





MECHANICAL SPECIFICATION

PART 1 - GENERAL

1.1 INCLUDED
A. THIS SECTION COVERS MECHANICAL WORK, COMPLETE. WORK INCLUDES FURNISHING, INSTALLING, CALIBRATING, ADJUSTING, TESTING, DOCUMENTING, AND STARTING UP EQUIPMENT IN ACCORDANCE WITH THESE SPECIFICATIONS...

1.2 CODES AND STANDARDS
A. ALL WORK SHALL BE DONE IN CODE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL BUILDING SAFETY CODES, ORDINANCES, AND REGULATIONS. ADDITIONALLY, ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE FOLLOWING STANDARDS:

- 1. NATIONAL FIRE PROTECTION ASSOCIATION.
2. CALIFORNIA MECHANICAL CODE.
3. CALIFORNIA PLUMBING CODE.
4. UNDERWRITERS LABORATORIES.
5. TITLES 8, 17, 19, 21, 24 OF THE CALIFORNIA CODE OF REGULATIONS.
6. CALIFORNIA ELECTRIC CODE.
7. SMACNA STANDARDS.
8. ASHRAE STANDARDS 55 AND 62.1.

B. WHEN THE CONTRACT DOCUMENTS CALL FOR MATERIALS OR CONSTRUCTION OF A HIGHER STANDARD THAN IS REQUIRED BY THE ABOVE, THE CONTRACT DOCUMENT REQUIREMENTS SHALL TAKE PRECEDENCE OVER THE REQUIREMENTS OF THE APPLICABLE LAWS, ORDINANCES, RULES, OR REGULATIONS. NOTHING IN THE CONTRACT DOCUMENTS SHALL BE INTERPRETED AS PERMITTING WORK IN VIOLATION OF SAID LAWS, RULES, AND/OR REGULATIONS.

C. THE CONTRACTOR FOR THIS WORK SHALL FURNISH, WITHOUT EXTRA CHARGE, ANY ADDITIONAL MATERIALS AND/OR LABOR AS MAY BE REQUIRED FOR COMPLIANCE WITH THESE LAWS, RULES, AND/OR REGULATIONS THROUGH SUCH MATERIALS AND/OR LABOR ARE NOT SPECIALLY SET FORTH IN THE CONTRACT DOCUMENTS.

1.3 LICENSING REQUIREMENTS

A. ALL WORK OF DIVISION 22 AND 23 SHALL BE PERFORMED BY AN APPROPRIATELY LICENSED CONTRACTOR. THE LICENSES SHALL BE CURRENT, VALID THROUGH THE TERM OF THE CONTRACT AND IN THE NAME OF THE CONTRACTOR.

- 1. ALL HVAC WORK, WHICH INCLUDES WARM AIR HEATING SYSTEMS AND WATER HEATING PUMPS, VENTILATING SYSTEMS, AIR CONDITIONING SYSTEMS, AND DUCTWORK, REGISTERS, FLUES, HUMIDITY, AND THERMOSTATIC CONTROLS IN CONNECTION WITH THESE SYSTEMS, SHALL BE PERFORMED BY A C-20 - WARM-AIR HEATING, VENTILATING AND AIR CONDITIONING CONTRACTOR.
2. ALL HYDRONIC PIPING SYSTEMS SHALL BE PERFORMED BY A C-4 - BOILER, HOT WATER HEATING AND STEAM FITTING CONTRACTOR.
3. ALL HYDRONIC PIPING INSULATION SHALL BE PERFORMED BY A C-2 - INSULATION AND ACOUSTICAL CONTRACTOR.

1.4 COOPERATION WITH OTHER TRADES

A. COOPERATE FULLY WITH OTHER TRADES DOING WORK ON THE PROJECT AS MAY BE NECESSARY FOR THE PROPER COMPLETION OF THE PROJECT. REFER TO THE STRUCTURAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR DETAILS OF THE BUILDING STRUCTURE AND EQUIPMENT INSTALLATION THAT WILL TEND TO OVERLAP, CONFLICT WITH OR REQUIRE COORDINATION WITH THE WORK OF THIS SECTION, AND SCHEDULE THIS WORK ACCORDINGLY.
B. ANY WORK DONE WITHOUT REGARD FOR OTHER TRADES SHALL BE MOVED, REPLACED, OR REDONE AS REQUIRED, WITHOUT EXTRA CHARGES TO OWNER.

1.5 DIVISION OF WORK BETWEEN DIVISIONS 23 AND 26

A. CLOSE COORDINATION BETWEEN THE ELECTRICAL AND MECHANICAL TRADES IS A PART OF THE WORK THAT IS REQUIRED BY THIS CONTRACT. NO ALLOWANCE WILL BE MADE FOR OMISSIONS BASED ON INCORRECTLY ASSUMING ANOTHER TRADE WILL BE PERFORMING YOUR WORK. CONFIRM YOUR SCOPE OF WORK WITH THE GENERAL CONTRACTOR.
B. THE DIVISION OF RESPONSIBILITIES BETWEEN TRADES SUPPLYING EQUIPMENT IN OTHER DIVISIONS MAY BE DIFFERENT. FOR INSTANCE, DIVISION 26 CONTRACTOR MAY BE REQUIRED TO SUPPLY DISCONNECT SWITCHES AND STARTERS FOR NON-HVAC MECHANICAL EQUIPMENT SUPPLIED UNDER OTHER DIVISIONS.
C. DIVISION 23 RESPONSIBILITIES

- 1. ASSUME RESPONSIBILITY FOR THE PROPER FUNCTIONING OF THE HVAC SYSTEMS IN THEIR ENTIRETY.
2. FURNISH AND INSTALL ALL CONDUCTORS AND CONDUIT REQUIRED FOR CONTROL OF HVAC EQUIPMENT.
3. MAKE ALL TERMINATIONS WITH THE EXCEPTION OF POWER CONDUCTORS.
4. FURNISH AND INSTALL ALL CONTROL PANELS AND DEVICES TO PROVIDE A COMPLETE AND FUNCTIONAL CONTROLS SYSTEM, INCLUDING ALL CONTROLS TRANSFORMERS.
5. FURNISH AND INSTALL MOTOR STARTERS FOR ALL EQUIPMENT SPECIFIED IN DIVISION 23.
6. INSTALL DUCT SMOKE DETECTORS FURNISHED BY FIRE ALARM CONTRACTOR IN BUILDINGS WITH FIRE ALARM SYSTEMS.
7. FURNISH AND INSTALL DUCT SMOKE DETECTORS IN BUILDINGS WITHOUT FIRE ALARM SYSTEMS.
8. FURNISH AND INSTALL ALL CONTROL CONDUCTORS AND CONDUIT CONNECTING DUCT SMOKE DETECTORS TO SMOKE DAMPERS AND FAN START CONTROLS.
9. ALL ELECTRICAL WORK PERFORMED UNDER DIVISION 23 SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 26.

D. DIVISION 26 RESPONSIBILITIES

- 1. FURNISH AND INSTALL ALL RACEWAYS, CONDUIT, DISCONNECT SWITCHES, AND CONDUCTORS NECESSARY FOR ELECTRICAL POWER SUPPLY.
2. MAKE ALL POWER SUPPLY TERMINATIONS TO MOTORS, STARTERS, DISCONNECT SWITCHES, CONTROL TRANSFORMERS, AND OTHER MECHANICAL DEVICES.
3. FIRE ALARM CONTRACTOR TO FURNISH DUCT SMOKE DETECTORS IN BUILDINGS WITH FIRE ALARM SYSTEMS.
4. PROVIDE POWER TO ALL DUCT SMOKE DETECTORS AND SMOKE DAMPERS.
5. COORDINATE ALL WORK WITH MECHANICAL CONTRACTORS.

1.6 AS-BUILT DRAWINGS

A. A COMPLETE SET OF CONTRACT DRAWINGS SHALL BE MAINTAINED AT THE WORK SITE, AND ALL CHANGES IN THE WORK SHALL BE RECORDED ON THIS SET, ON A DAILY BASIS. THE FINAL AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL.

1.7 DESIGN DRAWINGS

A. THE DRAWINGS INDICATE DIAGRAMMATICALLY THE GENERAL LAYOUT OF THE MECHANICAL SYSTEMS AND OTHER RELATED WORK. FIELD VERIFICATION OF SCALED DIMENSIONS TAKEN FROM THE DRAWINGS IS REQUIRED.

B. THE CONTRACTOR SHALL REVIEW AND COMPARE THE ARCHITECTURAL, STRUCTURAL, PLUMBING, MECHANICAL, AND ELECTRICAL DRAWINGS AND ALL OWNER SUPPLIED EQUIPMENT DRAWINGS, AND ADJUST THEIR WORK TO BE IN CONFORMITY WITH THE CONDITIONS INDICATED THEREON. DISCREPANCIES BETWEEN DRAWINGS, BETWEEN DRAWINGS AND ACTUAL FIELD CONDITIONS, OR BETWEEN DRAWINGS AND SPECIFICATIONS, SHALL PROMPTLY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR A DETERMINATION OF THE MODIFICATIONS TO BE EFFECTED. IN THE EVENT THAT A MAJOR MODIFICATION IS REQUIRED, A CHANGE ORDER WILL BE PREPARED.

1.8 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

A. BEFORE INSTALLATION OF ANY NEW WORK, VERIFY THE LOCATION, SIZE, AND OTHER CONDITIONS AT ALL POINTS OF CONNECTION TO SERVICES OR OTHER EXISTING PIPING, AND AT ALL LOCATIONS WHERE NEW WORK WILL CROSS OR PASS NEAR EXISTING PIPING, ELECTRICAL, OR OTHER FACILITIES.

B. REMOVE DUCTWORK, PIPING, CONTROLS, FIXTURES, AND EQUIPMENT THAT IS NOT TO REMAIN IN SERVICE AS SHOWN ON THE DRAWINGS OR AS REQUIRED. THIS INCLUDED THE REMOVAL OF ASSOCIATED APPURTENANCES AND SUPPORTS.

C. PATCH, CAP, OR REPAIR EXISTING WORKS AFFECTED BY THIS DEMOLITION IN CONCEALED SPACES WITHIN SIX (6) INCHES OF A LIVE MAIN OR BRANCH.

D. DELIVER REMOVED MATERIAL TO THE OWNER AS DIRECTED BY THE ARCHITECT. DISPOSE OF ALL OTHER REMOVED MATERIAL OFFSITE.

E. INFORMATION SHOWN RELATIVE TO EXISTING SERVICES IS BASED UPON AVAILABLE RECORDS AND DATA DURING PREPARATION OF THE DRAWINGS, BUT SHALL BE VERIFIED. MAKE REASONABLE DEVIATIONS FOUND NECESSARY TO CONFORM TO ACTUAL LOCATIONS AND CONDITIONS, WITHOUT EXTRA CHARGE.

1.9 OPERATING AND MAINTENANCE INSTRUCTIONS

A. FURNISH THREE SETS OF TYPEWRITTEN INSTRUCTIONS COVERING MAINTENANCE, ADJUSTMENT, AND OPERATION OF EACH PIECE OF APPARATUS, BOUND IN A HARD COVER LOOSE-LEAF BINDER. NEATLY OBTAIN OR CROSS OUT INAPPLICABLE DATA FROM MANUFACTURER'S LITERATURE. SUBMIT DATA TO THE ARCHITECT.

B. OPERATING INSTRUCTIONS SHALL SHOW SEQUENCE OF OPERATIONS, LUBRICATION, CARE, AND MAINTENANCE REQUIREMENTS OF ALL EQUIPMENT. FINAL ACCEPTANCE OF THE WORK WILL NOT BE MADE UNTIL A SATISFACTORY SUBMISSION OF THIS MATERIAL IS RECEIVED AND APPROVED BY THE ARCHITECT.

C. THE OWNER'S AUTHORIZED REPRESENTATIVE SHALL BE INSTRUCTED IN THE OPERATION AND SERVICING OF ALL HVAC & PLUMBING SYSTEMS.

1.10 ACCURACY OF DATA

A. THE DATA GIVEN HEREIN AND ON THE DRAWINGS ARE AS EXACT AS COULD BE REASONABLY SECURED, BUT ABSOLUTE ACCURACY IS NOT GUARANTEED. EXACT LOCATIONS, DISTANCES, ELEVATIONS, ETC. WILL BE DETERMINED BY SHOP DRAWINGS, THE BUILDING ITSELF, AND ACTUAL FIELD CONDITIONS.

1.11 DELIVERY, STORAGE, AND HANDLING

A. CONTRACTOR SHALL BE RESPONSIBLE FOR DELIVERY, STORAGE, PROTECTION, AND PLACING OF ALL EQUIPMENT AND MATERIALS. CONTRACTOR SHALL PROTECT THE WORK AND MATERIALS FROM DAMAGE DURING CONSTRUCTION. EQUIPMENT STORED AT THE JOB SITE SHALL BE PROTECTED FROM DUST, WATER, OR OTHER DAMAGE, AND BE COVERED IF EQUIPMENT IS EXPOSED TO WEATHER. PROTECT INTERIORS OF NEW EQUIPMENT AND PIPING SYSTEMS AGAINST ENTRY OF FOREIGN MATTER. CLEAN BOTH INSIDE AND OUTSIDE BEFORE PAINTING OR PLACING EQUIPMENT IN OPERATION. ANY ITEMS DAMAGED SHALL BE REPAIRED OR REPLACED, AT NO ADDITIONAL COST TO THE OWNER.

1.12 WARRANTIES

A. EQUIPMENT WARRANTIES SHALL BE PROVIDED FOR ALL EQUIPMENT, WITH ALL NECESSARY INFORMATION FILLED IN, EXCEPT PURCHASE DATE, IN FAVOR OF THE OWNER.

B. THE CONTRACTOR SHALL GUARANTEE THAT ALL WORK UNDER THIS SECTION IS FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FILING THE NOTICE OF COMPLETION. REPLACEMENT OF DEFECTIVE WORK AND DAMAGE CAUSED TO WORK OF OTHER TRADES AS A RESULT OF SUCH DEFECTIVE WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND SHALL BE MADE AT NO COST TO THE OWNER.

1.13 ALTERNATIVE MATERIALS AND METHODS

A. THESE PLANS AND SPECIFICATIONS DESCRIBE THE GENERAL SCOPE OF THE MECHANICAL SYSTEMS. THESE PLANS AND SPECIFICATIONS DO NOT PRECLUDE THE SUBMITTAL OF ALTERNATIVE METHODS OR MATERIALS. MANUFACTURER'S NAMES AND CATALOG NUMBERS ARE STATED TO IDENTIFY THE TYPE AND QUALITY OF THE EQUIPMENT OR MATERIALS REQUIRED FOR THE PROJECT.

B. THE CONTRACTOR MAY SUBMIT SHOP DRAWINGS AND/OR TECHNICAL INFORMATION ON ALTERNATIVE EQUIPMENT, MATERIALS OR INSTALLATION DETAILS TO ACCOMPLISH THE INTENT OF THE PLANS AND SPECIFICATIONS. APPROVAL OF THE ALTERNATIVE EQUIPMENT, MATERIALS OR INSTALLATION DETAILS SHALL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY FOR COMPLYING WITH THE INTENT OF THE PLANS AND SPECIFICATIONS. SUBMIT THE MANUFACTURERS' TECHNICAL INFORMATION, SHOP DRAWINGS, AND/OR WRITTEN DESCRIPTION OF ALTERNATIVE METHODS FOR EACH ITEM DESCRIBED BY MANUFACTURER'S NAME AND CATALOG NUMBER AND SPECIFICATIONS OF THE EQUIPMENT, MATERIAL, OR INSTALLATION DETAIL REQUIRED.

PART 2 - PRODUCTS

2.1 GENERAL

A. ALL MATERIALS, APPLIANCES, AND EQUIPMENT SHALL BE NEW AND BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS, AND OF THE MAKE, BRAND, OR QUALITY SPECIFIED OR AS ACCEPTED BY THE ARCHITECT.

B. WHEN TWO OR MORE UNITS OF MATERIALS OR EQUIPMENT OF THE SAME TYPE OR CLASS ARE REQUIRED, THESE UNITS SHALL BE PRODUCTS OF ONE MANUFACTURER.

C. APPLY AND INSTALL ALL ITEMS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. REFER CONFLICTS BETWEEN MANUFACTURER'S INSTRUCTIONS AND THE CONTRACT DRAWINGS AND SPECIFICATIONS TO THE ARCHITECT FOR RESOLUTION.

2.2 THERMOSTATS

A. ELECTRIC, SOLID-STATE, MICROCOMPUTER-BASED ROOM THERMOSTAT WITH THE FOLLOWING FEATURES.

- 1. AUTOMATIC SWITCHING FROM HEATING TO COOLING.
2. PREFERENTIAL RATE CONTROL TO MINIMIZE OVERSHOOT AND DEVIATION FROM SET POINT.
3. SET UP FOR FOUR SEPARATE TEMPERATURES PER DAY.
4. INSTANT OVERRIDE OF SET POINT FOR CONTINUOUS OR TIMED PERIOD FROM 1 HOUR TO 31 DAYS.
5. SHORT-CYCLE PROTECTION.
6. PROGRAMMING BASED ON EVERY DAY OF WEEK.
7. SELECTION FEATURES INCLUDE DEGREE F OR DEGREE C DISPLAY, 12- OR 24-HOUR CLOCK, KEYBOARD DISABLE, REMOTE SENSOR, AND FAN ON-AUTO.
8. BATTERY REPLACEMENT WITHOUT PROGRAM LOSS.
9. THERMOSTAT DISPLAY FEATURES INCLUDE THE FOLLOWING:

- a. TIME OF DAY.
b. ACTUAL ROOM TEMPERATURE.
c. PROGRAMMED TEMPERATURE.
d. PROGRAMMED TIME.
e. DURATION OF TIMED OVERRIDE.
f. DAY OF WEEK.
g. SYSTEM MODE INDICATIONS INCLUDE "HEATING," "OFF," "FAN AUTO," AND "FAN ON."

B. THERMOSTAT COVER CONSTRUCTION: HEAVY-DUTY, LOCKING THERMOSTAT GUARD, OF SOLID METAL TAMPERPROOF CONSTRUCTION.

C. ACCURACY: PLUS OR MINUS 0.5 DEG. F AT CALIBRATION POINT.

D. WIRE: TWISTED, SHIELDED-PAIR CABLE.

E. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS PRIOR TO ORDERING FAN AND CURB ADAPTOR.

2.3 DUCTWORK

A. SHEET METAL DUCTWORK - RECTANGULAR

- 1. DUCTS AND PLENUMS SHALL BE FABRICATED AND INSTALLED IN CONFORMANCE WITH THE LATEST EDITIONS OF NFPA AMPHLET NO. 90A; CALIFORNIA BUILDING CODE; CALIFORNIA MECHANICAL CODE AND THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS (METAL AND FLEXIBLE). DUCTS AND PLENUMS SHALL BE CONSTRUCTED OF HOT DIPPED GALVANIZED MILD STEEL AND SHALL HAVE AIRTIGHT CLASS "B" SEALS AT ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS. TABLES AND FIGURES HEREINAFTER REFERENCED ARE FROM THE 2005 EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS (METAL AND FLEXIBLE).
2. RECTANGULAR DUCT CONSTRUCTION SHALL CONFORM TO TABLE 2-3. ALL TRANSVERSE JOINTS SHALL BE FLANGED PER TABLE 2-32, WITH CORNER CLOSURES OR "DUCT MATE" FLANGED CONNECTIONS WITH CORNER CLOSURES PER FIGURE 2-17. ELBOWS SHALL BE STANDARD RADIUS (TYPE RE-1) OR SQUARE THROAT WITH VANES (TYPE RE-2) PER FIGURE 4-2, WITH DOUBLE THICKNESS TURNING VANES PER FIGURES 4-3 AND 4-4. OFFSETS AND TRANSITIONS SHALL BE PER FIGURE 4-7. SUPPLY, RETURN, AND EXHAUST BRANCH CONNECTIONS SHALL BE PER FIGURE 4-5 OR 4-6. SPLITTERS SHALL NOT BE USED.
3. LINED DUCTS SHALL BE FABRICATED SUCH THAT THE NET INSIDE DIMENSIONS EQUALS THE DUCT SIZES SHOWN ON THE DRAWINGS.

B. SHEET METAL DUCTWORK - ROUND DUCTS SHALL BE SPIRAL, UNITED MCGILL OR EQUAL. ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SHALL HAVE CLASS "B" SEALS. ALL BRANCHES IN ROUND DUCT SYSTEMS SHALL BE MADE WITH FACTORY FABRICATED HUNGING WITH VANES. DUCT TURNS SHALL BE MADE WITH STANDARD, FACTORY FABRICATED, THREE-PIECE ELBOWS.

C. SUPPORTS - SUPPORTS FOR HORIZONTAL DUCTS AND PLENUMS SHALL BE FABRICATED PER FIGURES 5-5 AND 5-6 AND TABLES 5-1, AND 5-3. THE MAXIMUM DISTANCE BETWEEN HANGERS SHALL BE EIGHT FEET FOR RECTANGULAR DUCTS AND TWELVE FEET FOR ROUND DUCTS. ATTACHMENTS TO THE STRUCTURE SHALL BE MADE WITH ADEQUATELY SIZED LAG BOLTS FOR STRAPHANGERS AND ADEQUATELY SIZED MACHINE BOLTS AND SIDE BEAM BRACKETS FOR ROD HANGERS. SUPPORTS FOR VERTICAL DUCTS SHALL BE BAND IRON STRAP OR ANGLE BRACKET TYPE PER FIGURE 5-8 AND 5-9.

D. DUCT ACCESS DOORS: INCLUDING THOSE FOR REMOVING FILTERS, DUCT ACCESS DOORS SHALL BE AS DETAILED IN FIGURE 7-2 WITH SASH LOCKS, PIANO HINGES, AND GASKETS. ACCESS DOORS SHALL HAVE AN UNOBSTRUCTED FULL SWING.

2.4 DUCTWORK ACCESSORIES

A. FLEXIBLE DUCT CONNECTIONS

- 1. DURO-DYNE "METAL-FAB" WITH DUROION, VENTFABRICS "VENTGLASS," OR APPROVED EQUAL.
2. INSTALL AT EACH POINT WHERE A BLOWER UNIT IS CONNECTED TO A DUCT. A MINIMUM CLEARANCE OF THREE INCHES BETWEEN THE DUCT AND THE SOURCE OF VIBRATION SHALL BE MAINTAINED. INSTALL PER FIGURE 2-17.

B. SCREENS - INSTALL REMOVABLE BIRD SCREENS AT ALL OUTSIDE INTAKES AND EXHAUST AIR DISCHARGES. SCREENS SHALL BE FABRICATED FROM 1/2" X 14 GAUGE MESH SECURED IN FULL FRAMES. SCREENS AND FRAMES SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE DUCT, HOOD, OR EQUIPMENT TO WHICH ATTACHED.

C. JOINTS - TAPE ALL JOINTS AIRTIGHT USING HARDCAST TYPE "DT" PRESSURELESS TAPE AND "HD-20" ADHESIVE, PER MANUFACTURER'S DIRECTIONS.

D. DAMPERS - PROVIDE BUTTERFLY OR MULTI-BLADE DAMPERS WHERE INDICATED ON THE DRAWINGS OR AS REQUIRED FOR BALANCING AIR QUANTITIES TO VALUES SHOWN WITHOUT GENERATING EXCESSIVE NOISE. PROVIDE DURO-DYNE "KS-385," APPROVED EQUAL, LOCKING QUADRANTS ON EACH MANUAL DAMPER. LOCATE DAMPERS IN FURRED CEILINGS NEAR ACCESS PANELS WHERE POSSIBLE.

- 1. BUTTERFLY DAMPERS SHALL BE CONSTRUCTED AS PER FIGURE 7-4, FIGURE A, B, AND C IN THE DUCT MANUAL.
2. MULTI-BLADE DAMPERS SHALL CONFORM TO FIGURE 7-5.
3. BACK-DRAFT DAMPERS SHALL BE AIR BALANCE "AIR DYNAMIC" MODEL DY-1002-V, OR EQUAL.

2.5 INSULATION

A. EXTERIOR OF DUCTWORK:

- 1. UNLESS SPECIFIED TO BE LINED, ALL SHEET METAL SUPPLY AND RETURN DUCTS IN INDIRECTLY CONDITIONED SPACES SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-6 INSTALLED.
2. UNLESS SPECIFIED TO BE LINED, ALL SHEET METAL SUPPLY AND RETURN DUCTS IN UNCONDITIONED SPACES SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-8 INSTALLED.
3. ALL OUTSIDE AIR DUCTWORK BETWEEN BUILDING OUTSIDE AIR INLET AND HVAC UNIT OR HEAT/ENERGY RECOVERY VENTILATOR SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-4 INSTALLED.
4. EXHAUST DUCTWORK WITHIN 10 FEET OF TERMINATION POINT AND BETWEEN ANY HEAT/ENERGY RECOVERY VENTILATOR AND EXHAUST TERMINATION SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-4 INSTALLED.

2.6 REFRIGERATION PIPING AND APPURTENANCES

A. REFRIGERANT PIPING SHALL BE TYPE "ACR" DE-OXIDIZED HARD TEMPER COPPER TUBE, ASTM B260.

B. MECHANICAL JOINTS ON REFRIGERANT PIPING SYSTEMS ARE PROHIBITED. ALL REFRIGERANT PIPING JOINTS SHALL BE BRAZED, USE LEAD-FREE, SILVER SOLDER, MINIMUM 15% SILVER CONTENT.

C. PIPE FITTINGS SHALL BE WROUGHT-COPPER WITH SOLDERED JOINTS, ASME B16.22.

D. FLEXIBLE CONNECTIONS SHALL BE BRONZE, DOUBLE BRAIDED, SWEAT SOLDER ENDS.

E. MOISTURE/LIQUID INDICATORS (SIGHT GLASSES) SHALL BE COLOR CHANGE MOISTURE INDICATION TYPE, REPLACEABLE ELEMENT, FILTER SCREEN AND PAD, SWEAT SOLDER ENDS; SPORLAN "SEE-ALL", HENRY, OR EQUAL.

F. CHARGING AND PURGE VALVES SHALL BE FORGED BRASS, DIAPHRAGM PACKLESS, GLOBE TYPE, ANGLE OR STRAIGHT THROUGH, ONE END SOLDER, ONE END FLARE; HENRY 623 AND 643 SERIES, SPORLAN OR EQUAL.

G. SOLENOID VALVES SHALL BE FORGED BRASS, EXTENDED END CONNECTIONS, SOLDER ENDS, MOLDED COIL; SPORLAN "E" SERIES OR EQUAL, COMPLY WITH ARI 760 & UL 429.

H. FILTER DRIERS SHALL BE REPLACEABLE MEDIA, ANGLE TYPE; HENRY "DRI-COR" OR EQUAL; ARI 730.

I. THERMOSTATIC EXPANSION VALVES SHALL HAVE FORGED BRASS BODY, STAINLESS STEEL SEATS AND PINS, ODF SOLDER CONNECTIONS, EXTERNAL EQUALIZER; ARI 750.

J. OUTDOOR CONDENSING UNITS SHALL HAVE A FLEXIBLE PIPING SECTION AT THE OUTDOOR UNIT.

2.7 ACCESS PANELS

A. WHERE CONSTRUCTION IS NOT INHERENTLY ACCESSIBLE, PROVIDE ADEQUATELY SIZED AND CONVENIENTLY LOCATED ACCESS DOORS IN CEILINGS, WALLS, AND FURRING FOR SERVICING VALVES, EQUIPMENT, ETC. DOORS SHALL BE DELIVERED TO THE GENERAL CONTRACTOR FOR INSTALLATION.

B. FIRE RATED: INRYCO/MILCOR, U.L. LISTED, "B" LABEL, 1 1/2 HOUR RATING. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

C. DRYWALLED SURFACES: INRYCO/MILCOR, STYLE DW, PRIME COATED STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

D. CONCRETE AND TILED SURFACES: INRYCO/MILCOR, STYLE M, PRIME COATED STEEL, EXCEPT ACCESS PANELS INSTALLED IN TILED SURFACES SHALL BE STAIN FINISH STAINLESS STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

E. PLASTERED SURFACES: INRYCO/MILCOR, STYLE K, PRIME COATED STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

PART 3 - EXECUTION

3.1 EQUIPMENT STARTUP

A. NOTIFY THE OWNER'S REPRESENTATIVE A MINIMUM OF TWO WEEKS PRIOR TO EQUIPMENT STARTUP DATE TO ALLOW FOR OWNER'S PERSONNEL TO BE PRESENT DURING STARTUP.

B. MANUFACTURER MUST PROVIDE A SERVICE TECHNICIAN TO SUPERVISE RIGGING OF THE UNITS TO ENSURE PROPER FIT.

C. UNIT MUST BE CHECKED OUT, TESTED AND PLACED INTO OPERATION BY THE INSTALLING CONTRACTOR UNDER THE SUPERVISION OF AN AUTHORIZED REPRESENTATIVE OF THE FACTORY.

D. DURING STARTUP, THE FULL FUNCTIONALITY OF THE EQUIPMENT SHALL BE DEMONSTRATED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE, INCLUDING HEATING, MECHANICAL COOLING, ECONOMIZER COOLING, ZONE MODULATION, AND ALL EMERGENCY SHUTDOWN FEATURES.

3.2 EQUIPMENT, GENERAL REQUIREMENTS

A. EQUIPMENT SHALL OPERATE QUIETLY AND WITHOUT OBJECTIONABLE VIBRATION FROM EQUIPMENT. VIBRATION FROM EQUIPMENT OPERATING AT OPTIMUM CONDITIONS, SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE ELIMINATED AT THE DIRECTION OF THE ARCHITECT.

B. INSTALL EQUIPMENT TO PROVIDE GOOD APPEARANCE, EASY ACCESS, AND ADEQUATE SPACE TO ALLOW REPLACEMENT AND MAINTENANCE. PROVIDE BASES, SUPPORTS, ANCHOR BOLTS, AND OTHER ITEMS REQUIRED TO ACHIEVE THIS. INSTALLATION SHALL BE LEVEL, ABOVE MOISTURE LEVEL, AND ADEQUATELY BRACED.

C. THOROUGHLY LUBRICATE EQUIPMENT BEFORE OPERATING. REPAIR OF DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

D. CONNECTIONS TO PIPING SHALL BE SECURED AND PROPERLY ALIGNED AND ALL UTILITY AND CONTROL CONNECTIONS SHALL BE PROPERLY ISOLATED FROM THE BUILDING STRUCTURE BY MEANS OF VIBRATION ISOLATORS AND FLEXIBLE CONNECTIONS. ANY EQUIPMENT NOT MEETING THIS REQUIREMENT WILL BE MODIFIED AND REINSTALLED AT NO EXPENSE TO THE OWNER.

E. MOVE EQUIPMENT INTO BUILDING THROUGH AVAILABLE OPENINGS. DISMANTLE EQUIPMENT WHERE NECESSARY TO ACCOMPLISH THIS. AFTER REASSEMBLY, TEST EQUIPMENT TO VERIFY ITS SATISFACTORY OPERATING CONDITION.

3.3 DUCTWORK

A. ALL DUCTWORK SHALL BE INSTALLED WITHIN SPACES PROVIDED WHERE POSSIBLE. DUCTS SHALL BE INSTALLED TRUE TO LINE AND GRADE, FULLY SECURED TO STRUCTURAL FAMING WITH SPECIFIED HANGERS AND SUPPORTS, INSULATED, AND VIBRATION ISOLATED, WHERE REQUIRED.

B. EACH SECTION OF SUPPLY AIR DUCTWORK SHALL BE CLEANED AT THE SHOP, DUST AND OIL FREE, USING A DEGREASING AGENT AND DETERGENT AND SEALED AIRTIGHT AT BOTH ENDS WITH VISQUEEN AND TAPE. SUPPLY DUCTS SHALL BE ADDITIONALLY CLEANED WITH A DISINFECTING SOLUTION. ENDS OF ALL SUPPLY AND INTERNALLY INSULATED EXHAUST DUSTS SHALL BE KEPT SEALED UNTIL THE TIME THEY ARE JOINTED. WHEN DUCT SECTIONS ARE JOINED, Wipe DOWN ALL INTERIOR SURFACES WITH A CLEAN TACK CLOTH. IF TACK CLOTH SHOWS ANY DUST, THEN RE-CLEAN DUCT AS DESCRIBED ABOVE. THE INTENT IS THAT NO FOREIGN MATTER BE ALLOWED TO ENTER THE DUCTWORK AT ANY TIME AFTER FACTORY CLEANING AND DURING CONSTRUCTION.

3.4 CONTROLS

A. THIS CONTRACTOR SHALL PROVIDE ALL REQUIRED CONTROL COMPONENTS, INCLUDING BUT NOT LIMITED TO THERMOSTATS, TEMPERATURE SENSORS, STATIC PRESSURE SENSORS, HUMIDITY SENSORS, DAMPER ACTUATORS, VALVE ACTUATORS, UNITARY CONTROLLERS, RELAYS, AND LOW-VOLTAGE WIRING, SUCH THAT THE OWNER IS PROVIDED WITH A FULLY FUNCTIONAL CONTROL SYSTEM.

B. WHERE WORK IS PERFORMED IN AN EXISTING BUILDING, THIS CONTRACTOR SHALL INTEGRATE ALL CONTROL MODIFICATIONS INTO THE EXISTING BUILDING CONTROL SYSTEM, IF APPLICABLE. SPECIFIC REQUIREMENTS SHALL BE COORDINATED WITH OWNER AND APPROVED BY ARCHITECT PRIOR TO INSTALLATION.

C. INSTALLATION OF THE SYSTEM SHALL BE MADE UNDER THE SUPERVISION OF THE MANUFACTURER OF THE EQUIPMENT, OR HIS FACTORY AUTHORIZED REPRESENTATIVE.

D. ROOM THERMOSTATS SHALL BE INSTALLED IN THE LOCATIONS INDICATED ON THE CONTRACT DRAWINGS. FINAL LOCATIONS SHALL BE COORDINATED WITH OWNER'S MAINTENANCE PERSONNEL AND SHALL BE INSTALLED IN LOCATIONS WHICH SHALL PROVIDE REPRESENTATIVE TEMPERATURES FOR THE ADJACENT AREAS.

E. LOW VOLTAGE CONTROL WIRING AND CONDUIT SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF DIVISION 26.

3.5 INSULATION

A. EXTERIOR DUCTWORK:

- 1. THE INSULATION SHALL BE CUT LONGER THAN THE PERIMETER OF THE DUCT TO PROVIDE 2" STAPLE LAP AND MINIMUM COMPRESSION AT THE CORNERS. ALL JOINTS SHALL BE LAPPED 2" AND STAPLED WITH OUTWARD CLINCHING STAPLES 2" ON CENTER. THE INSULATION SHALL BE MECHANICALLY FASTENED TO THE UNDERSIDE OF ALL DUCTS 24" WIDE OR MORE USING CUP-HEAD PINS, WELD PINS, OR STICK PINS WITH SPEED CLIPS 18" ON CENTER. ALL JOINTS AND PENETRATIONS OF THE VAPOR BARRIER JACKET SHALL BE SEALED WITH A MINIMUM 3" WIDE MATCHING PRESSURE SENSITIVE TAPE. PRESSURE-SENSITIVE TAPE SHALL BE FIRMLY RUBBED IN PLACE IMMEDIATELY AFTER APPLICATION USING A "SQUEEGEE" TYPE TOOL. WHEN A JOINT SEAL IS REQUIRED, TWO COATS OF VAPOR RETARDER MASTIC REINFORCED WITH ONE LAYER OF 1" WIDE, OPEN WEAVE GLASS FABRIC MAY BE USED IN LIEU OF PRESSURE-SENSITIVE TAPE. MASTIC SHALL BE BRUSHED ONTO JOINT AND GLASS FABRIC UNTIL THE FABRIC IS FILLED. MASTICS SHALL BE APPLIED IN ACCORDANCE WITH APPLICATION INSTRUCTIONS ON THE CONTAINER.

C. REFRIGERANT PIPING

1. THE INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL JOINTS AND SEAMS SHALL BE SEALED WITH WATERPROOF VAPOR RETARDANT ADHESIVE. ALL PIPES EXPOSED TO THE WEATHER SHALL BE COATED WITH ALUMINUM JACKETING TO PROTECT THE UNDERLAYER FROM UV RADIATION IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS.

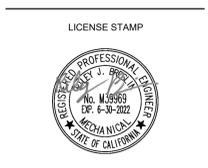
3.6 TEST, INSPECTIONS

A. MAKE ALL NECESSARY CONTROL ADJUSTMENTS AND BALANCING OF AIR AND WATER FLOWS. OPERATE THE ENTIRE SYSTEM FOR A PERIOD OF TIME NOT LESS THAN THREE (3) WORKING DAYS FOR THE PURPOSE OF PROVING SATISFACTORY PERFORMANCE. DURING THIS PERIOD, INSTRUCT SUCH PERSONS AS THE OWNER AND/OR ARCHITECT MAY DESIGNATE IN THE PROPER OPERATION OF THE SYSTEMS. SHOULD FURTHER ADJUSTMENT PROVE NECESSARY, OPERATING TESTS SHALL BE REPEATED UNTIL A SATISFACTORY TEST IS OBTAINED.

B. THIS CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY WORK OF THIS SECTION TO BE COVERED OR ENCLOSED UNTIL IT HAS BEEN INSPECTED, TESTED, AND APPROVED BY THE ARCHITECT AND THE AUTHORITIES HAVING JURISDICTION OVER THE WORK. SHOULD ANY OF THIS WORK BE ENCLOSED OR COVERED UP BEFORE SUCH INSPECTION, TESTING, AND APPROVAL, THIS CONTRACTOR SHALL UNCOVER THE WORK, HAVE THE NECESSARY INSPECTION TESTS, AND APPROVALS MADE AND, AT NO EXPENSE TO THE OWNER, MAKE ALL REPAIRS NECESSARY TO RESTORE BOTH HIS WORK AND THAT OF OTHER CONTRACTORS WHICH MAY HAVE BEEN DAMAGED TO BE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.



2727 Sochell Lane, Redding, CA 96002
Ph: (530) 232-6160 www.frontierce.com



KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY IT BUILDING

825 5TH STREET EUREKA, CA 95501

Table with columns: NO., REVISIONS, DATE

Table with columns: NO., REVISIONS, DATE (empty rows)

SHEET TITLE

MECHANICAL SPECIFICATIONS

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE: 6/09/2022
DRAWN BY: TA
REVIEWED BY: RB
SCALE:
PROJECT NO: 22008

END OF SECTION

M101









