

MECHANICAL SPECIFICATIONS

PART 1- GENERAL

1.01 GENERAL

- A. THE LATEST EDITION OF AIA DOCUMENTS A201 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, OR AS REQUIRED BY THE ARCHITECTURAL DOCUMENTS AND/OR THE STRUCTURAL ENGINEERS DOCUMENTS ARE PART OF THE CONTRACT.
- B. BIDDERS SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THIS WORK BEFORE SUBMITTING PROPOSALS. SUBMISSION OF A PROPOSAL WILL BE CONSIDERED EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR SUPPLIES REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO BID. IF DISCREPANCIES ARE NOT RESOLVED TO CONTRACTORS SATISFACTION THEY SHALL BE QUALIFIED IN THEIR BID SUBMISSION.
- C. THIS CONTRACTOR SHALL REVIEW ALL CONSTRUCTION DOCUMENTS ASSOCIATED WITH THIS PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND SPRINKLER SYSTEMS AND SPECIFICATIONS. ALL WORK REQUIRED IN THE BID WHICH IS INDICATED OR IMPLIED TO BE PERFORMED BY THIS TRADE IN OTHER SECTIONS OF THE WORK SHALL BE INCLUDED IN THEIR BID. IF A CONFLICT OCCURS IN THE BID SPECIFICATIONS AND/OR ON THE DRAWINGS, THE MORE STRINGENT SITUATION SHALL APPLY.
- D. COORDINATE ALL WORK OF THE SECTION WITH EXISTING CONDITIONS AND THE WORK OF OTHER TRADES. THE CONTRACTOR SHALL THOROUGHLY ACQUAINT HIMSELF WITH THE WORK INVOLVED AND SHALL VERIFY AT THE BUILDING ALL MEASUREMENTS NECESSARY FOR THE PROPER INSTALLATION OF THE WORK, OBTAINING THE SAME WHEN NECESSARY FROM THE OTHER CONTRACTORS. CONTRACTOR SHALL ALSO BE PREPARED TO FURNISH TO ADJACENT TRADES A FURNISH TO OTHER CONTRACTORS ANY INFORMATION RELATING TO THE WORK OF THIS SECTION NECESSARY FOR THE PROPER INSTALLATION OF OTHER CONTRACTS AND SHALL COOPERATE TO SECURE THE BEST PROGRESS OF, AND HARMONY BETWEEN, THE WORK OF THE DIFFERENT CONTRACTS AND SECTIONS IN THE INTERESTS OF THE INSTALLATION AS A WHOLE. CONFER WITH OTHER CONTRACTORS AND ENGINEER FOR ADJACENT WORK TO THIS SECTION AND ARRANGE TO HAVE VISIBLE PORTIONS OF WORK FIT AND HARMONIZE IN A MANNER SATISFACTORY TO THE OWNERS REPRESENTATIVE.
- E. THE SPECIFICATIONS ARE ACCOMPANIED BY DRAWINGS INDICATING THE GENERAL LOCATION OF EQUIPMENT AND CONNECTIONS THERETO, UNLESS SPECIFICALLY DIMENSIONED. LOCATIONS OF EQUIPMENT AND ROUTINGS ARE APPROXIMATE. SCALES ON DRAWINGS ARE INDICATED FOR BIDDING PURPOSES ONLY. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION AND MANUFACTURING DETAILS. CERTAIN SYSTEMS ARE DIAGRAMMATIC AND GIVE THE GENERAL ARRANGEMENT ONLY. NO ADDED COMPENSATION WILL BE PERMITTED FOR VARIATIONS DUE TO FIELD CONDITIONS AND CONTRACTORS ARRANGEMENTS SHALL BE DETERMINED BY THE FIELD ON THE BASIS OF DETAILS INDICATED ON APPROVED SHOP DRAWINGS, AND SUPPLEMENTARY INFORMATION ISSUED BY THE ENGINEER, AND SHALL PROVIDE FOR OPERATING EFFICIENCY, NEATNESS OF APPEARANCE, AND EASE OF MAINTENANCE.
- F. GUARANTEE: THE CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION. THE CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT HIS OWN EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE PERFORMED THE SAME DAY OF NOTIFICATION UNLESS IN EMERGENCY FASHION WHEN NOTIFIED BY THE OWNER OR AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT. ALL REFRIGERATION COMPRESSORS SHALL HAVE A FACTORY GUARANTEE INCLUDING PARTS AND LABOR FOR FIVE YEARS TOTAL. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED SYSTEMS, AND DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATION, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVALS.
- G. EQUIPMENT AND MATERIALS: MOST ITEMS OF MECHANICAL AND ELECTRICAL EQUIPMENT AND MATERIAL ARE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS WITH A MANUFACTURER'S NAME AND CATALOG NUMBER. THIS DESIGNATION IS USED TO SET THE STANDARD FOR CONSTRUCTION, PERFORMANCE, OPERATION AND APPEARANCE. PRODUCTS OF OTHER MANUFACTURERS WILL BE CONSIDERED AND RULED UPON BY THE ENGINEER. THE SUBMISSION OF A SUBSTITUTION IMPLIES THAT THE ITEM HAS ALL NECESSARY UNDERWRITERS LABORATORIES, BOARD OF STANDARDS AND APPEALS, NEW YORK CITY MEA, NATIONAL ELECTRICAL CODE, NEW YORK CITY ELECTRICAL CODE AND NEW YORK CITY ELECTRICAL ADVISORY BOARD, ETC. APPROVALS. SHOULD THE ITEM BE FOUND NOT TO HAVE SUCH APPROVAL, IT SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- H. SUBSTITUTIONS: DEVIATIONS FROM CONTRACT DOCUMENTS AND SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED SHALL BE REQUESTED INDIVIDUALLY IN WRITING. FURNISH INFORMATION AS REQUIRED TO DEMONSTRATE THAT THE ARTICLE, MATERIAL, APPARATUS, PRODUCT OR PROCESS TO BE USED IS ADEQUATELY COMPARABLE TO THAT SPECIFIED IN QUALITY, FINISH, DESIGN, EFFICIENCY, DURABILITY AND GENERAL APPEARANCE, AND HAS BEEN ELSEWHERE DEMONSTRATED TO BE SERVICEABLE FOR THE PURPOSES FOR WHICH IT IS INTENDED. IF TESTS OR DEMONSTRATIONS ARE REQUIRED BY THE OWNER'S REPRESENTATIVES, THE COST OF SUCH TESTS OR DEMONSTRATIONS SHALL BE BORNE BY THE CONTRACTOR. DESCRIBE REASON FOR CHANGE, CONNECTIONS TO ADJACENT MATERIALS, ELECTRICAL SERVICES, SERVICE ACCESS, REQUIREMENTS, DIFFERENCES IN OPERATING CHARACTERISTICS OR CYCLES AND ALL OTHER POINTS OF DEVIATION. CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR SAFETY, COORDINATION WITH OTHER TRADES, OPERATION AND PERFORMANCE OF ALTERED SYSTEM.
- I. THIS CONTRACTOR IS TO OBTAIN A COPY OF THE BUILDING RULES AND REGULATIONS PRIOR TO BID SUBMISSION. ALL WORK MUST BE INSTALLED IN ACCORDANCE WITH THE BUILDING RULES AND REGULATIONS. DETERMINE REQUIREMENTS AND THE EXTENT OF PREMIUM TIME WORK REQUIRED BY THE PURPOSE OF THE BID. ASSUME ANY NOISE ABATEMENT (E.G. CHOPPING, CORE DRILLING, WELDING, BRAISING, SOLDERING, ETC.) AND BASE BUILDING SYSTEMS INTERRUPTIONS ARE TO BE PERFORMED OUTSIDE NORMAL BUSINESS HOURS.
- J. REMOVAL, TEMPORARY CONNECTIONS AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE INSTALLATION OF THE NEW SYSTEMS. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS FOR PROPER INSTALLATION OF NEW WORK.
- K. ALL NECESSARY CUTTING AND PATCHING IN FLOOR SLABS, ROOF SLABS, WALLS, AND CEILINGS FOR THE HVAC WORK SHALL BE PERFORMED BY THIS CONTRACTOR. RESTORE TO MATCH EXISTING CONDITIONS.
- L. WHERE PIPE AND/OR DUCTWORK PENETRATE RATED WALLS, THE SPACE BETWEEN THE INSULATION AND THE WALL SHALL BE CAULKED WITH NON-COMBUSTIBLE MATERIAL IN AN APPROVED MANNER. ALL PIPING AND/OR DUCTWORK TO BE INSTALLED ABOVE HUNG CEILING UNLESS OTHERWISE NOTED ON DRAWINGS. THE CONTRACTOR SHALL COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL CEILING ELEVATIONS.
- M. ACCESS DOORS IN FINISHED CONSTRUCTION: THE CONTRACTOR SHALL PREPARE A LIST OF ALL ACCESS DOORS (MINIMUM 18"x18") REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT AND OTHER DEVICES, WHICH SHALL BE SUPPLIED TO THE GENERAL CONTRACTOR FOR INSTALLATION. THE COST TO FURNISH AND INSTALL ACCESS DOORS SHALL BE INCLUDED IN THIS CONTRACTORS BID. THIS CONTRACTOR IN ADVANCE OF CEILING INSTALLATIONS SHALL SUITABLY FIELD TAG AND IDENTIFY ALL CONCEALED EQUIPMENT, VALVES, DAMPERS, ETC., WHICH REQUIRE ACCESS DOOR PROVISIONS.
- N. NEW DUCTWORK SHALL ARRIVE ON THE CONSTRUCTION SITE SEALED AND REMAIN PROTECTED FROM DEBRIS THROUGHOUT CONSTRUCTION PRIOR TO FINAL INSTALLATION. AIR DISTRIBUTION ACCESSORIES AND INTERNAL COMPONENTS OF ALL HVAC EQUIPMENT SHALL BE SEALED AND PROTECTED FROM DEBRIS WHILE ON THE CONSTRUCTION SITE PRIOR TO FINAL CONNECTION AND START-UP.
- O. ALL VOLATILE ORGANIC COMPOUND (VOC) LIMITS OF ADHESIVES, SEALANTS AND SEALANT PRIMERS MUST COMPLY WITH SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) RULE #1168, AMENDMENT DATE OF JANUARY 7, 2005.

1.02 SCOPE OF WORK

- A. THE CONTRACTOR SHALL FURNISH AND INSTALL AN HVAC SYSTEM COMPLETE WITH ALL EQUIPMENT, DUCTWORK, PIPING, INSULATION, CONTROLS, ACCESSORIES AND ASSOCIATED WORK IN ACCORDANCE WITH THE NEW YORK STATE BUILDING CODE, ALL NATIONAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION, BUILDING MANAGEMENT, DESIGN DRAWINGS AND THIS SPECIFICATION.
- B. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, HOISTING AND RIGGING, BREAKDOWN AND SETUP OF EQUIPMENT FOR INSTALLATION, SCAFFOLDING, AND SERVICES TO COMPLETE THE SYSTEM AND PROVIDE THE OWNER WITH A FULLY OPERATIONAL SYSTEM. ANY EQUIPMENT, PARTS, MATERIALS, ACCESSORIES, OR LABOR THAT IS NECESSARY FOR PROPER

PERFORMANCE OF THE MECHANICAL WORK ALTHOUGH NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL COSTS. WHEN INSTALLATION OF A PART OF ANY SYSTEM (PLUMBING, HEATING, AIR CONDITIONING, ELECTRICAL OR OTHERWISE) REQUIRES A SHUTDOWN OF ANY OPERATING SYSTEM, CONNECT THE PARTIAL SYSTEM ONLY AFTER NOTIFICATION TO AND WITH APPROVAL OF THE OWNER. COORDINATE ACTIVITIES CLOSELY WITH THOSE OF SUBCONTRACTORS SO THE OPERATION IS RESTRICTED TO AS SHORT AN INTERVAL AS POSSIBLE AND "OUT OF SERVICE" TIME OF THESE FACILITIES IS KEPT TO A MINIMUM. ANY SHUTDOWN OF THE ELECTRICAL SYSTEM WILL BE DONE OUT OF HOURS AS APPROVED BY OWNER.

IT IS IMPERATIVE THAT EXISTING SYSTEMS BE MAINTAINED IN CONTINUOUS OPERATION DURING THE COURSE OF CONSTRUCTION; IF SHUTDOWNS ARE REQUIRED TO PERMIT THE DISCONNECTION AND REMOVAL OR RECONNECTION OF EXISTING WORK, OR FINAL CONNECTION TO BE MADE TO AN EXISTING SYSTEM, THEY SHALL OCCUR ONLY DURING OFF-HOURS AND ONLY AFTER PROPER PERMISSION HAS BEEN OBTAINED FROM BUILDING MANAGEMENT.

THE BUILDING MANAGEMENT REQUIRES NOT LESS THAN SEVEN DAYS NOTICE FOR SHUTDOWN OF ANY BUILDING SYSTEM.

MAKE AN ACCURATE TAKE-OFF ALL EXISTING EQUIPMENT, DUCTWORK, PIPING, CONDUIT, PANELBOARDS, WIRING DEVICES AND OTHER ACCESSORIES BEING REMOVED DURING DEMOLITION AND INCLUDE THE COST FOR DISCONNECTING AND REMOVAL OF STATED EQUIPMENT, ETC. INTO THE BASE BID. REMOVALS SHALL BE AS SPECIFIED AND/OR AS INDICATED ON THE DRAWINGS. IN CERTAIN CASES, EQUIPMENT OR MATERIALS DESIGNATED FOR REMOVAL SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE TURNED OVER AT LOCATIONS IN THE BUILDING AS DIRECTED BY THE OWNER.

PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH AND AIR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING MANAGEMENT.

THIS OWNER SHALL PROCURE THE SERVICES OF A THIRD PARTY INSPECTION COMPANY TO PERFORM ALL SPECIAL INSPECTIONS IN ACCORDANCE WITH THE NEW YORK CITY BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO THE OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

1.03 SHOP DRAWINGS, EQUIPMENT SUBMISSION, MAINTENANCE MANUALS

- A. SUBMIT ONE (1) REPRODUCIBLE AND ONE (1) PRINT OF THE SHEET METAL AND PIPING SHOP DRAWINGS, 3/8" SCALE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED.
- B. SUBMIT THREE (3) COPIES OF ALL SHEET METAL AND PIPING SHOP STANDARDS LEAKAGE TEST CERTIFICATION, AIR AND WATER BALANCING REPORTS, AND CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAMS, AND AUTOMATIC TEMPERATURE CONTROL SHOP DRAWINGS INCLUDING CONTROL AND WIRING DIAGRAMS, SEQUENCE OF OPERATIONS AND ALL CUTS OF EQUIPMENT AND DEVICES.
- C. SUBMIT FOUR (4) BOOK BOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL AS-BUILT SHOP DRAWINGS FOLDED AND PLACED INTO BINDER POCKETS. AS-BUILT DRAWINGS IN ELECTRONIC FORMAT, COPIES OF REVIEWED EQUIPMENT CUTS FOR INSTALLED EQUIPMENT, COPIES OF EQUIPMENT START UP CHECKLISTS, AIR AND WATER BALANCING REPORTS, LEAK TESTS, HYDROSTATIC TESTS, WATER TREATMENT AND CHEMICAL CLEANING CERTIFICATION. CONTRACTOR SHALL INSTRUCT OWNERS PERSONNEL ON THE OPERATION OF ALL HVAC SYSTEMS.
- D. AS WORK PROGRESSES AND FOR DURATION OF CONTRACTOR, MAINTAIN COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT THE JOB SITE. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS CLEARLY AND ACCURATELY INCLUDING WORK INSTALLED AS A MODIFICATION OR ADDITION TO THE ORIGINAL DESIGN. RECORD VALVE TAGS AS THEY ARE INSTALLED. FINAL SUBMISSION OF REPRODUCIBLE AS-BUILT DRAWINGS ARE TO BE SIGNED AND CERTIFIED BY INSTALLING CONTRACTOR THAT THIS IS THE AS-BUILT CONDITION OF THE WORK. AS-BUILT SHOP DRAWINGS SHALL BE SUBMITTED IN DRAWING AND ELECTRONIC FORMAT (AUTOCAD 2007 MINIMUM).

PART 2- PRODUCT/APPLICATION

2.01 DUCTWORK

- A. PROVIDE ALL SUPPLY, RETURN, EXHAUST, AND OUTSIDE AIR SHEET METAL DUCTWORK, FITTINGS, DAMPERS, TURNING VANES, ACCESS DOORS, PLENUMS, FLEXIBLE CONNECTIONS, AND SUPPORTS AND PERFORM LEAK TEST PER LATEST SMACNA STANDARDS AND NFPA90A AS MODIFIED BY NEW YORK STATE BUILDING CODE. ALL DUCTWORK JOINTS SHALL BE SEALED AIR TIGHT WITH APPROVED DUCT SEALANT, SIMILAR TO 3M-900.
- B. ALL LOW PRESSURE DUCTS EXPOSED IN OCCUPIED AREAS, OTHER THAN MECHANICAL AND FAN ROOMS FABRICATED WITH HEMMED "S" SLIPS. REINFORCE JOINTS OF DUCTS OVER 30" WIDE WITH FLAT BARS OR FLAT BARS AND 3/8" RODS FOR DUCTS OVER 54" WIDE. TOP JOINT WITH BAR SKIP UNDER 31" WIDTH AND REINFORCED BAR SKIP FOR 31" AND LARGER IN WIDTH.
- C. ROUND DUCTS SPIRAL LOCK. G.I. COMPANY. SHEET METAL PRODUCTS, UNITED SHEET METAL, PACIFIC AIR PRODUCTS, OR AS APPROVED. ROUND DUCTS OVER 60" WITH BUTT WELDED, LONGITUDINAL SEAMS, AND FLANGE JOINTS.
- D. FITTINGS IN ROUND DUCTS SHALL BE NO LIGHTER THAN 20 GAUGE, AND WELDED. G. 1. COMPANY, SHEET METAL PRODUCTS, UNITS SHEET METAL, PACIFIC AIR PRODUCTS, OR AS APPROVED. BRANCH TEE TAKE-OFFS MADE WITH "CON-T" TYPE CONICAL TEE FITTINGS. WHERE MAIN DUCT REDUCES IN SIZE AFTER TAKE-OFF, USE "CON-T" OR TURNS, AND 3-PIECE FOR 45 DEGREE TURNS.
- E. CONTRACTOR SHALL ADHERE TO THE FULL INSIDE CROSS SECTIONAL DUCTWORK AREAS SHOWN ON THE DRAWINGS AND PROVIDE ALL TRANSITIONS AND OFFSETS AS REQUIRED TO MEET FIELD CONDITIONS, ACCOMMODATE EQUIPMENT MAINTENANCE REQUIREMENTS AND COORDINATE WITH ALL TRADES. ALL FIELD CONDITIONS WHICH REQUIRE MODIFIED TRANSITIONS WILL NOT BE APPROVED WITHOUT PRIOR ENGINEER APPROVAL THROUGH SHOP DRAWING OR RFI.
- F. FOR DUCTS WITH ACOUSTICAL LINING THE SIZES SHOWN ON THE PLAN SHALL BE THE CLEAR INSIDE DIMENSIONS.
- G. ALL OPEN-ENDED RETURN, TRANSFER OR EXHAUST DUCTS SHALL BE PROVIDED WITH WIRE MESH SCREENS.
- H. NEW DUCTWORK SHALL HAVE PRESSURE CLASSIFICATION, SEALING REQUIREMENTS AND LEAKAGE TESTING AS LISTED BELOW UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS.
 - 1. 4" CLASS: ALL SUPPLY DUCTWORK FROM DISCHARGE OF AIR UNITS TO INLETS OR TERMINAL BOXES. SEAL CLASS A, LEAKAGE CLASS 6 (RECTANGULAR) OR CLASS 3 (ROUND). PROVIDE TDF FLANGE CONNECTIONS FOR ALL SYSTEM 4" PRESSURE CLASS AND ABOVE.
 - 2. 2" CLASS: ALL OTHER LOW PRESSURE DUCTWORK. SEAL CLASS B, LEAKAGE CLASS 24 (RECTANGULAR) OR CLASS 12 (ROUND).
 - 3. LEAKAGE TESTING:
 - A) ALL NEW LOW PRESSURE DUCTWORK (2" CLASS) SHALL BE TESTED ON AN AS-NEEDED BASIS AT THE ENGINEERS DISCRETION OR IF BALANCING AIR QUANTITIES CAN NOT BE MET. IF SPECIMEN FAILS TO MEET ALLOTTED LEAKAGE LEVEL, THE CONTRACTOR SHALL MODIFY TO BRING IT INTO COMPLIANCE AND SHALL RETEST IT UNTIL ACCEPTABLE MAJOR IS DEMONSTRATED. TESTS AND NECESSARY REPAIRS SHALL BE COMPLETED PRIOR TO CONCEALMENT OF DUCTS.

F. MATERIALS:

- 1. SHEETMETAL: HOT-DIPPED GALVANIZED SHEETMETAL WITH G60 COMMERCIAL COATING ACCORDING TO ASTM A653 & A924 FOR ALL DUCTWORK UNLESS OTHERWISE SPECIFIED.
- 2. ALUMINUM: ALLOY 3003-H14, OF THICKNESS REQUIRED BY THE SMACNA DUCT CONSTRUCTION STANDARDS. PROVIDE FOR ALL DUCTWORK EXPOSED TO WEATHER AND MOISTURE INCLUDING OUTSIDE AIR DUCTS WITHIN 10 FEET OF LOUVERS AND TOILET ROOMS EQUIPPED WITH BATHS OR SHOWERS.
- G. PROVIDE MANUAL BALANCING DAMPERS AS REQUIRED TO PROPERLY BALANCE THE AIR DISTRIBUTION SYSTEM AS SHOWN ON DRAWINGS AND AS LISTED BELOW:
 - 1. ALL SUPPLY AIR MAIN BRANCHES FROM TRUNK, EACH SPLIT, AND ALL SUB-BRANCHES FROM MAINS SHALL HAVE BALANCING DAMPERS.
 - 2. EXHAUST AND RETURN MAIN BRANCHES FROM TRUNK, EACH SPLIT AND ALL SUB-BRANCHES FROM MAINS SHALL HAVE BALANCING DAMPERS.
 - 3. IF DAMPER IS NOT ACCESSIBLE, OR IS LOCATED ABOVE A PLASTER OR DRYWALL CEILING, PROVIDE A REMOTE DAMPER ACTUATOR AND DAMPER AS MANUFACTURED BY YOUNG REGULATOR MODEL 896-C WITH NO. 1200A RIGHT ANGLE WORM GEAR AND DAMPER MODEL 820 OR APPROVED EQUAL.

H. FIRE DAMPERS:

- 1. PROVIDE ALL FIRE DAMPERS, SMOKE DETECTORS, AND ASSOCIATED CONTROLS AND ALARMS AS REQUIRED BY CODE.
- 2. DAMPERS SHALL BE DYNAMIC TYPE, U.L. LISTED AND LABELED, AND IN CONFORMANCE WITH NFPA.
- 3. FIRE DAMPER SHALL BE FUSIBLE LINK TYPE (165 DEGREE F.), TYPE B SHUTTER OUT OF THE

AIR STREAM AS MANUFACTURED BY POTTORFF MODEL VFD-10 (1-1/2 HR RATED) AS REQUIRED OR APPROVED EQUAL.

- I. SLOPE AND DRAIN ALL DUCTS EXPOSED TO MOISTURE, CONSTRUCT OF ALUMINUM AND DO NOT INTERNALLY LINE.
- J. AUTOMATIC CONTROL DAMPERS: PROVIDE DAMPERS WITH PARALLEL BLADES FOR 2-POSITION. AUTOMATIC DAMPERS ARE TO BE VERY LOW LEAKING TYPE WITH A MAXIMUM LEAKAGE RATE OF 6 CFM PER SQUARE FOOT AT 4" W.G. DAMPER MATERIAL SHALL BE THE SAME AS DUCT. PROVIDE WEATHERPROOF COMPONENTS FOR DAMPERS IN A MOISTURE ENVIRONMENT.
- K. LOUVERS SHALL MATCH THE BUILDING EXTERIOR. SUBMIT THE SELECTED LOUVERS PRESSURE DROP AND WATER PENETRATION CHARACTERISTICS FOR REVIEW. LOUVERS SHALL BE GREENGLASS ES-435 OR EQUIVALENT. LOUVERS SHALL HAVE AN EXTRUDED ALUMINUM STRUCTURE WITH AN ANODIZED ALUMINUM MILL FINISH OR FINISH AS SPECIFIED BY THE BUILDING MANAGEMENT. LOUVERS ARE ALSO TO BE PROVIDED WITH 1/2" WIRE MESH ALUMINUM BIRD SCREENS. ALL LOUVER SECTIONS NOT IN USE SHALL BE BLANKED-OFF WITH AN INSULATED SHEET METAL PANEL.

2.02 GRILLES, REGISTERS AND DIFFUSERS

- A. PROVIDE ALL AIR OUTLETS AND RETURNS OF THE TYPE AND SIZES, AS SELECTED AND INDICATED ON DRAWING. ALL DUCTED RETURN AND EXHAUST OUTLETS SHALL HAVE OPPOSED BLADE DAMPERS (ADJUSTABLE THROUGH THE FACE) PROVIDE FRAMES AND MOUNTING TYPES AS REQUIRED TO MATCH SURROUNDING CEILING CONSTRUCTION. FINISHES TO BE SELECTED BY THE ARCHITECT.
- B. ALL CEILING TYPE AIR DIFFUSERS SHALL BE PROVIDED WITH EQUALIZING DEFLECTOR.
- C. A SCHEDULE OF DIFFUSERS, GRILLES AND REGISTERS WITH MANUFACTURERS MODELS, SIZES, ACCESSORIES, FINISHES, ETC., SHALL BE SUBMITTED FOR APPROVAL PRIOR TO RELEASE FOR FABRICATION AND DELIVERY.
- D. DIFFUSERS SHOWN ON DIFFUSER SCHEDULE SHALL BE CHANGED TO MATCH EXISTING DIFFUSER TYPE WHERE EXISTING DIFFUSERS ARE REMAINING.
- E. ALL NON-DUCTED RETURN DIFFUSERS SHALL BE PROVIDED WITH LIGHT SHIELDS.

2.03 PIPING

- A. PROVIDE PIPING WHICH IS SCHEMATICALLY INDICATED AND SIZED ON DRAWINGS. PIPING TO BE INSTALLED TO MEET SPECIFIED HEADROOM OR FIELD CONDITIONS AND SHALL CONFORM TO LATEST ASME CODES FOR PRESSURE PIPING. PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS PER THE PIPE AND FITTING SCHEDULES SHOWN ON DRAWINGS.
- B. PIPING, FITTINGS, AND ALL PIPE APPURTENANCES SHALL BE SUITABLE FOR THE PRESSURE AND TEMPERATURE OF SERVICE.
- C. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.
- D. PROVIDE AIR VENTS AT EACH HIGH POINT AND DRAIN VALVES WITH HOSE BIB AT EACH LOW POINT.
- E. PIPING SHALL BE INSTALLED WITH PROPER ANCHORS AND EXPANSION/CONTRACTION DEVICES SUCH AS LOOPS OR APPROVED EXPANSION JOINTS TO PREVENT UNDUE STRAINS ON PIPING OR APPARATUS CONNECTED TO THE PIPING, AS REQUIRED.
- F. SUPPORT PIPING WITH HANGERS EQUIPPED WITH INSULATION SADDLES FROM APPROVED CONCRETE INSERTS, EXPANSION SHIELDS, BEAM CLAMPS, AND/OR SUPPLEMENTARY STEEL ANGLES, PLATES, AND CHANNELS. CONTRACTOR SHALL SUBMIT METHOD OF PIPING SUPPORT SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER FOR REVIEW.
- G. UNIONS WITH REMOVABLE SECTIONS OF PIPING SHALL BE INSTALLED AT ALL EQUIPMENT TO PERMIT EASE OF DISCONNECTION FOR EQUIPMENT SERVICE/REMOVALS WITHOUT DISMANTLING OF MAJOR PORTIONS OF CONNECTED PIPING.
- H. PROVIDE TEES IN PIPING SYSTEM FOR TESTING AND BALANCING, AND INSTALLATIONS OF FLOW OR FLOAT SWITCHES, GAUGED, THERMOMETERS AND OTHER BALANCING AND CONTROL DEVICES, COORDINATE WITH THE CONTROL CONTRACTOR AND BALANCER.

- I. PROVIDE AUTOMATIC PRESSURE RELIEF VALVES AND VACUUM BREAKERS TO PREVENT AGAINST PIPE RUPTURE OR SYPHONING ACTIONS. EXTEND DRAINS FROM RELIEF VALVES TO SPILL OVER FLOOR DRAINS.
- J. ALL PIPE SLEEVES SHALL BE SCHEDULE 40 GALVANIZED STEEL. ANNULUS BETWEEN PIPE OR PIPE INSULATION AND SLEEVE SHALL BE CAULKED WITH A NON-COMBUSTIBLE MATERIAL TO WITHIN 1/4" OF WALL FACES AND FILLED WITH CAULKING COMPOUND FOR INTERIOR SLEEVES. EXTERIOR SLEEVES OR WATERPROOF SLEEVES SHALL UTILIZE LINK SEAL (LS) TYPE TO FILL THE ANNULUS. PROVIDE ESCUTCHEONS ON ALL EXPOSED PIPING THROUGH WALLS OR FLOORS HELD IN PLACE WITH SCREWS.
- K. PROVIDE SECURELY FASTENED LABELING OF ALL PIPING (BOTH EXPOSED AND CONCEALED) IN ACCORDANCE WITH ANSI STANDARDS AND COLOR CODED AS PER BUILDING MANAGEMENT STANDARDS. LABELING SHOULD BE PROVIDED 20 FEET ON CENTERS AND/OR AT LEAST ONE IN EACH ENCLOSED SPACE OR ROOM WHERE THE WALLS EXTEND ABOVE THE CEILING.
- L. PROVIDE VALVE TAGS AND CHARTS:
 - 1. EACH VALVE SHALL HAVE A 2 INCH DIAMETER BRASS TAG WITH 1 INCH HIGH NUMERAL STAMPED THEREON, SECURED TO THE VALVE BY MEANS OF BRASS S HOOK OR BRASS CHAIN. EACH SYSTEM TO HAVE A LETTER DESIGNATION INDICATING SERVICE.
 - 2. THE CONTRACTOR SHALL FURNISH AN APPROVED NEATLY DRAWN VALVE CHART, PROPERLY FRAMED, SHOWING THE USE AND LOCATION OF EACH VALVE THAT IS TAGGED.

M. VALVES AND STRAINERS:

- 1. VALVES, STRAINERS, ETC., SHALL NOT CONTAIN ASBESTOS AND HAVE THE NAME OF THE MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER.
- 2. VALVES USED FOR THROTTLING OR CONTROLLING FLOW SHALL BE BALL (3" OR SMALLER) OR PLUS TYPE VALVES (ALL SIZES). VALVES FOR ISOLATION SHALL BE LUG FOR LIQUID SYSTEMS UNLESS OTHERWISE SPECIFIED. BUTTERFLY VALVE SHALL BE LUG TYPE AND MAY BE SUBSTITUTED FOR BALL VALVES FOR SIZES 4" AND LARGER. REFER TO AUTOMATIC TEMPERATURE CONTROL SECTION FOR CONTROL VALVES.
- 3. VALVES SHALL HAVE WORKING PRESSURE AND TEMPERATURE RATINGS SAME AS PIPE FITTINGS SPECIFIED FOR THE SERVICE. REGARDLESS OF SERVICE, VALVES SHALL NOT BE DESIGNED FOR LESS THAN 125 PSI WORKING PRESSURE.
- 4. LUBRICATED, TAPERED PLUG VALVES WITH LOCKING FLOW PLATE SHALL BE PROVIDED IN THE DISCHARGE PIPING FROM WATER CIRCULATING PUMPS, IN THE LEAVING WATER PIPING BRANCHES FROM ALL COIL HEAT EXCHANGERS, TYPES OF JOURNIFANT, AND ALL RETURN WATER RISERS OF SUB-MAINS THAT CONNECT TO HYDRONIC MAINS FOR BOTH BALANCING AND ISOLATION PURPOSES.
- 5. CHECK VALVES SIZED 2-1/2" AND LARGER SHALL BE IRON BODY, FLANGED ENDS, BRONZE MOUNTED, SWING PATTERN, WITH REMOVABLE CAP, RE-GRINDABLE DISC AND SEAT RING. CHECK VALVES SIZED 2" AND SMALLER SHALL BE BRONZE BODY, SCREWED ENDS, SWING PATTERN. PROVIDE SPRING LOADED, SILENT ACTION, NON-SLAM TYPE CHECK VALVE WITH REMOVABLE CAP, RE-GRINDING DISC AND SEAT RING IN ALL VERTICAL INSTALLATIONS AND DISCHARGE PIPING FROM PUMPS AS MANUFACTURED BY SMOLENSKY, MUELLER, WILLIAMS-HAGER OR MILLER.
- 6. BALL VALVES SHALL BE PROVIDED WITH STAINLESS STEEL BALL, STEM AND SEAT RING, TFE BUSHING AND SEAT RING GASKET. BALL VALVES INSTALLED IN COPPER SYSTEMS SHALL HAVE BRONZE BODIES. BALL VALVES SHALL BE RATED FOR A MINIMUM OF 275 PSI @ 100 DEGREE F. BALL VALVES USED FOR THROTTLING (3" AND SMALLER) SHALL BE PROVIDED WITH A LOCKING BALANCING STOP.
- 7. STRAINERS OF SARCO OR MEULLER MANUFACTURER SHALL BE PROVIDED IN THE INLET PIPING TO EACH STEAM TRAP, MAKE UP CONNECTION, PUMP, AND AUTOMATIC CONTROL VALVE OF STEAM AND HYDRONIC SYSTEM. STRAINER SHALL BE Y-PATTERN UNLESS OTHERWISE SPECIFIED ON DRAWINGS. STRAINERS SHALL BE OF DESIGN TO ALLOW BLOW-DOWN OF ACCUMULATED DEBRIS AND TO FACILITATE REMOVAL AND REPLACEMENT OF THE STRAINER SCREEN WITHOUT DISCONNECTION FROM THE MAIN PIPING. STRAINERS INSTALLED IN COPPER SYSTEMS SHALL HAVE BRONZE BODIES. STRAINER BASKET SHALL BE NICKEL, COPPER, BRASS OR STAINLESS STEEL OF AMPLE STRENGTH TO PREVENT COLLAPSING UNDER SHOCK LOADING. PERFORATIONS SHALL BE AS FOLLOWS: STEAM-1/32"; WATER UP TO 2" SIZE-1/16"; WATER 4" AND OVER-1/8"; FOG STRAINERS 2-1/2" AND LARGER, PROVIDE A VALVE DIRT BLOW-OUT PIPING CONNECTION TERMINATED WITH A PIPE NIPPLE AND CAP. STRAINERS 2" AND SMALLER SHALL HAVE 6" LONG BLOW-OFF NIPPLE WITH CAPPED END.

N. THERMOMETERS AND PRESSURE GAUGES:

- 1. PROVIDE PIPE THERMOMETERS WITH SEPARABLE SOCKETS IN THE ENTERING AND LEAVING WATER PIPING CONNECTIONS TO COOLING TOWERS, CHILLERS, HEAT EXCHANGES, HEATING, COOLING AND CONDENSER COILS. THERMOMETERS SHALL BE WEISS, WEKSLER, THERICE OR OTHER APPROVED MANUFACTURER AND SHALL BE MINIMUM OF 4-1/2" DIAL TYPE, ALUMINUM FLANGLESS CASE FURNISHED WITH MICROMETER ADJUSTABLE POINTER. THERMOMETER SHALL HAVE A 1% ACCURACY AND MIDPOINT AS SYSTEM OPERATING TEMPERATURE.
- 2. PROVIDE LIQUID FILLED PRESSURE GAUGES ON INLET AND OUTLET WATER PIPING CONNECTIONS TO ALL PUMPS AND OTHER WATER HEAT EXCHANGE APPARATUS INCLUDING WATER COILS, HEAT EXCHANGERS, CHILLERS. EACH PRESSURE GAUGE INSTALLATION SHALL INCLUDE A 1/4" BALL VALVE FOR ITS CONNECTION TO PIPING. PRESSURE GAUGES

SHALL BE WEISS, WEKSLER, THERICE OR OTHER APPROVED MANUFACTURER AND SHALL BE MINIMUM OF 4-1/2" DIAL TYPE, CAST ALUMINUM CASE, STEEL MOVEMENT, MICROMETER ADJUSTABLE POINTER, 1% ACCURACY AND MIDPOINT AT SYSTEM OPERATING PRESSURE.

O. PIPE TESTING:

- 1. NO TESTING SHALL BE CONDUCTED UNTIL PIPE CLEANING AND PRETREATMENT HAS BEEN COMPLETED AND RECORDED.
- 2. ALL TESTING SHALL BE COORDINATED BY THE CONTRACTOR AND SHALL BE WITNESSED BY A BUILDING OWNERS REPRESENTATIVE. ALL SYSTEMS WHICH FAIL THE PRESSURE TESTS SHALL BE FIXED AND RETESTED AT NO EXPENSE TO THE OWNER.
- 3. ISOLATE ALL EQUIPMENT WHICH IS TO BE EXCLUDED FROM THE PRESSURE TEST AND PROVIDE ALL TEMPORARY PIPING CONNECTIONS, FITTINGS, VALVES, EQUIPMENT, LABOR, ETC., TO PRESSURE TEST ALL SYSTEMS.
- 4. GLYCOL HOT WATER SYSTEMS WILL BE HYDROSTATICALLY TESTED WITH WATER AT 1-1/2 TIMES THE WORKING PRESSURE, FOR A MINIMUM PERIOD OF TWO HOURS, WITH NO LEAKS.

2.04 INSULATION REQUIREMENTS

- A. INSULATION SHALL BE APPLIED TO PIPING AND MATERIALS AS SPECIFIED HEREIN AND FOR APPLICABLE SYSTEMS OF THIS PROJECT. INSULATION SHALL HAVE A FLAME SPREAD RATING NOT EXCEEDING 25 AND A SMOKE DEVELOPED INDEX OF 50 OR LESS AND SHALL MEET THE REQUIREMENTS OF ASTM NFPA.
- B. INSULATION SHALL BE CONTINUOUS THROUGH WALL AND SLAB SLEEVE OPENINGS EXCEPT FOR RATED WALLS OR SLABS WHERE AN APPROVED FIRESTOP IS REQUIRED AS PER NFPA.
- C. INSULATION OF COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE SPECIFIED SHALL BE APPLIED WITH AN UNBROKEN VAPOR SEAL. HANGERS AND SUPPORTS THAT ARE SECURED TO COLD SURFACES SHALL BE ADEQUATELY INSULATED TO PREVENT CONDENSATION.
- D. WHERE INSULATION IS SPECIFIED FOR PIPING, INSULATE SIMILARLY ALL CONNECTIONS, VENTS, DRAINS, FLANGES, FITTINGS, VALVES, TANKS, PUMP CASINGS AND OTHER PARTS OF THE SYSTEM SUBJECT TO HEAT GAIN OR LOSS AND TO PREVENT CONDENSATION.
- E. ALL EQUIPMENT, FITTINGS, DEVICES, ETC REQUIRING SERVICING OR INSPECTION SHALL HAVE REMOVABLE INSULATION WHICH CAN BE REPLACED WITHOUT DAMAGE.
- F. ALL LEAK AND PRESSURE TESTS SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF ANY INSULATION.
- G. PIPING INSULATION:
 - 1. CONDENSATE DRAIN AND DOMESTIC WATER MAKE-UP PIPING SHALL BE INSULATED WITH 1" THICK MOLDED GLASS FIBER WITH A MAXIMUM K FACTOR OF 0.27 AT 75 DEGREE F MEAN TEMPERATURE AND FACTORY APPLIED VAPOR BARRIER JACKET.
 - 2. GLYCOL HOT WATER PIPING UP TO 220 DEGREES F SHALL BE INSULATED WITH 1-1/2" THICK MOLDED GLASS FIBER FOR PIPE SIZES UP TO 1-1/2" INCHES IN DIAMETER AND 2" THICK FOR PIPE SIZES LARGER THAN 1-1/2" INCHES IN DIAMETER. INSULATION SHALL HAVE A MAXIMUM K FACTOR OF 0.27 AT 75 DEGREE F MEAN TEMPERATURE AND FACTORY APPLIED VAPOR BARRIER JACKET.
 - 3. ALL PIPING INSULATION TO BE INSTALLED WITH LONGITUDINAL LAP AND VAPOR BARRIER JOINT SEAL STRIPS WITH ADHESIVE OR SELF-SEALING LAPS. FITTINGS, FLANGES, AND VALVES SHALL BE INSULATED WITH PRE-MOLDED AND PRE-CUT FITTINGS WITH METERED SEGMENTS.

2.05 ACOUSTICAL TREATMENT

- A. ACOUSTICAL LINING SHALL MEET THE MINIMUM THERMAL INSULATION VALUE OF R-6 OR A MAXIMUM K FACTOR OF 0.24 AT 1.5" THICKNESS WITH A MEAN TEMPERATURE OF 75 DEGREE F.
- B. INSTALL LINER IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. COMPLETELY COVER ALL PORTIONS OF DUCTWORK PLENUMS AND CASINGS WITH APPROVED ADHESIVE. INSTALL LINER WITH ALL TRAVERSE JOINTS NEATLY BUTTED WITH NO INTERRUPTIONS OR GAPS. COVER ALL EXPOSED EDGES, JOINTS, MECHANICAL FASTENERS AND ANY DAMAGED AREAS WITH ADHESIVE. PROVIDE METAL NOSING AT EQUIPMENT DISCHARGES AND AT END EDGES OF LINING. SECURE LINER WITH APPROVED MECHANICAL FASTENERS INSTALLED IN ACCORDANCE WITH SMACNA DUCT LINER APPLICATION STANDARD.
- C. DO NOT EXTERNALLY INSULATE ACOUSTICALLY LINED DUCTS.
- D. DO NOT INTERNALLY LINE DUCTWORK WHICH IS A PART OF AN OUTSIDE AIR SYSTEM WHICH DISTRIBUTES UNCONDITIONED AIR.
- E. FURNISH AND INSTALL ACOUSTICAL LINING IN DUCTWORK, PLENUMS AND CASINGS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED BELOW:
 - 1. ALL SUPPLY & RETURN DUCTWORK SHALL BE INTERNALLY LINED.

2.06 VIBRATION ISOLATION SYSTEMS

- A. ALL ROTATING, REVOLVING OR RECIPROCATING EQUIPMENT, INCLUDING PIPING CONNECTIONS TO THIS EQUIPMENT SHALL BE ACOUSTICALLY ISOLATED TO PREVENT THE TRANSMISSION OF OBJECTIONABLE NOISES, SOUND OR VIBRATIONS TO THE OCCUPIED SPACES AND TO THE BUILDING STRUCTURES. ALL VIBRATION ISOLATION PRODUCTS SHALL BE SPECIFICALLY DESIGNED FOR THEIR INTENDED USE.
- B. STATIC DEFLECTION OF ISOLATORS SHALL BE A MINIMUM OF 90% EFFICIENT.
- C. MANUFACTURER OF VIBRATION ISOLATION EQUIPMENT SHALL DETERMINE VIBRATION ISOLATOR SIZES AND LOCATIONS, PROVIDE SUITABLE PIPING AND EQUIPMENT VIBRATION ISOLATION SYSTEMS, GUARANTEE SPECIFIED VIBRATION ISOLATION SYSTEM ATTENUATION AND DEFLECTION, AND PROVIDE INSTALLATION INSTRUCTIONS, DRAWINGS AND FIELD SUPERVISION TO ASSURE PROPER INSTALLATION AND PERFORMANCE.
- D. MOUNTING TYPES:
 - 1. PROVIDE TYPE KSL SPRING ISOLATOR WITH INERTIA BASE FOR FLOOR MOUNTED PUMPS 5 HP AND ABOVE HAVING THE FOLLOWING MINIMUM DEFLECTIONS:
 - DEFLECTION MOTOR HP INERTIA BASE
 - 0 1" UP TO 30 HP 6"
 - 2. PROVIDE SPRING ISOLATORS TYPE 30N FOR CEILING-SUPPORTED FANS. PROVIDE 1" MINIMUM STATIC DEFLECTION.
 - 3. PROVIDE SPRING ROOF CURB TYPE RSC FOR ROOFTOP AC & HV UNITS. ROOF CURBS SHALL BE PRE-MANUFACTURED OF NON-COMBUSTIBLE CONSTRUCTION AND APPROVED BY LOCAL AUTHORITIES. PROVIDE 1" MINIMUM STATIC DEFLECTION FOR LESS THAN 7,500CFM AND 2" FOR GREATER THAN 7,500CFM.
 - 4. SUPPORT OF PIPING EXPOSED ON ROOF AND IN EQUIPMENT ROOMS:
 - A) FLOOR SUPPORTED PIPING ISOLATORS (TYPE SLR).
 - B) VERTICAL RISER PIPING ANCHOR AND GUIDES (TYPE ADA).
 - C) CEILING SUPPORTED PIPING ISOLATORS (TYPE 30N).
 - 5. PROVIDE FLEXIBLE CONNECTIONS BETWEEN ALL FANS, AC & HV UNITS AND DUCTWORK AS PER DUCTWORK SPECIFICATION SECTION.
- E. FLEXIBLE HOSE CONNECTORS SHALL BE INSTALLED AT INLET AND DISCHARGE CONNECTIONS TO ALL PUMPS.
- F. SPRING TYPE 30N HANGERS SHALL BE PROVIDED FOR PIPING FOR A DISTANCE OF 50 FEET OR 50 PIPE DIAMETERS, WHICHEVER IS GREATER, UP AND DOWNSTREAM OF ALL POWER DRIVEN EQUIPMENT. THE HANGER SHALL PROVIDE 1" OF STATIC DEFLECTION FOR PIPES 4" OF OUTSIDE DIAMETER AND LARGER AND 1/2" STATIC DEFLECTION FOR PIPES SMALLER THEN 4" OUTSIDE DIAMETER.
- G. VIBRATION ISOLATORS FOR FLOOR OR CEILING SUPPORTED EQUIPMENT SHALL HAVE A MAXIMUM LATERAL MOTION UNDER EQUIPMENT START-UP OR SHUT-DOWN CONDITIONS OF 1/4" AND MOTIONS IN EXCESS SHALL BE RESTRAINED BY SPRING TYPE MOUNTINGS.
- H. ALL ISOLATORS INSTALLED OUTDOORS SHALL BE PROVIDED WITH CORROSION PROTECTION.
- I. VIBRATION ISOLATOR SHALL BE PROVIDED BY MASON INDUSTRIES, VIBRATION ELIMINATOR CO., CONSOLIDATED KINETICS CO., OR APPROVED EQUAL.

2.07 EQUIPMENT

- A. ROOFTOP HEATING & VENTILATING UNIT (HV-R-1 THRU 12):
 - I. MANUFACTURERS:
 - 1. TRANE
 - 2. RAPID ENGINEERING
 - 3. REZNOR
 - II. GENERAL:
 - 1. UNITS ARE COMPLETELY FACTORY ASSEMBLED, PIPED, WIRED AND TEST FIRED. ALL UNITS CONTAIN DUCT FURNACES THAT ARE ETL CERTIFIED AND CONFORM WITH THE LATEST ANSI STANDARDS FOR SAFE AND EFFICIENT PERFORMANCE. UNITS ARE MOUNTED ON METAL RAILS WITH LIFTING AND ANCHOR HOLES AND ARE SUITABLE FOR SLAB OR CURB MOUNTING. UNITS ARE AVAILABLE FOR OPERATION ON EITHER NATURAL OR LP (PROPANE) GAS. THE FIRING RATE OF EACH FURNACE WILL NOT EXCEED 400 MBH AND CONTAINS ITS OWN HEAT EXCHANGER, FLUE COLLECTOR, VENTING, BURNERS, SAFETY AND IGNITION CONTROLS. ALL UNITS ARE ETL CERTIFIED FOR ELECTRICAL SAFETY IN COMPLIANCE WITH UL 1995 AND CSA C22.2 NO. 236 SAFETY STANDARD FOR HEATING, VENTILATING AND COOLING EQUIPMENT. STANDARD CONTROL RELAYS SOCKET MOUNTED WITH TERMINAL BLOCK CONNECTIONS.

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