MECHANICAL SPECIFICATION SHEETS ARE INTENDED TO BE ALL-INCLUSVE AND INCLUDE SPECIFICATION SECTIONS THAT MAY OR MAY NOT APPLY TO THIS PARTICULAR PROJECT. REFER TO THE DRAWINGS FOR SCOPE OF WORK.

DIVISION 15 - MECHANICAL

SECTION 15000
MECHANICAL GENERAL PROVISIONS

A. GENERAL CONDITIONS

1. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND ALL OTHER SPECIFICATION SECTIONS ARE A PART OF THIS CONTRACT AND APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 15.

2. THE CONTRACTOR FOR THIS WORK IS REQUIRED TO READ THE ENTIRE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL OTHER TRADES.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING HIS SUBCONTRACTORS WITH A FULL SET OF BID SET DOCUMENTS (INCLUDING SPECIFICATIONS) AND THE COORDINATION OF HIS WORK AND INSPECTIONS AND THE WORK AND INSPECTIONS OF HIS SUBCONTRACTORS WITH ALL OTHER TRADES ON SITE CONFORMING TO THE GENERAL CONTRACTOR'S TIME SCHEDULE.

4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING HIS BID TO DETERMINE CONDITIONS AFFECTING THE WORK. BIDS SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.

5. WHEN USED, THE TERM "PROVIDED BY CONTRACTOR" SHALL BE INTERPRETED AS MEANING "FURNISHED AND INSTALLED" WITH THE EXCEPTION WHERE ITEMS ARE "PROVIDED BY OWNER" WHICH MEANS "FURNISHED ONLY" (INSTALLED BY CONTRACTOR), EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

B. GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION, INCIDENTALS AND DETAILS NECESSARY TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL MECHANICAL SYSTEM AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS. ALL WORK NOT SPECIFICALLY NOTED AS BEING BY THE LANDLORD SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. CLOSELY COORDINATE THE ENTIRE INSTALLATION WITH THE OWNER, AS REQUIRED. FIELD VERIFY THE EXACT TYPE, SIZE AND LOCATION, ETC. OF EXISTING PIPE AND DUCTS IN THE TENANT SPACE PRIOR TO BID.

2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER AND ANY MATERIAL OR LABOR CALLED FOR IN ONE SHALL BE PROVIDED EVEN THOUGH NOT SPECIFICALLY MENTIONED IN BOTH. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON THE DRAWINGS NOR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK, AND WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER, SHALL BE PROVIDED AS PART OF CONTRACT.

3. WHERE THE DRAWINGS OR SPECIFICATIONS CALL FOR ITEMS WHICH EXCEED CODES, THE CONTRACTOR IS STILL RESPONSIBLE FOR PROVIDING THE SYSTEM AS DESIGNED AND DESCRIBED ON THESE DRAWINGS, UNLESS SPECIFICALLY NOTED OTHERWISE.

4. ALL MECHANICAL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATING, SERVICING, MAINTAINING, AND REPAIRING. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUFFICIENT ACCESS TO ALL EQUIPMENT FOR SERVICE.

5. THE CONTRACTOR SHALL DO ALL CUTTING, CORE DRILLING, CHASING OR CHANNELING AND PATCHING REQUIRED FOR ANY WORK UNDER THIS DIVISION. CUTTING SHALL HAVE PRIOR APPROVAL BY THE CONSTRUCTION MANAGER. PATCHING SHALL MATCH FINISH OF SURROUNDING AREA.

C. CODES

1. ALL WORK SHALL BE PERFORMED IN A NEAT PROFESSIONAL MANNER USING GOOD ENGINEERING PRACTICES. ALL WORK SHALL CONFORM TO THE OWNER'S CRITERIA, THE STATE'S, COUNTY'S, CITY'S AND LOCAL CODES AND ORDINANCES, SAFETY AND HEALTH CODES, NFPA CODES, ENERGY CODES AND ALL OTHER APPLICABLE CODES AND REQUIREMENTS. THE CONTRACTOR SHALL INQUIRE INTO AND COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. AFTER CONTRACT IS ISSUED, NO ADDITIONAL COST DUE TO CODE ISSUES SHALL BE REIMBURSED BY THE OWNER TO THE CONTRACTOR.

D. LICENSES, PERMITS, INSPECTIONS & FEES

1. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS, INSPECTIONS, AND FEES REQUIRED OR RELATED TO HIS WORK.

2. FURNISH TO THE CONSTRUCTION MANAGER ALL CERTIFICATES OF INSPECTION AND FINAL INSPECTION APPROVAL AT SUBSTANTIAL COMPLETION DATE OF PROJECT.

E. DRAWINGS

1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL DUCT AND PIPING OFFSETS, FITTINGS AND ACCESSORIES THAT MAY BE REQUIRED.

2. THE LAYOUT SHOWN ON THE DRAWINGS IS BASED ON A PARTICULAR MAKE OF EQUIPMENT. IF ANOTHER MAKE OF EQUIPMENT IS USED WHICH REQUIRES MODIFICATION OR CHANGE OF ANY DESCRIPTION FROM THE DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE AS PART OF THIS WORK, FOR MAKING ALL SUCH MODIFICATIONS AND CHANGES, INCLUDING THOSE INVOLVING OTHER TRADES WITH THE COST THEREOF INCLUDED IN HIS BID. IN SUCH CASE, CONTRACTOR SHALL SUBMIT DRAWINGS AND SPECIFICATIONS PRIOR TO STARTING WORK SHOWING ALL SUCH MODIFICATIONS AND CHANGES. HIS PROPOSAL SHALL BE SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.

F. EXISTING SPACE CONDITIONS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF THE DEMOLITION OF EXISTING MECHANICAL WORK SHOWN ON THE MECHANICAL DRAWINGS AND THE MECHANICAL DEMOLITION SHOWN ON THE ARCHITECTURAL DRAWINGS.

2. THE CONTRACTOR SHALL INCLUDE, AND WILL BE HELD RESPONSIBLE FOR, THE REMOVAL OF ALL EXISTING FIRE PROTECTION, PLUMBING FIXTURES, PIPING, HVAC UNITS, REFRIGERANT RECAPTURE, EXHAUST FANS, ETC. AND ASSOCIATED ROOF CURBS NOT TO BE REUSED ON THIS PROJECT, UNLESS SPECIFICALLY NOTED OTHERWISE. CONTRACTOR MUST VERIFY WITH THE CONSTRUCTION MANAGER ALL PRESUMED ABANDONED EQUIPMENT, PIPES, DUCTWORK, AND EQUIPMENT PRIOR TO REMOVAL. ROOF CURBS SHALL BE REMOVED AND THE ROOF PATCHED UNLESS NOTED FOR REUSE OR RECONFIGURATION ON PLANS. ROOF PATCHING SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE BY A ROOFING CONTRACTOR APPROVED BY THE OWNER. ALL EXTRANEOUS ITEMS IN THE SPACE OR ON THE ROOF (ABOVE THIS SPACE) NOT APPLICABLE TO THE NEW WORK OR PART OF THE ACTIVE SYSTEM MUST BE REMOVED AND ROOF/WALL/FLOOR PATCHED/REPAIRED TO MATCH EXISTING STRUCTURE. EXISTING ABANDONED PIPES, DUCTS, OR EQUIPMENT IN THE FLOOR, EMBEDDED IN CONCRETE, OR OTHERWISE INACCESSIBLE ARE TO BE CUT OFF AND SEALED BELOW OR WITHIN FLOOR OR WALL LEVEL WHEN THEY ARE NOT TO BE REUSED IN THIS PROJECT. IF REQUIRED BY OWNER OR CODES, ABANDONED PIPING AND/OR DUCTWORK MUST BE REMOVED TO POINT OF ORIGIN. CONFIRM THE EXTENT OF DEMOLITION PRIOR TO BID AND INCLUDE IN BID PROPOSAL.

3. ACTIVE UTILITIES OR SERVICES ENCOUNTERED IN WORK SHALL BE PROTECTED AND SUPPORTED. IF EXISTING SERVICES NOT ANTICIPATED REQUIRE RELOCATION, CONTACT THE CONSTRUCTION MANAGER IMMEDIATELY. ALL COSTS FOR REPAIR OF DAMAGES TO ACTIVE SERVICES DURING CONSTRUCTION SHALL BE PAID FOR BY THE CONTRACTOR CAUSING THE DAMAGE.

4. TIE-INS AND MODIFICATIONS TO EXISTING OWNER SERVICES MUST BE DONE WITH MINIMUM INTERRUPTION OF OWNER'S OPERATION AND DURING HOURS SPECIFIED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING EXACT WORKING HOURS OF THIS WORK WITH THE OWNER PRIOR TO SUBMITTING HIS BID. THE CONTRACTOR SHALL INCLUDE IN HIS BID, ALL PREMIUM TIME REQUIRED TO PERFORM MODIFICATIONS DURING OTHER THAN NORMAL WORKING HOURS. ALL SUCH WORK MUST BE COORDINATED WITH THE OWNER.

G. DISCREPANCIES IN DOCUMENTS

1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. WHERE DRAWINGS, EXISTING SITE CONDITIONS, SPECIFICATIONS OR OTHER TRADES CONFLICT OR ARE UNCLEAR, ADVISE THE GENERAL CONTRACTOR IN WRITING, PRIOR TO SUBMITTAL OF BID. THE GENERAL CONTRACTOR IS RESPONSIBLE TO ADVISE THE CONSTRUCTION MANAGER, IN WRITING, OF VARIATIONS TO CONTRACT DOCUMENTS PRIOR TO SUBMISSION OF BID. OTHERWISE, CONSTRUCTION MANAGER'S INTERPRETATION OF CONTRACT DOCUMENTS OR CONDITIONS SHALL BE FINAL WITH NO ADDITIONAL COMPENSATION PERMITTED.

H. TRADE NAMES AND MANUFACTURERS

1. WHERE TRADE NAMES AND MANUFACTURERS ARE USED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THE EXACT EQUIPMENT SHALL BE USED AS A MINIMUM STANDARD FOR THE BASE BID. MANUFACTURERS CONSIDERED AS AN EQUAL OR BETTER IN ALL ASPECTS TO THAT SPECIFIED WILL BE SUBJECT TO APPROVAL IN WRITING BY THE CONSTRUCTION MANAGER PRIOR TO ACCEPTANCE. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

I. SHOP DRAWINGS

1. SUBMIT SIX COPIES OF MATERIAL LISTS AND SHOP DRAWINGS FOR ALL EQUIPMENT AND DUCT FABRICATION DRAWINGS TO THE CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO ORDERING EQUIPMENT. SUBMISSIONS MUST BE EARLY ENOUGH TO ALLOW THE CONSTRUCTION MANAGER EIGHT WORKING DAYS FOR REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BE IN ACCORDANCE WITH THE GENERAL CONDITIONS USING THE MANUFACTURER'S LISTED ON THE DRAWINGS. SHOP DRAWINGS SHALL INCLUDE ALL DATA THAT PERTAINS TO THE REQUIREMENTS SET FORTH ON THE DRAWINGS AND IN THE SPECIFICATIONS. THE SUBMITTAL SHALL INCLUDE BUT NOT BE LIMITED TO CUTS OR CATALOGS INCLUDING DESCRIPTIVE LITERATURE AND CHARACTERISTICS OF EQUIPMENT SUBMITTALS SHALL SHOW MAJOR DIMENSIONS, ROUGHING-IN DATA, CAPACITY, CURVES, PRESSURE DROP, CODE COMPLIANCE, MOTOR AND DRIVE DATA AND ELECTRICAL DATA. OBSERVE SPECIAL INSTRUCTIONS WHEN REQUIRED. SUBMITTALS SHALL BEAR THE STAMP OF THE GENERAL AND SUB-CONTRACTOR SHOWING THAT HE HAS REVIEWED AND CONFIRMED THAT THEY ARE IN CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS TAKE PLACE. LACK OF SUCH CONTRACTOR'S REVIEW AND APPROVAL WILL BE CAUSE FOR REJECTION WITHOUT REVIEW BY CONSTRUCTION MANAGER. ALL SHOP DRAWINGS MUST APPEAR IN THE OPERATION AND MAINTENANCE MANUALS LEFT ON SITE AT JOB COMPLETION.

2. CONSTRUCTION MANAGER'S REVIEW OF SHOP DRAWINGS OR SCHEDULES SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS, OMISSIONS OR OTHER DEFICIENCIES OR DEVIATIONS OF THE SHOP DRAWING FROM THE CONTRACT DRAWINGS AND SPECIFICATIONS.

J. RECORD DRAWINGS

1. THE CONTRACTOR SHALL MAINTAIN ONE COPY OF DRAWINGS AND SPECIFICATIONS ON THE JOB SITE TO RECORD DEVIATIONS FROM CONTRACT DRAWINGS, SUCH AS:

A. LOCATION OF CONCEALED PIPING VALVES AND DUCTS.
B. REVISIONS, ADDENDUMS, AND CHANGE ORDERS.
C. SIGNIFICANT DEVIATIONS MADE NECESSARY BY FIELD CONDITIONS, APPROVED EQUIPMENT SUBSTITUTIONS, AND CONTRACTOR'S COORDINATION WITH OTHER TRADES.
D. EXACT ROUTING OF ALL SANITARY AND DOMESTIC WATER PIPING UNDER FLOOR.

2. AT COMPLETION OF THE PROJECT AND BEFORE FINAL APPROVAL, THE CONTRACTOR SHALL MAKE ANY FINAL CORRECTIONS TO DRAWINGS AND CERTIFY THE ACCURACY OF EACH PRINT BY SIGNATURE THEREON. THE DRAWINGS ARE TO BE TURNED OVER TO THE CONSTRUCTION MANAGER.

K. GUARANTEE

1. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORK UNDER HIS CONTRACT AND SHALL MAKE GOOD, REPAIR OR REPLACE AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL, OR EQUIPMENT WHICH MAY BE DISCOVERED WITHIN A PERIOD OF 12 MONTHS FROM THE DATE OF ACCEPTANCE (IN WRITING) OF THE INSTALLATION BY THE CONSTRUCTION MANAGER. PROVIDE EXTENDED WARRANTIES AS SPECIFIED WITH INDIVIDUAL EQUIPMENT. IN CASE OF REPLACEMENT OR REPAIR OF EQUIPMENT DUE TO FAILURE WITHIN GUARANTEE PERIOD, GUARANTEE ON THAT PORTION OF WORK SHALL BE EXTENDED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUCH REPLACEMENT OR REPAIR.

L. OPERATIONS MANUALS

1. ONE COPY OF EACH OPERATION AND MAINTENANCE MANUAL FOR ALL EQUIPMENT FURNISHED ON JOB SHALL BE COLLECTED AND INSERTED IN A 3" THREE RING BINDER AND TURNED OVER TO THE CONSTRUCTION MANAGER. EACH NOTEBOOK SHALL INCLUDE BUT NOT BE LIMITED TO INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTIONS, PAMPHLETS OR BROCHURES, APPROVED SHOP DRAWINGS AND WARRANTIES OBTAINED FROM EACH MANUFACTURER OF PRINCIPAL ITEMS OF EQUIPMENT.

M. SLEEVES

1. THE CONTRACTOR SHALL PROVIDE SLEEVES TO PROTECT EQUIPMENT OR FACILITIES IN THE INSTALLATION. EACH SLEEVE SHALL EXTEND THROUGH IT'S RESPECTIVE FLOOR, WALL OR PARTITION AND SHALL BE CUT FLUSH WITH EACH SURFACE EXCEPT SLEEVES THAT PENETRATE THE FLOOR, WHICH SHALL EXTEND 2" ABOVE THE FLOOR.

2. ALL SLEEVES AND OPENINGS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE FIRE SEALED WITH CALCIUM SILICATE, SILICONE "RTV" FOAM, "3M" FIRE RATED SEALANTS OR EQUAL, SO AS TO RETAIN THE FIRE RATING OF THE FLOOR OR WALL. CONFORM TO U.L. ASSEMBLY RATING OF FLOOR OR WALL.

3. SLEEVES IN BEARING AND MASONRY WALLS, FLOORS, AND PARTITIONS SHALL BE STANDARD WEIGHT STEEL PIPE FINISHED WITH SMOOTH EDGES. FOR OTHER THAN MASONRY PARTITIONS, THROUGH SUSPENDED CEILINGS, OR FOR CONCEALED VERTICAL PIPING, SLEEVES SHALL BE NO. 22 U.S.G. GALVANIZED STEEL MINIMUM.

4. SLEEVES TO BE MINIMUM 14 GAUGE STEEL.

N. HANGERS

1. HANGERS SHALL INCLUDE ALL MISCELLANEOUS STEEL SUCH AS ANGLE IRON, BANDS, C-CLAMPS WITH RETAINING CLIPS, CHANNELS, HANGER RODS, ETC., NECESSARY FOR THE INSTALLATION OF WORK.

2. HANGERS SHALL BE FASTENED TO BUILDING STEEL, CONCRETE, OR MASONRY, BUT NOT TO PIPING OR DUCTWORK. HANGING FROM METAL DECK IS NOT PERMITTED. HANGERS MUST BE ATTACHED TO UPPER CHORD OF BAR JOIST. WHERE INTERFERENCES OCCUR, IN ORDER TO SUPPORT DUCTWORK OR PIPING, THE CONTRACTOR MUST INSTALL TRAPEZE TYPE HANGERS OR SUPPORTS WHICH SHALL BE LOCATED WHERE THEY DO NOT INTERFERE WITH ACCESS TO FIRE DAMPERS, VALVES, ACCESS DOORS AND OTHER EQUIPMENT SERVICE REQUIREMENTS AND/OR OTHER TRADES. HANGER TYPES AND INSTALLATION METHODS ARE SUBJECT TO ENGINEER'S CRITERIA.

3. HANGERS FOR ALL INSULATED PIPING SHALL BE SIZED AND INSTALLED FOR THE OUTER DIAMETER OF INSULATION. INSTALL 6" LONG SPLIT CIRCLE GALVANIZED SADDLE BETWEEN THE HANGER AND THE PIPE INSULATION.

4. HANGERS AND PIPING OF DISSIMILAR METALS SHALL BE DI-ELECTRICALLY SEPARATED FROM ONE ANOTHER.

O. ACCESS DOORS

1. FURNISH STEEL ACCESS DOORS AND FRAMES, MIN. 16" X 20" OR AS SHOWN ON DRAWINGS, TO GENERAL CONTRACTOR FOR ALL LOCATIONS WHERE NECESSARY TO PROVIDE ACCESS TO CONCEALED VALVES, AND OTHER EQUIPMENT REQUIRING SERVICE OR INSPECTION. LOCATION, TYPE, SIZE AND NUMBER AS DETERMINED BY CONTRACTOR AND APPROVED BY CONSTRUCTION MANAGER TO SUIT EQUIPMENT REQUIREMENTS. GENERAL CONTRACTOR WILL INSTALL ACCESS DOORS AND FRAMES.

2. ACCESS DOORS LOCATED IN FIRE-RATED WALLS, FLOORS, CEILING-FLOOR OR CEILING-ROOF ASSEMBLIES SHALL BE FIRE RATED, UNDERWRITER'S LABORATORIES, INC., LISTED AND LABELED.

3. ACCESS DOORS SHALL BE FLUSH TYPE, MANUFACTURED FROM NO. 14 GAUGE STEEL, COMPLETE WITH FLUSH FLANGE TYPE FRAMES MANUFACTURED FROM NO. 16 GAUGE STEEL, PROVIDED WITH ANCHORS. ACCESS DOORS SHALL BE SUITABLE FOR INSTALLATION IN WALL OR CEILING MATERIALS SHOWN IN ROOM FINISH SCHEDULES.

P. ELECTRICAL MOTORS

1. FURNISH, INSTALL AND ALIGN ALL MOTORS REQUIRED FOR THIS EQUIPMENT. UNLESS THEY ARE FACTORY INSTALLED ON THE UNIT, ALL STARTERS AND ASSOCIATED WIRING AND SAFETY SWITCHES FOR SUCH MOTORS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. STARTERS SHALL MEET ALL REQUIREMENTS AS DEFINED IN THE ELECTRICAL DIVISION OF THE SPECIFICATIONS.

2. DESIGN, CONSTRUCTION AND PERFORMANCE CHARACTERISTICS OF MOTORS SHALL CONFORM TO ALL APPLICABLE PROVISIONS OF LATEST NEMA, ANSI, ISEE STANDARDS FOR ELECTRICAL EQUIPMENT. ALL MOTORS SHALL BE SUITABLE FOR OPERATION ON VOLTAGE VARIATION OF PLUS OR MINUS 10%, 40 DEGREES C AMBIENT TEMPERATURE; HAVE A SERVICE FACTOR OF NOT LESS THAN 1.15.

Q. LOW VOLTAGE (24 VOLT) WIRING

1. THE CONTRACTOR IS TO INSTALL ALL LOW VOLTAGE WIRING REQUIRED FOR HIS EQUIPMENT. THIS WORK INCLUDES ALL TRANSFORMERS AND DEVICES TO MAKE THIS A COMPLETE FUNCTIONAL SYSTEM.

2. ALL WORK IS TO CONFORM TO THE LATEST ADDITION N.E.C AND TO DIVISION 16 ELECTRICAL SPECIFICATIONS.

3. ANY CONDUIT REQUIRED BY CODE OR THE OWNER'S EQUIPMENT WILL BE INSTALLED BY THE ELECTRICAL SUBCONTRACTOR.

DIVISION 15 - MECHANICAL

SECTION 15500
HEATING, VENTILATION, AND AIR CONDITIONING

A. SCOPE OF WORK

1. THE HVAC CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION AND FACILITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL TO, THE FURNISHING, INSTALLATION, COMPLETION AND TESTING OF ALL THE WORK FOR THE MECHANICAL SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:(REFER TO RESPONSIBILITY SCHEDULE FOR EXACT RESPONSIBILITIES)

A. HVAC UNITS, EQUIPMENT, AND APPURTENANCES.
B. DUCTWORK, FITTINGS, DAMPERS, AND INSULATION.
C. HYDRONIC PIPING AND INSULATION (AS APPLICABLE, REFER TO PLANS).
D. REFRIGERANT PIPING (AS APPLICABLE, REFER TO PLANS).
E. DIFFUSERS, GRILLES, AND REGISTERS.
F. CURBS AND STEEL FRAMING FOR SUPPORT (AS APPLICABLE, REFER TO PLANS).
G. TESTING, ADJUSTING, AND BALANCING.
H. OPERATIONS MANUALS.
I. TEMPERATURE CONTROLS AND RELATED DIAGRAMS.
J. SEQUENCES OF OPERATION.
K. CONNECTION TO ANY LANDLORD ENERGY MANAGEMENT SYSTEM.

2. BEFORE STARTING WORK, THIS CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, AND INTEGRATE THE VARIOUS ELEMENTS OF THE HVAC SYSTEM, MATERIALS AND EQUIPMENT WITH OTHER CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

B. HVAC EQUIPMENT

1. PRIMARY HEATING, VENTILATION AND AIR CONDITIONING UNITS.

A. PRIMARY HEATING, VENTILATION, AND AIR CONDITIONING UNITS ARE TO BE BY CARRIER OR APPROVED EQUAL BY TRANE OR LENNOX, AS SCHEDULED. ALL COMPRESSORS ARE TO INCLUDE A 5-YEAR EXTENDED WARRANTY.
B. ALL EQUIPMENT SHALL BE COMPLETE IN EVERY RESPECT WITH ALL DEVICES, APPURTENANCES, AND ACCESSORIES PROVIDED TO MEET THE DESIGN INTENT AND OPERATION OF THE SYSTEMS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN.
C. EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL AIR CONDITIONING EQUIPMENT MUST HAVE A CONDENSATE DRAIN AND BE TRAPPED IN ACCORDANCE WITH MANUFACTURERS DATA. SEE DRAWINGS FOR ADDITIONAL DETAILS.
D. SECONDARY DRAIN PANS ARE REQUIRED TO BE INSTALLED BENEATH ALL INDOOR AIR CONDITIONING EQUIPMENT WITH THE EXCEPTION OF VAV BOXES. SECONDARY PANS ARE TO PROTECT ENTIRE UNIT. PROVIDE CONDENSATE PUMPS, AS REQUIRED. CONDENSATE SHALL BE DIRECTED TO MOP SINK OR AS SPECIFIED ON PLANS.

2. ROOFTOP UNITS

A. UNITS TO HAVE DIRECT DRIVE HERMETIC COMPRESSORS WITH INTERNAL SPRING VIBRATION ISOLATION, BUILT-IN THERMAL OVERLOAD PROTECTION, CRANCKCASE HEATER, LOW PRESSURE SWITCHES.
B. EVAPORATOR SECTION TO HAVE COPPER TUBE/ALUMINUM FIN COIL, CENTRIFUGAL BLOWER WITH BELT DRIVE, DRAIN PAN, FILTER RACK WITH THROWAWAY FILTERS.
C. CONDENSER SECTION WITH COPPER TUBE/ALUMINUM FIN COILS AND DIRECT DRIVE PROPELLER FANS.
D. HEATING SECTION TO HAVE ALUMINIZED STEEL HEAT EXCHANGER, MINIMUM 81% AFUE RATING, FORCED COMBUSTION BLOWER AND COMPLETE FACTORY INSTALLED CONTROLS INCLUDING 100% GAS SAFETY SHUTOFF AND DIRECT SPARK IGNITION. HEATING EXCHANGERS TO HAVE EXTENDED (5 YEAR) WARRANTY.
E. UNIT CABINET OF HEAVY GUAGE GALVANIZED STEEL WITH WEATHER RESISTANT BAKED ENAMEL FINISH. UNIT TO HAVE ROOF CURB, ECONOMIZER CONTROL SECTION WITH BAROMETRIC RELIEF DAMPER.
F. MICROPROCESSOR CONTROLS SHALL INCLUDE ANTI-SHORT CYCLE TIMERS, AND MINIMUM RUN TIME SEQUENCE. uNIT TO HAVE SINGLE POINT POWER CONNECTION AND 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE WITH COVER U.L. LISTED FOR DAMP LOCATIONS.

3. VARIABLE AIR VOLUME BOXES (VAV)

A. PROVIDE VAV BOXES COMPLETE WITH CONTROLS, HEATING COILS (FANS AS REQUIRED). INSTALLATION, DUCT CONNECTIONS, AND FLEXIBLE DUCT/PIPE CONNECTIONS SHALL BE PROVIDED BY THE CONTRACTOR.

4. EXHAUST FANS

A. BASIS OF DESIGN FOR EXHAUST FANS IS GREENHECK. APPROVED EQUAL EQUIPMENT BY PENN OR ACME IS ALSO ACCEPTABLE.
B. PROVIDE EXHAUST FAN UNITS COMPLETE WITH GRAVITY BACK DRAFT DAMPERS. ALL DUCTWORK, ROOF OPENINGS, CURBS AND CAPS NECESSARY TO PROVIDE A COMPLETE EXHAUST SYSTEM. REFER TO PLANS FOR APPLICABILITY.
C. CENTRIFUGAL ROOF EXHAUST FANS SHALL BE BELT DRIVE WITH ALUMINUM HOUSING, BIRD SCREEN, PERMANENTLY LUBRICATED MOTOR, U.L. LISTING AND INTEGRAL DISCONNECT SWITCH.
D. CEILING OR CABINET FANS SHALL HAVE CENTRIFUGAL WHEEL WITH BACKDRAFT DAMPER, VIBRATION ISOLATORS, INTEGRAL DISCONNECT SWITCH, WHITE PLASTIC GRILLE (WHERE APPLICABLE) AND U.L. LISTING.

5. BASEBOARD, CABINET, AND UNIT HEATERS

A. WHERE SHOWN ON DRAWINGS, PROVIDE ELECTRIC HEATERS COMPLETE WITH ELECTRIC HEATING COIL, CONTROLS, AND INTEGRAL THERMOSTAT.

6. VIBRATION ISOLATION DEVICES

A. VIBRATION ISOLATION DEVICES SHALL BE PROVIDED IN ALL SUPPORTS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, FAN POWERED VAV BOXES, ETC.) AND STRUCTURE.
B. VIBRATING EQUIPMENT HUNG FROM STRUCTURE SHALL BE ISOLATED WITH RUBBER AND SPRING DEVICES. VIBRATING EQUIPMENT SUPPORTED FROM FLOOR OR DECK SHALL BE ISOLATED WITH HOUSED SPRING MOUNT DEVICES.
C. EXAMINE DEAD LOAD AND OPERATING LOAD CONDITIONS WHEN SELECTING DEVICES. ADJUST FOR PROPER ALIGNMENT AND LOADING. AVOID "GROUNDING" THE ISOLATOR.
D. CHECK HANGER ROD SIZE FOR ALLOWABLE LOADS AT THE ISOLATING DEVICE AND AT THE UPPER AND LOWER ATTACHMENTS TO STRUCTURES, DUCTS, EQUIPMENT, ETC.
E. CONSULT MANUFACTURER FOR APPLICATION DATA.

7. CURBS AND STEEL FRAMING FOR SUPPORT

A. CURB IS TO BE OF UNIVERSAL TYPE
B. THIS CONTRACTOR WILL PROVIDE ALL NECESSARY CURBS AND STEEL FRAMING REQUIRED TO INSTALL ALL HVAC EQUIPMENT AS DESCRIBED OR IMPLIED ON THE DRAWINGS. CURBS SHALL BE A MINIMUM OF 14" HIGH, OF THE SAME MANUFACTURER OF THE EQUIPMENT SUPPORTED. INSULATE UNDER THE COMPRESSOR SECTION TO PREVENT CONDENSATION. ALL CURBS MUST BE INSTALLED SO THAT TOP OF CURBS ARE "DEAD" LEVEL. ALL PENETRATIONS OF EXISTING STRUCTURE SHALL BE DONE IN ACCORDANCE TO THE OWNER'S GUIDELINES AT THIS CONTRACTOR'S EXPENSE.

C. METAL DUCTWORK - NO FIBERGLASS DUCT ALLOWED

1. NO DUCTWORK SHALL BE FABRICATED PRIOR TO APPROVAL BY THE CONSTRUCTION MANAGER. SIGNIFICANT DEVIATIONS FROM DESIGN MUST BE APPROVED BY CONSTRUCTION MANAGER PRIOR TO FABRICATION OR INSTALLATION. ALL DUCT MAINS ARE TO BE RECTANGULAR UNLESS NOTED OTHERWISE. ALL DUCT BRANCHES TO DIFFUSERS ARE TO BE ROUND RIGID DUCT.

2. EXCEPT AS OTHERWISE INDICATED, FABRICATE AND INSTALL RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" OF THE LATEST EDITION. CONFORM TO THE REQUIREMENTS IN THE REFERENCED STANDARD FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.

3. EXCEPT WHERE OTHERWISE INDICATED, CONSTRUCT DUCT SYSTEMS TO THE FOLLOWING PRESSURE CLASSIFICATIONS: (VERIFY WHETHER RETURN OR EXHAUST DUCT IS POSITIVE OR NEGATIVE PRESSURE).

A. SUPPLY DUCTS: 2 INCHES WATER GAUGE, POSITIVE PRESSURE
B. RETURN AND EXHAUST DUCTS: 2 INCHES WATER GAUGE NEGATIVE PRESSURE. PRESSURE TEST DUCTS FOR LEAKAGE. REMAKE LEAKING JOINTS AND APPLY SEALANTS AS REQUIRED TO FABRICATE A SYSTEM THAT DOES NOT EXCEED 5% LEAKAGE OR LESS AS STATED BY PRESSURE CLASS RATINGS IN SMACNA STANDARDS.

4. AS A MINIMUM, CROSSBREAK ALL FLAT SURFACES OR REINFORCE WITH A BEAD APPROXIMATELY 3/8" WIDE X 3/16" DEEP ON 12" CENTERS TO PREVENT VIBRATIONS.

5. INSTALL DOUBLE THICKNESS TURNING VANES IN ALL RIGHT ANGLE ELBOWS.

6. INSTALL RIGID ROUND AND RECTANGULAR METAL DUCT WITH SUPPORT SYSTEMS INDICATED IN SMACNA STANDARDS. SUPPORT HORIZONTAL DUCTS WITHIN 2 FEET OF EACH ELBOW AND WITHIN 4 FEET OF EACH BRANCH INTERSECTION USING DOUBLE STRAP HANGERS ON EACH SIDE OF FITTING. SUPPORT VERTICAL DUCTS AT A MAXIMUM INTERVAL OF 16 FEET AND AT EACH FLOOR. NO WOOD SHALL BE USED TO SUPPORT OR BRACE DUCTS. PROVIDE SWAY AND SEISMIC BRACING AS REQUIRED BY STATE AND LOCAL CODES OR BY LANDLORD.

7. WHERE DUCTS PASS THROUGH ROOFS AND FLOORS, PROVIDE AS MINIMUM 1- 1/2"X1-1/2" X1/8" STEEL ANGLE FRAMES AT EACH SIDE OF OPENING. THE ANNULAR SPACE BETWEEN DUCT AND ANGLE FRAMES SHALL BE CAULKED WITH SILICONE SEALANT OR FIREPROOFED AS REQUIRED BY ASSEMBLY FIRE RATING.

8. ALL TRAVERSE JOINTS AND SEAMS IN SUPPLY AIR DUCT SHALL BE SEALED AIR TIGHT WITH DAP CMC DUCT SEALER. JOINTS ALSO SHALL BE RIVETED OR CONNECTED WITH SHEET METAL SCREWS.

9. SOFT ELASTOMER BUTYL GASKET WITH ADHESIVE BACKING SHALL BE USED TO SEAL FLANGED JOINTS.

10. DUCT TRANSITIONS SHALL NOT EXCEED 30 DEGREES SLOPE EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

11. PROVIDE ACCESS TO ALL MOTORIZED DAMPERS, FIRE DAMPERS, CONTROLS, AND OTHER ITEMS IN DUCTWORK THAT REQUIRE SERVICE OR INSPECTION. IF THE ACCESS PANEL LOCATION IS EXPOSED TO THE SALES AREA, IT MUST BE APPROVED BY THE TENANT'S CONSTRUCTION MANAGER PRIOR TO INSTALLATION. LAY-IN SUPPLY AND RETURN AIR DIFFUSERS, GRILLES AND REGISTERS WITH PLASTER FRAMES MAY BE USED AS ACCESS LOCATIONS.

12. FLEXIBLE CONNECTIONS

A. FLEXIBLE COLLARS SHALL BE PROVIDED IN ALL CONNECTIONS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, FAN POWERED VAV BOXES, ETC.) AND DUCTS OR CASINGS. ALSO, PROVIDE FLEXIBLE CONNECTIONS WHERE DUCTS CROSS BUILDING EXPANSION JOINTS.
B. FLEXIBLE CONNECTIONS SHALL CONSTRUCTED OF NEOPRENE-COATED FLAMEPROOF FABRIC. PROVIDE ADEQUATE JOINT FLEXIBILITY TO ALLOW FOR MOVEMENT AND PREVENT THE TRANSMISSION OF VIBRATION.
C. FLEXIBLE CONNECTION IS TO BE RATED FOR THE OPERATING PRESSURE OF THE SYSTEM.

13. FIRE DAMPERS

A. PROVIDE PRIMARY FIRE DAMPERS WHERE INDICATED OR REQUIRED BY CODES. DAMPERS SHALL BE DESIGNED FOR HORIZONTAL OR VERTICAL FLOW OF AIR AS REQUIRED. FIRE DAMPERS SHALL BE UL LABELED.
B. FIRE DAMPERS SHALL HAVE THE BLADES OUT OF THE AIRSTREAM AND A 165°F FUSIBLE LINK, TYPE A, AS MINIMUM.
C. PROVIDE ALL NECESSARY FRAMING AND SLEEVES FOR DAMPER MOUNTING PER UL AND CODE REQUIREMENTS.
D. PROVIDE DUCT ACCESS DOORS IN AN ACCESSIBLE LOCATION FOR ALL FIRE DAMPERS. DOOR IS TO BE 20 GA GALVANIZED DOOR WITH QUICK-OPENING LATCH AND PIANO HINGE.

14. FLEXIBLE AIR DUCT

A. FLEXIBLE AIR DUCT SHALL BE 1" INSULATED CLASS 1 AND RATED FOR THE OPERATING PRESSURE OF THE SYSTEM. DUCT CONSTRUCTION MATERIAL (PLASTIC, CLOTH, ALUMINUM) MUST ADHERE TO LOCAL CODES AND LANDLORD'S REQUIREMENTS AND BE INCLUDED AS SUCH IN THE BID.
B. FLEXIBLE AIR DUCT MAY ONLY BE USED IN VERTICAL APPLICATIONS WITH PRIOR APPROVAL FROM TENANT'S CONSTRUCTION MANAGER.
C. FLEXIBLE DUCT SHALL NOT EXTEND OVER 5'-0" IN LENGTH AT ANY ONE LOCATION.

15. SUPPLY AIR TAKE-OFF FITTINGS

A. PROVIDE CONICAL OR "BELL-MOUTH" TAKE-OFFS FROM MAIN DUCTWORK TO ROUND BRANCHES. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
B. PROVIDE 45° RECTANGULAR TAKE-OFFS FROM MAIN DUCTWORK TO RECTANGULAR BRANCHES.

16. DAMPERS

A. PROVIDE MANUAL LOCKING QUADRANT VOLUME CONTROL DAMPERS WITH HANDLE OPERATORS IN EACH BRANCH DUCT AND AS SHOWN ON PLANS TO FACILITATE AIR BALANCING.
B. WHERE ACCESS TO BALANCING DAMPER IS RESTRICTED, YOUNG'S REGULATORS SHALL BE USED.
C. ALL RECTANGULAR DAMPERS IN OUTSIDE AIR, RELIEF AIR, OR RETURN AIR DUCTS ARE TO BE OF OPPOSED BLADE TYPE. ALL OUTSIDE AIR DUCT DAMPERS MUST ALSO BE OF THE LOW LEAKAGE TYPE.
D. ALL MOTORIZED DAMPERS NOT FURNISHED WITH EQUIPMENT ARE TO BE HONEYWELL DAMPERS.

17. DIFFUSERS, GRILLES, AND REGISTERS

A. PROVIDE DIFFUSERS GRILLES AND REGISTERS AS SCHEDULED. DEVICES TO BE COMPLETE WITH DAMPERS FRAMES AND ALL ACCESSORIES. FINISH AS INDICATED.
B. INSTALL ALL AIR DEVICES AS LOCATED ON THE ARCHITECTURAL REFLECTED CEILING PLAN.
C. APPROVED MANUFACTURERS: TITUS IS SPECIFIED, EQUALS BY METALAIRE OR E.H. PRICE ARE ACCEPTABLE.

18. MEDIUM PRESSURE DUCT

A. WHERE DUCTWORK IS SPECIFICALLY NOTED AS MEDIUM PRESSURE, IT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS FOR A PRESSURE RATING OF 3 INCHES WATER COLUMN MINIMUM OR LARGER AS REQUIRED BY ENGINEER.
B. ALL GAUGES AND REINFORCEMENT MUST MEET WITH THE LATEST EDITION OF SMACNA STANDARDS FOR MEDIUM PRESSURE DUCT AND WITH THE LANDLORD'S CRITERIA.
C. ALL OTHER ITEMS FROM METAL DUCTWORK SPECIFICATION SECTION APPLY TO THIS SECTION.

19. DUCTWORK INSULATION

A. INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOGNIZED INDUSTRY PRACTICES. INSULATION MUST COMPLY WITH NFPA 90A. DUCT SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
B. VAPOR BARRIER IS TO BE MAINTAINED THROUGHOUT DUCT SYSTEM. ALL JOINTS MUST BE TAPED SO THAT NO INSULATION FIBER IS VISIBLE. EXTEND DUCTWORK INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS, AND SIMILAR PENETRATIONS.
C. ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NO HIGHER THAT 50 WHEN TESTED IN ACCORDANCE WITH ASTM C 411, OR AS REQUIRED BY LOCAL CODES.
D. INSULATE SUPPLY AND RETURN AIR DUCTWORK. DUCTWORK SHALL BE EXTERNALLY WRAPPED WITH 1 1/2" THICK, 1 POUND PER CUBIC FOOT DENSITY FOIL FACED FIBERGLASS INSULATION (R=5.6).
E. INSULATE ALL DUCTWORK EXPOSED TO THE OUTSIDE AIR AND OUTSIDE AIR DUCTWORK WITH 2" THICK, 2 POUND PER CUBIC FOOT DENSITY (R=8.0) DUCT WRAP WITH VAPOR BARRIER.

20. SYSTEM CLEANOUT

A. DUCTWORK AND AIR HANDLING EQUIPMENT IS TO BE CLEANED OUT AND BLOWN OUT BEFORE PAINTING IS STARTED BY THE GENERAL CONTRACTOR
B. FILTERS MUST BE IN UNITS AT ANY TIME FANS ARE OPERATED.

D. SYSTEM TESTING, ADJUSTING, AND BALANCING

1. TESTING, ADJUSTING AND BALANCING OF ALL WORK SHALL BE MADE BY AN INDEPENDENT CONTRACTOR WHO IS CURRENTLY LICENSED ASSOCIATED AIR BALANCING COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) BALANCING CONTRACTOR. NO OTHER BALANCE REPORTS WILL BE REVIEWED OR ACCEPTED. ALL BALANCING WORK MUST BE COMPLETE AND DONE IN ACCORDANCE WITH THE MOST RECENT STANDARDS OF THEIR SOCIETY. PAYMENT OF ALL COSTS FOR TESTING SHALL BE MADE BY THE HVAC CONTRACTOR.

2. THE HVAC CONTRACTOR SHALL INSTALL NEW FILTERS IN ALL UNITS PRIOR TO THE AIR BALANCE. THE COMPLETE AIR BALANCE SHALL TAKE PLACE WITH OUTSIDE AIR DAMPERS IN MINIMUM POSITION.

3. BALANCE AIR AND WATER QUANTITIES TO WITHIN + 5% OF THAT INDICATED ON THE DRAWINGS. ANY REQUIRED CHANGES IN SHEAVES, BELTS, PULLEYS, OR THE ADDITION OF DAMPERS REQUIRED TO ACHIEVE SPECIFIED FLOW RATES SHALL BE PERFORMED BY THE HVAC CONTRACTOR WITH NO ADDITIONAL COST TO THE TENANT.

4. THE BALANCE REPORT SHALL INCLUDE AS A MINIMUM THE FOLLOWING INFORMATION:

A. AABC OR NEBB CERTIFICATION NUMBER AND SIGNATURE OF BALANCING CONTRACTOR.
B. INSTRUMENTATION LIST WITH LAST CALIBRATION DATES.
C. MAKE AND MODEL NUMBERS OF ALL HVAC EQUIPMENT TESTED.
D. AIR CFM AND STATIC PRESSURE READINGS (DISCHARGE AND SUCTION) AS MEASURED BY PITOT TUBE DUCT TRAVERSE AT THE UNIT.
E. MOTOR NAMEPLATE DATA WITH ACTUAL FIELD VOLTAGE AND AMPERAGE READINGS FOR EACH LEG.
F. MOTOR AND FAN RPMS, SHEAVE SIZES AND BELT SIZES.
G. OUTSIDE, RETURN, MIXED AND SUPPLY AIR TEMPERATURES AT FULL COOLING.
H. WATER BALANCE DATA INCLUDING GPM WITH INLET AND OUTLET TEMPERATURE AND PRESSURE READINGS (WHERE APPLICABLE).
I. MAKE AND MODEL NUMBERS OF ALL AIR DISTRIBUTION EQUIPMENT.
J. FINAL BALANCED AIR VOLUMES AT ALL OUTLETS (INCLUDING RETURNS WHERE DUCTED).
K. INDEXED PLAN WITH DIFFUSER AND RETURN LOCATIONS.
L. REPORT SHALL INCLUDE VAV BOX AIRFLOW SENSOR DIFFERENTIAL PRESSURE READING AT MAX. AND MIN. COOLING.

5. ALL CONTROL SEQUENCES SHALL BE TESTED (INTERLOCKED EQUIPMENT, SMOKE DETECTORS, SMOKE EVACUATION, ECONOMIZER, ETC.) AND OPERATING STATUS RECORDED IN THE REPORT.

6. THREE COPIES OF THE BALANCE REPORT SHALL BE SUBMITTED THROUGH THE GENERAL CONTRACTOR TO THE CONSTRUCTION MANAGER FOR APPROVAL.

7. THE BALANCING CONTRACTOR SHALL PERFORM ALL APPLICABLE TESTING AND BALANCING FUNCTIONS REQUIRED FOR THE SYSTEM DESIGNED IN THESE DRAWINGS. THE BALANCING CONTRACTOR SHALL RECHECK ANY ITEMS THAT THE CONSTRUCTION MANAGER DEEMS NECESSARY AT NO ADDITIONAL COST TO THE OWNER.

8. FINAL BALANCE REPORT SHALL BE INCLUDED IN THE OPERATION & MAINTENANCE MANUALS.

9. A COPY OF THE FINAL AIR BALANCE REPORT MUST GO TO THE MALL'S OPERATIONS DIRECTOR.

E. FINAL HVAC INSPECTIONS

1. ASIDE FROM NORMAL INTERIM INSPECTIONS OF WORK IN PLACE, THE TENANT SHALL HAVE THE RIGHT TO AN INDEPENDENT HVAC CONTRACTOR INSPECT THE FINISHED HVAC INSTALLATION UPON COMPLETION FOR COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODES. THE INSTALLING CONTRACTOR WILL BE RESPONSIBLE TO BRING ALL ITEMS REPORTED BY THE INDEPENDENT HVAC CONTRACTOR UP TO PLANS AND SPECIFICATION REQUIREMENTS AT NO COST TO OWNER.

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MECHANICAL SPECIFICATIONS

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