

**MECHANICAL SPECIFICATIONS**

SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES, WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

**DEFINITIONS:**

- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 6) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 7) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

**1.0 SCOPE OF WORK:**

1.1 THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

- A. FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TOOLS, ETC., AS REQUIRED TO COMPLETE INSTALLATION OF MECHANICAL SYSTEMS INDICATED ON DRAWINGS.
- B. OBTAIN ALL PERMITS, INSPECTIONS, AND APPROVALS AS REQUIRED BY THE LOCAL AUTHORITIES HAVING JURISDICTION AND DELIVER CERTIFICATE OF APPROVAL TO THE GENERAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL PAY ALL FEES ASSOCIATED WITH PERMITS, INSPECTIONS, APPROVALS, ETC.
- C. ALL MATERIALS AND EQUIPMENT OF THE HVAC SYSTEMS NECESSARY FOR THEIR PROPER OPERATION, BUT NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL CHARGE.
- D. THE MECHANICAL CONTRACTOR SHALL FULFILL ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS AND SHALL COMPLETE ALL WORK SHOWN ON THE DRAWINGS AND AS INDICATED IN GENERAL NOTES. ALL SYSTEMS SHALL BE FINISHED AND PROVEN TO BE FULLY OPERATIONAL AND USEABLE.
- E. ALL WORK SHALL BE IN ACCORDANCE WITH THE GOVERNING CODES, AS ADOPTED BY THE LOCAL AUTHORITIES HAVING JURISDICTION, AND SHALL COMPLY WITH ALL OSHA REQUIREMENTS.

1.2 THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE AUTHORITY HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR IT. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

1.3 THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT, FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

1.4 PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, DUCTWORK, PIPING AND CONTROL SYSTEMS INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

**2.0 SHEET METAL WORK:**

- 2.1 EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL SUPPLY AND RETURN AIR DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED (G90) SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS, PRESSURE CLASSIFICATION 2 IN. W.G.
- 2.2 VOLUME DAMPERS: GALVANIZED STEEL PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT OTHER END, FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.

2.3 ACCESS DOORS: INSULATED OR UN-INSULATED, SAME AS DUCT.  
 1) PROVIDE MINIMUM 20 IN. X 14 IN. ON MAIN DUCTS, AND 24 IN. X 6 IN. ON BRANCH DUCTS, UNLESS OTHERWISE APPROVED. AT FIRE DAMPERS, ACCESS DOOR ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS, AND LOUVERS.  
 2) ALL ACCESS DOORS TO BE HINGED, WITH HATCH SIMILAR TO HATCH NO. 100.

2.4 FLEXIBLE CONNECTIONS: NEOPRENE COATED GLASS FABRIC, 30 OZ PER SQ YD WITH SEWED AND CEMENTED SEAMS. SIMILAR TO GELBENT FABRICS, PROVIDE WITH METAL COLLARS AND LOW MINIMUM MOVEMENT COEFF.

2.5 TURNING VANES: GALVANIZED STEEL SINGLE DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE RADIUS.

2.6 FIRE DAMPERS: UL LISTED GALVANIZED STEEL CONSTRUCTION, MULTI-BLADED SPRING LOADED, EQUIPPED WITH FUSIBLE LINK, CONFORMING TO NFPA STANDARD 90A, SIMILAR TO AIR BALANCE MODEL 319-P, RATED AS REQUIRED, SEE INSTALLATION ON DRAWING.

2.7 ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.

2.8 AUTOMATIC DAMPERS: COMPLETE WITH LINKAGE AND ELECTRIC OPERATOR OPPOSED BLADE DAMPER OR GALVANIZED STEEL MIN. 4 IN. MAX. 8 IN. WIDE WITH COMPRESSIBLE EDGE SEALS TO PREVENT LEAKAGE. FACTORY-ASSEMBLE STEEL LINKAGE AND SHAFT WITH NYLON OR OIL-IMPREGNATED BRONZE BEARINGS. MOTOR WITH SUFFICIENT POWER TO LIMIT LEAKAGE TO 4 CFM PER SQ FT. LINKAGE TO WITHSTAND LOAD QUAL. TO TWICE MAXIMUM OPERATING FORCE WITHOUT DEFLECTION. DAMPER MOUNTED IN WELDED STEEL CHANNEL FRAME.

2.9 ALUMINUM DUCTWORK: ALL OUTSIDE AIR, EXHAUST, AND RELIEF DUCTWORK WITHIN 5 FT OF LOUVERS SHALL BE ALUMINUM WITH SEAMS SEALED WATERTIGHT WITH ALCOA ALUMINASTIC TYPE C SEAM SEALER OR SOLDER. PITCH DUCTWORK TOWARDS LOUVER.

2.10 WIRE MESH SCREEN (WMS): NO. 16 USSG, 3/4 SQUARE MESH, IN 1 IN. WIDE GALVANIZED STEEL ENCLOSING FRAME. FLANGED DUCT OPENING TO RECEIVE FRAME.

2.11 FLEXIBLE DUCT SHALL BE COMMERCIAL GRADE, INSULATED WITH ACOUSTICAL VINYL VAPOR BARRIER (UL APPROVED), STRETCHED AND SUSPENDED IN ACCORDANCE WITH LOCAL CODE. MAXIMUM LENGTH SHALL BE SIX (6) FEET.

2.12 COMBINATION FIRE AND SMOKE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE, EQUIPPED WITH FUSIBLE LINK CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN MODEL FSD 60.

**3.0 KITCHEN HOOD EXHAUST DUCTS**

3.1 GREASE DUCTS SERVING TYPE I HOODS SHALL BE CONSTRUCTED OF STEEL NOT LESS THAN 0.055 INCH (NO. 16 GAGE) IN THICKNESS OR STAINLESS STEEL NOT LESS THAN 0.044 INCH (NO. 18 GAGE) IN THICKNESS. JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID-TIGHT WELD OR BRAZE MADE ON THE EXTERNAL SURFACE OF THE DUCT SYSTEM.

**4.0 AIR OUTLETS:**

4.1 GENERAL:  
 1) MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS.  
 2) FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS INDICATED ON ARCHITECTURAL PLANS.  
 3) EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL PLANS.  
 4) SUITABLE FOR OPERATION AT 20% EXCESS AND 20% LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20% EXCESS AND 60% LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING AN APPLICATION OF EACH OUTLET AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING RANGE.  
 5) ALL REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE VOLUME DAMPERS. DAMPER OPERATING LEVERS SHALL BE ACCESSIBLE AT THE FACE OF AIR OUTLETS.

4.2 DIFFUSERS: DIFFUSERS SHALL BE STEEL CONSTRUCTION PAINTED WHITE SIMILAR TO TITUS TYPE SUITABLE FOR THE TYPE OF CEILING. ALL CEILING DIFFUSERS SHALL BE PROVIDED WITH VOLUME DAMPER.

4.3 REGISTERS AND GRILLES:  
 1) RETURN AND EXHAUST REGISTERS: STEEL CONSTRUCTION WITH VOLUME DAMPER AS PER MECHANICAL SCHEDULE.

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 1) RETURN AND EXHAUST REGISTERS: STEEL CONSTRUCTION WITH VOLUME DAMPER AS PER MECHANICAL SCHEDULE.

**5.0 NOISE CONTROL:**

5.1 ALL ROOM NC LEVELS SHALL BE MAXIMUM NC-40.

5.2 PROVIDE SOUND LINING FOR THE FOLLOWING DUCTWORK:  
 1) ALL DUCTWORK NOT LESS THAN 20 FT ON EACH SIDE OF ALL FANS AND AC UNITS.  
 2) ALSO WHERE NOTED ON A DRAWING.

**6.0 TESTING AND BALANCING:**

6.1 AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY.

6.2 UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO BALANCE ALL NEW WORK.  
 6.3 THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE RANGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE THE SYSTEM.  
 6.4 BALANCING REPORT SHALL BE PROVIDED ON ABC-TYPE FORMS.  
 6.5 FANS AND AIR HANDLING UNITS SHALL BE BALANCED TO WITHIN +5% OF THEIR DESIGN CAPACITIES AND OTHER AIR HANDLING QUANTITIES SHALL BE BALANCED TO WITHIN +10% OF THEIR DESIGN CAPACITY.

6.6 BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY AN INDEPENDENT FIRM SPECIALIZED IN TESTING AND BALANCING. THE CITY INSPECTOR SHALL RECEIVE A COPY OF THE CERTIFIED AIR BALANCE REPORT PRIOR TO THE ISSUE OF CERTIFICATE OF OCCUPANCY.

6.7 THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT SHALL BE DEMONSTRATED BY THE CONTRACTOR.  
 7. INSULATION - GENERAL REQUIREMENTS P  
 ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA 999-1963). FLAME SPREAD: MAXIMUM 25. FUEL CONTRIBUTED AND SMOKE DEVELOPED: MAXIMUM 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.

7.2 DEFINITIONS:  
 1) EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS AND IN AREAS WHICH WILL BE VISIBLE WITHOUT REMOVING CEILINGS OR OPENING ACCESS PANELS.  
 2) CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT, WHICH IS NOT EXPOSED.  
 3) OUTDOOR: DUCTS, PIPING OR EQUIPMENT, WHICH IS EXPOSED TO THE WEATHER.

**8.0 DUCTWORK INSULATION:**

8.1 INSULATE ALL INDOOR RETURN AND SUPPLY AIR DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT NOTED OTHERWISE.  
 1) SUPPLY/RETURN - CONCEALED - THICKNESS REQUIRED FOR R-5 - D1  
 2) SUPPLY/RETURN - EXPOSED - THICKNESS REQUIRED FOR R-5 - D2  
 3) SUPPLY/RETURN - ALL - 1" THICKNESS - D3

8.2 NON-INSULATED DUCTWORK:  
 1) WHERE SOUND LINING IS OF MINIMUM THICKNESS SPECIFIED FOR INSULATION. NOTE: 1" UNACOUSTIC LESS THAN R-5.

8.3 MATERIAL:  
 1) TYPE D-1: MINIMUM 1-LB DENSITY FIBERGLASS BLANKET, MAXIMUM 0.28 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY-APPLIED FOIL-SKRIM-KRAFT VAPOR RETARDER FACING, WITH A 2" (MIN.) STAPLING AND TAPING FLANGE ON ONE EDGE. SIMILAR TO JOHNS MANVILLE MICROLITE.  
 2) TYPE D-2: 3 LB FIBERGLASS BOARD, THE MAXIMUM K FACTOR SHALL BE 0.23 AT 75 DEG F MEAN TEMPERATURE WITH A MINIMUM DENSITY OF 3 LB. THE INSULATION SHALL BE PROVIDED WITH A FACTORY-APPLIED FSK VAPOR RETARDER-FACED MATERIAL. THE INSULATION SHALL BE EQUAL TO JOHNS MANVILLE TYPE 814 SPIN-GLAS AP.  
 3) TYPE D-3: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEG F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071 AND ASTM G21/G22. SIMILAR TO JOHNS MANVILLE PERMACOTEC LINACUSTIC.

8.4 GENERAL INSTALLATION:  
 1) BEFORE APPLYING INSULATION AIR DUCTS SHALL BE CLEAN, DRY AND TIGHTLY SEALED AT ALL JOINTS AND SEAMS, AND ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.  
 2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED.  
 3) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS, PROVIDE SADDLES OR SHIELDS FOR PROTECTION.  
 4) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

8.5 INSTALLATION:  
 1) FIBERGLASS BLANKET: 2 IN. LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALL DUCTS OVER 24 IN. WIDE WITH MIN. 2 ROWS OF WELD PINS 12 IN. ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE. INSTALL DUCT WRAP INSULATION WITH FACING OUTSIDE SO THAT THE TAPE FLAP OVERLAPS THE INSULATION AND FACING AT THE OTHER END OF THE PIPE. DUCT WRAP ADJACENT SECTIONS OF DUCT WRAP INSULATION SHALL BE TIGHTLY BUTTED WITH THE 2" STAPLING AND TAPING FLAP OVERLAPPING. IF DUCTS ARE RECTANGULAR OR SQUARE, INSTALL SO INSULATION IS NOT EXPOSED TO THE COMPRESSED AIR AT CORNERS. SEAMS SHALL BE STAPLED, APPROX. 6" ON CENTER WITH 1/2" (MIN.) STEEL OUTWARD CLIPPING STAPLES.  
 2) FIBERGLASS BOARD: SEAL JOINTS AND SEAMS IN FACING WITH 3 IN. WIDE TAPE WHICH FACES AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS. WELD PINS ON TOP SIDES AND BOTTOM.  
 3) SOULDERS: ALL SOUND LINING, ADHESIVES, FACES AND ACCESSORIES SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.  
 4) NON-CORNER: INSTALL PER MANUFACTURER'S INSTRUCTIONS.

8.6 MATERIAL: SEAL JOINTS AND SEAMS IN FACING WITH 3 IN. WIDE TAPE WHICH FACES AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS. WELD PINS ON TOP SIDES AND BOTTOM.

8.7 SOULDERS: ALL SOUND LINING, ADHESIVES, FACES AND ACCESSORIES SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.  
 8.8 NON-CORNER: INSTALL PER MANUFACTURER'S INSTRUCTIONS.

**9.0 PIPING INSULATION**

9.1 MATERIAL: 1-1/2" ARMSTRONG ARMAFLEX INSULATION ON ALL MUA REFRIGERANT LINES. PROVIDE WEATHER-TIGHT, UV PROTECTION.  
 9.2 INSTALLATION: DO NOT INSULATE REFRIGERANT LINES UNTIL ALL LEAK CHECKS AND ANY REQUIRED INSPECTION OF PIPING JOINTS HAS BEEN COMPLETED.

**10.0 REFRIGERANT PIPING**

10.1 MATERIAL: FACTORY CLEANED AND CHARGED, ACR COPPER TUBING (TYPE L) WITH ENDS CAPPED TO PROTECT CLEANLINESS OF INTERIOR, CONFORMING TO ASTM B 280.  
 10.2 FITTINGS: WROUGHT-COPPER  
 10.3 JOINTS: BRAZED. BRAZING FILLER METALS: AWS A5.8, SUITABLE FOR ACR PIPING.  
 10.4 INSTALLATION:  
 1) SUPPORT PIPING PER MSS STANDARD SP-69. PROVIDE ADDITIONAL SUPPORT AT ELBOWS AND FITTINGS.  
 2) PROTECT INSULATION AT HANGER SUPPORTS WITH SHIELDS.

**11.0 VIBRATION ISOLATION SYSTEMS:**

11.1 GENERAL:  
 1) PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.  
 2) INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.  
 3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 IN.  
 4) ACCEPTABLE MANUFACTURERS:

- MASON INDUSTRIES, INC.
- VIBRATION ELIMINATOR CO.
- KORFUND DYNAMICS CORP.

**12.0 MOTORS:**

12.1 MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C50 STANDARDS.  
 1) PREMIUM EFFICIENCY UNLESS OTHERWISE NOTED.  
 2) 1.15 SERVICE FACTOR.  
 3) SQUIRREL CAGE INDUCTION, OPEN DRIP PROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS, CONTINUOUS DUTY, EXCEPT AS NOTED.

**13.0 MOTOR CONTROLLERS:**

13.1 PROVIDED BY HVAC CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.  
 13.2 NEMA ENCLOSURE, WEATHERPROOF WHERE MOUNTED OUTDOORS.  
 13.3 WITH OVERLOAD PROTECTION. COORDINATE ALL MOTOR CONTROLLER SIZES WITH MOTOR TYPES AND SIZES.

13.4 1/2 HP AND SMALLER: PROVIDE MANUAL STARTER EXCEPT USE MAGNETIC TYPE WHERE AUTOMATICALLY CONTROLLED.  
 1) MANUAL TYPE: 2-POLE TOGGLE SWITCH WITH OVERLOAD PROTECTION AND FLOT LIGHT.

13.5 1/2 HP AND LARGER: PROVIDE MAGNETIC STARTER.  
 1) COMBINATION UNFUSED DISCONNECT SWITCH AND MAGNETIC STARTER EXCEPT AS NOTED.  
 2) OVERLOAD PROTECTION IN EACH PHASE WITH FUSE IN ENCLOSURE.  
 3) HOA SELECTOR SWITCH FOR AUTOMATICALLY CONTROLLED MOTORS. SAFETY CONTROLS COMMON TO BOTH CONTROL TYPES.

4) RED, GREEN AND AMBER LIGHTS.  
 5) CONTROL TRANSFORMER FOR MOTORS OVER 120 VOLTS, TO STEP DOWN CONTROL VOLTAGE TO 120 VOLTS, OF THE REQUIRED CAPACITY WITH FUSE AND GROUND CONNECTION TO VOLTAGE SIDE.  
 6) TERMINALS: SIMILAR TO BUSSMAN.  
 7) CONTACTS: TO SUPPLEMENT AUXILIARY CONTACTS IN CONTROLLER. MINIMUM 10 AMP COIL AND TWO 10 AMP CONTACTS.  
 8) TERMINALS: SUITABLE FOR CONDUCTORS NOTED AND AS APPROVED.

13.6 ACCEPTABLE MANUFACTURERS:  
 CUTLER-HAMMER  
 SQUARE D  
 ALLEN BRADLEY.

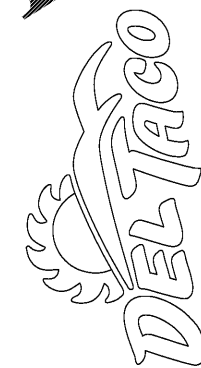
**14.0 EQUIPMENT:**

14.1 PROVIDE AND INSTALL ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH APPROVED SHOP DRAWINGS AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL MOTOR STARTERS AS REQUIRED. MOTOR STARTERS WILL BE INSTALLED BY THIS CONTRACTOR AND WIRED BY ELECTRICAL TRADE.

14.2 CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL REQUIRED CLEARANCES FOR SERVICING AND MAINTENANCE. COORDINATE REQUIREMENTS WITH ALL TRADES.

**15.0 OPERATION AND MAINTENANCE MANUAL**

15.1 UPON COMPLETION OF THE CONSTRUCTION AND PRIOR TO ACCEPTANCE OF THE PROJECT BY THE OWNER, CONTRACTOR SHALL SUBMIT THREE SETS OF OPERATION AND MAINTENANCE MANUAL OF ALL EQUIPMENT TO THE OWNER.



DO NOT SCALE DRAWINGS CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS-NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BEGINNING CONSTRUCTION



MAY 18TH, 2018

NO REVISION

DEL TACO STORE # DT2017  
 4825 JIMMY LEE SMITH PARKWAY  
 HIRAM, GA 30141  
 PAULTON COUNTY  
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**Order Plans**