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SCHEDULE OF MATERIALS IS PROVIDED AS AN ADDENDUM TO THE CONTRACT DOCUMENTS.

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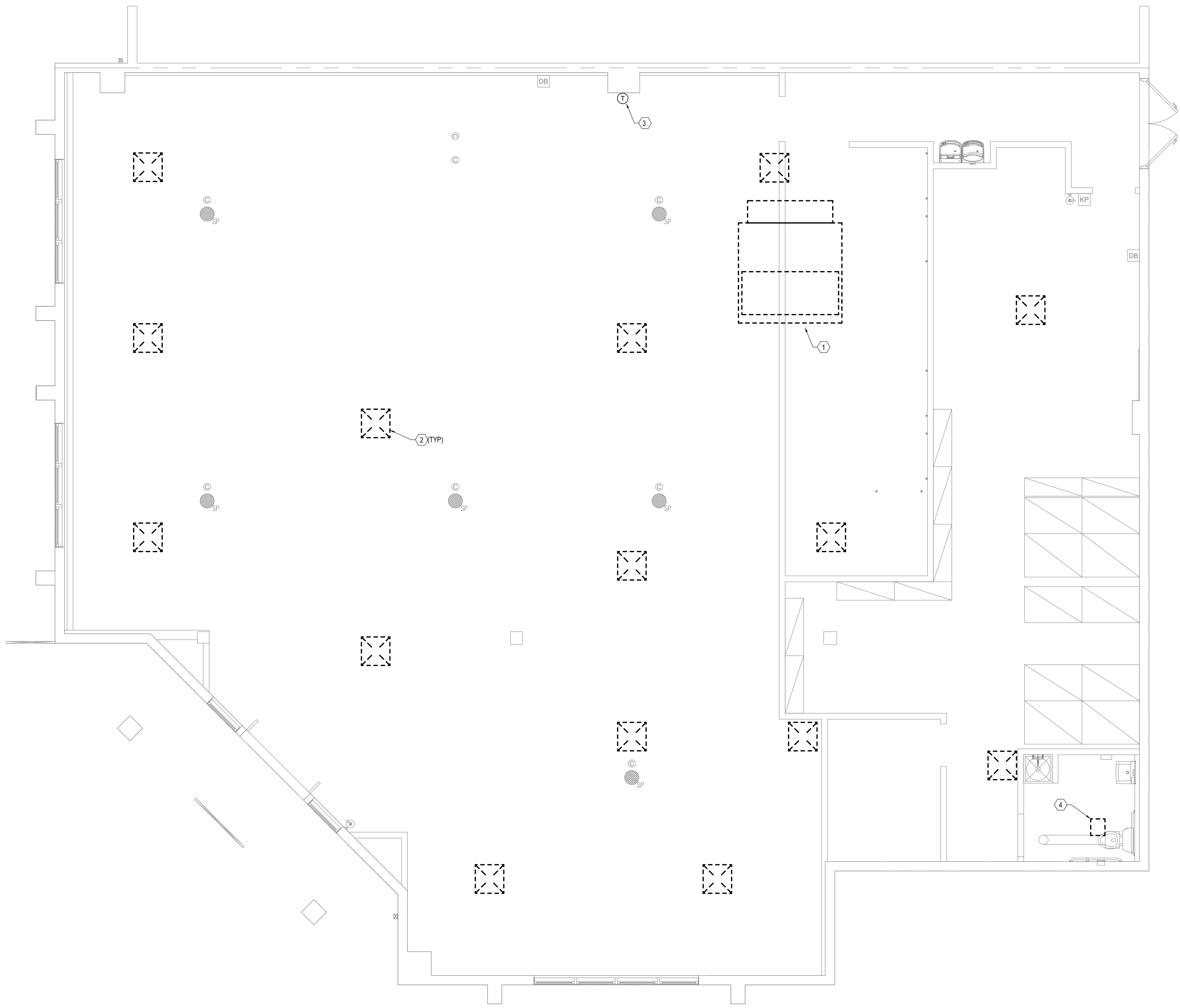
**FOLSOM PREMIUM OUTLETS**  
STORE # 4045  
13000 FOLSOM BLVD SUITE #407  
FOLSOM, CA 95630

REV	DATE	DESCRIPTION

DATE: 2024/04/22  
SCALE: AS NOTED  
DRAWN BY: RT  
REVIEWED BY: KL  
PROJECT NUMBER: JCF-105

SHEET TITLE:  
**DEMO MECHANICAL PLAN**  
SHEET NUMBER:  
**M-050**

- MECHANICAL DEMOLITION KEY NOTES**
- ① REMOVE EXISTING ROOF TOP UNIT, RTU-1, ALONG WITH ITS ASSOCIATED DUCTWORK, AIR OUTLETS, HANGER AND SUPPORT AND CONTROLS IN ITS ENTIRETY. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF THE UNIT AND EXTENT OF THE REMOVAL SCOPE OF WORK PRIOR TO BID.
  - ② REMOVE EXISTING SUPPLY AIR DIFFUSER/GRILLE AND ASSOCIATED BRANCH DUCTWORK, CEILING SUPPORT AND HANGER. REMOVE ALL DUCTWORK. EXISTING CONDITIONS/ASBUILTS DRAWINGS WERE NOT AVAILABLE AT THE MOMENT AND NOT SHOWN AT THE PLANS. CONTRACTOR TO FIELD VERIFY EXACT EXISTING DUCTWORK SIZES, ROUTING AND LOCATION AND THE EXTENT OF REMOVAL SCOPE OF WORK PRIOR TO BID.
  - ③ EXISTING WALL MOUNTED THERMOSTAT TO BE REMOVED.
  - ④ REMOVE EXISTING EXHAUST SYSTEMS AND ALL ASSOCIATED DUCT WORK AND GRILLS. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF THE UNIT AND EXTENT OF THE REMOVAL SCOPE OF WORK PRIOR TO BID.



① **MECHANICAL DEMOLITION PLAN**  
SCALE: 1/4" = 1'-0"

### ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)

MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	SUPPLY FAN					COOLING COIL										GAS FIRED HEAT EXCHANGER					WEIGHT (LBS)	NOTES											
					FAN TYPE	CFM	ESP (IN)	TSP (IN)	BHP (HP)	NOM HP (HP)	VFD (Y/N)	TH (IN)	SH (IN)	EAT (°F DB)	LAT (°F DB)	REFR TYPE	MIN EFF (%)	MIN NO STAGES	MAX VEL (FPM)	MIN OUT (IN)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)			REFR TYPE	MIN NO STAGES	MAX VEL (FPM)								
RTU-1	LENNOX	LG1564M	13	SINGLE ZONE VAV	FC	5,800	0.8	0.94	2.77	3.0	N	150.8	143	79.1	64.7	56.6	56.1	R410A	12	15.5	3	550	292	380	81	56.8	103.2	2	600	940	795	209/3	66	90	NF	2261	A-Q

MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

- REFER TO ROOFTOP UNIT CONTROL MATRIX FOR ADDITIONAL UNIT FEATURES, COMPONENTS, MODULES, ACCESSORIES, AND CONTROLS THAT SHALL BE PROVIDED WITH THE EQUIPMENT.
- EQUIPMENT SIZED FOR 105°F AMBIENT TEMPERATURE.
- PROVIDE 2" MERV 13, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
- DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
- STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
- PROVIDE SINGLE POINT POWER CONNECTION.
- COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
- PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR VENT AND DAMPER LOCATIONS WHEN IN USE.
- SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
- SPECIFIED FAN TSP INCLUDES EXTERNAL DUCT AND INTERNAL FILTER COIL, AND CASING LOSSES. FILTER LOSS IS AT A MAXIMUM OF 430 FPM FACE VELOCITY.
- PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
- PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE.
- COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
- SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT.
- COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
- PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
- PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
- ABS. MIN. Q/A IS THE ABSOLUTE MINIMUM OUTSIDE AIR CFM USING VENTILATION RESET OR DEMAND CONTROL VENTILATION.

### OUTSIDE AIR REQUIREMENTS, 2022 CEC

SYSTEM DESIGNATION	SYSTEM TYPE	SINGLE-ZONE SYSTEMS ONLY		FLOOR AREA SERVED BY SYSTEM [Aq] (SF)	SYSTEM AVERAGED AREA-BASED OUTDOOR AIR RATE (CFM/SF)	SYSTEM POPULATION [P] (PEOPLE)	SYSTEM AVERAGED PEOPLE-BASED OUTDOOR AIR RATE (CFM/P)	RATE THAT SETS MAXIMUM AIRFLOW	REQUIRED OA INTAKE FLOW [Vol] (CFM)	DESIGN OA INTAKE FLOW [Vol] (CFM)	REQUIRED DCV OA INTAKE FLOW [Vol] (CFM)	NOTES
		VENTILATION ZONE ASSOCIATED WITH SYSTEM	VENTILATION ZONE ASSOCIATED WITH SYSTEM									
RTU-1	MULTIZONE (RTU-1)			4,090	0.23	95	16.6	EVALUATED AT ZONE LEVEL	931	940	791	A

GENERAL NOTES:

- VENTILATION CALCULATIONS BASED ON 2022 CALIFORNIA ENERGY CODE.
- SYSTEM POPULATIONS BASED ON MAX SEATING AND/OR CODE MAXIMUM VALUES.
- SINGLE-ZONE SYSTEMS (Vol < V<sub>o2</sub>): SYSTEM VENTILATION EFFICIENCY CALCULATION IS NOT REQUIRED FOR SINGLE-ZONE SYSTEMS. CALCULATION TAKES MAXIMUM OUTSIDE AIR FLOW REQUIRED BY THE CEC FOR THAT ZONE.

NOTES:

- VENTILATION AIR PROVIDED VIA OUTSIDE AIR INTAKE FROM ROOF TOP UNIT SERVING THE SPACE.

### FAN SCHEDULE

MARK	SERVICE DESCRIPTION	MANUFACTURER	MOUNTING	MODEL	CFM					DRIVE (BELT/DIRECT)	VFD (Y/N)	ELECTRICAL			WEIGHT (LBS)	NOTES
					CFM	ESP (IN)	BHP	NOM HP	FAN RPM			W/PH	DISC TYPE	STARTER TYPE		
EF-1	EXHAUST	GREENHECK	CEILING	SP-E200	150	0.7	0.03	0.25	980	DIRECT	N	115/1	NF	COMBINATION	10	A-F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURER IS THE BASIS FOR THE DESIGN.

NOTES:

- PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
- DIVISION 26 CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH.
- DIVISION 26 CONTRACTOR SHALL PROVIDE STARTER.
- PROVIDE WITH MANUFACTURER'S FAN SPEED CONTROLLER FOR BALANCING PURPOSES.
- PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.

### GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION TYPE	FACE TYPE	MOUNTING LOCATION	BORDER TYPE	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
CSD1	TITUS	SUPPLY	OMNI	STEEL	PLAQUE	CEILING	3	24x24	25	0.1	A, B, C, F, H
CRG1	TITUS	RETURN	OMNI	STEEL	PLAQUE	CEILING	3	24x24	17	0.13	B, C, F, H
DSG1	TITUS	SUPPLY	350FL	STEEL	PLAQUE	DUCT	--	REFER TO PLAN	25	0.1	D, E, F, G

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURER IS THE BASIS FOR THE DESIGN.

NOTES:

- 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
- NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
- BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
- FRONT BLADES PARALLEL TO LONG DIMENSION.
- DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE.
- FRAME TYPE TO MATCH CEILING WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING WALL PLAN.
- PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.
- PROVIDE BORDER TYPE TO MATCH CEILING CONSTRUCTION WITH CONCEALED BORDER MOUNTING AND INSULATED PLENUM BOX WITH NECK.

### AIR CURTAIN SCHEDULE

MARK	AREA SERVED	MANUFACTURER	MODEL	UNIT SPECS				ELECTRICAL	MAX SOUND (dBA)	NOTES	
				LENGTH (IN)	MAX AIRFLOW (CFM)	HEATING CAPACITY (KW)	FAN QTY				MOTOR (HP)
EAC-1	ENTRANCE	POWERED AIRE	ETA-2-72	72	2800	--	2	3/4	208/3	63 dBA	A-J

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

- EQUIPMENT PROVIDED BY DIVISION 23.
- MOUNT UNIT PER MANUFACTURER'S RECOMMENDATIONS TO FACE OF WALL OR DOOR FRAMING AND SUPPORT VERTICALLY.
- DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
- STARTER PROVIDED BY DIVISION 26 CONTRACTOR.
- REFER TO SEQUENCE OF OPERATION FOR UNIT CONTROLS.
- PROVIDE AIR CURTAIN WITH MAGNETIC NORMALLY CLOSED DOOR LIMIT SWITCH FOR INSTALLATION ON DOOR.
- PROVIDE WITH INTEGRAL THERMOSTAT.
- PROVIDE WITH TIME DELAY MICROSWITCH WITH ADJUSTABLE DELAY TIMERS PRE-MOUNTED IN THE AIR CURTAIN CONTROL PANEL.
- PROVIDE WITH POWDER COATED, COLOR AS SELECTED BY THE ARCHITECT FINISH.

### ROOFTOP UNIT CONTROL MATRIX

CONTROL FEATURE	UNITS	RTU-1 SETPOINT OR Y/N	NOTES
<b>SETPOINTS</b>			
COOLING - UNOCCUPIED SETPOINT	*F	75	
COOLING - OCCUPIED SETPOINT	*F	80	
DEAD BAND - MINIMUM HEATING AND COOLING TEMPERATURE SETPOINT DIFFERENCE	*F	5	
HEATING - OCCUPIED SETPOINT	*F	70	
HEATING - UNOCCUPIED SETPOINT	*F	60	
<b>PROGRAMMED CONTROL FEATURES</b>			
HVAC SYSTEM - OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT		Y	A
REMOTE TEMPERATURE SENSOR		N	A
DEMAND CONTROL VENTILATION - CO2 SENSOR FEEDBACK	PPM	1000	A
DEMAND LIMITING SEQUENCE		Y	B
<b>EQUIPMENT ACCESSORIES AND CONTROL MODULES</b>			
OUTSIDE AIR DAMPER - MOTOR OPERATED (MODULATING)		Y	G
INTEGRATED ECONOMIZER - DIFFERENTIAL ENTHALPY ENABLE (OR ENTHALPY < RH ENTHALPY)	BTU/LB	Y	C
ECONOMIZER FULLY DUCTED AND DUCTLESS (DD) SYSTEM		Y	D, E
RELIEF - VARIABLE VOLUME POWERED EXHAUST FAN	IN, W.C.	Y	F
COOLING COIL (DX - STAGED)		Y	H
HEATING COIL (NATURAL GAS)		Y	H
<b>SUPPLY FAN CONTROL METRICS</b>			
ON DURING OCCUPIED HOURS		Y	
OPTIMUM START SEQUENCE		Y	K
VARIABLE VOLUME - MODULATE FAN SPEED IN RESPONSE TO ZONE TEMPERATURE		N	H, J
<b>SAFETIES, INTERLOCKS, AND ALARMS</b>			
GAS VALVE SAFETY		Y	D
SUPPLY AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	A
RETURN AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	A
EXTERIOR OPENING INTERLOCK (WINDOW, DOOR, WALL, OR ROOF)		Y	L

DIV. 23 CONTRACTOR SHALL PROVIDE CONTROL PANEL(S), WIRING, THERMOSTAT(S), TEMPERATURE SENSOR(S), HUMIDISTAT(S), AND/OR CO2 SENSOR(S) WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO FACILITATE THE SCHEDULED CONTROL MODULES AND SEQUENCES OF OPERATION. EACH UNIT SHALL CONTROL BASED ON ITS OWN INTERNAL SAFETIES, TIME DELAYS AND SEQUENCES UNLESS NOTED OTHERWISE. COORDINATE WITH OWNER/FINAL BUILDING AND EQUIPMENT MANUFACTURER TO SCHEDULE DURING STARTUP. REFERENCE DIVISION SPECIFICATIONS FOR INDIVIDUAL DEVICE REQUIREMENTS.

NOTES:

- DIVISION 23 CONTRACTOR SHALL PROVIDE DEVICE.
- UPON RECEIPT OF SIGNAL TO TRIM ELECTRICAL DEMAND, THE COOLING TEMPERATURE SETPOINT SHALL RESET UP BY A MINIMUM OF 4°F (ADJ.). THE HEATING TEMPERATURE SETPOINT SHALL RESET DOWN BY A MINIMUM OF 4 DEG. F OR MORE (ADJ.).
- IF SETPOINT VALUE IS LISTED, IT INDICATES ECONOMIZER HIGH-LIMIT SHUTOFF. UNIT SHALL BE IN ECONOMIZER IF CONDITIONS ARE LESS THAN SETPOINT. THE FOLLOWING SENSORS SHALL DETERMINE ECONOMIZER ON/OFF: OUTSIDE AIR TEMPERATURE, DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE. RETURN AIR TEMPERATURE, DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE. OUTSIDE AIR HUMIDITY, DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE. RETURN AIR HUMIDITY, DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
- DEVICE SHALL BE FACTORY MOUNTED AND PRE-WIRED FOR OPERATION SUBJECT TO THE ONBOARD CONTROLLER.
- PROVIDE UNIT WITH AN FDD SYSTEM CONSISTING OF PERMANENTLY INSTALLED OUTSIDE AIR SUPPLY AIR AND RETURN AIR TEMPERATURE SENSORS. THE UNIT CONTROLLER SHALL AT A MINIMUM BE CAPABLE OF PROVIDING SYSTEM STATUS OF ECONOMIZER, COMPRESSOR, HEATING, MIXED AIRFLOW LIMIT ALARM, AND SENSOR VALUES. EACH OPERATING MODE SHALL BE CAPABLE OF INDEPENDENTLY OPERATING FOR TESTING. THE SYSTEM SHALL REPORT FAULTS TO AN APPLICATION ACCESSIBLE BY SERVICE PERSONNEL. THE FOLLOWING FAULTS SHALL BE DETECTED: AIR TEMPERATURE SENSOR FAILURE, ECONOMIZER ENABLED/DISABLED WHEN ECONOMIZER SHOULD BE OFF ON, RESPECTIVELY, DAMPER NOT MODULATING, AND EXCESS OUTSIDE AIR.
- POWERED EXHAUST FAN SHALL STAGE ON AND OFF ACCORDING TO DAMPER POSITION.
- EQUIPMENT MANUFACTURER SHALL PROVIDE MODULATING DAMPER AND CONTROLS CAPABLE OF ADJUSTING THE DAMPER POSITION TO MAINTAIN THE SCHEDULED OUTSIDE AIR ON THE DRAWINGS ACROSS ALL FAN SPEEDS. DIV. 23 CONTRACTOR SHALL PROGRAM MULTIPLE DAMPER POSITION SETPOINTS IN THE FIELD DURING TESTING AND BALANCING TO MAINTAIN MINIMUM VENTILATION WHEN NOT IN ECONOMIZER. DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.
- UNITARY CONTROLLER SHALL MODULATE AND/OR CYCLE SUPPLY FAN SPEED SETTING AND COIL CAPACITY STAGES SUBJECT TO THE INTERNAL SAFETIES AND SEQUENCES TO MAINTAIN SCHEDULED SETPOINTS.
- PROVIDE MODULATING FAN CONTROL WITH MINIMUM SPEED LESS THAN 50% OF FULL SPEED. AT MINIMUM SPEED THE FAN SHALL DRAW NO MORE THAN 30% OF FULL SPEED POWER.
- DURING OPTIMUM START SEQUENCE THE UNIT SHALL SUPPLY THE LESSER OF THE MINIMUM RATE OF OUTDOOR AIR OR SUPPLY 3 COMPLETE AIR CHANGES DURING THE 1-HOUR PERIOD BEFORE NORMAL OCCUPIED MODE.
- PROVIDE INTERLOCK TO OVERRIDE ZONE SETPOINT TO 90 DEGREE F COOLING AND 55 DEGREE F HEATING. SETPOINT CHANGE SHALL OCCUR AFTER 5 MINUTES OF EXTERIOR OPENING BEING OPENED.



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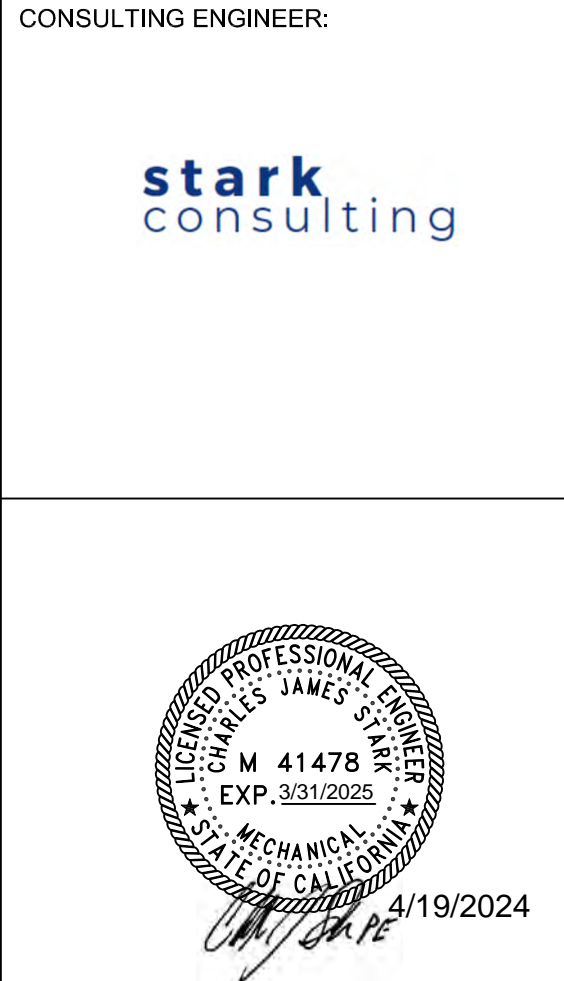
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**FOLSOM PREMIUM OUTLETS**

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DATE: 2024/04/22  
SCALE: AS NOTED  
DRAWN BY: RT  
REVIEWED BY: KL  
PROJECT NUMBER: JCF-105  
SHEET TITLE: MECHANICAL SCHEDULES  
SHEET NUMBER: M-300

HEATING, VENTILATING, AND AIR CONDITIONING SPECIFICATIONS

PART 1 GENERAL INSTRUCTIONS

1.01 GENERAL REQUIREMENTS

ALL REQUIREMENTS UNDER DIVISION 01 AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION, WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF DIVISION 01. THIS REFERENCE INCLUDES SPECIFICATIONS, NOTES, AND SUPPLEMENTARY CONDITIONS, AND TO REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION, OR BOTH, WORK REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION SERVICES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE THE FUNCTION OF EACH SYSTEM AS IMPLIED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.

THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND ANY PORTION OF WORK DESCRIBED IN ONE SHALL BE PROVIDED AS DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCY, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.

DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UNLESS OTHERWISE NOTED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIPS, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY COMPLY WITH THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE SYSTEMS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER INSTALLATION REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT WORK TO IDENTIFY THAT MATERIALS AND EQUIPMENT WILL FIT INTO THE DESIGNATED SPACES, AND WHICH WHEN INSTALLED PER MANUFACTURERS' REQUIREMENTS WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY, AND PROPERLY OPERATING SYSTEM.

1.02 DEFINITIONS

DEFINITIONS: REFERENCES CONTAINED IN THIS SPECIFICATION FOLLOW THE NUMBERING SYSTEM DEFINED IN THE CONSTRUCTION SPECIFICATIONS INSTITUTE (CSI) MASTERFORMAT 2004 EDITION. SPECIFICATION DIVISIONS 01 THROUGH 13 PROVIDED WITH THIS PROJECT MAY REFERENCE THE CSI MASTERFORMAT 1995 EDITION. THE CORRESPONDING DIVISION REFERENCES BETWEEN THE 2004 EDITION AND THE 1995 EDITION ARE AS FOLLOWS:

Table with 2 columns: 2004 Edition and 1995 Edition. Rows include: 1. DIVISION 05 - MECHANICAL PRESSURE, DIVISION 15 DIVISION 22 - PLUMBING, DIVISION 23 - HVAC, DIVISION 24 - ELECTRICAL, DIVISION 27 - COMMUNICATIONS, DIVISION 28 - ELECTRONIC SAFETY AND SECURITY.

FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS.

INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE INCLUDING, BUT NOT LIMITED TO, THE ACTUAL UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, SPRING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP, AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.

PROVIDE: TO FURNISH AND INSTALL.

FURNISHED BY OWNER (OR OWNER FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE AND READY FOR INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION, INCLUDE THE INSTALLATION UNDER THE WARRANTY PROVIDED BY THIS DIVISION.

ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS, WHEN USED IN THIS DIVISION, ENGINEER MEANS INCREASED INVOLVEMENT BY AND OBLIGATIONS TO THE ENGINEER, IN ADDITION TO INVOLVEMENT BY AND OBLIGATIONS TO THE ARCHITECT.

AHJ: THE LOCAL CODE AND/OR MECHANICAL AUTHORITY HAVING JURISDICTION OVER THE WORK.

NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 29 CFR 1910.7 (E.G., UL, ETC., CSA, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT. NATIONALLY RECOGNIZED TESTING LABORATORIES AND STANDARDS LISTED ARE USED ONLY TO REPRESENT THE CHARACTERISTICS REQUIRED AND ARE NOT INTENDED TO RESTRICT THE USE OF OTHER NRTLs THAT ARE ACCEPTABLE TO THE AHJ AND STANDARDS THAT MEET THE SPECIFIED CRITERIA.

SUBSTITUTION: CHANGES IN PRODUCTS, MATERIALS, EQUIPMENT, AND METHODS OF CONSTRUCTION FROM THOSE REQUIRED BY THE CONTRACT DOCUMENTS AND PROPOSED BY CONTRACTOR. SUBSTITUTIONS INCLUDE VALUE ENGINEERING PROPOSALS. SUBSTITUTIONS FOR EQUIPMENT SHALL BE APPROVED BY THE ARCHITECT. SUBSTITUTIONS FOR MATERIALS SHALL BE APPROVED BY THE ARCHITECT. SUBSTITUTIONS FOR METHODS OF CONSTRUCTION SHALL BE APPROVED BY THE ARCHITECT. SUBSTITUTIONS SHALL BE APPROVED BY THE ARCHITECT. SUBSTITUTIONS SHALL BE APPROVED BY THE ARCHITECT. SUBSTITUTIONS SHALL BE APPROVED BY THE ARCHITECT.

THE TERMS "APPROVED EQUIVALENT," "EQUIVALENT," OR "EQ" ARE USED SYNONYMOUSLY, AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED." THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

1.03 PREBID SITE VISIT

PRIOR TO SUBMITTING BID, VISIT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

1.04 MATERIAL AND WORKMANSHIP

PROVIDE NEW MATERIAL, EQUIPMENT, AND APPARATUS UNDER THIS CONTRACT UNLESS OTHERWISE STATED HEREIN, OF BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE, AND FREE FROM DEFECTS. INSTALL MATERIAL AND EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE MANUFACTURER'S LITERATURE, THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT NECESSARILY INTENDED TO DESIGNATE THE REQUIRED TRIM. WRITTEN DESCRIPTIONS OF THE TRIM GOVERN MODEL NUMBERS.

PIPE, PIPE FITTINGS, PIPE SPECIALTIES AND VALVES SHALL BE MANUFACTURED IN PLANTS LOCATED IN THE UNITED STATES OR CERTIFIED TO MEET THE SPECIFIED ASTM AND ANSI STANDARDS.

WORK PERFORMED UNDER THIS CONTRACT SHALL PROVIDE A NEAT AND "WORKMANLIKE" APPEARANCE WHEN COMPLETED, TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORKMANSHIP SHALL BE THE FIRST PRIORITY BY EXPERIENCED MECHANICS. INSTALLATION SHALL COMPLY WITH APPLICABLE CODES AND LAWS.

THE COMPLETE INSTALLATION SHALL FUNCTION AS DESIGNED AND INTENDED WITH RESPECT TO EFFICIENCY, CAPACITY, NOISE LEVEL, ETC. ABNORMAL NOISE CAUSED BY RATTING EQUIPMENT, PIPING, DUCTS, AIR DEVICES, AND SQUEAKS IN NOCTURNAL COMPONENTS SHALL NOT BE ACCEPTABLE. MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY, LIGHT DUTY AND RESIDENTIAL GRADE EQUIPMENT SHALL NOT BE ACCEPTED UNLESS OTHERWISE INDICATED.

REMOVE FROM THE PREMISES WASTE MATERIAL PRESENT AS A RESULT OF WORK, INCLUDING CORTICES, CRATING, PAPER, STICKERS, AND EXCESSIVE MATERIAL, NOT REUSE OR RECYCLE MATERIAL, AND CLEAN EQUIPMENT INSTALLED UNDER THIS CONTRACT TO PRESENT A NEAT AND CLEAN INSTALLATION AT THE TERMINATION OF THE WORK.

REPAIR OR REPLACE PUBLIC AND PRIVATE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT TO THE SATISFACTION OF AUTHORITIES AND REGULATIONS HAVING JURISDICTION. PROVIDE ALL SAFETY LIGHTS, GUARDS, AND WARNING SIGNS REQUIRED FOR THE PERFORMANCE OF THE WORK AND FOR THE SAFETY OF THE PUBLIC.

1.05 MANUFACTURERS

IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.

WHERE A LIST IS PROVIDED, MANUFACTURERS ARE LISTED ALPHABETICALLY AND NOT IN ACCORDANCE WITH ANY RANKING OR PREFERENCE.

WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

1.06 COORDINATION

COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS ARE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.

UNLESS OTHERWISE INDICATED, THE OWNER, CONTRACTOR SHALL PROVIDE CHANGES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH THE NECESSARY INFORMATION AND DRAWINGS TO IDENTIFY THE LOCATION AND SIZE OF EACH OPENING. CONTRACTOR SHALL BE INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT AND SHALL EXECUTE WORK IN A MANNER AS NOT TO INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.

FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING AS VARIATIONS MAY OCCUR. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.

PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.

1.07 ORDINANCES AND CODES

WORK PERFORMED UNDER THIS CONTRACT SHALL, AT A MINIMUM, BE IN CONFORMANCE WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES HAVING JURISDICTION. EQUIPMENT FURNISHED AND ASSOCIATED INSTALLATION WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN STRICT COMPLIANCE WITH CURRENT APPLICABLE CODES ADOPTED BY THE LOCAL AHJ, INCLUDING ANY AMENDMENTS AND STANDARDS AS SET FORTH BY THE FOLLOWING:

- 1. NATIONAL ELECTRICAL CODE (NEC)
2. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
3. UNDERWRITERS LABORATORIES (UL)
4. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
5. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
6. AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR CONDITIONING ENGINEERS (ASHRAE)
7. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
8. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM)
9. OTHER NATIONAL STANDARDS WHERE APPLICABLE

WHERE THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE REFERENCED CODES, STANDARDS, ETC., THE CONTRACT DOCUMENTS SHALL GOVERN. WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT.

PROMPTLY BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE ATTENTION OF THE ARCHITECT AND ENGINEER FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW.

PROCURE AND PAY FOR PERMITS AND LICENSES REQUIRED FOR THE ACCOMPLISHMENT OF THE WORK HEREIN DESCRIBED, WHERE REQUIRED, OBTAIN, PAY FOR, AND FURNISH CERTIFICATES OF INSPECTION TO OWNER.

1.08 PROTECTION OF EQUIPMENT AND MATERIALS

STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE. FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMPNESS, OR TEMPERATURE VARIATIONS, STORE INSIDE IN CONTAINERS. FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO SUCH CONDITIONS, STORE OUTDOOR WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DUST, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. REPEL INSULATION THAT HAS BECOME WET AT ANY TIME DURING CONSTRUCTION. DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ALL CRACKS OR JOINTS OF INTERIOR INSULATION. INSULATION EQUIPMENT AND MATERIAL DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REJECTED AND CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND AT HIS OWN EXPENSE.

KEEP PREMISES BECOMING CLEAN OF FOREIGN MATERIAL, CREATED DURING WORK PERFORMED UNDER THIS CONTRACT. PIPING, EQUIPMENT, ETC. SHALL HAVE A NEAT AND CLEAN APPEARANCE AT THE TERMINATION OF THE WORK. REMOVE DEBRIS FROM CEILING/STAIR AREA FLOOR, INCLUDING DUST.

PLUG, SEAL, OR CAP OPEN ENDS OF DUCTWORK AND PIPING SYSTEMS WHILE STORED AND INSTALLED DURING CONSTRUCTION WHEN NOT IN USE TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS. REMOVE TEMPORARY PROTECTION PRIOR TO STARTING EQUIPMENT AND TURNING THE SYSTEM OVER TO THE OWNER.

1.09 SUBSTITUTIONS

MATERIALS, PRODUCTS, EQUIPMENT, AND SYSTEMS DESCRIBED IN THE BIDDING DOCUMENTS ESTABLISH A STANDARD OF REQUIRED FUNCTION, DIMENSION, APPEARANCE AND QUALITY TO BE MET BY THE PROPOSED SUBSTITUTION. THE BASE BID SHALL INCLUDE ONLY THE PRODUCTS FROM MANUFACTURERS SPECIFICALLY NAMED IN THE DRAWINGS AND SPECIFICATIONS. CERTIFIED EQUIPMENT SHALL BE SUBSTITUTION REQUEST FORM FROM THE ARCHITECT OR ENGINEER, COMPLETE AND SEND THE SUBSTITUTION REQUEST FORM FOR EACH MATERIAL, PRODUCT, EQUIPMENT, OR SYSTEM THAT IS PROPOSED TO BE SUBSTITUTED. THE BURDEN OF PROOF OF THE MERIT OF THE PROPOSED SUBSTITUTION UPON THE PROPOSER.

UNLESS STATED OTHERWISE IN WRITING TO THE ENGINEER BY THE CONTRACTOR, CONTRACTOR WARRANTS TO THE ENGINEER, ARCHITECT, AND OWNER THE FOLLOWING:

- 1. PROPOSED SUBSTITUTIONS WILL BE FULLY INVESTIGATED AND DETERMINED TO MEET OR EXCEED THE SPECIFIED WORK IN ALL RESPECTS UNLESS STATED OTHERWISE IN THE SUBSTITUTION REQUEST.
2. PROPOSED SUBSTITUTIONS WILL BE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS AND WILL, PROVIDED INDICATED RESULTS, INCLUDING FUNCTIONAL CLEARANCES, MAINTENANCE SERVICE, AND SOURCING OF REPLACEMENT PARTS.
3. PROPOSED SUBSTITUTION HAS RECEIVED NECESSARY APPROVALS OF AUTHORITIES HAVING JURISDICTION.
4. SUBSTITUTIONS WILL BE FURNISHED FOR PROPOSED SUBSTITUTIONS FOR SPECIFIED WORK.
5. IF ACCEPTED SUBSTITUTIONS FAIL TO PERFORM AS REQUIRED, CONTRACTOR SHALL REPLACE SUBSTITUTE MATERIAL OR SYSTEM WITH THAT ORIGINALLY SPECIFIED AND BEAR COSTS INCURRED THEREBY.
6. GENERAL ENGINEERING, DESIGN AND CHANGES IN THE WORK AS NECESSARY FOR ACCEPTED SUBSTITUTION WILL BE COMPLETE IN ALL RESPECTS.

NO SUBSTITUTIONS WILL BE CONSIDERED UNLESS THE SUBSTITUTION REQUEST FORM IS COMPLETED AND ATTACHED WITH THE APPROPRIATE SUBSTITUTION DOCUMENTATION. NO SUBSTITUTION WILL BE CONSIDERED PRIOR TO RECEIPT OF BID UNLESS WRITTEN REQUEST FOR APPROVAL TO DO SO HAS BEEN RECEIVED BY THE ENGINEER AT LEAST TEN (10) CALENDAR DAYS PRIOR TO THE DATE OF THE FIRST OPENING OF BIDS.

IF THE PROPOSED SUBSTITUTION IS APPROVED PRIOR TO RECEIPT OF BIDS, SUCH APPROVAL WILL BE STATED IN AN ADDENDUM. BIDDERS SHALL BE FULLY ADVISED THAT SUCH APPROVAL WILL BE GIVEN. NO SUBSTITUTIONS WILL BE CONSIDERED AFTER THE CONTRACT IS AWARDED UNLESS SPECIFICALLY PROVIDED IN THE CONTRACT DOCUMENTS.

1.10 SUBMITTALS

ASSEMBLE AND SUBMIT FOR REVIEW SHOP DRAWINGS, MATERIAL LISTS, MANUFACTURER PRODUCT LITERATURE FOR EQUIPMENT TO BE FURNISHED, AND ITEMS REQUIRED COORDINATION BETWEEN CONTRACTORS UNDER THIS CONTRACT. PROVIDE SUBMITTALS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE DESIGN CONCEPT. REFER TO THE DESIGN CONCEPT, PARTS LIST, MATERIALS, FINISHES, WIRING DIAGRAMS, ELECTRICAL REQUIREMENTS AND DEVIATIONS FROM THE SPECIFIED EQUIPMENT OR MATERIALS FOR EQUIPMENT WITH MOTOR STARTERS OR VFDs. INCLUDE SHORT CIRCUIT CALCULATIONS FOR ALL IMPULSED LOAD ITEMS. SHOP DRAWINGS WILL BE RETURNED WITHOUT REVIEW IF THE ABOVE MENTIONED REQUIREMENTS ARE NOT MET.

TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW FOR TWO WEEKS ENGINEER REVIEW TIME, PLUS TIME FOR MAILING TIME VIA THE ARCHITECT, PLUS A DUPLICATION OF THIS TIME FOR RESUBMITTAL IF REQUIRED. ONLY THE SUBMITTALS THAT THE ARCHITECT HAS REVIEWED FOR RESUBMITTAL.

SUBMITTALS SHALL CONTAIN THE PROJECT NAME, APPLICABLE SPECIFICATION SECTION, SUBMITTAL DATE, EQUIPMENT IDENTIFICATION INFORMATION AS USED ON THE DRAWINGS, AND THE CONTRACTOR'S STAMP. THE STAMP SHALL CERTIFY THAT THE SUBMITTAL HAS BEEN CHECKED BY THE CONTRACTOR, COMPIES WITH THE DRAWINGS AND SPECIFICATIONS, AND IS COORDINATED WITH OTHER TRADES. MANUFACTURER PRODUCT LITERATURE SHALL INCLUDE SHOP DRAWINGS, PRODUCT DATA, PERFORMANCE DATA, AND OTHER INFORMATION. MATERIALS AND EQUIPMENT SHALL BE IDENTIFIED BY TRADE, MAKE, OR INDICATE THE MATERIALS, PERFORMANCE CRITERIA, AND ACCESSORIES THAT ARE BEING PROVIDED. GENERAL PRODUCT CATALOGS DATA NOT SPECIFICALLY NOTED TO BE PART OF THE SPECIFIED PRODUCT WILL BE REJECTED AND RETURNED WITHOUT REVIEW.

SUBMITTALS AND SHOP DRAWINGS SHALL NOT CONTAIN THE FIRM NAME, LOGO, SEAL, OR SIGNATURE OF THE ENGINEER. THEY SHALL NOT BE MARKED WITH ANY IDENTIFYING INFORMATION. SUBMITTALS SHALL BE IDENTIFIED BY SERIAL NUMBERS OF SUCH PRODUCT. REFER TO PARAGRAPH "ELECTRONIC DRAWING FILES" FOR PROCEDURES TO BE USED.

SEPARATE SUBMITTALS ACCORDING TO INDIVIDUAL SPECIFICATION SECTIONS. ILLEGIBLE SUBMITTALS WILL BE REJECTED AND RETURNED WITHOUT REVIEW. CATALOG DATA SHALL BE PROPERLY BOUND, INDEXED, AND LABELED IN A 3-RING BINDER. EACH ITEM OR MODEL NUMBER SHALL BE CLEARLY MARKED AND ACCESSORIES INDICATED. LABEL THE CATALOG DATA WITH THE EQUIPMENT IDENTIFICATION ACRONYM OR NUMBER AS USED ON THE DRAWINGS AND INCLUDE PERFORMANCE CURVES, CAPACITIES, SIZES, WEIGHTS, MATERIALS, FINISHES, WIRING DIAGRAMS, ELECTRICAL REQUIREMENTS AND DEVIATIONS FROM THE SPECIFIED EQUIPMENT OR MATERIALS FOR EQUIPMENT WITH MOTOR STARTERS OR VFDs. INCLUDE SHORT CIRCUIT CALCULATIONS FOR ALL IMPULSED LOAD ITEMS. SHOP DRAWINGS WILL BE RETURNED WITHOUT REVIEW IF THE ABOVE MENTIONED REQUIREMENTS ARE NOT MET.

PROVIDE THE QUANTITY OF SUBMITTALS REQUIRED BY DIVISION 01. IF NOT INDICATED AND HARD-COPY SETS ARE PROVIDED, SUBMIT A MINIMUM OF SIX (6) COPIES. REFER TO DIVISION 01 FOR ACCEPTANCE OF ELECTRONIC SUBMITTALS FOR THIS PROJECT. FOR ELECTRONIC SUBMITTALS, CONTRACTOR SHALL SUBMIT THE DOCUMENTS IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN DIVISION 01. CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER THAT THE SUBMITTALS HAVE BEEN POSTED. IF ELECTRONIC SUBMITTAL PROCEDURES ARE NOT DEFINED IN DIVISION 01, CONTRACTOR SHALL INCLUDE THE NEAREST PRACTICE INFORMATION. CONTRACTOR SHALL SUBMIT THE DOCUMENTS IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN DIVISION 01. CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER THAT THE SUBMITTALS HAVE BEEN POSTED. IF ELECTRONIC SUBMITTAL PROCEDURES ARE NOT DEFINED IN DIVISION 01, CONTRACTOR SHALL INCLUDE THE NEAREST PRACTICE INFORMATION. CONTRACTOR SHALL SUBMIT THE DOCUMENTS IN ACCORDANCE WITH THE PROCEDURES SPECIFIED IN DIVISION 01. CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER THAT THE SUBMITTALS HAVE BEEN POSTED. IF ELECTRONIC SUBMITTAL PROCEDURES ARE NOT DEFINED IN DIVISION 01, CONTRACTOR SHALL INCLUDE THE NEAREST PRACTICE INFORMATION.

THE CHECKING AND SUBSEQUENT ACCEPTANCE OF SUBMITTALS BY THE ENGINEER AND/OR ARCHITECT SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM THE DRAWINGS AND SPECIFICATIONS. ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES, OMISSIONS OF COMPONENTS OR CONNECTIONS, COORDINATION OF ELECTRICAL REQUIREMENTS, AND NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS AND ADJACENT WORK, PROCEED WITH THE DESIGN AND INSTALLATION OF THE EQUIPMENT AFTER RECEIVING REQUIRED SHOP DRAWINGS RELATIVE TO EACH ITEM.

1.11 ELECTRONIC DRAWING FILES

IN PREPARATION OF SHOP DRAWINGS OR RECORD DRAWINGS, CONTRACTOR MAY, AT HIS OPTION, OBTAIN ELECTRONIC DRAWING FILES IN AUTOCAD OR DXF FORMAT ON CD-ROM, DVD, DISK, FLASH DRIVE OR OTHER DOWNLOAD, AS DESIRED. FROM THE ENGINEER FOR A SHIPPING AND HANDLING FEE OF \$200 FOR A DRAWING SET UP TO 1 SHEETS AND \$15 PER SHEET FOR EACH ADDITIONAL SHEET. THE ARCHITECT SHALL BE RESPONSIBLE FOR THE NECESSARY SOFTWARE AND HARDWARE TO VIEW THE DRAWING FILES. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NECESSARY RELEASE AGREEMENT FORM AND TO SPECIFY SHIPPING METHOD AND DRAWING FORMAT. IN ADDITION TO PAYMENT, THE WRITTEN AUTHORIZATION FROM THE ARCHITECT AND RELEASE AGREEMENT FORM FROM THE ENGINEER MUST BE RECEIVED BEFORE ELECTRONIC DRAWING FILES WILL BE SENT.

1.12 RECORD DRAWINGS (AS-BUILT DRAWINGS)

DURING PROGRESS OF THE WORK IN THIS DIVISION, CONTRACTOR SHALL MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE DURING THE INSTALLATION OF THE SYSTEM. UPON COMPLETION OF THE WORK, ACCURATELY TRACKED, LABEL, RECORD INFORMATION TO THREE IDENTICAL SETS OF THE APPROVED SHOP DRAWINGS. INSERT ONE SET INTO EACH COPY OF THE MANUAL, DESCRIBED ABOVE.

SEE DIVISION 01 AND GENERAL CONDITIONS FOR ADDITIONAL INFORMATION.

1.13 OPERATION AND MAINTENANCE INSTRUCTIONS

DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPLETE A COMPLETE BROCHURE OF EQUIPMENT FURNISHED AND INSTALLED ON THIS PROJECT. INCLUDE OPERATION AND MAINTENANCE INSTRUCTIONS, PARTS LISTS, WIRING DIAGRAMS, PARTS LISTS, APPROVED SUBMITTALS AND SHOP DRAWINGS, WARRANTIES, AND DESCRIPTIVE LITERATURE AS FURNISHED BY THE EQUIPMENT MANUFACTURER. INCLUDE AN INSIDE COVER SHEET THAT LISTS THE PROJECT NAME, DATE, OWNER, ARCHITECT, ENGINEER, GENERAL CONTRACTOR, SUBCONTRACTOR, AND AGENCY OF ORIGIN.

SUBMIT THREE COPIES OF LITERATURE BOUND IN APPROVED BINDERS WITH INDEX AND TABS SEPARATING EQUIPMENT TYPES BY THE ARCHITECT. FOR EACH ITEM, THE BINDER SHALL INCLUDE THE EQUIPMENT NAME, SERIAL NUMBER, RUBBER BANDS, LOSS-LEAF BINDING, AND MAILING ENVELOPES ARE NOT CONSIDERED APPROVED BINDERS. FINAL APPROVAL OF SYSTEMS INSTALLED UNDER THIS CONTRACT SHALL BE WITHHELD UNTIL THIS EQUIPMENT BROCHURE IS RECEIVED AND DELIVERED COMPLETE BY THE ARCHITECT AND ENGINEER. INSTRUCT WORKMEN TO SAVE REQUIRED LITERATURE SHIPPED WITH THE EQUIPMENT ITSELF FOR INCLUSION IN THIS BROCHURE.

INCLUDE RECORD DRAWINGS AS DESCRIBED ABOVE.

REFER TO DIVISION 01 FOR ACCEPTANCE OF ELECTRONIC MANUALS FOR THIS PROJECT. FOR ELECTRONIC MANUALS, REFER TO PARAGRAPH "SUBMITTALS" FOR REQUIREMENTS.

1.14 SPARE PARTS

FURNISH TO OWNER WITH RECEIPT THE FOLLOWING SPARE PARTS FOR THE EQUIPMENT FURNISHED FOR THIS PROJECT:

- 1. ONE SET OF SPARE PARTS FOR EACH TYPE OF EQUIPMENT.
2. INSTALL NEW FILTERS PRIOR TO TESTING, ADJUSTING, AND BALANCING WORK AND BEFORE TURNING SYSTEM OVER TO OWNER.
3. FURNISH ONE COMPLETE SET OF BELTS FOR EACH FAN.
4. FURNISH THREE OPERATING KEYS FOR EACH TYPE OF AIR OUTLET AND INLET THAT REQUIRE THEM.

1.15 TRAINING

AT A TIME MUTUALLY AGREED UPON BETWEEN THE OWNER AND CONTRACTOR, PROVIDE THE SERVICES OF A FACTORY TRAINING AND AUTHORIZED REPRESENTATIVE TO TRAIN OWNER'S DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE EQUIPMENT PROVIDED FOR THIS PROJECT.

PROVIDE TRAINING TO INCLUDE, BUT NOT BE LIMITED TO, AN OVERVIEW OF THE SYSTEM AND/OR EQUIPMENT AS IT RELATES TO THE FACILITY AS A WHOLE. OPERATION AND MAINTENANCE PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, PREVENTIVE MAINTENANCE AND APPROVED OPERATOR INTERVENTION; AND REVIEW OF DATA INCLUDED IN THE OPERATION AND MAINTENANCE MANUALS.

SUBMIT TO THE ARCHITECT LETTER TO THE ARCHITECT STATING THAT THE OWNER'S DESIGNATED REPRESENTATIVE HAS BEEN TRAINING AND THE OWNER REPRESENTATIVE SHALL SIGN THE CERTIFICATION LETTER INDICATING AGREEMENT THAT THE TRAINING HAS BEEN PROVIDED.

SCHEDULE TRAINING WITH OWNER WITH AT LEAST 7 DAYS ADVANCE NOTICE.

1.16 WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN, OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC TERMS ARE NOTED TO CARRY A LONGER WARRANTY PERIOD. CONTRACTOR SHALL BE RESPONSIBLE FOR THE NECESSARY CORRECTIVE WORK WITHIN 30 DAYS OF THE ACTUAL, WERE SUCH DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 01.

WARRANTIES SHALL INCLUDE LABOR AND MATERIAL, INCLUDING TRAVEL EXPENSES, MAKE REPAIRS OR REPLACE MATERIALS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER, AND TO THE SATISFACTION OF THE OWNER, ARCHITECT, AND ENGINEER. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD AND ANY ACTIONS THE OWNER MUST TAKE IN ORDER TO MAINTAIN WARRANTY STATUS. EACH WARRANTY INSTRUMENT SHALL BE ADDRESSED TO THE OWNER AND STATE THE COMMENCEMENT DATE AND TERM.

PART 2 GENERAL OPERATIONS AND INSTALLATION

2.01 BUILDING OPERATION

COMPLY WITH THE SCHEDULE OF OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. ACCOMPLISH WORK THROUGHOUT INTERRUPTION OF BUILDING OPERATION AT A TIME WHEN THE BUILDING IS NOT IN OPERATION. DURING THE BUILDING OPERATION, VERIFY THE INTEGRITY OF THE ENTIRE NETWORK FOLLOWING THE CONSTRUCTION OF BUILDING OPERATION WITH THE OWNER AND/OR TENANT A MINIMUM OF SEVEN (7) DAYS IN ADVANCE OF WORK.

2.02 EXISTING EQUIPMENT REUSE AND REMOVAL

REMOVE AND UNUSE EQUIPMENT, DUCTWORK, PIPING, AND ASSOCIATED SUPPORTS, CAP DUCTWORK AND PIPING AT MAINS AND SEAL AIR AND WATER TIGHT.

PROVIDE ITEMS OF HVAC SYSTEMS MODIFICATION REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS OR NECESSARY FOR PROPER OPERATION, MATCH EXISTING MATERIALS AND CONSTRUCTION TECHNIQUES WHEN REUSING EXISTING SYSTEMS. UNLESS SPECIFIED OTHERWISE, COORDINATE ADDITIONAL REQUIREMENTS WITH GENERAL CONTRACTOR AND ARCHITECT.

SEAL AIRTIGHT EXISTING DUCTWORK REQUIRED TO BE ABANDONED IN PLACE OR NOT IN USE AT THE TERMINATION OF THE WORK.

CAP AND SEAL WEATHERTIGHT EXISTING ROOF CURBS AND ROOF OPENINGS TO BE ABANDONED IN PLACE AS A RESULT OF EQUIPMENT REMOVAL. EXISTING DUCTWORK, DIFFUSERS, REGISTERS, AND GRILLES INTENDED FOR REUSE AS REQUIRED OR AS NOTED ON DRAWINGS.

2.03 CUTTING AND PATCHING

CONFORM TO THE REQUIREMENTS IN DIVISION 01, CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO INSTALL AND OPERATE THE EQUIPMENT. PATCH AND FINISH ALL CUTS AND OPENINGS TO MATCH EXISTING CONDITIONS. PATCH AND FINISH ALL CUTS AND OPENINGS TO MATCH EXISTING CONDITIONS. PATCH AND FINISH ALL CUTS AND OPENINGS TO MATCH EXISTING CONDITIONS. PATCH AND FINISH ALL CUTS AND OPENINGS TO MATCH EXISTING CONDITIONS.

2.04 ROUGH-IN

COORDINATE WITHOUT DELAY ALL ROUGH-IN WITH OTHER DIVISIONS, CONCEAL, PIPING, CONDUIT, AND ROUGH-IN EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.

2.05 STRUCTURAL SUPPORT SYSTEMS

STRUCTURAL STEEL USED FOR SUPPORT OF OPERATING, DUCTWORK AND PIPING SHALL BE NEW, CLEAN, AND CONFORM TO ASTM DESIGNATION A-36.

SUPPORT MECHANICAL COMPONENTS FROM THE BUILDING STRUCTURE. DO NOT SUPPORT MECHANICAL COMPONENTS FROM CEILING, OTHER MECHANICAL, OR ELECTRICAL COMPONENTS, OR OTHER NON-STRUCTURAL ELEMENTS.

2.06 PRE-ENGINEERED ROOF EQUIPMENT SUPPORTS AND CURBS

PRE-FABRICATED EQUIPMENT SUPPORT RAILS AND ROOF CURBS MANUFACTURED BY AES INDUSTRIES, CUSTOM CURBS, AND OTHER MANUFACTURERS, SHALL BE USED. PROVIDE WITH FULLY INTERED BARBED CANT AND STEP TO MAINTAIN INSULATION THICKNESS. WELDED, MINIMUM 1/8 INCH GALVANIZED STEEL, INTERNALLY REINFORCED TO LOAD BEARING FACTORS OF EQUIPMENT BEING SUPPORTED. MINIMUM 1/2 INCH THICK, 3 POUND RIB INSULATION INTERNAL TO SHELL TO MAINTAIN CONTINUOUS ROOF INSULATION WHERE REQUIRED. FACTORY INSTALLED WOOD NAILER, AND MINIMUM 1/8 INCH JACKET WITH COUNTERLASHING WHERE EQUIPMENT DOES NOT FULLY COVER THE EQUIPMENT SUPPORT. PROVIDE SLOPED ROOF EQUIPMENT SUPPORTS TO DRAIN EXISTING WATER. PROVIDE SLOPED ROOF EQUIPMENT SUPPORTS TO DRAIN EXISTING WATER. PROVIDE SLOPED ROOF EQUIPMENT SUPPORTS TO DRAIN EXISTING WATER.

ATTACH EQUIPMENT DIRECTLY TO PRE-ENGINEERED ROOF EQUIPMENT SUPPORT USING ONE OF THE FOLLOWING METHODS:

- 1. RAIL EQUIPMENT SUPPORTS: SECURE EACH EQUIPMENT SUPPORT LEG TO THE RAIL WITH A MINIMUM OF 4 POINTS OF CONNECTION PER LEG.
2. ROOF CURBS: SECURE EACH CORNER OF THE EQUIPMENT TO THE CURB NAILER USING A MINIMUM OF 4 LAG SCREWS, LOCATED ALONG THE LENGTH OF THE EQUIPMENT. ALTERNATIVELY, SECURE EQUIPMENT TO THE CURBS USING 1/2 INCH DIA. HOOK-ROOF BRACKETS. PROVIDE MINIMUM 1/2 INCH LONG, 1/4 INCH GALVANIZED STEEL BRACKETS SIZED TO WRAP AROUND TOP OF CURB AND UNDER EQUIPMENT BASE RAIL WITH SUFFICIENT HORIZONTAL OFFSET TO COVER OVERLAP GAP BETWEEN THE EQUIPMENT RAIL AND CURB. SECURE BRACKET TO EQUIPMENT CURB NAILER USING A MINIMUM OF 4 POINTS OF CONNECTION PER BRACKET. PROVIDE ONE BRACKET AT EACH CORNER ALONG THE LENGTH OF THE UNIT.

2.07 ACCESS PANELS AND DOORS

ACCESS DOORS FOR ALL CONCEALED EQUIPMENT AND DUCT AND PIPING ACCESSORIES THAT REQUIRE SERVICE WHERE INDICATED OR AS REQUIRED, EXCEPT WHERE ABOVE-LAY-UP CEILING ACCESS DOORS SHALL BE ADEQUATELY SIZED FOR THE DEVICES SERVED WITH A MINIMUM SIZE OF 18 INCHES X 18 INCHES. ACCESS DOORS MUST BE OF THE PROPER CONSTRUCTION FOR THE TYPE OF EQUIPMENT TO BE SERVED. ACCESS DOORS SHALL BE INSTALLED, OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE OPERATION. PROVIDE FACTORY-FABRICATED AND ASSEMBLED UNITS, COMPLETE WITH ATTACHMENT DEVICES AND FASTENERS READY FOR INSTALLATION. CONCEALED HANGES, FLUSH SCREWDRIVER-OPERATED COIL LOCK, AND ANCHOR STRAPS. PROVIDE ACCESS DOORS MANUFACTURED BY MILCOR, TRUSS, ZURN, OR EQUAL.

2.08 PENETRATIONS

SEAL ELEVATED FLOOR, EXTERIOR WALL, AND ROOF PENETRATIONS WATERTIGHT AND WEATHERTIGHT WITH NON-SHRINK, NON-HARDENING COMPOUND, SEALANT, PACK WITH MINERAL WOOL, AND SEAL BOTH ENDS WITH MINIMUM OF 1/2 INCH OF SEALANT. PROVIDE AND TEST FOR A MINIMUM OF 1/2 INCH OF SEALANT. PROVIDE AND TEST FOR A MINIMUM OF 1/2 INCH OF SEALANT.

SEAL ABOVE PENETRATIONS OF FIRE RATED ASSEMBLIES, COORDINATE FIRE RATINGS AND LOCATIONS WITH THE ARCHITECTURAL DRAWINGS. REFER TO ARCHITECTED SPECIFICATIONS FOR FIRE STOPPING. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

PRE-FABRICATED ROOF CURBS WHERE REUSE OF ROOF OR DUCTWORK PENETRATE ELEVATED SLABS OR THE ROOF TO THE EXTERIOR, PROVIDE COVER OVER CURBS WITH WEATHER-RESISTANT MATERIAL AND SEAL DUCT OR ROOF PENETRATIONS THROUGH THE COVER. PROVIDE FIRE COLLAR OR WEATHER-RESISTANT MATERIAL WITH STAINLESS STEEL, PIPE CLAMPS FOR PIPING PENETRATIONS.

PROVIDE BOX FRAMES FOR RECTANGULAR OPENINGS WELDED 1/2 INCH GALVANIZED STEEL, ATTACHED TO FORMS AND OF A MAXIMUM DIMENSION ESTABLISHED BY THE ARCHITECT. NOTIFY THE GENERAL CONTRACTOR OR ARCHITECT BEFORE INSTALLING ANY BOX OPENING NOT SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON WALL PIPES WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JAY R. SMITH, JOSAM WADE, WATTS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY CALPICO, METALFLEX, OR THUNDERLINE 1 LINK SEAL.

ELEVATED CONCRETE SLAB WITH WATER PROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. PROVIDE WATERSTOP MEMBRANE PENETRATIONS WITH "WALL PIPES" CLAIMING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JAY R. SMITH, JOSAM WADE, WATTS OR ZURN.

PROVIDE 1/2 INCH THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF NON-PRESSURE PIPE PASSING THRU CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2 INCHES ABOVE AND BELOW THE CONCRETE SLAB.

2.09 PRESTOPPING

SEALANTS AND ACCESSORIES SHALL HAVE FIRE-RESISTANCE RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH UL 2079 OR ASTM E 814, OR OTHER NLT, ACCEPTABLE TO AHJ.

MANUFACTURERS: HLT, RECTORSPEC, SPECIFIED TECHNOLOGICAL INC., UNITED STATES OXYGEN COMPANY, OR JAC CORP. THROUGH AND MEMBRANE PENETRATION FIRESTOPPING SYSTEMS PRODUCT SCHEDULE, PROVIDE UL LISTING, LOCATION, WALL OR FLOOR RATING, AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

WHERE PROJECT CONDITIONS REQUIRE MODIFICATION TO QUALIFIED TESTING AND INSPECTING AGENCY'S ILLUSTRATIONS FOR A PARTICULAR FIRESTOPPING CONDITION, SUBMIT ILLUSTRATION, WITH MODIFICATIONS MARKED, PROVIDED BY PENETRATION FIRESTOPPING MANUFACTURER'S FIRE-PROTECTION ENGINEER AS AN ENGINEERING JUDGMENT OR EQUIVALENT. FIRE-RESISTANCE RATED ASSEMBLY, INCLUDE QUALIFICATION'S DATA FOR TESTING AGENCY.

2.10 MOTORS AND STARTERS

PART 4 HVAC EQUIPMENT

4.01 ROOFTOP UNITS (GAS FIRED HEAT) 3-25 TONS

PROVIDE ELECTRIC COOLING, GAS HEATING ROOFTOP UNITS AS SCHEDULED ON THE DRAWINGS, MANUFACTURED BY AAO, CARBER, DAIKIN, LENOX, JOHNSON CONTROLS, TRANE, OR YORK, WITH FEATURES AS NOTED IN THE RTU SCHEDULE AND IN THE RTU CONTROL MATRIX, AND COMPLETE WITH FACTORY INSTALLED DIRECT-DRIVE HERMETIC COMPRESSORS WITH INTERNAL SPRING VIBRATION ISOLATION, BUILT-IN MOTOR THERMAL OVERLOAD PROTECTION, CRANKCASE HEATER, AND LOW PRESSURE SWITCHES; DIRECT EXPANSION COOLING AND CONDENSING COILS, MINIMUM SEER OR SEER RATING (COOLING) AS REQUIRED BY THE APPLICABLE ENERGY CODE OR GREATER IF SCHEDULED ON THE DRAWINGS, CENTRIFUGAL EVAPORATOR BLOWER, AIR FILTER RACK, PROPPELLER TYPE CONDENSER FAN, ALUMINIZED STEEL HEAT EXCHANGER, MINIMUM AFUE RATING (HEATING) AS REQUIRED BY THE APPLICABLE ENERGY CODE OR GREATER IF SCHEDULED ON THE DRAWINGS, FORCED COMBUSTION AIR BLOWER, COMPLETE FACTORY INSTALLED MICRO-PROCESSOR CONTROLS INCLUDING ANTI-SHORT CYCLE TIMERS, TIME DELAY RELAYS AND MINIMUM "ON" TIME CONTROLS, 100 PERCENT SAFETY GAS SHUTOFF, DIRECT SPARK IGNITION SYSTEM, BUILT-IN THERMAL OVERLOAD PROTECTION ON MOTORS AND COMPRESSORS, OUTDOOR AIR DAMPER, RELIEF, WEATHERIGHT HOUSING CONSTRUCTED OF ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL WITH WEATHER-RESISTANT BAKED ENAMEL FINISH, FIRE-ENGINEERED ROOF CURBS WITH MINIMUM HEIGHT AS SCHEDULED ON THE DRAWINGS IF UNIT IS EQUIPPED WITH INTERNAL VIBRATION ISOLATORS. TYPE CURB IF UNIT IS NOT EQUIPPED WITH INTERNAL VIBRATION ISOLATORS. SINGLE POINT ELECTRICAL POWER CONNECTION, PROVIDE GUARDS OR LOUVERED PANELS TO PROTECT THE CONDENSER COIL FROM HAIL OR OTHER DAMAGE. PROVIDE A 120 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER, UL LISTED FOR WET AND DAMP LOCATIONS WHEN IN USE. PROVIDE ELECTRONIC PROGRAMMABLE TYPE THERMOSTAT. PROVIDE UNIT COMPLETE WITH MANUFACTURERS ONE YEAR GUARANTEE ON COMPONENTS PLUS AN ADDITIONAL FOUR YEAR GUARANTEE ON THE COMPRESSORS AND HEAT EXCHANGERS. FOR UNITS EQUIPPED WITH AN ECONOMIZER ASSEMBLY, THE ASSEMBLY SHALL BE COVERED WITH MINIMUM 5 YEAR MANUFACTURER WARRANTY, CERTIFIED TO OPERATE THROUGH 80,000 DAMPER OPENING AND CLOSING CYCLES, AND CERTIFIED TO MEET LEAKAGE REQUIREMENTS SPECIFIED UNDER THE SECTION, "CONTROL DAMPERS."

PART 5 TEMPERATURE CONTROLS

5.01 GENERAL REQUIREMENTS

PROVIDE A COMPLETE TEMPERATURE CONTROL SYSTEM INCLUDING CONTROL PANELS, CONTROLLERS, CONTROL POWER TRANSFORMERS, THERMOSTATS, SENSORS, TIME SWITCHES, OVERRIDE TIMERS, ACTUATORS, RELAYS, AND WIRING AS REQUIRED TO CONTROL THE SYSTEMS AS SPECIFIED ON THE DRAWINGS.

SUBMIT SHOP DRAWINGS OF EQUIPMENT PROVIDED FOR TEMPERATURE CONTROL, SUBMIT OPERATION AND MAINTENANCE DATA, INCLUDING TROUBLE SHOOTING MAINTENANCE GUIDE, STEP-BY-STEP PROCEDURES NEEDED FOR EACH CONTROLLER AND THERMOSTAT FUNCTION, INSPECTION PERIOD, CLEANING METHODS AND MATERIALS, AND CALIBRATION TOLERANCES.

PROVIDE INTEGRATED WIRING DIAGRAMS SHOWING INTERCONNECTIONS BETWEEN FIELD-INSTALLED EQUIPMENT AND PACKAGE WIRING FURNISHED WITH THE HVAC EQUIPMENT. CONTROL WIRING SHALL BE SIZED TO ACCOMMODATE THE VOLTAGE DROP ASSOCIATED WITH THE DISTANCE BETWEEN THE CONTROL DEVICE AND THE CONTROLLER.

PROVIDE SUPERVISION AND ON-JOB CHECKOUT SERVICE AS REQUIRED TO ENSURE THAT INSTALLATION AND OPERATION OF THE TEMPERATURE CONTROL SYSTEM MEETS REQUIREMENTS OF THE DRAWINGS, SPECIFICATIONS, AND SEQUENCES OF OPERATION. THE SYSTEM SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING THE ACCEPTANCE OF THE SYSTEM BY THE ARCHITECT/ENGINEER. CORRECT DEFECTS OCCURRING DURING THIS PERIOD AT NO ADDITIONAL COST TO THE OWNER.

INSTALL CONTROL DEVICES WITH TOP OF DEVICE AT 48 INCHES AFF TO MEET ADA REQUIREMENTS UNLESS OTHERWISE NOTED ON THE PLANS.

5.02 THERMOSTAT CONTROL EQUIPMENT

PROVIDE THERMOSTAT CONTROL EQUIPMENT WITH SUFFICIENT COMMUNICATION, PROGRAMMING, INPUT AND OUTPUT CONNECTIONS, AND MODULATING OR STAGING CAPABILITY TO MEET THE SEQUENCE OF OPERATIONS. PROVIDE THERMOSTATS WITH THE FEATURES AS INDICATED:

- 1. LCD OR LED DISPLAY SCREEN.
2. BUTTON OR TOUCHSCREEN INTERFACE.
3. DISPLAY TEMPERATURE.
4. DISPLAY TEMPERATURE SETPOINT.
5. ADJUST TEMPERATURE SETPOINT.
6. LIMIT TEMPERATURE SETPOINT ADJUSTMENT WITHIN PLUS OR MINUS 3 DEGREES F.
7. DISPLAY OPERATING MODE.
8. ADJUST OPERATING MODE.
9. ADJUST SCHEDULE, MINIMUM SEVEN DAY OCCUPIED/UNOCCUPIED.
10. ADJUST FAN SWITCH SETTING.
11. SECURITY LOCKOUT.
12. SECURITY COVER.
13. RECESSED MOUNTING WITH ASPIRATING BOX.
14. AT CONTRACTOR'S OPTION WHERE MULTIPLE SENSORS ARE SHOWN, THE SENSORS MAY BE PROVIDED WITH THE THERMOSTAT IN A SINGLE DEVICE.

PROVIDE THERMOSTAT CONTROL EQUIPMENT THAT SHALL INTERFACE WITH A BAS BY LIGHTSTAT WITH QUALITY AND FEATURES AS INDICATED.

PROVIDE PROGRAMMABLE THERMOSTATS OR CONTROLLERS WITH WALL MODULE INTERFACES THAT SHALL CONTROL NON-PACKAGED EQUIPMENT REQUIRING CUSTOMIZED CONTROLS PER THE SEQUENCE OF OPERATIONS BY LIGHTSTAT WITH QUALITY AND FEATURES AS INDICATED. INCLUDE ADDITIONAL CONTROLLERS AND SENSORS AS REQUIRED FOR ECONOMIZER OPERATION.

PROVIDE PROGRAMMABLE THERMOSTATS THAT SHALL CONTROL PACKAGED EQUIPMENT BY THE PACKAGED EQUIPMENT MANUFACTURER OR LIGHTSTAT OR EQUAL.

PROVIDE NON-PROGRAMMABLE THERMOSTATS FOR ON/OFF OPERATION BY THE EQUIPMENT MANUFACTURER OR LIGHTSTAT OR EQUAL.

PROVIDE WALL OR DUCT-MOUNTED HUMIDISTAT AS INDICATED ON THE DRAWINGS THAT IS COMPATIBLE WITH THE THERMOSTAT.

PROVIDE ECONOMIZER CONTROLLERS FOR EQUIPMENT SPECIFIED TO INCLUDE ECONOMIZER IN ITS SEQUENCE OF OPERATION BUT IS NOT FACTORY FURNISHED WITH ECONOMIZER CONTROLS (INCLUDE). ECONOMIZER CONTROLS SHALL BE HONEYWELL YW223J JADE ECONOMIZER MODULE KIT OR EQUAL. ECONOMIZER MODULE KIT SHALL INCLUDE THE ECONOMIZER LOGIC MODULE, DAMPER ACTUATOR, AND SENSORS OF TYPE REQUIRED TO IMPLEMENT THE TYPE OF ECONOMIZER SCHEDULED ON THE DRAWINGS.

5.03 SENSORS AND RELAYS

MANUFACTURERS AND MODEL NUMBERS ARE LISTED FOR REFERENCE AS TO QUALITY AND FEATURES REQUIRED FOR THE SENSORS AND RELAYS. PROVIDE GENERAL PURPOSE TYPE SENSING ELEMENTS FOR USE IN INPUT AND OUTPUT SENSORS. PROVIDE TRANSMITTERS OR TRANSDUCERS WITH SENSOR AS REQUIRED, COMPATIBLE WITH THE CONTROLLERS USED, WITH RANGE SUITABLE FOR THE SYSTEMS ENCOUNTERED. TRANSMITTERS AND TRANSDUCERS SHALL HAVE OFFSET AND SPAN ADJUSTMENTS, TEMPERATURE COMPENSATION, SHOCK AND VIBRATION IMMUNITY, AND ZEROING CAPABILITY. ACCURACY REQUIREMENTS SHALL INCLUDE THE COMBINED EFFECTS OF LINEARITY, HYSTERESIS, REPEATABILITY, AND THE TRANSMITTER.

PROVIDE SENSORS THAT MEET THE FOLLOWING MINIMUM PERFORMANCE:

- 1. DRY-BULB TEMPERATURE SENSORS AT A MINIMUM SHALL BE ACCURATE TO +/- 2 DEGREES FAHRENHEIT OVER THE RANGE OF 40 TO 80 DEGREES FAHRENHEIT.
2. WET-BULB TEMPERATURE SHALL BE CALCULATED USING DRY-BULB TEMPERATURE AND HUMIDITY AND SHALL BE ACCURATE TO +/- 2 DEGREES FAHRENHEIT.
3. ENTHALPY SHALL BE CALCULATED USING DRY-BULB TEMPERATURE AND HUMIDITY AND SHALL BE ACCURATE TO +/- 3 BTU/LB OVER THE RANGE OF 20 TO 28 BTU/LB.
4. HUMIDITY SENSORS AT A MINIMUM SHALL BE ACCURATE WITHIN +/- 3 PERCENT FULL RANGE BETWEEN 20 AND 95 PERCENT, WITH DRIFT LESS THAN 1 PERCENT FULL SCALE PER YEAR.
5. PRESSURE TRANSMITTERS AT A MINIMUM SHALL BE ACCURATE TO +/- 1 PERCENT FULL SCALE WITH DRIFT LESS THAN 1 PERCENT FULL SCALE PER YEAR.
6. CARBON DIOXIDE (CO2) SENSORS SHALL MEASURE TOTAL PERCENTAGE OF CO2 IN PPM. SENSOR SHALL HAVE AN ACCURACY OF PLUS/MINUS 75 PPM AT A 800 AND 1000 PPM CONCENTRATION AND CERTIFIED BY THE MANUFACTURER TO REQUIRE CALIBRATION NO MORE FREQUENTLY THAN ONCE EVERY 5 YEARS.

PROVIDE AC1 BUTTON-TYPE SENSOR OR EQUAL, WITH APPROPRIATE RESISTANCE RATING COMPATIBLE WITH CONTROLLERS USED, AND WITH PLASTIC FINISH FOR REMOTE TEMPERATURE SENSORS WHERE NOTED ON THE PLANS.

PROVIDE CO2 SENSORS BY HONEYWELL, TELAIR, TOXALERT, VERIS, OR EQUAL. SENSOR SHALL BE EQUIPPED WITH DIGITAL DISPLAY TO CONTINUOUSLY DISPLAY READING.

SMOKE DETECTORS FURNISHED AND INSTALLED AS INDICATED IN THIS SECTION OR AS SCHEDULED ON THE PLANS (OR HEAT DETECTORS, IF PERMITTED BY CODE) SHALL SHUT DOWN EACH ASSOCIATED UNIT SUPPLY FAN UPON ACTIVATION WHERE REQUIRED BY CODE. PROVIDE REMOTE VISUAL AND AUDIBLE ALARM DEVICE IN AN APPROVED LOCATION IF SMOKE DETECTORS ARE NOT CONNECTED TO A FIRE ALARM PANEL AND LABEL DEVICE AS "AIR DUCT DETECTOR TROUBLE."

PROVIDE 24 VOLT OR 120 VOLT TIMESWITCHES INTERMATIC SERIES FM1D20 OR EQUAL PROGRAMMABLE TYPE WITH 7-DAY PROGRAMMING WITH UP TO TWO "ON" AND "OFF" PER DAY. BATTERY BACKUP SHALL PROVIDE 48 HOURS OF MEMORY RETENTION. OVERRIDE TIMER SWITCHES SHALL BE SPRING WOUND, SHOCK NORMALLY OPEN TYPE, COORDINATE 120 V WIRING OF TIMESWITCH WITH ELECTRICAL CONTRACTOR IF 120 V MODEL IS PROVIDED.

PROVIDE RELAYS WITH CONTACT RATING, CONFIGURATION, AND COIL VOLTAGE THAT IS SUITABLE FOR THE APPLICATION. RELAY SHALL BE GENERAL PURPOSE, ENCLOSED PLUG-IN TYPE AND PROTECTED BY A HEAT AND SHOCK RESISTANT DUCT COVER. NUMBER OF CONTACTS AND OPERATIONAL FUNCTION SHALL BE AS REQUIRED. TRANSIENT SUPPRESSION SHALL BE PROVIDED AS AN INTEGRAL PART OF THE RELAY. CONTACTORS SHALL BE SINGLE COIL, ELECTRICALLY OPERATED, MECHANICALLY HELD, DOUBLE-BREAK, SILVER-TO-SILVER TYPE PROTECTED BY ARCING CONTACTS. POSITIVE LOCKING SHALL BE OBTAINED WITHOUT THE USE OF HOOKS, LATCHES, OR SEMI-PERMANENT MAGNETS. OPERATING AND RELEASE TIMES SHALL BE 100 MILLISECONDS OR LESS.

5.04 WIRING

PROVIDE ELECTRICAL AND CONTROL WIRING AS SPECIFIED UNDER THE SECTION "ELECTRICAL WIRING."

PART 6 SEQUENCE OF OPERATION

6.01 ROOFTOP UNIT CONTROL

REFERENCE THE ROOFTOP UNIT CONTROL MATRIX FOR SEQUENCE OF OPERATIONS.

6.02 EXHAUST FAN CONTROL (EF-1)

INTERLOCK FAN OPERATION WITH THE TIME CLOCK. FAN SHALL OPERATE DURING OCCUPIED HOURS.

DURING UNOCCUPIED HOURS, FAN SHALL BE OFF.

PART 7 ALTERNATES

7.01 DESCRIPTION

REFER TO THE ARCHITECTURAL PORTION OF THE SPECIFICATION FOR LIST OF ALTERNATES. APPLICABLE SECTIONS OF THE BASE SPECIFICATIONS SHALL APPLY TO ALL WORK REQUIRED BY THE ALTERNATE UNLESS OTHERWISE SPECIFIED, DETERMINE WHETHER OR NOT AND HOW EACH ALTERNATE AFFECTS WORK, INCLUDE LABOR, MATERIALS, EQUIPMENT, AND TRANSPORTATION SERVICES NECESSARY FOR AND INCIDENTAL TO THE COMPLETION OF WORK UNDER EACH PARTICULAR ALTERNATE. FURNISH SEPARATE BID FOR EACH ALTERNATE APPLICABLE TO WORK, STATING THE AMOUNT TO BE ADDED OR DEDUCTED FROM THE BASE BID.

END OF SECTION 23



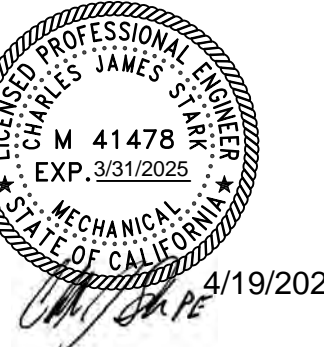
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