

# MECHANICAL/PLUMBING SPECIFICATIONS

## PART ONE - GENERAL

- THE CONTRACTOR SHALL PROVIDE THE WORK SHOWN ON THE DRAWINGS AND SPECIFIED FOR THEIR INDIVIDUAL SECTIONS OF WORK. THE WORD "WORK" SHALL MEAN ALL LABOR, TRANSPORTATION, MATERIAL, EQUIPMENT, TOOLS, INSTALLATION, SUPERVISION AND ANY OTHER INCIDENTAL ITEMS OR SERVICES NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE COMPLETE SYSTEMS WHICH SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY INDICATED OR NOTED.
- ALL GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE CONSTRUCTION SPECIFICATIONS ARE MADE PART OF THIS SPECIFICATION AND HAVE THE SAME FORCE AND EFFECT AS IF COMPLETELY REPRODUCED.
- THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL, MAKE ALL FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATING CONDITION.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE APPLICABLE FLORIDA BUILDING CODE - BUILDING, FLORIDA BUILDING CODE - MECHANICAL, FLORIDA BUILDING CODE - PLUMBING, NATIONAL ELECTRIC CODE (NEC), AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING ALL FEES AND OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
- THE CONTRACTOR SHALL CAREFULLY EXAMINE ALL CONTRACT DOCUMENTS. THE CONTRACTOR SHALL COORDINATE THE WORK WITH ALL OTHER TRADES INCLUDING, BUT NOT LIMITED TO, THE CONTRACT DOCUMENTS, SHOP DRAWINGS, ETC. FOR ALL GENERAL CONSTRUCTION, STRUCTURAL, MECHANICAL, ELECTRICAL AND SPECIALTY CONTRACTOR WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS PLANNED, WITHOUT INTERFERENCE WITH OTHER WORK, AND SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUTS NEEDED TO PREVENT CONFLICT WITH OTHER TRADES, TO PROVIDE ACCESS AND FOR THE PROPER EXECUTION OF THE WORK.
- DRAWINGS ARE DIAGNOSTIC AND SCHEMATIC IN NATURE, AND INDICATE THE TYPE, SIZE, ARRANGEMENT AND LOCATION OF MATERIALS AND EQUIPMENT. WORK INCLUDES CERTAIN COMPONENTS, AFFURTENANCES AND RELATED SPECIALTIES THAT MAY NOT BE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY ITEMS TO COMPLETE THE WORK ACCORDING TO INDUSTRY STANDARDS. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS TO CALL OUT FOR FINISHED WORK TESTED AND READY FOR OPERATION. DO NOT SCALE DRAWINGS. ARRANGEMENT OF EQUIPMENT AND ROUTING OF PIPES AND DUCTWORK, ETC. INDICATED ON DRAWINGS SHALL BE ROUTED PLUMB AND AT RIGHT ANGLES TO BUILDING CONSTRUCTION AND MAY REQUIRE MODIFICATION DUE TO UNFORESEEN CONDITIONS AND REQUIRE ON SITE REVISIONS DURING CONSTRUCTION. (SEE ALSO "BIDDING").
- ALL WORK REQUIRED FOR IDENTICAL ITEMS SHOWN ON THE DRAWINGS SHALL BE PROVIDED, ALTHOUGH EACH SPECIFIC IDENTICAL ITEM MAY NOT BE SHOWN IN DETAIL.
- THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR ALL EQUIPMENT AND MATERIALS SPECIFIED HEREIN TO THE ENGINEER. THE ENGINEER SHALL REVIEW SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ENGINEERING FEES NECESSARY TO CHANGE PERMIT DOCUMENTS BASED ON ALTERNATE SUBMITTAL PACKAGES/EQUIPMENT SUBSTITUTIONS.
- ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER FOR CONSIDERATION PRIOR TO BIDDING. THE OWNER'S REPRESENTATIVE SHALL PREAPPROVE ANY PROPOSED SUBSTITUTION IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT OR MATERIALS WITH OTHER BUILDING TRADES, INCLUDING ALL ELECTRICAL, STRUCTURAL OR ARCHITECTURAL ELEMENTS. THE CONTRACTOR SHALL IDENTIFY AND ANNOTATE ALL REVISED REQUIREMENTS PER BUILDING TRADE ON THE SHOP DRAWINGS. THE CONTRACTOR SHALL ALSO IDENTIFY ALL COST DEBITS OR CREDITS IN WRITING FOR THE PROPOSED CHANGES PER BUILDING TRADE.
- UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH FIVE (5) COMPLETE SETS OF AS-BUILT DOCUMENTS ACCURATELY SHOWING THE MATERIALS AND EQUIPMENT AS INSTALLED.
- ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE (1) YEAR FROM DATE OF ACCEPTANCE BY OWNER. REFRIGERATION COMPRESSORS SHALL BE GUARANTEED FOR A MINIMUM OF FIVE (5) YEARS FROM DATE OF OWNER'S ACCEPTANCE. IN ADDITION, THE CONTRACTOR SHALL GUARANTEE THAT THE INSTALLATION WHEN OPERATED IN ACCORDANCE WITH THE CONTRACTOR'S INSTRUCTIONS WILL DEVELOP CAPACITY AND CHARACTERISTICS AS SPECIFIED AND WILL FULFILL EACH AND EVERY REQUIREMENT OF THE DRAWINGS AND SPECIFICATIONS. SHOULD THE INSTALLATION IN ANY WAY FAIL TO DO SO, THE CONTRACTOR WILL, WITHOUT DELAY OR WITHOUT COST TO THE OWNER, PROVIDE WHATEVER ADDITIONAL EQUIPMENT, MATERIAL, AND LABOR REQUIRED TO CORRECT THE DEFICIENCY AND COMPLY WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.
- CONTRACTOR SHALL CHECK AND VERIFY ALL SIZES, DIMENSIONS, AND CONDITIONS BEFORE STARTING ANY WORK. ANY DEVIATIONS OR PROBLEMS SHALL BE TRANSMITTED TO THE ENGINEER FOR REVIEW.
- PROVIDE BASE AND COUNTER FLASHING FOR ITEMS PENETRATING THE ROOF OR EXTERIOR WALLS.
- STARTERS AND CONTROLS FOR MOTORS, ETC. TO BE FURNISHED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO INSTALL THE AFOREMENTIONED ITEMS, AND FURNISH ALL POWER WIRING. ALL CONTROL AND INTERLOCKING WIRING SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
- ALL WORK SHOWN IS NEW UNLESS NOTED OTHERWISE.
- MAINTAIN OCCUPANCY AND FIRE WALL SEPARATION INTEGRITY AS REQUIRED. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF ALL OCCUPANCY/FIREWALL SEPARATIONS AND SPECIFIC DETAILS FOR CONSTRUCTION. PROVIDE ALL NECESSARY FIRE AND SMOKE FIRE DAMPERS, ACCESS DOORS, CAULKING, ETC. FOR APPROVED INSTALLATION.

- CONTRACTOR TO ESTABLISH ALL UTILITY SERVICES AND PROVIDE TENANT WITH ALL NECESSARY MEANS TO TRANSFER ACCOUNTS ARE NOT TO BE CANCELED BEFORE TRANSFER. INCLUDE ANY SITE VISITS, INSPECTIONS AND PERMITTING TO TRANSFER ACCOUNT TO TENANT.

## BIDDING

- THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL COMPARE THE WORK SPECIFIED IN THE CONTRACT DOCUMENTS WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL IDENTIFY AND NOTATE ALL WORK OR CONDITIONS THAT ARE DIFFERENT FROM THE CONTRACT DOCUMENTS OR THEIR INTENT. THE CONTRACTOR SHALL, UPON DISCOVERY, IMMEDIATELY NOTIFY AND REPORT, IN WRITING, ANY DISCREPANCIES TO THE ENGINEER. NO EXTRAS OR CHANGE ORDERS WILL BE ALLOWED FOR FAILURE TO PERFORM THE PRE-BID SITE VISIT.
- BASE PROPOSAL ON MANUFACTURER NAMES LISTED UNLESS "OR EQUAL" IS INDICATED. PROVIDE SUBSTITUTION REQUESTS A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO BID DATE CLOSING TO ALLOW TIME FOR DUE CONSIDERATION OF PROPOSED ALTERNATE. DETERMINATION OF SUBSTITUTION OF EQUALITY RESTS SOLELY WITH THE ENGINEER.

## PART TWO - PRODUCTS

### HVAC EQUIPMENT

- PROVIDE HVAC EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S OWNER'S OPERATING AND MAINTENANCE MANUAL. TROUBLE-FREE PRIOR TO STARTING TEST AND BALANCE (TAB) WORK.

### DUCTWORK

- DUCTWORK SHALL BE ASTM A575 OR A571 GALVANIZED SHEET METAL LOCK-FORMING QUALITY HAVING ZINC COATING OF 125 OZ PER SQ. FT. FOR EACH SIDE PER ASTM A590 AND INSTALLED ACCORDING TO ASHRAE RECOMMENDATIONS, AND SMACNA DUCT CONSTRUCTION STANDARDS. DUCTWORK SYSTEMS SHALL BE (2" CLASSIFICATION SUPPLY, AND 1" CLASSIFICATION RETURN AND EXHAUST).
- PROVIDE MANUAL VOLUME DAMPERS WITH LOCKING QUADRANTS AND IDENTIFY RIBBONS AT DAMPER HANDLES FOR AIR BALANCING EACH BRANCH DUCT TAKE-OFF OR PIECE OF AIR DISTRIBUTION EQUIPMENT.
- SEAL ALL DUCT PENETRATIONS THROUGH WALLS, FLOOR AND ROOF. SEAL ALL TRANSVERSE DUCT SEAMS WITH APPROVED MASTIC. DUCT TAPES SHALL NOT BE ALLOWED FOR RIGID DUCTWORK. SUPPLY AND RETURN DUCTWORK SHALL BE INSULATED WITH 1 1/2" THICK FLEXIBLE GLASS FIBER ANSI/ASTM C209, MAXIMUM 'K' VALUE OF 0.23 AT 75°F, WITH FOL-KRAFT FLAME RESISTANT VAPOR BARRIER, 3/4" C/FT. DENSITY.
- ALL DUCTWORK SIZES SHOWN ARE FREE AREA DIMENSIONS. EXHAUST DUCTWORK SHALL BE UNINSULATED. DUCTWORK INTERIOR BEHIND DEVICES SHALL BE PAINTED FLAT BLACK.
- LINE DUCTWORK TEN FEET UPSTREAM AND DOWNSTREAM OF ALL FANS AND WHERE INDICATED WITH 1 1/2" THICK, 3 POUNDS PER CUBIC FOOT (PCF) DENSITY DUCT LINER. LINING SHALL BE APPLIED TO DUCTWORK WITH FIRE RESISTANT ADHESIVES, FOSTER 95-10 OR EQUAL, AND COPPER OR CADMIUM PLATED MECHANICAL FASTENERS, (GRAHAM, O'MARK OR EQUAL). ALL DUCT SIZES INDICATED ARE CLEAR INSIDE.
- FLEXIBLE DUCTWORK WHERE INDICATED ON THE DRAWINGS SHALL BE INSULATED, WITH PLASTIC VAPOR BARRIER AT INTERIOR AND EXTERIOR. STEEL WIRE COIL REINFORCED. JOINTS SHALL BE BAND-CLAMPED AND TAPE SEALED TO MAINTAIN INTEGRITY OF VAPOR BARRIER. FLEXIBLE INSTALLATION SHALL BE SUPPORTED TO ELIMINATE SAGS. FLEXIBLE GLASS FIBER INSULATION SHALL HAVE A MAXIMUM 0.23 K VALUE AT 75°F.
- FIRE DAMPERS SHALL MEET UL 555 AND SHALL HAVE BLADES OUT OF AIR STREAM IN COILED POSITION. FUSIBLE LINK SHALL BE RATED AT 165°.

### MECHANICAL PRODUCTS

- REFRIGERANT PIPING: PROVIDE PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND FAN COIL UNIT OR HEAT PUMP. PROVIDE ALL NECESSARY AUXILIARIES AND APPARATUS TO MAKE SYSTEM COMPLETE AND OPERABLE UNDER FULLY AUTOMATIC CONTROL. PIPING SHALL BE ACR COPPER TUBING MADE UP WITH WROUGHT COPPER FITTINGS USING SILVER SOLDER OF SIZES AS RECOMMENDED BY MANUFACTURER. SUCTION LINES, HOT GAS BYPASS AND OUTDOOR LIQUID LINES SHALL BE INSULATED WITH 3/4" THICK RIGID CLOSED CELL FOAM INSULATION. DO NOT RUN PIPE INSULATION IN RETURN AIR FLOW.
- DIFFUSERS, REGISTERS AND GRILLES: MAXIMUM SOUND PRESSURE LEVELS SHALL NOT EXCEED NC 30. COORDINATE FINISH AND MOUNTING TYPE WITH ARCHITECT. ACCEPTABLE MANUFACTURERS: TITUS, METAL, AIRE, TUTTLE AND BAILEY, PRICE
- FANS: PROVIDE 14" ROOF CURB, DISCONNECT SWITCH, FORWARD CURVED BELT DRIVEN OR DIRECT DRIVEN STEEL FAN, BACK DRAFT DAMPER AND CAST IRON OR STEEL DYNAMICALLY BALANCED VARIABLE OR ADJUSTABLE PITCH MOTOR SHEAVES. ACCEPTABLE MANUFACTURERS: GREENHECK, COOK, ACME.
- PACKAGED ELECTRIC/GAS ROOFTOP UNITS (HEAT PUMPS INCLUDED): UNIT SHALL BE COMPLETE WITH HERMETICALLY SEALED COMPRESSOR WITH HIGH AND LOW PRESSURE CUT-OFFS, COILS, HEATING SECTION, AIR COOLED CONDENSER, CONDENSER BLOWER OR FAN, AUTOMATIC CONTROLS, CONTROL PANEL WITH STARTERS AND DISCONNECT SWITCH, RELAYS, ETC. FOR SINGLE POINT POWER CONNECTION. UNITS SHALL BE FURNISHED WITH 2 SETS OF 1" THROUGHOUT PLEATED 30% FILTERS. UNITS SHALL BE COMPLETELY FACTORY WIRED FOR TERMINAL CONNECTIONS OF THERMOSTAT WITH A FAN-AUTO/MANUAL SWITCH AND A SYSTEM HEAT/OFF/COOL/AUTO SWITCH UNITS TO BE INSTALLED AS PER MANUFACTURER RECOMMENDATIONS, WITH MANUAL OUTSIDE AIR DAMPER, 14" ROOF CURB, ITEMS AS SCHEDULED AND ALL NECESSARY ACCESSORIES REQUIRED FOR EFFICIENT AND PROPER OPERATION. ACCEPTABLE MANUFACTURERS: TRANE, LENNOX, MCQUAY, CARRIER, YORK.

- AIR COOLED CONDENSER: PROVIDE COILS WITH INTEGRAL SUBCOOLING AND CASING WITH 6" DUCT. COILS SHALL BE ALUMINUM PLATE FINN ON COPPER TUBES (LEAK TESTED 150 PSIG, PRESSURE TESTED 420 PSIG). FANS SHALL BE DIRECT DRIVE PROPPELLER WITH FAN GUARD. FAN SHAFT AND BLADES SHALL BE PERMANENTLY LUBRICATED OR BALL BEARING SHAFT BEARINGS. WATER OR DX CORROSION PROTECTED. HEAD PRESSURE CONTROL SHALL BE BY FAN CYCLING. COMPRESSOR SHALL BE HERMETIC WITH EXTERNAL SPRING ISOLATORS AND UNLOAD IN RESPONSE TO SUCTION PRESSURE IN STEPS FOR PARTIAL LOAD OPERATION. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK.
- SPLIT SYSTEM FAN COIL UNIT: UNITS SHALL HAVE GALVANIZED STEEL CABINET WITH FIBERGLASS INTERNAL LINER AND SERVICE PANELS. FAN SHALL BE CENTRIFUGAL FORWARD CURVE, STATICALLY AND DYNAMICALLY BALANCED, AND HAVE PERMANENTLY LUBRICATED OR BALL BEARING SHAFT BEARINGS. WATER OR DX COILS SHALL BE COPPER TUBES MECHANICALLY BONDED TO ALUMINUM FINN AND LEAK TESTED AT 350 PSIG. PROVIDE TWO OR THREE WAY WATER CONTROL VALVES AS REQUIRED. PROVIDE INTEGRAL ON WALL THERMOSTAT, 1" DISPOSABLE FILTERS, 3 SPEED MOTOR WITH SPEED SWITCH AND 18 GAUGE STEEL DRAIN FAN UNDER COILS. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK.

### AUTOMATIC TEMPERATURE CONTROL

- THE MECHANICAL CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS. THIS SYSTEM SHALL INCLUDE BUT NOT BE LIMITED TO: HEAT/OFF/COOL/AUTO - THERMOSTAT, AUTO/MANUAL - FAN, TRANSFORMERS AND ALL REQUIRED RELAYS, WIRING AND CONDUIT. THERMOSTAT SHALL BE 1 DAY PROGRAMMABLE WITH AUTOMATIC CHANGE OVER FROM HEATING TO COOLING AND VICE VERSA.
- MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL, IN ACCORDANCE WITH NEC AND THIS PROJECT ELECTRICAL SPECIFICATIONS, ALL CONDUIT, WIRE, JUNCTION BOXES, THERMOSTAT BACK BOXES AND CIRCUIT BREAKERS REQUIRED FOR A FULLY OPERATIONAL A/C SYSTEM.
- DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR WHEN THE DUCT TYPE SMOKE DETECTOR IS REQUIRED TO BE PART OF THE DESIGN BUILD FIRE ALARM SYSTEM. WHEN NOT PART OF THE FIRE ALARM SYSTEM, THE DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND PROVIDED AT 24 VAC. DUCT MOUNTED SMOKE DETECTORS SHALL SHUT DOWN THE RESPECTIVE UNIT AND ALL ADDITIONAL UNITS IN A COMMON AREA IF THE SUMMATION OF THE AIRFLOW EXCEED 2000 CFM TOTAL.

### PLUMBING EQUIPMENT

- PROVIDE PLUMBING EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S OWNER'S OPERATING AND MAINTENANCE MANUAL. TROUBLE FREE AND CONFORMING TO THE ONE-YEAR WARRANTY.

### PLUMBING PRODUCTS

- DOMESTIC WATER PIPING: (ABOVE GROUND) TYPE "L" COPPER ABOVE GRADE (ASTM B-88), WROUGHT FITTINGS/ASME B16.22, JOINTS: ANSI/ASTM B32, SOLDER, GRADE 95 TA, 0.2% MAX LEAD. (UNDER GROUND): PROTECTED FROM SOIL; TYPE "K" COPPER BELOW GRADE (ASTM B-88), HARD DRAIN, WROUGHT FITTINGS (ASME B16.22), JOINTS: AUS AS, B, ECU, SILVER BRAZE.
- DOMESTIC WASTE & VENT PIPING MATERIALS: ABOVE GROUND SHALL BE NO-HUB CAST IRON (ASTM-A-888, C15F1 301). BELOW GROUND SHALL BE NO-HUB CAST IRON (ASTM-A-888, C15F1 301). PVC/ABS DUV PIPING MAY BE USED UNDERGROUND BASED ON SOIL CONDITIONS.
- PIPE INSULATION: ALL DOMESTIC COLD WATER PIPING (IN UNCONDITIONED SPACES ONLY) AND ALL DOMESTIC HOT WATER PIPING ABOVE GROUND SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH ALL-SERVICE JACKET AND MAXIMUM K VALUE OF 0.21 AT 75°F. WHERE CLEARANCE LIMITATIONS PREVENT THE USE OF FIBERGLASS INSULATION, A MINIMUM 3/4" THICK CLOSED CELL NEOPRENE PIPE INSULATION MAY BE USED.
- PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2": MALLEABLE IRON, CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING. PIPE SIZES 2" TO 4": CARBON STEEL, ADJUSTABLE CLEVIS. PIPE SIZES 6" AND OVER: ADJUSTABLE STEEL YOKE, CAST IRON ROLL, DOUBLE HANGER.
- INTERIOR CONDENSATE DRAIN PIPING: TYPE 1M COPPER (ASTM B-88), WROUGHT FITTINGS (ASME B16.22), JOINTS: ANSI/ASTM B32, SOLDER, GRADE 95 TA, 0.2% MAX LEAD.
- EXTERIOR CONDENSATE DRAIN PIPING: LATEX COATED PAINTED PVC PIPE FOR UV PROTECTION.

### TEST AND BALANCE REPORT (TAB)

- BALANCE ALL DUCTS, DIFFUSERS, AND GRILLES TO OBTAIN THE AIR QUANTITIES AS SHOWN ON PLANS. TEST AND BALANCE WORK SHALL BE PERFORMED BY AN INDEPENDENT, APPROVED, AND CERTIFIED AABC OR NEBB CONTRACTOR.
- THE TEST AND AIR BALANCE (TAB) REPORT SHALL INCLUDE DESIGN AIR QUANTITIES AND AIR QUANTITIES AFTER ADJUSTMENTS. FURNISH OWNER'S REPRESENTATIVE WITH THREE (3) COPIES OF THE FINAL TAB REPORT.

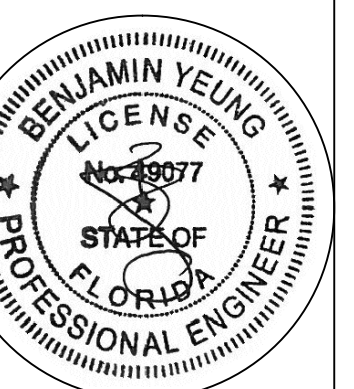
### NOTES

- DIELECTRIC FITTINGS SHALL BE USED WHEREVER DISSIMILAR METALS ARE JOINED.
- PROVIDE ACCESS PANELS IN CEILING TO ACCESS VOLUME DAMPERS WHERE REQUIRED.
- FIRE AND SMOKE FIRE DAMPERS SHALL MEET UL 555 AND UL 555S AND FIRE DAMPERS SHALL HAVE BLADES OUT OF AIR STREAM IN COILED POSITION.

- PLUMBING FIXTURES: PROVIDE CHROME PLATED ANGLE STOPS WITH ESCUTCHEON PLATES AT PLUMBING FIXTURES. ALL PLUMBING FIXTURES SHALL COMPLY WITH LOCAL REGULATIONS AND ADOPTED WATER FIXTURES CODES.
- DISINFECT ALL POTABLE WATER SYSTEMS IN ACCORDANCE WITH PLUMBING CODE AND/OR AWWA STANDARD. PROVIDE WRITTEN CONFIRMATION TO OWNERS REPRESENTATIVE THAT THIS WORK HAS BEEN COMPLETED.

## PART THREE - EXECUTION

- THE CONTRACTOR SHALL PROVIDE ALL SLEEVES, OPENINGS, CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THE WORK. CUTTING AND PATCHING SHALL BE DONE BY WORKMEN SKILLED IN THE TRADES REQUIRED AND PAID BY THE CONTRACTOR REQUIRING THE WORK COMPLETED.
- THE CONTRACTOR SHALL PROVIDE ALL RIGGING, HANDLING OF MATERIALS AND EQUIPMENT, AND THE NECESSARY PROTECTION FOR MATERIALS AND EQUIPMENT.
- THE CONTRACTOR WILL PROTECT THE WORK AND MATERIAL AGAINST DIRT, THREAT, INJURY OR DAMAGE UNTIL ACCEPTED BY OWNER. ALL WORK SHALL BE TURNED OVER TO OWNER CLEAN AND IN NEW CONDITION.
- PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OR DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE FIRE RATING OF THE SEPARATION AREA AND ALL LISTED.
- EACH CONTRACTOR SHALL PROVIDE ALL FOUNDATIONS, HANGERS, AND SUPPORTS FOR ALL EQUIPMENT SUPPLIED AND/OR INSTALLED UNDER THEIR WORK. ANY EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS TO PIPING AND OR DUCTWORK IF APPLICABLE.
- WHERE PIPES OR CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILINGS IN FINISHED AREAS, THEY SHALL BE FURNISHED WITH ESCUTCHEON PLATES (COLOR PER ARCHITECT AND/OR INTERIOR DESIGNER).
- AT THE CONCLUSION OF THE JOB, EACH PIECE OF EQUIPMENT, VALVE, SWITCH, STARTER, PANE, PIPE LINE, CONDUIT, ETC., SHALL BE CLEARLY IDENTIFIED WHETHER EXPOSED OR CONCEALED, COVERED OR UNCOVERED, IN ACCORDANCE WITH OSHA AND ANSI REGULATIONS. IDENTIFY PIPES NEAR EACH VALVE WITH "BRANDY-FERRIA" CODE PIPE TAPE" OR T. 4 B. WESTLINE "TEL-A-PIPE" INDICATING DIRECTION OF FLOW, SERVICE, ZONE, AND SIZE. TAPE SHALL BE APPLIED TO PIPE, CONDUIT, OR COVERING. VALVES, CONTROLS, AND DAMPERS SHALL BE IDENTIFIED BY 2-INCH LACQUERED BRASS TAGS WITH STAMPED LETTERS FASTENED WITH "S" HOOKS OR CHAINS. EQUIPMENT IS TO BE IDENTIFIED AS TO FUNCTION AND PURPOSE BY MEANS OF PERMANENTLY ATTACHED LAMINATED ENGRAVED PHENOLIC NAMEPLATES WITH BEVELED EDGES, AND WHITE LETTERS ON BLACK BACKGROUND. (NO ADHESIVE LABELS ALLOWED).
- AT THE CONCLUSION OF THE WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE BALANCED, ADJUSTED, AND TESTED TO PROVIDE A QUIET-OPERATING, STABLE, AND SAFELY OPERATING SYSTEM(S). DEMONSTRATE OPERATION OF ALL SYSTEMS TO THE OWNER'S DESIGNATED REPRESENTATIVE. TEST AND BALANCE WORK SHALL BE PERFORMED IN ACCORDANCE WITH NEBB OR AABC STANDARDS, BY INDEPENDENT, APPROVED, AND CERTIFIED TEST AND BALANCE PERSONNEL.
- THE MECHANICAL/PLUMBING CONTRACTOR IS RESPONSIBLE FOR RETAINING AND PAYING FOR THE DESIGN SERVICES OF A STRUCTURAL ENGINEER TO CREATE THE DESIGN AND INSTALLATION DRAWINGS FOR MECHANICAL/PLUMBING SYSTEMS SEISMIC RESTRAINT SUPPORT, PER THE PROJECT BUILDING CODE. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT MECHANICAL SYSTEMS SHOP DRAWINGS BASED UPON MULTI DISCIPLINE COORDINATION, INCLUDED WITH THE SHOP DRAWINGS SUBMISSION SHALL BE SEISMIC RESTRAINT DRAWINGS NOTING WHERE SEISMIC SUPPORT IS REQUIRED. FOR EACH AREA NOTED NEEDING SEISMIC SUPPORT FOR THE MECHANICAL SYSTEMS, THERE SHALL BE A SEISMIC DRAWING DETAILING THE REQUIRED SUPPORT. THE SEISMIC SUPPORT DRAWINGS SHALL BE SIGNED AND SEALED BY A REGISTERED STRUCTURAL ENGINEER IN THE SAME STATE AS THE PROJECT. IN ADDITION TO THE PROJECT DESIGN TEAM REVIEW, THE SEISMIC SUPPORT DRAWINGS WILL BE ISSUED TO THE LOCAL BUILDING DEPARTMENT FOR REVIEW AS PART OF A DEFERRED SUBMITTAL FOR THE BUILDING DOCUMENTS. COMMENCEMENT OF CONSTRUCTION PRIOR TO BUILDING DEPARTMENT REVIEW IS AT THE CONTRACTOR'S RISK.
- CONTRACTOR SHALL REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF GRILLES, REGISTERS AND DIFFUSERS.
- PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2" - 6'-0" MAX SPACING, 3/8" ROD DIAMETER; PIPE SIZES 2" TO 3" - 10'-0" MAX SPACING, 1/2" ROD DIAMETER; PIPE SIZES 4 TO 6'-10'-0" MAX SPACING, 3/8" ROD DIAMETER.
- WATER PROOFING AND FLASHING OF PIPE PENETRATIONS THROUGH EXTERIOR WALL AND ROOF SHALL BE BY THIS CONTRACTOR. PLUMBING CONTRACTOR SHALL COORDINATE LOCATIONS AND METHODS WITH GENERAL CONTRACTOR PRIOR TO CONSTRUCTION OF ROOF DECK.
- CONTRACTOR SHALL OBTAIN FROM THE ARCHITECT THE EXACT LOCATION OF EQUIPMENT, PLUMBING FIXTURES, FLOOR DRAINS AND ANY OTHER APPARATUS SPECIFIED IN THESE DRAWINGS.
- PROVIDE CLEAN OUTS IN SANITARY, WASTE AND DRAIN LINES AS SHOWN AND AS REQUIRED BY LOCAL CODE. ALL CLEANOUTS SHALL BE READILY ACCESSIBLE.
- PROVIDE BALANCE VALVE FOR HOT WATER RETURN SYSTEM AS REQUIRED.
- PROVIDE PRESSURE REDUCING VALVE IN SYSTEM AS REQUIRED.
- PROVIDE A NON-VENTED TRAP ON ALL INDIRECT WASTE PIPING FIVE (5) TO FIFTEEN (15) FEET IN DEVELOPED LENGTH. INDIRECT WASTE PIPING WITH ANGLES AND CHANGES OF DIRECTION SHALL BE PROVIDED WITH CLEANOUTS.
- WHERE A SINK IN A BAR, SODA FOUNTAIN, OR COUNTER HAS AN INDIRECT WASTE, THE DEVELOPED LENGTH FROM THE SINK OUTLET SHALL NOT EXCEED FIVE (5) FEET.



AUG. 02, 2016

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proj. no. 16-002  
 date: 08-02-2016  
 project architect: B.A.  
 project manager: A.D.  
 drawn by: MSA  
 file name: LAKEWORTH  
 revised:  
 plot scale: AS NOTED  
 sheet name:  
 SPECIFICATIONS

MSA \*L16203

