT DEPTH OF INSULATION INDICATED WITH INTEGRAL 1-1/2-INCH GALVANIZED CARBON-STEEL WASHER.
B. INSULATION-RETAINING WASHERS: SELF-LOCKING WASHERS FORMED FROM 0.016-INCH-THICK OF MATERIAL TO MATCH DUCTWORK WITH BEVELED EDGE SIZED AS REQUIRED TO HOLD INSULATION SECURELY IN PLACE BUT NOT LESS THAN 1-1/2 INCHES IN DIAMETER.

DUCT INSULATION

- 1. REFER TO "HVAC DUCT INSULATION" SCHEDULE FOR APPLICATIONS & 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: CERTAINTED 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.

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, FLAN, 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 B'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER, USING COPPER-PHOSPHOROUS 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 I.D. 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 WELODS.
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.
H. FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL, SIZE, TYPE, AND THICKNESS FOR SERVICE APPLICATION. INSTALL GASKET CONCENTRICALLY POSITIONED. USE SUITABLE LUBRICANTS ON BOLT THREADS.

- 1. PIPE HANGERS:
A. INSTALL THE FOLLOWING PIPE ATTACHMENTS:
A.1.1. ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL PIPING LESS THAN 20 FEET LONG.
A.1.2. ADJUSTABLE ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL PIPING 20 FEET OR LONGER.
A.1.3. PIPE ROLLER: MSS SP-58, TYPE 44 FOR MULTIPLE HORIZONTAL PIPING 20 FEET OR LONGER, SUPPORTED ON A TRAPEZ.
A.1.4. SPRING HANGERS TO SUPPORT VERTICAL RUNS.
A.1.5. PROVIDE COPPER-CLAD HANGERS AND SUPPORTS FOR HANGERS AND SUPPORTS IN DIRECT CONTACT WITH COPPER PIPE.
A.1.6. INSTALL HANGERS FOR STEEL PIPING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
A.1.7. NPS 3/4: MAXIMUM SPAN, 7 FEET; MINIMUM ROD SIZE, 1/4 INCH.
B. INSTALL HANGERS FOR DRAWN-TEMPER COPPER PIPING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
B.1.1. NPS 3/4: MAXIMUM SPAN, 5 FEET; MINIMUM ROD SIZE, 1/4 INCH.

CONTROL VALVES

- 1. PROVIDE FACTORY FABRICATED PRESSURE INDEPENDENT SELF BALANCING 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 APPLICATIONS & 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: CERTAINTED 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.

CLEANING, BALANCING AND ADJUSTMENT

- 1. THOROUGHLY CLEAN ALL NEW APPARATUS (COILS, REPLACE FILTERS, ETC) PRIOR TO PLACING IN OPERATION. CALIBRATE AND/OR REPLACE FAULTY COMPONENTS AS REQUIRED.
2. AIR BALANCING SHALL BE PROVIDED UNDER THIS CONTRACT IN COMPLIANCE WITH THE BELOW. AIR BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT NEEB CERTIFIED COMPANY, NOT ASSOCIATED WITH THE CONTRACTOR.
3. PROVIDE AIR READINGS BEFORE THE COMMENCEMENT OF WORK AS INDICATED ON THE CONTRACT DRAWINGS.
4. MARK EQUIPMENT SETTINGS, INCLUDING DAMPER CONTROL POSITIONS, DEVICES, TO SHOW FINAL SETTINGS AT COMPLETION OF BALANCING. PROVIDE MARKINGS WITH PAINT OR OTHER SUITABLE PERMANENT IDENTIFICATION MATERIALS.
5. TEST, ADJUST, AND BALANCE AIR DISTRIBUTION SYSTEMS TO PROVIDE AIR QUANTITIES INDICATED WITHIN PLUS OR MINUS 5 PERCENT.
6. SUBMIT A TEST REPORT INDICATING QUANTITY OF AIR AT EACH OUTLET AFTER BALANCING. LIST OBVIOUS NOISE AND AIR DRAFT PROBLEMS AND RECOMMENDED CORRECTIVE ACTION.

CUTTING, ALTERING AND PATCHING

- 1. PROVIDE ALL CUTTING, CHASING, DRILLING, ALTERING AND ROUGH PATCHING REQUIRED FOR THE WORK OF THIS DIVISION.
2. INCLUDING THE RESTORING OF EXISTING WORK CUT FOR OR DAMAGED BY INSTALLATION OF NEW WORK, AND WHERE PRESENT WORK IS REMOVED.
3. ALL MATERIALS AND WORKMANSHIP REQUIRED IN CONNECTION WITH CUTTING, ALTERING AND ROUGH PATCHING SHALL MATCH THE EXISTING WORK IN EVERY RESPECT.
4. DO ALL SHORING, BRACING, CUTTING, PATCHING, PIECING OUT, FILLING IN, REPAIRING AND REFINISHING OF ALL PRESENT WORK AS MADE NECESSARY BY THE ALTERATION AND THE INSTALLATION OF NEW WORK.
5. ALL HOLES AND OPENINGS OCCURRING IN THE EXISTING FLOORS AFTER EQUIPMENT, PARTITIONS, FLOORS, STEEL WORK, CONDUITS AND PIPES ARE REMOVED OR INSTALLED SHALL BE CLOSED UP WITH MATERIALS SIMILAR TO THE ADJACENT WORK.
6. THE SIZE AND LOCATION OF ITEMS REQUIRING AN OPENING, CHASE OR OTHER PROVISIONS TO RECEIVE IT SHALL BE GIVEN BY THE TRADE REQUIRED SAME IN AMPLIE TIME TO AVOID UNDUE CUTTING OF ANY NEW WORK TO BE INSTALLED. THESE PROVISIONS SHALL NOT RELIEVE THE CONTRACTOR FROM KEEPING INFORMED AS TO THE REQUIRED OPENING, CHASES, ETC., NOR FROM RESPONSIBILITY FOR THE CORRECTNESS THEREOF. NOR FOR CUTTING AND REPAIRING AFTER THE NEW WORK IS IN PLACE.
7. INCLUDE ALL CUTTING, REPAIRING AND PATCHING IN CONNECTION WITH THE WORK THAT MAY BE REQUIRED TO MAKE THE SEVERAL PARTS COME TOGETHER PROPERLY AND FIT IT TO RECEIVE OR BE RECEIVED BY THE WORK OF OTHER TRADES, AS SHOWN ON THE DRAWINGS AND/OR SPECIFIED, OR REASONABLY IMPLIED BY THE DRAWINGS AND SPECIFICATIONS.
8. ALL REPAIRING, PATCHING, PIECING-OUT, FILLING-IN, RESTORING AND REFINISHING SHALL BE NEATLY DONE BY MECHANICS SKILLED IN THEIR TRADE TO LEAVE SAME IN CONDITION SATISFACTORY TO THE OWNER.
9. MATERIALS AND THEIR METHODS OF APPLICATION FOR PATCHING SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF THE SPECIFICATIONS.
10. MATERIALS AND WORKMANSHIP NOT COVERED BY THE SPECIFICATIONS AND ITEMS OF WORK EXPOSED TO VIEW ADJOINING EXISTING WORK TO REMAIN SHALL CONFORM TO SIMILAR MATERIALS AND WORKMANSHIP EXISTING IN OR ADJACENT TO THE SPACES TO BE ALTERED.
11. CUTTING, REPAIRING AND PATCHING SHALL INCLUDE ALL ITEMS SHOWN ON THE DRAWINGS, SPECIFIED IN THE SPECIFICATIONS OR REQUIRED BY THE INSTALLATION OF NEW WORK OR THE REMOVAL OF EXISTING WORK.
12. REMOVE PARTITIONS, WALLS, SUSPENDED CEILINGS, ETC., AS NECESSARY TO PERFORM THE REQUIRED ALTERATIONS OR NEW CONSTRUCTION WORK.
13. AVOID DAMAGE TO CONSTRUCTION AND FINISHES THAT ARE TO REMAIN.
14. PROTECT AND BE RESPONSIBLE FOR THE EXISTING BUILDING, FACILITIES AND IMPROVEMENTS.
15. ANY DISTURBANCE OR DAMAGE TO THE WORK, THE EXISTING BUILDING, AND IMPROVEMENTS, OR ANY IMPAIRMENTS OF FACILITIES RESULTING FROM THE CONSTRUCTION OPERATIONS, SHALL BE PROMPTLY RECTIFIED, WITH THE DISTURBED, DAMAGED, OR IMPAIRED WORK, RESTORED, REPAIRED OR REPLACED AT NO EXTRA COST.
16. ALL ALTERATIONS WHICH ARE NOT INDICATED ON THE DRAWINGS NOR SPECIFIED HEREIN BUT NECESSARY TO MAKE GOOD EXISTING WORK DISTURBED BY REASON OF THE WORK SHALL BE RESTORED TO A CONDITION SATISFACTORY TO THE OWNER.
17. ALL HOLES IN MASONRY FLOORS AND WALLS ARE TO BE CORE DRILLED.
18. DISTURBED CONCRETE AND/OR CEMENT FLOOR AREAS SHALL BE PATCHED WITH APPROVED TYPE LATEX MORTAR.
19. WHEN CEMENT MORTAR IS USED FOR PATCHING, THE SURFACES SHALL BE DEPRESSED A MINIMUM DEPTH OF 1".

TEMPORARY OPENINGS

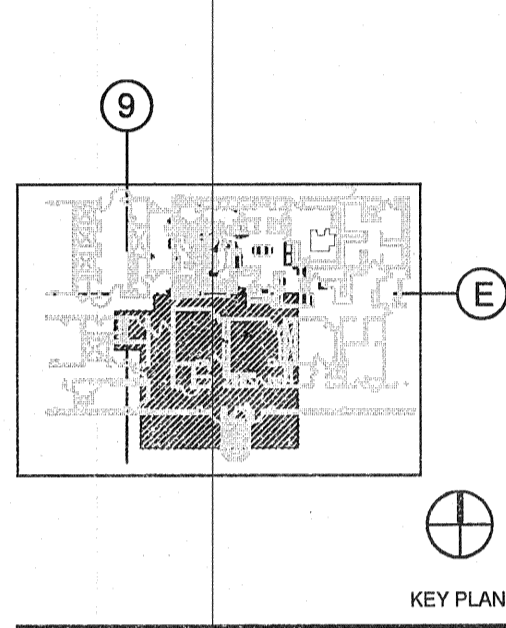
- 1. ALL TEMPORARY OPENINGS CUT IN WALLS, FLOORS OR CEILINGS FOR PIPE OR DUCTWORK SHALL BE CLOSED OFF WITH TRANSITE OR AN EQUALLY NON-COMBUSTIBLE MATERIAL EXCEPT WHEN MECHANICS ARE ACTUALLY WORKING AT THE PARTICULAR OPENING.

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.

Table with 3 columns: NO, DATE, REVISION. It contains two rows of revision information.

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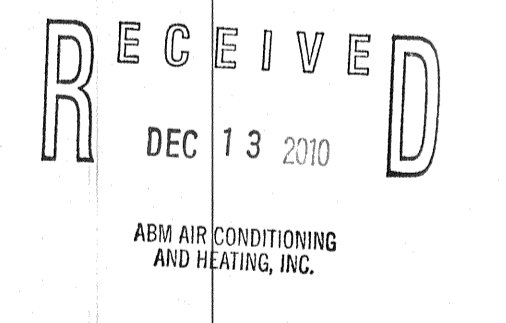


Owner:

Danbury Hospital logo and address: 301 MAIN STREET, DANBURY, CT. Includes text: 'A Difference That Matters', 'DANBURY HOSPITAL 3 TOWER: R/F & ERCP SUITE: ROOM 4 & 5 Danbury, Connecticut'.

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PROJECT TITLE: R/F & ERCP SUITE ROOM 4 & 5 3 TOWER Danbury, CT PROJECT No: 41581.00 DRAWING TITLE: SPECIFICATIONS - MECHANICAL

SCALE: NOT TO SCALE

M-400

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