HVAC GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMIT FEES, INSPECTIONS, AND LICENSES REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
2. CONTRACTOR MUST BE REGISTERED, HAVE NECESSARY LICENSES, OBTAIN NECESSARY PERMITS, AND HAVE CONSENT FROM ALL GOVERNMENTAL AGENCIES TO CARRY OUT THE WORK OF THE CONTRACT.
3. ALL WORK AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH CURRENT SMACNA STANDARDS, CURRENT ASHRAE GUIDELINES, AND ALL APPLICABLE STATE AND LOCAL BUILDING CODES.
4. CONTRACTOR SHALL REMOVE AND HAUL AWAY FROM THE PREMISES ALL UNUSED MATERIALS AND DEBRIS RESULTING FROM THE PERFORMANCE OF THE CONTRACT AND SHALL BEAR THE COST OF DISPOSAL.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF WALLS, ROOF, AND FLOORS, INCLUDING SAW CUTTING AND CORE DRILLING. ANY CUTTING AND DRILLING REQUIRED OF STRUCTURAL ELEMENTS THAT IS NOT SHOWN ON THE DRAWINGS SHALL BE BROUGHT TO THE OWNERS REPRESENTATIVES ATTENTION PRIOR TO PERFORMING THE WORK. CONTRACTOR SHALL SUBMIT PROPOSED LOCATIONS AND SIZES OF SUCH A CUTTING AND DRILLING FOR APPROVAL. CONTRACTOR SHALL COORDINATE ALL WORK PERFORMED BY OTHERS WITH GENERAL CONTRACTOR.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE PRIOR TO SUBMITTING THEIR BID AND TO HAVE EXAMINED AND FAMILIARIZED THEMSELVES WITH THE SITE CONDITIONS. THEY SHALL COMPARE THE DRAWINGS AND SPECIFICATIONS WITH THE RESULTS OF THEIR EXAMINATION OF THE SITE AND CONFIRM THAT ALL REQUIREMENTS FOR COMPLETE H.V.A.C. MAY BE FULFILLED. NO EXTRA PAYMENTS WILL BE ALLOWED TO THE H.V.A.C. CONTRACTOR DUE TO UNFAMILIARITY WITH THE SITE CONDITIONS.
7. CONTRACTOR SHALL SUBMIT BID BASED ON THE DRAWINGS, AND PROVIDE ALTERNATE BID FOR VALUE-ENGINEERED COST SAVINGS. CONTRACTOR SHALL EVALUATE DUCT CONSTRUCTION FOR AIR DISTRIBUTION MAIN TRUNKS AND PROVIDE VALUE-ENGINEERED ALTERNATE FOR COST SAVINGS TO THE OWNER.
8. THE TENANT RESERVES THE RIGHT TO ACCEPT AND/OR REJECT ANY OR ALL BIDS.
9. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE MATERIALS BEFORE, DURING, AND AFTER INSTALLATION. IN THE EVENT OF DAMAGE, IMMEDIATELY REPAIR ALL DAMAGED AND DEFECTIVE WORK TO THE APPROVAL OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
10. AS BUILT DRAWINGS SHOWING DIMENSIONS AND LOCATIONS OF PIPES, DUCTS, AND EQUIPMENT SHALL BE SUBMITTED TO THE ARCHITECT, ENGINEER, TENANT, AND OWNER AT CONCLUSION OF CONSTRUCTION.
11. THE ARCHITECT/ENGINEER SHALL HAVE THE RIGHT TO ACCEPT AND/OR REJECT MATERIALS, EQUIPMENT, AND/OR WORKMANSHIP, AND SHALL APPROVE ONLY WHEN THE CONTRACTOR HAS COMPLIED WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
12. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO ORDERING OR INSTALLING EQUIPMENT OR MATERIALS. SHOP DRAWINGS SHALL CLEARLY IDENTIFY SUBSTITUTIONS ON EQUIPMENT AND MATERIALS, AND SHALL CLEARLY IDENTIFY ALL PERTINENT DATA TO SUBSTANTIATE THE EQUALITY OF THE PRODUCT. THIS CONTRACTOR SHALL SUBMIT TO-SCALE DUCTWORK SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
13. WORKMANSHIP SHALL BE OF THE BEST QUALITY AND ONLY COMPETENT MECHANICS, SKILLED IN THEIR RESPECTIVE TRADES, SHALL BE EMPLOYED.
14. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THEIR WORK WITH ALL OTHER TRADES. THIS INCLUDES COORDINATING THE LOCATION AND SIZE OF ALL OPENINGS, LOCATIONS OF EQUIPMENT, PADS, AND CHANGES IN ELEVATION OF DUCTWORK, PIPING, AND OTHER EQUIPMENT.
15. ALL MECHANICAL TRIM/FINISHES SHALL BE COLORED AS PER ARCHITECT REQUIREMENTS. CONTRACTOR SHALL VERIFY COLOR REQUIREMENTS WITH THE ARCHITECT PRIOR TO ORDERING AIR INLETS/OUTLETS, WALL LOUVERS, AND THERMOSTATS.
16. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH THE ARCHITECTURAL REFLECTED CEILING PLAN, ELECTRICAL LIGHTING LAYOUT, AND ARCHITECTURAL ROOM ELEVATIONS.
17. FIELD-BUILT SLEEPERS OR PLATFORMS FOR ROOF-MOUNTED EQUIPMENT, ROOF PENETRATIONS, CUTTING, AND PATCHING BY GENERAL CONTRACTOR.
18. LINE VOLTAGE WIRING, CONDUIT, DISCONNECT SWITCHES, AND FINAL TERMINATIONS BY ELECTRICAL CONTRACTOR. LOW VOLTAGE WIRING, CONDUIT, AND FINAL TERMINATIONS BY MECHANICAL CONTRACTOR.
19. ALL LINE VOLTAGE CONTROLS INCLUDING STARTERS, RELAYS, CONTACTORS, TRANSFORMERS, ETC. SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
20. CONDENSATE DRAIN AND GAS PIPING SHALL BE BY PLUMBING CONTRACTOR.
21. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS AND CONTROL DEVICES FOR THE COMPLETE INSTALLATIONS OF AN AUTOMATIC TEMPERATURE CONTROL SYSTEM.
22. CONTRACTOR SHALL INSTALL ROOFTOP EQUIPMENT AT A MINIMUM OF 10 FEET FROM ANY EDGE OF THE BUILDING WHEN PARAPET WALLS ARE LOWER THAN 42" ABOVE ROOF DECK. WHERE SUCH INSTALLATION IS NOT POSSIBLE, CONTRACTOR SHALL PROVIDE A 42" HIGH SAFETY RAIL.
23. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
24. ALL NEW H.V.A.C. EQUIPMENT, DUCTWORK, PIPING, VALVES, AND CONTROL COMPONENTS SHALL BE PLACED AND LABELED WITH A PERMANENT LAMINATED PLASTIC LABEL. SUBMIT LABELING TO ENGINEER FOR APPROVAL AS A FORMAL SUBMITTAL.
25. CONNECT MAIN DUCT TO AIR CONDITIONING UNIT WITH WEATHERPROOF FLEXIBLE CONNECTION. PROVIDE SUN SHIELD OVER ENTIRE FLEXIBLE CONNECTION IF EXPOSED TO WEATHER. FLEXIBLE CONNECTIONS SHALL BE 12" IN LENGTH.
26. CONTRACTOR SHALL FURNISH TO TENANT AND PLACE INTO STORAGE FOR TENANT ONE COMPLETE SET OF REPLACEMENT FILTERS AND DRIVE BELTS FOR ALL NEW H.V.A.C. EQUIPMENT ON THIS PROJECT.
27. FURNISH AND INSTALL FIRE, SMOKE, OR COMBINATION FIRE/SMOKE DAMPERS WHERE SHOWN ON PLANS OR AS REQUIRED FOR A COMPLETE INSTALLATION. CONTRACTOR SHALL COORDINATE WITH FIRE-RATED CEILING AREAS AND WALLS AS INDICATED ON ARCHITECTURAL DRAWINGS AND LOCAL CODE REQUIREMENTS. THIS NOTE SHALL TAKE PRECEDENCE OVER ANY OMISSIONS ON THE DRAWINGS.
28. CONTRACTOR SHALL FURNISH AND INSTALL DUCT ACCESS DOORS AND CEILING ACCESS PANELS AT LOCATIONS AS NECESSARY TO SERVICE DAMPERS TO PROVIDE MAINTENANCE FOR EQUIPMENT. ALL CEILING ACCESS PANEL LOCATIONS SHALL BE VERIFIED WITH THE ARCHITECT PRIOR TO INSTALLATION.
29. CONTRACTOR SHALL PROVIDE & INSTALL DUCT MOUNTED SMOKE DETECTORS IN AIR DISTRIBUTION SYSTEMS WHERE AIRFLOW IS GREATER THAN 2000 CFM. MECHANICAL CONTRACTOR SHALL WIRE DUCT SMOKE DETECTOR TO SHUT DOWN FAN, AND ELECTRICAL/FIRE ALARM CONTRACTOR SHALL WIRE IT TO THE FIRE ALARM SYSTEM FOR SUPERVISION AND SHUTDOWN.
30. CONTRACTOR SHALL FURNISH AND INSTALL SUPPORTS, HANGERS, UPPER & LOWER ATTACHMENTS, AND ANCHORS REQUIRED TO INSTALL ALL MATERIALS AND EQUIPMENT FURNISHED AND INSTALLED UNDER THIS CONTRACT. DUCTWORK AND PIPING SHALL NOT BE SUPPORTED FROM THE ROOF DECK. UPPER ATTACHMENTS FOR HANGING DUCT SHALL BE SUPPORTED FROM BEAMS, JOISTS OR SUPPLEMENTARY STRUCTURAL MEMBERS PROVIDED BY MECHANICAL CONTRACTOR.
31. PROVIDE TURNING VANES AT ALL MITERED ELBOWS, OPPOSED BLADE BALANCING DAMPERS WITH LOCKING QUADRANTS AT BRANCH DUCTS, VOLUME DAMPERS, SPLITTER DAMPERS, AND ANY OTHER APPLICABLE DEVICES NECESSARY FOR MINIMUM DUCT RESISTANCE AND PROPER AIR BALANCING. ALL DAMPERS OR SPLITTERS SHALL BE SUFFICIENTLY STIFFENED TO PREVENT NOISE OR VIBRATION AND SHALL BE FITTED WITH AN ACCESSIBLY-LOCATED ADJUSTER.
32. CONTRACTOR SHALL FURNISH AND INSTALL DAMPERS, LINKAGES, AND ACTUATORS REQUIRED FOR AIR FLOW CONTROL SYSTEM. DAMPERS SHALL BE OPPOSED BLADE WITH RUBBER GASKETS. ACTUATORS SHALL BE "BELIMO" NO-LINKAGE TYPE OR "HONEYWELL" WITH LINKAGE. ACTUATOR MOTORS SHALL BE 24 VOLT WITH SPRING RETURN AND MANUAL OVERRIDE FOR EMERGENCY.
33. ALL DUCT SIZES ARE CLEAR INSIDE DIMENSIONS. DUCTWORK SHALL BE INSULATED OR LINED AS SHOWN ON DRAWINGS. ALL DUCTWORK EXPOSED ON ROOF SHALL BE INTERNALLY LINED UNLESS OTHERWISE INDICATED OR SPECIFIED.
34. ALL SUPPLY AND RETURN AIR DUCTWORK CONCEALED ABOVE CEILINGS SHALL BE INSULATED AND WRAPPED WITH TWO INCH FIBERGLASS INSULATION WITH FOIL FACED VAPOR BARRIER. REFRIGERANT SUCTION PIPING SHALL BE INSULATED WITH ARMAFLEX AND JACKETED WHEN EXPOSED TO THE OUTDOORS. CONDENSATE DRAIN PIPING SHALL BE INSULATED WITH ARMAFLEX.
35. CONTRACTOR TO PROVIDE 1" ACOUSTICAL FIBERGLASS DUCT LINER FOR APPROXIMATELY 10'-0" FROM UNITS ON BOTH SUPPLY AND RETURN DUCTS.
36. ROUND AND RECTANGULAR DUCTWORK ARE INTERCHANGEABLE TO AVOID OBSTRUCTIONS IF CROSS-SECTIONAL AREAS ARE EQUIVALENT. CONTRACTOR IS TO VERIFY THE EXACT AVAILABLE CEILING SPACE AND INTERCHANGE THE DUCT SIZE TO FIT THE CEILING SPACE WITHOUT ADDITIONAL COST.
37. INSTALL VOLUME CONTROL DAMPERS AT EACH SUPPLY DIFFUSER AND WHERE NECESSARY TO CONTROL AIR FLOW IN THE DUCT SYSTEMS.
38. EXHAUST TERMINATIONS SHALL BE MINIMUM 10'-0" AWAY FROM OR 3'-0" ABOVE ANY FRESH AIR INTAKE, OPERABLE WINDOWS, AND DOORS, AND MINIMUM 10'-0" ABOVE GRADE.
39. PROVIDE BACKDRAFT DAMPER FOR ALL EXHAUST AIR INLETS UNLESS OTHERWISE NOTED PER CODE.
40. PROVIDE ALL FRESH AIR INTAKES AND EXHAUST OUTLETS WITH HOOD WITH 1/4" GALVANIZED MESH SCREENS.
41. ALL CEILING DIFFUSERS ARE 4-WAY UNLESS OTHERWISE NOTED. DIFFUSERS AND REGISTERS SHALL BE TITUS, KRUEGER, ADP, METALAIRE, ANEMOSTAT OR EQUAL.
42. ALL EXPOSED MATERIALS WITHIN A RETURN AIR PLENUM SHALL BE NON-COMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84.
43. CONTRACTOR IS RESPONSIBLE FOR SIZING REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS, FIELD MEASURED TOTAL EQUIVALENT LENGTHS, AND VERTICAL LIFTS, AND PROVIDE ALL NECESSARY COMPONENTS.
44. ALL MATERIALS AND EQUIPMENT PROVIDED AND/OR INSTALLED UNDER THIS CONTRACTOR SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF BENEFICIAL OCCUPANCY. ANY DEFECTS IN MATERIALS AND/OR WORKMANSHIP OCCURRING DURING TIME PERIOD SHALL BE REPAIRED OR REPLACED BY THIS CONTRACTOR AT NO COST TO THE OWNER. WARRANTY FOR COMPRESSORS SHALL BE (5) YEARS, AND WARRANTY FOR HEAT EXCHANGERS SHALL BE (10) YEARS.
45. CONTRACTOR SHALL SUBMIT A COMPLETE BALANCE REPORT FOR APPROVAL. THE REPORT SHALL INCLUDE THE REQUIREMENTS DESCRIBED IN THE TEST AND BALANCE SPECIFICATION SECTION. CONTRACTOR SHALL FURNISH SEPARATE BALANCE REPORTS FOR GENERAL H.V.A.C. SYSTEMS AND KITCHEN EXHAUST/MAKEUP AIR SYSTEMS, IF APPLICABLE. THERE SHOULD BE NO OUTSTANDING ITEMS ON THE REPORTS PRIOR TO CITY FINAL INSPECTION.

EXISTING CONDITIONS/SCOPE NOTES

CONTRACTOR SHALL CLOSELY INSPECT AND VERIFY ALL EXISTING CONDITIONS AND INCLUDE IN BID ALL WORK REQUIRED TO DELIVER DESIGN INTENT. COORDINATE ALL ROOF-TO-SPACE PENETRATIONS WITH LANDLORD AND REQUEST ADDITIONAL SHELL INFORMATION FROM LANDLORD AS NECESSARY. NO CHANGE ORDER WILL BE ALLOWED.

DAMPER CONTROL

DAMPERS FOR OUTDOOR AIR SUPPLY AND EXHAUST SHALL AUTOMATICALLY SHUT WHEN THE SYSTEM OR SPACES SERVED ARE NOT IN USE OR DURING BUILDING WARM-UP, COOL-DOWN, AND SETBACK. OPERATION OF DAMPERS SHALL BE ALLOWED DURING VENTILATION PREPURGE ONE HOUR BEFORE EXPECTED OCCUPANCY AND FOR UNOCCUPIED PERIOD PRE-COOLING DURING THE COOLING SEASON.

GREEN BUILDING NOTES

5.410.4 TESTING AND ADJUSTING OF NEW SYSTEMS INSTALLED TO SERVE AN ADDITION OR ALTERATION SUBJECT TO SECTION 5.410.4 SHALL BE REQUIRED.

5.504.1 TEMPORARY VENTILATION.
IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION. USE RETURN AIR FILTERS WITH A MERV OF 8, BASED ON ASHRAE 52.2-1999, OR AN AVERAGE EFFICIENCY OF 30% BASED ON ASHRAE 52.1-1192. REPLACE ALL FILTER IMMEDIATELY PRIOR TO OCCUPANCY.

5.504.3 AT THE TIME OF ROUGH INSTALLATION OR DURING STORAGE ON THE CONSTRUCTION SITE AND UNTIL START-UP PF THE HEATING AND COOLING EQUIPMENT, ALL DUCTS AND OTHER RELATED AIR DISTRIBUTION COMPONENT EQUIPMENT SHALL BE COVERED WITH TAPE, PLASTIC, SHEETMETAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST OR DEBRIS WHICH MAY COLLECT IN THE SYSTEM.

5.504.4.1 ADHESIVES, SEALANTS, AND CAULKS USED IN THE PROJECT SHALL MEET THE REQUIREMENTS OF THE FOLLOWING STANDARDS:

1. ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.1 AND 5.504.4.2.
2. AEROSOL ADHESIVES AND SMALLER UNIT SIZES OF ADHESIVES AND SEALANT OR CAULKING COMPOUNDS (IN UNITS OF PRODUCT, LESS PACKAGING, WHICH DO NOT WEIGHT MORE THAN ONE POUND AND DO NOT CONSIST OF MORE THAN 16 FLUID OUNCES) SHALL COMPLY WITH STATEWIDE VOC STANDARDS AND OTHER REQUIREMENTS, INCLUDING PROHIBITIONS ON USE OF CERTAIN TOXIC COMPOUNDS, OF CALIFORNIA CODE OF REGULATIONS, TITLE 17, COMMENCING WITH SECTION 94507.0

5.504.5.3 IN MECHANICAL VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDES AT LEAST A MERV 8.

5.506.1 MECHANICAL VENTILATION SHALL BE CALCULATED PER SECTION 120.1 OF THE CALIFORNIA ENERGY CODE, OR THE APPLICABLE LOCAL CODE, WHICHEVER IS MORE STRINGENT, AND DIVISION 1, CHAPTER 4 OF CCR, TITLE 8.

5.506.2 FOR BUILDINGS EQUIPPED WITH DEMAND CONTROL VENTILATION, CO2 SENSORS AND VENTILATION CONTROLS SHALL BE SPECIFIED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CALIFORNIA ENERGY CODE, SECTION 120(C).

5.508 HVAC, REFRIGERATION, AND FIRE-SUPPRESSION EQUIPMENT SHALL NOT CONTAIN CFCS OR HALON.

LEGEND

PD	PRESSURE DROP
PH	PHASE
POC ⊕	POINT OF CONNECTION
PPM	PARTS PER MILLION
PREFAB	PRE-FABRICATED
PRV	PRESSURE REDUCING VALVE, POWER ROOF VENTILATOR
PSI	POUNDS PER SQUARE INCH
PTAC	PACKAGED TERMINAL AIR CONDITIONER
R	THERMAL RESISTANCE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RM	ROOM
RPM	REVOLUTION PER MINUTE
RTU	ROOF TOP UNIT
REV	REVOLUTION, REVISION
RV	RELIEF VALVE
S/S	STAINLESS STEEL
SENS	SENSIBLE
SF	SAFETY FACTOR
SMK	SMOKE
STN	STRAINER
TCV	TEMPERATURE CONTROL VALVE
TDV	TRIPLE DUTY VALVE
TEMP	TEMPERATURE
TONS	TONS OF REFRIGERATION
TSTAT	THERMOSTAT
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VAV	VARIABLE AIR VOLUME
VSC	VARIABLE SPEED CONTROLLER
VVT	VARIABLE VOLUME TERMINAL
WB	WET BULB TEMPERATURE
WT	WEIGHT

SHEET INDEX

LEGEND

SYMBOL & ABBREVIATION	DESCRIPTION
COEFF	COEFFICIENT
COL	COLUMN
COND	CONDENSER, CONDENSING
CONT	CONTINUOUS
COP	COEFFICIENT OF PERFORMANCE (HEATING)
CCP	COOLING COIL PUMP
CP	CONDENSATE PUMP
CT	COOLING TOWER
CTR	COOLING TOWER RETURN
CTS	COOLING TOWER SUPPLY
CU	CONDENSING UNIT
CW	COLD WATER
CWP	COLD WATER PUMP
CWR	COLD WATER RETURN
CWS	COLD WATER SUPPLY
dB	DECIBEL
DB	DRY BULB TEMPERATURE
DCV	DEMAND CONTROLLED VENTILATION
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DEPT	DEPARTMENT
DET	DETAIL
DH	DUCT HEATER
DIA	DIAMETER
DISC	DISCONNECT
DISCH	DISCHARGE
DPS	DIFFERENTIAL PRESSURE SENSOR
DR	DRAIN
DWG	DRAWING
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECON	ECONOMIZER
EER	ENERGY ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
(E)	EXISTING
EFF	EFFICIENCY
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EH	ELECTRIC HEATER
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FC	FAN COIL UNIT
FD	FIRE DAMPER
FLEX	FLEXIBLE
FLR	FLOOR
FLTR	FILTER
FPM	FEET PER MINUTE
FPT	FAN POWERED TERMINAL
FSD	FIRE SMOKE DAMPER
FSS	FLOW SENSING SWITCH
FURN, FAU	FURNACE AIR UNIT
GA.	GAGE/GAUGE
GC	GENERAL CONTRACTOR
HP	HEAT PUMP
HSTAT	HUMIDISTAT
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HW	HOT WATER
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HWT	HOT WATER TANK
HZ	FREQUENCY
ID	INSIDE DIAMETER
IN WC	INCHES, WATER COLUMN
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
MCA	MINIMUM CIRCUIT AMPACITY
MFR	MANUFACTURER
MECH	MECHANICAL
MOCP	MAXIMUM OVERCURRENT PROTECTION
(N)	NEW
NA	NOT APPLICABLE
NC	NOISE CRITERIA, NORMALLY CLOSED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OA/OSA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER
P	PUMP

LEGEND

SYMBOL & ABBREVIATION	DESCRIPTION
SA/SUP	SUPPLY AIR (RISE/DROP)
RA/RET	RETURN AIR DUCT (RISE/DROP)
EA/EXH	EXHAUST AIR DUCT (RISE/DROP)
CD/SR	CEILING DIFFUSER/SUPPLY REGISTER (ARROWHEAD REPRESENTS NUMBER OF THROW) (4-WAY TYPICAL IF NO ARROWS)
RR/RG	RETURN REGISTER/GRILLE
ER/EG	EXHAUST REGISTER/GRILLE
	RECTANGULAR DUCT ELBOW WITH TURNING VANES
FC	FLEXIBLE CONNECTION
MVD	MANUAL VOLUME DAMPER
FD	FIRE DAMPER
(L)	DUCT LINING (1" THICK UNLESS OTHERWISE NOTED)
	SINGLE LINE DUCT BRANCH TAKE-OFF
	DUCT TRANSITION (RECTANGULAR TO ROUND)
FLEX	FLEXIBLE DUCT
T	T-STAT PROGRAMABLE THERMOSTAT
S	TEMPERATURE SENSOR
SD	SD DUCT SMOKE DETECTOR
F	FD FIRE DAMPER
FS	FSD COMBINATION FIRE/SMOKE DAMPER
Z	ZD ZONE DAMPER
CD	CD CONDENSATE DRAIN
Ø	DIA. DIAMETER
DL	DL DOOR LOUVER
UC	UC DOOR UNDERCUT (3/4" MINIMUM)
	POC POINT OF CONNECTION
M	FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
E	FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
ME	FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.
SD-1 / 100	(SD-SUPPLY DIFFUSER, RD-RETURN DIFFUSER, E-EXHAUST) AIR QUANTITY IN CFM
AC / 1	MECHANICAL EQUIPMENT DESIGNATION DESIGNATED NUMBER
A/C , AC, ACU	AIR CONDITIONING UNIT
ADD	ADDITION
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFS	AIR FLOW SENSOR
AHU	AIR HANDLER UNIT
ALT	ALTERNATE
AMB	AMBIENT
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL
AS	AIR SEPARATOR
AV	AIR VENT
BAPR	BAROMETRIC PRESSURE
BARO	BAROMETER
BBD	BOILER BLOW DOWN
BCV	BUTTERFLY CHECK VALVE
BDD	BACK DRAFT DAMPER
BFP	BACK FLOW PREVENTER
BFV	BACK FLOW VALVE
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLR	BOILER
BP	BOILING POINT
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BYP	BY PASS
CA	COMPRESSED AIR
CAV	CONSTANT AIR VOLUME
CB	CIRCUIT BREAKER
C/C,CC	COOLING COIL
CD	CONDENSATE DRAIN
CLG.	CEILING
CO2	CARBON DIOXIDE
CONN.	CONNECT/CONNECTION
CONT.	CONTINUATION
CONT'R	CONTRACTOR
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHKV	CHECK VALVE
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CKT	CIRCUIT
CLG	CEILING
CO	CARBON MONOXIDE, CLEAN-OUT
CO2	CARBON DIOXIDE

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CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL LEGEND, NOTES, AND ABBREVIATIONS

M-010

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MECHANICAL SPECIFICATION

SECTION 1500 - HEATING, VENTILATION AND AIR CONDITIONING

1.00 - GENERAL

1.01 DESCRIPTION OF WORK

FURNISH AND INSTALL COMPLETE AND OPERATIONAL HVAC SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

A. PACKAGED HEATING & COOLING ROOFTOP UNITS.

B. POWER VENTILATORS.

C. AIR DISTRIBUTION METAL DUCTS.

D. HYDRONIC PIPING.

E. HANGERS AND SUPPORTS FOR DUCTWORK, PIPING AND HVAC EQUIPMENT.

F. THERMAL AND ACOUSTIC INSULATION.

G. SEISMIC RESTRAINTS AND BRACING.

H. AUTOMATIC TEMPERATURE CONTROL SYSTEM.

H. DEMOLITION AND REMOVAL OF EXISTING HVAC EQUIPMENT AS REQUIRED.

1.02 RELATED WORK INCLUDED UNDER OTHER SECTIONS

A. FIRE PROTECTION, SECTION 15300.

B. PLUMBING, SECTION 15400.

C. LINE VOLTAGE AND POWER WIRING, ELECTRICAL SECTION 16000.

1.03 EXAMINATION OF SITE

VISIT SITE BEFORE SUBMITTING BID AND CHECK LOCATION OF ALL EXISTING CONDITIONS WHICH WILL AFFECT THIS WORK, VERIFY DIMENSIONS AND LOCATIONS SHOWN ON DRAWINGS AND COVER ALL COSTS. CONTRACTOR SHALL ASSUME REASONABLE VARIATIONS OR MINOR OMISSIONS AND SHALL COMPLETE PROPOSED WORK WITHOUT ADDITIONAL COST. FAILURE TO VISIT SITE WILL NOT LESSEN RESPONSIBILITY OR ENTITLE ADDITIONAL COMPENSATION FOR WORK NOT INCLUDED IN PROPOSAL.

1.04 DRAWINGS

THE ACCOMPANYING DRAWINGS SHALL BE CONSIDERED PART OF THESE SPECIFICATIONS. WORK AND MATERIALS SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS AND VICE VERSA SHALL BE EXECUTED AS IF SPECIFICALLY MENTIONED OR SHOWN IN BOTH. THE DRAWINGS SHALL BE CONSIDERED AS SCHEMATIC IN NATURE AND MINOR MODIFICATIONS OF THE WORK TO COMPLY WITH THE STRUCTURE AS FOUND SHALL BE MADE.

1.05 RULES AND REGULATIONS

A. ALL WORK AND MATERIAL SHALL BE IN FULL ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE STATE FIRE MARSHAL AND OTHER APPLICABLE STATE AND LOCAL RULES AND REGULATIONS.

B. NOTHING IN THESE DRAWINGS OR SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

C. FURNISH WITHOUT ANY EXTRA CHARGE ANY ADDITIONAL MATERIAL AND LABOR WHEN REQUIRED TO COMPLY WITH THESE LAWS, ORDINANCES AND CODES REGARDLESS OF WHETHER SHOWN OR MENTIONED IN THESE SPECIFICATIONS OF DRAWINGS.

1.06 SUBMITTALS

A. SUBMIT FOR REVIEW A COMPLETE AND ALL-INCLUSIVE LIST OF EQUIPMENT AND MATERIALS PROPOSED FOR USE; (1) SOFT COPY, ACCOMPANIED BY MANUFACTURER'S DATA SHEETS. DATA SHALL BE FORWARDED IN A SINGLE PACKAGE WITHIN 15 DAYS AFTER AWARD OF CONTRACT. SUBMIT PORTABLE DOCUMENT FORMAT (PDF) AND ONE REPRODUCIBLE SHOP DRAWING SHOWING PROPOSED DUCTWORK INSTALLATION. INCLUDE SIZES, LOCATIONS AND OTHER REQUIRED INFORMATION TO COORDINATE INSTALLATION WITH OTHER TRADES.

B. WITHIN 5 DAYS AFTER AWARD OF CONTRACT, SUBMIT PDF & A COPY OF A LETTER STATING ANY MATERIALS THAT CONTRACTOR WISHES TO SUBSTITUTE, TO THE OWNER FOR APPROVAL. INCLUDE SUCH INFORMATION AS MANUFACTURER'S NAME, TYPE OF MATERIAL, CERTIFIED RATINGS, OVERALL APPEARANCE, AND NECESSARY INFORMATION TO EXPLAIN FUNCTION AND OPERATION OF MATERIAL. ALL PROPOSED SUBSTITUTIONS SHALL BE EQUAL IN QUALITY, DESIGN, UTILITY AND APPEARANCE TO MATERIAL, EQUIPMENT OR METHOD SPECIFIED.

1.07 AS-BUILT DRAWINGS

A SET OF HVAC PRINTS OR ACCESS TO A PRINT SHOP/PDFS WILL BE FURNISHED TO THE CONTRACTOR ON WHICH HE/SHE SHALL INDICATE THE INSTALLATION "AS-BUILT" AS THE WORK PROGRESSES. UPON COMPLETION OF THE WORK, A SET OF REPRODUCIBLE DRAWINGS SHALL BE OBTAINED FROM THE OWNER AT COST, AND ALL CHANGES AS NOTED ON THE RECORD SET OF PRINTS SHALL BE INCORPORATED THEREON. THIS SET OF REPRODUCIBLES, ALONG WITH ONE SET OF PDF'S, SHALL BE DELIVERED TO THE OWNER UPON COMPLETION AND BEFORE FINAL ACCEPTANCE OF THE PROJECT.

1.08 GUARANTEE

THE CONTRACTOR SHALL LEAVE THE ENTIRE INSTALLATION IN COMPLETE WORKING ORDER FREE FROM ANY DEFECTIVE MATERIAL, WORKMANSHIP OR FINISH. HE SHALL GUARANTEE TO REPAIR OR REPLACE, WITHOUT CHARGE, DEFECTS DUE TO FAULTY WORKMANSHIP OR MATERIAL FOR A PERIOD OF ONE YEAR FROM THE DATE OF FILING OF THE NOTICE OF COMPLETION.

1.09 OPERATION MANUALS AND OWNER INSTRUCTIONS

A. PROVIDE COMPLETE OPERATION AND MAINTENANCE MANUALS COVERING ALL MECHANICAL SYSTEMS AND EQUIPMENT THAT HAVE BEEN INSTALLED. A HARD COPY & SOFT COPY OF THE MANUAL SHALL BE PROVIDED TO AN OWNER.

B. PROVIDE INSTRUCTIONS TO STORE PERSONNEL AS TO OPERATION OF ALL HVAC EQUIPMENT AND THERMOSTATS. INSTRUCTION PERIOD TO COMMENCE FOR MINIMUM OF (2) HOURS AND SHALL BE SCHEDULED AT OWNER'S CONVENIENCE. ALSO, PROVIDE STORE MANAGER WITH OPERATION MANUAL.

1.10 CUTTING AND PATCHING

A. CONTRACTOR SHALL DO ALL CUTTING, DRILLING AND PATCHING WHICH MAY BE REQUIRED FOR THE INSTALLATION OF THE WORK UNDER THIS SECTION OF THE SPECIFICATIONS.

B. PATCHING SHALL BE OF THE SAME WORKMANSHIP, MATERIAL, AND FINISH AND SHALL MATCH ACCURATELY ALL SURROUNDING CONSTRUCTION IN A MANNER SATISFACTORY TO THE OWNER. NO CUTTING OF THE STRUCTURE SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE OWNER AND THE ARCHITECT.

2.00 - DUCTWORK

2.01 MATERIALS

2.01.1 METAL AIR DUCTS

A. SHEET METAL RECTANGULAR AND ROUND DUCTWORK, PLENUMS, AND CASINGS SHALL BE FABRICATED IN STRICT ACCORDANCE WITH LATEST EDITION OF SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" BASED ON INDICATED STATIC-PRESSURE CLASS.

B. MATERIAL FOR DUCTWORK SHALL BE HOT DIPPED GALVANIZED (G60) STEEL OF GAUGES SHOWN IN THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS. ALL DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH PRESSURE CLASSIFICATION SCHEDULES OF NO LESS THAN CLASS +/- 2" W.G., AND SHALL BE SEALED TO THE DUCT SEALING REQUIREMENTS OF CLASS "C" MINIMUM.

C. SELECT TRANSVERSE JOINT AND LONGITUDINAL SEAM TYPES, FIGURES 1-4 AND 1-5 RESPECTIVELY, AND FABRICATE RECTANGULAR DUCTWORK ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

D. SELECT ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, TEES AND LATERALS, AND OTHER FITTING TYPES, AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

E. TRANSITIONS IN SIZE OF DUCTS SHALL BE MADE BY UNIFORMLY TAPERING SECTIONS HAVING 1 INCH INCREASE IN WIDTH FOR EACH 7 INCHES OF RUN UNLESS CONSTRUCTION LIMITATIONS REQUIRE A MORE ABRUPT TRANSITION.

F. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE", CHAPTER 4, "HANGERS AND SUPPORTS" FOR UPPER AND LOWER ATTACHMENTS. FIGURES 4.2 AND 4.4 RESPECTIVELY. REFER TO TABLES 4.1 AND 4.2 FOR RECTANGULAR AND ROUND MINIMUM HANGER SIZE AND SPACING.

G. SHEET METAL ROUND DUCT SHALL BE UNITED MCGILL, SEMCO INC., LINX IND., OR EQUAL SPIRAL SEAM DUCTS WITH GASKET "UNISEAL" CONNECTION FOR EXPOSED INSTALLATIONS, AND SPIRAL OR LONGITUDINAL SEAM WITH BEADED SLEEVE JOINT CONNECTIONS FOR CONCEALED INSTALLATIONS. FITTINGS SHALL BE "UNIFORM" MACHINE FORMED WITH CONTINUOUS WELDS.

H. SUPPLY AND RETURN AIR DUCTWORK SHALL BE EXTERNALLY INSULATED AS REQUIRED BY LOCAL ENERGY CODE. INSULATION SHALL BE OWENS-CORNING SOFT DUCT WRAP OR EQUAL CONSISTING OF A BLANKET OF GLASS FIBER INSULATION FACTORY-LAMINATED TO FRK VAPOR RETARDER FACING. INSULATION SHALL MEET THE REQUIREMENTS OF NFPA 90A AND 90 B AND OTHER MECHANICAL ENERGY CODES.

2.01.2 FACTORY-MADE AIR DUCTS

A. FACTORY-MADE AIR DUCTS SHALL BE APPROVED FOR THE USE INTENDED. EACH SECTION OF A FACTORY-MADE AIR DUCT SHALL BE IDENTIFIED BY THE MANUFACTURER WITH A LABEL INDICATING CLASS DESIGNATION. THESE DUCTS SHALL BE LISTED AND SHALL BE INSTALLED IN ACCORDANCE WITH THE TERMS OF THEIR LISTING, AND SHALL BE APPROVED FOR USE WITHOUT LENGTH LIMITATIONS BY THE AUTHORITY HAVING JURISDICTION.

B. ACOUSTICAL FLEXIBLE DUCT SHALL BE UL 181 LISTED, CLASS 1, 2-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND SPRING-STEEL WIRE, FIBROUS-GLASS INSULATION TO MEET LOCAL CODE R-VALUES, AND FINISHED WITH A POLYETHYLENE VAPOR-BARRIER FILM. INTERIOR VINYL FILM SHALL BE PERFORATED FOR SOUND ATTENUATION. FLEXIBLE DUCT SHALL BE RATED TO +10"/-1" W.G., 4000 FPM, AND -20 TO 210°F TEMPERATURE RANGE. FLEXIBLE DUCT CLAMP CONNECTORS SHALL BE STAINLESS-STEEL BAND WITH CADMIUM HEX SCREW TO TIGHTEN BAND WITH A WORM-GEAR ACTION. FLEXIBLE DUCTS SHALL BE ALLOWED ONLY AT THE FINAL CONNECTION TO AIR OUTLETS/INLETS AT A LENGTH OF 5 FEET MAXIMUM.

C. INSULATED ALUMINUM FLEXIBLE DUCT SHALL BE UL 181 LISTED, CLASS 0, INTERLOCKING SPIRAL OF ALUMINUM FOIL, FIBROUS-GLASS INSULATION SHALL MEET LOCAL CODE R-VALUE, AND SHALL BE FINISHED WITH A POLYETHYLENE VAPOR-BARRIER FILM. ALUMINUM FLEXIBLE DUCT SHALL BE RATED TO +/- 8" W.G., 5000 FPM VELOCITY, AND -20 TO 250°F TEMPERATURE RANGE.

D. INSULATED WIRE FLEXIBLE DUCT SHALL BE UL 181 LISTED, CLASS 1, 2-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND SPRING-STEEL WIRE, FIBROUS-GLASS INSULATION SHALL MEET LOCAL CODE R-VALUES, AND SHALL BE FINISHED WITH A POLYETHYLENE VAPOR-BARRIER FILM. FLEXIBLE DUCTS SHALL BE RATED TO +10/-1" W.G., 4000 FPM VELOCITY, AND -20 TO 210°F TEMPERATURE RANGE. FLEXIBLE DUCT CLAMP CONNECTORS SHALL BE STAINLESS-STEEL BAND WITH CADMIUM HEX SCREW TO TIGHTEN BAND WITH A WORM-GEAR ACTION.

E. INSTALLATION OF FACTORY-MADE AIR DUCT JOINTS AND ATTACHMENTS SHALL BE IN STRICT ACCORDANCE WITH LATEST EDITION OF SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

F. SELECT TRANSITIONS, BRANCH CONNECTIONS, TEES AND LATERALS, AND OTHER FITTING TYPES, AND FABRICATE ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" BASED ON INDICATED STATIC-PRESSURE CLASS.

G. SELECT SIZING PRACTICES IN ACCORDANCE TO THE AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA), MANUALS D & Q. IN PRACTICE LIMIT VELOCITIES TO 700 FPM MAX. FOR SUPPLY AND RETURN AIR DUCTS, AND INCREASE DUCT SIZES BY ONE SIZE (EVEN NUMBER) LARGER THAN METAL AIR DUCTS.

H. FACTORY-MADE DUCTS SHALL NOT BE USED FOR VERTICAL RISERS IN AIR DISTRIBUTION DUCT SYSTEMS. SUCH A DUCT SHALL NOT PENETRATE CONSTRUCTION WHERE FIRE DAMPERS ARE REQUIRED.

2.01.3 DUCTWORK ACCESSORIES

A. DAMPER OPERATORS
A.A. DUCTS WITH EXTERNAL INSULATION: VENTLOCK #637, DURADYNE, YOUNG, OR APPROVED EQUAL.
A.B. DUCTS WITH INTERNAL INSULATION AND/OR NO INSULATION: VENTLOCK #635, DURADYNE, YOUNG, OR APPROVED EQUAL.

B. FLEXIBLE CONNECTIONS: VENTFABRICS "VENTGLAS", DURADYNE, OR APPROVED EQUAL, U.L. 181 APPROVED WITH METAL ATTACHMENT.

C. AIR EXTRACTOR: TITUS AG-225, KRUEGER EX-88C, OR APPROVED EQUAL.

D. TURNING VANES SHALL COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS. ALL RECTANGULAR DUCT WITH MITERED ELBOWS SHALL BE FITTED WITH TURNING VANES.

E. SPIN-IN-FITTINGS ARE NOT ALLOWED. USE UNITED MCGILL BELLMOUTH FITTING FOR ROUND DUCT TAPS.

F. ACCESS DOORS IN DUCTWORK: SHALL BE VENTLOCK, DUCTMATE OR APPROVED EQUAL, STAMPED OR FORMED INSULATED ACCESS DOORS COMPLETE WITH ALL HARDWARE AND SEALANT.

G. JOINT SEALING:
G.1. THE FOLLOWING ITEMS ARE TO BE SEALED WITH HARDCAST DT TAPE AND ADHESIVE:
G.1.a. LONGITUDINAL AND TRANSVERSE SEAMS OF RECTANGULAR DUCTWORK.
G.1.b. ALL ROUND FITTINGS AND JOINT CONNECTORS USE FTA-20 FOR INDOOR USE AND RTA-20 FOR OUTDOOR USE.
G.2. FLEXIBLE DUCT AT DIFFUSERS SHALL USE INTEGRAL STAINLESS STEEL DRAW BAND AND PRESSURE SENSITIVE TAPE, HARDCAST P-301 OR EQUAL.

H. BRACINGS, HANGERS, NUTS, ETC. SHALL BE GALVANIZED.

I. CURVED ELBOWS SHALL HAVE CENTERLINE RADIUS EQUAL TO ONE AND ONE-HALF TIMES DUCT WIDTH IN PLANE OF TURN.

J. SQUARE ELBOWS SHALL HAVE TURNING VANES. MITER ELBOWS (NOT SQUARE) SHALL HAVE SPLITTER VANES 3 INCHES O.C.

K. VOLUME DAMPERS SHALL BE CONSTRUCTED TO SMACNA STANDARDS AND SHALL BE YOUNG REGULATOR MODEL 4040 FOR ROUND DUCTS AND SERIES 820 FOR RECTANGULAR DUCTS.

L. CONTRACTOR SHALL PROVIDE MANUAL VOLUME DAMPERS AT ALL BRANCH DUCTWORK IN SUPPLY AIR, RETURN AIR AND OUTSIDE AIR SYSTEMS (WHETHER SHOWN ON PLANS OR NOT) WHERE REQUIRED FOR AIR BALANCING OF HVAC SYSTEMS. ALL ACCESSIBLE VOLUME CONTROLS SHALL HAVE LOCKING QUADRANTS. ALL INACCESSIBLE CONTROLS (DAMPERS, ETC.) SHALL BE PROVIDED WITH PERMANENT EXTENSIONS TO ACCESSIBLE SPACES. BRANCH VOLUME CONTROLS ARE IN ADDITION TO VOLUME CONTROLS AT THE REGISTERS AND DIFFUSERS.

M. DIFFUSERS, GRILLES AND REGISTERS: AIR INLETS, OUTLETS SHALL BE PROPERLY SET IN PLACE. REGISTERS AND GRILLES SHALL BE TIGHTLY SEALED. EACH REGISTER AND DIFFUSER SHALL BE EQUIPPED WITH A VOLUME DAMPER OR AIR EXTRACTOR. PAINT INTERIOR SURFACE OF ALL UNITS FLAT BLACK. FACE AND TRIM OF ALL UNITS SHALL BE FINISHED. SIZE, FINISH, FRAMES, ACCESSORIES, CAPACITY AND PATTERN AS SHOWN ON DRAWINGS.

2.02 EXECUTION

A. ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR TIGHT (MAX. 5 % LEAKAGE) AND NOISELESS (NO OBJECTIONABLE NOISE) SYSTEMS, CAPABLE OF PERFORMING EACH INDICATED SERVICE. INSTALL EACH RUN WITH MINIMUM OF JOINTS.

B. ALIGN DUCTWORK ACCURATELY AT CONNECTIONS, WITHIN 1/8" MISALIGNMENT TOLERANCE AND WITH INTERNAL SURFACES SMOOTH.

C. SUPPORT DUCTS RIGIDLY WITH SUITABLE TIES, BRACES, HANGERS AND ANCHORS OF TYPE WHICH WILL HOLD DUCT TRUE TO SHAPE AND WILL PREVENT BUCKLING.

D. PROVIDE ALL NECESSARY OFFSETS AND TRANSITIONS AS REQUIRED IN THE INSTALLATION OF THE WORK, ALTHOUGH SOME MAY NOT BE SPECIFICALLY SHOWN ON THE PLANS. OFFSET ALL DUCTS AS REQUIRED TO INCREASE HEAD ROOM UNDER THEM, TO IMPROVE THE APPEARANCE OF EXPOSED DUCTS, AND TO AVOID INTERFERENCE WITH THE WORK OF OTHER TRADES.

E. LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY AND AVOID DIAGONAL RUNS WHEREVER POSSIBLE.

F. HOLD DUCTS CLOSE TO WALLS OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING.

G. WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS AND EXTERIOR WALLS, CONCEAL SPACE BETWEEN CONSTRUCTION OPENING AND DUCT OR DUCT-PLUS-INSULATION WITH SHEET METAL FLANGES OF SAME GAGE AS DUCT.

H. WHERE DUCTS PASS THROUGH TIME-RATED FIRE RESISTIVE CONSTRUCTION, ALL OPENINGS AROUND THE DUCTS SHALL BE SEALED WITH FIRE STOPPING MATERIAL, EXCEPT WHERE FIRE DAMPERS ARE SHOWN, NOTED OR REQUIRED.

I. PROVIDE ANGLE, CHANNEL, OR EQUAL TYPE FRAMES FOR ALL MANUAL AND AUTOMATIC DAMPERS AND INSTALL AS REQUIRED.

J. COORDINATE DUCT INSTALLATIONS WITH INSTALLATION OF ACCESSORIES, DAMPERS, COIL FRAMES, EQUIPMENT, CONTROLS AND OTHER ASSOCIATED WORK OF DUCTWORK SYSTEM.

K. SUPPORT DUCTWORK IN MANNER COMPLYING WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" HANGER AND SUPPORTS SECTION.

3.00 - HYDRONIC & DIRECT EXPANSION PIPING

3.01 MATERIALS

A. HOT, CHILLED, AND CONDENSER WATER SERVICE PIPING ABOVE GROUND OF NOMINAL DIAMETER 2-1/2" OR LESS SHALL BE DRAWN-TEMPER COPPER PIPE, ASTM B88, TYPE L, WITH WROUGHT-COPPER FITTINGS, AND 95/5 LEAD FREE SOLDERED JOINTS.

B. REFRIGERANT PIPING SHALL BE TYPE L HARD COPPER ACR TUBING WITH WROUGHT COPPER, SOLDER JOINT FITTINGS, SILVER SOLDERED. ALL REFRIGERANT PIPING SHALL BE INSULATED EXCEPT WHERE THE UNINSULATED AREA DOES NOT RESULT IN AN ENERGY LOSS TO THE SYSTEM OR AN ADVERSE EFFECT TO THE SYSTEM FROM STRAY HEAT. PIPE INSULATION SHALL BE ARMSTRONG ARMAFLEX, OWENS-CORNING FLEXIBLE TUBING, RUBICON OR APPROVED EQUAL. THICKNESS SHALL BE 3/4" ON INTERIOR PIPING AND 1" ON EXTERIOR PIPING. INSULATED PIPING EXPOSED TO WEATHER SHALL BE PROVIDED WITH ARMSTRONG ARMAFLEX FINISH AND ALL-WEATHER SERVICE JACKET FOR OUTDOOR APPLICATIONS VALVES, STRAINERS, SIGHT GLASS, FILTER DRIERS, OIL SEPARATORS, ETC. SHALL BE MANUFACTURED BY SPORLAN VALVE CO.

C. COPPER PIPING SHALL HAVE SOLDERED JOINTS OF 250 PSIG PRESSURE RATING.

D. CONDENSATE DRAIN PIPE SHALL BE COPPER TYPE M, ASTM B88, WROUGHT COPPER FITTINGS, SOLDERED JOINTS.

E. GATE VALVES, 2-INCH AND SMALLER: MSS SP-80; CLASS 125, BODY AND BONNET OF ASTM B 62 CAST BRONZE; WITH THREADED OR SOLDER ENDS, SOLID DISC, SILICON BRONZE ALLOY STEM, BRASS PACKING GLAND, "TEFLON" IMPREGNATED PACKING, AND MALLEABLE IRON HANDWHEEL. PROVIDE CLASS 150 VALVES MEETING THE ABOVE WHERE SYSTEM PRESSURE REQUIRES.

F. BALL VALVES, 2-INCH AND SMALLER: MSS SP-110; RATED FOR 150 PSI SATURATED STEAM PRESSURE, 600 PSI WOG PRESSURE; TWO-PIECE CONSTRUCTION; WITH BRONZE BODY CONFORMING TO ASTM B 62, STANDARD PORT, CHROME-PLATED BRASS BALL, REPLACEABLE "TEFLON" OR "TFE" SEATS AND SEALS, BLOWOUT-PROOF STEM, AND VINYL-COVERED STEEL HANDLE. PROVIDE SOLDER ENDS FOR CONDENSER WATER, CHILLED WATER; AND THREADED ENDS FOR HEATING HOT WATER.

G. PLUG VALVES, 2-INCH AND SMALLER: RATED AT 150 PSI WOG; BRONZE BODY, WITH STRAIGHT- AWAY PATTERN, SQUARE HEAD, AND THREADED ENDS

H. GLOBE VALVES, 2-INCH AND SMALLER: MSS SP-80; CLASS 125; BODY AND SCREWED BONNET OF ASTM B 62 CAST BRONZE; WITH THREADED OR SOLDER ENDS, BRASS OR "TEFLON" DISC, SILICON BRONZE ALLOY STEM, BRASS PACKING GLAND, "TEFLON" IMPREGNATED PACKING, AND MALLEABLE IRON HANDWHEEL. PROVIDE CLASS 150 VALVES MEETING THE ABOVE WHERE SYSTEM PRESSURE REQUIRES.

I. SWING CHECK VALVES, 2-INCH AND SMALLER: MSS SP-80; CLASS 125, CAST-BRONZE BODY AND CAP CONFORMING TO ASTM B 62; WITH HORIZONTAL SWING, Y-PATTERN, AND BRONZE OR "TEFLON" DISC; AND HAVING THREADED OR SOLDER ENDS. PROVIDE VALVES CAPABLE OF BEING REGROUND WHILE THE VALVE REMAINS IN THE LINE. PROVIDE CLASS 150 VALVES MEETING THE ABOVE SPECIFICATIONS, WITH THREADED END CONNECTIONS, WHERE SYSTEM PRESSURE REQUIRES OR WHERE CLASS 125 VALVES ARE NOT AVAILABLE.

J. BALANCING VALVES, 2 ½" AND SMALLER: BRONZE BODY, BALL TYPE, 125-PSIG WORKING PRESSURE, 250°F MAXIMUM OPERATING TEMPERATURE, AND HAVING THREADED ENDS. VALVES SHALL HAVE CALIBRATED ORIFICE OR VENTURI, CONNECTIONS FOR PORTABLE DIFFERENTIAL PRESSURE METER WITH INTEGRAL SEALS, AND BE EQUIPPED WITH A MEMORY STOP TO RETAIN SET POSITION.

K. AUTOMATIC FLOW-CONTROL VALVES: GRAY-IRON BODY, FACTORY SET TO MAINTAIN CONSTANT FLOW WITH PLUS OR MINUS 5 PERCENT OVER SYSTEM PRESSURE FLUCTUATIONS, AND EQUIPPED WITH A READOUT KIT INCLUDING FLOW METER, PROBES, HOSES, FLOW CHARTS, AND CARRYING CASE. EACH VALVE SHALL HAVE AN IDENTIFICATION TAG ATTACHED BY CHAIN, AND BE FACTORY MARKED WITH THE ZONE IDENTIFICATION, VALVE NUMBER, AND FLOW RATE.

L. MANUAL AIR VENT: BRONZE BODY AND NONFERROUS INTERNAL PARTS; 150-PSIG WORKING PRESSURE; 225°F OPERATING TEMPERATURE; MANUALLY OPERATED WITH SCREWDRIVER OR THUMBSCREW; WITH 1/8" DISCHARGE CONNECTION AND ½" INLET CONNECTION.

M. AUTOMATIC AIR VENT: DESIGNED TO VENT AUTOMATICALLY WITH FLOAT PRINCIPLE; BRONZE BODY AND NONFERROUS INTERNAL PARTS; 150-PSIG WORKING PRESSURE; 240°F OPERATING TEMPERATURE; WITH ¼" DISCHARGE CONNECTION AND ½" INLET CONNECTION.

N. Y-PATTERN STRAINERS: 125-PSIG WORKING PRESSURE; CAST-IRON BODY (ASTM A 126, CLASS B), THREADED CONNECTIONS FOR 2" AND SMALLER, BOLTED COVER, PERFORATED STAINLESS-STEEL BASKET, AND BOTTOM DRAIN CONNECTION.

O. FLEXIBLE CONNECTORS: STAINLESS-STEEL BELLOWS WITH WOVEN, FLEXIBLE, BRONZE, WIRE-REINFORCING PROTECTIVE JACKET; 150-PSIG MINIMUM WORKING PRESSURE AND 250°F MAXIMUM OPERATING TEMPERATURE. CONNECTORS SHALL HAVE FLANGED- OR THREADED-END CONNECTIONS TO MATCH EQUIPMENT CONNECTED AND SHALL BE CAPABLE OF 3/4-INCH (20-MM) MISALIGNMENT.

P. INSULATE ALL WATER PIPING WITH DENSITY FIBROUS GLASS INSULATION WITH WHITE KRAFT BONDED TO ALUMINUM FOIL. THICKNESS AND R-VALUE AS PER TABLE 120.3-A OF CEC STANDARDS. FITTINGS SHALL BE INSULATED WITH PRE-MOLDED FIBERGLASS INSULATION. THE INTEGRITY OF THE VAPOR BARRIER SHALL BE MAINTAINED THROUGHOUT THE INSTALLATION. TAPE AND SEAL ALL JOINTS WITH VAPOR BARRIER TAPE.

3.02 EXECUTION:

A. INSTALL HANGERS, SUPPORTS, CLAMPS, AND ATTACHMENTS TO SUPPORT PIPING PROPERLY FROM BUILDING STRUCTURE; COMPLY WITH MSS SP-69. ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING TO BE SUPPORTED TOGETHER ON TRAPEZE TYPE HANGERS WHERE POSSIBLE. INSTALL SUPPORTS WITH MAXIMUM SPACING COMPLYING WITH MSS SP-69. WHERE PIPING OF VARIOUS SIZES IS TO BE SUPPORTED TOGETHER BY TRAPEZE HANGERS, SPACE HANGERS FOR SMALLEST PIPE SIZE OR INSTALL INTERMEDIATE SUPPORTS FOR SMALLER DIAMETER PIPE.

B. INSTALL HANGERS AND SUPPORTS COMPLETE WITH NECESSARY INSERTS, BOLTS, RODS, NUTS, WASHERS AND OTHER ACCESSORIES. EXCEPT AS OTHERWISE INDICATED FOR EXPOSED CONTINUOUS PIPE RUNS, INSTALL HANGERS AND SUPPORTS OF SAME TYPE AND STYLE AS INSTALLED FOR ADJACENT SIMILAR PIPING.

C. PREVENT ELECTROLYSIS IN SUPPORT OF COPPER TUBING BY USE OF HANGERS AND SUPPORTS WHICH ARE COPPER PLATED, OR BY OTHER RECOGNIZED INDUSTRY METHODS.

D. INSTALL HANGERS AND SUPPORTS TO ALLOW CONTROLLED MOVEMENT OF PIPING SYSTEMS AND TO PERMIT FREEDOM OF MOVEMENT BETWEEN PIPE ANCHORS, AND TO FACILITATE ACTION OF EXPANSION JOINTS, EXPANSION LOOPS, EXPANSION BENDS AND SIMILAR UNITS.

E. INSTALL HANGERS AND SUPPORTS SO THAT PIPING LIVE AND DEAD LOADING AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.

F. INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES, AND SO THAT MAXIMUM PIPE DEFLECTIONS ALLOWED BY ANSI B31 PRESSURE PIPING CODES ARE NOT EXCEEDED.

G. INSULATED PIPING: COMPLY WITH THE FOLLOWING INSTALLATION REQUIREMENTS.
G.1. CLAMPS: ATTACH CLAMPS, INCLUDING SPACERS, TO PIPING WITH CLAMPS PROJECTING THROUGH INSULATION; DO NOT EXCEED PIPE STRESSES ALLOWED BY ANSI B31.
G.2. SHIELDS: WHERE LOW-COMPRESSIVE-STRENGTH INSULATION OR VAPOR BARRIERS ARE INDICATED ON WATER PIPING, INSTALL COATED PROTECTIVE SHIELDS.
G.3. SADDLES: WHERE INSULATION WITHOUT VAPOR BARRIER IS INDICATED, INSTALL PROTECTION SADDLES.

H. ALL CONNECTIONS BETWEEN DISSIMILAR METALS SHALL UTILIZE DIELECTRIC INSULATING FITTINGS, COUPLINGS AND UNIONS.

4.00 - EQUIPMENT

4.01 AIR DEVICES

DIFFUSERS, GRILLES AND REGISTERS: TITUS, KRUEGER, METALAIRE, OR THERMAFUSER WHERE SHOWN. FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR. PROVIDE VOLUME DAMPERS AND PAINT INTERIOR FLAT BLACK. SIZE, FINISH, FRAME TYPES AND ACCESSORIES AS SHOWN ON THE DRAWINGS.

4.02 FIRE DAMPERS & SMOKE FIRE DAMPERS

A. PROVIDE FIRE DAMPERS WITH ACCESS DOORS INSTALLED WHERE REQUIRED BY ALL LOCAL CODES. IN GENERAL, FIRE DAMPERS ARE REQUIRED WHERE DUCTS PIERCE FIRE-RATED FLOORS, CEILINGS, WALLS AND SHAFTS. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF ALL FIRE RATED ASSEMBLIES.

B. FIRE DAMPERS SHALL BE EQUAL TO AIR BALANCE INC., MODEL NO. 119BLX, OR 119CL, OR AS APPROVED, FOR RECTANGULAR AND ROUND DUCTS. DAMPERS SHALL MEET THE REQUIREMENTS FOR NFPA BULLETIN NO. 90A, AND SHALL BE TESTED IN ACCORDANCE WITH UL 555 TEST CRITERIA, FIRE DAMPERS SHALL BE LABELED AND LISTED BY UL.

C. IF APPLICABLE, FIRE DAMPERS SHALL COMPLY WITH UL-555-2006, 7TH EDITION AND SHALL BE MARKED "FOR USE IN DYNAMIC SYSTEMS" OR "FOR USE IN STATIC SYSTEMS" AS REQUIRED.

D. COMBINATION SMOKE FIRE DAMPERS SHALL BE INSTALLED WHERE DUCTWORK PENETRATES FIRE RATED WALLS SURROUNDING AN EXIT CORRIDOR, OR WHERE OTHERWISE REQUIRED BY CODE.

4.03 AIR CONDITIONING EQUIPMENT

A. FURNISH AND INSTALL AIR CONDITIONING EQUIPMENT AS SPECIFIED ON THE DRAWINGS AND IN EQUIPMENT SCHEDULES.

B. DESCRIPTION: FACTORY ASSEMBLED AND TESTED; DESIGNED FOR ROOF OR SLAB INSTALLATION; AND CONSISTING OF COMPRESSORS, CONDENSERS, EVAPORATOR COILS, CONDENSER AND EVAPORATOR FANS, REFRIGERATION AND TEMPERATURE CONTROLS, FILTERS, AND DAMPERS.

C. CASING: MANUFACTURER'S STANDARD CONSTRUCTION WITH CORROSION-PROTECTION COATING AND EXTERIOR FINISH, HINGED PANELS OR ACCESS DOORS WITH NEOPRENE GASKETS FOR INSPECTION AND ACCESS TO INTERNAL PARTS, MINIMUM 1/2-INCH THICK THERMAL INSULATION, KNOCKOUTS FOR ELECTRICAL AND PIPING CONNECTIONS, EXTERIOR CONDENSATE DRAIN CONNECTION, AND LIFTING LUGS.

D. EVAPORATOR FANS: FORWARD CURVED, CENTRIFUGAL, BELT DRIVEN WITH ADJUSTABLE SHEAVES OR DIRECT-DRIVE FANS; AND WITH PERMANENTLY LUBRICATED MOTOR BEARINGS.

E. EXHAUST/RELIEF FANS: FORWARD-CURVED, CENTRIFUGAL OR PROPELLER TYPE, DIRECTLY DRIVEN WITH PERMANENTLY LUBRICATED MOTOR BEARINGS.

F. CONDENSER FANS: PROPELLER TYPE, DIRECTLY DRIVEN WITH PERMANENTLY LUBRICATED MOTOR BEARINGS.

G. REFRIGERANT COILS: ALUMINUM-PLATE FIN AND SEAMLESS COPPER TUBE IN GALVANIZED STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.

H. COMPRESSORS: SERVICEABLE, SEMI-HERMETIC, OR FULLY HERMETIC COMPRESSORS WITH INTEGRAL VIBRATION ISOLATORS AND CRANKCASE HEATERS.

I. SAFETY CONTROLS: FOR SEMI-HERMETIC COMPRESSORS PROVIDE MANUAL-RESET TYPE SAFETY CONTROLS FOR LOW PRESSURE, HIGH PRESSURE, AND COMPRESSOR MOTOR OVERLOAD PROTECTION.

J. TIMED-OFF CONTROL: AUTOMATIC-RESET CONTROL SHUTS COMPRESSOR OFF AFTER 5 MINUTES.

K. HEAT EXCHANGERS: MANUFACTURER'S STANDARD CONSTRUCTION FOR GAS-FIRED HEAT EXCHANGERS AND BURNERS WITH THE FOLLOWING CONTROLS:
K.1. REDUNDANT, DUAL GAS VALVES (2-STAGE HEATING).
K.2. INTERMITTENT PILOT IGNITION.
K.3. ELECTRONIC-SPARK IGNITION SYSTEM.
K.4. HIGH-LIMIT CUTOUT.
K.5. FORCED-DRAFT PROVING SWITCH.

L. ELECTRIC HEAT: MANUFACTURER'S STANDARD CONSTRUCTION, ELECTRIC RESISTANCE, FACTORY WIRED FAR SINGLE-POINT WIRING CONNECTION, WITH OVERCURRENT AND OVERHEAT PROTECTION DEVICES.

M. ECONOMIZER CONTROL: RETURN- AND OUTSIDE-AIR DAMPERS, OUTSIDE-AIR FILTER, FULLY MODULATING ELECTRONIC-CONTROL SYSTEM WITH ADJUSTABLE MIXED-AIR THERMOSTAT AND AUTOMATIC CHANGEOVER THROUGH ADJUSTABLE DRY BULB/ENTHALPY-CONTROL DEVICE.

N. VARIABLE-AIR-VOLUME CONTROL: ELECTRIC DISCHARGE-AIR-TEMPERATURE STEP CONTROLLER AND ELECTRONIC-CONTROL SYSTEM.

O. LOW AMBIENT CONTROL: HEAD-PRESSURE CONTROL, DESIGNED TO OPERATE AT TEMPERATURES AS LOW AS 30°F.

P. THERMOSTAT: STAGED HEATING AND COOLING WITH MANUAL OR AUTOMATIC CHANGEOVER ON STANDARD SUBBASE.

Q. SMOKE DETECTORS: PHOTOELECTRIC DUCT DETECTOR LOCATED IN SUPPLY/RETURN-AIR DISTRIBUTION PLENUM, TO DE-ENERGIZE UNIT.

R. IN BUILDINGS THAT DO NOT HAVE FIRE ALARM SYSTEMS, PROVIDE AUDIBLE AND VISUAL ALARM EQUAL TO AIR PRODUCTS AND CONTROL INC. MODEL MS-RH/P/A IN AN APPROVED LOCATION.

S. ELECTRICAL CONVENIENCE OUTLET: FACTORY WIRED 115-V, AC FUSED OUTLET, SEPARATELY FUSED, LOCATED IN UNIT CABINET.

T. OPERATING CONTROLS: FACTORY-INSTALLED MICROPROCESSOR CONTROLS AND MONITORS UNIT AND COMMUNICATES WITH CENTRAL CONTROL PROCESSOR.
T.1. CONTROL OUTPUTS: 2-STAGE HEATING, 2-STAGE COOLING; AND AUTOMATIC OR CONTINUOUS FAN OPERATION AND ECONOMIZER DAMPER OPERATION.
T.2. CONTROL SENSORS: RETURN-AIR-TEMPERATURE SENSOR, FAN AIRFLOW-PROVING SWITCH, DIRTY-FILTER SWITCH, DISCHARGE-AIR-TEMPERATURE SENSOR, ROOM- TEMPERATURE SENSOR, AND NIGHT-SETBACK-OVERRIDE SWITCH.
T.3. CONTROL FEATURES: DAY/OCCUPIED MODES FOR HIGH OR LOW ENTHALPY AND NIGHT/UNOCCUPIED MODE.

4.04 INSULATION (INSTALLED PER MANUFACTURER'S RECOMMENDATIONS)

A. HEATING AND COOLING DUCTWORK LOCATED IN INTERIOR LOCATIONS
A.1. INSULATE WITH OWENS-CORNING FIBERGLASS ALL SERVICE FACED DUCT WRAP TYPE 150 WITH FACTORY APPLIED FLAME RETARDANT FOIL REINFORCED KRAFT FACING (FRK-25 UL LABELSD), OR APPROVED EQUAL.
INSTALLED THERMAL RESISTANCE SHALL BE A MINIMUM OF:
- R-8 FOR DUCTWORKS INSTALLED IN THE OUTDOORS, SPACE BETWEEN ROOF AND INSULATED CEILING, SPACE UNDER ROOF WITH FIXED VENT OPENING TO OUTSIDE, UNCONDITIONED CRAWLSPACE, AND UNCONDITIONED SPACES, OR
- R-4.2 FOR DUCTWORKS BURRIED IN CONCRETE SLAB, OR INSTALLED WITHIN THE INDIRECTLY CONDITIONED SPACE SUCH AS THE SPACE BETWEEN THE CEILING AND INSULATED ROOF, WHERE THERE IS NO FIXED VENTS OR OPENINGS TO THE OUTDOORS OR TO THE UNCONDITIONED SPACES.

B. ACOUSTICAL DUCTWORK, PLENUM, AND CASING LINER
B.1. PROVIDE INTERNALLY LINED DUCTWORK WHERE INDICATED ON DRAWINGS. ACOUSTICAL DUCT LINER SHALL BE JOHNS MANVILLE LINACOUSTIC RC DUCT LINER, OR EQUAL, MATTE FACE, SUITABLE FOR VELOCITIES FROM 1500 TO 4000 FPM, IN COMPLIANCE W/ UL723 AND UL181. SECURE LINER TO DUCTWORK WITH ADHESIVE AND MECHANICAL FASTENERS PER SMACNA DUCT LINER APPLICATION STANDARD.
B.2. FIBERGLASS DUCT AND PLENUM INSULATION ARE TO BE APPLIED ONLY WITH MANUFACTURER'S APPROVED ADHESIVES, MASTICS AND MECHANICAL FASTENING DEVICES.

C. HEATING AND COOLING DUCTWORK LOCATED ON THE ROOF
C.1. INSULATE WITH RIGID BOARD INSULATION WITH A MINIMUM R VALUE OF R-8 AS REQUIRED PER CODE. COAT EXTERIOR OF INSULATION WITH PERFORATED SHEET METAL LINER, SUITABLE FOR VELOCITIES FROM 1500 TO 4000 FPM, IN COMPLIANCE W/ UL723 AND UL181.
C.2. WHERE INTERNAL INSULATION IS APPLIED, DUCT AND PLENUM SIZES AS SHOWN ON THE DRAWINGS SHALL BE INSIDE CLEAR DIMENSIONS.

D. SOFT FLEXIBLE DUCT
D.1. R-8 FOR DUCTWORKS INSTALLED IN THE OUTDOORS, SPACE BETWEEN ROOF AND INSULATED CEILING, SPACE UNDER ROOF WITH FIXED VENT OPENING TO OUTSIDE, UNCONDITIONED CRAWLSPACE, AND UNCONDITIONED SPACES, OR R-4.2 FOR DUCTWORKS INSTALLED WITHIN THE INDIRECTLY CONDITIONED SPACE SUCH AS THE SPACE BETWEEN THE CEILING AND INSULATED ROOF, WHERE THERE IS NO FIXED VENTS OR OPENINGS TO THE OUTDOORS OR TO THE UNCONDITIONED SPACES
D.2. FOIL FACED FIBERGLASS, OWENS CORNING TYPE 75 OR EQUAL, FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPMENT RATING OF NOT MORE THAN 50 UNLESS SHOWN OTHERWISE. ALL INSULATION SHALL BE EXTERNAL TO DUCTWORK.

E. DUCT LINER
E.1. FOR EXTERIOR DUCTS: FIBERGLASS WITH FIRE RATED BLACK COATING, OWENS CORNING AEROFLEX TYPE 150.
E.2. FOR OTHER LOCATIONS SHOWN ON DRAWINGS: AEROFLEX TYPE 150, AS ABOVE, EXCEPT 1 INCH THICK. FLAME SPREAD RATING OF NOT MORE THAN 25 AND SMOKE DEVELOPED RATING OF NOT MORE THAN 50.
E.3. AN EPA-APPROVED BIOCIDE IN THE AIRSTREAM COATING ENABLES OWENS-CORNING DUCT LINERS TO RESIST FUNGAL OR BACTERIAL GROWTH WHEN SUBJECTED TO MICROBIAL ATTACK DESCRIBED IN ASTM C 665 AND STANDARD PRACTICES ASTM G 21 (FUNGUS TEST) AND G 22 (BACTERIA TEST).

4.05 TEMPERATURE CONTROL SYSTEM

A. ALL UNITARY HEATING OR COOLING SYSTEMS, INCLUDING HEAT PUMPS, NOT CONTROLLED BY A CENTRAL ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) SHALL HAVE A SETBACK PROGRAMMABLE THERMOSTAT.
A.1. SETBACK CAPABILITIES: ALL THERMOSTATS SHALL HAVE A CLOCK MECHANISM THAT ALLOWS THE BUILDING OCCUPANT TO PROGRAM THE TEMPERATURE SETPOINTS FOR AT LEAST FOUR PERIODS WITHIN 24 HOURS.

B. HEAT PUMPS WITH SUPPLEMENTARY ELECTRIC RESISTANCE HEATERS SHALL HAVE CONTROLS:
B.1. THAT PREVENT SUPPLEMENTARY HEATER OPERATION WHEN THE HEATING LOAD CAN BE MET BY THE HEAT PUMP ALONE; AND
B.2. IN WHICH THE CUT-ON TEMPERATURE FOR COMPRESSION HEATING IS HIGHER THAN THE CUT-ON TEMPERATURE FOR SUPPLEMENTARY HEATING, AND THE CUT-OFF TEMPERATURE FOR COMPRESSION HEATING IS HIGHER THAN THE CUT-OFF TEMPERATURE FOR SUPPLEMENTARY HEATING.

C. ALL UNITARY SINGLE ZONE, AIR CONDITIONERS, HEAT PUMPS, AND FURNACES, THE THERMOSTAT SHALL COMPLY WITH THE REQUIREMENTS CALIFORNIA ENERGY COMMISSION, T-24, PART 6, REFERENCE JOINT APPENDIX JA5, ALSO KNOWN AS THE OCCUPANT CONTROLLED SMART THERMOSTATS, WHICH ARE CAPABLE OF RECEIVING DEMAND RESPONSE SIGNALS IN THE EVENT OF GRID CONGESTION AND SHORTAGES DURING HIGH ELECTRICAL DEMAND PERIODS.

D. CONTRACTOR SHALL POST IN THE OCCUPIED SPACE TYPEWRITTEN INSTRUCTIONS ON OPERATION OF ALL CONTROLS.

(SPECIFICATIONS CONTINUED ON FOLLOWING SHEET)

sg

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PROJECT INFORMATION:
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CHECKED BY:	GP/DY
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SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL SPECIFICATIONS

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MECHANICAL SPECIFICATION (CONTINUED)

4.06 SEISMIC RESTRAINTS AND BRACING

A. ALL HVAC EQUIPMENT, DUCTWORK, PIPING AND WIRING CONDUITS SHALL BE INSTALLED TO MEET THE LATERAL BRACING REQUIREMENTS FOR THE APPLICABLE SEISMIC ZONE. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH SEISMIC HAZARD LEVEL (SHL) A OF THE "SEISMIC RESTRAINT MANUAL: GUIDELINES FOR MECHANICAL SYSTEMS" DATED 2009, AS PUBLISHED BY S.M.A.C.N.A. AND ALSO IN ACCORDANCE WITH APPLICABLE LOCAL BUILDING CODES.

B. ALL ROOFTOP EQUIPMENT SHALL HAVE PROPER ANCHORING AND RESTRAINT SYSTEMS AND SHALL BE SECURED TO A ROOF CURB, EQUIPMENT PAD, OR OTHER STRUCTURAL MEMBER TO PREVENT LATERAL, VERTICAL, OR OVERTURNING MOVEMENT WITHOUT SACRIFICING ANY RESILIENT VIBRATION ISOLATION REQUIREMENTS.

5.00 TESTING AND BALANCING (SEE ALSO, SECTION 15990)

BALANCING OF THE AIR CONDITIONING SYSTEM WILL BE PERFORMED BY AN INDEPENDENT TEST AND BALANCING AGENCY. THE MECHANICAL CONTRACTOR SHALL COOPERATE WITH THE SELECTED TEST AND BALANCE AGENCY IN THE FOLLOWING MANNER:

A. PROVIDE SUFFICIENT TIME BEFORE FINAL COMPLETION DATE SO THAT TEST AND BALANCING CAN BE ACCOMPLISHED.

B. PROVIDE IMMEDIATE LABOR AND TOOLS TO MAKE CORRECTIONS WHEN REQUIRED WITHOUT UNDUE DELAY. INSTALL BALANCING DAMPERS AS REQUIRED BY TEST AND BALANCE AGENCY.

C. THE CONTRACTOR SHALL PUT ALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS AND EQUIPMENT INTO FULL OPERATION AND SHALL CONTINUE THE OPERATION OF SAME DURING EACH WORKING DAY OF TESTING AND BALANCING.

D. TESTING AND BALANCING AGENCY SHALL BE KEPT INFORMED OF ANY MAJOR CHANGES MADE TO SYSTEM DURING CONSTRUCTION AND SHALL BE PROVIDED WITH COMPLETE AS-BUILT DRAWINGS.

E. THE MECHANICAL CONTRACTOR SHALL INCLUDE THE COSTS OF DAMPERS, PULLEY AND BELT CHANGES IN HIS CONTRACT.

6.00 SPECIAL CONDITIONS

A. AIR CONDITIONING EQUIPMENT ON ROOF: THE EXACT EQUIPMENT LOCATIONS ON THE ROOF SHALL BE FIELD VERIFIED BY CONTRACTOR. THE INTENT OF THE DESIGN IS TO UTILIZE A MANUFACTURER-SUPPLIED ROOF CURB THAT WOULD SUPPORT THE NEW EQUIPMENT.

B. CONTRACTOR SHALL CONFORM TO MANUFACTURER'S PUBLISHED INSTALLATION AND ASSEMBLY GUIDE. INSTALLATION SHALL CONFORM TO STRUCTURAL ENGINEERS'S REQUIREMENTS.

C. STRUCTURAL SUPPORT FOR THE AIR CONDITIONING UNIT: THE OWNER SHALL ENGAGE A LICENSED STRUCTURAL ENGINEER TO DESIGN THE STRUCTURAL SUPPORT FOR THE AIR CONDITIONING UNIT ON THE ROOF. THE MECHANICAL CONTRACTOR IS TO COORDINATE ALL WORK WITH THE STRUCTURAL ENGINEER.

D. ALL REQUIRED PENETRATIONS OF EXISTING ROOFING SYSTEM SHALL BE MADE BY LANDLORD'S ROOFING CONTRACTOR AT OWNER'S EXPENSE AFTER NOTIFICATION TO LANDLORD FOR APPROVAL.

END OF SECTION

TESTING, ADJUSTING, & BALANCING SPECIFICATION

SECTION 159900 - TESTING, ADJUSTING AND BALANCING

1.00 - GENERAL

1.01 DESCRIPTION

THE TESTING AND BALANCING WORK WILL BE PERFORMED UNDER A SEPARATE CONTRACT FROM THE HVAC WORK. THE WORK DESCRIBED IN THIS SECTION SHALL BE PERFORMED BY AN INDEPENDENT TEST AND BALANCE AGENCY, SPECIALIZING IN TESTING AND BALANCING OF HVAC SYSTEMS AND SHALL BE A MEMBER OF AABC, NEBB, OR APPROVED EQUAL ORGANIZATION.

1.02 SCOPE OF WORK

A. TEST, ADJUST, AND BALANCE HOT, CHILLED, AND CONDENSER WATER SYSTEMS, AIR MOVING EQUIPMENT, AND AIR SUPPLY, RETURN, AND EXHAUST SYSTEMS AS HEREIN SPECIFIED.

B. EACH PIECE OF AIR CONDITIONING AND HEATING EQUIPMENT AND THE AIR DISTRIBUTIONS SYSTEMS SHALL BE TESTED AND ADJUSTED TO INSURE PROPER FUNCTIONING OF ALL CONTROL, PROPER DISTRIBUTION OF AIR, MAINTENANCE OF TEMPERATURE, ELIMINATION OF DRAFTS, NOISE AND VIBRATION, AND LEFT IN FIRST CLASS OPERATING CONDITION. THE AIR SYSTEM SHALL BE READJUSTED IF REQUIRED FOR COMFORT OF EACH ROOM.

C. THE MECHANICAL CONTRACTOR WILL MAKE ANY CHANGES IN THE PULLEYS, BELTS, DAMPERS, VANES, BAFFLES AND OTHER BALANCING DEVICES REQUIRED FOR CORRECT BALANCE OF SYSTEM AS RECOMMENDED BY T&B AGENCY AND TO THE SATISFACTION OF THE OWNER.

1.03 SUBMITTALS

A. PROVIDE (1) HARD COPY & (1) SOFT COPY OF TEST AND BALANCE REPORT TO THE OWNER FOR REVIEW AND APPROVAL, LETTER SIZE, 3-RING BINDER MANUAL COMPLETE WITH INDEX PAGE AND INDEXING TABS. THE REPORT SHALL INCLUDE A SET OF REDUCED DRAWINGS WITH AIR OUTLETS AND EQUIPMENT IDENTIFIED TO CORRESPOND WITH THE MECHANICAL PLANS.

B. THE CERTIFIED TAB REPORTS SHALL INCLUDE INSTRUMENT TYPE AND MAKE, SERIAL NUMBER, DATES OF USE, AND DATES OF CALIBRATION. INSTRUMENTS USED FOR TESTING AND BALANCING MUST HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX (6) MONTHS AND CHECKED FOR ACCURACY PRIOR TO START OF WORK.

2.00 EXECUTION

2.01 EXAMINATION

A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.

B. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.

C. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.

D. EXAMINE EQUIPMENT PERFORMANCE DATA INCLUDING FAN AND PUMP CURVES.

E. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.

F. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.

G. EXAMINE TERMINAL UNITS SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.

H. EXAMINE STRAINERS. VERIFY THAT STARTUP SCREENS ARE REPLACED BY PERMANENT SCREENS WITH INDICATED PERFORATIONS.

I. EXAMINE SYSTEM PUMPS TO ENSURE ABSENCE OF ENTRAINED AIR IN THE SUCTION PIPING.

J. EXAMINE OPERATING SAFETY INTERLOCKS AND CONTROLS ON HVAC EQUIPMENT.

K. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TAB PROCEDURES.

L. OBSERVE AND RECORD SYSTEM REACTIONS TO CHANGES IN CONDITIONS. RECORD DEFAULT SET POINTS IF DIFFERENT FROM INDICATED VALUES.

2.02 PREPARATION

A. PREPARE A TAB PLAN THAT INCLUDES STRATEGIES AND STEP-BY-STEP PROCEDURES.

B. COMPLETE SYSTEM-READINESS CHECKS AND PREPARE REPORTS. VERIFY THE FOLLOWING:

B.1. PERMANENT ELECTRICAL-POWER WIRING IS COMPLETE.

B.2. HYDRONIC SYSTEMS ARE FILLED, CLEAN, AND FREE OF AIR.

B.3. AUTOMATIC TEMPERATURE-CONTROL SYSTEMS ARE OPERATIONAL.

B.4. EQUIPMENT AND DUCT ACCESS DOORS ARE SECURELY CLOSED.

B.5. BALANCE, SMOKE, AND FIRE DAMPERS ARE OPEN.

B.6. ISOLATING AND BALANCING VALVES ARE OPEN AND CONTROL VALVES ARE OPERATIONAL.

B.7. CEILINGS ARE INSTALLED IN CRITICAL AREAS WHERE AIR-PATTERN ADJUSTMENTS ARE REQUIRED AND ACCESS TO BALANCING DEVICES IS PROVIDED.

B.8. WINDOWS AND DOORS CAN BE CLOSED SO INDICATED CONDITIONS FOR SYSTEM OPERATIONS CAN BE MET.

2.03 GENERAL PROCEDURES

A. PREPARE TEST REPORTS FOR BOTH FANS AND OUTLETS. OBTAIN MANUFACTURER'S OUTLET FACTORS AND RECOMMENDED TESTING PROCEDURES. CROSSCHECK THE SUMMATION OF REQUIRED OUTLET VOLUMES WITH REQUIRED FAN VOLUMES.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT-AIRFLOW MEASUREMENTS.

D. CHECK AIRFLOW PATTERNS FROM THE OUTDOOR-AIR LOUVERS AND DAMPERS AND THE RETURN- AND EXHAUST-AIR DAMPERS THROUGH THE SUPPLY-FAN DISCHARGE AND MIXING DAMPERS.

E. LOCATE START-STOP AND DISCONNECT SWITCHES, ELECTRICAL INTERLOCKS, AND MOTOR STARTERS.

F. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

G. CHECK DAMPERS FOR PROPER POSITION TO ACHIEVE DESIRED AIRFLOW PATH.

H. CHECK FOR AIRFLOW BLOCKAGES.

I. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

J. CHECK FOR PROPER SEALING OF AIR-HANDLING-UNIT COMPONENTS.

K. VERIFY THAT THE AIR DUCT SYSTEMS ARE SEALED.

L. PERFORM THE FOLLOWING MINIMUM TEST AND BALANCE:

L.1. TEST AND ADJUST SUPPLY, RETURN, AND EXHAUST FANS TO DESIGN REQUIREMENTS.

L.2. CHANGE SHEAVES AND BELTS AS REQUIRED TO OBTAIN DESIGN AIR QUANTITIES.

L.3. TEST AND RECORD MOTOR ELECTRICAL CHARACTERISTICS, RPM, SERVICE FACTOR, MEASURE VOLTAGE, FULL LOAD AMPERES AND CONNECTED LOAD AMPERAGE. CHECK AND RECORD STARTER HEATERS SIZES AND RATING, REPLACEMENT BELTS SIZES, ETC.

L.4. MAKE PITOT TUBE TRAVERSE (MINIMUM OF 16 POINT) OF MAIN SUPPLY DUCTS AND OBTAIN DESIGN CFM AT FANS. SEAL ALL TEST HOLES WITH SUITABLE HOLE PLUGS.

L.5. TEST AND RECORD SYSTEM STATIC PRESSURES, SUCTION, AND DISCHARGE.

L.6. TEST AND ADJUST SYSTEM FOR DESIGN CFM RECIRCULATED AIR.

L.7. TEST AND ADJUST SYSTEM FOR DESIGN CFM OUTSIDE AIR.

L.8. TEST AND RECORD ENTERING AIR TEMPERATURES. (D.B. HEATING AND COOLING)

L.9. TEST AND RECORD ENTERING AIR TEMPERATURES. (W.B. COOLING)

L.10. TEST AND RECORD LEAVING AIR TEMPERATURES. (D.B. COOLING)

L.11. TEST AND RECORD LEAVING AIR TEMPERATURES. (W.B. COOLING)

L.12. ADJUST ALL MAIN SUPPLY AND RETURN AIR DUCTS TO PROPER DESIGN CFM.

L.13. ADJUST ALL ZONES TO PROPER DESIGN CFM, SUPPLY, AND RETURN.

L.14. TEST AND ADJUST EACH DIFFUSER, GRILLES, AND REGISTER TO WITHIN 10% OF DESIGN REQUIREMENTS.

L.15. EACH GRILLE, DIFFUSER, AND REGISTER SHALL BE IDENTIFIED AS TO LOCATION AND AREA. SIZE, TYPE, FLOW FACTOR, AND MANUFACTURER OF DIFFUSERS, GRILLES, REGISTERS, AND ALL TESTED EQUIPMENT SHALL BE IDENTIFIED AND LISTED.

L.16. READINGS AND TESTS OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND TEST RESULTANT VELOCITY, REQUIRED CFM AND TEST RESULTANT CFM AFTER ADJUSTMENTS.

L.17. IN COOPERATION WITH THE TEMPERATURE CONTROL CONTRACTOR'S REPRESENTATIVE, SETTING ADJUSTMENTS OF AUTOMATICALLY OPERATED DAMPERS TO OPERATE AS SPECIFIED, INDICATED, AND/OR NOTED. THE BALANCE AGENCY SHALL CHECK ALL CONTROLS FOR PROPER CALIBRATIONS AND LIST ALL CONTROLS REQUIRING ADJUSTMENT BY THE TEMPERATURE CONTROL CONTRACTOR.

L.18. ALL DIFFUSERS, GRILLES, AND REGISTERS SHALL BE ADJUSTED TO MINIMIZE DRAFTS IN ALL AREAS.

M. ALL EQUIPMENT SHALL BE IDENTIFIED BY EQUIPMENT SERVICE TAG, MANUFACTURER, MODEL NUMBER, AND SERIAL NUMBER, MOTOR HORSEPOWER, MOTOR NAMEPLATE VOLTAGE, MOTOR RPM, ACTUAL AND DESIGN STATIC PRESSURE, ACTUAL OUTLET VELOCITY, ACTUAL CFM, DESIGN CFM.

N. EACH AIR OUTLET SHALL BE TAGGED AND IDENTIFIED WITH MANUFACTURER, MODEL NUMBER, SIZE, VELOCITY, CORRECTION FACTOR, ACTUAL CFM, DESIGN CFM.

O. TRAVERSE READING OF MAIN SUPPLY, RETURN AND OUTSIDE AIR DUCTS TO ESTABLISH TOTAL AIRFLOW QUANTITIES.

P. TEST AND RECORD TEMPERATURES FROM MAIN SUPPLY AIR TRUNK, MIXED AIR DURING THE FULL HEATING AND FULL COOLING CYCLE AND ECONOMIZER CYCLE.

2.04 DEFICIENCIES IN SYSTEM

BALANCING CONTRACTOR SHALL REPORT IN WRITING TO THE OWNER ANY DISCREPANCIES ON ITEMS NOT INSTALLED IN ACCORDANCE WITH CONTRACT DOCUMENTS, ALL DEFICIENCIES IN HVAC SYSTEM, AND OTHER DEFICIENCIES. THE OWNER WILL REIMBURSE THE BALANCING CONTRACTOR IF ADDITIONAL WORK IS REQUIRED FOR HIS/HER PHASE OF WORK.

2.05 WARRANTY

THE TEST AND BALANCE AGENCY SHALL INCLUDE AN EXTENDED WARRANTY OF 90 DAYS, AFTER COMPLETION OF WORK, DURING WHICH TIME THE OWNER, AT THEIR DISCRETION, MAY REQUEST A RECHECK OR RESETTING OF ANY OUTLET, SUPPLY AIR FAN, OR EXHAUST FAN AS LISTED IN TEST REPORT.

END OF SECTION

sg

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SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL SPECIFICATIONS

M-012

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STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE — NRCC-MCH-E

This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, or §141.0(b)2 for alterations.

Project Name:	Sweetgreen - Walnut Creek	Report Page:	Page 1 of 9
Project Address:	1556 Mt. Diablo Blvd. Walnut Creek, CA	Date Prepared:	2021-08-03

A. GENERAL INFORMATION

01	Project Location (city)	Walnut Creek	04	Total Conditioned Floor Area	2,668
02	Climate Zone	12	05	Total Unconditioned Floor Area	93
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

☐ Office (B) ☐ Retail (M) ☐ Non-refrigerated Warehouse (S)
☐ Hotel/ Motel Guest Rooms (R-1) ☐ School (F) ☐ Healthcare Facility (H)
☐ High-Rise Residential (R-2/R-3) ☐ Relocatable Class Bldg (E) ☑ Other (Write In): Restaurant, Fast Casual (A-2) △A

[1] *FOOTNOTES: Climate zone can be determined on the California Energy Commission's website at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html*

B. PROJECT SCOPE

Table Instructions: Include any mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, or §141.0(b)2 for alterations.

My project consists of (check all that apply)

01	02	03
Air System(s)	Wet System Components	Dry System Components
☐ Heating Air System	☐ Water Economizer	☐ Air Economizer
☐ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ Hydronic System Piping	☐ Fan Systems
☐ Mechanical Controls	☐ Cooling Towers	☑ Ductwork △C
	☐ Chillers	☑ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

C. COMPLIANCE RESULTS

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

01		02		03		04		05		06		07		08	09
System Summary §110.1, §110.2, §140.4	AND	Pumps §140.4(k)	AND	Fans/ Economizers §140.4(c), §140.4(e)	AND	System Controls §110.2, §120.2, §140.4(f)	AND	Ventilation §120.1	AND	Terminal Box Controls §140.4(d)	AND	Distribution §120.3, §140.4(l)	AND	Cooling Towers §110.2(e)2	**Compliance Results**
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
N/A	AND	N/A	AND	N/A	AND	N/A	AND	Yes	AND	N/A	AND	Yes	AND	N/A	**COMPLIES**
														Mandatory Measures Compliance (See Table Q for Details)	**COMPLIES**

T-24 COMPLIANCE FOR (E) RTU'S SUBMITTED UNDER LANDLORD PACKAGE. △C △C

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE — NRCC-MCH-E

Project Name:	Sweetgreen - Walnut Creek	Report Page:	Page 2 of 9
Project Address:	1556 Mt. Diablo Blvd. Walnut Creek, CA	Date Prepared:	2021-08-03

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

The permit applicant has indicated on Table J that ventilation calculations have been attached or included elsewhere on the plans.
Selections made in Table O have been changed by the permit applicant. See Table E. Additional Remarks for permit applicant's explanation.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

This Section Does Not Apply

G. PUMPS

This Section Does Not Apply

H. FAN SYSTEMS & AIR ECONOMIZERS

This Section Does Not Apply

I. SYSTEM CONTROLS

This Section Does Not Apply

J. VENTILATION AND INDOOR AIR QUALITY

Table Instructions: Complete the following Table to demonstrate compliance with mandatory ventilation requirements in §120.1 and §120.2(e)3B for all nonresidential, high-rise residential and hotel/motel occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☑	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☐	Check this box if the project includes new or altered high-rise residential dwelling units.
03	☐	Check the box if the project is using natural ventilation in any spaces to meet required ventilation rates per §120.1(c)2.

Table Continued

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Table Continued

Nonresidential and Hotel/ Motel Ventilation Systems

04	05	06	07
System Name:	System Design OA CFM Air Flow[1]:	System Design Transfer Air CFM:	Air Filtration per §120.1(c) and §141.0(b)2[2]

08	09	10	11	12	13	14	15	16
	Mechanical Ventilation Required per §120.1(c)3[3]					Exh. Vent. per §120.1(c)4		
Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads/ toilets	# of people[5]	Required Min OA CFM	Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[6]
								DCV:
								Occ Sensor:

17	Total System Required Min OA CFM		18	Ventilation for this System Complies?	

[1] *FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system.*
[2] *Air filtration requirements apply to the following three system types per §120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.*
[3] *Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.*
[4] *See Standards Tables 120.1-A and 120.1-B.*
[5] *For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.*
[6] *§120.2(e)3 requires systems serving rooms that are required by §130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft² or smaller, multipurpose rooms less than 1,000ft², classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by §130.1(c).*

K. TERMINAL BOX CONTROLS

This Section Does Not Apply

STATE OF CALIFORNIA
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CERTIFICATE OF COMPLIANCE — NRCC-MCH-E

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L. DISTRIBUTION (DUCTWORK AND PIPING)

Table Instructions: Complete the following tables to show compliance with mandatory pipe insulation requirements found in §120.3 and prescriptive requirements found in §140.4(l) for duct leakage testing.

Duct Leakage Sealing

The answers to the questions below apply to the following duct system(s):	(E)RTU-2,3,4	Duct leakage testing triggered for these systems?	Yes

11	No	The scope of the project includes only duct systems serving healthcare facilites.	
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.	
13	Yes	The space conditioning system serves less than 5,000 ft² of conditioned floor area.	
14	Yes	The combined surface area of the ducts in the following locations is more than 25% of the total surface area of the entire duct system:	
		☐ Outdoors	
		☑ in a space directly under a roof that has a U-factor greater than the U-factor of the ceiling, or if the roof does not meet the requirements of §140.3(a)1B or if the roof has fixed vents or openings to the outside/ unconditioned spaces	
		☐ in an unconditioned crawlspace	
		☐ in other unconditioned spaces	
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.	
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.	
17		Duct system shall be sealed in accordance with the California Mechanical Code.	

△C

M. COOLING TOWERS

This Section Does Not Apply

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCI/

YES	NO	Form/Title	Field Inspector: Pass	Field Inspector: Fail
◉		NRCI-MCH-01-E - Must be submitted for all buildings.	☐	☐

sg

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Copyright©2021
REGISTERED PROFESSIONAL ENGINEER DANIEL YAU No.M38083 Exp.09/30/22 MECHANICAL STATE OF CALIFORNIA
XX.XX.XXXX

PROJECT INFORMATION:
WALNUT CREEK

PROJECT INFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL T-24 FORMS

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STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
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O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCA/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
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◉	○	NRCA-MCH-02-A Outdoor Air must be submitted for all newly installed HVAC units. *Note: MCH02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.*	☐	☐
○	◉	NRCA-MCH-03-A Constant Volume Single Zone HVAC NOTE: This form does not automatically move to "Yes". If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	☐	☐
◉	○	NRCA-MCH-04-A Air Distribution Duct Leakage	☐	☐
○	◉	NRCA-MCH-05-A Air Economizer Controls	☐	☐
○	◉	NRCA-MCH-06-A Demand Control Ventilation Systems Acceptance must be submitted for all systems required to employ demand controlled ventilation (refer to §120.1(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO2) concentration setpoints.	☐	☐
○	◉	NRCA-MCH-07-A Supply Fan Variable Flow Controls	☐	☐
○	◉	NRCA-MCH-08-A Valve Leakage Test	☐	☐
○	◉	NRCA-MCH-09-A Supply Water Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-10-A Hydronic System Variable Flow Controls	☐	☐
○	◉	NRCA-MCH-11-A Automatic Demand Shed Controls	☐	☐
◉	○	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	☐	☐
○	◉	NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance	☐	☐
○	◉	NRCA-MCH-14-A Distributed Energy Storage DX AC Systems Acceptance *NOTE: This form does not automatically move to "Yes". If Distributed Energy Storage DX AC Systems are included in the scope, permit applicant should move this form to "Yes".*	☐	☐
○	◉	NRCA-MCH-15-A Thermal Energy Storage (TES) System Acceptance *NOTE: This form does not automatically move to "Yes". If Chilled Water Storage, Ice-on-Coil Internal Melt, Ice-on-Coil External Melt, Ice Harvester, Brine, Ice-Slurry, Eutectic Salt, Clathrate Hydrate Slurry (CHS), Cryogenic or Encapulated (Ice Ball) Systems are included in the scope, permit applicant should move this form to "Yes".*	☐	☐
○	◉	NRCA-MCH-16-A Supply Air Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-17-A Condenser Water Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-18 Energy Management Control Systems	☐	☐
○	◉	NRCA-MCH-19 Occupancy Sensor Controls	☐	☐
◉	○	NRCA-MCH-20 Multi-Family Ventilation	☐	☐
○	◉	NRCA-MCH-21 Multi-Family Envelope Leakage	☐	☐

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Sweetgreen - Walnut Creek	Report Page:	Page 7 of 9
Project Address: 1556 Mt. Diablo Blvd. Walnut Creek, CA	Date Prepared:	2021-08-03

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be completed by a HERS Rater and provided to the building inspector during construction. The final documents must be created by a HERS Providers registry, but drafts can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCV/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail
◉	○	NRCV-MCH-04-H Duct Leakage Test *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-24 Enclosure Air Leakage Worksheet *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-27 High-rise Residential *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-32 Local Mechanical Exhaust *NOTE: Must be completed by a HERS Rater*	☐	☐

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 8/21) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Sweetgreen - Walnut Creek	Report Page:	Page 8 of 9
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Q. MANDATORY MEASURES DOCUMENTATION LOCATION

Table Instructions: Indicate where mandatory measures are documented in the plan set or construction documentation. For any mandatory measures that do not apply, mark the plan sheet or construction document location as "N/A", any active cells that are left blank will result in non-compliance in Table C.

01		02
		Plan sheet or construction document location
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block:	No	

03	04
Mandatory Measure	Plan sheet or construction document location
Heating Equipment Efficiency per §110.1	M-300
Cooling Equipment Efficiency per §110.1	M-300
Furnace Standby Loss Control per §110.2(d)	N/A
Duct Insulation per §120.4	M-011
Heating Hot Water Equipment Efficiency per §110.1	N/A
Cooling Chilled and Condenser Water Equipment Efficiency per §110.1	N/A
Open and Closed Circuit Cooling Towers conductivity of flow-based controls per §110.2(e)1	N/A
Open and Closed Circuit Cooling Towers Flow Meter with analog output per §110.2(e)3	N/A
Open and Closed Circuit Cooling Towers Overflow Alarm per §110.2(e)4	N/A
Open and Closed Circuit Cooling Towers Efficient Drift Eliminators per §110.2(e)5	N/A
Pipe Insulation per §120.3(b)	N/A
Combustion air shutoff, combustion air fan controls and stack design and controls for boilers per §120.9	N/A
Heat Pump with Supplementary Electric Resistance Heater Controls per §110.2(b)	N/A
The air duct and plenum system is designed per §120.4(a)-(f)	M-011
Kitchen range hoods shall be rated for sound in accordance with Section 7.2 of ASHRAE 62.2	N/A

sg

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ACIES ENGINEERING
400 N. McCarthy Blvd., STE 250
Milpitas, CA 95035
ph: (408) 522-5255
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info@acies.net

REGISTERED PROFESSIONAL ENGINEER — DANIEL PAO — No. M38083 — Exp. 09/30/22 — MECHANICAL — STATE OF CALIFORNIA

XX.XX.XXXX

PROJECT INFORMATION: **WALNUT CREEK**

PROJECT INFORMATION: **1556 MT. DIABLO BLVD WALNUT CREEK, CA, 94596**

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL T-24 FORMS

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R22117/B210651

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 8/21)

CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Sweetgreen - Walnut Creek	Report Page:	Page 9 of 9
Project Address: 1556 Mt. Diablo Blvd. Walnut Creek, CA	Date Prepared:	2021-08-03

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Daniel Yau	Documentation Author Signature:	
Company:	ACIES Engineering	Signature Date:	2021-08-03
Address:	400 N. McCarthy Blvd., Suite 250	CEA/ HERS Certification Identification (if applicable):	
City/State/Zip:	Milpitas, CA 95035	Phone:	(408) 522-5255

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. **The information provided on this Certificate of Compliance is true and correct.**
2. **I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)**
3. **The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.**
4. **The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.**
5. **I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.**

Responsible Designer Name:	Daniel Yau	Responsible Designer Signature:	
Company :	ACIES Engineering	Date Signed:	2021-08-03
Address:	400 N. McCarthy Blvd., Suite 250	License:	M38083
City/State/Zip:	Milpitas, CA 95035	Phone:	(408) 522-5255

Reviewed for Code Compliance
Revision #: R22117
Parent Permit #: B210651
Reviewed By: Prabhath Silva
Date: 03/25/2022
Revision # E. F, & G ONLY

sg

sweetgreen

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ARCHITECT OF RECORD:

Dewberry

Dewberry Architects Inc.

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916.239.4256 Phone
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REGISTERED PROFESSIONAL ENGINEER
DANIEL YAU
No.M38083
Exp.09/30/22
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STATE OF CALIFORNIA

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PROJECT INFORMATION:
WALNUT CREEK

PROJECT INFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL
T-24 FORMS

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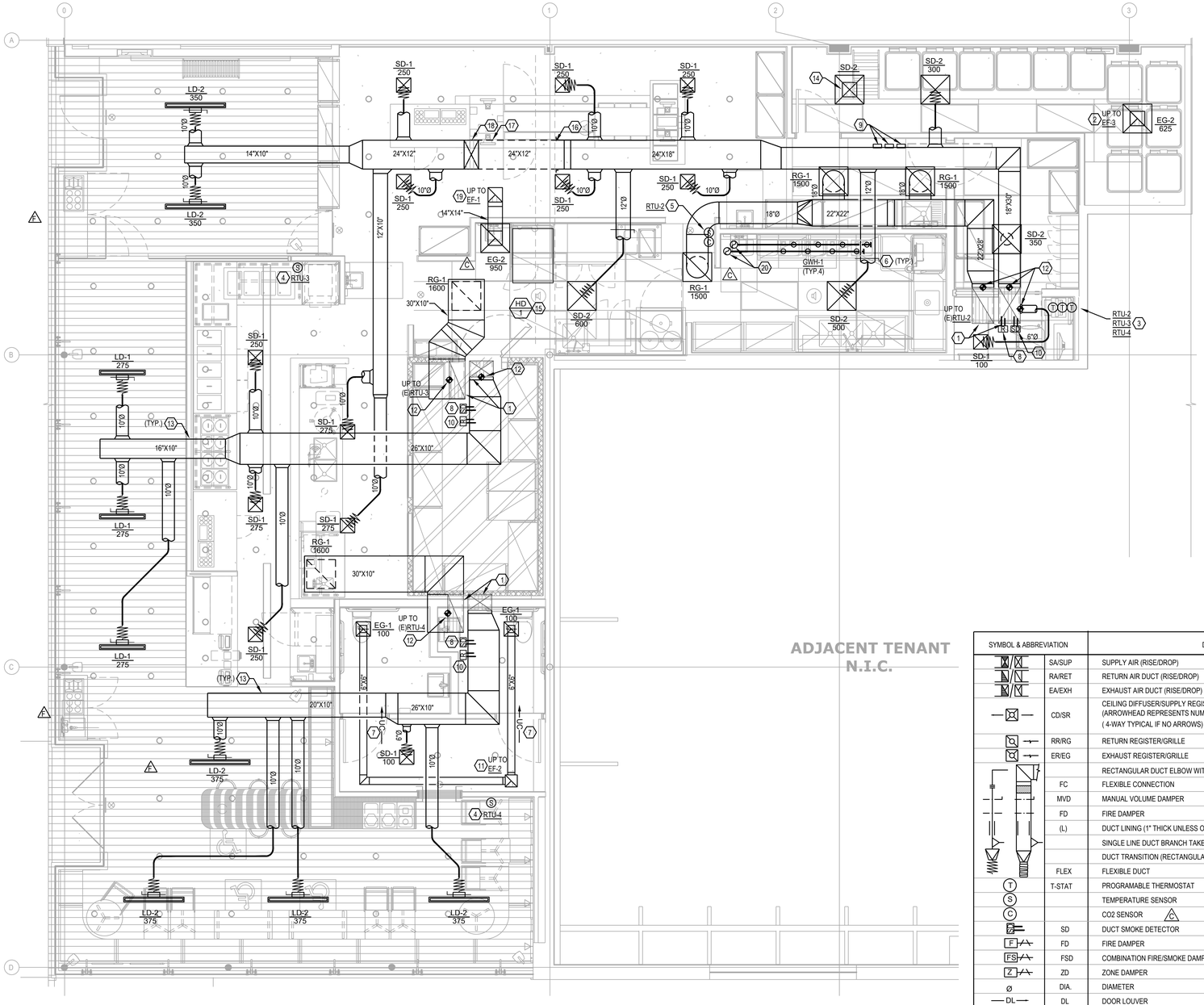
R22117/B210651



DEMOLITION NOTES

1. MECHANICAL CONTRACTOR TO COORDINATE WITH ONSITE PM REGARDING DEMOLITION AND REMOVAL OF EXISTING UNUSED HVAC EQUIPMENT.
2. DEMOLISH AND REMOVE ALL RIGID & FLEXIBLE DUCTWORK UNLESS OTHERWISE NOTED ON DRAWINGS.

GENERAL NOTES

1. GENERAL NOTES APPLY TO ALL HVAC SHEETS.
2. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SITE INVESTIGATION PRIOR COMMENCEMENT OF WORK, AND SHALL INFORM ARCHITECT OF ANY DISCREPANCY.
3. COORDINATE DUCT ROUTING WITH EXISTING PIPING, CONDUITS AND STRUCTURAL MEMBERS. DUCTWORK INSULATION SHALL BE AT LEAST 3" FROM LIGHT HOUSINGS. OFFSET AS REQUIRED.
4. DO NOT ROUTE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS. VERIFY NO EXISTING DUCTWORK OR PIPING ARE INSTALLED ABOVE PANELS. RELOCATE AS NECESSARY.
5. WORK SHALL COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AS APPROVED AND AMENDED BY THE AUTHORITY HAVING JURISDICTION, INCLUDING APPLICABLE SECTIONS OF NFPA, THE MECHANICAL CODE, AND ANY INTERIM AMENDMENTS AT THE TIME OF THE PROPOSAL. PURCHASE PERMITS ASSOCIATED WITH THE WORK. OBTAIN INSPECTIONS REQUIRED BY CODE. SEE SHEET G-001 FOR THE PREVAILING CODES.
6. CONTRACTOR AND SUBCONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS.
7. COORDINATE WORK WITH THE WORK OF OTHER TRADES, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND THE EXISTING CONDITIONS AT THE PROJECT SITE.
8. DRAWINGS FOR THE MECHANICAL WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWINGS SHALL ONT BE SCALED FOR EXACT MEASUREMENTS. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. REFER TO THE MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, OFFSETS, ACCESSORIES, AND MATERIALS NECESSARY FOR A COMPLETE SYSTEM.
9. DUCT DIMENSIONS ON PLANS INDICATE DIMENSIONS OF INTERNAL FREE AREA.
10. PERFORATED CEILING DIFFUSERS SHALL BE 4-WAY UNLESS OTHERWISE NOTED.
11. COORDINATE ROOF WORK WITH THE OWNER'S CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.
12. UNLESS OTHERWISE NOTED, RECTANGULAR ELBOWS GREATER THAN 45° SHALL BE MITERED ELBOWS WITH DOUBLE-THICKNESS TURNING VEINS AND RECTANGULAR ELBOWS 45° OR LESS SHALL BE RADIUSED ELBOWS WITH AN INSIDE RADIUS OF AT LEAST 1/2 THE WIDTH OF THE DUCT.
13. REPLACE AIR FILTERS WITH NEW, CLEAN MERV-13 FILTERS AT TURNOVER.
14. THE TERM "FURNISH" MEANS SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS. THE TERM "INSTALL" DESCRIBES THE OPERATIONS AT THE PROJECT SITE INCLUDING THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS. THE TERM "PROVIDE" MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.
15. A FINAL REPORT FOR THE TESTING AND ADJUSTMENTS OF ALL NEW SYSTEMS FROM ALL DISCIPLINES SHALL BE COMPLETED WITH FINAL APPROVAL BY THE FIELD INSPECTOR. THIS REPORT SHALL BE SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
16. TESTING AND BALANCING OF THE MECHANICAL SYSTEMS TO BE COMPLETED BY NATIONAL TAB AT THE GENERAL CONTRACTOR'S EXPENSE. REFER TO THE COVER SHEET, OR CONTACT SWEETGREEN'S CONSTRUCTION MANAGER FOR CONTACT INFORMATION.
17. ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, OR SHEET METAL UNTIL THE FINAL START UP OF THE HEATING, COOLING, AND VENTILATION EQUIPMENT.
18. REFER TO TRANE NATIONAL ACCOUNT INFORMATION BLOCK ON SHEET M-300 FOR REPRESENTATIVE CONTACT INFORMATION.
19. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY UNIT CONFIGURATIONS, COORDINATE DELIVERY WITH TRANE, RECEIVE AND UNLOAD EQUIPMENT, INSPECT EQUIPMENT, PROPERLY INSTALL EQUIPMENT INCLUDING FIELD-INSTALLED ITEMS, EQUIPMENT STARTUP AND 1ST YEAR LABOR WARRANTY AND ADMINISTRATION.

KEY NOTES (X)

1. EXISTING INTERNALLY INSULATED SUPPLY & RETURN PLENUMS DOWN FROM ROOFTOP UNIT ABOVE.
2. 12"X12" EXHAUST DUCT UP TO EXHAUST FAN ON ROOF.
3. WALL MOUNTED THERMOSTAT @ 48" AFF. LABEL EACH THERMOSTAT ACCORDINGLY. COORDINATE THERMOSTAT LOCATION WITH WALL-MOUNTED EQUIPMENT SO THAT THE THERMOSTATS ARE NOT BLOCKED BY SHELVING, COAT RACKS, OR DOORS.
4. REMOTE WALL MOUNTED TEMPERATURE SENSOR @ 60" AFF. WIRED TO THERMOSTAT IN OFFICE.
5. REMOTE WALL MOUNTED TEMPERATURE AND CO2 SENSOR @ 60" AFF. WIRED TO THERMOSTAT IN OFFICE.
6. MANUAL VOLUME DAMPER. (TYP)
7. 1" UNDERCUT DOOR.
8. SMOKE DETECTOR IN SUPPLY AIR DUCT TO SHUT DOWN BOTH RTU'S UPON DETECTION OF SMOKE.
9. PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET. WIRE A UNIT BACK TO EACH SMOKE DETECTOR. MOUNT UNIT 60" AFF. TYPICAL.
10. SWEETGREEN SHALL FURNISH AND CONTRACTOR SHALL INSTALL A REME HALO AIR PURIFICATION SYSTEM IN SUPPLY AIR DUCTWORK AS SHOWN. ADJUST AS REQUIRED FOR THE SUPPLY AIRFLOW. INSTALL PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
11. 8"X8" EXHAUST DUCT UP TO EXHAUST FAN ON ROOF.
12. CONNECT TO EXISTING SUPPLY AND RETURN DUCT DROPS. FIELD VERIFY EXISTING CONDITIONS.
13. DUCTWORK ABOVE CEILING.
14. 12"X12" MAKE-UP AIR DUCT UP TO GOOSENECK INTAKE ON ROOF.
15. VENTLESS CANOPY RECIRCULATING HOOD.
16. RUN DUCT OUT THROUGH VERTICAL WALL ONTO LOWER ROOF.
17. DUCTWORK ON LOWER ROOF.
18. 12"X24" DUCT DOWN FROM ROOF.
19. 14"X14" EXHAUST DUCT UP TO EXHAUST FAN ON ROOF.
20. 6"Ø COMMON FLUE VENT AND INTAKE FOR HIGH EFFICIENCY CONDENSING TANKLESS WATER HEATERS UP THRU ROOF. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. (C)

SYMBOL & ABBREVIATION		DESCRIPTION
	SA/SUP	SUPPLY AIR (RISE/DROP)
	RA/RET	RETURN AIR DUCT (RISE/DROP)
	EA/EXH	EXHAUST AIR DUCT (RISE/DROP)
	CD/SR	CEILING DIFFUSER/SUPPLY REGISTER (ARROWHEAD REPRESENTS NUMBER OF THROW) (4-WAY TYPICAL IF NO ARROWS)
	RR/RG	RETURN REGISTER/GRILLE
	ER/EG	EXHAUST REGISTER/GRILLE
		RECTANGULAR DUCT ELBOW WITH TURNING VANES
	FC	FLEXIBLE CONNECTION
	MVD	MANUAL VOLUME DAMPER
	FD	FIRE DAMPER
	(L)	DUCT LINING (1" THICK UNLESS OTHERWISE NOTED)
		SINGLE LINE DUCT BRANCH TAKE-OFF
		DUCT TRANSITION (RECTANGULAR TO ROUND)
	FLEX	FLEXIBLE DUCT
(T)	T-STAT	PROGRAMABLE THERMOSTAT
(S)		TEMPERATURE SENSOR
(C)		CO2 SENSOR (A)
	SD	DUCT SMOKE DETECTOR
F	FD	FIRE DAMPER
FS	FSD	COMBINATION FIRE/SMOKE DAMPER
Z	ZD	ZONE DAMPER
Ø	DIA.	DIAMETER
DL	DL	DOOR LOUVER
UC	UC	DOOR UNDERCUT (3/4" MINIMUM)
	POC	POINT OF CONNECTION

SD-1 / 100 — (SD-SUPPLY DIFFUSER, RD-RETURN DIFFUSER, E-EXHAUST) AIR QUANTITY IN CFM

AC / 1 — MECHANICAL EQUIPMENT DESIGNATION / DESIGNATED NUMBER

sweetgreen
3000 S. ROBERTSON BLVD.
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Copyright © 2021
REGISTERED PROFESSIONAL ENGINEER
DANIEL P. YU
No. M38083
EXP. 09/30/22
MECHANICAL
STATE OF CALIFORNIA
XX.XX.XXXX

PROJECT INFORMATION:
WALNUT CREEK

PROJECT INFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL FLOOR PLAN

M-100

MECHANICAL FLOOR PLAN | SCALE 1/4"=1'-0" | 1

LEGEND | SCALE NONE | -

NOTES | SCALE NONE | -

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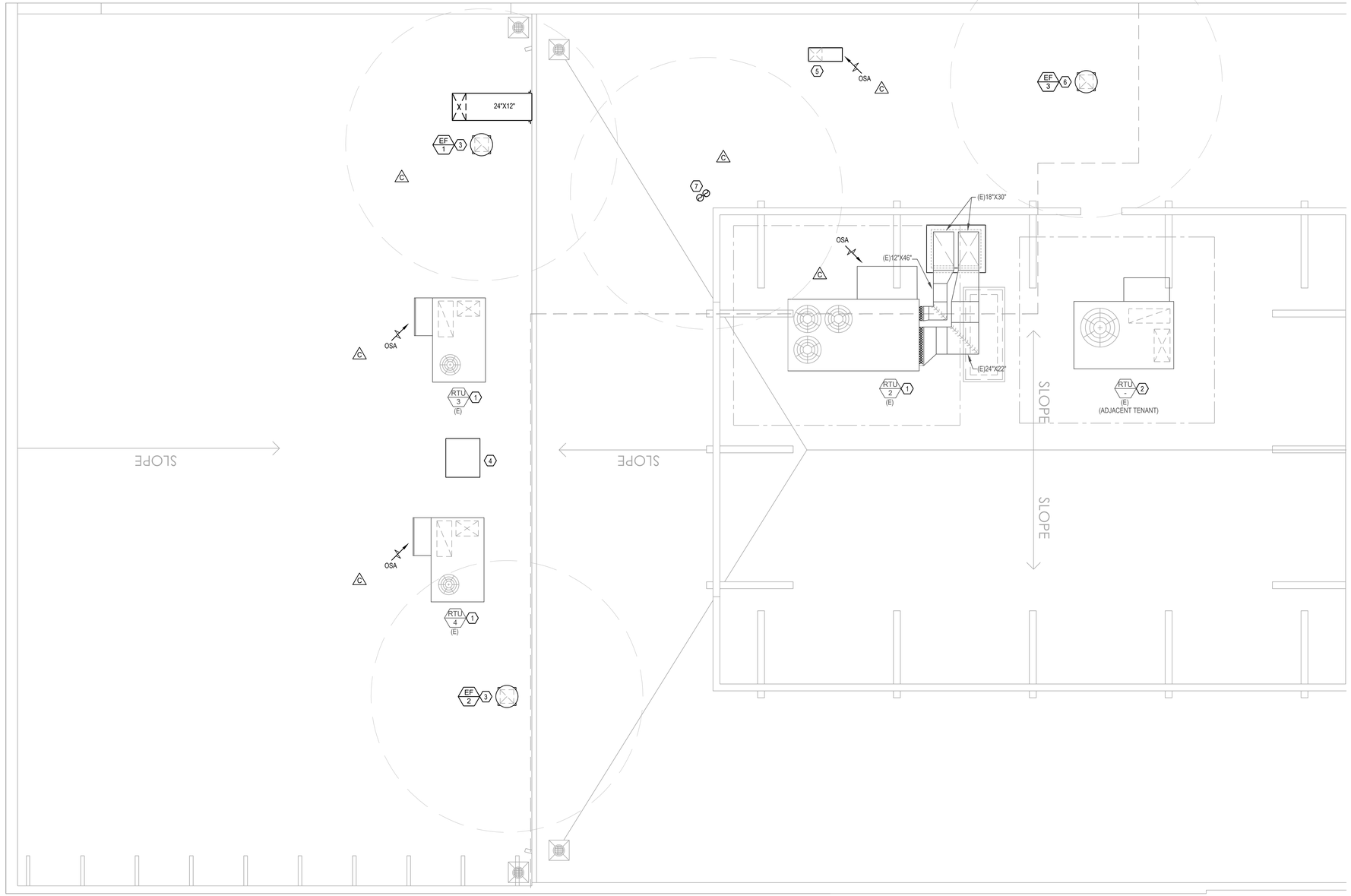

SYMBOL & ABBREVIATION		DESCRIPTION
	SA/SUP	SUPPLY AIR (RISE/DROP)
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T	T-STAT	PROGRAMABLE THERMOSTAT
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	SD	DUCT SMOKE DETECTOR
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FS	FSD	COMBINATION FIRE/SMOKE DAMPER
Z	ZD	ZONE DAMPER
⌀	DIA.	DIAMETER
DL	DL	DOOR LOUVER
UC	UC	DOOR UNDERCUT (3/4" MINIMUM)
	POC	POINT OF CONNECTION

SD-1 / 100 — (SD-SUPPLY DIFFUSER, RD-RETURN DIFFUSER, E-EXHAUST) / AIR QUANTITY IN CFM

AC / 1 — MECHANICAL EQUIPMENT DESIGNATION / DESIGNATED NUMBER

LEGEND | SCALE: NONE | -

GENERAL NOTES

1. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SITE INVESTIGATION PRIOR COMMENCEMENT OF WORK, AND SHALL INFORM ARCHITECT OF ANY DISCREPANCY.
2. COORDINATE DUCT ROUTING WITH EXISTING PIPING, CONDUITS AND STRUCTURAL MEMBERS. DUCTWORK INSULATION SHALL BE AT LEAST 3" FROM LIGHT HOUSINGS. OFFSET AS REQUIRED.
3. EXHAUST OUTLET TO BE MIN. 10 FEET AWAY FROM ALL BUILDING OPENINGS & OUTSIDE AIR INTAKE.
4. LABEL ALL ROOFTOP UNITS AND EQUIPMENT WITH TENANT NAME AND SPACE NUMBER.
5. ALL SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS.

KEY NOTES (X)

1. EXISTING PACKAGED GAS HEATING/ELECTRIC COOLING ROOFTOP UNIT. FIELD VERIFY EXISTING CONDITIONS.
2. ADJACENT TENANT ROOFTOP UNIT. SHOWN FOR REFERENCE ONLY.
3. NEW ROOF MUSHROOM TYPE EXHAUST FAN MOUNTED ON 12" CURB. MAINTAIN 10'-0" CLEAR FROM ANY BUILDING OUTSIDE AIR INTAKE.
4. NEW REMOTE REFRIGERATION CONDENSER ON PT WOOD SLEEPERS. COORDINATE AND PROVIDE MOUNTING SUPPORT FOR WALKIN COOLER CONDENSING UNIT WITH THE KITCHEN EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. COORDINATE AND PROVIDE ALL BUILDING PENETRATIONS AS REQUIRED TO ACCOMMODATE THE LINESET INSTALLATION. KITCHEN EQUIPMENT SUPPLIER SHALL PROVIDE LINESET, SPECIALTIES AND MAKE ALL FINAL CONNECTIONS BETWEEN THE CONDENSING UNIT AND EVAPORATOR COIL. (F)
5. 12"X12" MAKE-UP AIR DUCT GOOSENECK WITH 1/2" WIRE MESH SCREEN AT INTAKE.
6. NEW ROOF UPBLAST TYPE EXHAUST FAN MOUNTED ON 12" CURB. MAINTANI 10'-0" CLEAR FROM ANY BUILDING OUTSIDE AIR INTAKE.
7. 6"Ø INTAKE AND FLUE VENT FROM HIGH EFFICIENCY TANKLESS WATER HEATERS. (C)

TRUE N

MECHANICAL ROOF PLAN | SCALE: 1/4"=1'-0" | 1

NOTES | SCALE: NONE | -

sg

sweetgreen
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REGISTERED PROFESSIONAL ENGINEER — DANIEL PAO — No.M38083 — Exp.09/30/22 — MECHANICAL — STATE OF CALIFORNIA

XX.XX.XXXX

PROJECT INFORMATION:
WALNUT CREEK

PROJECT INFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

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SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
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MECHANICAL ROOF PLAN

M-200

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EXISTING PACKAGED GAS/ELECTRIC ROOFTOP UNIT SCHEDULE (SHOWN FOR REFERENCE)

EQUIP. TAG	MANUFACTURER & MODEL	AREA SERVED	LOCATION	INDOOR FAN				COOLING							HEATING						AIR FILTER EFFICIENCY	ELECTRICAL			PHYSICAL DATA		REMARKS
				SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	ESP (in. H20)	INDOOR FAN MOTOR FLA	NOMINAL CAPACITY (TONS)	MINIMUM TOTAL CAPACITY (MBH)	MINIMUM SENSIBLE CAPACITY (MBH)	MINIMUM EFFICIENCIES	ENTERING AIR TEMPERATURE (°Fdb/°Fwb)	LEAVING AIR TEMPERATURE (°Fdb/°Fwb)	AMBIENT AIR TEMPERATURE (°F)	GAS MINIMUM INPUT (MBH)	MINIMUM HEATING OUTPUT (MBH)	MINIMUM AFUE (%)	ENTERING AIR TEMPERATURE (°F)	LEAVING AIR TEMPERATURE (°F)	AMBIENT AIR TEMPERATURE (°F)		V/ph/Hz	MCA	MOCP	HEIGHT W/O LEVELING (IN)	WEIGHT (LBS)	
(E) RTU-2	BRYANT 581JP14D125	BACK OF HOUSE / PICK UP LINE	ROOF	4500	470	1.5	10.6	12.5	153.9	96.8	12.0 EER	75/67	-	95	144	118	81	-	-	-	MERV-13	208/3/60	64	80	57.4	1430	1-5
(E) RTU-3	BRYANT 581JP05A072	SERVE LINE	ROOF	1600	400	1.5	4.9	4.0	50.6	38.1	13.0 EER	75/67	-	99	82	66	82	-	-	-	MERV-13	208/3/60	29	40	46.75	590	1-5
(E) RTU-4	BRYANT 581JP05A072	DINING	ROOF	1600	400	1.5	4.9	4.0	50.6	38.1	13.0 EER	75/67	-	99	82	66	82	-	-	-	MERV-13	208/3/60	29	40	46.75	590	1-5

1. EXISTING PACKAGED GAS/ELECTRIC ROOFTOP UNIT. SHOWN FOR REFERENCE ONLY.
2. REPLACE FILTERS AFTER CONSTRUCTION PRIOR TO FINAL.
3. PROVIDE T-24 COMPLIANT WALL-MOUNT PROGRAMMABLE THERMOSTAT.
4. PROVIDE WALL-MOUNT REMOTE TEMPERATURE SENSOR.
5. PROVIDE SMOKE DETECTOR IN SUPPLY AIR DUCT/DISCHARGE TO SHUT DOWN UNIT UPON SMOKE DETECTION. PROVIDE WITH AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET.

EXHAUST FAN SCHEDULE

EQUIP. TAG	MANUFACTURER & MODEL	SERVICE	LOCATION	AIR FLOW (CFM)	TOTAL STATIC PRESSURE (in H2O)	FAN SPEED (RPM)	MOTOR SIZE	SONES	ELECTRICAL SERVICE (V/ph/Hz)	OPERATING WEIGHT (lbs)	REMARKS
EF-1	GREENHECK G-099-VG	BACK OF HOUSE	ROOF	950 C	0.5	1434	1/4 HP	9.6	115/1/60	46	1,2,3,4,5
EF-2	GREENHECK G-080-VG	RESTROOMS	ROOF	200	0.5	1500	1/10 HP	7.3	115/1/60	33	1,2,3,4,5
EF-3	GREENHECK CUE-095-VG	TRASH ROOM	ROOF	625	0.5	1559	1/6 HP	8.2	115/1/60	45	2,3,4,5,6

1. ROOF MOUNTED MUSHROOM TYPE EXHAUST FAN ON 12" ROOF CURB.
2. FLEXIBLE CONNECTIONS.
3. BACKDRAFT DAMPER.
4. SPEED CONTROLLER.
5. INTERLOCK TO TIMECLOCK. FAN SHALL RUN DURING OPERATING HOURS.
6. ROOF MOUNTED UPBLAST TYPE EXHAUST FAN ON 12" ROOF CURB.

RECIRCULATING HOOD SCHEDULE

EQUIP. TAG	MANUFACTURER & MODEL	DESCRIPTION	SUPPLIER	INSTALLER	WATTS	ELECTRICAL SERVICE (V/ph/Hz)	WEIGHT (lbs)	REMARKS
HD-1	RATIONAL ULTRAVENT PLUS 6-HALF SIZE	VENTLESS CANOPY RECIRCULATING HOOD	OWNER	OWNER	170	120/1/60	174	1,2

1. UL710B LISTED RECIRCULATING HOOD.
2. SERVES (2) COMBI-OVENS (ITEM K-540): MODEL: RATIONAL iCOMBI CLASSIC 6-HALF SIZE E, UL710B LISTED

EXHAUST AIR CALCULATIONS

PER CMC 2019 TABLE 403.7:

KITCHEN:	REQUIRED: 0.70 CFM/SF @ 1111 SF = 778 CFM	PROVIDED: 950 CFM
		EF-1: 950 CFM
TOILET #1:	REQUIRED: 70 CFM/UNIT	PROVIDED: 100 CFM
TOILET #2:	REQUIRED: 70 CFM/UNIT	PROVIDED: 100 CFM
		EF-2: 200 CFM
TRASH ROOM:	REQUIRED: 1.0 CFM/SF @ 205 SF = 205 CFM	PROVIDED: 625CFM
		EF-3: 625 CFM

C

AIR DISTRIBUTION SCHEDULE

DIFFUSER TAG	TYPE	MINIMUM AIR FLOW	MAXIMUM AIR FLOW	FACE SIZE	NECK SIZE	MOUNTING	MATERIAL	MANUFACTURER/ MODEL	REMARKS
SD-1	PERFORATED CEILING DIFFUSER	-	-	12"X12"	PER PLAN	LAY-IN / GYP. BOARD	ALUMINUM	TITUS PCS	1, 2, 3
SD-2	PERFORATED CEILING DIFFUSER	-	-	24"x24"	PER PLAN	LAY-IN / GYP. BOARD	ALUMINUM	TITUS PCS	1, 2, 3
LD-1	SLOT DIFFUSER PLENUM	0	300	3'-0" LENGTH 1" SLOT WIDTH (1) SLOT	10"Ø	GYP. BOARD	ALUMINUM	TITUS FL-10-JT	4, 5, 6
LD-2	SLOT DIFFUSER PLENUM	0	400	4'-0" LENGTH 1" SLOT WIDTH (1) SLOT	10"Ø	GYP. BOARD	ALUMINUM	TITUS FL-10-JT	4, 5, 6
RG-1	PERFORATED CEILING RETURN	0	1600	24"X24"	20"X20"	GYP. BOARD	ALUMINUM	TITUS PAR	1, 3
EG-1	CEILING EXHAUST GRILLE	0	100	8"X8"	6"Ø	LAY-IN	ALUMINUM	TITUS 50F	1, 3
EG-2	CEILING EXHAUST GRILLE	0	700	24"X24"	12"X12"	LAY-IN	ALUMINUM	TITUS 50F	1, 3

1. WHITE FINISH, COORDINATE WITH ARCHITECT.
2. 4-WAY PATTERN, UNLESS OTHERWISE NOTED.
3. PROVIDE INTEGRAL OBD.
4. FURNISH WITH FACE-OPERATED INLET DAMPER.
5. PROVIDE WITH TITUS FBPI-10 SLOT DIFFUSER PLENUM.
6. FURNISH WITH BORDER TYPE 55 AND MOUNTING CLIPS. PROVIDE BLOCK OFFS WHERE NO PLENUM SHOWN.

AIR BALANCE SCHEDULE

EQUIP. TAG	SUPPLY FLOW	RETURN FLOW	EXHAUST FLOW	SUBTOTAL
(E) RTU-2	4500	4030	0	470
(E) RTU-3	1600	1200	0	400
(E) RTU-4	1600	1200	0	400
EF-1	0	0	950	-950
EF-2	0	0	270	-270
NET PRESSURIZATION (CFM)				50 C

NOTE: EF-3 IN SEPARATE ZONE WITH GRAVITY INTAKE MAKE-UP

MATERIAL SCHEDULE

CATEGORY	APPLICATION	ALLOWABLE MATERIAL
DUCT	EXPOSED SUPPLY	ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	EXPOSED RETURN	ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	EXPOSED GENERAL EXHAUST	ROUND AS SHOWN. PAINTED TO MATCH ROOF DECK.
	CONCELED SUPPLY	RECTANGULAR OR ROUND AS SHOWN, LINED OR INSULATED.
	CONCEALED RETURN	RECTANGULAR OR ROUND AS SHOWN, LINED OR INSULATED.
	CONCEALED GENERAL EXHAUST IN CONDITIONED SPACE	RECTANGULAR OR ROUND AS SHOWN.
	CONCEAL GENERAL EXHAUST IN UNCONDITIONED SPACE	RECTANGULAR OR ROUND AS SHOWN, LINED OR INSULATED.
PIPING	HYDRONIC PIPING: HOT, CHILLED, AND CONDENSER WATER	TYPE L COPPER TUBE.
	CONDENSATE DRAINS	SCHEDULE 40 PVC PIPE FITTINGS.

REQUIRED OUTSIDE AIR VENTILATION RATES (2019 CMC)

Sweetgreen - Walnut Creek

Zone & Area	Occupancy Category	Area	2019 CMC, TABLE 402.1							2019 CEC, TABLE 120.1-A		2019 CEC, 120.1.b.2.B					Ventilation Air Required (CFM)	Ventilation Air Provided CFM
			Occupants per 1000 SF	No. of Occupants	Ventilation Air (CFM/SF)	Ventilation Air (CFM/PERSON)	Total CFM	Ventilation System Efficiency	Required Ventilation CFM	Ventilation Air (CFM/SF)	Required Ventilation CFM	CBC Occupancy Load (SF/OCC)	No. of Occupants	1/2 of CBC Occupants	Ventilation Air (CFM/PERSON)	Required Ventilation CFM		
Back-of-House	Kitchen	1007	10	11	0.12	7.5	204	80%	255	0.15	152	200	6	3	15	45	255	
Dining	Dining Room	225	70	16	0.18	7.5	161	80%	202	0.50	113	15	15	8	15	120	202	
Trash Room	-	186	0	0	0	0	0	80%	0	0.15	28	200	1	1	15	15	28	
Office	Office Space	37	5	1	0.06	5	8	80%	10	0.15	6	200	1	1	15	15	15	
(E) RTU-2	**Total**	**1455**		**28**			**373**		**467**		**299**			**13**		**195**	**467**	**470**
Serve Line	Kitchen	260	15	4	0.12	7.5	62	80%	78	0.15	39	200	2	1	15	15	78	
Dining	Dining Room	301	70	22	0.18	7.5	220	80%	275	0.50	151	15	21	11	15	165	275	
(E) RTU-3	**Total**	**561**		**26**			**282**		**353**		**190**			**12**		**180**	**353**	**400**
Restroom	-	166	0	0	0	0	0	80%	0	0.15	25	200	1	1	15	15	25	
Dining	Dining Room	486	70	35	0.18	7.5	350	80%	438	0.50	243	15	33	17	15	255	438	
(E) RTU-4	**Total**	**652**		**35**			**350**		**438**		**268**			**30**		**270**	**438**	**400**

sweetgreen
3000 S. ROBERTSON BLVD.
LOS ANGELES, CALIFORNIA 90034

ARCHITECT OF RECORD:
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MECHANICAL SCHEDULES

M-300

11/3/2020 1:57:11 PM

ANNA M. ROTH, RN, MS, MPH
HEALTH SERVICES DIRECTOR
RANDALL L. SAWYER
DEPUTY HEALTH DIRECTOR
JOCELYN STORTZ, MS, REHS
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December 7, 2021

Laurence Solis
Burnham Nationwide
652 California Street, 7th Floor
San Francisco, CA 94108

Plan Review Report For: **Sweetgreen (SR#17285 –Approval)**
Location: **1556 Mt. Diablo Blvd., Walnut Creek, CA 94596**
Scope of Work: **Remodel of Food Facility**

Dear Mr. Solis:

Contra Costa Environmental Health has completed its review of the revised plans for the above referenced project that was submitted to our office November 9, 2021. The plans are **approved** subject to the following conditions:

1. The proposed Rational iCombi Pro 6-half E/G oven is allowed for use on conditional basis at this time without an approved mechanical exhaust hood. A Cooling Load Calculation stamped by a CA Registered Professional Engineer, Daniel Yau, No. M38083, expiration date 9/30/2022, was provided along with the revised plans. When an inspection is conducted at this facility, if an inspector finds evidence that the area around the oven is not being maintained such as discolored walls/ceilings, accumulation of grease, stains, etc., an approved mechanical exhaust hood will be required.
2. All equipment shall be operated and maintained in accordance with manufacturer's recommendations.
3. Provide a minimum of 120°F of hot running water to all sinks.
4. All refrigeration units must be at 41°F or lower.
5. The Slimfoot cove base tile is not approved for floor/wall junctures in food preparation areas, dishwashing, storage, restrooms, and janitorial room.
6. The Armstrong Clean Room VL ceiling sample is approved for food facility above food preparation and service areas, dishwashing, janitorial room, restrooms, and storage room.
7. Comply with all applicable laws, regulations, and codes and obtain approval from other required agencies.

General Conditions

1. **Provide a copy of this letter to all contractors. Read and comply with all conditions. This agency will require the correction of improper work.**
2. This plan approval is valid for a period not to exceed six months from the date of this letter (one year if the work has started within six months from the date of approval).
3. A copy of the approved plans, supporting documents, this plan approval letter, and any subsequently approved changes or amendments, must be kept at the site during construction operations.
4. Plans are not to be changed or amended without prior written authorization from Contra Costa Environmental Health.
5. Nothing contained in this plan approval is deemed to authorize deviation from applicable laws, regulations, policies, or the Contra Costa Environmental Health *Construction Requirements For Retail Food Facilities*. Plan approval shall not prevent Contra Costa Environmental Health from subsequently requiring the correction of errors or omissions in such plans or specifications.
6. All necessary approvals and permits shall be obtained from the local building department and other required agencies (e.g., sewer agency, planning department, fire department, etc.) prior to starting work. **Construction inspections will not be scheduled if these other permits are not on site.**
7. The owner of the permitted facility is responsible for scheduling the required construction inspections. At least one construction inspection is required, which includes the following:
   a. A ***pre-final inspection*** must be scheduled when room finishes are completed and plumbing, ventilation, and equipment are in place. Schedule this inspection at least 4 working days in advance.
   b. A ***final* inspection** must be scheduled when 100 percent of the construction is completed, including all finishing work and utility hook-ups. **Schedule this inspection at least 4 working days in advance**. Please note that written approval for a health permit must be obtained prior to stocking food items or opening for business. The applicable permit fees and any outstanding plan check balance must be paid upon billing to receive a permit.
8. At least one employee must obtain food safety certification within 60 days of being approved for operation.

Visit our updated website at **www.cchealth.org/eh** and look at the revised Plan Review Program. You will be able to check the status of your plans, read updated FAQ's and see many new resource links throughout the revised Plan Review Construction Guidelines for Food Facilities and Pools/Spas. The plan check staff resource numbers are included on the website and are available daily from 7:30 a.m.-9:00 a.m.

If you have any questions, please feel free to contact me at (925) 608-5556 or sue.orsouphakheth@cchealth.org.

Sincerely,

Sue Orsouphakheth, R.E.H.S.
Environmental Health Specialist II
Plan Review Division

cc: City of Walnut Creek Building Inspection Department
Central CC Sanitary District
CC Fire Protection District
Kim DeGuzman, Sweetgreen
Joshua Slattengren, Environmental Health Specialist II
Veronica Burell, Supervising Environmental Health Specialist

SO:lj

SEQUENCE OF OPERATIONS

PACKAGED SINGLE ZONE AIR CONDITIONER

OCCUPIED:
DURING OCCUPIED PERIODS THE SUPPLY FAN WILL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER WILL OPEN TO MINIMUM POSITION OR BASE DAMPER POSITION (10% OPEN) IF EQUIPPED WITH DCV. THE SIX (6) MODES OF OPERATION DURING OCCUPIED MODE ARE ECONOMIZER, COOLING, HEATING, VENTILATION, DEMAND CONTROL VENTILATION, AND STANDBY MODE.

ECONOMIZER:
DURING OCCUPIED MODE, WHEN THE SPACE TEMP RISES 2 DEGREES HIGHER THAN SPACE TEMP SET POINT, AND WHEN OA TEMPERATURE IS BELOW THE RA TEMPERATURE, THE OUTSIDE AIR DAMPER WILL MODULATE OPEN TO MAINTAIN SUPPLY TEMP SET POINT OF 55 DEGREES. IF THE ECONOMIZER IS AT 100% OPEN AND CONTINUE ECONOMIZING, MECHANICAL COOLING WILL BE ACTIVATED. THE ECONOMIZER CYCLE IS THE FIRST STAGE OF COOLING AND WILL CONTROL TO THE SPACE TEMPERATURE SET POINT. WHEN OA TEMPERATURE IS ABOVE RA TEMPERATURE, THE ECONOMIZER CYCLE WILL BE DEACTIVATED AND THE OUTDOOR AIR DAMPER WILL MODULATE CLOSE TO MINIMUM DAMPER POSITION.

COOLING:
DURING OCCUPIED MODE, WHEN SPACE TEMP IS 2 DEGREES HIGHER THAN THE CONTROL TEMP COOLING SET POINT (72 DEG. F), THE COOLING MODE WILL BE ACTIVATED. CONVERSELY, WHEN THE SPACE TEMP IS 2 DEGREES LOWER THAN THE CONTROL COOLING SET POINT, COOLING MODE WILL BE DEACTIVATED. WHEN CONDITIONED SPACES BECOME UNOCCUPIED FOR MORE THAN 5 MINUTES AS SENSED BY OCCUPANCY SENSORS, COOLING MODE WILL BE DEACTIVATED AND PLACED INTO STANDBY MODE.

HEATING:
DURING OCCUPIED MODE; WHEN THE SPACE TEMP DROPS 2 DEGREES LOWER THAN SPACE HEATING CONTROL SET POINT (70 DEG. F), HEATING MODE WILL BE ACTIVATED; AND WHEN SPACE TEMP IS 2 DEGREES HIGHER THAN HEATING CONTROL SET POINT, HEATING MODE WILL BE DE-ACTIVATED. WHEN CONDITIONED SPACES BECOME UNOCCUPIED FOR MORE THAN 5 MINUTES AS SENSED BY OCCUPANCY SENSORS, HEATING MODE WILL BE DEACTIVATED AND PLACED INTO STANDBY MODE.

VENTILATION:
DURING OCCUPIED MODE, WHEN THE SPACE TEMP IS BETWEEN 2 DEGREES BELOW SPACE COOLING SET POINT AND 2 DEGREES ABOVE ZONE HEATING SET POINT, THE SUPPLY FAN WILL RUN CONTINUOUSLY, THE OUTSIDE AIR DAMPER WILL BE AT MINIMUM DAMPER POSITION, EXCEPT IN DEMAND CONTROL VENTILATION, AND BOTH HEATING AND COOLING COILS ARE DISABLED.

DEMAND CONTROL VENTILATION:
WHEN CO2 SENSOR INDICATE CO2 CONCENTRATION ABOVE 1000 PPM (ADJ.) IN THE SPACE, THE OUTSIDE AIR DAMPER MODULATES OPEN FROM BASE DAMPER POSITION (10% OPEN) TO MINIMUM DAMPER POSITION. THE SEQUENCE WORKS IN REVERSE WHEN THE CO2 CONCENTRATION REDUCES BELOW SETPOINT, OA DAMPERS MODULATE CLOSE TO REACH BASE DAMPER POSITION.

UNOCCUPIED:
DURING UNOCCUPIED PERIODS THE SUPPLY FAN WILL BE OFF, RETURN AIR DAMPERS 100% OPEN, AND OUTSIDE AIR DAMPERS 100% CLOSED. THE TWO MODES OF OPERATION DURING UNOCCUPIED MODE ARE NIGHT/DAY SETBACK AND NIGHT PURGE.

NIGHT/DAY SETBACK:
WHEN THE SPACE TEMP IS BELOW THE UNOCCUPIED HEATING SETPOINT (60°F ADJ), SUPPLY FAN WILL START, OUTSIDE AIR DAMPER WILL REMAIN CLOSED, AND HEATING MODE ENABLED. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT (60°F ADJ) PLUS THE UNOCCUPIED DIFFERENTIAL (4°F ADJ), HEATING MODE WILL BE DISABLED AND THE SUPPLY FAN WILL STOP.

WHEN THE SPACE TEMP IS ABOVE THE UNOCCUPIED COOLING SETPOINT (85°F ADJ), SUPPLY FAN WILL START, OUTSIDE AIR DAMPER WILL REMAIN CLOSED, AND COOLING MODE ENABLED. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT (85°F ADJ) MINUS THE UNOCCUPIED DIFFERENTIAL (4°F ADJ), COOLING MODE WILL BE DISABLED, AND THE SUPPLY FAN WILL STOP.

NIGHT PURGE:
DURING BUILDING FLUSH-OUT, THE ECONOMIZER SHALL MODULATE THE OUTSIDE AIR DAMPERS OPEN TO PURGE THE BUILDING WHEN OUTDOOR AIR TEMPERATURES ARE LOWER THAN SPACE AIR TEMPERATURE AND STOP WHEN SPACE TEMPERATURE REACHES 68°F. FLUSH-OUT SHALL START A 5:00 AM (ADJ.) AND STOP PRIOR TO MORNING COOL-DOWN CYCLE. NIGHT-TIME PURGE SHALL OPERATE ONLY DURING COOLING SEASON.

OPTIMAL START:
DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT (70°F ADJ), A MORNING WARM-UP SEQUENCE WILL BE ACTIVATED. THE SUPPLY FAN WILL START, OUTSIDE AIR DAMPER WILL REMAIN CLOSED, AND HEATING MODE ENABLED. WARM-UP WILL TERMINATE WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED HEATING SETPOINT (70°F ADJ) OR THE OCCUPIED TIME PERIOD HAS STARTED.

DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT (72°F ADJ), A MORNING COOL DOWN SEQUENCE WILL BE ACTIVATED BEFORE OCCUPANCY (ADJ.). THE SUPPLY FAN WILL START, OUTSIDE AIR DAMPER WILL REMAIN CLOSED, AND COOLING MODE ENABLED. OUTDOOR AIR DAMPERS SHALL MODULATE WHEN OUTDOOR AIR TEMPERATURE IS OPTIMAL FOR ECONOMIZING. COOL DOWN MODE WILL TERMINATE WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED COOLING SETPOINT (72°F ADJ) OR THE OCCUPIED TIME PERIOD HAS STARTED.

FREEZE PROTECTION:
DURING THE OCCUPIED COOLING MODE; THE OUTSIDE AIR DAMPER WILL MODULATE TO MINIMUM POSITION IF THE SUPPLY AIR TEMPERATURE DROPS BELOW 50°F (ADJ); AND IF THE SUPPLY AIR TEMPERATURE SENSOR SHOULD FAIL WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 40 DEGREES, THE OUTSIDE AIR DAMPER WILL CLOSE, AND AN ALARM WILL BE ANNUNCIATED. LOW LIMIT TEMPERATURE CUT-OFF FUNCTION SHALL BE ACHIEVED BY BAS THROUGH SOFTWARE VIA THE OUTDOOR AIR TEMPERATURE SENSOR.

FIRE ALARM MODE:
A ZONE FIRE ALARM SIGNAL FROM THE FIRE COMMAND PANEL WILL SHUT DOWN THE SUPPLY FANS UPON DETECTION OF SMOKE FROM ANY SMOKE DETECTOR. OUTDOOR AIR DAMPERS SHALL CLOSE TO THEIR NORMAL CLOSED POSITION WHENEVER SUPPLY FAN IS OFF. THE SYSTEM SHALL RETURN TO NORMAL OPERATION WHEN THE FIRE ALARM HAS CLEARED AND THE SYSTEM HAS BEEN RESET.

EXHAUST FANS (EF-1, EF-2, & EF-3)

OCCUPIED:

FAN OPERATION:
WHEN SCHEDULED BY THE TIME CLOCK TO BE IN OCCUPIED MODE, THE EXHAUST FAN IS TO START AND RUN CONTINUOUSLY.

OCCUPIED:

FAN OPERATION:
WHEN SCHEDULED BY THE TIME CLOCK TO BE IN UNOCCUPIED MODE, THE EXHAUST FAN SHALL REMAIN OFF.

sweetgreen
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LOS ANGELES, CALIFORNIA 90034

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REGISTERED PROFESSIONAL ENGINEER DANIEL YAU No.M38083 Exp.09/30/22 MECHANICAL STATE OF CALIFORNIA
XX.XX.XXXX

PROJECT INFORMATION:
WALNUT CREEK

PROJECT INFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL SCHEDULES

M-310

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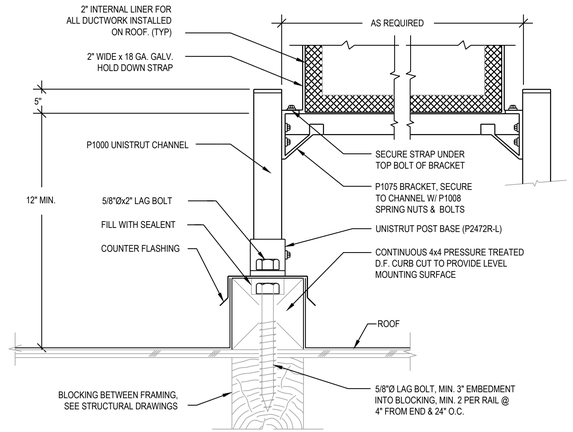

DUCT SUPPORT ON WOOD FRAMED ROOF

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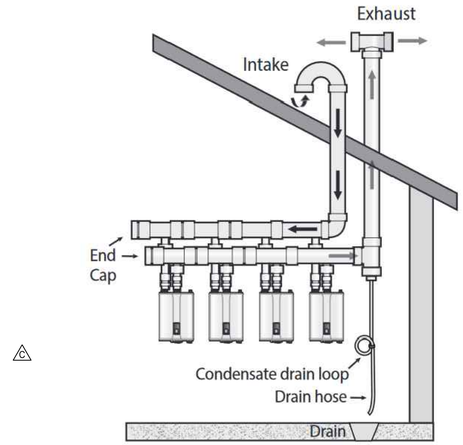

COMMON EXHAUST AND INTAKE FOR WATER HEATER

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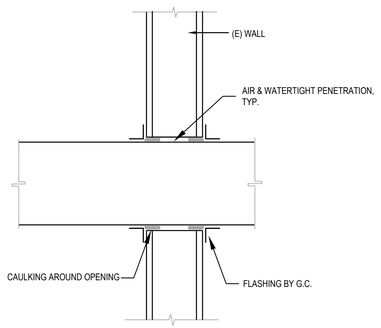

DUCT THRU WALL

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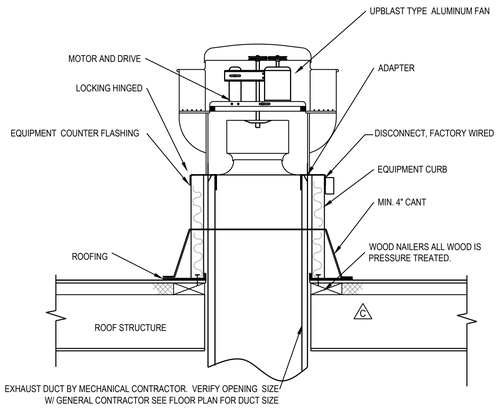

UPBLAST TYPE EXHAUST FAN

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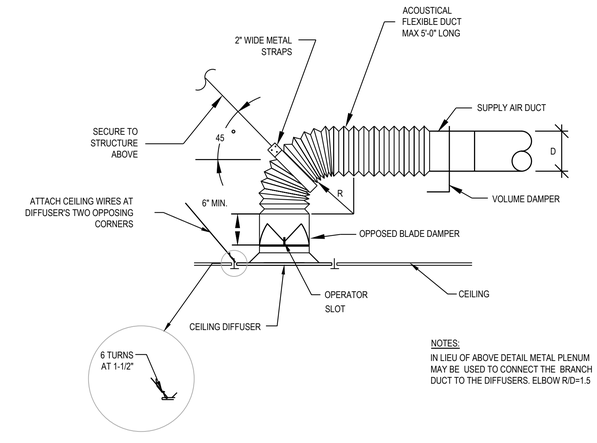

DIFFUSER MOUNTING DETAIL

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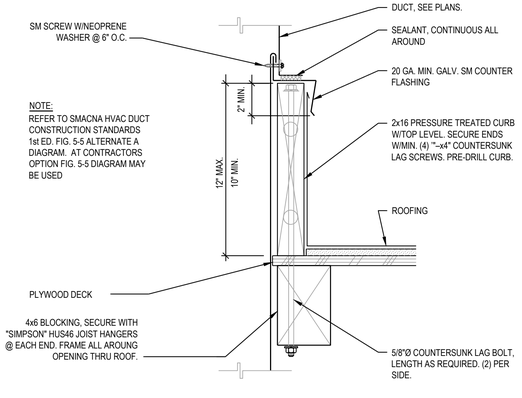
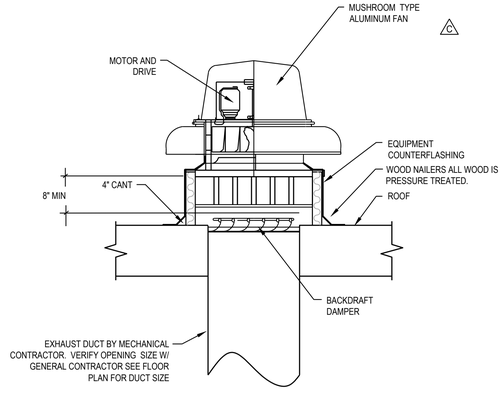


DUCT THROUGH ROOF

NOT TO SCALE 7



MUSHROOM TYPE EXHAUST FAN DETAIL

NOT TO SCALE 4

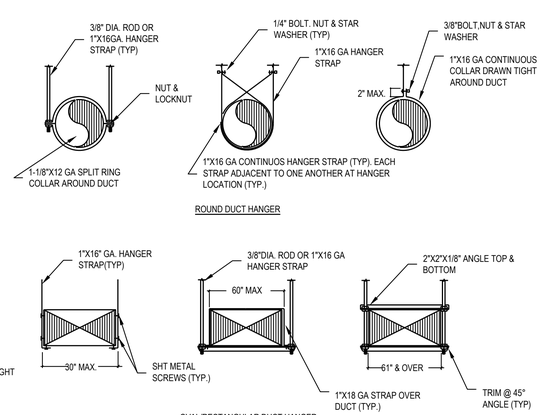
THESE TWO HANGERS ARE FOR DUCTS 25" & LARGER (MAY BE USED ON SMALLER DUCTS)

THIS HANGER IS FOR DUCTS 24" DIA & SMALLER

SINGLE HANGER MAX LOAD	
STRAP	WIRE OR ROD
1" X 22 GA. - 260 LBS	(12 GA.) 0.106" 80 LBS
1" X 20 GA. - 260 LBS	(10 GA.) 0.135" 80 LBS
1" X 18 GA. - 420 LBS	0.162" 160 LBS
1" X 16 GA. - 700 LBS	1/4" 270 LBS
1-1/2" X 16 GA. - 1100 LBS	3/8" 680 LBS

MINIMUM HANGER SIZES FOR ROUND DUCT				
DIA. (IN)	MAXIMUM SPACING	WIRE DIA.	ROD	STRAP
6-10	12'	ONE 12 GA.	1/4"	1" X 22 GA.
11-18	12'	TWO 12 GA. OR ONE 8 GA.	1/4"	1" X 22 GA.
19-24	12'	TWO 10 GA.	1/4"	1" X 22 GA.

NOTES:
1. REFER TO SPECIFICATIONS FOR HANGER SPACINGS.
2. 2 ATTACHMENTS TO OVERHEAD STRUCTURE SHALL BE MADE IN ACCORDANCE WITH STRUCTURAL ENGINEERS REQUIREMENTS AND WEIGHT LIMITATIONS. ALL ATTACHMENT METHODS TO STRUCTURE SHALL BE SUBMITTED TO STRUCTURAL ENGINEER FOR REVIEW.



DUCT SUPPORTS

NOT TO SCALE 1

11/3/2020 1:57:11 PM

sweetgreen
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REGISTERED PROFESSIONAL ENGINEER DANIEL YAU No.M38083 Exp.09/30/22 MECHANICAL STATE OF CALIFORNIA

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F	02/17/22	BULLETIN 1

MECHANICAL DETAILS

M-400

2020-08-14

Mr. Roland Hegmann
Rational AG
Iglinger Str 62
Landsberg, 86899
DE

Dear Mr. Hegmann,

This letter supersedes the letters dated March 15, 2019 and August 13, 2019 relating to models evaluated and represented by the previously conducted Grease Emissions Test (EPA202).

Per your request, project was opened for the evaluation of grease-laden vapors produced from the Model XS 6 2/3, model SCC 102 and model SCC 102/SCC 62 stacked.

The scope of this project was to determine the total grease emissions from cooking quartered roasting chickens weighing 2-1/2 to 3-1/2 lb. skin-on and bone-in as the specified food load as noted in Appendix A of our letter dated August 13, 2019. Testing was conducted in accordance with EPA Method 202 test guidelines to determine ultimate results. Results are used to determine compliance with Section 59 of UL710B, the Standard for Recirculating Systems, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and paragraph 4.1.1.2 of NFPA96, the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

For the record, the test was conducted using the Rational Appliances Model SCC-102, rated 208 V, 37 KW also Model SCC-102, rated 208 / 440 V, 37 KW and Model SCC-62, rated 208 / 440 V, 22.1 KW stacked. The test media, food load and oven programming were taken from UL 710B, section 59. The results are considered to comply with UL710B, Section 59, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and NFPA96, paragraph 4.1.1.2 when tested with the specified food load and maximum cook times since the total amount of grease-laden effluents collected was less than 5 mg/m³ limit. No evaluation was conducted in regards to fire protection.

The ovens tested were considered representative of oven models CMP XS 6 2/3, SCC XS 6 2/3, CM101, CM102, CM61, CM62, CMP101, CMP102, CMP61, CMP62, SCC WE101, SCC WE102, SCC WE61, SCC WE62, SCC101, SCC61, SCC62, and any combination of stacked version from the models noted above, which are rated less than the tested unit and are smaller in size and have less food throughput than the model tested.

Datasheet

iCombi® Classic 6-half size E/G

Description

- Combi-steamer in accordance with DIN 18866 for most cooking methods used in commercial kitchens for optional use of steam and convection, individually, one after the other, or combined.

Ventilation approvals: The electrical appliance conforms to the EPA 202 test in accordance with ANSI/ NFPA 96 "Ventilation Control and Fire Protection of Commercial Cooking Operations" Refer to UL Listing KNLZ.E148536 (America) or KNLZ7.E148536 (Canada).

Unit description and functions

Capacity
- Six (6) Half-size sheet pans or Six (6) Steam table pans or Six (6) 1/1 GN accessories
- Removable standard hinging rack with 2 5/8 inch rack spacing (68 mm)
- Large selection of accessories for various cooking procedures, such as grilling, braising or baking
- For use with 1/1, 1/2, 2/3, 1/3 GN accessories

Combi-steamer mode
- Steaming 86 °F - 266 °F
- Convection 86 °F - 572 °F
- Combination of steam and convection 86 °F - 572 °F

ClimaPlus
- Climate management – humidity measurement and control
- Humidity setting in 10-% increments

Cooking functions
- ClimaPlus: The active climate management in the cooking cabinet, which constantly measures and controls the humidity and guarantees effective dehumidification, combined with high productivity, cooking quality and low energy consumption. Humidity can be adjusted in increments of 10% and monitored via the digital display for precise manual cooking
- Dynamic air circulation in the cooking cabinet through reversing high-performance fan propeller with five fan speeds that can be programmed manually. The optimal energy yield results in excellent uniformity and short cooking times.
- High-performance steam generator for optimal steaming performance even at low temperatures below 212°F
- Integrated, maintenance-free fat separation system without an additional fat filter
- Cool-down function for quick cooling of the cooking cabinet via a fan propeller
- Core temperature measurement via core temperature probe and optional positioning aid (accessories)
- Delta-T cooking for extremely gentle preparation with minimal cooking losses
- Digital temperature display, can be set to °C or °F, displays target and actual values
- Cooking cabinet humidity and time displayed digitally; displays target and actual values
- Individual programming of up to 100 single or multi-stage cooking programs with up to 12 steps
- Individual adjustment of the cooking parameters time, temperature and humidity for a program step during ongoing operation
- Easy transfer of cooking programs to other cooking systems via USB stick.
- Integrated hand shower with automatic retraction and switchable spray/jet function
- Energy-saving, long-lasting LED lighting in the cooking cabinet, with excellent color fidelity to allow quick determination of cooking progress
- No-charge 4-hour RATIONAL certified chef assistance program

Occupational and operating safety
- Electronic safety temperature limiter for steam generator and convection heating
- Integrated fan wheel brake
- Use of Active Green cleaning tabs and Care tabs (solid cleaning agent) for ideal occupational safety levels
- HACCP data memory and output via USB
- Tested according to national and international standards for unsupervised operation
- Maximum tray height must not exceed 63 inch when using a RATIONAL stand
- Ergonomic door handle with right- / left-handed door opening and swing-shut function

Networking
- Integrated, IP-protected USB interface for local data exchange
- Optional integrated IP-protected Ethernet interface
- Optional integrated Wi-Fi interface (incl. Ethernet interface)

Cleaning and care
- Automatic, water pressure-independent cleaning and maintenance system for cooking cabinet and steam generator
- Care system: Automatic cleaning and descaling of the steam generator
- 4 cleaning programs of varying degrees for unsupervised cleaning, including overnight
- Easy and intuitive operation of the cleaning programs: Display of the selected cleaning program, the recommended quantity of tabs and the remaining cleaning time
- Safe ending of the cleaning in the event of a power failure with no cleaning agent left in the cooking cabinet
- Use of phosphate and phosphorous-free Active Green cleaner tabs and care tabs
- Hygienic setup flush with the counter without feet for easy and safe cleaning
- Unit door with rear-ventilated double glass panel and hinged inner pane for easy cleaning

Technical specifications

Dimensions and weights

Dimensions (W x H x D)	
Cooking system (body)	33 1/2 x 29 5/8 x 30 1/2 inches
Cooking system (total)	33 1/2 x 31 5/8 x 33 1/8 inches
Cooking system with packaging	36 3/4 x 37 3/4 x 37 5/8 inches
Top rack maximum working height*	≤ 5 ft. 2 7/8 inches

*When using an original RATIONAL stand

Weights	
Maximum load size per tray	33 lb
Maximum total load capacity	66 lb
Weight - electric unit without packaging	205 lb
Weight - electric unit with packaging	244 lb
Weight - gas unit without packaging	222 lb
Weight - gas unit with packaging	262 lb

Electrical connection conditions

Voltage 3 AC 208 V / 240 V	
Connected loads - electric	10.8 kW
Steam power	9 kW
Convection power	10.25 kW
Breaker	35 A
RCD type	B
Cable diameter	AWG 8 140°F
Voltage 3 AC 440 V / 480 V	
Connected loads - electric	10.8 kW
Steam power	9 kW
Convection power	10.25 kW
Breaker	20 A
RCD type	B
Cable diameter	AWG 14 140°F
Voltage 2 AC 208 V / 240 V	
Connected loads - electric	10.8 kW
Steam power	9 kW
Convection power	10.25 kW
Breaker	60 A
RCD type	B
Cable diameter	AWG 14 140°F

Connected loads - gas

Natural gas G20	
Nominal heat load, total	49500 BTU
Nominal heat load, Steam mode	45500 BTU
Nominal heat load, Hot Air mode	49500 BTU
Required connection flow pressure	6.5 – 10 inch w.c.
Liquid gas	
Nominal heat load, total	48500 BTU
Nominal heat load, Steam mode	44500 BTU
Nominal heat load, Hot Air mode	48500 BTU
Required connection flow pressure	10 – 15 inch w.c.

3/4" NPT with 3/4" gas shut off
Additional gas types and voltages available on request

Connected loads - gas

Voltage 2 AC 208 V	
Connected loads - gas	0.6 kW
Breaker	15 A
RCD Type	B
Voltage 1 NAC 120 V	
Connected loads - gas	0.6 kW
Breaker	15 A
RCD Type	F

Connection conditions water

Water inlet (pressure hose), each	3/4"
Water pressure (flow pressure), each	14.5–87.0 psi
Water drain, each	2" OD
Maximum flow rate per cooking system	3.17 gal/min

Water quality requirements
Untreated water can be 0 to 24.5 gr/gal (0 to 420ppm) hardness. We do not recommend treated water hardness < 5 gr/gal (86ppm) because the water could be corrosive. Sodium ion exchangers are not recommended; H+ ion exchange systems are recommended. Water that does not meet the following minimum standards will require the proper conditioning

Contaminant	Water Requirements	If > than recommended
Sand / Particles	< 15 µm	Particle filter
Chlorine (Cl2)	< 0.12 gr/gal (0.2 ppm)	Active carbon filter
Chloride (Cl-)	< 4.68 gr/gal (80 ppm)	RO

Connected loads - exhaust air and thermal load

Latent heat load	1943 BTU
Sensible heat emission	2391 BTU
Sound level (electric)	55 dBA
Sound level (gas)	60 dBA

Connection loads - data

LAN data interface	RJ45
WiFi data interface	IEEE 802.11 a/g/n

Minimum distances at installation
Clearance Requirements
To facilitate servicing, we recommend leaving a 20" (500 mm) gap on the left-hand side of the unit. If there is not 20" (500 mm) left side clearance available, provisions for moving the unit to the left for service access must be made. Such provisions include, but are not limited to, having quick connections (water, gas, etc.) and lengthened electrical connections with flexible cords.
If there are no external heat sources acting on the unit, there should be at least 2" (50 mm) of clearance on either side of the unit. The back of the unit can be mounted flush with the wall.
If a high temperature heat source is on the left side of the unit, clearance of at least 14" (350 mm) must be maintained on the left-hand side. This clearance may be reduced to 2" (50 mm) if a heat shield is used (see accessories).
Recommended clearance from unobstructed rear exhaust pipes and any surface collecting grease or flammable material: 16" (400 mm) gas, 10" (254 mm) electric. It is recommended to have a hood overhang of 6" (150 mm) to 18" (450 mm) at the front of the unit and 6" (150 mm) on the sides if installed at the end of the cooking line. Please refer to the Installation Manual for additional technical data and for instructions on installation and setup.

2020-08-26

Specification/Data sheet

UltraVent Plus models 6-half size, 10-half size US

Article number: 60.76.177

Description
The UltraVent Plus gets rid of escaping steam with its condensation technology. It is also equipped with special filter technology which reduces lingering smoke, which can build up while grilling and frying. No connection to the outside or extension of an existing exhaust system is necessary with this air recirculation hood. Installation is simple, and the hood can be retrofitted at any time.

Features
- Intelligent power control with automatic, continuously variable adjustment of the extraction power to the quantity of steam emitted
- Automatically boosts extraction rate when cooking cabinet door is opened
- Connects to both iCombi cooking systems in a Combi-Duo
- Eliminates lingering steam and vapours. These are extracted and condensed in the hood
- Special filter technology with a prefilter and HEPA H13 main filter to reduce smoke
- Easy to install and retrofit
- Issue of service notifications on the display of the iCombi Pro and iCombi Classic
- Adjustment of maximum extraction power on the display
- Easy to clean baffle plate, dishwasher safe

Technical Specifications
- Connection: 120V - 1 NAC 50/60 Hz
- Connected load: 170 W
- Extraction capacity: 24900 ft³/h
- Operating noise level: min 50 dBA; max 65 dBA
- Width: 33 5/8 inches
- Height: 15 7/8 inches
- Depth: 38 3/8 inches
- Weight: 174 lbs

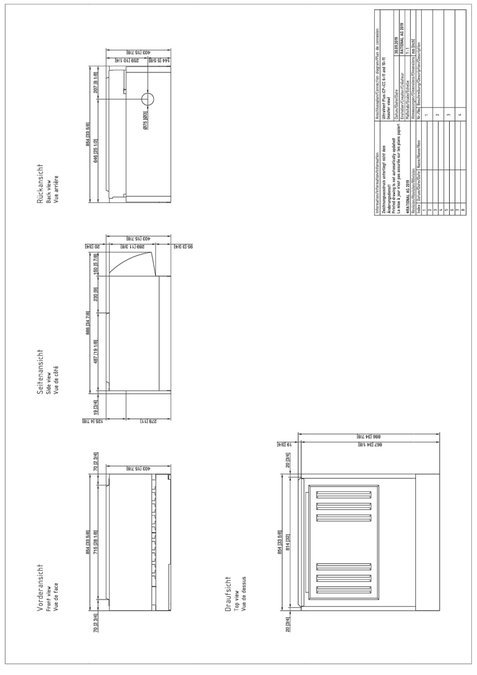
Material
- Rust-free stainless steel (CNS 1.4301)

Note
- To install an UltraVent, UltraVent Plus or exhaust hood on a SelfCookingCenter (from 09/2011) or CombiMaster Plus, a corresponding adapter kit is required
- The local standards and regulations for ventilation systems must be adhered to
- Only permitted for installation on electrical units

2020-08-26

Specification/Data sheet

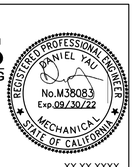
UltraVent Plus models 6-half size, 10-half size US



sweetgreen
3000 S. ROBERTSON BLVD.
LOS ANGELES, CALIFORNIA 90034

ARCHITECT OF RECORD:
Dewberry
Dewberry Architects Inc.
300 N. Lake Ave, 12th Floor
Pasadena, Ca. 91101
916.239.4256 Phone
916.2397245 Fax

STAMP:



ACIES ENGINEERING
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PROJECT NFORMATION:
WALNUT CREEK

PROJECT NFORMATION:
1556 MT. DIABLO BLVD
WALNUT CREEK, CA, 94596

DRAWN BY:	ACIES
CHECKED BY:	GP/DY
PROJECT MANAGER:	EN
SG DESIGN MANAGER:	KD
SG CONSTR. MANAGER:	KZ
PROJECT NO:	50132104
TEMPLATE VERSION:	06.01.2020

REVISIONS

REV.	DATE	DESCRIPTION
C	09/22/21	BLDG. DEPT. COMMENTS
D	12/03/21	BLDG. DEPT. COMMENTS 2
E	02/11/22	ISSUE FOR CONSTRUCTION
F	02/17/22	BULLETIN 1

MECHANICAL DETAILS

M-410

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