SECTION 15700 – MECHANICAL SPECIFICATIONS

GENERAL

1. GENERAL CONDITIONS:
   a. CONFORM TO APPLICABLE PROVISIONS OF THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND THE GENERAL REQUIREMENTS.
   b. DEFINITIONS: FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION. INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE. PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.
2. SCOPE OF WORK:
   a. PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, TOOLS, ERECTION, HOISTING, AND INCIDENTALS REQUIRED TO PROVIDE HEATING, VENTILATION, GREASE EXHAUST, AND AIR CONDITIONING SYSTEMS.
   b. PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.
3. RULES AND REGULATIONS:
   a. ALL WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE GOVERNING CITY. PURCHASE ALL PERMITS ASSOCIATE WITH THE WORK. OBTAIN ALL INSPECTIONS REQUIRED BY CODE.
   b. WHERE THE STANDARDS OF THE DRAWINGS AND SPECIFICATIONS FOR MATERIALS AND/OR WORKMANSHIP ARE HIGHER THAN THE REQUIREMENTS CITED ABOVE, THE DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE.
4. WARRANTY:
   a. PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION.
5. COORDINATION:
   a. COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.
   b. CONTRACTOR SHALL EXECUTE WORK SO THAT PROGRESS WILL HARMONIZE WITH THAT OF THE OTHER TRADES, AND SO THAT ALL WORK MAY PROCEED AS EXPEDITIOUSLY AS POSSIBLE.
   c. TO THE FULLEST EXTENT POSSIBLE, THE WORK UNDER THIS CONTRACT HAS BEEN INDICATED ON THE DRAWINGS IN SUCH POSITIONS AS TO SUIT AND ACCOMMODATE THE WORK OF OTHER TRADES, BUT THE WORK AS INDICATED IS LARGELY DIAGRAMMATIC AND THE FINAL POSITIONS OF ALL EQUIPMENT AND MATERIALS CANNOT BE INDICATED. THEREFORE, THE CONTRACTOR IS DIRECTLY RESPONSIBLE FOR THE CORRECT PLACEMENT OF WORK AND THE PROPER LOCATION AND CONNECTION OF WORK IN RELATION TO WORK OF OTHER TRADES.
6. LOCATION AND SPACE REQUIREMENTS
   a. VERIFY SPACES, DIMENSIONS, LOCATIONS, AND CONDITIONS REQUIRED FOR INSTALLATION OF ALL HVAC AND RELATED WORK.
   b. OBTAIN NECESSARY ROUGH-IN DATA AND DIMENSIONS OF FIXTURES, EQUIPMENT, TENANT FURNISHED EQUIPMENT, OWNER FURNISHED EQUIPMENT, AND EQUIPMENT FURNISHED UNDER OTHER SECTIONS.
   c. NO EXPOSED DUCTS WILL BE PERMITTED TO SHOW ON INTERIOR OF BUILDING IN FINISHED ROOMS. WHERE THIS WOULD OCCUR, EXPOSED PORTION SHALL BE FURRED AND PLASTERED, OR CASED WHEN NOT ADJACENT TO THE WALL.
   d. MAINTAIN SUFFICIENT CLEARANCE AND ACCESSIBILITY. INTERFERENCES BETWEEN WORK OF VARIOUS TRADES WILL BE RESOLVED BY THE ARCHITECT AND OWNER IN CONSULTATION WITH THE ENGINEER. RELOCATE OR OFFSET WORK AS REQUIRED TO ACCOMMODATE WORK OF OTHER TRADES. MAINTAIN CEILING HEIGHTS AND AVOID EXCESSIVE FURRING REQUIREMENTS.
   e. IF NOT PRECISELY LOCATED ON DRAWINGS, OBTAIN LOCATION OF FIXTURES, EQUIPMENT, AND APPLIANCES, FROM ARCHITECT AND FOOD SERVICE EQUIPMENT SUPPLIER. NO DEVIATIONS WILL BE ALLOWED.
7. MEASUREMENTS:
   a. ALL DIMENSIONS OF WORK OF OTHER TRADES WHICH REQUIRE VERIFICATION SHALL BE VERIFIED FROM SHOP DRAWINGS OF SUCH WORK OR FROM ACTUAL MEASUREMENTS AT BUILDING, WHICHEVER IS THE MOST ACCURATE AND PRACTICAL IN THE JUDGMENT OF THE CONTRACTOR, WHO SHALL BE RESPONSIBLE FOR THE ACCURACY OF SUCH MEASUREMENTS.

PRODUCTS

1. GENERAL MATERIALS:
   a. ALL MATERIALS SHALL CONFORM TO APPLICABLE ASHRAE AND SMACNA STANDARDS
   b. BRANDS OF MATERIALS MENTIONED ARE USED AS A STANDARD AND REQUESTS FOR SUBSTITUTIONS WILL BE CONSIDERED WHEN SUBMITTED TO THE ENGINEER IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN THE SUPPLEMENTARY GENERAL CONDITIONS.
   c. APPROVED EQUAL REFERS TO MATERIALS WHICH, IN THE OPINION OF THE ENGINEER, ARE SIMILAR AND EQUAL IN ALL RESPECTS TO MATERIAL OR METHOD INDICATED ON DRAWINGS OR AS SPECIFIED. ENGINEER IS NOT REQUIRED TO PROVE THAT A SUBSTITUTE MATERIAL IS NOT EQUAL TO SPECIFIED MATERIAL. CONTRACTOR SHALL SUBMIT IN WRITING TO ENGINEER EVIDENCE SUPPORTING HIS CONTENTION THAT SUBSTITUTED MATERIAL IS EQUAL TO MATERIAL SHOWN ON DRAWINGS OR SPECIFIED. ENGINEER RESERVES RIGHT TO REJECT MATERIALS AND WORKMANSHIP, EITHER BEFORE OR AFTER INSTALLATION, THAT ARE NOT SHOWN ON DRAWINGS OR SPECIFICATIONS, OR SUBSTITUTIONS THAT HAVE NOT BEEN APPROVED BY ENGINEER IN WRITING.
2. DUCTWORK:
   a. DUCT DIMENSIONS: UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.
   b. SHEET METAL DUCTWORK: PROVIDE SHEET METAL DUCTWORK FABRICATED AND INSTALLED IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS, FOR 1" W.G. PRESSURE CLASS, SEAL CLASS "A". SHEET METAL SHALL BE GALVANIZED SHEET STEEL OF LOCK FORMING QUALITY, ASTM-A525. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE, AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES AT ALL 90-DEGREE ELBOWS.
   c. ROUND SHEET METAL DUCT: PROVIDE SPIRAL SEAM (ALL SIZES) OR SNAP LOCK (DUCT SIZES UP TO 10") GALVANIZED STEEL COMPLYING WITH SMACNA STANDARDS. SPIRAL SEAM DUCTWORK SHALL HAVE SMACNA SEAM TYPE RL-1.
   d. FLEXIBLE DUCT: PROVIDE FACTORY ASSEMBLED CLASS 1 AIR DUCT (UL 181) WITH 1" THICK 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2" W.G. PRESSURE AND 0 TO 250-DEGREE F TEMPERATURE. USE TWIST-LOCK CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 6 FEET.
   e. EXPOSED DUCTWORK: EXPOSED DUCTWORK SHALL BE CLEANED OF DEBRIS AND OIL, THEN WIPED DOWN WITH VINEGAR OR OTHER SURFACE PREPARING CHEMICAL TO PREPARE DUCT FOR PAINT.
   f. DUCT SEALANT: PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS.
   g. DUCT TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.
3. DUCTWORK ACCESSORIES:
   a. FLEXIBLE DUCT CONNECTORS: PROVIDE UL LABELED 30 OUNCE NEOPRENE COATED FIBERGLASS FABRIC DUCT CONNECTORS.
   b. DUCT ACCESS DOORS: PROVIDE HINGED ACCESS DOORS IN DUCTWORK WHERE REQUIRED FOR ACCESS TO EQUIPMENT. PROVIDE INSULATED ACCESS DOORS FOR INSULATED DUCTWORK. CONSTRUCT OF SAME OR THICKER GAUGE SHEET METAL AS DUCT IN WHICH IT IS INSTALLED. PROVIDE FLUSH FRAMES FOR UNINSULATED DUCTS, AND EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCTS. PROVIDE CONTINUOUS HINGE ON ONE SIDE, WITH ONE HANDLE-TYPE LATCH FOR ACCESS DOORS 12" HIGH AND SMALLER, AND TWO HANDLE-TYPE LATCHES FOR LARGER ACCESS DOORS.
   c. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.
   d. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM 1/2" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".
4. FIRE DAMPERS/SMOKE DAMPERS:
   a. CURTAIN FIRE DAMPERS: PROVIDE CURTAIN TYPE FIRE DAMPERS, SUITABLE FOR VERTICAL OR HORITZONTAL INSTALLATION AS REQUIRED FOR THE LOCATION SHOWN. CURTAIN FIRE DAMPERS SHALL HAVE MINIMUM 24 GAUGE GALVANIZED STEEL BLADES, COMPLETELY OUT OF THE AIR STREAM. CURTAIN FIRE DAMPERS SHALL CONFORM TO UL STANDARD 555, WHICH INCLUDES TESTING TO CLOSE UNDER DYNAMIC AIRFLOW CONDITIONS, AND SHALL BE UL LABELED AS A DYNAMIC RATED FIRE DAMPER. DAMPERS SHALL BE 1-1/2 OR 3 HOUR RATED AS REQUIRED BY LOCATION, AND SHALL HAVE 212-DEGREE F FUSIBLE LINK.
   b. CEILING FIRE DAMPERS: PROVIDE CEILING FIRE DAMPERS CONSTRUCTED AND TESTED IN ACCORDANCE WITH CURRENT EDITION OF UL STANDARD 555C. CEILING FIRE DAMPERS SHALL HAVE MINIMUM 20 GAUGE GALVANIZED STEEL BLADES, WITH UL CALSSIFIED INSULATION, AND MINIMUM 20 GAUGE GALVANIZED STEEL FRAMES. CEILING FIRE DAMPERS SHALL HAVE A 212-DEGREE F FUSIBLE LINK. PROVIDE DIFFUSER RADIATION SHIELDS CONSTRUCTED OF REFRACTORY CERAMIC FIBER AS APPLICABLE.
   c. COMBINATION FIRE/SMOKE DAMPERS: PROVIDE COMBINATION FIRE/SMOKE DAMPERS CONSTRUCTED AND TESTED IN ACCORDANCE WITH CURRENT EDITION OF UL STANDARD 555S. COMBINATION FIRE/SMOKE DAMPERS SHALL HAVE GALVANIZED STEEL AIRFOIL BLADES WITH SILICONE RUBBER BLADE SEALS AND FLEXIBLE STAINLESS STEEL JAMB SEALS. FRAMES SHALL BE MINIMUM 16 GAUGE GALVANIZED STEEL. AXLES SHALL BE MINIMUM 1/2" PLATED STEEL. PROVIDE 212-DEGREE F FUSIBLE LINK. PROVIDE OPPOSED BLADE CONFIGURATION. LINKAGES SHALL BE CONCEALED IN THE FRAME. LEAKAGE RATING SHALL BE UL 555S CLASS I (4 CFM/SF AT 1.0" W.G.). PROVIDE FACTORY INSTALLED ACTUATOR, LOCATED OUT OF THE AIR STREAM. COMBINATION FIRE/SMOKE DAMPERS SHALL BE POWERED OPEN, SPRING CLOSED.
   d. PROVIDE APPROVED FIRE DAMPERS AT ALL LOCATIONS INDICATED ON THE PLANS AND/OR REQUIRED BY BUILDING CODE.
   e. FIRE DAMPERS AND FUSIBLE LINKS SHALL BE ACCESSIBLE THROUGH ACCESS DOORS OR PANELS IN DUCTS AND ACCESS PANELS IN THE BUILDING STRUCTURE OR CEILINGS.
   f. FIRE DAMPERS FURNISHED AS AN INTEGRAL PART OF DIFFUSERS OR GRILLES SHALL BE ACCESSIBLE BY MEANS OF REMOVABLE GRILLE OR DIFFUSER FACE.
5. DUCT INSULATION:
   a. BLANKET TYPE DUCT INSULATION: PROVIDE MINIMUM 1-1/2" THICK BLANKET TYPE FIBERGLASS INSULATION COMPLYING WITH ASTM C-553, TYPE II, WITH FACTORY APPLIED KRAFT BONDED TO ALUMINUM FOIL, REINFORCED WITH FIBERGLASS VAPOR BARRIER/JACKET. JACKET SHALL CONFORM TO ASTM C-1136, TYPE II.
   b. DUCT LINER: PROVIDE MINIMUM 1" THICK, 2 PCF DENSITY, NEOPRENE COATED, LONG TEXTILE FIBER TYPE DUCT LINER, WITH COATING ON THE AIR STREAM SIDE CONFORMING TO NFPA 90A. DUCT LINER ADHESIVE SHALL BE AS RECOMMENDED BY DUCT LINER MANUFACTURER, AND SHALL COMPLY WITH ASTM C-916. DUCT LINER FASTENERS SHALL COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION.
   c. CONCEALED CONDITIONED SUPPLY AND RETURN AIR DUCTS SHALL BE INSULATED WITH BLANKET TYPE DUCT INSULATION, INSTALLED IN ACCORDANCE WITH INSULATION MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   d. CONDITIONED SUPPLY AIR AND RETURN AIR DUCTS AND PLENUMS EXPOSED TO VIEW OR WHERE REQUIRED FOR ACOUSTICAL PURPOSES SHALL BE LINED WITH DUCT LINER. INSTALL DUCT LINER IN ACCORDANCE WITH LINER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
6. CONTROL SYSTEMS:
   a. PROVIDE COMPLETE CONTROL SYSTEMS, INCLUDING ALL INSTRUMENTS, CONTROLS, THERMOSTATS, TEMPERATURE SENSORS, LOW VOLTAGE WIRING, TRANSFORMERS, AND ALL NECESSARY APPURTENANCES. LOW VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS.

EXECUTION

1. TESTING, ADJUSTING, AND BALANCING:
   a. TEST, ADJUST, AND BALANCE ALL MECHANICAL SYSTEMS AND EQUIPMENT TO ENSURE PROPER BALANCE AND OPERATION. PERFORM TESTS IN ACCORDANCE WITH NEBB OR AABC AND ASHRAE STANDARDS. ELIMINATE NOISE AND VIBRATION, AND ENSURE PROPER FUNCTION OF CONTROLS. SUBMIT COMPLETED CERTIFIED TEST AND BALANCE REPORT TO OWNER'S REPRESENTATIVE. BALANCING CONTRACTOR SHALL BE AN INDEPENDENT NEBB OR AABC CERTIFIED TEST AND BALANCE CONTRACTOR. BALANCE ALL SYSTEMS TO WITHIN 5% OF AIR FLOWS INDICATED ON THE DRAWINGS, AND REPORT ALL DISCREPANCIES TO HVAC INSTALLER FOR CORRECTION. MARK FINAL BALANCE POSITIONS ON DAMPERS WITH PERMANENT MARKER. FINAL STORE BALANCE SHALL BE POSITIVE WITH RESPECT TO OUTDOORS.
2. VIBRATION AND NOISE
   a. ELIMINATE VIBRATION AND NOISE FROM THE OPERATION OF FANS, MOTORS, AND EQUIPMENT TO THE EXTENT THAT THEY WILL NOT BE HEARD OUTSIDE OF THE ROOM IN WHICH INSTALLED. ADJUSTMENTS AND CHANGES TO PRODUCE SATISFACTORY QUIETNESS TO BE MADE WITHOUT EXPENSE TO OWNER.
3. OPERATING AND MAINTENANCE MANUALS
   a. PROVIDE COMPLETE OPERATIONS AND MAINTENANCE MANUALS FOR ALL MECHANICAL EQUIPMENT INSTALLED ON PROJECT. INCLUDE INDEX OF EQUIPMENT, DIRECTORY INCLUDING SUPPLIER TELEPHONE NUMBERS, AND LIST OF RECOMMENDED SPARE PARTS. MANUALS SHALL BE FURNISHED IN "D-RING" BINDERS, CLEARLY LABELED "OPERATION AND MAINTENANCE MANUAL FOR CHECK CASHIERS". PROVIDE 2 COPIES OF EACH MANUAL. PROVIDE INSTRUCTIONS BY QUALIFIED TECHNICIAN TO OWNER'S REPRESENTATIVE.
4. CLEANING:
   a. MACHINERY AND APPARATUS. THOROUGHLY CLEAN CEMENT AND PLASTER AND OTHER MATERIALS. REMOVE GREASE AND OIL SPOTS WITH CLEANING SOLVENT. CAREFULLY WIPE SURFACES CLEAN.
   b. EXPOSED METAL WORK: CAREFULLY CLEAN WITH STEEL BRUSH, REMOVING ALL RUST AND SOILED SPOTS, AND PROVIDE TOUCH-UP PAINT AS REQUIRED.
   c. FINAL CLEANING: REMOVE ALL SCRAPS AND INSTALLATION-RELATED DEBRIS FROM AREA. LEAVE ENTIRE INSTALLATION AREA IN A NEAT, CLEAN, AND READY-TO-USE CONDITION.

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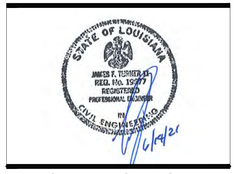

CFT - MONROE
SLEEP NUMBER

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