- INVESTIGATE EACH SPACE THROUGH WITH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- D. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.
- E. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- F. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- G. THIS CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR APPROVAL A PLAN INDICATING THE SIZE (MINIMUM 18 INCH X 18 INCH) AND LOCATION OF ALL ACCESS DOORS REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT, DEVICES, VALVES, DAMPERS AND CONTROLS. CONTRACTOR SHALL ARRANGE FOR FURNISHING AND INSTALLATION OF ALL ACCESS DOORS IN FINISHED CONSTRUCTION AND INCLUDE COSTS IN THE
- H. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.
- I. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO ENSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME. J. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED

MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW

K. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER

INSTALLATION OF NEW SYSTEM.

WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.

- L. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS. AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS. SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- M. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS. WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.
- N. ALL PRESENT MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE. ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS SHALL BE PROPERLY DISPOSED OF BY
- O. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- P. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED. AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- Q. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- S. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- T. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- U. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING. EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC.) AND CONDITIONS.
- V. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- W. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT. BALANCED THE VARIOUS SYSTEMS. DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL
- X. GUARANTEE:
- 1) ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THIS WORK. FINAL ACCEPTANCE SHALL BE DEFINED AS THE TIME AT WHICH THE MECHANICAL WORK IS TAKEN OVER AND ACCEPTED BY THE OWNER, AND IS UNDER CARE, CUSTODY, AND CONTROL OF THE OWNER. ENGAGE THE SERVICES OF VARIOUS MANUFACTURERS SUPPLYING THE EQUIPMENT FOR THE PROPER STARTUP AND OPERATION OF ALL SYSTEMS INSTALLED. INSTRUCT THE OWNERS PERSONNEL IN THE PROPER OPERATION AND SERVICING OF THE
- 2) THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND FQUIPMENT IN WHICH DEFECT: DEVELOP WITHIN THE GUARANTEE PERIOD. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL INCLUDE RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS. REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THIS CONTRACTOR.
- 3) THIS CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND OPERATION OF ALL SYSTEMS UNTIL THE FINAL ACCEPTANCE OF THE WORK.
- Y. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- Z. DEFINITIONS:
 - 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
 - 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH

RELATED ACCESSORIES.

- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 6) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS
- 7) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- 2. SCOPE OF WORK
- A. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
- B. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION. OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, DUCTWORK, PIPING AND CONTROL SYSTEMS INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- D. WITHIN 15 DAYS AFTER AWARD OF CONTRACT, SUBMIT FOR REVIEW, A LIST OF ALL MATERIAL AND EQUIPMENT MANUFACTURER'S PRODUCTS THAT ARE PROPOSED, AS WELL AS NAMES OF ALL SUBCONTRACTORS WHOM THIS TRADE PROPOSES TO UTILIZE ON THIS PROJECT.
- 3. SHOP DRAWINGS
 - A. INDICATE ON EACH SUBMISSION: PROJECT NAME AND LOCATION, ARCHITECT AND ENGINEER, ITEM IDENTIFICATION AND APPROVAL STAMP OF PRIME CONTRACTOR, SUBCONTRACTOR NAMES AND PHONE NUMBERS, REFERENCE TO THE APPLICABLE DESIGN DRAWING OR SPECIFICATION ARTICLE, DATE AND SCALE.
- B. THE WORK DESCRIBED IN ALL SHOP DRAWING SUBMISSION SHALL BE CAREFULLY CHECKED FOR ALL CLEARANCES (INCLUDING THOSE REQUIRED FOR MAINTENANCE AND SERVICING), FIELD CONDITIONS, MAINTENANCE OF ARCHITECTURAL CONDITIONS AND PROPER COORDINATION WITH ALL TRADES ON THE JOB.
- C. EACH SUBMITTED SHOP DRAWING IS TO INCLUDE A CERTIFICATION THAT ALL RELATED JOB CONDITIONS HAVE BEEN CHECKED AND VERIFIED AND THAT THERE ARE NO CONFLICTS.
- D. ALL SHOP DRAWINGS ARE TO BE SUBMITTED TO ALLOW AMPLE TIME FOR CHECKING IN ADVANCE OF FIELD REQUIREMENTS. ALL SUBMITTALS TO BE COMPLETE AND CONTAIN ALL REQUIRED AND DETAILED INFORMATION. SHOP DRAWINGS WITH MULTIPLE PARTS SHALL BE SUBMITTED AS A
- E. IF SUBMITTALS DIFFER FROM THE CONTRACT DOCUMENT REQUIREMENTS, MAKE SPECIFIC MENTION OF SUCH DIFFERENCES IN A LETTER OF TRANSMITTAL, WITH REQUEST FOR SUBSTITUTION, TOGETHER WITH REASONS FOR SAME.
- F. SUBMISSIONS:
- PROVIDE ALL COORDINATION DRAWINGS, DUCTWORK AND PIPING SHOP DRAWINGS IN AUTOCAD FORMAT. VERSION COMPATIBLE WITH OWNER. ALL CATALOG CUTS AND SUBMITTALS TO BE PROVIDED IN ELECTRONIC "PDF" FORMAT THE ARCHITECT WILL FORWARD ALL SUBMISSIONS TO THE
- G. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
 - DUCTWORK LAYOUT AND SHEET METAL DESIGNS.
 - A. SHEETMETAL SHOP STANDARDS SHALL BE COMPILED DIRECTLY FROM THE "SMACNA DUCT CONSTRUCTION STANDARDS— METAL AND FLEXIBLE" MANUAL. MODIFICATIONS FOR A SPECIFIC PROJECT, IF ANY, SHALL BE INDICATED DIRECTLY ON THE SMACNA TEMPLATES. MODIFIED SHOP STANDARDS NOT TAKEN DIRECTLY FROM THE SMACNA TEMPLATES WILL NOT BE ACCEPTED. ANY DEVIATIONS FROM SMACNA SHALL BE NOTED.
- 2) AIR OUTLETS.
- AIR AND WATER BALANCE REPORT.
- 4) AUTOMATIC CONTROL SYSTEMS AND DEVICES
- 5) SEQUENCE OF OPERATIONS
- H. COORDINATION DRAWINGS: PLANS, DRAWN TO SCALE INDICATING COORDINATION BETWEEN THE TRADES USING INPUT FROM INSTALLERS OF THE ITEMS INVOLVED:
- DUCT AND PIPING INSTALLATION INDICATING COORDINATION WITH GENERAL CONSTRUCTION, BUILDING COMPONENTS, AND OTHER BUILDING SERVICES. INDICATE LOCATIONS AND SIZES OF ALL OPENINGS IN FLOOR, WALLS AND ROOF THAT MAY BE REQUIRED.
- 2) COORDINATION WITH SUSPENDED CEILING COMPONENTS, STRUCTURAL MEMBERS TO WHICH DUCT WILL BE ATTACHED, SIZE AND LOCATION OF INITIAL ACCESS MODULES FOR ACOUSTICAL TILE, PENETRATIONS OF SMOKE BARRIERS AND FIRE-RATED CONSTRUCTION, LIGHTING FIXTURES, AIR OUTLETS AND INLETS., SPEAKERS., SPRINKLERS., ACCESS PANELS., PERIMETER MOLDINGS SHALL BE PERFORMED.
- 4. AS-BUILTS AND EQUIPMENT OPERATION INSTRUCTIONS
 - A. PROVIDE ALL COORDINATION DRAWINGS, DUCTWORK AND PIPING SHOP DRAWINGS IN AUTOCAD FORMAT, VERSION COMPATIBLE WITH OWNER. ALL CATALOG CUTS AND SUBMITTALS TO BE PROVIDED IN ELECTRONIC "PDF" FORMAT THE ARCHITECT WILL FORWARD ALL SUBMISSIONS TO THE ENGINEER.
 - B. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE O THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
 - C. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 INCH X 11 IN FORMAT. THE CONTRACTOR SHALL GIVE ONE COPY OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- D. THE INSTRUCTIONS SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT. ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS
- FINAL "AS-BUILT" DRAWINGS INDICATING AS INSTALLED CONDITIONS SHALL BE PROVIDED TO THE ARCHITECT AND ENGINEER AFTER COMPLETION OF THE INSTALLATION.
- 5. SUBSTITUTIONS
- A. NO SUBSTITUTE MATERIAL OR MANUFACTURER OF EQUIPMENT SHALL BE PERMITTED WITHOUT A FORMAL WRITTEN SUBMITTAL TO THE ENGINEER WHICH INCLUDES ALL DIMENSIONAL, PERFORMANCE AND MATERIAL SPECIFICATIONS. ANY CHANGES IN LAYOUT, ELECTRICAL CHARACTERISTICS, STRUCTURAL REQUIREMENTS OR DESIGN DUE TO THE USE OF A SUBSTITUTION SHALL BE SUBMITTED TO THE ENGINEER AS PART OF THIS PROPOSAL. THE CONTRACTOR TAKES FULL RESPONSIBILITY FOR THE SUBSTITUTION AND ALL CHANGES RESULTING FROM THE SUBSTITUTION. ALL ITEMS SHALL BE SUBMITTED FOR REVIEW IN CONJUNCTION WITH THE SUBMITTAL OF THE SUBSTITUTION. ANY SUBSTITUTION MUST BE SUBMITTED WITH AN EXPLANATION WHY A SUBSTITUTION IS BEING UTILIZED. IF THE SUBSTITUTED ITEM DEVIATES FROM THE SPECIFIED ITEM, THOSE DEVIATIONS ARE TO BE IDENTIFIED ON A LINE BY LINE BASIS. IF THE SUBSTITUTE IS BEING UTILIZED FOR FINANCIAL REASONS, THE ASSOCIATED CREDIT MUST BE SIMULTANEOUSLY SUBMITTED.
- B. ALL SUBSTITUTED EQUIPMENT SHALL CONFORM TO SPACE REQUIREMENTS AND PERFORMANCE REQUIREMENTS SHOWN ON CONTRACT DOCUMENTS. CONTRACTOR SHALL REPLACE ANY EQUIPMENT THAT DOES NOT MEET THESE REQUIREMENTS AT HIS OWN EXPENSE. ANY MODIFICATIONS TO ASSOCIATED SYSTEMS OR ADDITIONAL COSTS ATTRIBUTED TO THIS SUBSTITUTION SHALL BE AT THIS CONTRACTOR'S EXPENSE.
- C. CONTRACTOR SHALL SUBMIT BID BASED ON SPECIFIED ITEMS AND SHALL SUPPLY AS AN ALTERNATE PRICE ANY SUBSTITUTIONS.
- 6. ACCESS DOORS IN GENERAL CONSTRUCTION
- A. THIS CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR APPROVAL A PLAN INDICATING THE SIZE (MINIMUM 18 INCH X 18 INCH) AND LOCATION OF ALL ACCESS DOORS REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT, DEVICES, VALVES, DAMPERS AND CONTROLS. CONTRACTOR SHALL ARRANGE FOR FURNISHING AND INSTALLATION OF ALL ACCESS DOORS IN FINISHED CONSTRUCTION AND INCLUDE COSTS IN THE BID.

7. SHEET METAL WORK

- A. DUCT CONSTRUCTION, INCLUDING SHEET METAL THICKNESSES, SEAM AND JOINT CONSTRUCTION, REINFORCEMENTS, AND HANGERS AND SUPPORTS, SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS -METAL AND FLEXIBLE, LATEST EDITION" AND PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- B. EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL
- C. DESCRIPTION OF DUCTWORK PRESSURE CLASS AND EQUIPMENT:
- 1) 4 INCH AND GREATER DUCT CLASS: ALL SUPPLY DUCTWORK FROM DISCHARGE OF FANS, AIR HANDLING UNITS OR AC UNITS. SEAL CLASS 'A", LEAKAGE CLASS 6 (RECTANGULAR METAL) OR CLASS 3 (ROUND).
- 4 INCH AND GREATER DUCT CLASS: ALL RETURN AIR DUCTWORK FROM SUCTION OF FANS, AIR HANDLING UNITS OR AC UNITS. SEAL CLASS "A", LEAKAGE CLASS 6 (RECTANGULAR METAL) OR CLASS 3 (ROUND).
- D. GENERAL FABRICATION REQUIREMENTS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE", LATEST EDITION, BASED ON INDICATED STATIC-PRESSURE CLASS UNLESS OTHERWISE INDICATED.
- 1) THE FOLLOWING FITTING CONNECTIONS AND DUCT CONSTRUCTION GAUGES ARE NOT ACCEPTABLE
- a. DRIVE SLIP [T-1, T-2] FITTING CONNECTIONS

b. 26 GAUGE DUCTWORK.

- TRANSVERSE JOINTS: SELECT JOINT TYPES AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, "TRANSVERSE (GIRTH) JOINTS", FOR STATIC-PRESSURE CLASS, APPLICABLE SEALING REQUIREMENTS, MATERIALS INVOLVED, DUCT-SUPPORT INTERVALS, AND OTHER PROVISIONS IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS — METAL AND FLEXIBLE." FITTINGS AND/OR JOINTS OF TWO DIFFERENT GAUGES, CONNECTED JOINT RATING SHALL MEET MORE STRINGENT CONDITIONS.
- 3) USE THE FOLLOWING SMACNA TRANSVERSE (GIRTH) JOINTS
 - a. DUCT CONSTRUCTION AS FOLLOWS FOR 4" W.G. CLASS:
 - (1) UP TO 12 INCH WIDE USE T-6 OR T-7
 - (2) 13 INCH TO 18 INCH WIDE USE T-11 OR T12 (3) 19 INCH WIDE AND UP USE TDC OR TDF
- E. VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL." EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.
- PROVIDE MANUAL VOLUME DAMPERS TO PROPERLY PROVIDE MANUAL BALANCING VOLUME DAMPERS AS REQUIRED TO PROPERLY BALANCE THE AIR DISTRIBUTION SYSTEM. IF THE LOCATION OF BALANCING DAMPERS ARE NOT DEFINED ON THE DRAWINGS, THE FOLLOWING MINIMUM STANDARDS SHALL GOVERN:
- a. LOW PRESSURE: ALL SUPPLY AIR MAIN BRANCHES FROM TRUNK, EACH SPLIT, AND ALL SUB-BRANCHES FROM MAINS SHALL BE PROVIDED WITH BALANCING DAMPERS.
- LOW PRESSURE: ALL EXHAUST AND RETURN BRANCHES FROM TRUNK, EACH SPLIT AND ALL SUB-BRANCHES FROM MAINS SHALL BE PROVIDED WITH BALANCING DAMPERS.
- c. AS NOTED ON PLANS
- F. FLEXIBLE DUCTS
 - FLEXIBLE DUCT SHALL BE USED ONLY FOR FINAL CONNECTIONS TO OUTLETS, FIVE FOOT LENGTH MAXIMUM WITH GRADUAL BENDS OR OFFSETS. ELBOWS SHALL BE SUPPORTED BY A MANUFACTURERS PACKAGED ELBOW SUPPORT (FLEXFLOW).
 - 2) TEAR RESISTANT, RUGGED FLEXIBLE DUCT DESIGNED FOR HIGH PRESSURE ENGINEERED HVAC SYSTEMS. UL181 CLASS I INSULATED AND NON-INSULATED AIR DUCT FABRICATED WITH A UNIQUE AND EXTREMELY TOUGH HEAVY COATED FIBERGLASS FABRIC. SOLID MECHANICAL UNION OF FABRIC AND CORROSION RESISTANT GALVANIZED STEEL CREATE AN EXTRAORDINARY DURABLE SEAM. THERMALLY INSULATED TO AN R VALUE OF 4.2 AND OFFERED WITH A CHOICE OF FIRE RETARDANT POLYETHYLENE OR REINFORCED METALIZED PROTECTIVE VAPOR BARRIERS SUITABLE FOR UP TO 10 INCHES FOR SIZES UP TO 12 INCH DIAMETER, 6 INCHES FOR SIZES 14 TO 16 INCH DIAMETER, AND 4 INCHES FOR 18 TO 20 INCH DIAMETERS.
 - FLEXIBLE DUCT CONNECTORS: CLAMPS SHALL BE STAINLESS STEEL BANDS WITH CADMIUM PLATED HEX SCREW TO TIGHTEN BAND WITH A WORM GEAR ACTION TO SUIT DUCT SIZE.

4) MANUFACTURED BY FLEXMASTER TYPE 4, THERMAFLEX MODEL M-KC.

- G. ACCESS DOORS: INSULATED OR UNINSULATED, SAME AS DUCT. PROVIDE MINIMUM 20 INCH X 14 INCH ON MAIN DUCTS, AND 12 INCH X 6 INCH ON BRANCH DUCTS, UNLESS OTHERWISE APPROVED, AT FIRE
- DAMPERS, AND AT ALL DUCT ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS, AND LOUVERS. 2) ALL ACCESS DOORS TO BE HINGED, WITH LATCH SIMILAR TO
- VENTLOCK NO. 100. H. FLEXIBLE CONNECTIONS: NEOPRENE-COATED GLASS FABRIC, 30 OZ PER SQUARE YD WITH SEWED AND CEMENTED SEAMS, SIMILAR TO VENT FABRICS. PROVIDE WITH METAL COLLARS. ALLOW MINIMUM MOVEMENT OF
- I. TURNING VANES: GALVANIZED STEEL SMALL DOUBLE-THICKNESS VANES WITH 2 INCH INSIDE RADIUS.
- J. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR
- K. EXISTING DUCTWORK TO BE REUSED:
- 1) THIS CONTRACTOR SHALL INSPECT, SEAL PER SMACNA REQUIREMENTS, LEAK TEST, AND INSULATE ALL EXISTING DUCTWORK TO BE REUSED. EXISTING DUCTWORK TO BE REUSED SHALL CONFORM TO SPECIFICATIONS FOR NEW DUCTWORK LISTED HEREIN. ALL REQUIRED WORK SHALL BE PART
- 8. AIR OUTLETS
- A. GENERAL:
 - MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS. FINISH SHALL MATCH COLOR SAMPLE AS APPROVED:
- FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS INDICATED ON ARCHITECTURAL PLANS.
- EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL
- 4) PROVIDE MOUNTING AND BLOCKING
- SUITABLE FOR OPERATION AT 20% EXCESS AND 20% LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20% EXCESS AND 60%
- LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING APPLICATION OF EACH OUTLET AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING
- 7) PROVIDE SHEETMETAL BLANK OFF AS REQUIRED FOR 1 WAY, 2 WAY OR 3 WAY DIFFUSERS, OR DIFFUSERS WITH PATTERNS IDENTIFIED ON
- PROVIDE BLANKING FOR PROPER COVERAGE AND BLOW WITHOUT PRODUCING OBJECTIONABLE NOISE OR AIR MOTION AT OCCUPIED LEVEL.
- MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- a. ANEMOSTAT PRODUCTS; A MESTEK COMPANY
- c. TUTTLE AND BAILEY
- d. PRICE
- e. METALAIRE

b. TITUS.

B. SQUARE DIFFUSERS: DIFFUSERS SHALL BE STEEL CONSTRUCTION PAINTED WHITE SUITABLE FOR THE TYPE OF CEILING.

- C. REGISTERS AND GRILLES:
 - 1) RETURN AND EXHAUST REGISTERS: STAINLESS STEEL CONSTRUCTION.
- 9. TESTING AND BALANCING
 - A. ALL AIR AND WATER BALANCING SHALL BE BY AN INDEPENDENT CONTRACTOR NOT AFFILIATED WITH THE MECHANICAL CONTRACTOR AND IN ACCORDANCE WITH LOCAL STANDARDS. CONTRACTOR SHALL UTILIZE BASE BUILDING BALANCING CONTRACTOR OR APPROVED EQUAL, CONTACT BUILDING MANAGEMENT.
 - B. CONTRACTOR TO BALANCE ENTIRE SYSTEM TO AIR AND/OR WATER QUANTITIES AS SHOWN ON ALL RELATED DRAWINGS FOR THIS JOB, AND AS DESCRIBED HEREIN. BALANCING MUST BE DONE IN THE PRESENCE OF A
 - BUILDING ENGINEER. C. AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. AIR SUPPLY OUTLETS TO BE BALANCED TO A UNIFORM SUPPLY ACROSS ENTIRE FACE. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR

ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE

GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY.

ADJUST FLOW THROUGH COILS AS REQUIRED.

BALANCE ALL NEW WORK.

- FANS. AIR HANDLING UNITS. PUMPS. CHILLERS. HEAT EXCHANGERS AND COILS SHALL BE BALANCED TO WITHIN +5% OF THEIR DESIGN CAPACITIES. ALL OTHER AIR AND WATER QUANTITIES SHALL BE BALANCED TO WITHIN +10% OF THEIR DESIGN QUANTITIES.
- F. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AND WATER DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO
- G. IF DISCREPANCIES EXIST IN THE REPORT THAT REQUIRE FIELD VERIFICATION. THE TESTING AND BALANCING COMPANY IN THE PRESENCE OF THE ENGINEER SHALL VISIT THE JOBSITE FOR FIELD VERIFICATION OF THE REPORT.
- H. THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE GAUGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE SYSTEMS. BALANCING REPORT SHALL BE PROVIDED ON NEBB OR AABC-TYPE
- J. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED NEBB OR AABC TECHNICIAN.
- K. THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT TO BE DEMONSTRATED BY THE CONTRACTOR.
- 10. INSULATION GENERAL REQUIREMENTS
- A. ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA A2.5-1963). FLAMESPREAD: MAXIMUM 25. FUEL CONTRIBUTED AND SMOKE DEVELOPED MAXIMUM 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.
- PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.
- C. DEFINITIONS:
 - EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS
 - 2) CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT WHICH IS NOT
 - OUTDOOR: DUCTS, PIPING OR EQUIPMENT WHICH IS EXPOSED TO THE
- 11. DUCTWORK INSULATION
 - INSULATE ALL DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.
 - INSULATION SCHEDULE DUCTWORK
 - SERVICE LOCATION THICKNESS MATERIAL FINISH SUPPLY/RETURN CONCEALED 2" D-1 VAPORSEAL
 - RETURN CONCEALED IN 2" D-1 VAPORSEAL UNCONDITIONED SPACE REINSULATE ALL DUCTWORK AND PIPING WHICH IS EXISTING AND
- INSULATE WITH SAME MATERIAL AND THICKNESS.
- MATERIAL: TYPE D-1: MINIMUM 1-LB DENSITY FIBERGLASS BLANKET HAVING AN INSTALLED (25% COMPRESSED) R-VALUE OF 6.0 MINIMUM, MAXIMUM 0.28 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY-APPLIED FOIL-SKRIM-KRAFT FACING SIMILAR TO MANVILLE MICROLITE.

DAMAGED DURING CONSTRUCTION OR SHOWN OR REQUIRED TO BE RELOCATED.

- D. INSTALLATION: FIBERGLASS BLANKET: 2 INCH LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALL DUCTS OVER 24 INCH WIDE WITH MIN. 2 ROWS OF WELD PINS 12 INCH ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER

TAPE AND VAPORSEAL ADHESIVE.

- 12. EQUIPMENT, DUCT, AND PIPING TAGS AND LABELS
- A. PIPE AND DUCT LABELS PIPE AND DUCT LABELS SHALL BE INSTALLED AT MAXIMUM INTERVALS OF 50 FEET ON STRAGIHT RUNS AND 25 FEET IN AREAS OF CONGESTED
 - PIPING AND EQUIPMENT. GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS:

SELF-ADHESIVE PIPE AND DUCT LABELS: PRINTED PLASTIC WITH

- PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.
- CONTACT-TYPE, PERMANENT-ADHESIVE BACKING. 4) PIPE AND DUCT LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS, PIPE SIZE, AND AN ARROW INDICATING FLOW DIRECTION.

a. FLOW-DIRECTION ARROWS: INTEGRAL WITH PIPING OR DUCT SYSTEM

SERVICE LETTERING TO ACCOMMODATE BOTH DIRECTIONS, OR AS SEPARATE UNIT ON EACH PIPE OR DUCT LABEL TO INDICATE FLOW DIRECTION.

b. LETTERING SIZE: AT LEAST 1-1/2 INCHES HIGH.

- 13. EQUIPMENT A. PROVIDE ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND
- CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS. INSTALL EQUIPMENT IN ACCORDANCE WITH APPROVED SHOP DRAWINGS,
- PROVIDE EQUIPMENT SUPPORTS AND/OR MOUNTINGS AS INDICATED ON
- THE DRAWING, IN VIBRATION SPECIFICATION AND AS FOLLOWS: FLOOR MOUNTED EQUIPMENT - PROVIDE DIMENSIONS FOR A 4 INCH CONCRETE HOUSEKEEPING PAD WITH ALL REQUIRED WATERPROOFING TO THE CONSTRUCTION MANAGER.

MANUFACTURERS INSTRUCTIONS AND ALL CODES AND REGULATIONS WHICH

STRUCTURAL STEEL OR STEEL PIPES AND FITTINGS ATTACHED TO FLOOR. ROOF MOUNTED EQUIPMENT — PROVIDE PREFABRICATED ISOLATED ROOF CURB WITH INTEGRAL VIBRATION ISOLATORS.

EQUIPMENT ON FLOOR STANDS - PROVIDE FLOOR STAND OF

SUITABLE ANCHORS SUSPENDED DIRECTLY FROM BUILDING STEEL PROVIDE SUPPLEMENTAL STEEL AS REQUIRED TO ADEQUATELY SUPPORT

4) CEILING MOUNTED EQUIPMENT - PROVIDE SUPPORTS WITH APPROVED

- 6) EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATION. REFER TO VIBRATION ISOLATION SECTION.
- 1) EXISTING SYSTEM SURVEY

D. REUSE OF EXISTING EQUIPMENT:

THE EQUIPMENT LOAD.

- PERFORM EXISTING CONDITIONS SURVEY OF SYSTEMS TO BE REUSED AND PREPARE COMPLETE REPORT INDICATING PHYSICAL CONDITION OF UNITS AND ACCESSORIES AND NOTE ANY REPAIRS REQUIRED BEYOND ITEMS INCLUDED IN DESIGN DOCUMENTS TO RESTORE EQUIPMENT TO A FULLY OPERATIONAL CONDITION.REPORT TO BE SUBMITTED TO ENGINEER
- b. PROVIDE A UNIT PRICE LIST TO BE SUBMITTED WITH YOUR BID FOR
- c. EQUIPMENT TO BE REUSED AS WELL AS ALL ACCESSORIES. UPON
- d. COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL WARRANTY ALL REUSED EQUIPMENT FOR ONE (1) YEAR.
- 2. AUTOMATIC CONTROLS GENERAL REQUIREMENTS

A. WORK INCLUDED

- 1) FURNISH AND INSTALL AS HEREIN SPECIFIED, A COMPLETE AUTOMATIC TEMPERATURE CONTROL SYSTEM. MANUFACTURER SHALL BE
- APPROVAL. 3) PROVIDE POWER FOR PANELS AND CONTROL DEVICES FROM A SOURCE
- DESIGNATED BY THE ELECTRICAL CONTRACTOR.
- 5) FURNISH, MOUNT, AND WIRE ALL ASSOCIATED PANELS AND DEVICES FOR THE SYSTEM TO BE COMPLETELY OPERATIONAL REGARDLESS OF
- B. SUBMITTALS 1) PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL LITERATURE FOR EACH CONTROL DEVICE INDICATED, LABELED WITH SETTING OR ADJUSTABLE RANGE OF CONTROL. INDICATE DIMENSIONS, CAPACITIES
- TYPE OF PRODUCT INDICATED. 2) SHOP DRAWINGS: DETAIL EQUIPMENT ASSEMBLIES AND INDICATE ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD
- b. WIRING DIAGRAMS: POWER, SIGNAL, AND CONTROL WIRING.

QUALITY ASSURANCE

- 1) INSTALLER QUALIFICATIONS: A QUALIFIED INSTALLER WHO IS AN AUTHORIZED REPRESENTATIVE OF THE AUTOMATIC CONTROL SYSTEM MANUFACTURER FOR BOTH INSTALLATION AND MAINTENANCE OF UNITS
- COMPLY WITH ALL CURRENT GOVERNING CODES, ORDINANCES, AND REGULATIONS INCLUDING UL, NFPA, THE LOCAL BUILDING CODE, NEC,
- 3) MATERIALS AND EQUIPMENT SHALL BE THE CATALOGUED PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN PRODUCTION AND INSTALLATION OF AUTOMATIC TEMPERATURE CONTROL SYSTEMS AND SHALL BE MANUFACTURER'S
- D. SEQUENCE OF OPERATIONS
 - 1) CATH LAB 4
 - a. EXISTING (1) THE EXISTING CONTROL SYSTEM AND SEQUENCE OF OPERATION SHALL REMAIN AS IS. PROVIDE NEW THERMOSTATS AND HUMIDISTATS AS
 - REQUIRED FOR THE COMFORT POINT OPEN SYSTEM. b. LEAK DETECTION
 - (1) A NEW DRAIN PAN IS BEING PROVIDED IN A SHAFT FOR AN OPEN END DRAIN. PROVIDE A LEAK DETECTOR IN THE DRAIN PAN TO ALARM AT THE BUILDING DDC FRONT END AND WIRE TO SHUT DOWN AC-1 WHICH SERVES THE EQUIPMENT ROOM OF CATH LAB 4.

- PRIOR TO START OF CONSTRUCTION, CONTRACTOR TO FOR REVIEW AND ANY CORRECTIVE ACTION. COORDINATE THIS WORK WITH ANY NEW OR REFURBISHMENT WORK LISTED IN THE SPECIFICATIONS OR PLANS.
- THE REPAIR OF ALL INTERNAL COMPONENTS OF ALL

- HONEYWELL, AND SHALL TIE INTO THE EXISTING CONTROL SYSTEM. ALL
- NEW CONTROLS SHALL BE THE COMFORT OPEN SYSTEM. 2) PROVIDE A SUBMITTAL THAT MEETS THE REQUIREMENTS BELOW FOR
- 4) COORDINATE INSTALLATION SCHEDULE WITH THE MECHANICAL CONTRACTOR AND GENERAL CONTRACTOR.
- FUNCTION OR VOLTAGE, UNLESS OTHERWISE STATED.
 - PERFORMANCE CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, FINISHES FOR MATERIALS, AND INSTALLATION AND STARTUP INSTRUCTIONS FOR EACH
- DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD
- a. SCHEMATIC FLOW DIAGRAMS SHOWING FANS, COILS, DAMPERS, VALVES, AND CONTROL DEVICES.
- c. DETAILS OF CONTROL PANEL FACES, INCLUDING CONTROLS, INSTRUMENTS, AND LABELING.
- REQUIRED FOR THIS PROJECT.
- REQUIREMENTS.

LATEST STANDARD DESIGN THAT COMPLIES WITH THE SPECIFICATION

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Maine Medical Center

PROJECT

MaineHealth Maine Medica Center

KEYPLAN

22 Bramhall Street

Portland, ME 04102



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SPECIFICATIONS

Job Number

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SHEET NUMBER

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