

DIVISION 23 - MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

A. GENERAL

1. GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE PROJECT SPECIFICATIONS MANUAL ARE MADE PART OF THIS SPECIFICATION AND HAVE THE SAME FORCE AND EFFECT AS IF COMPLETELY REPRODUCED.
2. DEFINITIONS: THE WORD "WORK" SHALL MEAN LABOR AND ANY INCIDENTAL ITEMS OR SERVICES NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE COMPLETE SYSTEMS NOTED ON THESE DRAWINGS AND ASSOCIATED SPECIFICATIONS. THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL AND MAKE FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATING CONDITION.
3. WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE APPLICABLE CBC (CALIFORNIA BUILDING CODE), CECRS (CALIFORNIA ENERGY COMMISSION REGULATIONS AND STANDARDS), CMC (CALIFORNIA MECHANICAL CODE), CPC (CALIFORNIA PLUMBING CODE), CEC (CALIFORNIA ELECTRICAL CODE), AND OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS; INCLUDING AMENDMENTS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING FEES AND OBTAINING PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
5. INFORM THE OWNER OF ANY WORK OR MATERIALS WHICH VIOLATES ANY OF THE APPLICABLE LAWS AND REGULATIONS BEFORE PROCEEDING WITH THE WORK.
6. MATERIALS SPECIFIED BY REFERENCE TO A SPECIFIC STANDARD SUCH AS THE ASTM (AMERICAN SOCIETY OF TESTING MATERIALS), UL (UNDERWRITERS' LABORATORIES), ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE), FS (FEDERAL SPECIFICATIONS), A TA (TRADE ASSOCIATION) STANDARD, OR OTHER SIMILAR STANDARD SHALL COMPLY WITH THE REQUIREMENTS OF THE LATEST REVISION THEREOF IN EFFECT AT THE TIME OF BIDDING, EXCEPT AS LIMITED BY TYPE, CLASS OR GRADE, OR MODIFIED IN SUCH REFERENCE.
7. ALL MATERIALS, EQUIPMENT AND APPARATUS SHALL BE UL LISTED OR LABELED FOR ALL ITEMS WHERE SUCH LISTING OR LABELING IS AVAILABLE. ITEMS WHICH ARE NOT UL LISTED OR LABELED WILL NOT BE ACCEPTED IF LISTED OR LABELED EQUIPMENT CAN BE OBTAINED FROM ANOTHER ACCEPTABLE MANUFACTURER. EACH COMPONENT OF ASSEMBLIES SHALL BE UL LISTED AS A "RECOGNIZED COMPONENT". COMPONENTS NOT SO LISTED OR MARKED WILL NOT BE ACCEPTED IF LISTED OR MARKED COMPONENTS ARE AVAILABLE FROM ANOTHER MANUFACTURER'S.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS INDICATED ON DRAWINGS, 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.
9. WORK SHALL BE COORDINATED WITH THE WORK OF OTHER TRADES INCLUDING CONTRACT DOCUMENTS, SHOP DRAWINGS, AND EXISTING SYSTEMS.
10. DO NOT SCALE DRAWINGS AS THEY ARE DIAGRAMMATIC AND SCHEMATIC IN NATURE. CONTRACTOR SHALL PROVIDE 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. ARRANGEMENT OF EQUIPMENT AND ROUTING OF PIPES AND DUCTWORK INDICATED ON DRAWINGS SHALL BE ROUTED PLUMB AND AT RIGHT ANGLES. INSTALLATION OF SYSTEMS MAY REQUIRE MODIFICATION DUE TO UNFORESEEN CONDITIONS.
11. THE MECHANICAL DETAILS SHALL BE CONSIDERED A PART OF THE CONTRACT DOCUMENTS. THESE DETAILS SHALL BE INCORPORATED INTO THE ASSOCIATED WORK AND PROVIDE GENERAL GUIDANCE AS TO THE INSTALLATION INTENT WHETHER REFERENCED OR NOT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL NECESSARY COMPONENTS FOR A COMPLETE INSTALLATION AND ENSURE THAT ALL INSTALLATIONS ARE IN ACCORDANCE WITH THE EQUIPMENT'S LISTING AND THE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
12. CONTRACTOR SHALL SUBMIT A BID BASED ON MANUFACTURER NAMES LISTED UNLESS "OR EQUAL" IS INDICATED. SUBSTITUTION REQUESTS WILL BE REVIEWED BY THE ENGINEER, AND MUST BE SUBMITTED A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO BID DATE CLOSING. ACCEPTABILITY OF SUBSTITUTION WILL BE SOLELY DETERMINED BY THE OWNER.
13. THE BASE BUILDING FIRE PROTECTION REPORT AND TENANT IMPROVEMENT LETTERS ARE A PART OF THESE DOCUMENTS AND SHALL BE REVIEWED IN ITS ENTIRETY AND THE WORK INDICATED THEREIN IMPLEMENTED ACCORDINGLY.
14. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT.
15. GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE (1) YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER. ALL MANUFACTURER'S WARRANTIES FOR EQUIPMENT EXTENDING BEYOND THE GUARANTEE PERIOD SHALL BE TURNED OVER TO THE OWNER.
16. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
17. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY.

B. EXAMINATION OF BIDDING DOCUMENTS:

1. EACH BIDDER SHALL EXAMINE THE BIDDING DOCUMENTS CAREFULLY AND, NOT LATER THAN SEVEN (7) DAYS PRIOR TO THE DATE OF RECEIPT AND BIDS, SHALL MAKE WRITTEN REQUEST TO THE ARCHITECT FOR INTERPRETATION OR CORRECTION OF ANY DISCREPANCIES, AMBIGUITY, INCONSISTENCY OR ERROR THEREIN. ANY INTERPRETATION OR CORRECTION WILL BE ISSUED AS AN ADDENDUM BY THE ARCHITECT. ONLY A WRITTEN INTERPRETATION OR CORRECTION BY ADDENDUM SHALL BE BINDING; NO BIDDER SHALL RELY UPON INTERPRETATIONS OR CORRECTIONS GIVEN BY ANY OTHER METHOD. IF DISCREPANCIES, AMBIGUITY, INCONSISTENCY OR ERROR ARE NOT COVERED BY ADDENDUM OR WRITTEN DIRECTIVE, CONTRACTOR SHALL INCLUDE IN THE BID, LABOR, MATERIALS AND METHODS OF CONSTRUCTION RESULTING IN HIGHER COST. AFTER AWARD OF CONTRACT, NO ALLOWANCE OR EXTRA COMPENSATION WILL BE MADE IN BEHALF OF THE CONTRACTOR DUE TO THE FAILURE TO MAKE THE WRITTEN REQUESTS AS DESCRIBED ABOVE.
2. THE COMPANY/CONTRACTOR SUBMITTING THE REQUEST WILL BE RESPONSIBLE FOR ITS PROMPT DELIVERY. FAILURE TO REQUEST CLARIFICATION OF ANY INADEQUACY, OMISSION OR CONFLICT WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY. THE SIGNING OF THE CONTRACT WILL BE CONSIDERED AS IMPLICITLY DENOTING THAT THE CONTRACTOR HAS A THOROUGH COMPREHENSION OF THE FULL INTENT AND SCOPE OF THE WORKING DRAWINGS AND SPECIFICATIONS.

C. EXISTING CONDITIONS

1. THIS PROJECT INVOLVES CONSTRUCTION INSIDE AN EXISTING STRUCTURE. CONTRACTORS, BY SUBMITTING A BID ARE DEEMED TO BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITIONS OF THE BUILDING AS IT INFLUENCES THE WORK DESCRIBED. NO CLAIMS FOR EXTRA COMPENSATION WILL BE CONSIDERED FOR EXISTING CONDITIONS VISIBLE OR REASONABLY INFERRABLE FROM A CAREFUL EXAMINATION OF THE EXISTING BUILDING CONDITIONS.
2. CONTRACTOR SHALL INSPECT THE EXISTING FIELD CONDITIONS AT THE SITE AND THE CONTRACT DOCUMENTS PRIOR TO THE START OF ANY WORK TO DETERMINE WHAT EFFECT THE EXISTING CONDITIONS WILL HAVE ON THE WORK POTENTIAL. CONTRACTOR SHALL REPORT DISCREPANCIES TO THE ARCHITECT AND INCLUDE IN THE BID ALL COSTS REQUIRED TO MAKE THE WORK MEET EXISTING CONDITIONS.

3. ALL WORK SHALL BE DONE AS EXPEDITIOUSLY AS POSSIBLE IN SUCH A MANNER AS NOT TO CAUSE INTERFERENCE OR INTERRUPTION TO THE BUSINESS OF THE OWNER. SUBMIT SCHEDULE FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL NOT OBSTRUCT ENTRANCES OR PASSAGES ON THE OWNER'S PREMISES.
4. TRANSPORTATION OF MATERIAL INTO AND THROUGH THE BUILDING WILL BE SUBJECT TO REVIEW AND APPROVAL OF THE OWNER AND MAY BE LIMITED TO RESTRICTED TIMES.
5. THE OWNER WILL MAKE AVAILABLE TO THE CONTRACTOR AN ELEVATOR FOR HANDLING MATERIALS, RUBBISH, ETC. AT SUCH TIMES WHEN IT IS CONVENIENT TO THE OCCUPANTS OF THE BUILDING. THE CONTRACTOR SHALL PROTECT THE INTERIOR OF THE CAB AGAINST DAMAGE AND PROVIDE LABOR TO HANDLE MATERIALS IN AND OUT OF THE ELEVATOR AND OUT OF THE BUILDING.
6. VERIFY ALL SIZES, DIMENSIONS, AND CONDITIONS BEFORE STARTING ANY WORK. ANY DEVIATIONS OR CONFLICTS SHALL BE TRANSMITTED TO THE ENGINEER FOR REVIEW.
7. CONTRACTOR SHALL PERFORM AND PREPARE A PRE-CONSTRUCTION TEST AND BALANCE REPORT TO BENCHMARK EXISTING PERFORMANCE OF ALL AIRSIDE AND WATERSIDE SYSTEMS MODIFIED AS PART OF THIS SCOPE.
8. CONTRACTOR SHALL CONNECT THEIR WORK TO VARIOUS EXISTING PIPING, DUCTWORK, AND CONTROL SYSTEMS. THE NEW WORK SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM.
9. CARE SHALL BE TAKEN DURING DEMOLITION AND INSTALLATION OF THE NEW WORK, AS NOT TO DAMAGE OR INTERRUPT THE EXISTING BUILDING SYSTEMS AND SERVICES INSTALLED. DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT CAUSED BY CONTRACTOR DURING THE INSTALLATION OF THEIR WORK SHALL BE REPAIRED AND/OR REPLACED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE BUILDING OWNER.
10. SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTION TO EXISTING SERVICES SHALL BE COORDINATED WITH THE OWNER. CONTRACTOR SHALL SUBMIT REQUESTS WHERE THEY AFFECT THE OPERATION OF THE BUILDING SYSTEMS AT LEAST ONE (1) WEEK IN ADVANCE OF ANY REQUIRED SHUTDOWN. THE ACTUAL SHUTDOWN PERIOD SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AGREED TO BY THE OWNER.
11. DEMOLITION SHALL BE COORDINATED BETWEEN OWNER, ARCHITECT AND CONTRACTOR.
12. CONTRACTOR SHALL REPORT ANY EQUIPMENT DEFICIENCIES FOUND TO THE ARCHITECT WITHIN FIVE (5) DAYS OF DISCOVERY.
13. CONTRACTOR SHALL PROVIDE THE FOLLOWING SERVICES AS APPLICABLE, ON EXISTING HVAC (HEATING, VENTILATION AND AIR-CONDITIONING) EQUIPMENT INDICATED TO REMAIN: FILTER CHANGES, BALANCING, LUBRICATION OF APPLICABLE MOVING COMPONENTS, CLEAN COILS, CALIBRATE UNIT CONTROL COMPONENTS, VERIFY FAN ROTATION AND OPERATION, VERIFY CONTROLS OPERATION, CLEAN CONDENSATE PAN AND TRAP, AND VERIFY PITCH OF CONDENSATE DRAIN.

D. SUBMITTALS

1. CONTRACTOR SHALL SUBMIT FIVE (5) SETS OF SHOP DRAWINGS, TECHNICAL DATA SHEETS, AIR DISTRIBUTION LAYOUT DRAWINGS (1/4"=1'-0" SCALE), AND PIPING DISTRIBUTION LAYOUT DRAWINGS (1/4"=1'-0" SCALE). THE ROUTING OF NEW DISTRIBUTION SYSTEM IS SHOWN DIAGRAMMATICALLY AND APPROXIMATED. THE CONTRACTOR SHALL PROVIDE OFFSETS AND TRANSITIONS AS REQUIRED. THE CONTRACTOR SHALL DETERMINE EXACT ROUTING AND LOCATIONS, PROVIDING PROPER CLEARANCES, MAKING PROVISIONS FOR MAINTENANCE ACCESS, AND COORDINATING WITH EXISTING AND NEW COMPONENTS OF OTHER TRADES, THE STRUCTURE, AND OTHER OBSTRUCTIONS. INDICATE SPACES RESERVED FOR FIRE SPRINKLER, PIPING AND ELECTRICAL CONDUIT MAINS. THE DUCTWORK SHOP DRAWING SUBMITTAL SHALL BE BASED ON THIS COORDINATION EFFORT AND SHALL SHOW AIR DISTRIBUTION COMPONENTS. DUCTWORK, PIPING AND COMPONENTS SHALL BE DRAWN TO SCALE, AND SIZES SHALL BE INDICATED. THE ENGINEER SHALL REVIEW SUBMITTALS AND SHOP DRAWINGS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK.
2. CONTRACTOR SHALL SUBMIT FIVE (5) SETS OF EQUIPMENT AND SYSTEM CONTROL SEQUENCES, SCHEMATICS, LOGIC DIAGRAMS AND SYSTEM COMPONENTS INCLUDING DETAILS OF TIE-IN TO EXISTING BUILDING CONTROL. THE ENGINEER SHALL REVIEW CONTROL SHOP DRAWINGS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK.
3. CONTRACTOR SHALL IDENTIFY ANY DEVIATIONS IN SHOP DRAWINGS FROM THE DESIGN DOCUMENTS.
4. SUBSTITUTIONS SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION PRIOR TO BIDDING. SUBSTITUTIONS SHALL BE PRE-APPROVED IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING REQUIREMENTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT OR MATERIALS WITH OTHER BUILDING TRADES INCLUDING ELECTRICAL, STRUCTURAL, AND ARCHITECTURAL ELEMENTS. CONTRACTOR SHALL IDENTIFY AND ANNOTATE REVISED REQUIREMENTS PER BUILDING TRADE ON THE SHOP DRAWINGS. CONTRACTOR SHALL ALSO IDENTIFY COST DEBITS OR CREDITS IN WRITING FOR THE PROPOSED CHANGES PER BUILDING TRADE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ENGINEERING FEES NECESSARY TO CHANGE PERMIT DOCUMENTS BASED ON ALTERNATE SUBMITTAL PACKAGES/EQUIPMENT SUBSTITUTIONS.

E. RECORD DRAWINGS

1. CONTRACTOR SHALL MAINTAIN TWO (2) SETS OF DRAWINGS PERTAINING TO THE WORK. ONE (1) SET OF PRINTS SHALL BE KEPT ON SITE AND CHANGES OR DEVIATIONS FROM THE CONTRACT DRAWINGS SHALL BE CAREFULLY NOTED AS CHANGES OR DEVIATIONS ARE MADE. AT THE COMPLETION OF THE PROJECT AND BEFORE FINAL ACCEPTANCE OF THE WORK, COPY THE CHANGES, DEVIATIONS, AND COMPLEMENTARY INFORMATION ON THE OTHER SET OF PRINTS AND RETURN IT TO THE OWNER. THE COST OF PRINTS AND COSTS INVOLVED IN THE PREPARATION OF THESE RECORD DRAWINGS SHALL BE BORNE BY THE CONTRACTOR.
2. NO APPROVAL FOR FINAL PAYMENT WILL BE GIVEN UNTIL, IN THE JUDGEMENT OF THE ENGINEER, COMPLETE AND ACCURATE "AS-BUILT" DRAWINGS HAVE BEEN SUBMITTED.
3. FINAL AS-BUILT DRAWINGS ARE TO BE AT LEAST 1/4"=1'-0" SCALE. AS-BUILT DRAWINGS CAN BE GENERATED ON COMPUTER OR BY HAND. IF DRAWINGS ARE HAND GENERATED THEY SHALL BE ON MYLAR. IF THE AS-BUILT DRAWINGS ARE COMPUTER GENERATED, THE CONTRACTOR SHALL DELIVER AN ELECTRONIC COPY OF THE AS-BUILT DOCUMENTATION TO THE OWNER.

F. OPERATING AND MAINTENANCE (O&M) INSTRUCTIONS

1. CONTRACTOR SHALL PROVIDE THREE (3) COPIES OF MANUFACTURER'S O&M INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT AND SYSTEM. COPIES SHALL BE COMPILED IN SETS AND PLACED IN A HARD COVER THREE (3) RING BINDER WITH INDEX PAGE AND INDEX TABS. NAME TAG INFORMATION SUCH AS MANUFACTURER, TYPE, SIZE, CAPACITY, SERIAL NUMBER, ETC SHALL BE INCLUDED AS PART OF THE MANUAL.
2. PROVIDE WRITTEN OPERATING INSTRUCTIONS WITH DIAGRAMS FOR ALL EQUIPMENT AND ACCESSORIES.
3. THE O&M MANUALS SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW.
4. FURNISH ONE (1) CLEAN COPY OF EACH FULLY CORRECTED AND PROCESSED SHOP DRAWING.
5. REVIEW AND DEMONSTRATE THE O&M INSTRUCTIONS ON SITE WITH THE BUILDING OWNER AFTER THE COMPLETION OF START-UP, TESTING AND BALANCING.

PART 2 - PRODUCTS

A. GENERAL

1. PROVIDE EQUIPMENT AS SPECIFIED AND/OR SCHEDULED 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 TAB (TEST AND BALANCE) WORK.

B. DUCTWORK

1. DUCTWORK SIZES SHOWN ARE FREE AREA DIMENSIONS. INCREASE DUCTWORK DIMENSIONS TO ACCOMMODATE LINING REQUIREMENTS.
2. MATERIAL, CONSTRUCTION, AND INSTALLATION SHALL MEET REQUIREMENTS OF THE LATEST EDITION OF SMACNA (SHEET METAL AND AIR-CONDITIONING CONTRACTORS NATIONAL ASSOCIATION) DUCT CONSTRUCTION STANDARDS AND ASHRAE (AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS) RECOMMENDATIONS, EXCEPT FOR MORE STRINGENT REQUIREMENTS SPECIFIED OR SHOWN ON DRAWINGS.
3. SUPPLY, RETURN, AND GENERAL EXHAUST DUCT SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE SPECIFIED.
4. PROVIDE SUPPORTING AND HANGING DEVICES NECESSARY TO ATTACH ENTIRE HVAC SYSTEM INCLUDING DUCTWORK, EQUIPMENT, AND PIPING TO PREVENT VIBRATION. SYSTEMS AND ASSOCIATED COMPONENTS SHALL BE FREE FROM VIBRATION UNDER ALL CONDITIONS OF OPERATION.
5. PROVIDE VERTICAL AND HORIZONTAL SUPPORTS AS REQUIRED BY THE ADOPTED STATE BUILDING CODE TO MEET MINIMUM APPLICABLE EARTHQUAKE RESISTANCE STANDARDS.
6. WHEN MAKING OFFSETS AND TRANSFORMATIONS NECESSARY TO ACCOMMODATE STRUCTURAL CONDITIONS, PRESERVE FULL CROSS-SECTIONAL AREA OF DUCTWORK SHOWN ON DRAWINGS.
7. PRESSURE TEST DUCTS AFTER TAKEOFFS AND WALL PENETRATIONS ARE IN PLACE AND BEFORE APPLYING EXTERIOR INSULATION. CORRECT ANY LEAKS.
8. PRESSURE AND LEAK TEST 25% OF LOW PRESSURE DUCTWORK AT 150% OF DUCT CONSTRUCTION CLASS PRESSURE. NOTE: FOR SUPPLY SYSTEMS, PERFORM POSITIVE PRESSURE TEST. FOR RETURN AND EXHAUST SYSTEMS ON SUCTION SIDE, PERFORM NEGATIVE PRESSURE TEST. DUCT SHALL BE CONSTRUCTED SO THERE IS NO JOINT OR STRUCTURAL FAILURE AT THE TEST PRESSURE.

C. FLEXIBLE DUCTWORK

1. FLEXIBLE DUCTWORK SHALL BE UL RATED FOR 12" WG (WATER GAUGE) POSITIVE PRESSURE, 2" WG NEGATIVE PRESSURE WITH A MAXIMUM VELOCITY OF 4000 FPM (FEET PER MINUTE). BE LISTED AS A CLASS 1 CONNECTOR ACCORDING TO UL 181, AND MEET THE REQUIREMENTS OF NFPA (NATIONAL FIRE PROTECTION ASSOCIATION) 90A. MAXIMUM ASTM E-84 FIRE HAZARD RATING SHALL BE 25 FLAME SPREAD, 50 FUEL CONTRIBUTED AND 50 SMOKE DEVELOPED. INSULATED FLEXIBLE DUCT SHALL BE EQUIVALENT TO FLEXMASTER TYPE 1. UNINSULATED FLEXIBLE DUCT SHALL BE EQUIVALENT TO FLEXMASTER TYPE 4. JOINTS SHALL BE STEEL BAND-CLAMPED AND TAPE SEALED TO MAINTAIN INTEGRITY OF VAPOR BARRIER. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS TO ELIMINATE SAGS EXCEEDING 1/2" PER FOOT BETWEEN SUPPORTS.
2. FLEXIBLE DUCTWORK, CONNECTING TO UNINSULATED OR UNLINED DUCT, SHALL BE VINYL COATED FIBERGLASS CLOTH, MINIMUM 25 STRANDS PER INCH THREAD COUNT WITH CORROSION-RESISTANT HELICAL WIRE REINFORCEMENT.
3. FLEXIBLE DUCTWORK CONNECTING TO INSULATED OR LINED DUCT SHALL BE STEEL WIRE COIL REINFORCED, INSULATED (MINIMUM K-VALUE OF 6.0) WITH A FLAME RETARDANT (UL LISTED) VAPOR BARRIER MEETING ASTM E-84 RATING.
4. FLEXIBLE DUCT SHALL BE SECURED TO RIGID DUCTWORK AND AIR DEVICES WITH SCREWS AND DRAWBANDS. LENGTH OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO 5'-0" AND SHALL NOT BE COMPRESSED. FLEXIBLE DUCTWORK SHALL NOT BE USED ABOVE INACCESSIBLE CEILINGS AND SHALL NOT PASS THROUGH WALLS.

D. DUCTWORK INSULATION

1. INSULATE SUPPLY, RETURN, AND OUTSIDE AIR DUCTS AND PLENUMS. RETURN DUCTS (IN CEILING PLENUM) OF ASSOCIATED PLENUM RETURN AIR SYSTEM DO NOT NEED TO BE INSULATED. INSULATION SHALL BE A MINIMUM OF 1-1/2" THICK, 3/4 LBS/CU FT (POUNDS PER CUBIC FOOT) DENSITY (MAXIMUM K-VALUE OF 0.29 AT 75°F) FIBROUS GLASS CLOTH WRAP. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVE AND SEALANT COUNCIL STANDARDS, SMACNA AND HAVE FLAME SPREAD/SMOKE DEVELOPED RATING OF 25/50 OR LESS. INSULATION SHALL BE SECURED WITH WIRE TIES AT 12" ON CENTER OR WITH SELF-SEALING LAP AND TAPE JOINTS 3" ON CENTER AT FITTINGS. JOINTS SHALL BE COVERED WITH 3" WIDE FOIL REINFORCED KRAFT TAPE.
2. ADHESIVE OR MECHANICAL FASTENERS SHALL BE USED WHERE NECESSARY TO PREVENT SAGGING. VAPOR BARRIER PENETRATIONS BY MECHANICAL FASTENERS SHALL BE SEALED WITH VAPOR BARRIER ADHESIVE. INSULATION SHALL STOP AND POINT AROUND ACCESS DOORS AND DAMPER OPERATORS TO ALLOW OPERATION WITHOUT DISTURBING WRAPPING.
3. PROVIDE ACOUSTICAL DUCT LINER (2" THICK, MAXIMUM K-VALUE OF 0.23) ON SUPPLY DUCTWORK, RETURN DUCTWORK, AND PLENUMS 20'-0" UPSTREAM AND DOWNSTREAM OF FANS (EXCLUDING KITCHEN HOOD DUCTWORK, DISHWASHER DUCTWORK, AND MOISTURE EXHAUST DUCTWORK). PROVIDE 1" THICK LINER ON LOW PRESSURE DUCTWORK 10'-0" DOWNSTREAM OF TERMINAL BOXES AND WHERE INDICATED ON DRAWINGS. DUCT LINER SHALL BE APPLIED TO DUCTWORK WITH FIRE-RESISTANT ADHESIVES AND COPPER OR CADMIUM PLATED MECHANICAL FASTENERS SIMILAR TO JOHNS MANVILLE (LINACOUSTIC RC - RECTANGULAR, SPIRACOUSTIC PLUS - ROUND).
4. EXHAUST DUCTWORK EXCEPT KITCHEN EXHAUST DUCTWORK SHALL BE UNINSULATED UNO (UNLESS NOTED OTHERWISE).

E. DUCTWORK ACCESSORIES AND MISCELLANEOUS


1. DUCT HANGERS SHALL BE CONSTRUCTED OF GALVANIZED STEEL. DUCTS SHALL BE SUPPORTED AND CONNECTED TO THE STRUCTURE PER SMACNA DUCT CONSTRUCTION STANDARDS. HANGERS AND SUPPORTS FOR GREASE DUCT SHALL BE OF NON-COMBUSTIBLE MATERIALS. FLEXIBLE DUCTS SHALL BE SUPPORTED WITH GALVANIZED STRAPS.
2. PROVIDE PROPER PRESSURE AND LEAKAGE RATED, GASKETED, DUCT MOUNTED ACCESS PANELS/DOORS. IN INSULATED DUCTS, ACCESS DOORS SHALL BE INSULATED DOUBLE WALL. GAUGES OF DOOR MATERIALS, NUMBER OF HINGES, NUMBER AND TYPE OF DOOR LOCKS SHALL BE AS REQUIRED BY THE SMACNA DUCT CONSTRUCTION STANDARD. UNHINGED DOORS SHALL BE CHAINED TO FRAME WITH A MINIMUM LENGTH OF 6" TO PREVENT LOSS OF DOOR. FOR SEAL CLASS A, HINGED DOORS ARE NOT ACCEPTABLE, SCREWED OR BOLTED ACCESS PANELS ARE NOT ACCEPTABLE. ACCESS DOORS SHALL BE LEAKED RATED, NEOPRENE GASKETED UL 94 HF1 LISTED. DUCTMATE "SANDWICH".
3. ACCESS DOOR METAL SHALL BE THE SAME AS THE ATTACHED DUCT MATERIAL. THE MINIMUM SIZES ARE:
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| FIRE DAMPERS | 12" x 12" (OR LARGER) |
| AUTOMATIC SMOKE CONTROL DAMPERS | 6" x 6" |
| MANUAL VOLUME DAMPERS 2 SQ FT AND LARGER | 6" x 6" |
| SUCTION AND DISCHARGE SIDES OF INLINE FANS | 24" x 24" |
4. PROVIDE FIRE DAMPERS THROUGHOUT AIR DISTRIBUTION SYSTEM AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE ADOPTED STATE BUILDING CODE. PROVIDE ACCESS DOOR FOR EACH FIRE DAMPER OF SUFFICIENT SIZE TO REPAIR INTERNAL LINK. BLADES OF DAMPERS SHALL BE OUT OF AIR STREAM. DAMPERS SHALL BEAR 1-1/2 HOUR MINIMUM UL RATING FIRE

- DAMPER LABEL AND SHALL BE CONSTRUCTED AND INSTALLED AS REQUIRED BY UL 555. FUSIBLE LINKS SHALL BE RATED AT 165°F MINIMUM TEMPERATURE.
5. FIRE DAMPERS INSTALLED IN SYSTEMS THAT CAN REMAIN IN OPERATION AFTER DAMPER HAS CLOSED SHALL BE DYNAMIC TYPE DAMPERS. ALL OTHER FIRE DAMPERS MAY BE STATIC TYPE FIRE DAMPERS.
6. PROVIDE SMOKE DAMPERS THROUGHOUT AIR DISTRIBUTION SYSTEM AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE ADOPTED STATE BUILDING CODE. SINGLE OR MULTIPLE BLADE SHALL BE LEAKAGE CLASS 1 SMOKE (UL 555S) RATED DAMPERS, DAMPER BEARING SHALL BE NYLON. BUSHINGS THAT TURN IN BEARINGS SHALL BE OIL-IMPREGNATED, SINTERED METAL. SMOKE DAMPERS SHALL BE SUPPLIED WITH ZERO VELOCITY TYPE SMOKE DETECTORS THAT HAVE A DETECTION RANGE OF 0-3000 FPS (FEET PER SECOND), MANUFACTURER RECOMMENDED AND FACTORY MOUNTED EXTERNAL ELECTRIC ACTUATOR WITH SPRING RETURN, DAMPER FRAMES SHALL BE STRUCTURALLY EQUIVALENT TO 13 GAUGE GALVANIZED SHEET METAL FRAME WITH FLANGES FOR DUCT-MOUNTING, DAMPER BLADES SHALL NOT EXCEED 6" IN WIDTH. BLADES SHALL BE SUITABLE FOR DUCT VELOCITY PERFORMANCE AND SHALL BE MANUFACTURED BY POTTORFF, GREENHECK, RUSKIN, OR APPROVED EQUAL.
7. COMBINATION FIRE/SMOKE DAMPERS INSTALLED IN RETURN/SMOKE EXHAUST DUCTWORK SHALL HAVE TEMPERATURE LIMITED OVERRIDE FOR USE AT ELEVATED TEMPERATURES DURING SMOKE CONTROL OPERATION.
8. THROUGH PENETRATIONS OF FIRE-RATED CONSTRUCTION AND SMOKE PARTITIONS SHALL BE PROVIDED WITH SLEEVES THAT MEET SMACNA FIRE DAMPER AND HEAT STOP GUIDE. OPENINGS IN WALLS, PARTITIONS AND OTHER FIRE-RATED CONSTRUCTION THAT DO NOT REQUIRE SMOKE DAMPERS SHALL MEET NFPA 90A. MATERIALS FOR PREPARED OPENINGS IN PARTITIONS SHALL WATCH CONSTRUCTION PENETRATED AND SHALL BE A UL LISTED ASSEMBLY. FIREPROOF PACKING SHALL BE APPLIED TO SEAL ANY OPENINGS BETWEEN SLEEVE AND WALL. MATERIALS SHALL MAINTAIN THE FIRE RATING OF THE WALL, AND SHALL BE INSTALLED IN ACCORDANCE WITH THE SMACNA FIRE DAMPER AND HEAT STOP GUIDE.
9. PROVIDE MANUAL ADJUSTABLE VOLUME DAMPERS, WITH EXTENDED MOUNT INDICATING AND LOCKING QUADRANTS AT EACH TAKE-OFF TO REGISTER, GRILLE OR DIFFUSER (NOT ALL ARE SHOWN ON DRAWINGS). FOR SEAL CLASS A, PENETRATIONS SHALL BE PROVIDED WITH SEALED ASSEMBLIES. VENTLOK HIVEL 641 AND HIVEL 609 END BEARINGS OR APPROVED EQUAL. FOR INSULATED DUCTS PROVIDE PROPER ASSEMBLY. DAMPERS SHALL BE 1/2" SMALLER IN BOTH DIMENSIONS OR 1" SMALLER DIAMETER THAN SIZE OF DUCT IN WHICH THEY ARE INSTALLED. EXAMPLE: USE 23-1/2" x 23-1/2" DAMPER FOR 24" SQUARE DUCT. DAMPERS LARGER THAN 12" IN HEIGHT SHALL BE OPPOSED MULTI-BLADE. DAMPER BLADES SHALL BE TWO (2) GAUGES HEAVIER THAN ADJOINING DUCTWORK, AND SHALL BE RIVETED TO SUPPORTING RODS. HEM OVER EDGES PARALLEL TO RODS. BRACKETS SHALL BE GALVANIZED METAL, SECURED TO DUCTWORK WITH SHEET METAL SCREWS WITH LOCKING QUADRANT ARMS (SEE SEAL CLASS SECTION FOR ADDITIONAL REQUIREMENTS). PROVIDE 2" HANDLE EXTENSION FOR ALL DAMPERS ON EXTERNALLY INSULATED DUCTWORK. ALL REQUIRED VOLUME DAMPERS MAY NOT BE INDICATED ON DRAWINGS BUT DAMPERS SHALL BE PROVIDED AS NECESSARY FOR SYSTEM BALANCING.
10. BACKDRAFT DAMPERS FOR EXHAUST FANS, DRYER VENTS, ETC SHALL HAVE NEOPRENE EDGES (NO METAL ON METAL CONTACT).
11. PATCH AND SEAL OPENINGS IN EXISTING DUCTWORK NOT UTILIZED FOR NEW LAYOUT.
12. SEAL DUCT PENETRATIONS THROUGH WALLS, FLOORS, AND ROOF.
13. SEAL TRANSVERSE JOINTS AND LONGITUDINAL DUCT SEAMS WITH APPROVED MASTIC. DUCT TAPES SHALL NOT BE ALLOWED FOR RIGID DUCTWORK.
14. WHEN SECTION OF DUCTWORK IS NOT LABELED FOR SIZE, THE LARGER SIZE INDICATED ON THE CONNECTED DUCT SHALL PREVAIL. SIZE OF DUCT RUN-OUTS TO DIFFUSER SHALL EQUAL DIFFUSER NECK SIZE UNLESS NOTED OTHERWISE.
15. DUCT BRANCH CONNECTION AND TAKE-OFFS SHALL BE MADE WITH 45° CONNECTION, BELLMOUTH OR CONICAL ONLY. SPIN-IN COLLARS AND STRAIGHT TAPS SHALL NOT BE USED.
16. RADIUSED ELBOWS OR MITERED ELBOWS WITH SINGLE THICKNESS TURNING VANES SHALL BE UTILIZED. TURNING VANES SHALL BE SUPPORTED AT INTERVALS OF 3'-0" MAXIMUM. TURNING VANE RUNNERS SHALL HAVE A VANE IN EVERY SLOT.
17. DUCTWORK SHALL NOT RUN ALONG FULL HEIGHT PARTITIONS.
18. DUCTWORK VISIBLE BEHIND DUCTED OR UNDUCTED DIFFUSERS, REGISTERS, GRILLES, PERFORATED CEILINGS, CEILING REVEALS, OR DECORATIVE ARCHITECTURAL GRILLES SHALL BE PAINTED FLAT BLACK.

F. PIPING AND FITTINGS

1. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.
2. EQUIPMENT AND CONDENSATE DRAINS SHALL BE TYPE M HARD DRAWN COPPER TUBING WITH WROUGHT COPPER FITTINGS. COPPER TUBING SHALL BE SOLDERED WITH 95-5 TIN-ANTIMONY SOLDER OR BRAZED WITH SILVER BASED FILLER MATERIAL. DRAINS SHALL BE ROUTED SO AS NOT TO CREATE A TRIPPING HAZARD.
3. REFRIGERANT PIPING SHALL BE ACR COPPER TUBING.
4. VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. VALVES SHALL BE AS MANUFACTURED BY APOLLO, CRANE, NIBCO, STOCKHAM, MILWAUKEE, OR APPROVED EQUAL.
5. SHUT-OFF VALVES 2" AND SMALLER SHALL BE FULL PORT BALL-TYPE, BRONZE BODY AND TRIM.
6. SLOPE CONDENSATE DRAIN PIPING AT 1% AND PROVIDE MINIMUM 3" DEEP TRAP.
7. STRAINERS SHALL BE FULL SIZE OF EXTERNAL PIPE SIZE AND HAVE A MAXIMUM CLEAN PRESSURE DROP OF ONE (1) PSIG (POUNDS PER SQUARE INCH GAUGE) FOR STEAM CONDENSATE 1/4 PSIG. INSTALL STRAINERS AT LOCATIONS THAT WILL ALLOW REMOVAL OF SCREENS FOR CLEANING. STRAINERS SHALL BE MANUFACTURED BY SARCO, WATTS, ARMSTRONG, OR APPROVED EQUAL.
8. PROVIDE AUTOMATIC PRESSURE INDEPENDENT FLOW CONTROL VALVES BY GRISWOLD, AUTOFLOW, OR APPROVED EQUAL WHERE INDICATED ON THE DRAWINGS. VALVES SHALL BE FACTORY SET AND SHALL AUTOMATICALLY LIMIT THE RATE OF FLOW TO REQUIRED ENGINEERED CAPACITY WITHIN ±5% OVER AN OPERATING PRESSURE DIFFERENTIAL OF AT LEAST 14 TIMES THE MINIMUM REQUIRED FOR CONTROL. PROVIDE GAUGE KIT BY VALVE MANUFACTURER FOR USE BY OWNER. ALL VALVE FLOW RATES SHALL BE FIELD VERIFIED AND THE VALVES RE-CALIBRATED AS NECESSARY TO MEET PERFORMANCE REQUIREMENTS.
9. PROVIDE CALIBRATED COMBINATION BALANCING SHUT-OFF VALVES. ACCEPTABLE MANUFACTURERS SHALL BE ARMSTRONG, BELL AND GOSSETT, FLOW DESIGN, TACO, OR APPROVED EQUAL. PROVIDE DIFFERENTIAL PRESSURE METER WITH CALIBRATION CHARTS FOR PROJECT.
10. PROVIDE REFRIGERANT PIPING BETWEEN OUTDOOR CONDENSING UNIT AND INDOOR FAN COIL UNIT OR HEAT PUMP. PROVIDE NECESSARY AUXILIARIES AND APPARATUSSES TO MAKE SYSTEM COMPLETE AND OPERABLE UNDER FULLY AUTOMATIC CONTROL.
11. PIPE HANGERS FOR INSULATED PIPE SIZES 1/2" TO 1-1/2" SHALL BE ADJUSTABLE STEEL BAND TYPE. PIPE HANGERS FOR INSULATED PIPE SIZES 2" AND OVER SHALL BE ADJUSTABLE, STEEL CLEVIS TYPE. SHIELDS SHALL BE USED WHERE HANGER SUPPORTS INSULATED PIPE. SHIELDS SHALL BE MINIMUM 18 GAGE GALVANIZED STEEL OVER INSULATION 180° AND A

Stamp



Corrections

PLN CHK 08-17-18

UTILITIES BY: ☐ PUBLIC WORKS ☐ ENGINEERING DIVISION

DATE: ☐ BY: ☐ DATE: ☐ BY: ☐

DATE: ☐ BY: ☐ DATE: ☐ BY: ☐

DATE: ☐ BY: ☐ DATE: ☐ BY: ☐

Project Title

City of La Mesa, California
Department of Public Works
Engineering Division

Project No.

18-0405-01

Project Architect

Mike Smith

Drawn By

ES/GM/SC

Project Number

200509.00

Date:

08-17-18

Sheet Number

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Project Title

City of La Mesa
Police Facility
For Construction

Project No.

18-0405-01

9282.11



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MINIMUM OF 12" LONG. SHIELD THICKNESS AND LENGTH SHALL BE IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. PIPE HANGERS FOR BARE PIPE SHALL BE ADJUSTABLE, MALLEABLE STEEL, SPLIT RING TYPE. BARE COPPER PIPE SHALL BE PROTECTED FROM CORROSION BY TRISOLATOR OR SIMILAR PRODUCT. HANGERS SHALL BE LOCATED 12" MAXIMUM FROM ANY CHANGE IN DIRECTION AND SPACED AS FOLLOWS FOR STRAIGHT RUNS.

PIPE SIZE	MAXIMUM HANGER SPACING	MINIMUM HANGER ROD DIAMETER
1/2" to 1-1/4"	6'-0"	3/8"
1-1/2" to 2"	8'-0"	3/8"
2-1/2" to 3"	10'-0"	1/2"
4" to 6"	10'-0"	5/8"

12. THROTTLING VALVES AND SHUT-OFF VALVES SHALL BE BALL VALVES.

13. PIPE SLEEVES THROUGH FLOORS AND THROUGH EXTERIOR, STRUCTURAL, AND FIRE-RATED CONSTRUCTION SHALL BE HOT-DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH PARTITIONS AND NON-RATED CONSTRUCTION SHALL BE 28 GAUGE GALVANIZED STEEL WITH LOCK LONGITUDINAL SEAMS, OR APPROVED PLASTIC PIPE. PROVIDE WATERPROOFING MEMBRANE, LOCKING DEVICES AT FLOOR. PROVIDE 150 LBS SLIP-ON WELDING FLANGES AT EXTERIOR WALL PENETRATIONS.

14. PACKING FOR RATED PIPE SLEEVES SHALL BE INSTALLED BETWEEN THE PIPE AND THE SLEEVE (WALL/SLAB OPENING) AND SHALL BE A COMBINATION OF FIREPROOF INSULATION AND FIREPROOF CAULK. THE COMBINATION OF MATERIALS SHALL HAVE THE SAME FIRE RATING AS THE WALL OR SLAB, AS TESTED IN ACCORDANCE WITH THE LATEST EDITION OF ASTM E-814 (UL 1479). THE COMBINATION OF MATERIALS SHALL BE CLASSIFIED BY UL (FILL, VOID OR CAVITY MATERIALS) FOR THE FIRE RATING REQUIRED AND SHALL BE LISTED AS NUMBERED SYSTEM IN THE UL FIRE RESISTANCE DIRECTORY. FIBERGLASS SHALL NOT BE USED AS THE INSULATION MATERIAL. ACCEPTABLE FIREPROOF INSULATION MATERIALS SHALL BE KAOLIN (KAOWOOL BY BABCOCK AND WILCOX), CERAMIC FIRE BLANKET (FIBERLAX BY STANDARD OIL), FIRE-RATED MINERAL WOOL (THERMAFIBER BY USG), OR APPROVED EQUAL. ACCEPTABLE FIREPROOF CAULK SHALL BE SILICONE FIRESTOP 200 BY DOW CORNING, INTUMESCENT SYNTHETIC ELASTOMER (FIRE BARRIER CAULK BY 3M, HILTI CS2420), OR APPROVED EQUAL.

15. PACKING FOR SLEEVES THAT DO NOT REQUIRE MAINTENANCE OF FIRE RATING SHALL BE SILICATE FOAM, CERAMIC FIBRE, MINERAL FIBRE WITH APPROVED SEALANT, OR APPROVED EQUAL. PACK OR FOAM TO WITHIN 1" OF BOTH WALL SURFACES. SEAL PENETRATION PACKING WITH APPROVED CAULKING AND PAINTABLE WATER PROOF MASTIC SURFACE FINISH OR SILICONE CAULKING.

16. FURNISH AND INSTALL ALL GAUGES INDICATED ON THE DRAWINGS OR SPECIFIED HEREIN. EQUIP ALL GAUGES ON DISCHARGE SIDE OF PUMPS WITH RAY SNUBBERS. GAUGES SHALL HAVE CAST ALUMINUM CASES WITH CHROME PLATED RINGS AND SHALL HAVE NON-CORRODIBLE MOVEMENTS. THE PIPES TO EACH GAUGE SHALL BE PROVIDED WITH VALVES. SUBMIT DETAIL DRAWINGS OF GAUGES FOR APPROVAL. SUBMITTAL SHALL INDICATE THE LOCATIONS, PRESSURE RANGES SUB-DIVISIONS, CONSTRUCTION, ETC.

6. PIPE INSULATION

1. REFRIGERANT SUCTION LINES, REFRIGERANT HOT GAS BYPASS LINES, AND OUTDOOR REFRIGERANT LIQUID LINES SHALL BE INSULATED WITH RIGID CLOSED CELL FOAM INSULATION WITH A MAXIMUM K-VALUE OF 0.25 AT 75°F TEMPERATURE. REFRIGERANT PIPE INSULATION THICKNESS FOR PIPES 1-1/2" OR SMALLER SHALL BE A MINIMUM OF 1-1/2" PER IECC. PIPES LARGER THAN 1-1/2" SHALL BE INSULATED WITH A MINIMUM OF 1-1/2" INSULATION.

2. OUTDOOR INSULATION THICKNESS SHALL BE DOUBLE INDOOR THICKNESS WITH A MAXIMUM THICKNESS OF 3". EXTERIOR APPLICATION SHALL HAVE 0.16" THICK ALUMINUM JACKETS.

3. INSULATED PIPING EXPOSED TO VIEW (THROUGHOUT THE FACILITY) SHALL BE COVERED AND FINISHED WITH PVC JACKET EQUAL TO MANVILLE PVC/PERMA-WELD PIPE JACKETING SYSTEM USING 30mm THICK JACKET. FITTINGS, FLANGES, VALVES AND ACCESSORIES SHALL BE JACKETED. INSTALL PER MANUFACTURER'S INSTRUCTIONS WITH SEAM ON TOP OF PIPE SO AS NOT TO BE VISIBLE FROM OCCUPIED SPACE.

1. PRODUCTS

1. ROOF CURBS: ROOF CURB ASSEMBLIES SHALL CONSIST OF HEAVY GAUGE GALVANIZED STEEL ROOF CURB, UNITIZED CONSTRUCTION, WITH INTEGRAL BASE PLATE, 3 LBS DENSITY INSULATION AND 2 x 2 NAILER. ROOF CURB SHALL BE AS MANUFACTURED BY PATE, THYCURB, OR APPROVED EQUAL.

2. EQUIPMENT RAILS: EQUIPMENT RAIL SUPPORTS SHALL BE 18 AWG GALVANIZED STEEL, UNITIZED CONSTRUCTION, WITH INTEGRAL BASE PLATE, CONTINUOUS WELDED CORNER SEAMS, PRESSURE TREATED WOOD NAILER, COUNTERFLASHING WITH LAG SCREWS AND INTERNALLY REINFORCED TO CONFORM WITH LOAD BEARING FACTORS. STANDARD WOOD NAILER SHALL HAVE OVERHANG UNLESS OTHERWISE SPECIFIED. EQUIPMENT RAIL SUPPORTS SHALL BE AS MANUFACTURED BY PATE OR APPROVED EQUAL.

3. EQUIPMENT INSULATION: INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE OR OWENS CORNING. INSULATE THE FOLLOWING EQUIPMENT: HEAT EXCHANGERS, EXPANSION TANKS, AIR SEPARATORS, DRAIN PANS, DUCT-MOUNTED COILS, PUMPS. INSULATION SHALL BE 1" THICK FIBROUS GLASS RIGID BLOCK OR SEMI-RIGID BOARD RATED FOR TEMPERATURE INTENDED. INSULATION SHALL BE FORMED OR FABRICATED TO FIT EQUIPMENT.

4. DRIVES: DRIVES FOR BELTED MOTORS SHALL BE FLAME RETARDANT AND BY ALLIS-CHALMERS. BROWNING OR WOODS V-BELT DRIVES WITH ADJUSTABLE MOTOR SHEAVE. DRIVES SHALL BE AS SHORT AS PRACTICAL AND SHALL HAVE NUMBER OF BELTS NECESSARY TO TRANSMIT REQUIRED HORSEPOWER WITHOUT UNDUE SLIP OR STRAIN. SHEAVES SHALL BE BALANCED STATICALLY AND DYNAMICALLY.

5. ELECTRICAL ACCESSORIES WORK: MOTORS FOR DAMPERS, FANS AND AIR-CONDITIONING WORK SHALL BE FURNISHED AND INSTALLED BY THIS SUBCONTRACTOR. MOTORS SHALL BE OF THE PROPER TYPES AND CAPACITIES FOR THEIR RESPECTIVE SERVICES. EXCEPT WHERE OTHERWISE SPECIFICALLY CALLED FOR, MOTOR STARTING AND CONTROLLING DEVICES SHALL BE FURNISHED, INSTALLED AND WIRED BY THIS SUBCONTRACTOR. ELECTRIC SERVICE LINES TO MOTOR CIRCUIT SWITCHES AND STARTERS WILL BE FURNISHED AND INSTALLED UNDER ANOTHER DIVISION.

6. ELECTRIC STARTERS: EACH MOTOR, EXCEPT AS NOTED, SHALL BE PROVIDED WITH A COMBINATION FUSED ACROSS-THE-LINE MAGNETIC STARTER WITH HOA (HAND-OFF-AUTOMATIC) SWITCH MOUNTED ON COVER. FURNISH MANUALLY OPERATED MOTOR STARTERS OF THE PROPER SIZE FOR ALL MOTORS LESS THAN 1/2 HP (HORSEPOWER) WHICH ARE NOT AUTOMATICALLY CONTROLLED. EACH MANUALLY CONTROLLED STARTER SHALL BE EQUIPPED WITH HEATERS PROPERLY SIZED TO PROTECT MOTOR. STARTERS FOR MOTORS 175 WATTS OR LESS SHALL CONSIST OF A SNAP SWITCH WITH THERMAL OVERLOAD PROTECTION WHERE SUCH PROTECTION IS NOT AN INTEGRAL PART OF THE MOTOR. SIZE 00 MOTORS ARE NOT ACCEPTABLE. MAGNETIC STARTERS FOR ALL MOTORS SHALL HAVE THERMAL OVERLOAD AND LOW VOLTAGE PROTECTION IN ALL THREE PHASES. INCLUDE A CONTROL TRANSFORMER FOR EACH STARTER 1/2 HP AND ABOVE TO PROVIDE REQUIRED CONTROL POWER VOLTAGE. ALL STARTERS SHALL HAVE PROVISIONS FOR PADLOCKING IN AN OPEN POSITION. WHEN USED, FUSES SHALL BE FUSETRONS. STARTERS SHALL BE PROVIDED WITH FUSES FOR PROTECTION OF CONTROL CIRCUITS. ALL STARTERS SHALL BE MOUNTED IN NEMA 1 (NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION) ENCLOSURES EXCEPT FOR THOSE MOUNTED OUTDOORS, WHICH SHALL BE IN NEMA 4 ENCLOSURES.

7. FILTERS: FILTERS MEDIUM EFFICIENCY, THROW AWAY TYPE: FILTERS SHALL BE FARR OR AAF, AS SCHEDULED ON DRAWINGS. FILTERS SHALL BE UL LISTED C, CLASS 2, AND RATED AT AN AVERAGE EFFICIENCY OF MERV 7-8 (25-30%) PER ASHRAE 52.5. FILTERS HIGH EFFICIENCY, THROW AWAY TYPE: FILTERS SHALL BE AFF OR FARR RIGA-FLO OF THE SIZES AND QUANTITIES SHOWN ON THE DRAWINGS. EACH FILTER SHALL CONSIST OF HIGH LOFT MICRO FINE GLASS FIBER MEDIA WHICH HAS NON-WOVEN BACKING AND IS LAMINATED TO A WELDED WIRE GRID. THE ENTIRE PACK SHALL BE SEALED INTO A GALVANIZED FRAME WITH METAL CONTOUR STABILIZERS AND GALVANIZED STEEL DIAGONAL SUPPORT BRACES ON AIR ENTERING AND LEAVING SIDE (CARDBOARD IS NOT PERMITTED). EACH FILTER SHALL HAVE AN AVERAGE EFFICIENCY OF MERV 13-14 (80-95%) BY ASHRAE TEST STANDARD 52.5. FILTER SHALL BE

UL LISTED. DO NOT OPERATE SYSTEMS WITHOUT DESIGN FILTERS. PROVIDE SPARE SET OF FILTERS AND INSTALL SPARE FILTERS BEFORE BALANCING. PROVIDE DRY TYPE AIR FILTER GAUGE, WITH SCALE OF 0 TO 2" ACROSS FILTER BANK. GAUGE SHALL INCLUDE APPROPRIATE STATIC PRESSURE TIPS, VENT VALVES AND TUBING. GAUGE SHALL BE SUITABLY MARKED TO INDICATE WHEN FILTER SHOULD BE CHANGED, AND SHALL BE DWYER MAGNAHELIC TYPE OR APPROVED EQUAL.

8. AIR COOLED CONDENSER/CONDENSING UNIT: PROVIDE COILS WITH INTEGRAL SUBCOOLING AND CASING WITH STAND. COILS SHALL BE ALUMINUM PLATE FINS ON COPPER TUBES (LEAK TESTED 150 PSIG, PRESSURE TESTED 420 PSIG). FANS SHALL BE DIRECT DRIVE PROPELLER WITH FAN GUARD. FAN SHAFT AND BLADES SHALL BE 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: DATA AIRE, LIEBERT, STULZ OR APPROVED EQUAL.

9. 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 FINS AND LEAK TESTED AT 350 PSIG. PROVIDE TWO- OR THREE-WAY WATER CONTROL VALVES AS REQUIRED. PROVIDE THERMOSTAT, 1" MERV 6 DISPOSABLE FILTERS, THREE (3) SPEED MOTOR WITH SPEED SWITCH AND 18 GAUGE STEEL DRAIN PAN UNDER COILS. ACCEPTABLE MANUFACTURERS: DATA AIRE, LIEBERT, STULZ OR APPROVED EQUAL.

10. SOUND ATTENUATOR: OUTER CASINGS OF RECTANGULAR SILENCERS SHALL BE MADE OF 22 GAUGE TYPE #6-90 LOCK-FORMER-QUALITY GALVANIZED STEEL. INTERIOR PARTITIONS FOR RECTANGULAR SILENCERS SHALL BE NOT LESS THAN 22 GAUGE TYPE #6-90 GALVANIZED LOCK-FORMER-QUALITY PERFORATED STEEL. FILLER MATERIAL SHALL BE INORGANIC GLASS FIBER OF A PROPER DENSITY TO OBTAIN THE SPECIFIED ACOUSTIC PERFORMANCE AND BE PACKED UNDER NOT LESS THAN 5% COMPRESSION TO ELIMINATE VOIDS DUE TO VIBRATION AND SETTLING. MATERIAL SHALL BE INERT, VERMIN AND MOISTURE-PROOF. FILLER MATERIAL SHALL BE TOTALLY ENCAPSULATED AND SEALED WITH POLYMERIC FILM OF AN APPROPRIATE THICKNESS. THE ENCAPSULATED FILL MATERIAL SHALL BE SEPARATED FROM THE INTERIOR PERFORATED Baffles BY MEANS OF A NONCOMBUSTIBLE, EROSION RESISTANT, FACTORY INSTALLED, ACOUSTIC STAND-OFF. COMBUSTION RATINGS FOR THE SILENCER ACOUSTIC FILL SHALL HAVE A FLAME-SPREAD INDEX NOT EXCEEDING 25 AND SMOKE-DEVELOPED INDEX NOT EXCEEDING 50 WHEN TESTED TO ASTM E84. ACCEPTABLE MANUFACTURERS VIBRO-ACOUSTICS, IAC, COMMERCIAL ACOUSTICS OR KINETICS.

11. AIR DEVICES: AIR DEVICES SHALL BE AS SCHEDULED. EXPOSED SCREWS SHALL BE THE FINISHING TYPE AND PAINTED TO MATCH THE AIR DEVICE. SQUARE TO ROUND ADAPTORS SHALL BE PROVIDED WHERE REQUIRED. AIR DEVICES SHALL BE FINISHED WITH WHITE BAKED ENAMEL UNLESS NOTED OTHERWISE, SECURED TO T-BAR CEILINGS WHERE APPLICABLE. ACCEPTABLE MANUFACTURERS: TITUS, METALAIR, PRICE, KRUEGER.

12. VIBRATION ISOLATION: PROVIDE VIBRATION ISOLATION FOR EACH PIECE OF ROTATING OR PISTON DRIVEN MECHANICAL EQUIPMENT SHOWN ON THE DRAWINGS AND SCHEDULES. ISOLATION COMPONENTS SHALL BE SUPPLIED BY A SINGLE MANUFACTURER. MASON INDUSTRIES OR KINETICS. TYPES OF ISOLATORS, REQUIRED DEFLECTIONS, AND INSTALLATION PRACTICES SHALL BE IN STRICT ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS OF THE VIBRATION ISOLATION MANUFACTURER.

13. SEISMIC RESTRAINTS: SEISMIC RESTRAINTS SHALL BE PROVIDED AS REQUIRED BY THE ADOPTED STATE BUILDING CODE AND SMACNA SEISMIC RESTRAINT MANUAL, GUIDELINES FOR MECHANICAL SYSTEMS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF THE PROPOSED RESTRAINTS, STRUCTURAL ATTACHMENT METHODS, RESTRAINT LOCATIONS AND ASSOCIATED CALCULATIONS TO THE ARCHITECT FOR REVIEW AND APPROVAL. THE SUBMITTED DOCUMENTS SHALL BE PREPARED AND STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE PROJECT LOCATION.

J. ATC (AUTOMATIC TEMPERATURE CONTROLS)

1. STAND-ALONE CONTROLS BY EQUIPMENT MANUFACTURER.

PART 3 - EXECUTION

A. GENERAL

1. ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT SHALL BE VERIFIED WITH ELECTRICAL DRAWINGS PRIOR TO ORDER RELEASE. ADDITIONAL ELECTRICAL WORK RESULTING FROM EQUIPMENT SUBSTITUTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

2. ELECTRICAL CONTRACTOR SHALL PROVIDE STARTERS AND CONTROLLERS FOR MOTORS. WHERE NOT PROVIDED BY ELECTRICAL CONTRACTOR, MECHANICAL CONTRACTOR SHALL PROVIDE STARTERS AND CONTROLLERS AS SPECIFIED IN PART 2. MECHANICAL CONTRACTOR SHALL FURNISH VARIABLE FREQUENCY DRIVES AND ELECTRICAL CONTRACTOR SHALL INSTALL UNLESS FACTORY INSTALLED. MOTORS 1 HP AND ABOVE SHALL BE PREMIUM EFFICIENCY. ALL DRIVES SHALL BE PROVIDED WITH INTEGRAL LOCKING DISCONNECT.

3. COORDINATE ROUTING OF DUCTWORK AND PIPING TO MAINTAIN CLEARANCES ABOVE ELECTRICAL PANELS AND EQUIPMENT PER NEC REQUIREMENTS. MAINTAIN REQUIRED CLEARANCES WITHIN ELEVATOR EQUIPMENT ROOMS.

4. COORDINATE CHASE, SLEEVE AND SLAB BLOCK-OUT REQUIREMENTS BEFORE CONCRETE IS POURED OR BLOCK IS SET.

5. MAINTAIN OCCUPANCY AND FIRE WALL SEPARATION INTEGRITY AS REQUIRED. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF OCCUPANCY/FIRE WALL SEPARATIONS AND SPECIFIC DETAILS FOR CONSTRUCTION. PROVIDE NECESSARY FIRE AND FIRE/SMOKE DAMPERS, ACCESS DOORS, CAULKING, ETC FOR APPROVED INSTALLATION.

6. PENETRATIONS OF FIRE-RATED WALLS OR FLOORS BY PIPE OR DUCT SHALL BE SEALED BY A FIRESTOPPING SYSTEM UL LISTED FOR THE APPLICATION. INSTALL PENETRATION SEAL MATERIALS IN ACCORDANCE WITH THE WRITTEN INSTRUCTION OF THE UL FIRE RESISTANCE DIRECTORY AND MANUFACTURER'S INSTRUCTIONS. FIRESTOPPING SYSTEM SHALL BE AS SPECIFIED BY ARCHITECT OR EQUAL TO 3M FIRE BARRIER. FIRESTOPPING MATERIAL SHALL BE CAULK OR PUTTY TYPE.

7. PENETRATIONS OF BELOW GRADE WALLS BY PIPE SHALL BE SEALED WITH THUNDERLINE LINK-SEAL OR APPROVED EQUAL. PENETRATION SEAL MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

8. PENETRATIONS THROUGH STRUCTURE, STUDS, OR FIRE-RATED WALLS SHALL BE MADE OVERSIZED TO PREVENT CONTACT.

9. UNDER NO CIRCUMSTANCE IS THE FIREPROOFING OF THE BUILDING STRUCTURE (WHERE APPLICABLE) TO BE REMOVED FOR THE INSTALLATION OF HANGERS, SUPPORTS, DUCTWORK AND PIPING. CLAMPING DEVICES SHALL NOT BE USED WHERE THE STRUCTURE IS FIRE PROOFED. IF FIRE PROOFING IS DAMAGED, IT SHALL BE REPAIRED TO THE SATISFACTION OF THE BUILDING OWNER.

10. STRUCTURAL STEEL SUPPORTS, HANGER BRACKETS, ETC REQUIRED FOR SUPPORT SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR. THE WELDS AND EDGES OF BRACKETS SHALL BE FILED OR GROUND SMOOTH FOR PAINTING. HANGERS SHALL BE STEEL ANGLE IRON, STEEL CHANNEL, OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. SUPPORTS, HANGERS, BRACKETS, ETC SHALL BE AS APPROVED BY THE ENGINEER. NO PERFORATED STRAP, CHAIN LINK, OR WIRE MAY BE USED. HANGERS SHALL BE GALVANIZED OR PAINTED WITH TWO COATS OF RUSTOLEUM PAINT BEFORE THEIR INSTALLATION.

11. WHERE PIPES OR CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILINGS IN FINISHED AREAS, THEY SHALL BE FURNISHED WITH ESCUTCHEON PLATES (COLOR PER ARCHITECT OR INTERIOR DESIGNER).

12. DUCTWORK, PIPING AND CONDUIT PENETRATIONS THROUGH SOUND RATED PARTITIONS SHALL BE SEALED WITH ACOUSTICAL CAULK.

13. WATER PROOFING AND FLASHING OF PIPE PENETRATIONS THROUGH EXTERIOR WALL AND ROOF SHALL BE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE LOCATIONS AND METHODS WITH GENERAL CONTRACTOR OR OTHER DIVISIONS PRIOR TO CONSTRUCTION OF ROOF DECK.

14. MECHANICAL EQUIPMENT SHALL BE SECURED AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE SECTIONS OF THE ADOPTED STATE BUILDING AND MECHANICAL CODE.

15. CONTRACTOR SHALL PROVIDE HOUSEKEEPING PADS, FOUNDATIONS, HANGERS, AND SUPPORTS FOR EQUIPMENT SUPPLIED OR INSTALLED UNDER THEIR WORK.

16. COORDINATE AND VERIFY ACTUAL APPROVED EQUIPMENT DIMENSIONS PRIOR TO POURING EQUIPMENT PADS. COORDINATE WITH VIBRATION ISOLATION AND SEISMIC RESTRAINT REQUIREMENTS.

17. PIPING AND DUCT CONNECTIONS TO AIR HANDLERS, FAN COILS, HEAT PUMPS, FANS, ETC SHALL BE MADE WITH FLEXIBLE CONNECTIONS. FLEXIBLE PIPE CONNECTIONS MAY BE OMITTED IF ROTATING/VIBRATING EQUIPMENT IS INTERNALLY ISOLATED. FLEXIBLE CONNECTIONS EXPOSED TO THE ENVIRONMENTAL ELEMENTS SHALL BE SHIELDED TO PREVENT DEGRADATION.

18. DRAIN PIPING FROM EQUIPMENT SHALL BE ROUTED SO AS NOT TO CREATE A TRIPPING HAZARD. COORDINATE ACTUAL DRAIN CONNECTIONS WITH PLUMBING SECTION. COORDINATE FLOOR SINK LOCATIONS ACCORDINGLY.

19. MECHANICAL EQUIPMENT SHALL BE IDENTIFIED WITH BAKELITE NAMEPLATES. COLOR CODING OF NAMEPLATES AND IDENTIFICATION INFORMATION SHALL BE COORDINATED WITH THE OWNER.

20. PIPING SHALL BE IDENTIFIED WITH PLASTIC PIPE MARKERS IN CLEAR VIEW AND ALIGNED WITH AXIS OF PIPING. MARKERS SHALL BE PREPRINTED WITH PRESSURE SENSITIVE PERMANENT ADHESIVE AND COLOR CODED IN COMPLIANCE WITH ANSI A13.1. SERVICE AND FLOW DIRECTION SHALL BE INDICATED. DISTANCE BETWEEN IDENTIFICATION LOCATIONS SHALL NOT EXCEED 25 FEET. IDENTIFICATION SHALL BE LOCATED AT EACH VALVE, RUNOUT, EQUIPMENT CONNECTION AND ON BOTH SIDES OF AN OBSTRUCTION. VALVE TAGS SHALL BE BRASS AND 1.5" DIAMETER WITH SOLID BRASS CHAIN. TAGS FOR FLOW CONTROLS SHALL INCLUDE FLOW AND PRESSURE DROP SET POINTS.

21. DUCTWORK SHALL BE IDENTIFIED WITH ADHESIVE BACKED PLASTIC DUCT MARKERS INDICATING DIRECTION OF AIRFLOW AND DUCT SERVICE (SUPPLY, RETURN, EXHAUST, ETC). LABELS SHALL BE MINIMUM 2-1/4" HIGH WITH 1-1/2" HIGH TYPE. LABELS FOR SUPPLY AND OUTSIDE AIR SHALL BE BLUE BACKGROUND WITH WHITE LETTERING. LABELS FOR EXHAUST, RELIEF, AND RETURN AIR SHALL BE GREEN BACKGROUND WITH WHITE LETTERING. WHERE USED IN EXISTING BUILDINGS, COLOR SCHEME SHALL MATCH EXISTING IDENTIFICATION MARKERS AND BE COORDINATED WITH OWNER. PROVIDE LABELS AT MAXIMUM 50'-0" INTERVALS, WHERE DUCTS ENTER INTO CONCEALED SPACES, AND ON EITHER SIDE OF OBSTRUCTIONS. UNLESS OTHERWISE DIRECTED BY OWNER OR ARCHITECT, LABELS SHALL NOT BE PROVIDED ON EXPOSED DUCTWORK IN FINISHED SPACES.

22. SMOKE DETECTORS USED TO ACTUATE FIRE/SMOKE DAMPERS SHALL BE LOCATED WITHIN 5'-0" OF THE DAMPER. FOR UNDUCTED FIRE/SMOKE DAMPERS, THE DETECTOR SHALL BE WITHIN 5'-0" HORIZONTAL DISTANCE. SMOKE DETECTORS SHALL BE ZERO VELOCITY TYPE.

23. CEILING DIFFUSERS SHALL BE 3'-0" MINIMUM FROM CEILING MOUNTED SMOKE DETECTORS. COORDINATE WITH ELECTRICAL AND FIRE ALARM CONTRACTORS.

24. SECURE DIFFUSERS AND GRILLES TO T-BAR CEILINGS, WHERE APPLICABLE. SUBMIT SHOP DRAWING FOR APPROVAL PRIOR TO BEGINNING WORK.

25. PROVIDE 18" x 18" MINIMUM ACCESS DOOR IN INACCESSIBLE CEILINGS AND WALLS FOR EQUIPMENT REQUIRING ACCESS OR ADJUSTMENT INCLUDING UPSTREAM OF DUCT COILS. COORDINATE LOCATIONS AND SUBMIT TO ARCHITECT FOR APPROVAL PRIOR TO BEGINNING WORK.

26. OPEN END DUCTWORK SHALL BE COVERED WITH SCREEN PROTECTION HAVING OPENINGS THROUGH WHICH A 1/2" SPHERE CANNOT PASS. ATTACH SCREEN WITH ANGLE AROUND PERIMETER AND REINFORCE AT 24" ON CENTER.

27. MANUAL AIR VENTS SHALL BE PROVIDED AT HIGH POINTS OF HYDRONIC SYSTEMS. MANUAL AIR VENTS SHALL CONSIST OF A 3/8" BALL VALVE WITH THREADED PORTS.

28. INSTALL THERMOSTATS AND SENSORS AT MOUNTING HEIGHTS 4'-0" ABOVE FINISHED FLOOR IN ACCORDANCE WITH ADA (AMERICANS WITH DISABILITIES ACT) REQUIREMENTS. COORDINATE EXACT LOCATIONS IF FIELD WITH THE CONTRACTOR AND ARCHITECT.

29. DUCT EXTERNAL INSULATION IS NOT REQUIRED WHERE DUCT HAS ACOUSTICAL DUCT LINER. PROVIDE 12" OVERLAP OF EXTERNAL INSULATION AND INTERIOR LINER AT TRANSITION OF INSULATION TYPE.

30. ALL DUCTWORK, FITTINGS, EQUIPMENT, HANGERS, AND SUPPORTS LOCATED BELOW 7'-0" IN ALL MECHANICAL ROOMS, FAN ROOMS OR OTHER EQUIPMENT ROOMS SHALL BE PROVIDED WITH PADDING MATERIAL ON ALL HORIZONTAL AND VERTICAL CORNERS, EDGES, AND OTHER SURFACES WHICH MAY CAUSE INJURY OR OTHERWISE BE HAZARDOUS. PADDING MATERIAL SHALL BE MINIMUM 1" THICK ARMAFLEX SHEET INSULATION OR APPROVED EQUAL. MATERIAL SHALL HAVE FLAME SPREAD/SMOKE DEVELOPED INDEX OF 25/50 OR LESS. ATTACH TO SURFACE WITH COMPLETE ADHESIVE COVERAGE.

31. PROVIDE DUCT AND AIR TRANSITIONS TO EQUIPMENT AND EXISTING SYSTEMS AS REQUIRED.

32. CLEANING: AT THE CONCLUSION OF THE PROJECT, ALL COMPONENTS SHALL BE CLEANED AS INDICATED BELOW.

32.1. DUCTWORK: ALL NEW DUCTWORK SHALL BE THOROUGHLY CLEANED SO THAT NO DIRT OR DUST SHALL BE DISCHARGED FROM DIFFUSERS, REGISTERS, OR GRILLES, WHEN SYSTEM IS OPERATED. WHERE NEW DUCTS CONNECT TO EXISTING DUCTWORK, CLEAN NEW DUCTS TO INSURE THAT DIRT AND DUST DOES NOT DISCHARGE THROUGHOUT OCCUPIED SPACES.

32.2. PIPING: AFTER WATER PIPING HAS BEEN PRESSURE TESTED AND APPROVED FOR TIGHTNESS, CLEAN AND FLUSH PIPING.

32.3. EQUIPMENT: AFTER COMPLETION OF PROJECT, CLEAN THE EXTERIOR SURFACE OF EQUIPMENT INCLUDED IN THIS SECTION.

32.4. WORK AREA: AFTER COMPLETION OF PROJECT, REMOVE ALL CONSTRUCTION DEBRIS, TEMPORARY FACILITIES AND EQUIPMENT FROM WORK AREA. CLEAN WORK AREA TO PERMIT OCCUPATION.

B. TEST AND BALANCE

GENERAL

1. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR START-UP, TESTING AND BALANCING OF MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN IN SCHEDULES, AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY, TOWN OR COUNTY INSPECTORS, OWNERS AND ARCHITECT. NOTE THAT SOME ATC (AUTOMATIC TEMPERATURE CONTROL) START-UP PROCEDURES REQUIRE THE COOPERATION OF THE BALANCING CONTRACTOR, THE EQUIPMENT MANUFACTURER'S REPRESENTATIVE AND THE ATC CONTRACTOR. ENSURE THAT ALL CONTRACTORS ARE PRESENT ON SITE DURING THE ENTIRE TIME THAT THESE PROCEDURES TAKE PLACE. NOTE THAT SOME PROCEDURES LISTED BELOW HAVE A DISTINCT ORDER OF PRECEDENCE. EXAMPLE: THE TESTING OF THE TEMPERATURE CONTROL SYSTEM SHALL NOT OCCUR UNTIL MAJOR PIECES OF MECHANICAL EQUIPMENT HAVE BEEN STARTED UP AND TESTING IS COMPLETE. ENSURE THAT ANY LISTED ORDERS OF PRECEDENCE FOR PROCEDURES ARE FOLLOWED.

2. THE SUBCONTRACTOR SHALL PROCURE THE SERVICES OF AN INDEPENDENT AIR BALANCE AND TESTING AGENCY, AS APPROVED BY THE ARCHITECT, WHICH SPECIALIZES IN THE BALANCING AND TESTING OF HVAC SYSTEMS, TO BALANCE, ADJUST AND TEST WATER CIRCULATING AND AIR MOVING EQUIPMENT, AIR DISTRIBUTION AND EXHAUST SYSTEMS FOR ENTIRE FLOOR. THE TESTING AGENCY SHALL PROVIDE PROOF OF HAVING SUCCESSFULLY COMPLETED AT LEAST FIVE (5) PROJECTS OF SIMILAR SIZE AND SCOPE, AND SHALL BE A CERTIFIED MEMBER OF AABC (ASSOCIATED AIR BALANCE COUNCIL), THE HVAC SUBCONTRACTOR SHALL AWARD THE TAB CONTRACT TO THE SELECTED AGENCY AS SOON AS POSSIBLE AFTER RECEIPT OF THE CONTRACT, TO ALLOW THE AIR BALANCE AGENCY TO SCHEDULE THIS WORK IN COOPERATION

WITH OTHER TRADES AND COMPLY WITH THE COMPLETION DATE. INSTRUMENTS USED SHALL BE CALIBRATED WITHIN SIX (6) MONTHS OF BALANCING AND MAINTAINED IN GOOD WORKING ORDER. IF REQUESTED, THE TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE ARCHITECT AND/OR THE REPRESENTATIVE.

3. INCLUDE AN EXTENDED WARRANTY OF SIX (6) MONTHS AFTER ACCEPTANCE AND OCCUPANCY, DURING WHICH TIME THE ARCHITECT, AT THEIR DISCRETION, MAY REQUEST A RECHECK OR RESETTING OF ANY OUTLET, SUPPLY AIR FAN OR EXHAUST FAN AS LISTED IN TEST REPORT. PROVIDE TECHNICIANS TO ASSIST IN MAKING ANY TESTS REQUIRED.

4. TESTING AND BALANCING SHALL NOT BEGIN UNTIL SYSTEM HAS BEEN COMPLETED AND IS IN FULL WORKING ORDER WITH THE SPECIFIED FILTERS IN PLACE. CONDITION OF THE FILTERS AT THE TIME SHALL BE SUCH THAT THE DIRT HOLDING CAPACITY IS NOT EXCEEDED. PLACE ALL SYSTEMS AND EQUIPMENT INTO FULL OPERATION AND CONTINUE THE OPERATION DURING EACH WORKING DAY OF TESTING AND BALANCING. SUBMIT COPIES OF DATA FOR THE TESTING AND BALANCING FOR THE REVIEW OF THE ARCHITECT. TESTING AND BALANCING SHALL BE COMPLETE AND REVIEWED BY THE ARCHITECT PRIOR TO ACCEPTANCE OF THE SYSTEM BY THE OWNER. NOTIFY ARCHITECT AND AUTHORITIES INVOLVED AT LEAST TWO (2) WEEKS BEFORE START-UP TESTING AND BALANCING BEGINS.

5. DO NOT COVER OR CONCEAL WORK BEFORE TESTING, INSPECTION AND OBTAINING APPROVAL.

6. INSTRUMENTS FOR TESTING AND BALANCING SHALL HAVE BEEN CALIBRATED WITHIN ONE (1) MONTH PRIOR TO TESTING AND BALANCING. CALIBRATION SHALL BE TRACEABLE TO NBS (NATIONAL BUREAU OF STANDARDS).

7. LEAKS, DAMAGE AND DEFECTS DISCOVERED OR RESULTING FROM START-UP, TESTING AND BALANCING SHALL BE REPAIRED OR REPLACED TO LIKE-NEW CONDITION WITH ACCEPTABLE MATERIALS. TESTS SHALL BE CONTINUED UNTIL SYSTEM OPERATES WITHOUT ADJUSTMENTS OR REPAIRS.

8. REPLACEMENT OF ADJUSTABLE PULLEYS, ADDITIONAL BALANCING DAMPERS, PRESSURE TAPS, BALANCING VALVES, COCKS AND FITTINGS, ETC., REQUIRED TO EFFECT PROPER AIR AND WATER BALANCE SHALL BE FURNISHED AND INSTALLED BY THE HVAC SUBCONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

9. FOR EACH PIECE OF EQUIPMENT, COPY NAMEPLATE DATA AND INCLUDE IN REPORT.

10. PROVIDE CAPACITY AND PERFORMANCE OF EQUIPMENT BY FIELD TESTING. INSTALL EQUIPMENT AND INSTRUMENTS REQUIRED FOR TESTING, THERMO-WELLS AND GAUGE CONNECTIONS AT NO ADDITIONAL COST TO OWNER.

11. QUALIFIED REPRESENTATIVE OF EQUIPMENT MANUFACTURER SHALL BE PRESENT AT TEST.

12. START-UP, TESTING AND BALANCING PROCEDURES OUTLINED BELOW ARE THE MINIMUM EFFORT REQUIRED FOR THE PROJECT. CONTRACTOR SHALL USE ANY ADDITIONAL PROCEDURES FELT NECESSARY TO PROPERLY START-UP, TEST AND BALANCE THE SYSTEM(S).

EQUIPMENT START-UP

1. START-UP ALL EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND WITH MANUFACTURER'S REPRESENTATIVE PRESENT. COMPLETE THE MANUFACTURER'S P START-UP CHECKLIST TO CERTIFY TO THE ARCHITECT THAT START-UP OF THE ABOVE PIECES OF EQUIPMENT HAS SUCCESSFULLY BEEN ACCOMPLISHED. COPY MULTIPLE CHECKLISTS AS REQUIRED. EDIT INAPPROPRIATE ITEMS AS REQUIRED.

ATC TESTING

1. START-UP TEMPERATURE CONTROL SYSTEM SO THAT ALL SEQUENCES OF OPERATION CALLED FOR IN ARCHITECTS DRAWINGS AND SPECIFICATIONS OPERATE PROPERLY. ENSURE THAT ALL CONTROL COMPONENTS ARE PROPERLY CALIBRATED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. SEE THAT ALL SOFTWARE, INCLUDED WITH CONTROL SYSTEM, IS FULLY DEBUGGED. FOR FURTHER REQUIREMENTS SEE ATC PARAGRAPH OF THESE SPECIFICATIONS. ATC CONTRACTOR SHALL PROVIDE A TESTING CHECKLIST VERIFYING ALL SEQUENCE OF CONTROLS AS DESCRIBED ON DRAWINGS, TO PROVE SYSTEM FUNCTIONALITY.

TEST AND BALANCE - AIR SYSTEMS

1. PERFORM THE FOLLOWING TESTS AND BALANCE ALL AIR SYSTEMS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS: ADJUST FAN RPM (REVOLUTIONS PER MINUTE) TO SPECIFIED AIR DELIVERY REQUIREMENTS, RECORD MOTOR FULL LOAD RATING AND ACTUAL AMPERES, RECORD SYSTEM STATIC PRESSURES, SUCTION AND DISCHARGE, ADJUST MAIN SUPPLY AND RETURN AIR DUCTS TO PROPER DESIGN CFM (CUBIC FEET PER MINUTE) AS INDICATED ON DRAWINGS, ADJUST EACH DIFFUSER, GRILLE AND REGISTER TO WITHIN -5% TO +10% OF DESIGN REQUIREMENTS. READINGS AND TESTS OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND ACTUAL FPM VELOCITY, REQUIRED CFM AND ACTUAL CFM AFTER ADJUSTMENTS, A FLOW DIAGRAM SHOWING QUANTITIES AND TEMPERATURES AT ALL VITAL POINTS THROUGHOUT THE SYSTEM, INCLUDING FRESH AIR, RETURN AIR, MIXED AIR, COOLING COIL DISCHARGE, FAN DISCHARGE, AND RE-HEAT DISCHARGE. WHERE POSSIBLE, ALL PERCENTAGES OF AIR SHOULD BE VERIFIED BY TAKING CORRESPONDING TEMPERATURES OF THE QUANTITIES BEING MIXED. MAKE PITOT TUBE TRAVERSE OF MAIN SUPPLY DUCTS AND OBTAIN DESIGN CFM AT FANS, ADJUST SYSTEM FOR DESIGN RECIRCULATED AIR CFM, ADJUST SYSTEM FOR DESIGN OUTSIDE AIR CFM, RECORD ENTERING AIR TEMPERATURES. DB (DRY BULB) HEATING AND COOLING, WB (WET BULB) COOLING, RECORD LEAVING AIR TEMPERATURES. DB HEATING AND COOLING, WB COOLING. IN COOPERATION WITH THE CONTROL MANUFACTURER'S REPRESENTATIVE, SET ADJUSTMENTS OF AUTOMATICALLY OPERATED DAMPERS TO OPERATE AS SPECIFIED, RECORD ON WHAT CYCLE SYSTEM WAS BALANCED. ADJUSTMENT SHOULD BE MADE IN DAMPER AND FAN SPEED SETTINGS SO AS TO MAINTAIN A CONSTANT TOTAL FAN CAPACITY WHEN THE SYSTEM MODULATES FROM FULL FRESH AIR TO FULL RETURN AIR, FROM HEATING TO COOLING, PRIOR TO THE START OF BALANCING. CHECK THE ROTATION OF ALL FANS. VERIFY THAT ALL FIRE DAMPERS ARE OPEN. ALL FILTERS MUST BE CHECKED TO SEE IF THEY EXCEED THE RECOMMENDED DIRT HOLDING CAPACITY. IF DIRTY, THEY SHALL BE REPLACED BY THE SUBCONTRACTOR, BEFORE COMMENCING BALANCING SO AS TO AVOID EXCESSIVE RESISTANCE TO THE SYSTEM. MAKE NECESSARY CHANGES IN FAN SPEED TO OBTAIN DESIGN SYSTEM CONDITIONS, AND RE-ALIGN BELTS WHEN NECESSARY. ADDITIONAL DAMPERS, SPLITTERS, TURNING VANES, TURBULENCE VANES, AND OTHER DEVICES NOT SPECIFICALLY INDICATED ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO OBTAIN THE CORRECT AIR BALANCE, SHALL BE INSTALLED BY THE SUBCONTRACTOR, DUCTWORK SHALL BE TESTED AS SPECIFIED IN PART 2 SECTION, "DUCTWORK".

TEST AND BALANCE - WATER SYSTEMS

1. CHECKING PHASE: PREPARE THE WATER CIRCULATING SYSTEMS FOR BALANCING IN THE FOLLOWING MANNER: OPEN ALL VALVES TO FULL OPEN POSITION. CLOSE COIL BYPASS STOP VALVES. SET CONTROL VALVE TO FULL COIL FLOW. SPOT CHECK CLEANLINESS OF STRAINERS AND MESH SIZE BY REMOVING AND REPLACING BASKETS, CHECK PUMP ROTATION, CHECK EXPANSION TANKS FOR PROPER OPERATION AND WATER LEVELS, CHECK ALL AIR VENTS AT HIGH POINTS OF WATER SYSTEMS AND DETERMINE THAT ALL ARE INSTALLED AND OPERATING FREELY AND THAT ALL AIR HAS BEEN REMOVED FROM THE SYSTEM, SET OPERATING PRESSURES OF CONDENSER WATER TO DESIGN REQUIREMENTS.

2. ADJUSTMENT PHASE: PROCEED AS FOLLOWS: (FLOW METERS MAY BE USED TO MEASURE FLOW.) SET ALL PUMPS TO PROPER GPM (GALLONS PER MINUTE) DELIVERY. ADJUST WATER FLOW THROUGH PROCESS COOLERS; BALANCE EACH ZONE. CHECK ENTERING AND LEAVING WATER TEMPERATURES; COOLER. RESET TO CORRECT DESIGN TEMPERATURES. UPON COMPLETION OF FLOW READINGS AND ADJUSTMENTS AT COILS, MARK ALL SETTINGS AND RECORD DATA. AFTER ADJUSTMENTS TO COILS ARE MADE, RECHECK SETTINGS AT THE PUMPS AND READJUST IF REQUIRED.



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Corrections
PLN CHK 08-17-18
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CITY OF LAS VEGAS, CLARK COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION		UTILITIES B.Y. # PROJECT BY: [] DATE: [] PUBLIC WORKS: []		CONTRACTOR DATE: [] DATE: [] DATE: []		REVISIONS DATE: [] DATE: [] DATE: []	
DATE	BY	DATE	BY	DATE	BY	DATE	BY
DESCRIPTION	DATE	DATE	DATE	DATE	DATE	DATE	DATE
ORIGINAL							

Project Title
City of La Mesa
Police Facility
For Construction

Project Architect
Mike Smith
Drawn By
ES/GM/SC
Project Number
200509.00
Date: 08-17-18
Sheet Number
M0.02

9282.12

NV5

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DIFFUSER AND REGISTER SCHEDULE							
SUPPLY AIR				RETURN OR EXHAUST AIR			
ITEM	NECK SIZE (IN)	CFM RANGE	TYPE	ITEM	NECK SIZE (IN)	CFM RANGE	TYPE
1	6 X 6	0 – 125	S1	1	6ø – 6 X 6	0 – 80	R1
2	8 X 8	126 – 250	S1	2	8ø – 8 X 8	81 – 140	R1
3	10 X 10	251 – 400	S1	3	10ø – 10 X 10	141 – 215	R1
4	12 X 12	401 – 600	S1	4	12ø – 12 X 12	216 – 315	R1
5	14 X 14	601 – 800	S1	5	14ø	316 – 430	R1
6	16 X 16	801 – 1000	S1	6	16ø	431 – 560	R1
7	18 X 18	1001 – 1200	S1	7	18 X 18	561 – 900	R1
8	20 X 20	1201 – 1350	S1	8	22 X 22	901 – 1345	R1
9	22 X 22	1351 – 1500	S1	9	6 X 6	0 – 100	R2
10	24 X 24	1501 – 1600	S1	10	8 X 8	101 – 200	R2
11	6ø – 6 X 6	0 – 90	S2	11	10 X 10	201 – 300	R2
12	8ø – 8 X 8	91 – 160	S2	12	12 X 12	301 – 450	R2
13	10ø – 10 X 10	161 – 250	S2	13	14 X 14	451 – 625	R2
14	12ø – 12 X 12	251 – 360	S2	14	16 X 16	626 – 810	R2
15	14ø – 14 X 14	361 – 460	S2	15	18 X 18	811 – 965	R2
16	16ø – 16 X 16	461 – 561	S2	16	20 X 20	966 – 1110	R2
17	6 X 6	0 – 125	S3	17	22 X 22	1111 – 1255	R2
18	8 X 8	126 – 250	S3				
19	12 X 8	251 – 350	S3				
20	18 X 8	351 – 550	S3				
21	24 X 12	551 – 1000	S3				
22	6ø	0 – 150	S4				
23	8ø	151 – 250	S4				
24	10ø	251 – 350	S4				
25	12ø	351 – 500	S4				
26	14ø	501 – 700	S4				
27	16ø	701 – 950	S4				
28	8ø	0 – 250	S5				
29	13–3/16"	0 – 300/FT	S6				

DIFFUSER AND REGISTER SPECIFICATIONS

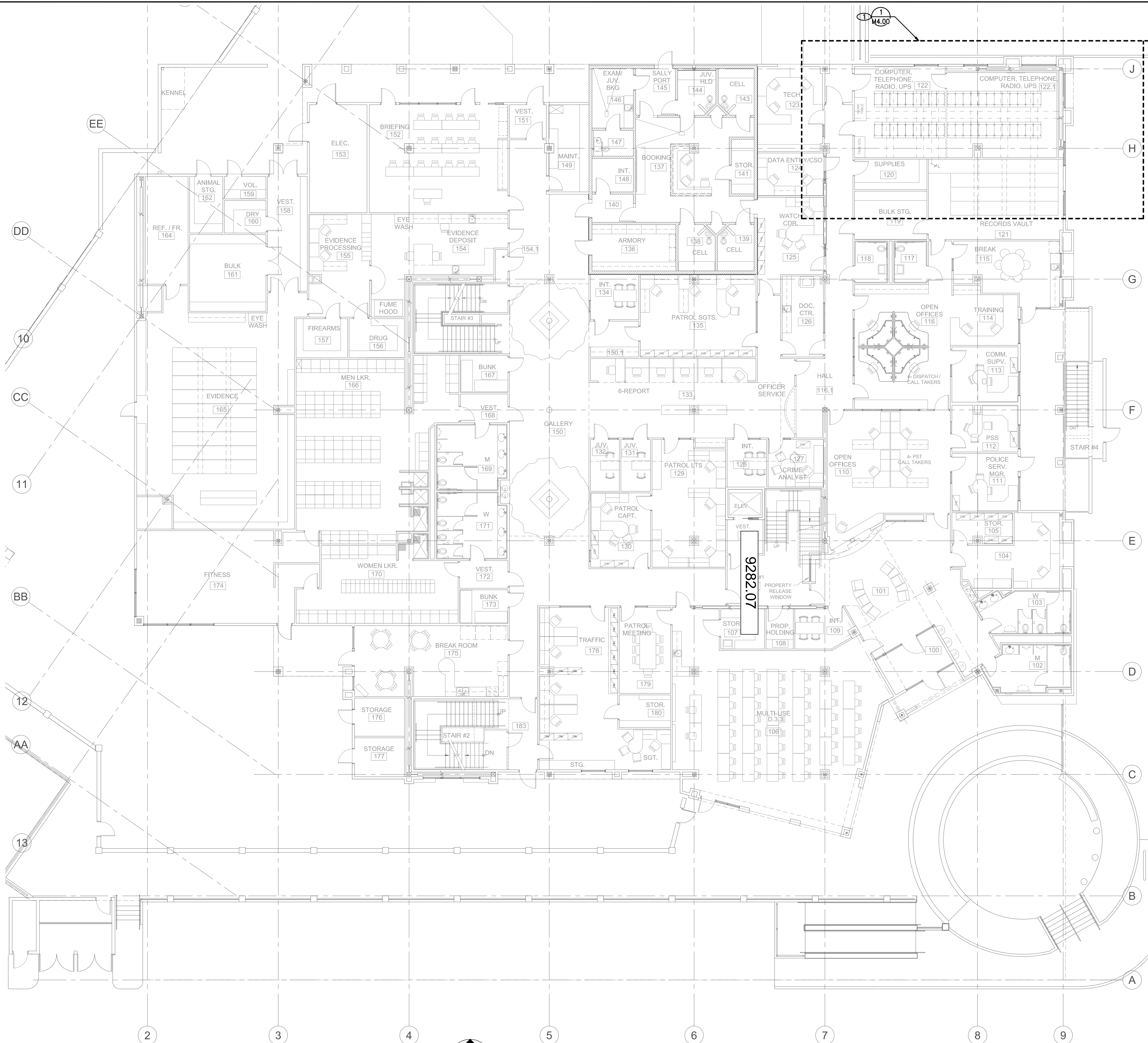
SUPPLY AIR:

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COMPUTER ROOM AIR CONDITIONER - OUTDOOR UNIT

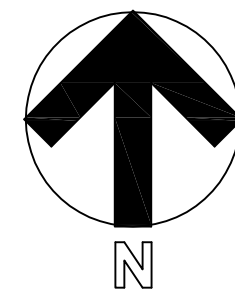
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3. PROVIDE CONTROL WIRING TO INTERLOCK OPERATION WITH ASSOCIATED INDOOR UNITS



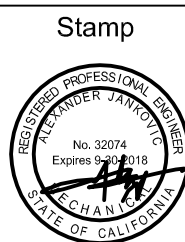
1 MECHANICAL PLAN
M2.01 SCALE: 1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8" = 1'-0"



NOTES

- 1 AREA OF WORK. REFER TO SHEET M4.00 FOR ENLARGED PLANS.



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Corrections
PLN CHK 08-17-18

UTILITIES BY: #	DATE	BY	APPROVED	DATE	BY	APPROVED
TRAFFIC BY: #						
ENGINEERING DIVISION						
DESCRIPTION	DATE	BY	APPROVED	DATE	BY	APPROVED
ORIGINAL						
CONTROL COPIES						
NO. OF						

Project Title
MECHANICAL PLAN

City of La Mesa
Police Facility
For Construction

Project Architect
Mike Smith
Drawn By
ES/GM/SC
Project Number
200509.00
Date: 08-17-18

Sheet Number
M2.01

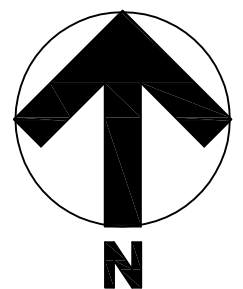
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Project Title

City of La Mesa Police Facility For Construction

Project Architect
Mike Smith

Drawn By
ES/MS/C

Project Number
200509.00

Date: 08-17-18

Sheet Title

MECHANICAL ROOF PLAN

CITY OF LA MESA, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

DESIGNED BY: *J. Smith*

DATE: *08/17/18*

DESCRIPTION: *BY*

ORIGINAL

UTILITIES BY: *III*

TRAFFIC BY: *J. Smith*

DEVELOPMENT BY: *None*

PUBLIC WORKS: *III*

DATE: *08/17/18*

APPROVED: *[Signature]*

DATE: *08/17/18*

PLANNED

CONSTRUCTION

CONTRACT COORDINATOR

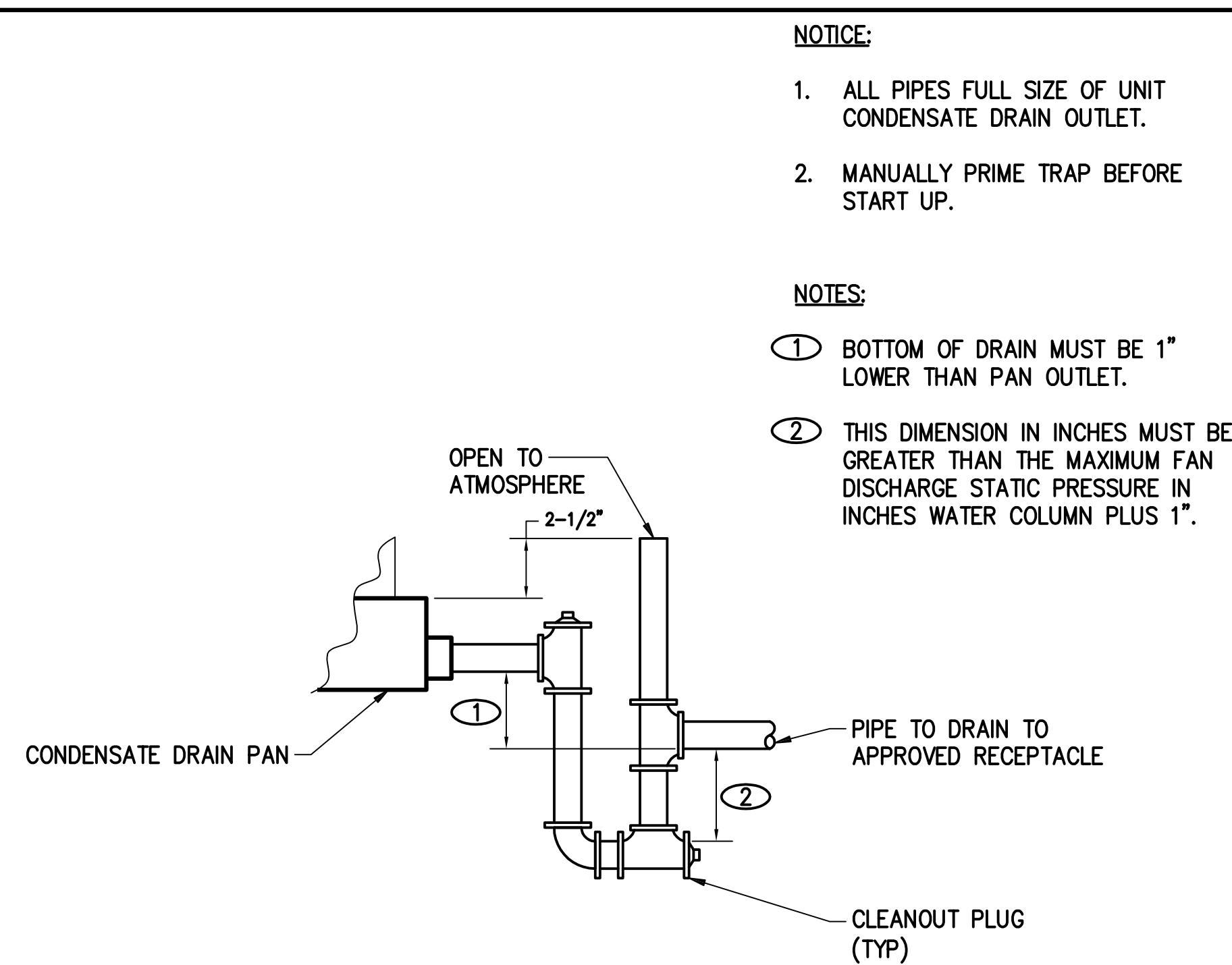
Project Number

M203

Sheet Number



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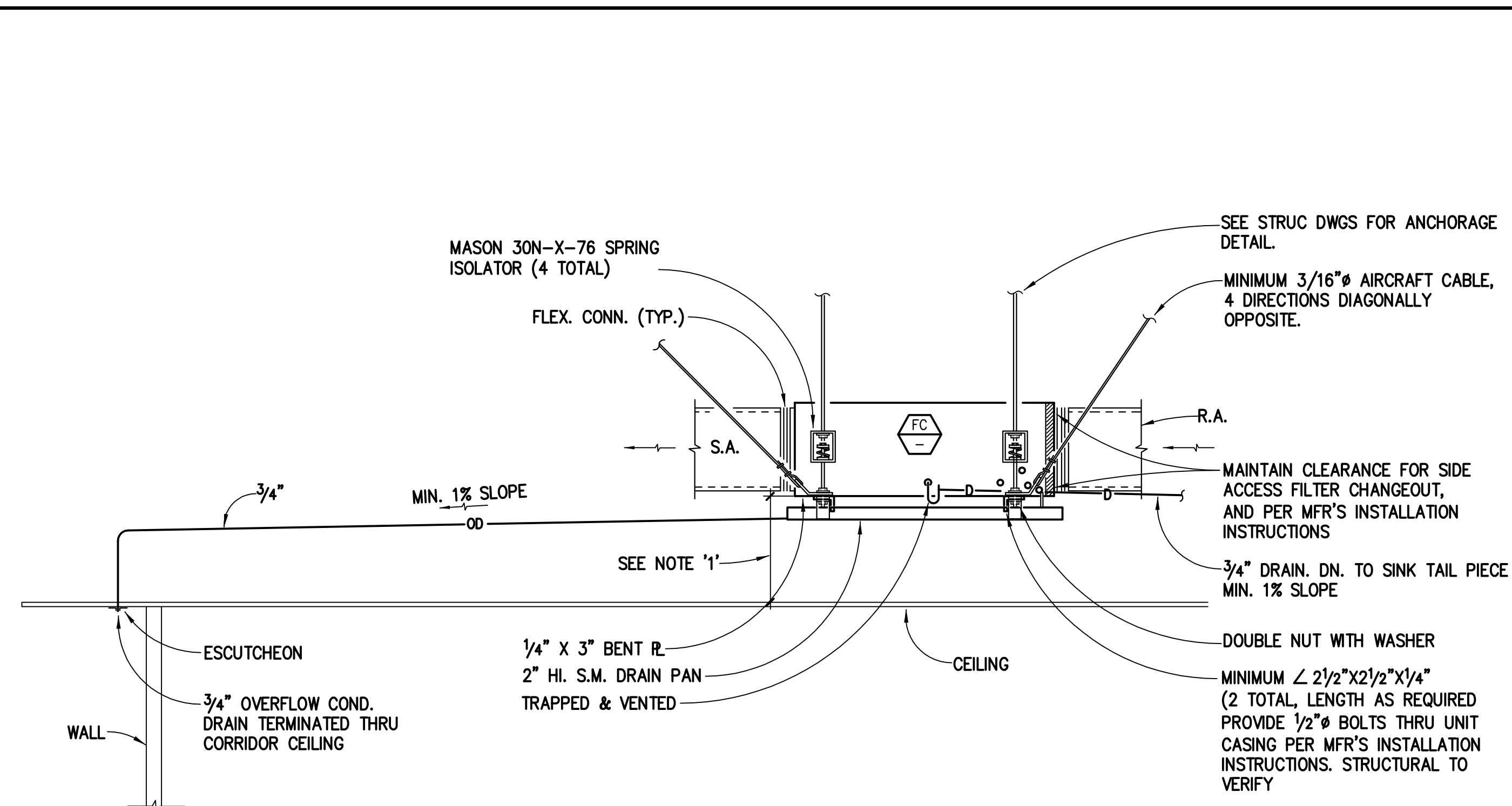


CONDENSATE DRAIN (BLOW THROUGH)

NO SCALE

1

M6.00

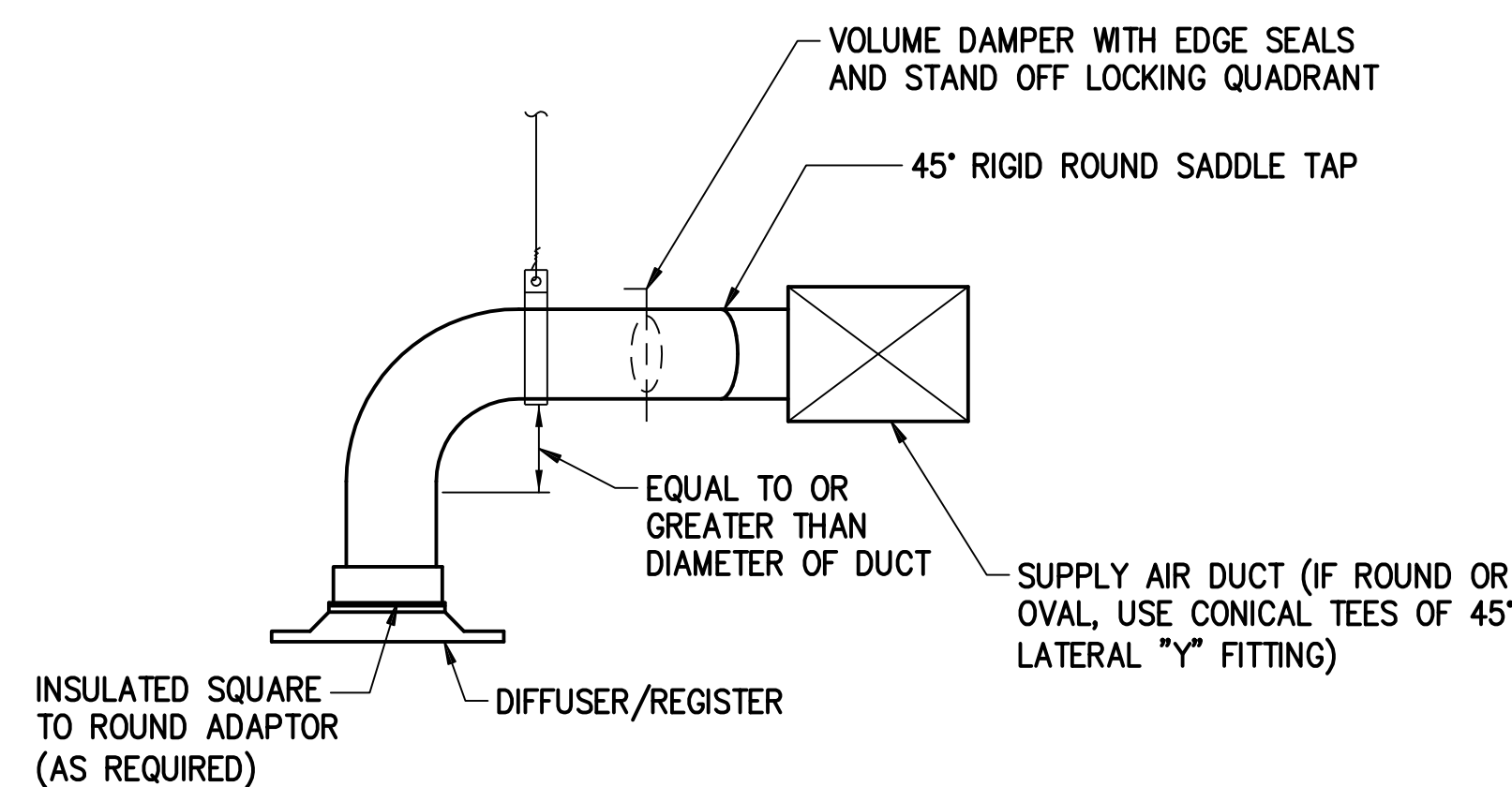


FAN COIL MOUNTING

NO SCALE

2

M6.00

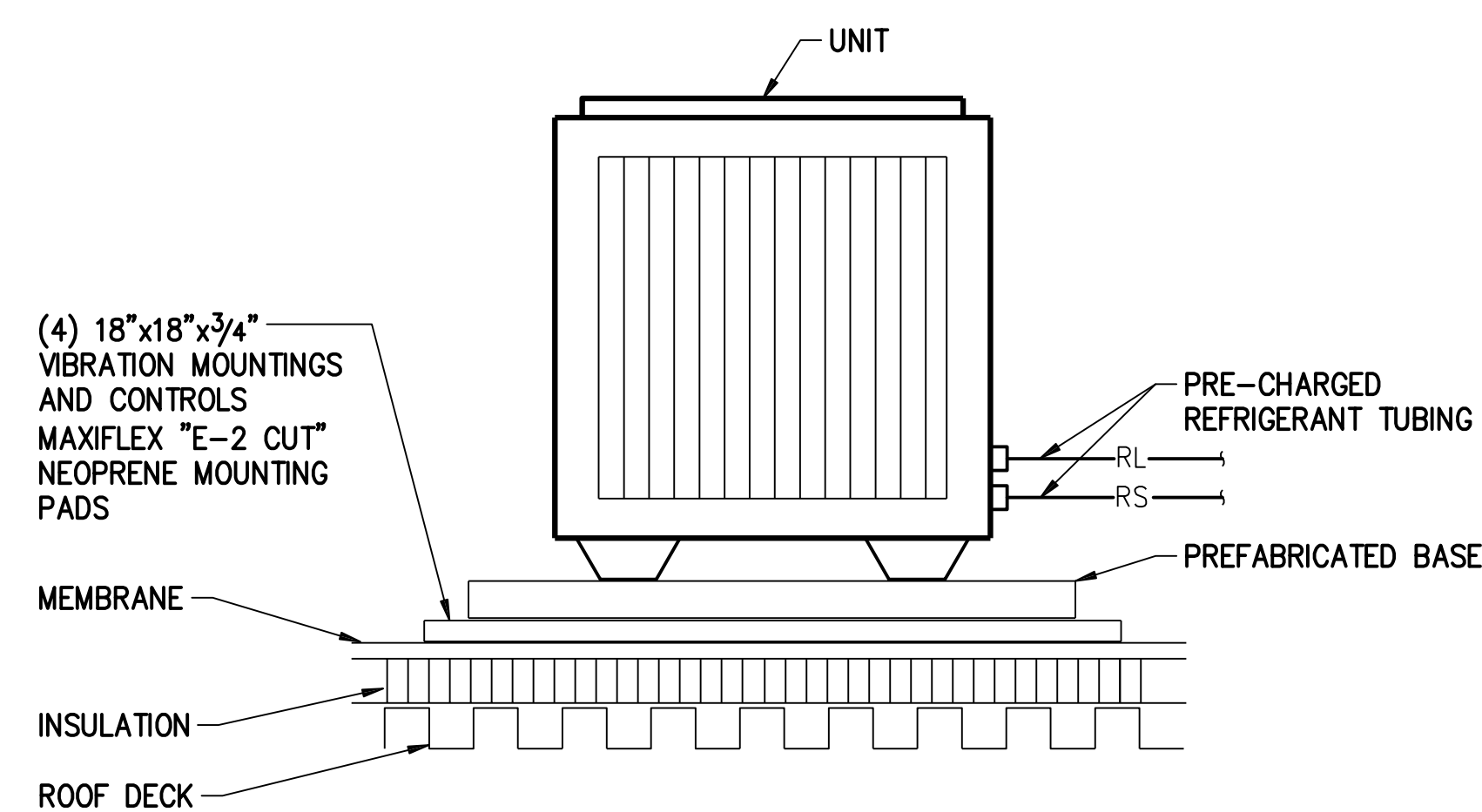


DIFFUSER/REGISTER MOUNTING

NO SCALE

3

M6.00

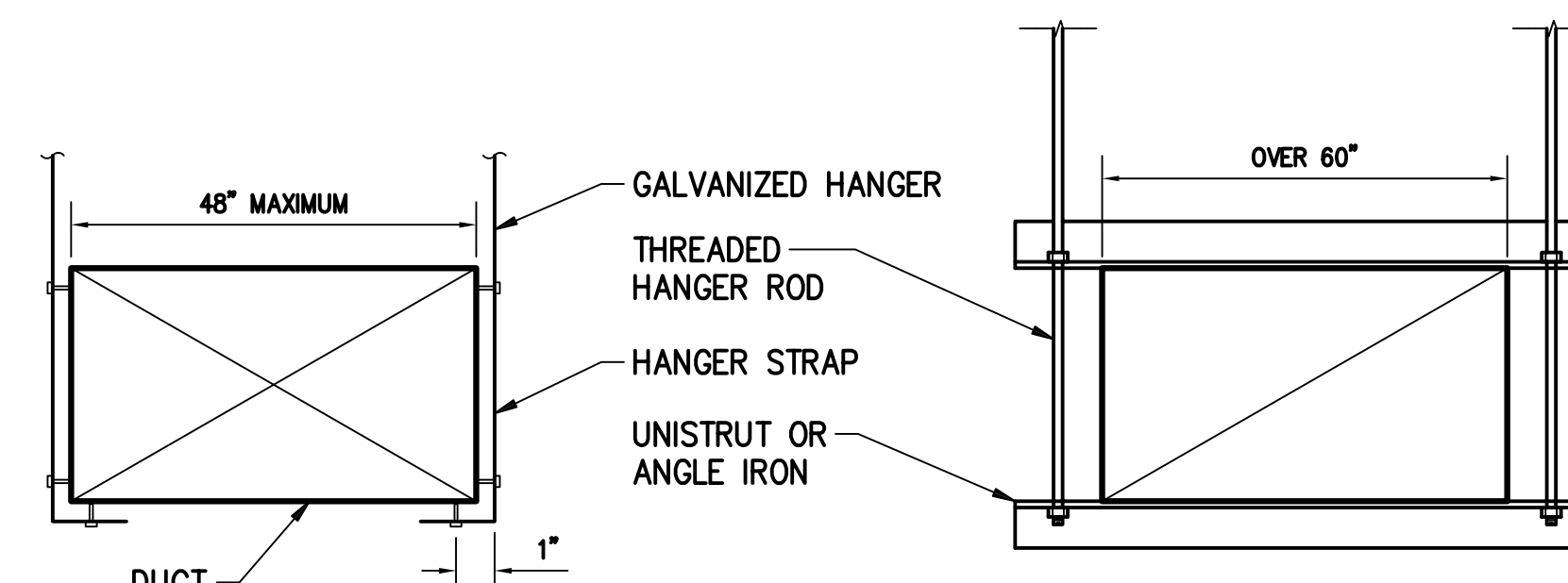


OUTDOOR UNIT

NO SCALE

4

M6.00

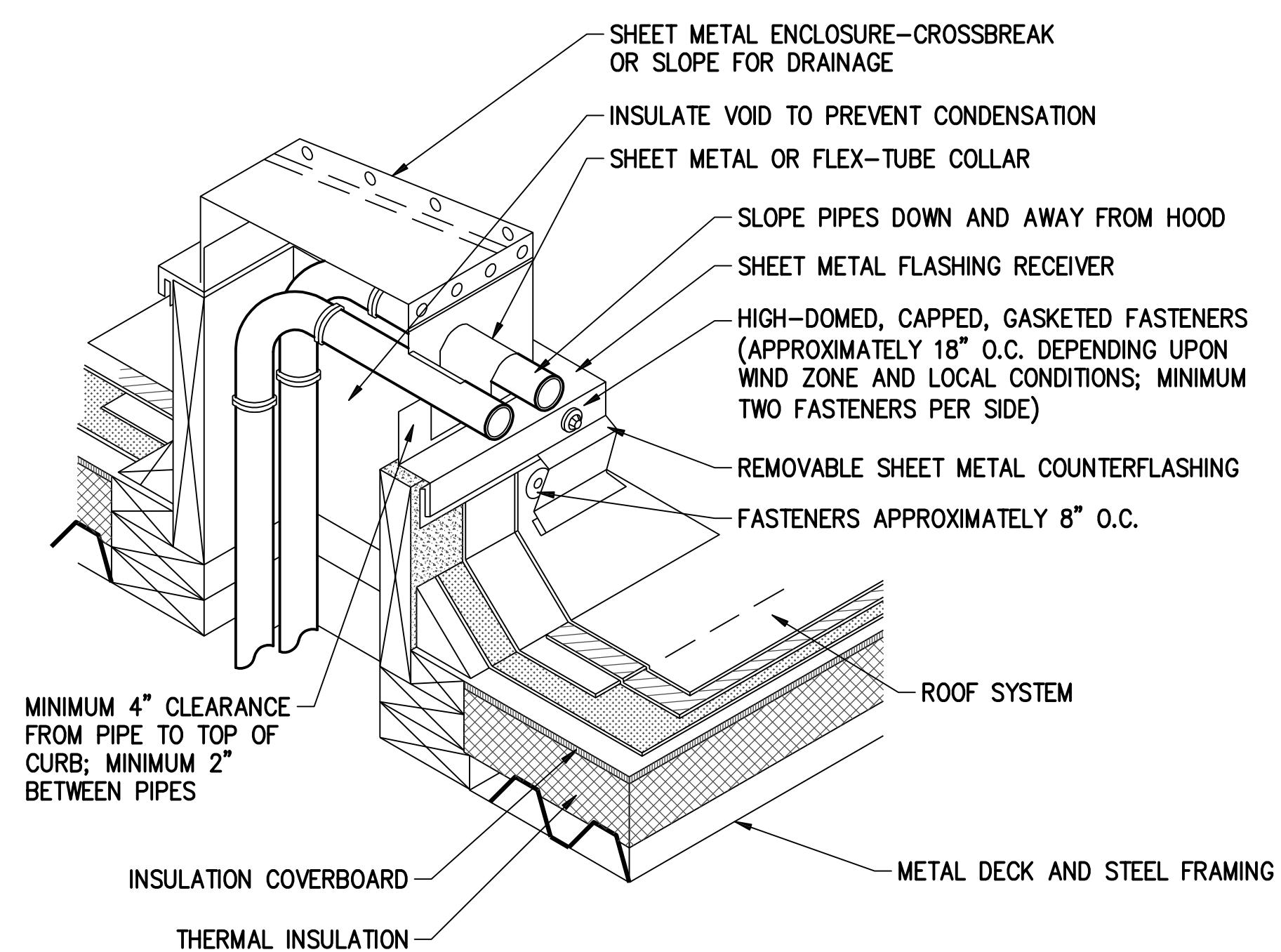


DUCT HANGER SUPPORT

NO SCALE

5

M6.00



PIPE THROUGH ROOF

NO SCALE

6

M6.00

- NOTICE:**
1. MOUNT FAN COIL SO AS TO ALLOW FOR ADEQUATE CONDENSATE DRAINS SLOPE. VERIFY.
 2. MAINTAIN CLEARANCES PER MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ACCESS TO FAN COIL AND CONNECTIONS.
 3. COORDINATE EXACT UNIT PLACEMENT WITH PLUMBING AND ELECTRICAL.
 4. COORDINATE WITH ACTUAL EQUIPMENT PURCHASED.

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Corrections

CITY OF LA MESA, CALIFORNIA DEPARTMENT OF PUBLIC WORKS ENGINEERING DIVISION		UTILITIES BY: <i>W</i>	
<i>1/1/20</i>		TRAFFIC BY: <i>1/1/20</i>	
<i>1/1/20</i>		DEVELOPMENT BY: <i>1/1/20</i>	
<i>1/1/20</i>		PUBLIC WORKS: <i>1/1/20</i>	
CITY ENGINEER RSE 6104	DATE	APPROVED	DATE
DESCRIPTION	BY	APPROVED	DATE
ORIGINAL			
			CONTROL CERTIFICATION
			EXEMPT COORDINATES
			RESP BY:

Sheet Title DESIGN DETAILS

**City of La Mesa
Police Facility
For Construction**

Project Title	Project Architect Mike Smith
	Drawn By ES/GM/SC
	Project Number 200509.00
	Date: 08-17-18
	Sheet Number

Sheet Number
M6.00

Sheet Number
M6.00