4) SUPPLY/RETURN (EXPOSED): 2 INCH THICK, D-1 MATERIAL, VAPORSEAL FINISH.

5) RETURN (EXPOSED IN UNCONDITIONED SPACES): 2 INCH THICK, D-2 MATERIAL, VAPORSEAL FINISH.

6) EXHAUST (MER EXPOSED): 2 INCH THICK, D-3 MATERIAL, VAPORSEAL FINISH.

C. REINSULATE ALL DUCTWORK AND PIPING WHICH IS EXISTING AND DAMAGED DURING CONSTRUCTION OR SHOWN OR REQUIRED TO BE RELOCATED. INSULATE WITH SAME MATERIAL AND THICKNESS.

D. NON-INSULATED DUCTWORK:

1) WHERE SOUNDLINING IS OF MINIMUM THICKNESS SPECIFIED FOR INSULATION.

2) AIR CONDITIONING RETURN AIR DUCTWORK EXPOSED IN AIR CONDITIONED SPACES AND INSTALLED IN HUNG CEILINGS WHERE SPACE IMMEDIATELY ABOVE AND BELOW ARE BOTH AIR CONDITIONED.

3) OUTDOOR DUCTWORK

A. FOR OUTDOOR DUCTWORK OR DUCTWORK EXPOSED TO THE ELEMENTS IN ADDITION TO INSULATION AND FINISHES SPECIFIED FOR INDOOR DUCTWORK, APPLY TWO (2) COATS OF WEATHERPROOF MASTIC AND EMBED INTO WET COAT TWO (2) LAYERS OF GLASS CLOTH OVER INSULATION JACKET. SMOOTH MEMBRANE TO AVOID WRINKLES AND OVERLAP ALL SEAMS AT LEAST 3". APPLY A SECOND COAT OF SAME COATING TO THE ENTIRE SURFACE. TOP CENTER OF RECTANGULAR DUCT SHALL PITCH TO EACH SIDE TO AVOID TRAPPING OF WATER IN THE CENTER.

E. MATERIAL:

1) TYPE D-1: MINIMUM 1.5-LB DENSITY FIBERGLASS BLANKET, MAXIMUM 0.25 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY-APPLIED FOIL-SKRIM-KRAFT FACING SIMILAR TO 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 ALL PURPOSE OR ALL SERVICE FACING. THE INSULATION SHALL BE EQUAL TO MANVILLE TYPE 814 SPIN-GLAS AP.

3) TYPE D-3: MINIMUM 6 LB FIBERGLASS BOARD. MAXIMUM 0.22 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY APPLIED ALL PURPOSE OR ALL SERVICE FACING. SIMILAR TO MANVILLE 817 SPIN-GLAS AP.

F. INSTALLATION:

1) FIBERGLASS BLANKET: 2 INCH LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALL DUCTS OVER 24 INCH WIDE WITH MIN. 2 ROWS OF WELD PINS 12 INCH ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE.

2) FIBERGLASS BOARD: SEAL JOINTS AND BREAKS IN FACING WITH 3-INCH-WIDE TAPE TO MATCH FACING AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5-INCH-WIDE TAPE AT CORNERS, WELD PINS ON TOP, SIDES AND BOTTOM.

16. PIPING INSULATION

A. INSULATE ALL PIPING IN ACCORDANCE WITH THE INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

B. INSULATION SCHEDULE - PIPING:

1) LOW TEMP 40 TO 100 DEG F (UP TO 4 INCH): 1-1/2 INCH THICK, P-1 MATERIAL, VAPORSEAL FINISH.

2) REFRIGERANT LIQUID & SUCTION LINES (ALL): 1 INCH THICK, P-6 MATERIAL, VAPORSEAL FINISH.

3) COLD WATER MAKEUP, COLD CONDENSATE, EQUIPMENT DRAINS BELOW 60 DEG F (ALL): 1 INCH THICK, P-1 MATERIAL, VAPORSEAL FINISH.

C. PIPING, VALVES AND FITTINGS TO BE INSULATED:

1) LOW TEMPERATURE PIPING SYSTEMS: 40 TO 100 DEG F INCLUDING:

A. CONDENSATE DRAIN PIPING.

D. MATERIAL:

1) TYPE P-1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO OWENS-CORNING 650 ASJ.

2) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEG F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

E. FINISH:

1) TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 INCH WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.

F. OUTDOOR PIPING:

1) FOR ALL PIPING, FITTINGS AND VALVES LOCATED OUTDOORS, INCREASE SCHEDULED INSULATION THICKNESS BY A MINIMUM OF 1 INCH AND PROVIDE F-4 FINISH. PROVIDE VAPORSEAL ON ALL OUTDOOR PIPES, VALVES AND FITTINGS SUBJECT TO CONDENSATION.

G. INDOOR PIPING EXPOSED:

1) PROVIDE JACKETS OVER INDOOR PIPE MADE OF 0.016 INCH ALUMINUM HELD WITH A FRICTION TYPE, Z-LOCK AND ALUMINUM BANDS. PROVIDE MOISTURE BARRIER LINING.

H. INSTALLATION:

1) BEFORE APPLYING INSULATION, ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.

2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 INCH LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.

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.

17. FIRE-RATED INSULATION SYSTEMS

A. FIRE-RATED BOARD: STRUCTURAL-GRADE, PRESS-MOLDED, XONOLITE CALCIUM SILICATE, FIREPROOFING BOARD SUITABLE FOR OPERATING TEMPERATURES UP TO 1700 DEG F. COMPLY WITH ASTM C 656, TYPE II, GRADE 6. TESTED AND CERTIFIED TO PROVIDE A 2-HOUR FIRE RATING BY A NRTL ACCEPTABLE TO AUTHORITY HAVING JURISDICTION. MANUFACTURERED BY JOHNS MANVILLE; SUPER FIRETEMP M.

B. FIRE-RATED BLANKET: HIGH-TEMPERATURE, FLEXIBLE, BLANKET INSULATION WITH FSK JACKET THAT IS TESTED AND CERTIFIED TO PROVIDE A 2-HOUR FIRE RATING BY A NRTL ACCEPTABLE TO AUTHORITY HAVING JURISDICTION. MANUFACTURED BY JOHNS MANVILLE; FIRETEMP WRAP; FIREMASTER DUCT WRAP, 3M; FIRE BARRIER WRAP PRODUCTS, UNIFRAX CORPORATION; FYREWRAP.

C. NYS PROJECTS: PRODUCT TO BE APPROVED FOR USE IN NYS FOR THE PARTICULAR APPLICATION.

18. VIBRATION ISOLATION

A. FURNISH AND INSTALL ALL NECESSARY VIBRATION ISOLATORS, VIBRATION HANGERS, MOUNTING PADS, RAILS, ETC., TO ISOLATE VIBRATION AND SOUND FROM BEING TRANSMITTED TO THE BUILDING STRUCTURE. ALL VIBRATION PRODUCTS SHALL BE SPECIFICALLY DESIGNED FOR THEIR INTENDED USE. PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK. ETC.

B. MANUFACTURER OF THE VIBRATION ISOLATION EQUIPMENT SHALL HAVE THE FOLLOWING RESPONSIBILITIES

1) SUBMIT TYPE, SIZE, DEFLECTION, LOCATION AND DETAILS INCLUDING FREE HEIGHT FOR EACH ISOLATOR PROPOSED FOR ITEMS IN THE SPECIFICATION AND ON THE DRAWINGS.

2) SUBMIT DETAILS OF ALL STEEL FRAMES AND CONCRETE INERTIA BASES TO BE USED IN CONJUNCTION WITH THE ISOLATION IN THIS SPECIFICATION AND IN THE DRAWINGS.

3) CLEARLY OUTLINE THE PROCEDURES FOR INSTALLING AND ADJUSTING THE ISOLATORS OR HANGERS.

4) GUARANTEE THE SPECIFIED ISOLATION SYSTEMS DEFLECTION AND THAT A MINIMUM OF 90% EFFICIENCY WILL BE OBTAINED.

C. THE FOLLOWING ARE APPROVED MANUfACTURERS, PROVIDED THEIR SYSTEMS STRICTLY COMPLY WITH THE DESIGN INTENT FOR PERFORMANCE, DEFLECTION AND STRUCTURAL CAPACITY OF THIS SPECIFICATION.

1) MASON INDUSTRIES, INC., HAUPPAUGE, NY

2) VIBRATION MOUNTINGS & CONTROLS, INC., BLOOMINGDALE, NJ

3) AMBER BOOTH, HOUSTON, TX

4) KINETICS NOISE CONTROL, INC

D. PROVIDE INSTALLATION INSTRUCTIONS, DRAWINGS AND FIELD SUPERVISION TO ASSURE PROPER INSTALLATION AND PERFORMANCE.

E. ISOLATION SYSTEMS SHALL BE MANUFACTURED BY MASON INDUSTRIES, VIBRATION ELIMINATOR COMPANY, AMBER BOOTH, VIBRATION MOUNTINGS AND CONTROLS.

F. INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS INCLUDING THE LOAD AND SPRING STATIC DEFLECTION FOR EACH FLOOR OR CEILING HUNG ISOLATOR.

G. PROVIDE LEVELING DEVICES AND APPROVED RESILIENT DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 INCH ISOLATORS SHALL HAVE CAPABILITY OF SUPPORTING EQUIPMENT AND PIPING AT A FIXED ELEVATION DURING INSTALLATION AND AT A SPECIFIED HEIGHT AFTER ADJUSTMENT.

H. ALL SPRINGS SHALL HAVE AT LEAST 50% ADDITIONAL LOAD CAPACITY ABOVE DESIGN LOAD.

I. PROVIDE THE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT CANNOT SUPPORT POINT LOADS.

J. PROVIDE CORROSION PROTECTION FOR EQUIPMENT MOUNTED OUTDOORS.

K. SPRING CORROSION RESISTANCE SHALL BE POWDER COATING OF THE SPRING WITH THE STEEL HOUSING HOT DIPPED GALVANIZED. ALL HARDWARE TO BE CADMIUM PLATED.

L. EQUIPMENT BASES

1) TYPE B-1 STEEL BASE

A. REINFORCED, AS REQUIRED TO PREVENT BASE FLEXING AT START UP AND MISALIGNMENT OF DRIVE AND DRIVEN UNITS. CENTRIFUGAL FAN BASES COMPLETE WITH MOTOR SLIDE RAILS ETC, MASON TYPE M, WF, OR AS APPROVED EQUAL.

2) EQUIPMENT STATIC DEFLECTIONS

A. 501 AND UP RPM 1.5 INCHES STATIC DEFLECTION

M. CENTRIFUGAL FANS

1) FLOOR MOUNTED AXIAL FANS, CABINET FANS, FAN SECTIONS, AIR HANDLING UNITS UTILIZE MASON TYPE SLF FREE STANDING SPRING OR EQUAL.

2) CEILING HUNG UTILIZE MASON TYPE 30N OR EQUAL.

N. SUPPORT OF PIPING IN EQUIPMENT ROOMS AND WHERE EXPOSED ON ROOF

1) HANGER ROD ISOLATORS (TYPE 30N) MOUNTINGS.

2) INDOOR SUPPORTED PIPING ISOLATORS (TYPE SLR).

O. FLOOR AND ROOF MOUNTING OF FACTORY ASSEMBLED AIR HANDLING UNITS, AIR CONDITIONING UNITS - SPRING ISOLATORS (ROOF MOUNTED EQUIPMENT TYPE SLR).

P. PROVIDE FLEXIBLE CONNECTIONS BETWEEN ALL FANS AND DUCTWORK (REFER TO DUCTWORK SECTION FOR SPECIFICATIONS).

19. PIPING - GENERAL REQUIREMENTS

A. COMPLETE WITH: PIPE, FITTINGS, HANGERS, SUPPORTS, SLEEVES, AND ACCESSORIES.

B. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS:

1) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).

2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).

3) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).

4) MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTING INDUSTRY (MSS).

C. GASKETS: ONE PIECE RING TYPE 1/16 INCH MINIMUM THICKNESS KLINGER C4400 ONLY (OR APPROVED EQUAL, SUBMIT FOR APPROVAL BEFORE USE).

D. COPPER TUBE BRAZING

1) ALL BRAZING SHALL BE DONE IN ACCORDANCE WITH ALL CODES APPLICABLE TO THE PARTICULAR SERVICE. BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR JOINING COPPER WITH COPPER; OR BAG-1, SILVER ALLOY FOR JOINING COPPER WITH BRONZE OR STEEL.

2) QUALIFY PROCESS AND OPERATORS IN ACCORDANCE WITH ASME BOILER AND PRESSURE VESSEL CODE, SECTION IX, "WELDING AND BRAZING QUALIFICATIONS".

3) BRAZERS SHALL BE QUALIFIED FOR ALL REQUIRED TUBE SIZES, MATERIAL, WALL THICKNESS, AND POSITION IN ACCORDANCE WITH THE AMERICAN SOCIETY OF MECHANICAL ENGINEERING (ASME), SECTION IX, BOILER AND PRESSURE VESSEL CODE.

A. COPIES OF THE CERTIFIED BRAZER QUALIFICATION REPORTS SHALL BE MAINTAINED BY THE RESPONSIBLE BRAZING AGENCY AND THE COMPANY PERFORMING THE BRAZING, AND SHALL BE SUBMITTED TO THE OWNER AND/OR ENGINEER UPON REQUEST.

B. ALL DEFECTIVE BRAZEMENTS SHALL BE CHIPPED OUT AND REPAIRED AT NO COST TO THE OWNER, BASED ON PROCEDURE TO BE SPECIFIED AT THE TIME.

E. GASKETS

1) PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS. ASME B16.21, NONMETALLIC, FLAT, ASBESTOS-FREE, 1/8-INCH MAXIMUM THICKNESS UNLESS THICKNESS OR SPECIFIC MATERIAL IS INDICATED.

F. ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.

1) REFRIGERANT PIPING

A. TEST REFRIGERANT PIPING FOR TIGHTNESS AND LEAKS UNDER PRESSURE OR VACUUM. THE DURATION OF EACH TEST SHALL BE TWENTY-FOUR (24) HOURS.

B. TEST JOINTS IN ACCORDANCE WITH ASHRAE 15-LATEST EDITION. THERE SHALL BE NO OBSERVABLE LEAKS OR CHANGES IN PRESSURE. IF EITHER IS OBSERVED, SEAL LEAKS, AND REPEAT TEST PROCEDURES

G. EXPANSION COMPENSATION:

1) ALL PIPING SHALL BE INSTALLED TO COMPENSATE FOR EXPANSION TO PROTECT THE BUILDING, EQUIPMENT AND PIPING SYSTEMS. PROVIDE ALL GUIDES, ANCHORS, EXPANSION LOOPS, SUPPLEMENTAL STEEL AND APPROVED TYPE EXPANSION JOINTS AS INDICATED OR REQUIRED FOR CONTROL OF EXPANSION.

H. SYSTEM FILLING:

1) SYSTEMS OR PORTIONS OF SYSTEMS TO BE TESTED SHALL HAVE PROVISIONS FOR FILLING, VENTING (AIR REMOVAL), DRAINAGE AND TEST PRESSURE CONNECTION.

2) LIQUID USED FOR TESTING SHALL BE CLEAN CITY WATER MIXED WITH CHEMICALS SPECIFIED BY THE BASE BUILDING WATER TREATMENT CONTRACTOR. THE HVAC CONTRACTOR SHALL HIRE THE SERVICES OF THE BUILDING WATER TREATMENT CONTRACTOR AND PROVIDE ALL REQUIRED LABOR. PROVIDE TEMPORARY METERING AND MIXING DEVICES AS REQUIRED. THE HVAC CONTRACTOR SHALL OBTAIN ALL REQUIREMENTS FROM THE BUILDING MANAGEMENT.

I. FLUSHING AND CLEANING AND TREATMENT:

1) AFTER COMPLETION OF HYDROSTATIC TESTS AND EMPTYING, PROVIDE LABOR FOR INITIAL FLUSHING, CLEANING, AND PASSIVATING IN ACCORDANCE WITH THE OWNER'S WATER TREATMENT SPECIFICATION. THE HVAC CONTRACTOR SHALL HIRE THE SERVICES OF THE BASE BUILDING WATER TREATMENT CONTRACTOR AND PROVIDE ALL LABOR. COORDINATE WITH THE OWNER'S WATER TREATMENT COMPANY AND PROVIDE ALL SPECIFICATION REQUIREMENTS AND REQUIRED LABOR. COORDINATE ALL REQUIREMENTS WITH BASE BUILDING MANAGEMENT FOR BASE BUILDING VENDOR.

A. PROVIDE ONE YEAR'S SUPPLY OF NECESSARY WATER TREATMENT CHEMICALS FOR NEW SYSTEM TO THE OWNER OR TENANT INCLUDING THE FOLLOWING:

J. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.

K. PIPE SUPPORTS:

1) PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.

2) HORIZONTAL PIPING TO BE SUPPORTED BY FORGED STEEL ADJUSTABLE CLEVIS TYPE HANGER. MAXIMUM SPACING AS FOLLOWS:

A. COPPER 1 INCH AND SMALLER: 5 FEET.

B. PROVIDE ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, BRANCH PIPING AND RUNOUTS OVER 5 FEET AND CONCENTRATE LOADS DUE TO VALVES, STRAINERS AND OTHER SIMILAR ITEMS.

3) ROD SIZE

A. PIPE 2 IN AND SMALLER: 3/8 IN

4) VERTICAL PIPING:

A. TOP SUPPORT HANGER OR SADDLE IN HORIZONTAL CONNECTION WITH PROVISIONS FOR EXPANSION.

B. FOR MULTIPLE PIPES, COORDINATE GUIDES, BEARING PLATES AND ACCESSORY STEEL.

20. LOW TEMPERATURE WATER SYSTEMS, BELOW 100 PSIG, -20 TO 200 DEG F OPERATING TEMPERATURES.

A. MATERIAL SHALL BE STEEL IN ACCORDANCE WITH ASTM A 53, SEAMLESS, GRADES A OR B.

1) WALL THICKNESS SHALL BE:

A. TO 2 INCH: SCHEDULE 40 WITH THREADED ENDS OR SCHEDULE 40 WITH SOCKET WELD ENDS.

B. PITCH WATER PIPING EXCEPT AS NOTED:

1) UP TO 1 INCH: 1 INCH IN 40 FEET.

C. CONDENSATE DRAIN PIPING

1) PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".

2) FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.

3) PITCH, EXCEPT AS NOTED:

A. 1 INCH IN 4 FEET PREFERRED.

B. 1 INCH IN 8 FEET MINIMUM.

21. REFRIGERANT SYSTEMS

A. PROVIDE ALL REFRIGERANT PIPING REQUIRED FOR A COMPLETE REFRIGERATION SYSTEM, WITH ALL VALVES, FITTINGS AND SPECIALTIES NECESSARY FOR SATISFACTORY OPERATION IN ACCORDANCE WITH ASHRAE STANDARD 15-LATEST EDITION AND ALL AUTHORITIES HAVING JURISDICTION. REFRIGERATION SYSTEM SHALL INCLUDE ALL REQUIRED ITEMS FOR CHARGING, DRAINING AND PURGING THE SYSTEM.

B. REFRIGERANT PIPING SHALL BE HARD COOPER, TYPE L OR ACR, ASTM B88 OR ASTM B 280, BRAZED.

C. JOINTS IN REFRIGERATION PIPING SHALL BE BRAZED.

D. REFRIGERANT PIPING SHALL BE OF THE SIZE AND NUMBER OF PIPES RECOMMENDED BY THE MANUFACTURER AND AS APPROVED BY THE ENGINEER.

E. HORIZONTAL PIPING OF THE COMPRESSOR SUCTION AND DISCHARGE LINES AND THE CONDENSER DISCHARGE LINES SHALL BE PITCHED A MINIMUM OF 1/2 INCH IN 10 FEET, IN THE DIRECTION OF REFRIGERANT FLOW. EACH SUCTION GAS VERTICAL RISER SHALL BE TRAPPED AT ITS EVAPORATOR WITH A TRAP AS RECOMMENDED BY THE COMPRESSOR MANUFACTURER.

F. INSTALL REFRIGERANT PIPING TO PREVENT EXCESSIVE OIL FROM BEING TRAPPED IN THE SYSTEM. ANY ADDITIONAL RISERS OR EQUALIZER LINES REQUIRED BY THE MANUFACTURER OF EQUIPMENT FOR THE PROPER SYSTEM OPERATION SHALL BE INSTALLED AS PART OF THIS CONTRACT. PROVIDE A FULLY PIPED OIL SEPARATOR FOR EACH REFRIGERANT SYSTEM AS PER MANUFACTURER'S RECOMMENDATIONS.

G. VALVES SHALL BE DESIGNED FOR REFRIGERANT SERVICE. SHUTOFF VALVES SHALL BE BRASS PACKLESS TYPE. UNIONS, FLANGED VALVES OR FITTINGS SHALL BE PROVIDED FOR DISCONNECTING EQUIPMENT, CONTROLS, ETC. FOR MAKING REPAIRS. PIPING SHALL BE RUN IN A SINGLE LAYER, WITH EACH LINE ISOLATED FROM ANOTHER TO PREVENT RUBBING. PROVISION SHALL BE MADE FOR EXPANSION AND CONTRACTION OF PIPING. ALL PIPING PASSING THROUGH WALLS, PARTITIONS, ETC., SHALL BE FURNISHED WITH SLEEVES AS REQUIRED.

H. REFRIGERANT PIPING PASSING THROUGH RATED FLOORS OR DEMISING WALLS SHALL BE ENCLOSED IN A RIGID AND GAS-TIGHT CONTINUOUS FIRE-RESISTING PIPE DUCT OR SHAFT VENTED TO THE OUTSIDE, IN ACCORDANCE WITH ASHRAE STANDARD 15-LATEST EDITION. PIPE CONDUIT SHALL BE COPPER TUBE TYPE L WITH SOLDERED FITTINGS.

22. ELECTRICAL WORK

A. GENERAL:

1) ELECTRICAL POWER WIRING SHALL BE PROVIDED BY THE ELECTRICAL CONTRACT. CONTROL WIRING SHALL BE PROVIDED BY THE HVAC CONTRACT. CONTROL WIRING SHALL BE DEFINED AS ANY WIRING 120V AND BELOW INSTALLED FOR PURPOSES OTHER THAN PROVIDING PRIMARY ELECTRICAL POWER TO EQUIPMENT.

2) MOTOR STARTERS AND VARIABLE FREQUENCY DRIVES (VFD) SHALL BE FURNISHED BY THE HVAC CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. REFER TO EQUIPMENT SECTION FOR VARIABLE FREQUENCY DRIVE SPECIFICATIONS.

3) DUCT MOUNTED SMOKE DETECTORS, WHERE REQUIRED, SHALL BE PROVIDED BY AND WIRED BY THE ELECTRICAL CONTRACTOR, AND MOUNTED BY THE HVAC CONTRACTOR.

A. THIS CONTRACTOR SHALL INSTALL THE SMOKE DETECTOR SAMPLING TUBES IN THE DUCT AS COORDINATED IN THE FIELD.

B. THIS CONTRACTOR SHALL ASSIST THE ELECTRICAL CONTRACTOR IN TESTING THE DUCT-MOUNTED SMOKE DETECTION SYSTEM.

4) ALL ELECTRICAL CONTROL WIRING SHALL COMPLY WITH LOCAL ELECTRICAL CODE, ALL AUTHORITIES HAVING JURISDICTION AND THE PROJECT ELECTRICAL SPECIFICATIONS.

5) MECHANICAL CONTRACTOR TO OBTAIN QUANTITY OF CONTROLLERS REQUIRED AND COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL OPERATING REQUIREMENTS, INTERLOCKS AND CONNECTIONS FOR STARTERS.

6) THE MECHANICAL CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL POINT TO POINT, COMPLETELY COORDINATED WIRING DIAGRAMS AND INDICATE ALL SOURCE POWER REQUIREMENTS AND ALL FIELD WIRING TO BE PERFORMED BY THE ELECTRICAL CONTRACTOR.

7) WHERE EXISTING STARTERS ARE TO BE REUSED, THIS CONTRACTOR SHALL MAINTAIN ALL EXISTING CONTROL CONNECTIONS. WHERE NEW STARTERS ARE TO BE PROVIDED TO REPLACE EXISTING, THIS CONTRACTOR SHALL SURVEY THE EXISTING CONTROL CONNECTIONS AND PREPARE AN EXISTING CONTROL WIRING DIAGRAM PRIOR TO DEMOLITION FOR SUBMITTAL TO THE ENGINEER. THE NEW STARTERS SHALL BE PROVIDED WITH THE NECESSARY CONTACTS AND RELAYS REQUIRED TO RECONNECT THE EXISTING CONTROLS. PROVIDE ALL REQUIRED CONTACTS FOR START/STOP AND FIRE ALARM.

23. MOTORS:

A. MOTORS SHALL HAVE THE ELECTRICAL CHARACTERISTICS AS LISTED ON THE DRAWINGS. COORDINATE ALL REQUIREMENTS WITH AN ELECTRICAL CONTRACTOR. ALL MOTORS SHALL COMPLY WITH NEMA MG-1 STANDARD AND SHALL BE OF THE HIGH EFFICIENCY TYPE AND MEET THE 1992 EPA ENERGY EFFICIENCY ACT AND UTILITY COMPANY REBATE REQUIREMENTS.

B. MOTORS FOR VARIABLE FREQUENCY DRIVES (VFD) SHALL BE SUITABLE FOR USE WITH VARIABLE FREQUENCY DRIVES AND COMPLY WITH NEMA MG-1 PART 31.40.4.2. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL THE REQUIREMENTS OF THE MOTOR AND VFD MANUFACTURER.

C. IF THE CONTRACTOR ELECTS TO SUBSTITUTE OR INCREASE MOTOR HORSEPOWER OVER THAT SPECIFIED, THE COST OF MOTOR AND ELECTRICAL CHANGES SHALL BE BORNE BY THIS CONTRACTOR.

D. MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C50 STANDARDS:

1) STANDARD EFFICIENCY UNLESS OTHERWISE NOTED.

2) 1.15 SERVICE FACTOR INCLUDING MOTORS SERVED FROM A VFD.

3) SQUIRREL CAGE INDUCTION, OPEN DRIPPROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS, CONTINUOUS DUTY, EXCEPT AS NOTED.

24. MOTOR CONTROLLERS

A. SUPPLIED BY HVAC CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

B. ENCLOSURES:

1) PROVIDE ENCLOSURES FOR STARTERS AND VFD'S SUITABLE FOR OPERATING ENVIRONMENT. ENCLOSURE'S SHALL BE NEMA 1 VENTILATED SHEETMETAL FOR INDOOR APPLICATION, NEMA 3R WITH ADDITIONAL GASKETING WEATHER-PROOF RAINTIGHT ENCLOSURE FOR EXPOSED OUTDOOR SERVICE OR INDOOR SERVICE EXPOSED TO MOISTURE. PROVIDE DISCONNECT SWITCH ON ENCLOSURE AS REQUIRED FOR SERVICE.

C. WITH SOLID-STATE (ELECTRONIC) OVERLOAD PROTECTION. COORDINATE ALL MOTOR CONTROLLER TYPES AND SIZES WITH MOTOR TYPES AND SIZES.

D. 1/3 HP AND SMALLER: PROVIDE MANUAL STARTER EXCEPT USE MAGNETIC TYPE WHERE AUTOMATICALLY CONTROLLED.

1) MANUAL TYPE: 2-POLE TOGGLE SWITCH WITH OVERLOAD PROTECTION AND PILOT LIGHT.

E. 1/2 HP AND LARGER: PROVIDE MAGNETIC STARTER:

1) COMBINATION UNFUSED DISCONNECT SWITCH AND MAGNETIC STARTER EXCEPT AS NOTED.

2) SOLID-STATE (ELECTRONIC) OVERLOAD PROTECTION IN EACH PHASE LEG WITH RESET IN ENCLOSURE.

3) HOA SELECTOR SWITCH FOR AUTOMATICALLY OPERATED MOTORS. SAFETY CONTROLS COMMON TO BOTH CONTROLS.

4) RED, GREEN AND AMBER PILOT LIGHTS.

5) SWITCHES: HORSE-POWER-RATED, EXTERNAL PADLOCKING TYPE.

6) HOLDING COILS: 10-WATT, 120 VOLT.

7) CONTACTS: MAIN LINE AND MINIMUM (2) - NORMALLY OPEN, (2) - NORMALLY CLOSED 10 AMP AUXILIARIES, IN ADDITION TO CONTACTS.

8) REQUIRED FOR CONTROLS SPECIFIED.

9) CONTROL TRANSFORMER: FOR MOTORS OVER 120 VOLTS, TO STEP DOWN CONTROL VOLTAGE TO 120 VOLTS; OF THE REQUIRED CAPACITY WITH FUSE AND GROUND CONNECTION ON THE VOLTAGE SIDE.

10) FUSES: SIMILAR TO BUSSMAN.

11) RELAYS: TO SUPPLEMENT AUXILIARY CONTACTS IN CONTROLLER. MINIMUM 10-WATT COIL AND TWO 10 AMP CONTACTS.

12) TERMINALS: SUITABLE FOR CONDUCTORS NOTED AND AS APPROVED.

F. DISCONNECT SWITCHES ARE PROVIDED BY THE ELECTRICAL CONTRACTOR IF NOT INTEGRAL WITH EQUIPMENT.

G. ACCEPTABLE MANUFACTURERS:

1) EATON/CUTLER HAMMER.

2) SQUARE D.

3) ALLEN BRADLEY.

4) ABB.

25. EQUIPMENT

A. PROVIDE ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS.

B. INSTALL EQUIPMENT IN ACCORDANCE WITH APPROVED SHOP DRAWINGS, MANUFACTURERS INSTRUCTIONS, AND ALL CODES AND REGULATIONS WHICH APPLY.

C. PROVIDE EQUIPMENT SUPPORTS AND/OR MOUNTINGS AS INDICATED ON THE DRAWING, IN VIBRATION SPECIFICATION AND AS FOLLOWS:

1) FLOOR MOUNTED EQUIPMENT - PROVIDE DIMENSIONS FOR A 4 INCH CONCRETE HOUSEKEEPING PAD WITH ALL REQUIRED WATERPROOFING TO THE CONSTRUCTION MANAGER.

2) EQUIPMENT ON FLOOR STANDS - PROVIDE FLOOR STAND OF STRUCTURAL STEEL OR STEEL PIPES AND FITTINGS ATTACHED TO THE FLOOR.

3) ROOF MOUNTED EQUIPMENT - PROVIDE PREFABRICATED ISOLATED ROOF CURB WITH INTEGRAL VIBRATION ISOLATORS.

4) CEILING MOUNTED EQUIPMENT - PROVIDE SUPPORTS WITH APPROVED SUITABLE ANCHORS SUSPENDED DIRECTLY FROM BUILDING STEEL STRUCTURE.

5) PROVIDE THE SUPPLEMENTAL STEEL AS REQUIRED TO ADEQUATELY SUPPORT THE EQUIPMENT LOAD.

6) EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATION, REFER TO VIBRATION ISOLATION SECTION.

D. PREPURCHASED EQUIPMENT

1) ASSIGNMENT:

A. EQUIPMENT HAS BEEN PREPURCHASED BY THE OWNER FOR THIS PROJECT. THE MECHANICAL CONTRACTOR, BY BIDDING ON THIS PROJECT, ACCEPTS ASSIGNMENT OF THE PREPURCHASED EQUIPMENT DESCRIBED HEREIN WHICH SHALL BE RECEIVED, INSTALLED AND PUT INTO OPERATION BY THIS MECHANICAL CONTRACTOR.

2) COORDINATION:

A. MECHANICAL CONTRACTOR SHALL PROVIDE COORDINATION BETWEEN INSTALLATION OF PREPURCHASED EQUIPMENT AND EQUIPMENT THAT IS NOT PREPURCHASED AND FURNISHED BY THIS CONTRACTOR. MECHANICAL CONTRACTOR TO OBTAIN ALL SUBMITTALS FROM PREPURCHASED EQUIPMENT MANUFACTURER AND SUBMIT SHOP DRAWING AS PART OF HIS WORK.

3) DELIVERY:

A. MECHANICAL CONTRACTOR SHALL ACCEPT DELIVERY OF PREPURCHASED EQUIPMENT AT A DESIGNATED LOCATION AND IN ACCORDANCE WITH THE DELIVERY SCHEDULE AS DIRECTED BY OWNER'S REPRESENTATIVE. BID SHALL INDICATE LOCATION OF DELIVERY

4) INSTALLATION:

A. MECHANICAL CONTRACTOR SHALL PROVIDE ALL LABOR FOR AND SCHEDULE THE INSTALLATION OF PRE-PURCHASED EQUIPMENT IN A TIMELY MANNER, AS DIRECTED BY THE GENERAL CONTRACTOR OR OWNER'S REPRESENTATIVE. BID SHALL INDICATE LOCATION OF DELIVERY.

B. PROVIDE MISCELLANEOUS APPURTENANCES AS REQUIRED TO MAKE PREPURCHASED EQUIPMENT A PROPERLY FUNCTIONING PART OF THE WORK OF THIS TRADE.

C. PROVIDE PREPURCHASED EQUIPMENT INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND THE CONTRACT DOCUMENTS.

D. PROVIDE ALL TOOLS AND MATERIALS AS REQUIRED TO PROVIDE A COMPLETE INSTALLATION OF ALL PREPURCHASED EQUIPMENT.

E. UP FRONT PURCHASE OF EQUIPMENT:

1) THE CONTRACTOR SHALL SUBMIT A LIST OF LONG LEAD TIME ITEMS THAT WILL AFFECT THE SCHEDULE OF THE PROJECT IF NOT PURCHASED IMMEDIATELY UP FRONT AT THE START OF THE PROJECT. THE MECHANICAL CONTRACTOR SHALL SUBMIT PROPOSED MANUFACTURER AND LEAD TIMES FOR ALL PROJECT EQUIPMENT AT TIME OF PROJECT AWARD.

F. REUSE OF EXISTING EQUIPMENT:

1) EXISTING SYSTEM SURVEY

A. PRIOR TO START OF CONSTRUCTION, CONTRACTOR TO PERFORM EXISTING CONDITIONS SURVEY OF SYSTEMS TO BE REUSED AND PREPARE COMPLETE REPORT INDICATING PHYSICAL CONDITION OF UNITS AND ACCESSORIES AND NOTE ANY REPAIRS REQUIRED BEYOND ITEMS INCLUDED IN DESIGN DOCUMENTS TO RESTORE EQUIPMENT TO A FULLY OPERATIONAL CONDITION. REPORT TO BE SUBMITTED TO ENGINEER FOR REVIEW AND ANY CORRECTIVE ACTION. COORDINATE THIS WORK WITH ANY NEW OR REFURBISHMENT WORK LISTED IN THE SPECIFICATIONS OR PLANS.

B. PROVIDE A UNIT PRICE LIST TO BE SUBMITTED WITH YOUR BID FOR THE REPAIR OF ALL INTERNAL COMPONENTS OF ALL EQUIPMENT TO BE REUSED AS WELL AS ALL ACCESSORIES. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL WARRANTY ALL REUSED EQUIPMENT FOR ONE (1) YEAR.

2) REHABILITATION OF EXISTING FANS.

A. MECHANICAL CONTRACTOR SHALL REFURBISH THE EXISTING FANS AS INDICATED ON THE PLANS. WORK SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: MOTOR AND DRIVE REPLACEMENT, ALIGNMENT, FLEXIBLE CONNECTION REPLACEMENT AND FIELD FAN WHEEL CLEANING AND AIR BALANCING.

B. CLEANING: DISASSEMBLE AND CLEAN ALL PARTS. IF SHOWING OXIDATION, BRUSH SCALE AND FINISH WITH ZINC COMPOUND. THE FAN SCROLL SHOULD BE THROUGHLY CLEANED OF ALL BUILT-UP MATTER.

C. MOTOR REPLACEMENT: MOTOR SHALL BE REPLACED WITH A NEW HIGH EFFICIENCY OPEN DRIP PROOF TYPE MOTOR OF THE SIZES AS SCHEDULED.

D. DRIVE REPLACEMENT: PROVIDE AND INSTALL NEW FAN AND MOTOR SHEAVES. PROVIDE AND INSTALL NEW BELTS TO ACCOMMODATE THESE SHEAVE CHANGES. MOTOR AND FAN SHALL BE ALIGNED AND BELT ADJUSTED AS PER THE FAN MANUFACTURERS INSTRUCTIONS, FOR THE NEW CFM AND RPM AS SCHEDULED.

E. BELT GUARD: PROVIDE AND INSTALL NEW BELT GUARDS. FABRICATED TO SMACNA AND OSHA STANDARDS PROVIDE 3/4-INCH DIAMOND MESH SCREEN WELDED TO ANGLE FRAME AND SECURED TO FAN. CONSTRUCT WITH PROVISIONS FOR BELT TENSION, BEARING LUBRICATION AND TACHOMETER READING WHILE IN PLACE. ROTATING ASSEMBLY: TEST SHAFT AND REPLACE IF NECESSARY, FIELD BALANCE ASSEMBLY (STATICALLY AND DYNAMICALLY). PERFORM A FULL FREQUENCY SPECTRUM ANALYSIS ON THE SYSTEM. INSTALL NEW PILLOW BLOCK GREASE LUBRICATED BEARINGS AND LUBRICATE BEFORE START-UP.

F. PROVIDE AND INSTALL NEW FLEXIBLE CONNECTIONS.

3) REUSE OF EXISTING AIR-CONDITIONING UNITS (CEILING AND FLOOR MOUNTED.

A. THE CONTRACTOR TO NITROGEN CLEAN THE COOLING COILS AND VACUUM CLEAN CASINGS UPON COMPLETION OF CONSTRUCTION.

B. CONTRACTOR TO VERIFY THE CONDITION AND REPAIR ALL COMPONENTS OF THE AIR CONDITIONING UNIT, INCLUDING COILS, COMPRESSOR, CONDENSER, REFRIGERANT CIRCUIT AND ACCESSORIES, FAN, FAN MOTORS, CONTROLS, AND ANY PARTS THAT ARE REQUIRED TO PROVIDE PROPER OPERATION. PROVIDE UNIT PRICES WITH BID OF ALL INTERIOR COMPONENTS THAT MIGHT REQUIRE REPLACEMENT.

C. VERIFY EXISTING AIR CONDITIONING UNIT SUPPORTING CONDITION TO ENSURE THAT IT IS PROPERLY SUPPORTED.

D. PROVIDE NEW PIPING, VALVING, INSTRUMENTATION, AND CONTROLS AS REQUIRED FOR PROPER UNIT OPERATION.

E. THE FOLLOWING IS A LISTING OF THE ITEMS WHICH MUST BE TESTED AND REPORTED ON FOR EACH UNIT.

(1) COMPLETE CHECK OF REFRIGERANT CIRCUITS, INCLUDING:

a) REQUIRED PRESSURE AND CHARGE

b) REFRIGERANT LEAKS

c) COMPRESSOR MOTOR

d) COMPRESSOR AMPERAGE

e) COMPRESSOR CONTROLS

f) HIGH/LOW PRESSURE SWITCH

g) HOLDING RELAY

h) CONTACTOR

i) LIQUID LINE DRYER

j) LIQUID LINE SIGHT GLASS

k) OVER CURRENT PROTECTION DEVICES.

(1) EVAPORATOR FANS AND CONDENSER FANS (AIR COOLED EQUIPMENT)

a) FAN SCROLL (BLADE DEFORMATION)

b) SHAFT ALIGNMENT

c) PHYSICAL CONDITION (DIRT, DEBRIS)

d) PULLEY AND SHEAVES (IF APPLICABLE)

e) BELTS (IF APPLICABLE)

f) MOTOR, NAMEPLATE, AMPERAGE

g) VIBRATION ISOLATION.

(1) CONDENSER (WATER COOLED EQUIPMENT)

a) PRESSURE DROP ACROSS CONDENSER

b) SHELL AND PIPING CONNECTIONS AND CONDITIONS

c) TEMPERATURE OF WATER IN AND OUT.

(1) EVAPORATOR COILS

a) PHYSICAL INSPECTION OF FINS AND TUBES FOR BLOCKAGE

b) PHYSICAL INSPECTION OF COIL CASING

c) FILTER CONDITION

d) TEMPERATURE OF DISCHARGE AIR (DB & WB)

(1) CONTROLS

a) EXPANSION VALVE

b) CONDENSER WATER REGULATING VALVES

c) ALL DAMPER AND ACTUATOR OPERATION AND PHYSICALCONDITION

d) OPERATE EACH DAMPER TO FULL OPEN CONDITION

e) ECONOMIZER/LOW AMBIENT CONTROL OPERATION

(1) ELECTRICAL POWER CHARACTERISTICS OF UNIT.

G. RIGGING

1) THIS CONTRACTOR SHALL PROVIDE ALL THE REQUIRED RIGGING, HOISTING AND BRACING TO INSTALL THE EQUIPMENT AS INDICATED ON THE PLANS. THIS WORK SHALL BE PERFORMED BY AN INSURED CERTIFIED LICENSED RIGGING COMPANY THAT IS EXPERIENCED IN RIGGING EQUIPMENT OF THE TYPE INDICATED FOR THE AREAS SHOWN ON THE CONSTRUCTION DOCUMENTS. THIS CONTRACTOR SHALL SUBMIT RIGGING PLANS FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK.

2) ALL PERMITS REQUIRED FROM THE AUTHORITIES AND AGENCIES INVOLVED TO PERFORM THE RIGGING ARE THE RESPONSIBILITIES OF THIS CONTRACTOR.

3) ALL STRUCTURAL SUPPORTS, MODIFICATIONS OR ADDITIONS ARE TO BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO PROCEEDING WITH THE WORK. ALL SUPPLEMENTAL STRUCTURAL SUPPORTS, ELEVATOR CHARGES / MODIFICATIONS, BRACING AND PROTECTION REQUIRED FOR THE RIG IS THE RESPONSIBILITY OF THIS CONTRACTOR.

H. FANS:

1) GENERAL (APPLIES TO ALL FAN TYPES EXCEPT AS NOTED):

A. PROVIDE CENTRIFUGAL TYPE, NON-OVERLOADING DESIGN EXCEPT AS NOTED WITH MINIMUM CAPACITIES AS NOTED AND WITH CERTIFIED RATINGS BY AMCA. THE WHEEL SHALL BE FACTORY BALANCED STATICALLY AND DYNAMICALLY. BRAKE HORSEPOWER RATINGS SHALL NOT BE MORE THAN 5 PERCENT ABOVE WHAT IS NOTED ON DRAWINGS. DRIVES SHALL BE MATCHED, MULTIPLE V-BELT DRIVE UNLESS OTHERWISE NOTED WITH MINIMUM CAPACITY OF 1.4 TIMES RATED MOTOR HP. PULLEYS SHALL BE CAST IRON.

B. MOTOR PULLEY SHALL BE VARIABLE PITCH DIAMETER EXCEPT FANS WITH VARIABLE FREQUENCY DRIVES SUPPLY AND INSTALL ONE FIXED PITCH PULLEY CHARGE AS REQUIRED PER FAN TO BALANCE SYSTEMS. COMPANION SHEAVES SHALL MAINTAIN BELTS PARALLEL. BELT GUARDS SHALL BE IN COMPLIANCE WITH OSHA REGULATIONS AND WITH TACHOMETER OPENING FOR FAN SPEED MEASUREMENTS. MANUFACTURER SHALL PROVIDE REPLACEMENT FIXED PITCHED SHEAVES WHERE NEEDED TO BALANCE SYSTEM.

C. PROVIDE REMOVABLE FLANGED SCREENS AT INLETS OR OUTLETS WHERE NO CONNECTING DUCTWORK IS INDICATED.

D. BEARINGS BALL ROLLER OR TAPER. PROVIDE PRESSURE TYPE LUBRICATING FITTINGS WITH PRESSURE RELIEF FITTINGS EXTENDED TO ACCESSIBLE LOCATIONS. MINIMUM L-10 LIFE RATING; 50,000 HOURS PER AFBMA STANDARD B-10 OR 250,000 HOURS AVERAGE (B-50) LIFE AT MAXIMUM CATALOG RATING.

I. VARIABLE FREQUENCY DRIVES

1) DESCRIPTION: NEMA ICS 2, IGBT, PWM, VFC; LISTED AND LABELED AS A COMPLETE UNIT AND ARRANGED TO PROVIDE VARIABLE SPEED OF AN NEMA MG 1, DESIGN B, 3-PHASE INDUCTION MOTOR BY ADJUSTING OUTPUT VOLTAGE AND FREQUENCY.

2) VFD SHALL BE MANUFACTURED BY ABB MODEL ACH550 ECLIPSE BYPASS

3) PROVIDE UNIT SUITABLE FOR OPERATION OF PREMIUM-EFFICIENCY MOTOR AS DEFINED BY NEMA MG 1 SUITABLE FOR INVERTER USE INSULATION RATED 1600V

4) DESIGN AND RATING: MATCH LOAD TYPE SUCH AS FANS, BLOWERS, AND PUMPS; AND TYPE OF CONNECTION USED BETWEEN MOTOR AND LOAD SUCH AS DIRECT OR THROUGH A POWER-TRANSMISSION

Berg+Moss Architects

BMA

BERG + MOSS ARCHITECTS PC
THE BEACON BUILDING
473 MAIN STREET No. 1
BEACON, NY 12508
T: 845 831 1318
INFO@BERGMOSS.COM

STRUCTURAL/ CIVIL ENGINEERS
Colliers
COLLIERS ENGINEERING & DESIGN
555 Hudson Valley Ave, Ste 101
New Windsor, NY 12553

MECHANICAL ENGINEERS
LEGACY ENGINEERS
498 Seventh Avenue, 17th Floor South
New York, NY 10018

No.	Description	Date
1	ISSUED FOR BID	11/03/23

SPRING VALLEY VILLAGE

SPRING VALLEY POLICE LOCKER UPGRADES

DRAWING TITLE

MECHANICAL SPECIFICATIONS

DRAWING NO.

M-701.00

SEAL & SIGNATURE

ISSUE DATE: 9-27-23
SCALE: NTS
DWG BY: DWN
CHK BY: CHECK

JOB NUMBER

23025-00