SYMBOLS (NOT ALL USED)

GENERAL

- NORTH ARROW
- DETAIL IDENTIFICATION NUMBER
- SHEET ON WHICH DETAIL IS DRAWN
- SECTION OR ELEVATION IDENTIFICATION LETTER
- SHEET ON WHICH SECTION OR ELEVATION IS DRAWN
- EQUIPMENT ABBREVIATION (SEE ABBREVIATION LIST)
- EQUIPMENT NUMBER
- REVISION CLOUD
- KEYNOTE
- REVISION
- POINT OF CONNECTION (P.O.C.)
- POINT OF DISCONNECTION (P.O.D.)

LINETYPE

- NEW WORK
- EXISTING WORK
- WORK TO BE REMOVED
- FUTURE

EQUIPMENT AIR MOVING DEVICE & COMPONENTS

- UTILITY SET EXHAUST FAN
- ROOF VENTILATOR, INTAKE
- ROOF VENTILATOR, EXHAUST
- DUCT SECTION, SUPPLY (POSITIVE)
- DUCT SECTION, RETURN (NEGATIVE)
- DUCT SECTION, EXHAUST (NEGATIVE)
- DIRECTION OF FLOW
- DUCT SIZE, WHERE FIRST DIMENSION IS VISIBLE DUCT
- CHANGE OF ELEVATION RISE (R) DROP (D)
- DUCTWORK, DOUBLE LINE
- ACOUSTICAL LINED DUCTWORK, DOUBLE LINE
SIZE SHOWN INDICATES NET INSIDE DIMENSION
- FLEXIBLE DUCTWORK, FLEXIBLE EQUIPMENT CONNECTION, DOUBLE LINE
- DUCTWORK, SINGLE LINE
- FLEXIBLE DUCTWORK, FLEXIBLE EQUIPMENT CONNECTION, SINGLE LINE
- TERMINAL UNIT, DUAL DUCT
- TERMINAL UNIT, SINGLE DUCT
- CEILING SUPPLY DIFFUSER WITH 4-WAY BLOW PATTERN
- CEILING SUPPLY DIFFUSER WITH 3-WAY BLOW PATTERN
- CEILING RETURN REGISTER
- CEILING EXHAUST GRILLE
- DIFFUSER/REGISTER NUMBER
- AIR INLET/OUTLET IDENTIFICATION
- AIRFLOW
- UNDERCUT DOOR, 1 INCH, 100 CFM
- HUMIDIFIER

DUCT ACCESSORIES & CONTROLS INSTRUMENTATION

- THERMOSTAT
- TEMPERATURE SENSOR
- REMOTE TEMPERATURE SENSOR
- CO2 SENSOR
- HUMIDITY SENSOR
- ROOM PRESSURE MONITOR
- MULTIROOM PRESSURE MONITOR
- AUTOMATIC DAMPER (ELECTRIC)
- AUTOMATIC DAMPER (PNEUMATIC)
- FIRE DAMPER
- COMBINATION FIRE SMOKE DAMPER (CSFD)
- BACK DRAFT DAMPER
- MANUAL VOLUME DAMPER
- SMOKE DETECTOR

PIPING

- DROP, DOUBLE LINE
- RISE, DOUBLE LINE
- TEE DOWN, DOUBLE LINE
- 90 DEGREE ELBOW, DOUBLE LINE
- DROP, SINGLE LINE
- RISE, SINGLE LINE
- TEE DOWN, SINGLE LINE
- 90 DEGREE ELBOW
- DIRECTION OF SLOPE DOWN
- CHILLED WATER RETURN
- CHILLED WATER SUPPLY
- CONDENSER WATER RETURN
- CONDENSER WATER SUPPLY
- HIGH PRESSURE CONDENSATE
- HIGH PRESSURE STEAM
- MEDIUM PRESSURE CONDENSATE
- MEDIUM PRESSURE STEAM
- LOW PRESSURE CONDENSATE
- LOW PRESSURE STEAM
- HEATING HOT WATER RETURN
- HEATING HOT WATER SUPPLY
- PUMP CONDENSATE
- CONDENSATE
- REFRIGERANT LIQUID
- REFRIGERANT SUCTION

VALVES

- BALL VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- GATE/GLOBE ANGLE VALVE
- GATE/GLOBE VALVE
- TWO WAY VALVE
- THREE WAY VALVE
- CHECK VALVE
- CONTROL VALVE
- PRESSURE REDUCING VALVE
- AIR VENT AUTOMATIC
- AIR VENT MANUAL

FITTING & PIPING SPECIALTIES

- PLUG OR CAP
- REDUCER
- BALANCING COCK
- UNION, SCREWED
- UNION, FLANGED
- FLEXIBLE CONNECTOR
- PRESSURE GAUGE
- PRESSURE SWITCH
- PUMP (INDICATE USE)
- STRAINER
- THERMOMETER, TEMPERATURE SENSOR

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AMB	AMBIENT
ARCH	ARCHITECTURAL
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
°C	DEGRESS CENTRIGRADE (CELCIUS)
CBC	CALIFORNIA BUILDING CODE
CC	COOLING COIL
CD	CEILING DIFFUSER
CD	CONDENSATE DRAIN
CFC	CALIFORNIA FIRE CODE
CFM	CUBIC FOOT/FEET PER MINUTE
CFSD	COMBINATION FIRE/SMOKE DAMPER
CG	CEILING GRILLE
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	CEILING
CMC	CALIFORNIA MECHANICAL CODE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CR	CEILING RETURN
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
DN	DOWN
DWG	DRAWING
EA	EXHHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
EES	ENERGY EFFICIENCY STANDARD (TITLE 24)
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRICAL
ENT	ENTERING
EQPM	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
°F	DEGREES FAHRENHEIT
(F)	FUTURE
FD	FIRE DAMPER
FF	FINAL FILTER
FLA	FULL LOAD AMPERES
FLR	FLOOR
FLX	FLXIBLE CONNECTION
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
GA	GAUGE
GAL	GALLON
GC	GENERAL CONTRACTOR
GPH	GALLON PER HOUR
GPM	GALLON PER MINUTE
H	HEIGHT
HC	HEATING COIL
HD	HOT DECK/HOT DUCT
HHWR	HEATING HOT WATER RETURN
HHWS	HEATING HOT WATER SUPPLY
KW	KILOWATT
L	LENGTH
(L)	LINED DUCTWORK
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LBD	LEAVING DRY BULB TEMPERATURE
LIN FT	LINEAR FEET
LVG	LEAVING
LWB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MB	MIXING BOX
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
MUA	MAKE-UP AIR
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OSA/OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
POD	POINT OF DISCONNECTION
RA	RETURN AIR
RG	RETURN GRILLE
RH	REHEAT COIL
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SF	SUPPLY FAN
SOV	SHUT OFF VALVE
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SQ.FT.	SQUARE FOOT
SS	STAINLESS STEEL
TA	TRANSFER AIR
TEMP	TEMPERATURE
TF	TRANSFER FAN
TG	TRANSFER GRILLE
TV	TURNING VANES
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UTR	UP THROUGH ROOF
V	VOLTS
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VENT	VENTILATION AIR
W	WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WMS	WIRE MESH SCREEN

GENERAL NOTES

1. ALL WORK, INSTALLATION, AND MATERIALS SHALL COMPLY WITH ALL CURRENT GOVERNING CODES, BUILDING STANDARDS, REGULATIONS, SPECIFICATIONS, AND ALL OTHER REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION. WHERE REQUIREMENTS BETWEEN THESE VARY, THE MOST STRINGENT SHALL APPLY.
2. ALL WORK SHALL BE PERMITTED. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, FEES, AND LICENSES, UNLESS OTHERWISE DEFINED BY OWNER.
3. CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS FOR ALL TRADES PRIOR TO SUBMITTING BID AND START OF WORK.
4. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE EXISTING FIELD CONDITIONS, INCLUDING BUT NOT LIMITED TO DIMENSIONS, THE EXISTING INSTALLATIONS, POINTS OF (DIS)CONNECTION, AND REQUIRED CLEARANCES. CONTRACTOR SHALL MAKE ANY MINOR ADJUSTMENTS NECESSARY TO AVOID CONFLICTS WITH THE BUILDING STRUCTURE AND THE WORK OF OTHER TRADES. THIS SHALL BE VERIFIED PRIOR TO BID SUBMITTAL, START OF CONSTRUCTION, AND/OR FABRICATION OF MATERIALS. BY THE ACT OF SUBMITTING A BID, THE CONTRACTOR ACCEPTS THE GIVEN WORKING CONDITIONS.
5. IF DISCREPANCIES ARE ENCOUNTERED BETWEEN THE DRAWINGS, BUILDING STANDARDS, SPECIFICATIONS, AND/OR CURRENT CONDITIONS, THE ENGINEER AND ARCHITECT SHALL BE NOTIFIED WITH A REQUEST FOR CLARIFICATION, AND THE OWNER SHALL BE NOTIFIED IN WRITING PRIOR TO COMMENCEMENT OF WORK. IF WORK IS DONE WITHOUT WRITTEN APPROVAL FROM OWNER REPRESENTATIVE, THE WORK SHALL BE CONSIDERED AT-RISK, AND A NON-CONFORMABLE INSTALLATION.
6. ALL DRAWINGS AND LAYOUTS ARE DIAGRAMMATIC TO SHOW DESIGN INTENT ONLY. CONTRACTOR SHALL COORDINATE NEW WORK WITH THE WORK OF ALL OTHER TRADES AND EXISTING CONDITIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL ALL WORK IN SUCH A MANNER AS TO AVOID OBSTRUCTIONS, PRESERVE HEADROOM, KEEP OPENINGS AND PASSAGEWAYS CLEAR, AND MAKE ALL EQUIPMENT REQUIRING INSPECTION, MAINTENANCE, AND REPAIR ACCESSIBLE WITHOUT EXTRA COST TO THE OWNER. NO CONSIDERATION SHALL BE GRANTED DUE TO LACK OF FAMILIARITY ON THE PART OF THE CONTRACTOR WITH ACTUAL PHYSICAL CONDITIONS, REQUIREMENTS, AND PRACTICES AT THE SITE.
7. SUBMIT ELECTRONIC PDF COPIES OF SUBMITTAL DOCUMENTS WITH DESCRIPTIVE DATA AND PROJECT-SPECIFIC PERFORMANCE FOR ALL PRODUCTS AND MATERIALS PROPOSED FOR THE PROJECT. CLEARLY INDICATE EXACT MAKE/MODEL INCLUDING ANY ACCESSORIES AND OPTIONS PROPOSED. SHOP DRAWINGS AT THE SAME SCALE AS THE CONSTRUCTION DOCUMENTS OR LARGER SHALL BE INCLUDED WITH SUBMITTALS AS REQUIRED. HARD COPY SUBMITTALS WILL NOT BE ACCEPTED. ALLOW A MINIMUM OF FIVE (5) WORKING DAYS FOR ENGINEER TO REVIEW SUBMITTALS. SUBMITTALS SHALL BE FOR A COMPLETE SYSTEM AND NOT A PARTIAL REPRESENTATION OF A SYSTEM.
8. SUBMIT REQUEST FOR INFORMATION (RFI) IN ELECTRONIC PDF FORMAT WITH PROPOSED SOLUTION INCLUDED, IF APPLICABLE. ALLOW MINIMUM OF THREE (3) WORKING DAYS FOR ENGINEER TO REVIEW AND RESPOND.
9. PREPARE COORDINATED SHOP DRAWINGS WITH ALL TRADES, INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION, STRUCTURAL, ETC. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION OF NEW/RELOCATED COMPONENTS. CONTRACTOR SHALL NOT USE THE ENGINEERED CAD FILES AS SHOP DRAWINGS. SHOP DRAWINGS SHALL CONFORM TO ALL SECTIONS OF AIA 201.
10. CONTRACTOR SHALL COMPLY WITH ALL CONTRACT DOCUMENTS IN LAYING OUT AND INSTALLING THEIR WORK AND EQUIPMENT. PRIOR TO INSTALLATION, COORDINATE WORK WITH THE WORK OF ALL OTHER TRADES AND JOB CONDITIONS.
11. CONTRACTOR SHALL OBTAIN AND FOLLOW ALL LANDLORD/OWNER REQUIREMENTS, GUIDELINES, RULES, AND PROCEDURES FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE INSURANCE IN ACCORDANCE WITH THE BUILDING'S CERTIFICATE OF INSURANCE REQUIREMENTS.
12. IF ANY EQUIPMENT SUBMITTED BY THE CONTRACTOR IS DIFFERENT FROM THE BASIS OF DESIGN SPECIFIED, CHANGES SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL. SUBMITTALS SHALL INDICATE ANY RESULTING CREDIT, ADDED COST, AND/OR ADJUSTMENT IN LEAD TIME. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PAYMENT OF ALL CHARGES RESULTING FROM ADDITIONS OR CHANGES IN THE WORK OF OTHER TRADES THAT ARE NECESSARY TO ACCOMMODATE THE REQUESTED SUBSTITUTION, UNLESS APPROVED BY OWNER. CONTRACTOR WILL PROCEED AT THEIR OWN RISK IF CHANGES OCCUR WITHOUT PRIOR APPROVAL.
13. ALL PENETRATIONS OF DUCTWORK, PIPING, CONDUITS, AND VENTS THROUGH FIRE, SMOKE, OR COMBINATION FIRE/SMOKE RATED BARRIERS SHALL HAVE FIRESTOP AND/OR SMOKE SEAL PROTECTION IN ACCORDANCE WITH THE STATE MINIMUM BUILDING CODE AND AUTHORITIES HAVING JURISDICTION. FIRESTOP AND SMOKE STOP PRODUCTS SHALL BE UL LISTED.
14. ALL PENETRATIONS OF DUCTWORK, PIPING, CONDUITS, AND VENTS THROUGH NON-RATED CONSTRUCTION SHALL BY PROPERLY AND GENEROUSLY CAULKED WITH SOUND-RESISTANT AND NON-HARDENING MATERIAL, SUCH AS SILICONE.
15. COORDINATE WITH OWNER'S ROOFING CONTRACTOR PRIOR TO MAKING ANY PENETRATIONS THROUGH ROOF. ROOF WARRANTY SHALL BE MAINTAINED.
16. FLASHING, COUNTER-FLASHING, AND ROOF MEMBRANE PATCHES AT ALL ROOF OPENINGS SHALL MATCH AND BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.
17. PROVIDE GENERAL CONTRACTOR WITH FINAL SIZES AND LOCATIONS OF ALL WALL, FLOOR, AND ROOF PENETRATIONS TO COORDINATE REQUIRED STRUCTURAL FRAMING MEMBERS.
18. COORDINATE ALL CUTTING, DRILLING, PATCHING, AND REINFORCING REQUIRED FOR WORK WITH THE GENERAL CONTRACTOR.
19. PROVIDE ACCESS PANELS/DOORS FOR ALL EQUIPMENT LOCATED IN INACCESSIBLE AREAS, SUCH AS ABOVE HARD LID CEILING OR BEHIND WALLS. ALL ACCESS PANEL/DOOR LOCATIONS SHALL BE COORDINATED WITH ARCHITECT.
20. REQUIRED ACCESS AND WORKING SPACE CLEARANCES FOR ALL EQUIPMENT AND CONTROL DEVICES MUST BE MAINTAINED TO ALLOW READY AND SAFE OPERATION, EXAMINATION, AND MAINTENANCE. REQUIRED CLEARANCES SHALL BE PER MANUFACTURER'S RECOMMENDATION AND GOVERNING CODES.
21. CONTRACTOR SHALL SECURE SITE WHILE WORK IS IN PROGRESS AND UNTIL THE WORK IS ACCEPTED BY OWNER'S REPRESENTATIVE.
22. THE CONTRACTOR IS SOLELY RESPONSIBLE TO PROVIDE METHODS OF PROCEDURE AND PERFORM ALL CONSTRUCTION MEANS AND METHODS.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, CAUSED BY THE WORK, TO EXISTING CONDITIONS OR THE WORK OF OTHER TRADES.
24. CONTRACTOR SHALL COORDINATE MOVEMENT AND STORAGE OF EQUIPMENT AND ALL OTHER COMPONENTS, INCLUDING TAKING ALL NECESSARY PRECAUTIONS TO COVER ALL EQUIPMENT/COMPONENTS TO PROTECT THEM FROM EXPOSURE TO OUTDOOR ELEMENTS, CONDITIONS OUTSIDE OF MANUFACTURER'S STORAGE CONDITIONS, AND CONSTRUCTION DEBRIS, WHETHER OR NOT EQUIPMENT IS POWERED OR IN USE.
25. ALL MATERIALS SHALL BE NEW, BEAR THE UNDERWRITERS LABORATORIES (UL) OR EQUIVALENT TESTING AGENCY LABEL, AND BE APPROVED BY THE AUTHORITIES HAVING JURISDICTION.
26. CONTRACTOR SHALL MAINTAIN RED-LINED AS-BUILT DRAWINGS DURING CONSTRUCTION TO DOCUMENT ALL CHANGES AND MODIFICATIONS TO THE CONTRACT DOCUMENTS. CONTRACTOR SHALL SUBMIT COMPLETE RED-LINED AS-BUILT DRAWINGS, UPON COMPLETION OF THE WORK, FOR REVIEW BY THE ARCHITECT/ENGINEER.
27. FURNISH FINAL CERTIFICATE OF INSPECTION OR WRITTEN EVIDENCE OF ACCEPTANCE BY INSPECTION AUTHORITIES FOR ALL WORK INSTALLED.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR MATINAINING A CLEAN AND SAFE WORK ENVIRONMENT THROUGHOUT THE DURATION OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL CONSTRUCTION DEBRIS, WITH ALL COSTS FOR DISPOSAL BORNE BY CONTRACTOR. UPON COMPLETION OF WORK, AREA(S) OF WORK SHALL BE LEFT IN A CLEAN CONDITION, ACCEPTABLE TO OWNER.
29. ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN AN ENVIRONMENTALLY RESPONSIBLE FASHION. RECYCLABLE MATERIAL SHALL BE PROPERLY RECYCLED, AND HAZARDOUS MATERIALS SHALL BE DISPOSED OF WITH PROPER CHAIN OF CUSTODY.
30. ALL PLANS APPROVED BY GOVERNING AGENCIES SHALL BE KEPT IN A SECURE PLACE AND SHALL NOT BE USED BY WORKERS. CONTRACTOR SHALL FURNISH ALL SUBCONTRACTORS CONSTRUCTION SETS REFLECTING THE APPROVED PLANS. CONTRACTOR SHALL ALSO MAINTAIN, IN GOOD CONDITION, ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS. THIS COMPLETE SET SHALL REMAIN ON PREMISES AT ALL TIMES, UNDER CARE OF THE JOB SUPERINTENDENT.
31. CONTRACTOR SHALL PROVIDE A WRITTEN WARRANTY TO REPLACE OR REMEDY ALL FAULTY, IMPROPER, OR INFERIOR MATERIALS AND/OR CORRECT FAULTY INSTALLATION AT NO COST TO OWNER, INCLUDING PARTS AND LABOR, FOR A PERIOD OF ONE (1) YEAR FROM DATE OF OWNER'S WRITTEN ACCEPTANCE OF ALL WORK INSTALLED.
32. PROVIDE OWNER WITH OPERATION AND MAINTENANCE MANUALS, GUARANTEES, AND WARRANTIES FOR ALL EQUIPMENT INSTALLED IN THE PROJECT.

MECHANICAL NOTES

1. ALL DRAWINGS AND LAYOUTS ARE DIAGRAMMATIC TO SHOW DESIGN INTENT ONLY. LOCATIONS OF DUCTWORK, PIPING, AND EQUIPMENT ARE APPROXIMATE. DUCT/PIPE OFFSETS, TRANSITIONS, SUPPORTS, AND HANGERS MAY NOT BE INDICATED. CONTRACTOR SHALL PROVIDE ALL TRANSITIONS AND FITTINGS NECESSARY FOR COMPLETE AND FUNCTIONING SYSTEMS. IF FIELD CONDITIONS DIFFER SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS AND AFFECT MECHANICAL WORK, INFORM ENGINEER OF RECORD IMMEDIATELY AND CONFIRM FURTHER DIRECTION BEFORE PROCEEDING WITH THE WORK IN THAT AREA.
2. DUE TO STRUCTURAL CONDITIONS, DUCTWORK OR PIPING INTERFERENCE, EXISTING OBSTRUCTIONS, OR OTHER REASONS, THE CONTRACTOR MAY WANT TO INSTALL WORK IN A MANNER DIFFERENT FROM THAT SHOWN IN THE CONTRACT DOCUMENTS. SUCH CHANGES SHALL BE PRESENTED TO THE ENGINEER OF RECORD AND OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING, AND THE RECORD DRAWING SHALL BE ACCURATELY REVISED TO SHOW THE CHANGES AS COMPLETED.
3. ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE NET CLEAR INSIDE DIMENSIONS AFTER INSULATION/LINING HAS BEEN INSTALLED.
4. PIPING ANCHORAGE, SUPPORT, AND THERMAL EXPANSION DEVICES ARE TO BE PROVIDED BY THE CONTRACTOR TO MEET ALL CODE REQUIREMENTS. PIPING SUPPORTS AND THERMAL EXPANSION DEVICES SHALL BE INCORPORATED INTO THE SHOP DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL.
5. ALL DUCTWORK AND PIPING SHALL BE ROUTED TIGHT TO STRUCTURE.
6. WHERE DEMOLITION DOES NOT ALLOW FOR MAINTAINING EXISTING HVAC SERVICE, CONTRACTOR SHALL PROVIDE TEMPORARY COOLING AND/OR HEATING WITH SUFFICIENT CAPACITY TO MAINTAIN COMFORT COOLING AND/OR HEATING, AT NO ADDITIONAL COST TO OWNER.
7. DUCTWORK, PIPING, AND FITTINGS SHALL CONFORM TO THE REQUIREMENTS OF THE WORKING PRESSURES INDICATED IN THE SPECIFICATIONS.
8. ALL DUCTWORK SHALL BE CONSTRUCTED, ERECTED, AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF LOCAL REGULATIONS AND PROCEDURES DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS AND THE APPLICABLE STANDARDS ADOPTED BY SMACNA. PROVIDE RECTANGULAR DUCTS OF GALVANIZED STEEL AND PREFABRICATED SPIRAL LOCKSEAM DUCTS AND FITTINGS.
9. DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CHAPTER 6 OF THE CMC.
10. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEET-METAL, OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER, AND DEBRIS WHICH MAY ENTER THE SYSTEM.
11. ALL PIPING AND ASSOCIATED FITTINGS AND VALVES SHALL BE OF SIMILAR MATERIAL PER CODE, UNLESS APPROVED OTHERWISE. DISSIMILAR MATERIALS SHALL BE CONNECTED OR FASTENED BY DIELECTRIC MEANS APPROPRIATE.
12. ALL PIPING AND DUCTWORK SHALL BE INSULATED CONSISTENT WITH THE REQUIREMENTS IN SECTIONS 120.3 AND 120.4 OF THE BUILDING ENERGY EFFICIENCY STANDARDS AND CHAPTER 6 OF THE CMC.
13. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT ALL EQUIPMENT CONNECTIONS, UNLESS OTHERWISE NOTED.
14. ALL MECHANICAL EQUIPMENT PADS SHALL EXTEND A MINIMUM OF 6" BEYOND THE FOOTPRINT OF THE UNIT ON ALL SIDES. MECHANICAL EQUIPMENT PADS LOCATED ON THE ROOF SHALL BE A MINIMUM OF 8" HIGH FOR FLASHING.
15. SUPPORT ALL SUSPENDED MECHANICAL EQUIPMENT WITH FULLY THREADED RODS AND VIBRATION ISOLATORS PER THE ASHRAE HANDBOOK OF HVAC APPLICATIONS.
16. ALL SUSPENDED CEILING MECHANICAL FIXTURES SHALL BE SUPPORTED BY ADDITIONAL INDEPENDENT 12 GAGE WIRES ATTACHED TO EACH CORNER OF FIXTURES. (ASCE 7 SECTION 13.5.6.2.2, CISCA)
17. FIRE DAMPERS AND/OR SMOKE DAMPERS AND THE NECESSARY ACCESS PANELS SHALL BE PROVIDED FOR ALL DUCTS PENETRATING FIRE AND/OR SMOKE BARRIERS/PARTITIONS, AS REQUIRED BY CODE. SEE ARCHITECTURAL DRAWINGS FOR THE EXACT LOCATIONS OF FIRE AND/OR SMOKE RATED BARRIERS/PARTITIONS.
18. SMOKE DETECTORS AND REMOTE ANNUNCIATOR ARE SUPPLIED BY MECHANICAL CONTRACTOR. SMOKE DETECTORS SHALL BE INSTALLED AND INTERLOCKED FOR SHUTDOWN IN ACCORDANCE WITH DIVISION 23. SEE SPECIFICATIONS.
19. ALL DUCT SMOKE DETECTORS INDICATED ON MECHANICAL DRAWINGS ARE FOR REFERENCE ONLY AND SHALL BE FURNISHED, INSTALLED AND WIRED UNDER ELECTRICAL WORK DIVISION "260000" OF SPECIFICATION.
20. MATERIALS EXPOSED WITHIN DUCTWORK OR PLENUMS SHALL HAVE A MAXIMUM FLAME SPREAD INDEX OF 25 AND MAXIMUM SMOKE-DEVELOPMENT RATING OF 50, WHEN TESTED IN ACCORDANCE WITH ASTM E84.
21. ALL NEW THERMOSTATS SHALL COMPLY WITH THE LATEST BUILDING ENERGY EFFICIENCY STANDARDS REFERENCE JOINT APPENDIX JA5.
22. ROOM THERMOSTATS SHALL BE CAPABLE OF BEING SET TO MAINTAIN SPACE TEMPERATURE SET POINTS FROM 55°F TO 85°F AND BE CAPABLE OF OPERATING THE HEATING AND COOLING IN SEQUENCE. THERMOSTATS SHALL BE ADJUSTABLE TO PROVIDE A TEMPERATURE RANGE OF UP TO 10°F BETWEEN HEATING AND COOLING SETPOINTS. CONTROLS SHALL HAVE CAPABILITY OF LIMITING HEATING SETPOINT ADJUSTMENT TO A MAXIMUM OF 70°F AND LIMITING COOLING SETPOINT ADJUSTMENT TO A MINIMUM OF 78°F.
23. THERMOSTATS SHALL BE LOCATED PER CBC FOR ADA COMPLIANCE AND CENTERED DIRECTLY ABOVE LIGHT SWITCHES UNLESS OTHERWISE NOTED. COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION.
24. CO_2 SENSORS SHALL BE LOCATED BETWEEN 3' TO 6' AFF. COORDINATE WITH ARCHITECT PRIOR TO INSTALLATION.
25. CONTRACTOR SHALL COORDINATE ALL NEW EQUIPMENT DESIGNATIONS WITH OWNER.
26. PROVIDE STEEL SUPPORTS FOR ALL WORK AS REQUIRED FOR A COMPLETE INSTALLATION IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS. PROVIDE SUPPLEMENTARY FRAMING AS REQUIRED FOR ATTACHMENT OF HANGERS, SUPPORTS, AND ANCHORS. DESIGN SUPPLEMENTAL FRAMING UNDER DIRECT SUPERVISION OF STRUCTURAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA AND SUBMIT FOR ARCHITECT/ENGINEER REVIEW.
27. CONTRACTOR SHALL COORDINATE AND PROVIDE STRUCTURAL MOUNTING FOR ALL EQUIPMENT SHOWN ON THE PLANS OR SPECIFIED, INCLUDING THOSE SHOWN SPECIFICALLY ON THE DETAIL SHEET(S).
28. CONTRACTOR SHALL COORDINATE VOLTAGE AND PHASE OF EACH PIECE OF EQUIPMENT REQUIRING POWER WITH THE ELECTRICAL CONTRACTOR.
29. PROVIDE MANUAL BALANCING DAMPER AT EACH SUPPLY/RETURN/EXHAUST BRANCH DUCT AS FAR FROM AIR INLET/OUTLET AS POSSIBLE. PROVIDE MANUAL BALANCING DAMPER WITH REMOTE CONTROL WHEN IS LOCATED ABOVE GYPBOARD CEILING.
30. ALL BRANCH DUCT SIZES SHALL MATCH AIR INLET/OUTLET NECK SIZE UON.

CODES AND STANDARDS

CODES
- CALIFORNIA CODE OF REGULATIONS (CCR)
- TITLE 19: STATE FIRE MARSHAL REGULATIONS
- TITLE 20: CALIFORNIA CODE OF REGULATIONS
- TITLE 24: CALIFORNIA BUILDING STANDARDS CODE
  - PART 1: 2022 CALIFORNIA ADMINISTRATIVE CODE (CAC)
  - PART 2: 2022 CALIFORNIA BUILDING CODE (CBC)
  - PART 3: 2022 CALIFORNIA ELECTRICAL CODE (CEC)
  - PART 4: 2022 CALIFORNIA MECHANICAL CODE (CMC)
  - PART 5: 2022 CALIFORNIA PLUMBING CODE (CPC)
  - PART 6: 2022 CALIFORNIA ENERGY CODE
  - PART 9: 2022 CALIFORNIA FIRE CODE (CFC)
  - PART 12: 2022 CALIFORNIA REFERENCED STANDARDS

STANDARDS
- AMERICAN SOCIETY OF HEATING, REFRIGERATING & AIR CONDITIONING ENGINEERS (ASHRAE) HANDBOOKS AND STANDARDS:
  - ASHRAE 2019 HANDBOOK, HVAC APPLICATIONS
  - ASHRAE 2020 HANDBOOK, HVAC SYSTEMS AND APPLICATIONS
  - ASHRAE 2021 HANDBOOK, FUNDAMENTALS
  - ASHRAE 2018 HANDBOOK, REFRIGERATION
  - ASHRAE STANDARD 170-2017-VENTILATION FOR HEALTH CARE FACILITIES
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) STANDARDS
- SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA) STANDARDS
- NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES AND STANDARDS
  - NFPA 13: STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2019
  - NFPA 10: STANDARD FOR PORTABLE FIRE EXTINGUISHER, 2018
  - NFPA 25: STANDARD FOR THE INSPECTION, TESTING, AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS, 2017
  - NFPA 70: NATIONAL ELECTRICAL CODE (NEC), 2021
  - NFPA 72: NATIONAL FIRE ALARM AND SIGNALING CODE, 2019
  - NFPA 99: HEALTH CARE FACILITIES CODE, 2018
  - NFPA 101: LIFE SAFETY CODE, 2018
  - NFPA 110: STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS, 2019
  - NFPA 111: STANDARD ON STORED ELECTRICAL ENERGY EMERGENCY AND STANDBY POWER SYSTEMS, 2019
- OCCUPATIONAL SAFETY AND HEALTH ASSOCIATION (OSHA)
- ENVIRONMENTAL PROTECTION AGENCY (EPA)
- AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- UNDERWRITERS LABORATORY (UL)

MECHANICAL SHEET INDEX

M001	MECHANICAL - NOTES, SYMBOLS AND ABBREVIATIONS
M002	MECHANICAL TITLE 24 FORMS
M003	MECHANICAL TITLE 24 FORMS
M111	MECHANICAL FLOOR PLAN
M121	MECHANICAL ROOF PLAN
M501	MECHANICAL DETAILS
M502	MECHANICAL GREASE DUCT DETAILS
M601	MECHANICAL AIRFLOW DIAGRAMS
M602	MECHANICAL CONTROLS
M603	MECHANICAL SPECIFICATIONS
M701	MECHANICAL SCHEDULES
M801	CAPTIVEAIRE DRAWINGS
M802	CAPTIVEAIRE DRAWINGS
M803	CAPTIVEAIRE DRAWINGS
M804	CAPTIVEAIRE DRAWINGS
M805	CAPTIVEAIRE DRAWINGS
M806	CAPTIVEAIRE DRAWINGS
M807	CAPTIVEAIRE DRAWINGS
M808	CAPTIVEAIRE DRAWINGS
M809	CAPTIVEAIRE DRAWINGS

RESPONSIBILITY MATRIX

DESCRIPTION	FURNISHED			INSTALLED			REMARKS
	GENERAL CONTRACTOR	OWNER	LANDLORD	GENERAL CONTRACTOR	OWNER	LANDLORD	
DIVISION 23: HEATING, VENTILATING, AND AIR CONDITIONING							
23.1 HVAC DUCTWORK AND PIPING IDENTIFICATION							
23.1.1 HVAC DUCTWORK SYSTEM IDENTIFICATION	●			●			
23.1.2 PIPING SYSTEM IDENTIFICATION	●			●			
23.1.3 UTILITY SHUT OFF IDENTIFICATION IN KITCHEN	●			●			
23.1.4 VALVE TAGS AND CHART	●			●			
23.1.5 HVAC DAMPER IDENTIFICATION	●			●			
23.2 ROOF CURBS							
23.2.1 EXHAUST FAN CURBS		●		●			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.2 ROOFTOP UNIT CURBS		●		●			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES. LANDLORD TO REIMBURSE.
23.2.3 CONDENSING UNIT CURBS		●		●			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.4 MAKE UP AIR AND DOAS UNIT CURBS		●		●			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES. LANDLORD TO REIMBURSE.
23.2.5 KITCHEN EXHAUST FAN CURBS		●		●			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES.
23.3 HVAC DUCTWORK SYSTEM COMPONENTS							
23.3.1 HVAC DUCTWORK	●			●			
23.3.2 INSULATION AND FIRE WRAP	●			●			GENERAL CONTACTOR SCOPE OF WORK TO INCLUDE TENANT FIT OUT FROM LANDLORD POINT OF CONNECTION
23.3.3 DAMPERS	●			●			
23.3.4 SMOKE DETECTORS	●			●			
23.3.5 SUPPLY, RETURN, AND EXHAUST GRILLS AND REGISTERS	●			●			
23.4 MECHANICAL PIPING SYSTEM COMPONENTS							
23.4.1 WALK-IN COOLER AND FREEZER REFRIGERATION		●			●		WALK-IN COOLER AND FREEZER SUPPLIED BY VENDOR NO. 27 GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE PIPING INSTALLATION AND FINAL CONNECTION
23.4.2 REFRIGERATION FOR OTHER HVAC EQUIPMENT	●			●			
23.4.3 CHILLED WATER							
23.4.4 CONDENSER WATER							
23.4.5 HEATING HOT WATER							
23.4.6 VALVES AND ACCESSORIES (E.G. AIR VENTS)							
23.5 HVAC EQUIPMENT							GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING FOR ALL ROOFTOP EQUIPMENT
23.5.1 SUPPLY FAN							
23.5.2 TOILET EXHAUST FAN		●		●			
23.5.3 KITCHEN EXHAUST FAN		●		●			SUPPLIED BY VENDOR NO. 26
23.5.4 DUCTED AND NON-DUCTED HEATING AND COOLING UNITS		●		●			
23.5.5 MAKE UP AIR AND DOAS UNITS		●		●			SUPPLIED BY VENDOR NO. 26. LANDLORD TO REIMBURSE.
23.5.6 ELECTRIC PATIO HEATERS							
23.5.7 HVAC CONDENSING UNITS		●		●			
23.5.8 REFRIGERATION CONDENSING UNITS		●		●			
23.5.9 RGF PHI SYSTEM							GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 12 VENDOR SUBSTITUTION IS NOT PERMITTED
23.6 KITCHEN EXHAUST WITH FIRE SUPPRESSION SYSTEM							
23.6.1 HOOD CONTROL PANEL		●		●			SUPPLIED BY VENDOR NO. 26
23.6.2 KITCHEN EXHAUST HOOD		●		●			SUPPLIED BY VENDOR NO. 26
23.6.3 STRUCTURAL SUPPORT	●			●			
23.6.4 ELECTRICAL AND CONTROL WIRING	●			●			
23.6.5 ANSUL SYSTEM		●		●			SUPPLIED BY VENDOR NO. 26 GENERAL CONTRACTOR TO COORDINATE AND FACILITATE SYSTEM SIGN-OFF
23.6.6 ANSUL WIRING AND UTILITIES CONNECTION	●			●			
23.6.7 ANSUL GAS VALVE		●		●			SUPPLIED BY VENDOR NO. 26
23.7 COMMISSIONING ACTIVITIES							
23.7.1 GREASE EXHAUST WATER LEAKAGE TEST	●			●			GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 10 VENDOR SUBSTITUTION IS NOT PERMITTED
23.7.2 TESTING AIR BALANCE (TAB) REPORT	●			●			GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 12 VENDOR SUBSTITUTION IS NOT PERMITTED

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

RON S. CHIN
M26613
MECHANICAL

Project Name

SHAKE SHACK - MONTGOMERY VILLAGE

Project Number

SHK-22-007

Description

MECHANICAL - NOTES, SYMBOLS AND ABBREVIATIONS

Scale

NTS

M001

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
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:	Shake Shack Montgomery Village	Report Page:	(Page 1 of 11)
Project Address:		Date Prepared:	2023-03-01T21:18:55-05:00

A. GENERAL INFORMATION

01	Project Location (city)	Santa Rosa	04	Total Conditioned Floor Area	2900
02	Climate Zone	2	05	Total Unconditioned Floor Area	0
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 (E)	☐	Healthcare Facility (I)	
☐	High-Rise Residential (R-2/R-3)	☐ Relocatable Class Bldg (E)	☒	Other (Write In)	Restaurants

B. PROJECT SCOPE

This table Includes mechanical systems or components 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.

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		☐	System Piping	☒	Fan Systems
☒	Mechanical Controls (existing to remain, altered or new)	☐	Cooling Towers	☒	Ductwork (existing to remain, altered or new)
		☐	Chillers	☒	Ventilation
		☐	Boilers	☐	Zonal Systems/ Terminal Boxes

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 2 of 11)
Project Address:		Date Prepared:	2023-03-01T21:18:55-05:00

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant 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)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance (See Table Q for Details)										COMPLIES					

D. EXCEPTIONAL CONDITIONS

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

E. ADDITIONAL REMARKS

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

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 3 of 11)
Project Address:		Date Prepared:	2023-03-01T21:18:55-05:00

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

This table is used to demonstrate compliance for mechanical equipment with mandatory requirements found in §110.1 and §110.2(a) and prescriptive requirements found in §140.4(a), §140.4(b) and §140.4(k) or §141.0(b)2 for alterations.

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters)

01	02	03	04	05	06	07	08	09	10	11
				Equipment Sizing per Mechanical Schedule (kBtu/h) §140.4 (a&b)						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
Name or Item Tag	Equipment Category per Tables 110.2	Equipment Type per Tables 110.2 / Title 20	Smallest Size Available[1] §140.4(a)	Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
DOAS-1	Unitary AC/ Cond. (no elec. resistance)	AC, air-cooled pkg (3 phase)	Yes				61900	96000		61400
DOAS-2	Unitary AC/ Cond. (no elec. resistance)	AC, air-cooled pkg (3 phase)	Yes				171500	240000		170400
CU-1/FC-1	Unitary Heat Pumps	Air-cooled, split (1phase)	Yes	20900	19700	0	18000	17700	800	8900

[1]FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per §140.4(a). Healthcare facilities are excepted.

[2]It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.

[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.

[4] Authority Having Jurisdiction may ask for load calculations used for compliance per §140.4(b).

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 4 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP))

01	02	03	04	05	06	07	08	09
		Heating Mode				Cooling Mode		
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
DOAS-1	>=65,000 and <135,000					EER IEER	11 12.7	16 20.2
DOAS-2	>=135,000 and <240,000					EER IEER	10.8 12.2	14.5 18.2
CU-1/FC-1	<65,000		HSPF	8.19	11.6	SEER	14	20.7

G. PUMPS

This section does not apply to this project.

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in §140.4(c), §140.4(e) and §140.4(m) for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name:	DOAS-1	Economizer:[1]	Fixed Temperature	Economizer Controls:	Designed per §140.4(e) and (m)	System Fan Type:	Variable Air Volume
01	02	03	04	05	06	07	08
						Fan Power Pressure Drop Adjustment - Table 140.4-B	
Fan Name or Item Tag	Fan Function	Qty	Maximum Design Supply Airflow (CFM)	HP Unit[2]	Design HP	Device	Design Airflow through Device (CFM)
DOAS-1	Supply	1	2265	Nameplate HP	2	NA	NA
Total System Design Supply Airflow (CFM):			2265	Total System Design (B)HP:	2	Maximum System Fan Power (B)HP:	

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 5 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name:	DOAS-2	Economizer:[1]	Fixed Temperature	Economizer Controls:	Designed per §140.4(e) and (m)	System Fan Type:	Variable Air Volume
01	02	03	04	05	06	07	08
						Fan Power Pressure Drop Adjustment - Table 140.4-B	
Fan Name or Item Tag	Fan Function	Qty	Maximum Design Supply Airflow (CFM)	HP Unit[2]	Design HP	Device	Design Airflow through Device (CFM)
DOAS-1	Supply	1	4700	Nameplate HP	5	NA	NA
Total System Design Supply Airflow (CFM):			4700	Total System Design (B)HP:	5	Maximum System Fan Power (B)HP:	

[1] FOOTNOTES: Computer room economizers must meet requirements of §140.9(a) and will be documented on the NRCC-PRC-E document.

[2] The unit used for HP must be consistent for all fans within a system.

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in §110.2 and §120.2 and prescriptive controls in §140.4(f) and (n) or requirements in §141.0(b)2E for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft^2)	Thermostats §110.2(b) & (c)[1], §120.2(a)or §141.0(b)2E	Shut-Off Controls §120.2(e)	Isolation Zone Controls §120.2(g)	Demand Response §110.12 and §120.2(b)	Supply Air Temp. Reset §140.4(f)	Window Interlocks per §140.4(n)
DOAS-1	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	NA: Single Zone	DR Tstat per §110.12	NA: Single Zone	NA: No operable windows
DOAS-2	Single zone	<= 25,000 ft^2	Setback	Auto Timer Switch	NA: Single Zone	DR Tstat per §110.12	NA: Single Zone	NA: No operable windows
CU-1/FC-1	Single zone	<= 25,000 ft^2	Setback	NA: 7 day per §120.2(e)1	NA: Continuous Heat/Cool	NA: PTAC, PTHP, Rm AC, HP	NA: Single Zone	NA: No operable windows

[1]FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 6 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

I. SYSTEM CONTROLS

*Notes: Controls with a * require a note in the space below explaining how compliance is achieved. EX: system 1: SA Temp Reset: Exempt because zones compliant with §140.4(d) ; EXCEPTION 1 to §140.4(f)

J. VENTILATION AND INDOOR AIR QUALITY

This table is used 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 ventialtion 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 included Nonresidential or Hotel/Motel spaces
	☐	Check this box if the project included new or altered high-rise residential dwelling units.
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per §120.1(c)2.

Nonresidential and Hotel/ Motel Ventilation Systems

04		05			06			07	
System Name	DOAS-1	System Design OA CFM Airflow[1]		660	System Design Transfer Air CFM		0	Air Filtration per §120.1(c) and §141.0(b)2 [2] Provided per §120.1(c) (NR and Hotel/Motel))	
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 ot item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	DCV or Sensor Controls per §120.1(d)3, §120.1(d)5, and §120.1(e)3 [6]	
DINING AREA 102	Restaurant Dining Rooms	1300		44	660			DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				660	18	Ventilation for this System Complies?		Yes

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 7 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

J. VENTILATION AND INDOOR AIR QUALITY

04		05			06			07	
System Name	DOAS-2	System Design OA CFM Airflow[1]		2600	System Design Transfer Air CFM		0	Air Filtration per §120.1(c) and §141.0(b)2 [2] Provided per §120.1(c) (NR and Hotel/Motel))	
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 ot item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	DCV or Sensor Controls per §120.1(d)3, §120.1(d)5, and §120.1(e)3 [6]	
OPEN KITCHEN 106, DISHWASHER 108, CUSTARD RM 107, BOH 109, MEN'S RESTROOM 103, WOMEN'S RESTROOM 104	Kitchen (cooking)	1595		13	239.25	1116.5	4700	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				239.25	18	Ventilation for this System Complies?		Yes

[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 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 250ft^2 or smaller, multipurpose rooms less than 1,000 ft^2, 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).

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 8 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used 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 systems:		DOAS-1	Duct leakage testing triggered for these systems? Yes
11	No	The scope of the project includes only duct systems serving healthcare facilities	
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 ft^2 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 crawl space
		☐	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 acordance with the California Mechanical Code	
The answers to the questions below apply to the following duct systems:		DOAS-2	Duct leakage testing triggered for these systems? Yes
11	No	The scope of the project includes only duct systems serving healthcare facilities	
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 ft^2 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 crawl space

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 9 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

L. DISTRIBUTION (DUCTWORK and PIPING)

		☐	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 acordance with the California Mechanical Code	

M. COOLING TOWERS

This section does not apply to this project.

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

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/

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

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/

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	DOAS-1; DOAS-2
NRCA-MCH-04-A - Air Distribution Duct Leakage	DOAS-1; DOAS-2
NRCA-MCH-05-A - Air Economizer Controls	DOAS-1; DOAS-2
NRCA-MCH-07-A Supply Fan Variable Flow Controls	DOAS-1; DOAS-1
NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance	CU-1/FC-1

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 10 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

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 Provider's registry, but drafts can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCV/

Form/Title	Systems/Spaces To Be Field Verified
NRCV-MCH-04-H Duct Leakage Test *NOTE: Must be completed by a HERS Rater*	DOAS-1; DOAS-2

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
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	M701
Cooling Equipment Efficiency per §110.1	M701
Furnace Standby Loss Control per §110.2(d)	N/A
Duct Insulation per §120.4	M603
Heat Pump with Supplemental electric Resistance Heater Controls per §110.2(b)	NA
The air duct and plenum system is designed per §120.4(a) -(f)	M603
Kitchen range hoods shall be rated for sound in accordance with Section 7.2 of ASHRAE 62.2	N/A

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Shake Shack Montgomery Village	Report Page:	(Page 11 of 11)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	Date Prepared:	2023-03-01T21:18:55-05:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name: David Le	Documentation Author Signature: [signature]
Company: iFactor	Signature Date: 03/03/2023
Address: 2361 ROSECRAN AVE	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: EL SEGUNDO AVE/CALIFORNIA/90245	Phone: (310) 725-1500

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: RON CHIN	Responsible Designer Signature: [signature]
Company: INFRASTRUCTURE FACTOR CONSULTING INC.	Date Signed: 03/03/2023
Address: 2361 ROSECRAN AVE	License: M26613
City/State/Zip: EL SEGUNDO AVE/CALIFORNIA/90245	Phone: (310) 725-1500

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHIN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
MECHANICAL TITLE 24 FORMS

Scale

M002

8/25/2023 10:25:09 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

STATE OF CALIFORNIA
Process Systems
NRCC-PRC-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-PRC-E
Project Name:	Shake Shack Montgomery Village	**Report Page:** (Page 3 of 5)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	**Date Prepared:** 2023-03-01T21:09:34-05:00

K. ELEVATOR LIGHTING AND VENTILATION

This section does not apply to this project.

L. ESCALATORS AND MOVING WALKWAYS SPEED CONTROLS

This section does not apply to this project.

M. COMPUTER ROOM SYSTEM SUMMARY

This section does not apply to this project.

N. COMMERCIAL KITCHEN EXHAUST AND VENTILATION

This table contains all new and replacement hoods being installed within the scope of the permit application. Table N is used to demonstrate compliance with prescriptive requirements found in §140.9(b).

Kitchen Ventilation §140.9(b)2

01	☐	Existing kitchen hoods not being replaced as part of an addition or alteration (do not need to meet requirements)
	Requirements	
02	Replacement Air to Hood Compliance Method §140.9(b)1A	
	Not providing replacement air directly to the hood(s)	
03	Mechanically cooled or heated makeup air delivered to any space with a kitchen hood is designed per 140.9(b)2A to not exceed the greater of:	
	The supply flow required to meet the space heating and cooling load	
04	Location that is supplying transfer air:	
05	The kitchen/ dining facility has a total Type I and Type II kitchen hood exhaust airflow > 5000 cfm and is designed to have one of the following per 140.9(b)2B:	
	NA: Not a kitchen/ dining facility having a total Type I and Type II kitchen hood exhaust airflow rate > 5,000 cfm	

STATE OF CALIFORNIA
Process Systems
NRCC-PRC-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-PRC-E
Project Name:	Shake Shack Montgomery Village	**Report Page:** (Page 2 of 5)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	**Date Prepared:** 2023-03-01T21:09:34-05:00

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through O. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

01	02	03	04	05	06	07	08	09	10	11
Refrigerated Warehouse/ Space §120.6(a) (See Table F)	Commercial Refrigeration §120.6(b) (See Table G)	Parking Garage Exhaust §120.6(c) (See Table H)	Process Boilers §120.6(d) (See Table I)	Compressed Air Systems §120.6(e) (See Table J)	Elevators §120.6(f) (See Table K)	Escalators & Moving Walkways §120.6(a) (See Table L)	Computer Rooms §140.9(a) (See Table M)	Commercial Kitchens §140.9(b) (See Table N)	Laboratory/Factory Exhaust §140.9(c) (See Table O)	**Compliance Results**
								Yes		COMPLIES

D. EXCEPTIONAL CONDITIONS

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

E. ADDITIONAL REMARKS

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

F. REFRIGERATED WAREHOUSES/SPACES

This section does not apply to this project.

G. COMMERCIAL REFRIGERATION

This section does not apply to this project.

H. ENCLOSED PARKING GARAGE EXHAUST

This section does not apply to this project.

I. PROCESS BOILER

This section does not apply to this project.

J. COMPRESSED AIR SYSTEMS

This section does not apply to this project.

STATE OF CALIFORNIA
Process Systems
NRCC-PRC-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-PRC-E
Project Name:	Shake Shack Montgomery Village	**Report Page:** (Page 1 of 5)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	**Date Prepared:** 2023-03-01T21:09:34-05:00

This document demonstrates compliance for process systems that are within the scope of the permit application and are regulated by mandatory requirements in §120.6 or prescriptive requirements in §140.9. This compliance document is used for newly constructed, addition and alteration projects.

A. GENERAL INFORMATION

01	Project Location (city)	Santa Rosa	04	Total Conditioned Floor Area	2900
02	Climate Zone	2	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1
☐ Office		☐ Retail	☐ Non-refrigerated Warehouse		
☐ Hotel/ Motel		☐ School	☐ Healthcare Facility		
☐ High-Rise Residential		☐ Relocatable Class Bldg	☒ Other (write in)	Restaurants	

B. PROJECT SCOPE

This table includes process systems that are within the scope of the permit application and are demonstrating compliance with mandatory requirements in §120.6 or prescriptive requirements in §140.9.

My project consists of: (check all that apply):

01	02
☐ Refrigerated Spaces <3,000 ft² Total (no Title 24, Pt6 requirements)	☐ Elevator Lighting & Ventilation Controls (mandatory §120.6(f))
☐ Refrigerated Spaces >=3,000 ft² Total (mandatory §120.6(a))	☐ Escalator & Moving Walkway Speed Controls (mandatory §120.6(g))
☐ Food Stores >8,000 ft² cfa (mandatory §120.6(b))	☐ Computer Rooms >20 W/ ft² Power Density (prescriptive §140.9(a))[1]
☐ Enclosed Parking Garage Exhaust >=10,000 cfm (mandatory §120.6(c))	☒ Commercial Kitchen Ventilation/Exhaust (prescriptive §140.9(b))[1]
☐ Newly Installed Process Boilers (mandatory §120.6(d))	☐ Laboratory Exhaust/Factory Exhaust & Fume Hood (prescriptive §140.9(c))[1]
☐ Compressed Air Systems Combined HP >= 25 (mandatory §120.6(e))	

[1] *FOOTNOTES: These building features can comply using the performance method. If using the performance method for these features, compliance should be demonstrated on the NRCC-PRF-E.*

STATE OF CALIFORNIA
Process Systems
NRCC-PRC-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-PRC-E
Project Name:	Shake Shack Montgomery Village	**Report Page:** (Page 5 of 5)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	**Date Prepared:** 2023-03-01T21:09:34-05:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

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

Documentation Author Name:	David Le	Documentation Author Signature:	
Company:	iFactor	Signature Date:	03/03/2023
Address:	2361 ROSECRAN AVE	CEA/ HERS Certification Identification (if applicable):	
City/State/Zip:	EL SEGUNDO AVE/CALIFORNIA/90245	Phone:	(310) 725-1500

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:	RON CHIN	Responsible Designer Signature:	
Company:	INFRASTRUCTURE FACTOR CONSULTING INC.	Date Signed:	03/03/2023
Address:	2361 ROSECRAN AVE	License:	M26613
City/State/Zip:	EL SEGUNDO AVE/CALIFORNIA/90245	Phone:	(310) 725-1500

STATE OF CALIFORNIA
Process Systems
NRCC-PRC-E
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-PRC-E
Project Name:	Shake Shack Montgomery Village	**Report Page:** (Page 4 of 5)
Project Address:	2424 Magowan Dr., STE. C1, Santa Rosa, Ca 95405	**Date Prepared:** 2023-03-01T21:09:34-05:00

N. COMMERCIAL KITCHEN EXHAUST AND VENTILATION

Kitchen Exhaust: Airflow Rate §140.9(b)1B

01	Kitchen Name or Item Tag	Type I	Compliance Method per §140.9(b)1B		Type1 hood design exhaust rates do not exceed the maximum allowed per §140.9(b)1 as documented below	
02	03	04	05	06	07	08
Name or Item Tag	Hood Type[1]	Hood Style	Hood Length (ft)	Equipment Duty	Design Hood Exhaust Rate CFM	Max Hood Exhaust Rate Allowed CFM
KEF-1	Type I	Wall-mounted Canopy	7.8	Heavy Duty	1371	2184
KEF-2	Type I	Wall-mounted Canopy	7.8	Heavy Duty	1371	2184

[1] *FOOTNOTES: Type II hoods do not have a max hood exhaust air rate per §140.9(b)1B*

O. LABORATORY AND FACTORY EXHAUST AND FUME HOODS

This section does not apply to this project.

P. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included 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/

Form/Title
NRCI-PRC-01-E - Covered Process

Q. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/attcp/providers.html

Form/Title	Systems/Spaces To Be Field Verified
NRCA-PRC-02-F Kitchen Exhaust	Type I

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RON S. CHIN
M26613
MECHANICAL
STATE OF CALIFORNIA

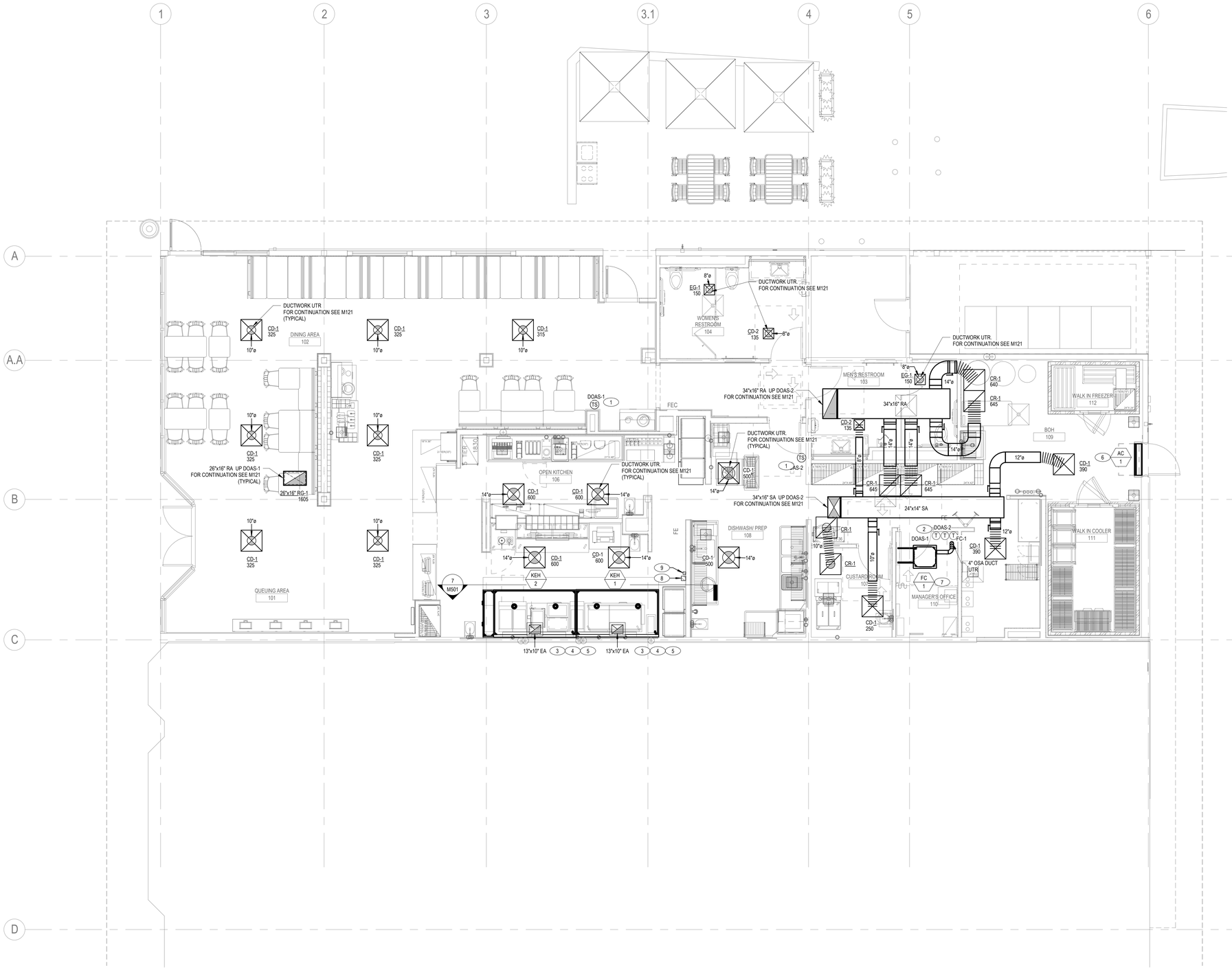
Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
MECHANICAL TITLE 24 FORMS

Scale

M003



RENOVATION KEY NOTES

1. MOUNT REMOTE TEMPERATURE SENSOR AT 48" ABOVE FINISHED FLOOR. COORDINATE WITH ARCHITECT FOR EXACT LOCATION.
2. MOUNT THERMOSTAT CONTROLLER AT 48" ABOVE FINISHED FLOOR. COORDINATE WITH ARCHITECT FOR EXACT LOCATION.
3. PROVIDE TYPE 1 GREASE EXHAUST DUCT FROM KITCHEN EXHAUST HOOD TO KITCHEN EXHAUST FAN. TRANSITION GREASE DUCT AS REQUIRED TO CONNECT TO NEW EXHAUST FAN KEF-1 & KEF-2 ON ROOF. GREASE DUCT TO BE WRAPPED WITH FIRE WRAP TO MAINTAIN 0" CLEARANCE TO COMBUSTIBLE.
4. TYPE 1 GREASE EXHAUST DUCT FROM KITCHEN EXHAUST HOOD TO KITCHEN EXHAUST FAN. DUCT TO BE FIRE WRAPPED TO MAINTAIN 0" CLEARANCE TO COMBUSTIBLES.
5. PROVIDE ACCESS DOOR CLEANOUT ON GREASE EXHAUST DUCT.
6. PROVIDE AIR CURTAIN MOUNTED ABOVE DELIVERY DOOR. PROVIDE WITH DOOR SWITCH. AIR CURTAIN TO OPERATE CONTINUOUSLY WHEN DOOR IS OPEN.
7. INSTALL FAN COIL UNIT IN CEILING GRID. ROUTE REFRIGERANT PIPING UP TO CONDENSER UNIT (CU-1) ON ROOF. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS.
8. KITCHEN HOOD AND HOOD FIRE SUPPRESSION SYSTEM PANEL. FURNISHED BY CAPTIVEAIRE AND INSTALLED BY CONTRACTOR. REFER TO KITCHEN EQUIPMENT DRAWINGS FOR ADDITIONAL INFORMATION. HOOD FIRE ALARM CONNECTION INSTALLED BY FIRE ALARM CONTRACTOR. COORDINATE EQUIPMENT FIRE PROTECTION REQUIREMENTS WITH FIRE PROTECTION CONTRACTORS PRIOR TO INSTALLATION.
9. INSTALL HOOD FIRE SUPPRESSION MANUAL PULL STATION. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH FIRE MARSHALL AND LOCAL CODE REQUIREMENTS.

GENERAL NOTES

1. A PERFORMANCE TEST SHALL BE CONDUCTED UPON COMPLETION AND BEFORE APPROVAL OF A VENTILATION SYSTEM SERVING COMMERCIAL COOKING APPLIANCES. THE TEST SHALL VERIFY THE EXHAUST AIRFLOW RATE IN ACCORDANCE WITH SECTIONS 508.10.1.2 THROUGH 508.10.1.5 OR THE AIRFLOW RATE STAMPED ON LISTED HOOD.
2. THE PERMIT HOLDER SHALL VERIFY A CAPTURE AND CONTAINMENT PERFORMANCE OF THE HOOD. A FIELD TEST SHALL BE PERFORMED WITH COOKING EQUIPMENT AT NORMAL OPERATING TEMPERATURE AND CAPTURE AND CONTAINMENT SHALL BE VERIFIED THROUGH A VISUAL OBSERVATION OF SMOKE OR STEAM PRODUCED BY SMOKE CANDLES OR PUFFERS. SMOKE BOMBS ARE PROHIBITED FROM USE ON THIS TEST.
3. PRIOR TO USE OR CONCEALMENT, A GREASE DUCT LEAKAGE TEST SHALL BE PERFORMED TO VERIY THE WELDED SEAMS AND JOINTS ARE LIQUID TIGHT. THE TEST SHALL BE A WATER TEST. THE PERMIT HOLDER SHALL BE RESPONSIBLE FOR PROVIDING THE EQUIPMENT AND FOR PERFORMING THE TEST.
4. GREASE DUCT SUPPORTS SHALL BE OF NONCOMBUSIBLE MATERIALS, AND THE SPACING SHALL NOT EXCEED 12 FEET FOR 8 INCH DUCTS AND 20 FEET FOR LARGER DUCTS. CMC 507.7.
5. HOODS SHALL BE SECURED IN PLACE BY NONCOMBUSTIBLE SUPPORTS. THE SUPPORTS SHALL BE CAPABLE OF SUPPORTING THE EXPECTED WEIGHT OF THE HOOD AND PLUS 800 POUNDS. CMC 508.4.

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHEN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

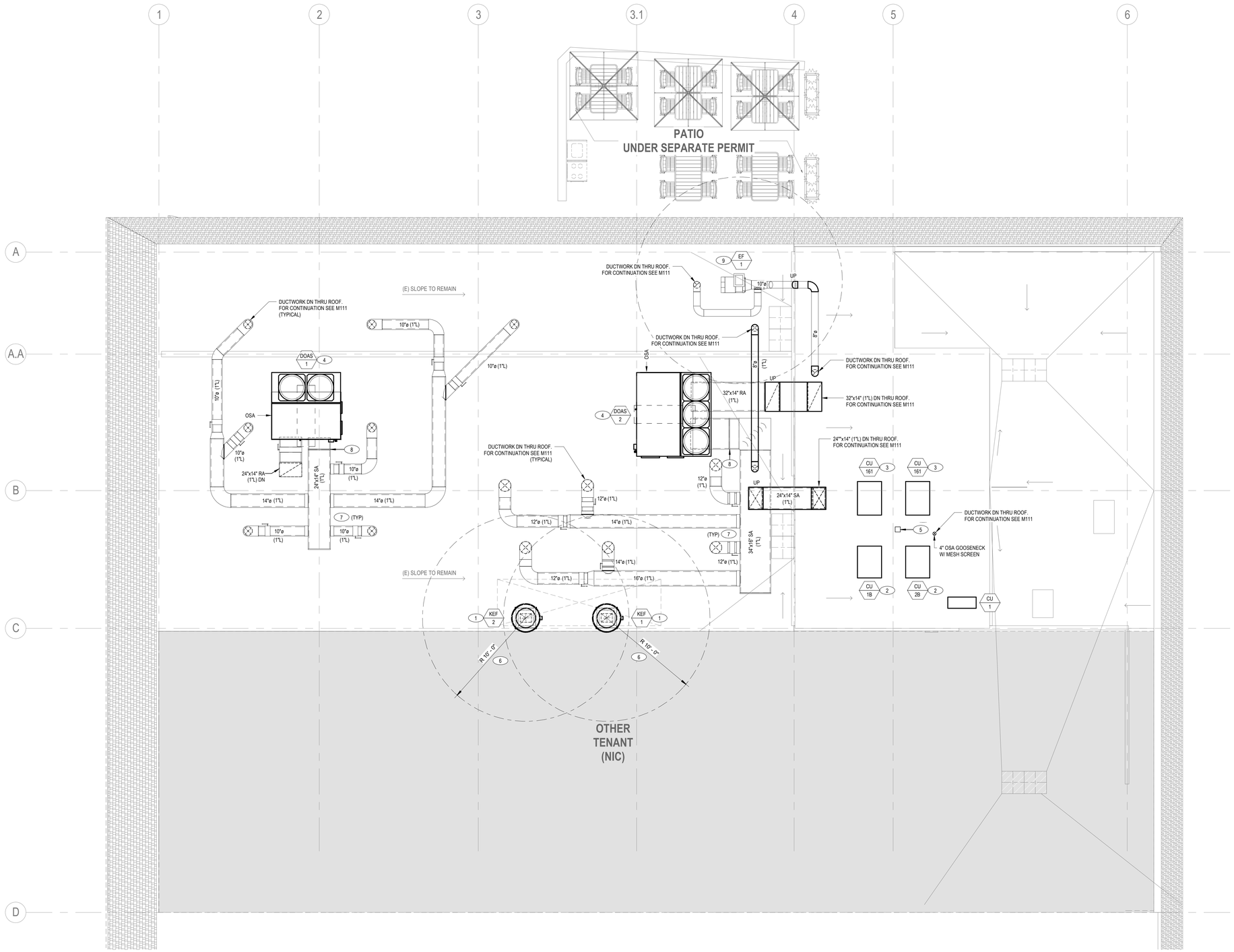
Description
MECHANICAL FLOOR PLAN

Scale
1/4" = 1'-0"

M111

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

8/25/2023 10:25:19 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt



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

RENOVATION KEY NOTES

1 KITCHEN HOOD EXHAUST FAN FURNISHED BY CAPTIVEAIRE AND INSTALLED BY MECHANICAL CONTRACTOR. INSTALL PER MANUFACTURER'S RECOMMENDATION. REFER TO CAPTIVEAIRE DRAWING SERIES M8.

2 COOLER/FREEZER CONDENSING UNITS TO BE PROVIDED BY VENDOR. INSTALLED PER MANUFACTURER'S RECOMMENDATION. REFER TO KITCHEN EQUIPMENT SCHEDULE FOR SPECIFICATIONS.

3 CUSTARD MACHINE CONDENSING UNITS TO BE PROVIDED BY VENDOR. INSTALLED PER MANUFACTURER'S RECOMMENDATION. REFER TO KITCHEN EQUIPMENT SCHEDULE FOR SPECIFICATIONS.

4 DEDICATED OUTSIDE AIR SYSTEM FURNISHED BY CAPTIVEAIRE AND INSTALLED BY MECHANICAL CONTRACTOR. PROVIDE WITH PLENUM ROOF CURB. COORDINATE CURB WITH REQUIREMENTS WITH MANUFACTURER AND STRUCTURAL DRAWINGS. INSTALL PER MANUFACTURER'S RECOMMENDATION. REFER TO CAPTIVEAIRE DRAWING SERIES M8.

5 PIPE CURB FOR REFRIGERANT PIPING. FIELD COORDINATE EXACT LOCATION AND ROUTING.

6 GREASE EXHAUST DISCHARGE TO 10 FEET AWAY FROM ANY INTAKE.

7 DUCTWORK ON ROOF SHALL BE LINED WITH INSULATION, R-4.2 VALUE.

8 PROVIDE WITH SMOKE DETECTOR FOR AUTOMATIC SHUT-DOWN OF UNIT UPON SMOKE DETECTION.

9 RESTROOM EXHAUST FAN. INSTALLED PER MANUFACTURER'S RECOMMENDATION.

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
04/28/2023	ISSUE FOR PERMIT

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RON S. CHIN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

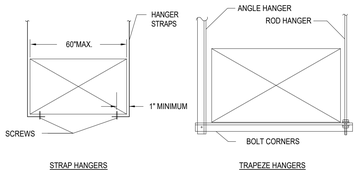
Project Number
SHK-22-007

Description
MECHANICAL ROOF PLAN

Scale
1/4" = 1'-0"

M121

8/25/2023 10:25:23 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

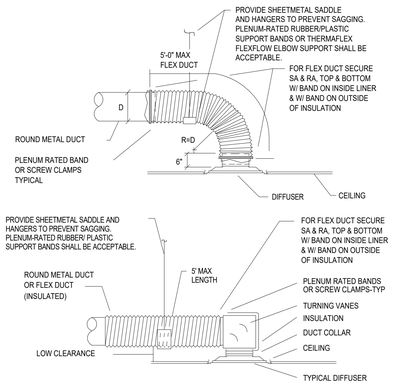


NOTES:

1. CONSTRUCTION STANDARDS TABLE FOR HANGER SIZE AND SPACING, SEE 2005 SMACNA HVAC DUCT 5-2.
2. DUCT CONSTRUCTION STANDARDS FOR UPPER ATTACHMENT TO BUILDING SEE SMACNA HVAC FIG. 5-1 TO 5-4, WITH SPECIFIC BUILDING STRUCTURAL ENGINEER APPROVAL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DETAILS AND SUPPORT LOCATIONS.
3. ALL DUCT HANGER AND ATTACHMENTS SHALL BE REVIEWED AND APPROVED BY SEOR BEFORE FABRICATION AND INSTALLATION.

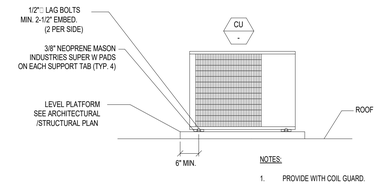
RECTANGULAR DUCT SUPPORT

SCALE: NTS | 4



DIFFUSER CONNECTION DETAIL

SCALE: NTS | 3



NOTES:

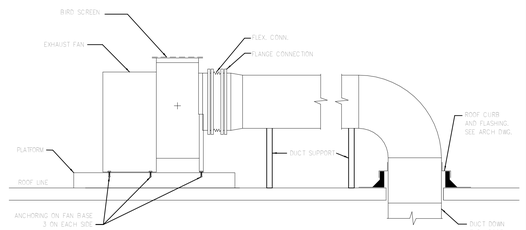
1. PROVIDE WITH COIL GUARD.

NOTES:

1. REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR EXACT INSTALLATION DETAIL.

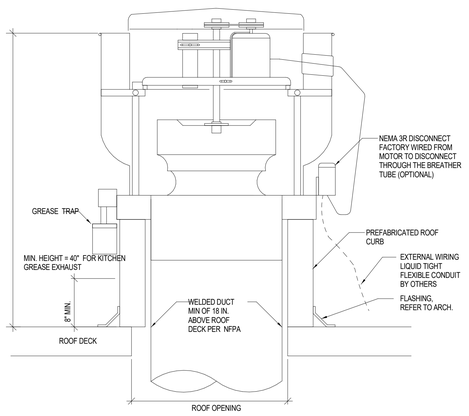
CONDENSING UNIT MOUNTING DETAIL

SCALE: NTS | 2



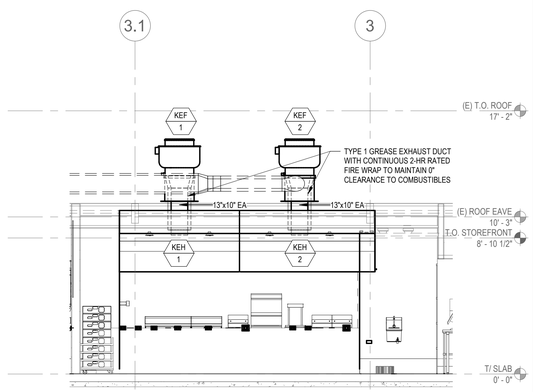
EXHAUST UTILITY FAN MOUNTING DETAIL

SCALE: NTS | 1



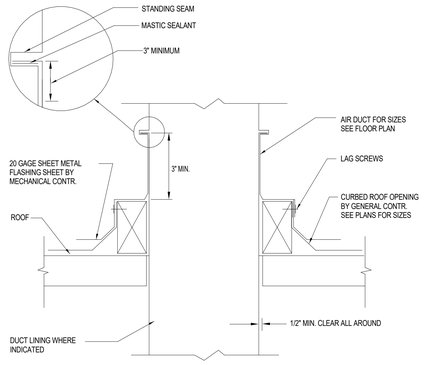
KITCHEN EXHAUST FAN MOUNTING DETAIL

SCALE: NTS | 8



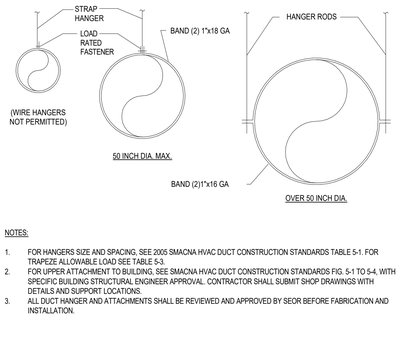
KEH-1 & KEH-2 SECTION

SCALE: 1/4" = 1'-0" | 7



DUCT THROUGH ROOF DETAIL

SCALE: NTS | 6



NOTES:

1. FOR HANGERS SIZE AND SPACING, SEE 2005 SMACNA HVAC DUCT CONSTRUCTION STANDARDS TABLE 5-1. FOR TRAPEZE ALLOWABLE LOAD SEE TABLE 5-3.
2. FOR UPPER ATTACHMENT TO BUILDING, SEE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FIG. 5-1 TO 5-4, WITH SPECIFIC BUILDING STRUCTURAL ENGINEER APPROVAL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DETAILS AND SUPPORT LOCATIONS.
3. ALL DUCT HANGER AND ATTACHMENTS SHALL BE REVIEWED AND APPROVED BY SEOR BEFORE FABRICATION AND INSTALLATION.

HORIZONTAL ROUND DUCT SUPPORT

SCALE: NTS | 5

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER — RON S. CHIN — M 26613 — MECHANICAL — STATE OF CALIFORNIA

Project Name

SHAKE SHACK - MONTGOMERY VILLAGE

Project Number

SHK-22-007

Description

MECHANICAL DETAILS

Scale

As indicated

M501

8/25/2023 10:25:25 AM BIM 360://005-4326.000 - Shake Shack - Montgomery Village/005-4326 - SS 1491 - Montgomery Village_M21.rvt

FireMaster® FastWrap® XL

Datasheet Code US: 714-236

Product Features

- Thin and Lightweight at 1-1/2" (38mm) thick, 6 pcf (96 kg/m³) density
- Contours easily to complex duct designs
- Grease duct installation UL and ULC Listed with butt joints at all seams on both layers
- Fully foil encapsulated for fast and clean installation
- Contains 2192°F (1200°C) rated fibers
- Microbial Resistance validated by UL Environment
- Good sound absorption
- Compliant to IMC, NFPA 96, UMC, CMC, CNBC

UL VALIDATED
✓ FIREMASTER FASTWRAP XL IS A LOW VOC EMITTING MATERIAL PER CA SECTION 01350
✓ FIREMASTER FASTWRAP XL IS MOLD RESISTANT PER ASTM C1338-08

CLASSIFIED UL — ULC LISTED — ICC ES

* Commonly referred to test method CA Section 01350 is CDPH Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.1, Feb 2010

Grease Duct Enclosure System
Air Ventilation Duct Enclosure System

Product Data & Installation Guide

1. Product Description

Thermal Ceramics FireMaster® FastWrap XL is a flexible blanket composed of high temperature fibers classified for applications to 2192°F (1200°C) and fully encapsulated in a durable glass fiber reinforced foil facing for easy handling and installation. Thermal Ceramics FastWrap XL is UL and ULC Listed for 1 and 2 hour fire resistive enclosure protection, zero clearance for kitchen exhaust ducts, electrical circuit protection, and as a component in UL firestop designs for fire resistance rated floors, ceilings, and walls. The core fibers in FastWrap XL are manufactured using Thermal Ceramics patented Superwool® fiber which is an alkaline-earth silicate wool with low biopersistence and therefore increased safety for installers. FastWrap XL is under UL's Follow-Up Service Program to ensure the consistent quality essential to this life-safety application.

2. Applications

- 2 hour enclosure and firestop system for kitchen exhaus duct
- Zero clearance to combustibles
- 1, 2 and 3 hour enclosure and firestop system for hazardous exhaust ducts, pressurization ducts, clothes dryer exhaust ducts, trash and linen chutes, and other fire rated HVAC ducts
- 1 hour electrical circuit integrity protection
- Engineered and tested solutions for fire protection of structural steel and storage vessels per ASTM E119, ISO 834, and UL1709

3. Specifications - Division 23 07 00 (or 15080)

CSI Spec and AutoCAD available online, www.arcat.com/sd/clients/thermcer.html.

Thermal Ceramics FireMaster FastWrap XL is a flexible high temperature insulation rated to 2192°F (1200°C) that is fully encapsulated in FSP facing. The duct enclosure system shall be listed by UL and /or ULC per ASTM E 2336, CAN/ULC S144 and ISO 6944 for 1-, 2- and 3-hour rating and zero clearance to combustibles, and tested per ASTM E84 for a flame/smoke rating less than 25/50. Insulation shall have a nominal thickness of 1-1/2 inches (38 mm) and density of 6 lbs/ft³ (96 kg/m³). Insulation shall have a R-Value of 7.3 at 75°F. Installation shall be in strict accordance to manufacturers published installation instructions, UL or ULC Listings, and shop drawings. FastDoor™ XL shall be used for duct access where specified or as required by code.

4. Physical Characteristics

Product	Unit	Size	Units/ Ctn.	Wt./ Ctn.
FastWrap XL	Roll	1-1/2" x 24" x 25'	1	37.5 lbs.
FastWrap XL	Roll	1-1/2" x 48" x 25'	1	75 lbs.

5. Performance Specifications

Reference Standard	Standard No.	Performance
Grease Duct Enclosure System	ASTM E2336	Pass
Section 16.1 - Non-Combustibility	ASTM E136	Pass
Section 16.2-Fire Resistance (wall)	ASTM E119	Pass
Section 16.3 - Durability Test	ASTM C518	Pass
Section 16.4 - Internal Fire Test	ASTM E2336	Pass
Section 16.5 - Fire Engulfment (duct)	ASTM E814/ E119	Pass
ULC Grease Duct Test Protocol		Pass
Standard Methods of Fire Resistance Tests - Grease Duct Assemblies	CAN/ULC S144	Pass
Grease Duct Clearances	UL 1978	Pass
Air Ventilation Duct Enclosure	ISO 6944	Pass
Surface Burning Characteristics	ASTM E84	<25/50
Thermal Resistance (R-value @ 75°F)	ASTM C518	7.3 per layer
Mold Growth	ASTM C1338	ULE Validated
Low VOCs	CA Standard 01350	ULE Validated

6. Listings/Building Code Reports

Listed Uses	Agency	Listing	Layers
Grease Duct Enclosure per ASTM E2336 and AC101 (2006, 2009, 2012 IMC, NFPA 96, UMC, CMC)	UL	G18	2
	ICC-ES	ESR 2213	
ULC Grease Duct Test Protocol and CAN/ULC S144*	ULC	FRD 4, 7*	2
Grease Duct Insulation (2003 IMC)	OPL	TC/BI 120-01	1
Through Penetration FireStop System per ASTM E814, UL 1479	UL	See Figure 2	1 or 2
	ULC		
1- or 2-hour Ventilation Duct Enclosure per ISO 6944-1985	UL	HNLJ.V1, 19, 29	1
	ULC	FRD 3, 5, 6, 18	
3-hour Ventilation Duct Enclosure per ISO 6944-1985	UL	HNLJ.V2	2
Electrical Circuit Protective System	UL	FHIT.5	2

7. Storage

Thermal Ceramics FastWrap XL must be stored in a dry warehouse environment on pallets. Pallets should not be stacked.

8. Installation

Thermal Ceramics FastWrap XL shall be installed by a qualified contractor in accordance with manufacturer's instructions and laboratory design listings.

Materials and Equipment

- Thermal Ceramics FastWrap XL blanket
- Aluminum foil tape
- Glass filament reinforced tape (optional)
- Carbon steel or stainless steel banding material, minimum 1/2" (13mm) wide, minimum 0.015" (0.4mm) thick, with steel banding clips
- Hand banding tensioner and crimping tool
- Minimum 12 gage (3mm) steel insulation pins; steel speed clips, minimum 1-1/2" (38mm) square or 1-1/2" (38mm) diameter, or equivalent sized cup-head pins;
- Capacitor discharge stud gun
- Thermal Ceramics FastDoor™ XL
- An approved firestop sealant

General

Cut edges of the blanket shall be taped with aluminum foil tape to prevent exposed edges of the insulation absorbing grease and moisture in the event of a compromised grease duct joint or condensation. Overlaps and/or tightly butted joints are used to block heat transfer in the event of duct deformation resulting from thermal expansion. Filament tape is suggested to hold the blanket in place until steel banding or pinning is installed to permanently secure the blanket.

A. Installation on Grease Duct per ASTM E2336 and CAN/ULC S144 (Figure 1)

System requires two layers of insulation applied directly to the duct with tight butt joints at all seams on both layers. The first layer of insulation is cut to a length sufficient to wrap around the duct and provide a tight butt joint where the blanket ends meet. Adjacent blankets on the first layer are butted tightly together with longitudinal seams offset minimum 6" (150mm). The second layer of insulation is installed in the same method as the first layer, with seams between layers offset a minimum of 6" (150mm). Banding and/or pinning per Section D is used to permanently secure the insulation to the duct.

B. Installation on HVAC Duct per ISO 6944 (Figure 1)

System requires one layer of insulation applied directly to the duct with 3" (75mm) overlaps at all seams. The insulation is cut to a length sufficient to wrap around the duct and provide a 3" (75mm) overlap where the blanket ends meet. Adjacent blankets are installed to provide a minimum overlap of 3" (75mm). Banding and/or pinning per Section D is used to permanently secure the insulation to the duct.

C. 2 & 3 Sided Wrap Installation (Figure 4)

When space does not allow for a complete wrap applied to the duct on all four sides, the FastWrap XL is approved for 2 or 3 sided installations with mechanical attachment to a rated concrete or CMU assembly. (See Figure 4 for installation details.)

D. Mechanical Attachment Methods

1) **Banding (Figure 1) -** Minimum 1/2" (13mm) wide carbon steel or stainless steel banding, 0.015" (0.4mm) thick, is placed around the entire perimeter of the insulated duct on maximum 10-1/2" (270mm) centers and 1-1/2" (38mm) from each blanket edge or 1-1/2" (38mm) from each collar edge when using the butt joint and collar method. The banding is placed around the blanket and tightened to firmly hold the FastWrap XL in place against the duct, but not cause any cutting or damage to the blanket.

2) **Pinning -** Pinning on all sides of the duct may be used as an alternative to banding. For ducts wider than 24" (610mm) pinning is required on the bottom of horizontal runs, or on one side of vertical runs (in addition to steel banding). When applicable, 12 Gage (0.4mm) steel pins are installed on 12" (305mm) centers along the width of the duct and 10-1/2" (270mm) centers along the length of the duct. Pins that extend beyond the outer blanket layer shall be turned down or the excessive length cut off to prevent sharp edges. Shoot through pins (cup head pins) may be used in conjunction with steel banding to prevent blanket sag.

E. Access Doors

1) **FastDoor™ XL (Figure 3) -** FastDoor XL is a UL Listed, liquid tight duct cover panel supplied complete with a single layer insulation cover per UL Listing HNKT G18. The FastDoor XL is installed per included installation instructions. No field welding is required.

2) **Field Fabricated Access Doors -** Each access door assembly has four threaded rods 1/4 inch (6mm) in diameter and 5" (127mm) in length, with one welded to each corner of the door opening. Hollow steel tubes, 4-1/2" (114mm) long are installed outside the access cover plate and over the threaded rods. Four 12 gage (3mm) and 4-1/2" (114mm) long steel insulation pins are welded to the access cover plate to allow for installation of the three layers of FastWrap XL. One layer of FastWrap XL is cut to approximately the same size as the access panel, and impaled over the insulation pins on the panel. A second layer of FastWrap XL is cut so as to overlap the first layer a minimum of 1-1/2" (38mm). It is essential that the first and second layer fit tightly against the surrounding wrap with no through openings. The third and outside layer should be cut to overlap the second insulation layer by a minimum of 1-1/2" (38mm). Minimum 1-1/2" (38mm) round or square insulation clips are installed on the insulation pins to secure the three layers of insulation to the access cover plate. All cut edges of the insulation shall be taped with minimum 3" (75mm) wide aluminum foil tape. Wing nuts and washers are installed on the four threaded rods, and tightened against the hollow steel tubes to seal the access cover plate to the duct.

F. Through Penetration Firestop System (Figure 2) - When the duct penetrates a fire rated assembly an approved fire stop system must be employed. Figure 2 provides a complete list of UL / ULC firestop design listings which can be found in the Certifications Directory at www.ul.com for US systems and www.ulc.ca for Canadian systems. Prior to installing any firestop system the surfaces of all openings and penetrating items must be clean and dry. The FastWrap XL core blanket (or mineral wool where allowed by the firestop design listing) must be compressed into the annular space. The packing material must be recessed a minimum depth from the surface of the concrete or gypsum assembly. The recessed opening must be filled with a minimum thickness of an approved firestop sealant. The packing material type and compression, minimum recess (typically 1/4" (6mm)), and approved firestop sealant and thickness (typically 1/4" (6mm)) shall be as specified in an approved UL / ULC firestop design listing. When there is not sufficient annular space around the duct to run the FastWrap XL enclosure system continuous through the fire rated assembly, the enclosure may terminate above and below the floor/ceiling assembly or on either side of a wall assembly as shown in Figure 2. When this method is used, the FastWrap XL must be mechanically attached on either side of the fire rated assembly using one of the attachment methods described in Section D, spaced a maximum of 1-1/2" (38mm) from the fire rated assembly.

G. Support Hanger Systems

1) **Grease ducts:** Trapeze support hangers shall be spaced on maximum 60 in. (1500 mm) centers. Hanger rods or straps shall be anchored with steel drop in or wedge expansion type masonry anchors. No additional protection is required for hangers and supports meeting the requirements of the Table below.

Hanger Cross Section	Maximum Perimeter, in (mm)	Trapeze Support (or equivalent Yield Strength), in (mm)
3⁄8 in (10 mm) threaded rod	148 (3759)	2 (51) x 2 (51) x 1⁄8 (3) in angle

2) **HVAC ducts:** Trapeze support hangers shall be spaced on maximum 60 in. (1500 mm) centers. Hanger rods or straps shall be anchored with steel drop in or wedge expansion type masonry anchors. No additional protection is required for hangers and supports meeting the requirements of the Table below.

Hanger Cross Section	Max. Perimeter, in (mm)	Trapeze Support (or equivalent Yield Strength), in (mm)
1 in x 16 gage strap (25 mm x 1.5 gage strap)	100 (2540)	
1⁄4 in (6 mm) threaded rod	50 (1270)	1½ (38) x 1½ (38) x 3⁄16 (5) angle
3⁄8 in (10 mm) threaded rod	150 (3810)	1½ (38) x 1½ (38) x 3⁄16 (5) angle
1⁄2 in (12.7 mm) threaded rod	218 (5540)	2 (51) x 2 (51) x 1⁄4 (6) angle

9. Maintenance and Repair

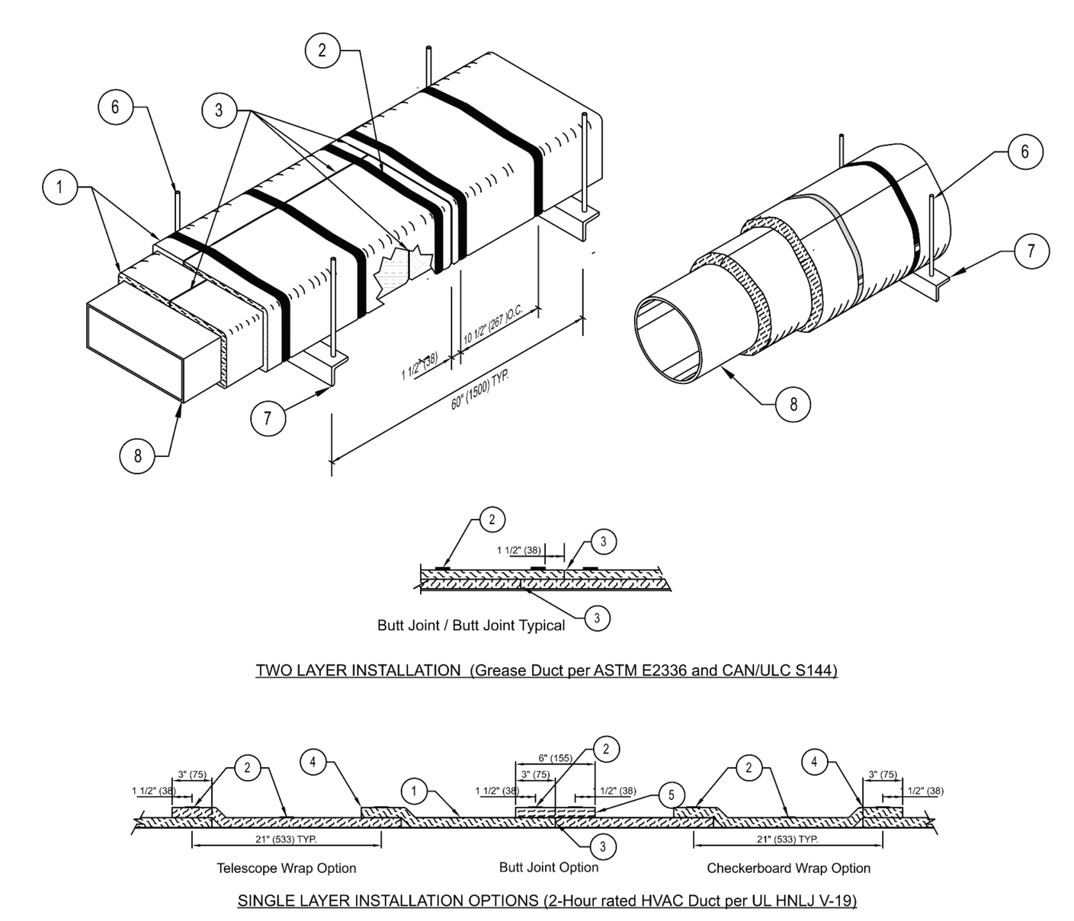
No maintenance is required when installed in accordance with Thermal Ceramics (TC) installation instructions. If damage is limited to the foil facing, aluminum foil tape can be used to repair the foil facing. If an area of blanket is found to be damaged the following procedure must be in-corporated. If the damaged area is larger than 8" (203mm) x 8" (203mm) the entire wrap section must be removed and replaced according to TC installation instructions. If the damaged area is small (less than 8" (203mm) x 8" (203mm)), the damaged area must be cut away and replaced with a new section 1" (25mm) larger in length and width than the cut out, such that the new section can be compressed tightly into the cut out area. All cut edges of the new section must be taped and sealed with aluminum foil tape. The new section must be held in place with either pinning or banding per TC installation i nstructions.

10. Limitations

Thermal Ceramics FireMaster FastWrap XL shall be installed in accordance with these installation instructions and appropriate laboratory design listings. The integrity of FastWrap XL systems is limited to the quality of the installation.

* For personal protective equipment recommendations, please see SDS.

Grease and HVAC Duct Enclosure System
1 or 2 Hour Shaft Alternative / Zero Clearance to Combustibles

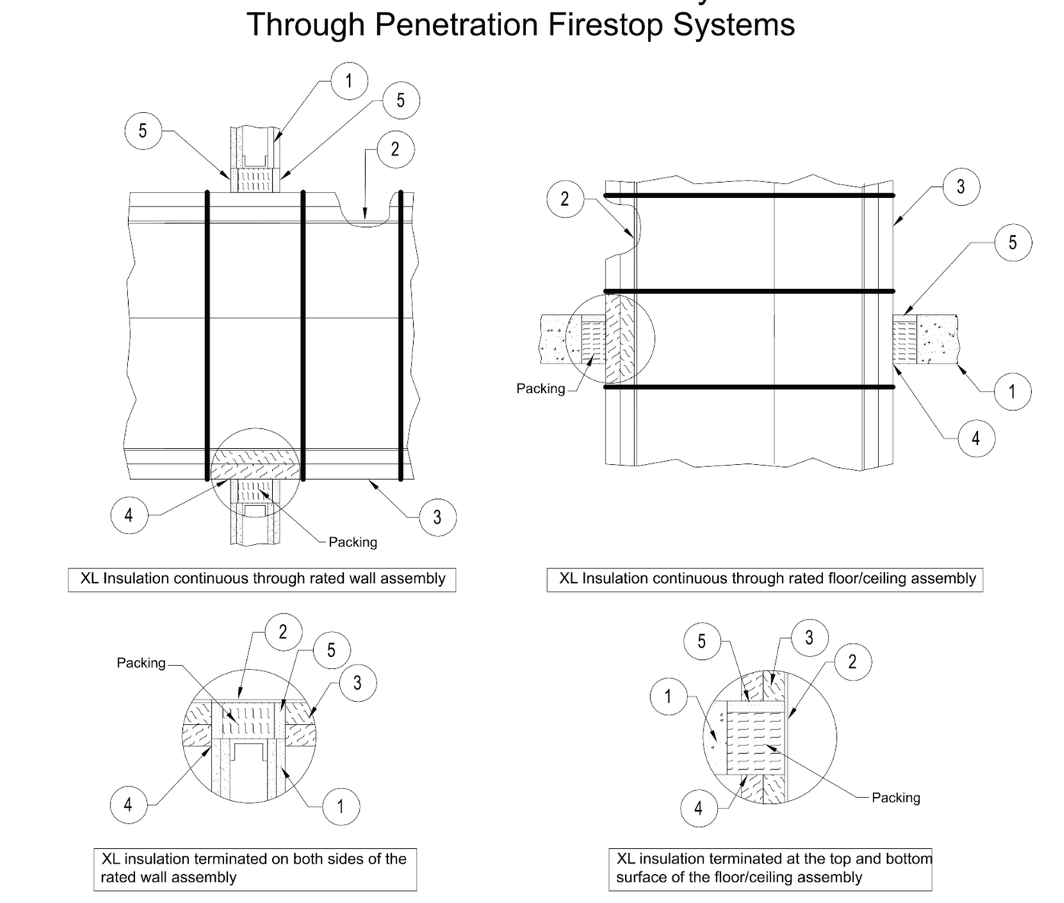


LEGEND	
1	Two Layers of XL Insulation for ASTM E2336 and CAN/ULC S144 Grease Duct Enclosures One Layer of XL Insulation for 2-Hour Air Ventilation Duct Enclosures
2	Steel banding minimum 1/2" (13) wide by 0.015" (0.4) thick.
3	Tight butt joints (no overlap) at perimeter and longitudinal joints, both layers for grease ducts
4	Min. 3" (75) overlap on perimeter and between adjacent blankets
5	Optional 6" XL collar
6	Hangers - size dependent weight of assembly (see datasheet Section G)
7	Trapeze Supports - size dependent on weight of assembly (see datasheet Section G)
8	Steel Rectangular or Round Duct (size, gage and construction dependent per Listed Design)

The integrity of Thermal Ceramics duct systems is limited to the quality of the installation.

XL001-10

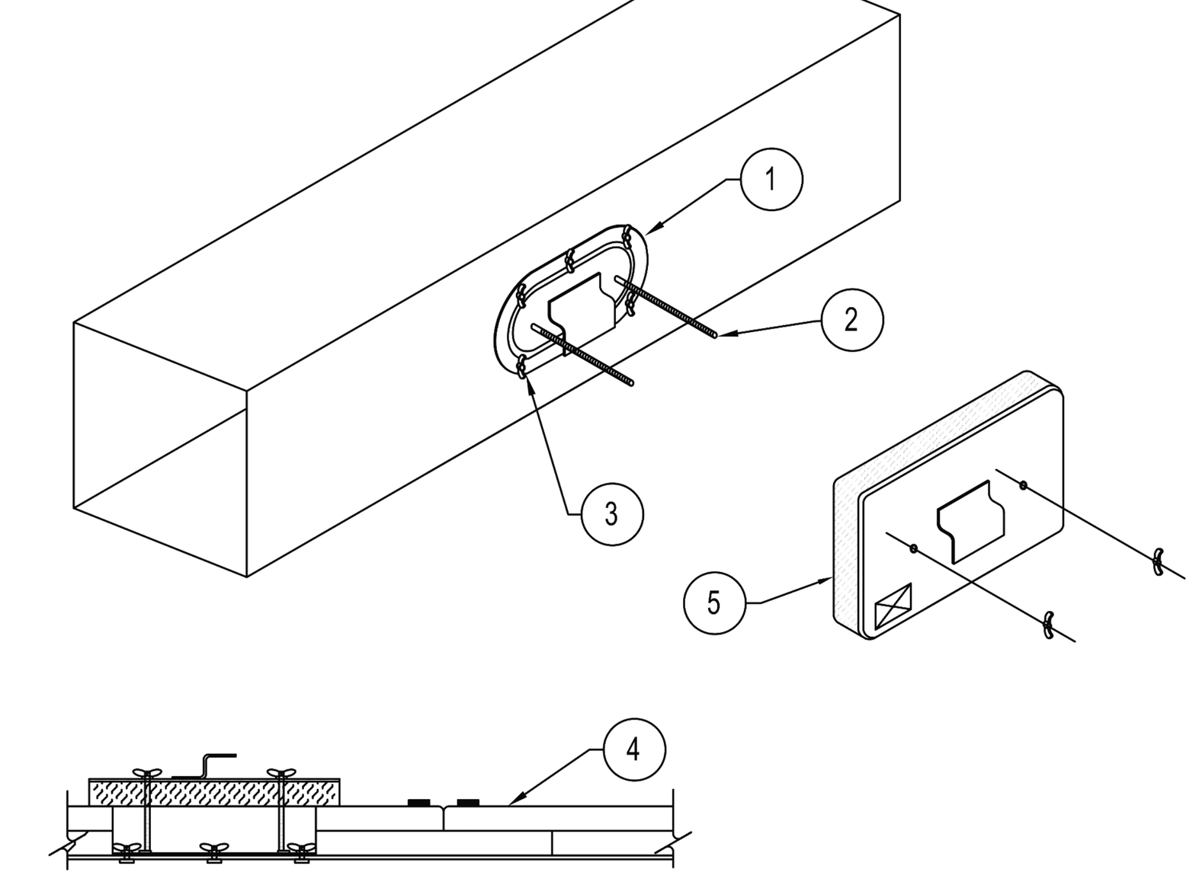
Commercial Kitchen Grease Duct Enclosure System
Air Ventilation Duct Enclosure System
Through Penetration Firestop Systems



Firestop Designs per ASTM E814 / UL 1479 - Consult UL / ULC Directories for System Details						
UL Listing	F- & T-Rating	(1) Floor/Wall	(2) Penetrant	(3) Enclosure Per	(4) Termination	(5) Firestop Sealant Details
C-AJ-7012	2-hour	Concrete/CMU	84x24; 26 Ga Duct	V19; FRD3; 5; 18	wrap through	1/2 in; STI; Tremco
C-AJ-7014	3-hour	Concrete/CMU	84x24; 26 Ga Duct	V2;	wrap through	1/2 in; STI; Tremco
C-AJ-7019	1 or 2-hour	Concrete/CMU	84x24; 26 Ga Duct	V19; FRD3, 5, 18	terminate at	1/4 in; STI; Tremco
C-AJ-7021	2-hour	Concrete/CMU	49x24; 16 Ga Duct	G18; FRD4; 7	terminate at	1/4 in; STI; Tremco
C-AJ-7095	2-hour	Concrete/CMU	39x39; 22 Ga Duct	V19; FRD3, 5, 18	wrap through	1/4 in; STI Hilti; Rectorseal; Tremco
C-AJ-7098	2-hour	Concrete/CMU	49x24; 16 Ga Duct	G18; FRD4; 7	wrap through	1/4 in; STI; Hilti; Rectorseal; Tremco
F-C-7036	1 or 2-hour	Wood/Gyp Floor	24x12; 16 Ga Duct	G18; FRD4; 7	wrap through	1/4 in; STI; Hilti; Rectorseal; Tremco
F-C-7055	1-hour	Wood/Gyp Floor	4 Dia; 30 Ga Duct	V29; FRD28	wrap through	1/4 in; STI
W-J-7086	2-hour	Concrete/CMU Wall	100x100; 26 Ga Duct	V19; FRD3;5; 18	terminate at	1/4 in; STI
W-L-7121	1 or 2-hour	Gyp Wall	30x30; 16 Ga Duct	G18; FRD4; 7	wrap through	1/4 in; STI; Hilti; Rectorseal; Tremco
W-L-7145	1 or 2-hour	Gyp Wall	100x100; 26 Ga Duct	V19; FRD3; 5; 18	terminate at	5/8 in; STI

The integrity of Thermal Ceramics duct systems is limited to the quality of the installation.

XL003-5

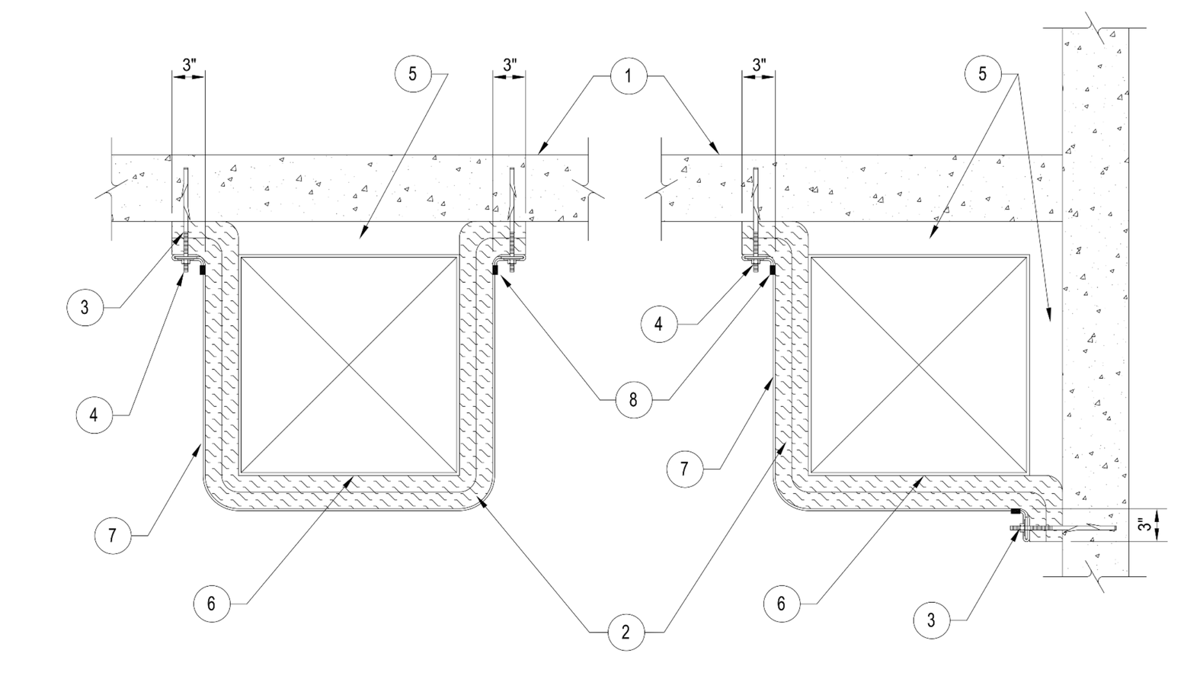


ASTM E 2336 Compliant Enclosure and Door System

FIGURE 3	
1	UL listed FastDoor XL access panel
2	All Thread Rods and wing nuts
3	Retainer Clips with threaded nut and wing bolts
4	Insulation layers as required by UL or ITS Listings
5	FastDoor XL; 1-1/2 inch thick single layer insulation

FastDoor XL1 Access Doors Sizes	
Available Opening Sizes	Ordering Code
10" x 4" Door Opening	*434-6970-033-99X1
10" x 6" Door Opening	434-6970-034-99X1
12" x 8" Door Opening	434-6970-035-99X1
12" x 12" Door Opening	434-6970-036-99X1
16" x 12" Door Opening	434-6970-037-99X1
20" x 20" Door Opening	434-6970-038-99X1
*Special Order; Curved and SS Available	

Commercial Kitchen Grease Duct Enclosure System
Air Ventilation Duct Enclosure System
1 Or 2 Or 3 Hour Shaft Alternative / Zero Clearance to Combustibles
2 and 3 Sided Wrap Detail for Attaching to Walls and/or Ceilings



Note: Ducts must be independently supported per code

LEGEND	
1	Rated Concrete floor/ceiling, or wall - with rating equal or greater than enclosure rating
2	Two layers of XL Insulation for Grease Duct Enclosures (install per UL G18)) One layer of XL Insulation for Air Ventilation Duct Enclosures (install per UL V19) Two layers of XL Insulation for 3-hr Air Ventilation Duct Enclosure (install per UL V2)
3	Concrete fastener system
4	3/16" (5) thick x 2" (50) -3" (75) wide bar stock perforated 12" (305) o.c.
5	8" (203) maximum Air Gap
6	Duct
7	Steel banding min. 1/2" (13) wide by 0.015" (0.4) thick.
8	Banding clip

The integrity of Morgan Thermal Ceramics duct systems is limited to the quality of the installation.

XL005-4

VIRO Enviromatic Corporation Of America, Inc. Since 1971
Atlanta, Austin, Chicago, Columbus, Dallas, Denver, Des Moines, Houston, Kansas City, Mpls, Orlando, St Louis
TOLL FREE 800-325-VIRO(8476)

Water Leak Testing of New and Existing Grease exhaust vent systems.

Summary: A high pressure multi-nozzle spinjet in conjunction (where needed) with a 1 degree or wider single nozzle lance is to be passed through all new grease exhaust ven systems with the water spray contacting all interior portions of the duct. This is to chec for any liquid leakage in the system plus to check for adequate access and other proble that can be repaired during the construction or leak testing phase. All water used in the test must be collected in some fashion for discharge to a sanitary drain.

1. The water testing job shall to be scheduled after the welded grease exhaust system with the hood and all access plates installed. The leaktesting can be done in multi stage for tall multi story runs or multi story multi duct runs, but there must be one final test o all connection joints.
2. All testing is to be done before any fire-wrap is installed or with fire wrap removed.
3. Testing Contractor shall verify water availability, building access, electrical availability, amount of high pressure hose needed to reach all areas of system, and any needed roof access with Job Superintendent when scheduling job.
4. The testing company should also re-verify during job reminder phone call that is to b made by Testing Contractor to the Job site Superintendent the working day before the j is scheduled.
5. A water source where a hose can be connected shall be available
6. A high pressure washer with minimum capabilities of 1000PSI @ 3GPM. (minimum requirements to run a multi nozzle duct cleaner(known as a spinjuet or roto-nozzle)
7. Adequate high pressure hose along with a 6" or 12" spinjet (or Roto-nozzle) shall be required.
8. The work should normally start at the intake(Hood) portion of the system (or at the electrostatic precipitator where applicable). The leaktest may start from other areas of system depending on layout.
9. The nozzles shall progress through the system at a rate of approximately one foot ev five seconds until it reaches the end point.
10. With the hood in place, the Testing Company shall collect the wastewater similar to a routine cleaning with the hood taped and clamped up with at least two mil or thicker clear poly (Plastic) funneling into a large watertight brute (or simila bucket.
11. A water vacuum shall be used to make sure all excess water is removed from hood and ductwork when done.
12. The general contractor's welder shall be on-site during the leaktesting with proper welding equipment(A MIG welder is highy recommended), a bright portable light, wit access to all parts of the system.
13. A spotter with the welder shall access the outside of the ductwork to spot any leaks
14. If the duct leaks, the leaks shall be repaired and the test is to be redone
15. Additional leaks shall continue to be repaired and re-tested until no leaks exist.
16. When testing is completed, The Testing Company shall dry out the duct, remove th plastic and return system to same condition as found (with leaks repaired).
17. The Testing Company will take pictures of the system and procedure, then e-mail them to Enviromatic to verify the job is done correctly.
18. A leaktest form shall be filled out and signed that system is liquid tight as specified by NFPA96 guidelines.
19. The leaktest form shall note number of leaks found, number of re-testing required in needed, rough drawing of the system with access plate locations and where the leaks were found and repaired. The form shall have signature lines for both the job site representative and the testing company representative.
20. If any sealant (EX: JB Weld, epoxies,etc) is found in a welded duct, the test shall immediately fail and the leaktesting will cease immediately until all sealant is removed to bare metal or bare welds.
21. For listed ducts with sealed joints, only the listed sealant shall be used. The leaktesting will progress in the same manner as the welded ducts EXCEPT leakage requiring sealant repairs will need to cure for the required time before re-testing.

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER — RON S. CHIN — M26613 — MECHANICAL — STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
MECHANICAL GREASE DUCT DETAILS

Scale
NTS

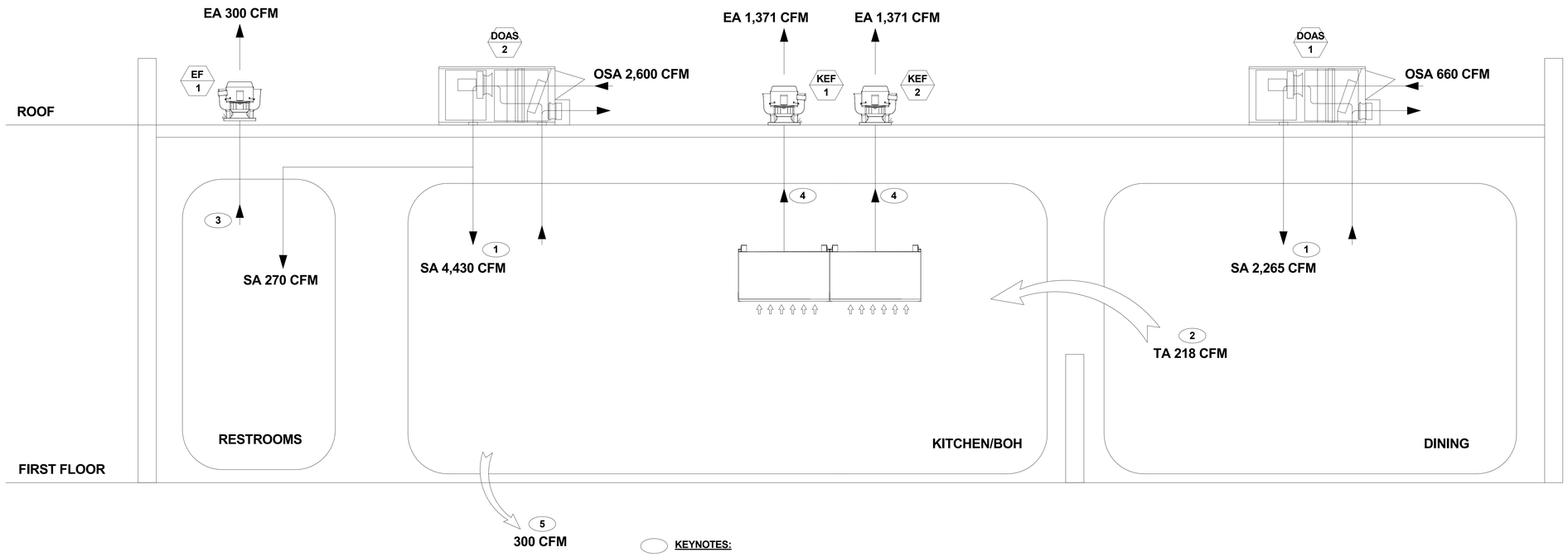
M502

8/25/2023 10:25:29 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

AIR BALANCE TABLE AT DESIGN

	HVAC SUPPLY (CFM)	HVAC RETURN (CFM)	HVAC OSA (CFM)	HOOD EXHAUST (CFM)	GENERAL EXHAUST (CFM)	AREA SERVED
DOAS-1	2,265	1,605	660	-	-	DINING
DOAS-2	4,430	1,830	2,600	-	-	KITCHEN
	270			-	-	RESTROOMS
KEF-1	-	-	-	1,371	-	HOOD
KEF-2	-	-	-	1,371	-	HOOD
EF-1	-	-	-	-	300	RESTROOMS
TOTAL	6,965	3,435	3,260	2,742	300	
OSA			3,260	-3,042		

TOTAL PRESSURIZATION DIFFERENCE = +218



KEYNOTES:

1. TOTAL OF AIR OUTLETS.
2. TRANSFER AIR TO KITCHEN FROM DINING.
3. TOTAL OF RESTROOM EXHAUST FANS.
4. KITCHEN HOOD EXHAUST.
5. EXFILTRATION

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHIA M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
MECHANICAL AIRFLOW DIAGRAMS

Scale
NTS

M601

8/25/2023 10:25:29 AM BIM 360://005-4326.000 - Shake Shack - Montgomery Village/005-4326 - SS 1491 - Montgomery Village_M21.rvt

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

GENERAL

ALL ROOFTOP UNITS SHALL SHUT DOWN UPON ALARM FROM KITCHEN EXHAUST HOOD FIRE EXTINGUISHING SYSTEM.

DOAS-1

1. DURING OCCUPIED HOURS, UNIT SHALL RUN CONTINUOUSLY AND OUTDOOR AIR DAMPER AND RETURN AIR DAMPER SET TO MINIMUM POSITION TO MAINTAIN MINIMUM VENTILATION.
2. WHEN FREE COOLING IS NOT AVAILABLE, THE COMPRESSORS WILL BE CONTROLLED BY THE ZONE THERMOSTAT. WHEN FREE COOLING IS AVAILABLE , THE OUTDOOR AIR DAMPER IS MODULATED BY ECONOMIZER CONTROL TO PROVIDE A 50 DEG-F TEMPERATURE INTO THE ZONE. AS THE MIXED AIR TEMPERATURE FLUCTUATES ABOVE 55DEG-F OR BELOW 50 DEG-F, DAMPERS WILL BE MODULATED (OPEN OR CLOSE) TO BRING THE MIXED-AIR TEMPERATURE BACK WITHIN CONTROL.
3. IF MECHANICAL COOLING IS UTILIZED WITH FREE COOLING , THE OUTDOOR AIR DAMPER WILL MAINTAIN ITS CURRENT POSITION AT THE TIME THE COMPRESSOR IS STARTED. IF THE INCREASE IN COOLING CAPACITY CAUSES THE MIXED-AIR TEMPERATURE TO DROP BELOW 45 DEG-F, THEN THE OUTDOOR AIR DAMPER POSITION WILL BE DECREASED TO THE MINIMUM POSITION. IF THE MIXED AIR TEMPERATURE CONTINUES TO FALL, THE OUTDOOR AIR DAMPER WILL CLOSE. CONTROL RETURNS TO NORMAL ONCE THE MIXED AIR TEMPERATURE RISES ABOVE 48 DEG-F.
4. THE POWER EXHAUST FANS WILL BE ENERGIZED AND DE-ENERGIZED AS THE OUTDOOR AIR DAMPER OPENS AND CLOSES. FOR ECONOMIZER OPERATION, THERE MUST BE A THERMOSTAT CALL FOR THE FAN..
5. IF THE UNIT IS ON OCCUPIED MODE AND THE FAN IS ON, THE DAMPER WILL OPERATE AT MINIMUM POSITION. OTHERWISE, THE DAMPER WILL BE CLOSED. WHEN THE ECONOMIZER IS IN OCCUPIED MODE AND A CALL FOR COOLING EXISTS, THE CONTROL WILL FIRST CHECK FOR INDOOR FAN OPERATION. IF THE FAN IS NOT ON, THEN COOLING WILL NOT BE ACTIVATED.
6. IF THE FAN IS ON, THEN THE CONTROL WILL OPEN THE ECONOMIZER TO THE MINIMUM POSITION. IF FREE COOLING CAN BE USED AS DETERMINED FROM THE APPROPRIATE CHANGEOVER COMMAND (73 DEG-F DB), THEN THE CONTROL WILL MODULATE THE DAMPERS OPEN TO MAINTAIN THE MIXED-AIR TEMPERATURE SET-POINT AT 50-DEG-F TO 55 DEG-F, IF THERE IS A FURTHER DEMAND FOR, THEN THE CONTROL WILL BRING ON COMPRESSOR STAGE 1 TO MAINTAIN THE MIXED-AIR TEMPERATURE SET POINT.

DOAS-2

1. DURING OCCUPIED HOURS, UNIT SHALL RUN CONTINUOUSLY AND:
   -WHEN THE EXHAUST HOOD CONTROLLER IS TURNED ON, ACTIVATING THE KITCHEN EXHAUST, THE MIXING BOX DAMPER IS MODULATED TO PROVIDE 2,125 CFM OF OA AIR FOR MAKE UP AIR. .
   -WHEN THE EXHAUST HOOD CONTROLLER IS TURNED OFF, DEACTIVATING THE KITCHEN EXHAUST.
2. UNIT SHALL BE OUTFITTED WITH CASLINK FOR FUTURE CLOUD BASED MONITORING, WHICH MONITORS EVERY POINT OF OPERATION. PROVIDES CONFIGURABLE AUTOMATED FAULT ALERT E-MAILS, AND REMOTE CONTROL CAPABILITIES.
3. SPACE TEMP CONTROL MAINTAINS A CONSTANT SUPPLY AIR VOLUME AND MODULATES THE COMPRESSOR FREQUENCY TO ACCURATELY MAINTAIN THE DESIRED SPACE TEMPERATURE SET POINT AND COMPENSATE FOR FLUCTUATIONS IN ENTERING OA AIR TEMPERATURE USING PID CONTROLS DESIGNED SPECIFICALLY FOR THE DOAS.
4. WHEN THE RELATIVE HUMIDITY IN THE SPACE IS ABOVE THE MAXIMUM SET POINT, THE COOLING CAPACITY SHALL BE STAGED TO PROVIDE A OFF COIL TEMPERATURE OF 54 DEG-F AND APPLY HOT GAS REAHEAT TO OBTAIN THE REQUIRED SUPPLY AIR TEMPERATURE TO ACHIEVE THE SPACE TEMPERATURE SET POINT.
5. THE UNIT WILL BE CAPABLE OF MODULATING AND SHUTTING OFF THE COMPRESSOR TO PROVIDE FREE COOLING AND DEHUMIDIFICATION AS THE OUTDOOR AIR CONDITIONS ALLOW.

KITCHEN EXHAUST FANS

1. KEF 1 SHALL BE ENERGIZED BY CONTACTORS IN THE HOOD CONTROLLER. COORDINATE INSTALLATION WITH ELECTRICAL CONTRACTOR.
2. UPON ALARM FROM KITCHEN EXHAUST HOOD FIRE EXTINGUISHING SYSTEM, EXHAUST FAN SHALL CONTINUE TO RUN.
3. NORMAL TEMPERATURE TEST: EXHAUST FANS SHALL OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300 DEG-F UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

RESTROOM EXHAUST FAN

1. EXHAUST FAN EF-1 SHALL OPERATE CONTINOUSLY DURING OCCUPIED HOURS.

KITCHEN EXHAUST HOODS

1. THE ELECTRICAL PACKAGE, TYPICALLY FP, IS DESIGNED TO THERMOSTATICALLY ACTIVATE THE EXHAUST FANS FOR AN EXHAUST HOOD WHENEVER ELEVATED TEMPERATURES ARE SENSED IN THE EXHAUST SYSTEM. THIS OPTION WILL MEET THE REQUIREMENTS OF BY PROVIDING A THERMOSTAT(S) MOUNTED IN THE DUCT OR HOOD RISER TO SENSE INCREASED EXHAUST TEMPERATURES.
2. CONTROLS SHALL BE LISTED BY ETL (UL 508A). THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.
3. TEMPERATURE PROBES(S) LOCATED IN THE DUCT RISER SHALL BE CONSTRUCTED OF STAINLESS STEEL.
4. A ROOM TEMPERATURE SENSOR IS ALSO PROVIDED FOR FIELD INSTALLATION IN THE KITCHEN SPACE IN ORDER TO START THE FAN(S) BASED ON THE TEMPERATURE DIFFERENTIAL BETWEEN THE ROOM AND THE EXHAUST AIR IN THE DUCT, RATHER THAN FIXED SET-POINTS. THE SYSTEM IS FACTORY PRE-SET TO ACTIVATE THE FANS AT 10 DEG-F ABOVE THE ROOM TEMPERATURE.
5. ONCE THE DUCT TEMPERATURE REACHES THE ACTIVATION POINT, THE EXHAUST FANS WILL BE ACTIVATED. THE CONTROLS ALSO PROVIDE HYSTERESIS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND THE HEAT IN THE EXHAUST SYSTEM IS REDUCED. THE HYSTERESIS IS FACTORY SET 2 DEGREES AND WILL KEEP THE EXHAUST RUNNING UNTIL THE TEMPERATURE FALLS 2 DEGREES BELOW THE ACTIVATION SET POINT. A HYSTERESIS TIMER ALSO EXISTS TO KEEP THE FANS RUNNING FOR AT LEAST 30 MIN AFTER BEING ACTIVATED BY THE TEMPERATURE RISE.
6. THE ACTIVATION AND HYSTERESIS SETTINGS MAY BE FIELD ADJUSTED ON THE BOARD LCD INTERFACE LOCATED INSIDE THE CONTROL ENCLOSURE TO MEET APPLICATION NEEDS. THE PANEL IS FACTORY CONFIGURED TO SHUT DOWN SUPPLY FANS, TURN ON THE EXHAUST FANS AND TURN OFF THE HOOD LIGHTS IN A FIRE CONDITION.

1 CONTROLS
SCALE: NTS

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RYAN S. OTIN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name

SHAKE SHACK - MONTGOMERY VILLAGE

Project Number

SHK-22-007

Description

MECHANICAL CONTROLS

Scale

NTS

M602

8/25/2023 10:25:30 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

SPECIFICATION TABLE OF CONTENTS

SECTION 230000 - ENERGY CONSERVATION

A. HVAC SYSTEMS AND EQUIPMENT CAPACITIES DO NOT EXCEED CALCULATED LOADS.

B. THEROMSTATIC CONTROLS.
  1. THERMOSTATIC CONTROLS SHALL HAVE A 5 DEG-F DEADBAND.
  2. THERMOSTATIC CONTROLS SHALL BE CAPABLE OF OPERATING THE DOWN TO 55 DEF-F OR UP TO 85 DEG-F.
  3. EACH ZONE SHALL BE PROVIDED WITH AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS FOR STARTING AND STOPPING THE SYSTEM FOR SEVERN DIFFERENT DAILY SCHEDULES PER WEEK.

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SCOPE OF WORK

A. PROVIDE LABOR, INCLUDING FIELD ERECTION AND SUPERVISION, MATERIALS, EQUIPMENT AND ANCILLARIES, AND COORDINATE, PROCURE, FABRICATE, DELIVER, ERECT OR INSTALL, INTERFACE WITH EXISTING WORK, START, DEBUG AND TEST ALL SYSTEMS AS NECESSARY TO PROVIDE THE OWNER WITH A COMPLETE OPERATING FACILITY IN CONFORMANCE WITH THE CONTRACT DOCUMENTS AND IN CONFORMITY WITH REQUIREMENTS OF ALL AUTHORITIES HAVE JURISDICTION.

B. THE WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
  1. DEMOLITION AND REMOVAL OF MECHANICAL WORK
  2. DUCTWORK AND AIR OUTLETS.
  3. AIR-CONDITIONING AND EXHAUST SYSTEMS.
  4. KITCHEN HOOD AND EXHAUST SYSTEMS.
  5. MAKEUP AIR SYSTEMS.
  6. THERMAL INSULATION.
  7. COORDINATION WITH OTHER TRADES FOR LOCATION OF DUCTWORK AND TO INFORM THE GENERAL CONTRACTOR (VIA DIMENSIONAL DRAWINGS) OF THE EXACT SIZE AND LOCATION OF ALL ROOF AND WALL OPENINGS.
  8. MISCELLANEOUS STEEL WORK, SUPPORTS AND HANGERS AND CUTTING AND PATCHING OF ROOF, WALLS AND PARTITIONS.
  9. RECORD DRAWINGS.
  10. CONTROLS.
  11. TESTING, ADJUSTING, AND BALANCING.

C. RELATED WORK INCLUDED IN THIS SECTION AND IN OTHER SECTIONS.
  1. GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS.
  2. REFER TO THE RESPONSIBILITY MATRIX FOR ADDITIONAL INFORMATION.

1.3 SUBMITTALS

A. PROVIDE CONTRACTOR SUBMITTAL MATERIAL WITH DESCRIPTIVE DATA FOR ALL PRODUCTS AND MATERIALS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING, PRIOR TO INSTALLATION. ALL SUBMITTALS SHALL BE HIGHLIGHTED TO INDICATE SPECIFIC PRODUCTS OR MATERIALS BEING USED. ALLOW MIN 5 DAYS FOR ENGINEER TO REVIEW SUBMITTALS.
  1. COORDINATED LAYOUT PLANS, SHOWING WORK OF ALL TRADES, INCLUDING BUT NOT LIMITED TO DUCTWORK; HVAC, REFRIGERANT, PLUMBING, FIRE PROTECTION PIPING; ELECTRICAL CONDUITS AND BUS DUCTS; EQUIPMENT. DRAWINGS SHALL BE 1/4 SCALE.
  2. DUCTWORK ACCESSORIES.
  3. DUCTWORK TYPICAL CONSTRUCTION.
  4. DUCT SEALING.
  5. REFRIGERANT PIPING.
  6. DAMPERS.
  7. DIFFUSERS, GRILLES AND REGISTERS.
  8. CERTIFIED ACOUSTICAL TEST PERFORMANCE DATA FOR DIFFUSERS, REGISTERS, GRILLES AND TERMINAL AIR UNITS.
  9. AIR AND WATER TEST AND BALANCE.
  10. COMPLETE FORMS PROPOSED FOR USE IN COMPILING AND RECORDING TEST AND BALANCE DATA.
  11. CONTROL DEVICES AND SYSTEMS.
  12. CONTROL SEQUENCE AND SYSTEM DRAWINGS.
  13. FIRE PROTECTION SYSTEM LAYOUTS IN CODE COMPLIANCE.
  14. VIBRATION ISOLATION.
  15. ONE SET OF AS-BUILT REPRODUCIBLE DRAWINGS.

B. PROVIDE 1 COPY OF APPROVED SUBMITTALS TO THE OFFICE OF THE BUILDING ENGINEER.

1.4 PRODUCT SUBSTITUTIONS

A. THE CONTRACTOR SHALL CERTIFY THE FOLLOWING ITEMS ARE CORRECT WHEN USING SUBSTITUTED PRODUCTS OTHER THAN THOSE SCHEDULED OR SHOWN ON THE DRAWINGS AS A BASIS OF DESIGN:
  1. THE PROPOSED SUBSTITUTION DOES NOT AFFECT DIMENSIONS SHOWN ON DRAWINGS.
  2. THE CONTRACTOR SHALL PAY FOR CHANGES TO BUILDING DESIGN, INCLUDING ENGINEERING DESIGN, DETAILING, STRUCTURAL SUPPORTS, AND CONSTRUCTION COSTS CAUSED BY PROPOSED SUBSTITUTION.
  3. THE PROPOSED SUBSTITUTION HAS NO ADVERSE EFFECT ON OTHER TRADES, CONSTRUCTION SCHEDULE, OR SPECIFIED WARRANTY REQUIREMENTS.
  4. MAINTENANCE AND SERVICE PARTS AVAILABLE LOCALLY ARE READILY OBTAINABLE FOR THE PROPOSED SUBSTITUTE.

B. THE CONTRACTOR FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

C. THE CONTRACTOR AGREES THAT THE TERMS AND CONDITIONS FOR THE SUBSTITUTED PRODUCT THAT ARE FOUND IN THE CONTRACT DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

1.5 MAINTENANCE MANUALS AND AS-BUILT DRAWINGS

A. PROVIDE FOUR (4) COPIES OF OPERATING AND MAINTENANCE MANUAL FOR OWNER'S USE FOR EACH PIECE OF EQUIPMENT WITHIN 90 DAYS OF ACCEPTANCE. EACH ITEM SHALL BE CROSS-REFERENCED AND NUMBERED WITH AS-BUILT DRAWING DESCRIPTIONS.

B. SOFT COPY OF AS-BUILT DRAWINGS ON AUTOCAD AND PDF AND ONE SET OF HARD COPY SHALL BE DELIVERED TO OWNER WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.

1.6 GUARANTEES

A. GUARANTEE: ALL MATERIALS, APPARATUS AND WORKMANSHIP INSTALLED UNDER THIS SECTION SHALL BE UNCONDITIONALLY GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF WORK BY THE OWNER AGAINST FAILURE DUE TO FAULTY MATERIAL OR WORKMANSHIP. THE CONTRACTOR SHALL CORRECT DEFECTS AT NO ADDITIONAL COST TO THE OWNER. LABOR AND REPLACEMENT OF PARTS TO BE ACCOMPLISHED AT NO COST TO OWNER.

1.7 SEISMIC SUPPORT

A. CONTRACTOR SHALL SUPPORT AND BRACE ALL NEW HVAC, PLUMBING AND FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH REQUIREMENTS SPECIFIED.

1.8 PRODUCT HANDLING

A. PROTECTION: PROTECT MATERIALS AND EQUIPMENT FROM DAMAGE DURING SHIPPING, STORAGE AND HANDLING. REMOVE FROM THE SITE ANY WET OR DAMAGED DUCT LINER OR INSULATION.

B. STORAGE: WHERE POSSIBLE, STORE MATERIALS AND EQUIPMENT INSIDE AND PROTECT FROM THE WEATHER. WHERE NECESSARY TO STORE OUTSIDE, STORE ABOVE GRADE AND ENCLOSE WITH WATERPROOF WRAPPING.

C. REPLACEMENT: IN THE EVENT OF DAMAGE, IMMEDIATELY REPAIR ALL DAMAGED AND DEFECTIVE WORK TO THE APPROVAL OF THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

1.9 CONTRACT DRAWINGS

A. CONTRACT DRAWINGS FOR MECHANICAL WORK ARE DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF THE WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTS, PIPING AND APPROXIMATE SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. DO NOT SCALE DRAWINGS FOR MEASUREMENTS.

B. CONSULT KITCHEN, MECHANICAL, PLUMBING, ARCHITECTURAL, STRUCTURAL AND ELECTRICAL CONTRACT DRAWINGS AND SPECIFICATIONS TO BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE WORK, COORDINATE INTERCONNECTING WORK WITH OTHER TRADES AFFECTED, AND VERIFY ALL SPACES IN WHICH THE WORK WILL BE INSTALLED.

C. WHERE JOB CONDITIONS REQUIRE REASONABLE CHANGES IN ORDER TO COORDINATE INSTALLATION WITH OTHER TRADES, THESE CHANGES SHALL BE MADE WITHOUT EXTRA COST TO THE OWNER.

1.10 DEMOLITION

A. PROTECT ADJACENT MATERIALS INDICATED TO REMAIN. INSTALL AND MAINTAIN DUST AND NOISE BARRIERS TO KEEP DIRT, DUST, AND NOISE FROM BEING TRANSMITTED TO ADJACENT AREAS. REMOVE PROTECTION AND BARRIERS AFTER DEMOLITION OPERATIONS ARE COMPLETE.

B. LOCATE, IDENTIFY, AND PROTECT MECHANICAL SERVICES PASSING THROUGH DEMOLITION AREA AND SERVING OTHER AREAS OUTSIDE THE DEMOLITION LIMITS. MAINTAIN SERVICES TO AREAS OUTSIDE DEMOLITION LIMITS. WHEN SERVICES MUST BE INTERRUPTED, INSTALL TEMPORARY SERVICES FOR AFFECTED AREAS.

C. MATERIALS AND EQUIPMENT TO BE SALVAGED: REMOVE, DEMOUNT, AND DISCONNECT EXISTING MECHANICAL MATERIALS AND EQUIPMENT INDICATED TO BE REMOVED AND SALVAGED, AND DELIVER MATERIALS AND EQUIPMENT TO THE ONWER.

D. REPAIR OR REPLACE EQUIPMENT OR MATERIALS DAMAGED DURING DEMOLITION TO SATISFACTION OF OWNER'S DESIGNATED REPRESENTATIVE.

1.11 INTERRUPTION OF EXISTING UTILITY SERVICE:

A. COORDINATE THE SHUT-OFF AND DISCONNECTION OF UTILITY SERVICES WITH THE OWNER AND THE UTILITY COMPANY.

B. NOTIFY THE OWNER'S REPRESENTATIVE OWNER'S PROJECT REPRESENTATIVE AT LEAST 5 DAYS PRIOR TO COMMENCING DEMOLITION OPERATIONS.

1.12 SCHEDULING:

A. SUBMIT SCHEDULES INDICATING PROPOSED METHODS AND SEQUENCE OF OPERATIONS FOR DEMOLITION PRIOR TO COMMENCEMENT OF WORK. INCLUDE COORDINATION FOR SHUT-OFF OF UTILITY SERVICES AND DETAILS FOR DUST AND NOISE CONTROL.

B. COORDINATE SEQUENCING WITH CONSTRUCTION PHASING AND OWNER OCCUPANCY.

1.13 MAINTENANCE OF EXISTING UTILITY SERVICES

A. UNINTERRUPTED NORMAL USE OF THE EXISTING FACILITIES MUST BE MAINTAINED DURING THE TIME REQUIRED TO PERFORM THE COMPLETE INSTALLATION OF THE WORK INDICATED IN THE CONTRACT DOCUMENTS. IT IS MANDATORY THAT THE EXISTING BUILDINGS BE MAINTAINED IN SERVICE.

B. INVESTIGATE EXISTING CONDITIONS AND THE LOCATION OF ALL EXISTING EQUIPMENT AND THE LOCATION OF ALL EXISTING SERVICES BEFORE STARTING.

C. IF A SERVICE IS DISTURBED, IMMEDIATELY WITHOUT REGARD FOR WORKING HOURS, PLACE THE SERVICE BACK INTO OPERATION.

D. SUFFICIENT ADVANCE NOTICE SHALL BE GIVEN TO THE OWNER AND ITS PERMISSION OBTAINED PRIOR TO INTERRUPTION OF PRESENT SERVICES. IT SHOULD BE ASSUMED THAT DISRUPTION OF UTILITIES AND SERVICES WILL BE DONE AT OTHER THAN NORMAL WORKING HOURS. NO ADDITIONAL OR EXTRA PAYMENT WILL BE AUTHORIZED TO COMPLY WITH THESE REQUIREMENTS.

E. REPAIR, REPLACE AND MAINTAIN IN SERVICE ANY UTILITIES, FACILITIES, OR SERVICES (UNDERGROUND, OVERGROUND, INTERIOR OR EXTERIOR) DAMAGED, BROKEN OR OTHERWISE RENDERED INOPERATIVE DURING THE COURSE OF CONSTRUCTION IN THE EXISTING BUILDING.

F. ALL OPENINGS MUST BE SECURELY COVERED, OR OTHERWISE PROTECTED, TO PREVENT INJURY DUE TO CARELESSLY OR MALICIOUSLY DROPPED TOOLS OR MATERIALS, GRIT, DIRT, OR ANY FOREIGN MATTER. DAMAGED WORK SHALL BE REPAIRED OR REPLACED UNTIL WORK IS FULLY AND FINALLY ACCEPTED.

G. PROTECT HEATING EQUIPMENT AND ALL SIMILAR ITEMS OF EQUIPMENT FROM DIRT, GRIME, PLASTER, PAINT AND WATER DURING ALL PHASES OF CONSTRUCTION. THIS PROTECTION SHALL BE PROVIDED BY COVERING WITH TRANSPARENT PLASTIC SHEETING.

H. MAKE ALL CONNECTIONS TO EXISTING SYSTEM PIPING AND EQUIPMENT SYSTEMS DURING DESIGNATED PERIODS UPON APPROVAL OF THE OWNER AND AT NO INCREASE IN THE CONTRACT SUM.

I. DO NOT INTERRUPT EXISTING UTILITIES UTILIZED BY THE OWNER, EXCEPT AS APPROVED BY THE OWNER. INTERRUPTIONS MUST BE SCHEDULED TO SUIT THE OWNER'S REQUIREMENTS.

J. VERIFY ALL EXISTING WORK. WHERE EXISTING CONNECTIONS ARE PARTIAL, PROVIDE ALL NECESSARY MATERIALS, LABOR AND EQUIPMENT REQUIRED TO MODIFY EXISTING WORK. IN ADDITION, MAINTAIN INTEGRITY OF THE EXISTING SYSTEMS. RECTIFY ANY CONTAMINATION, DEGRADATION OF CLEANLINESS OR DAMAGE TO THE EXISTING SYSTEMS TO THE SATISFACTION OF THE OWNER.

1.14 INSTALLATION OF THE WORK

A. THE CONTRACT DRAWINGS INDICATE THE GENERAL ARRANGEMENTS FOR THE HVAC, KITCHEN, PLUMBING, AND FIRE PROTECTION SYSTEMS.
  1. DRAWINGS ARE DIAGRAMMATIC AND DO NOT INDICATE NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS.
  2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE WORK IN SUCH A MANNER THAT IT WILL BE AT THE HIGHEST ELEVATION POSSIBLE, CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, MAINTAIN HEADROOM, LEAVE ADEQUATE CLEARANCES FOR LIGHT FIXTURES, RETURN AIR PATHWAYS, MAINTENANCE AND REPAIRS, AND PROVIDE CLEARANCE AND ACCESS AS REQUIRED BY CODES. NOTHING SHALL BE INSTALLED BELOW CEILING LEVEL WITHOUT ARCHITECT'S WRITTEN CONSENT.
  3. ABOVE ITEMS TO BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
  4. PROCEED AS RAPIDLY AS THE BUILDING CONSTRUCTION WILL PERMIT.
  5. THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION. CAP OPENINGS TO EXCLUDE DIRT UNTIL FINAL CONNECTIONS HAVE BEEN MADE.
  6. CUT MATERIALS ACCURATELY, WORK INTO PLACE WITHOUT SPRINGING OR FORCING, PROPERLY CLEAR WINDOWS, DOORS AND OTHER OPENINGS. EXCESSIVE CUTTING OR OTHER WEAKENING OF THE BUILDING STRUCTURE WILL NOT BE PERMITTED.
  7. MANUFACTURER'S DRAWINGS AND INSTRUCTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE MAKERS OF DEVICES AND EQUIPMENT FURNISH DIRECTIONS OR DETAILS NOT SHOWN ON THE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS.
  8. DRAWINGS ARE NOT INTENDED TO BE SCALED, BUT SHALL BE FOLLOWED WITH SUFFICIENT ACCURACY TO COORDINATE WITH OTHER WORK AND STRUCTURAL LIMITATIONS.
  9. SEISMIC DESIGN: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ANCHORS, SUPPORTS AND CONNECTIONS OF MECHANICAL WORK TO THE BUILDING STRUCTURE TO PREVENT DAMAGE AS A RESULT OF AN EARTHQUAKE, INCLUDING MANUFACTURED EQUIPMENT, THE CONNECTION AND INTEGRITY OF SHOP FABRICATED AND FIELD FABRICATED MATERIALS AND EQUIPMENT. ALL SUPPORTS, EQUIPMENT AND CONNECTIONS THERETO SHALL BE DESIGNED TO CONFORM TO REQUIREMENTS OF THE CALIFORNIA ADMINISTRATIVE CODE, OR OTHER GOVERNING CODES.
  10. ALL WORK SHALL BE PROPERLY SUPPORTED FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER, INDEPENDENT OF THE CEILING SUPPORT SYSTEM. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT DIRECT FASTENING OF SUPPORTS, FURNISH ADDITIONAL FRAMING.
  11. ALL EQUIPMENT SHALL BE SECURELY FASTENED TO BUILDING CONSTRUCTION WITH APPROVED SUPPORTS.
  12. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF DIFFUSERS, GRILLES, REGISTERS, AND THERMOSTATS (IF DEPICTED). IF THERMOSTATS ARE NOT DEPICTED SPECIFICALLY ON ARCHITECT'S DRAWINGS, OBTAIN ARCHITECT'S APPROVAL FOR LOCATIONS PRIOR TO INSTALLATION.
  13. COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER SECTIONS IN AMPLE TIME FOR PROPER INSTALLATION AND CONNECTION.
  14. CAREFULLY CHECK SPACE REQUIREMENTS, INCLUDING SERVICING SPACE REQUIREMENTS, WITH OTHER SECTIONS TO ENSURE THAT ALL EQUIPMENT AND MATERIALS CAN BE INSTALLED IN THE SPACES ALLOTTED THERETO.
  15. PREPARE DRAWINGS, ATTEND MEETINGS, OBTAIN ALL APPROVALS REQUIRED BY ALL AUTHORITIES HAVING JURISDICTION, CONDUCT REQUIRED TESTS AND OBTAIN REQUIRED PERMITS.

B. GENERAL:
  1. PAINTING
    a. PAINT:
      1) BEST GRADE FOR ITS PURPOSE.
      2) DELIVER IN ORIGINAL SEALED CONTAINERS.
      3) APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
      4) COLORS: TO MATCH EXISTING OR AS SELECTED BY ENGINEER.
    b. GALVANIZED IRON PRIMER.
    c. HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE.
    d. ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS.
  2. CLEANING:
    a. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE.
    b. PAINTED EXPOSED WORK SOILED OR DAMAGED: CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE.
    c. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
  3. CUTTING AND PATCHING: AS REQUIRED FOR NEW WORK

1.15 CONTROL AND DEVICES

A. ALL CONTROL DEVICES NOT SPECIFIED TO BE FURNISHED AND INSTALLED UNDER THE ELECTRICAL SECTIONS SHALL BE PROVIDED UNDER THIS SECTION.

1.16 PROJECT CLOSE-OUT

A. AFTER FINAL OPERATION FOR INSPECTION AND ACCEPTANCE DELIVER ALL COPIES OF OPERATION INSTRUCTIONS, MAINTENANCE MANUALS AND PARTS DESCRIPTIONS TO THE ENGINEER.

B. ALL TOOLS SUPPLIED WITH THE EQUIPMENT FOR MAINTENANCE SHALL BE TAGGED AND TEMPORARILY SECURED TO THE UNIT, OR TURNED OVER TO THE OWNER.

1.17 ELECTRICAL

A. GENERAL:
  1. ALL ELECTRICAL MATERIAL, EQUIPMENT, AND APPARATUS SPECIFIED HEREIN SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 26. REFER TO THE RESPONSIBILITY MATRIX FOR ADDITIONAL INFOMRATION.
  2. PROVIDE ALL MOTORS FOR EQUIPMENT SPECIFIED HEREIN. PROVIDE MOTOR STARTERS, CONTROLLERS, AND OTHER ELECTRICAL APPARATUS AND WIRING WHICH ARE REQUIRED FOR THE OPERATION OF THE EQUIPMENT SPECIFIED HEREIN.
  3. SET AND ALIGN ALL MOTORS AND DRIVES IN EQUIPMENT SPECIFIED HEREIN.
  4. SPECIFIC ELECTRICAL REQUIREMENTS (I.E., HORSEPOWER AND ELECTRICAL CHARACTERISTICS) FOR MECHANICAL EQUIPMENT ARE SCHEDULED ON THE DRAWINGS.

B. QUALITY ASSURANCE:
  1. ELECTRICAL COMPONENTS AND MATERIALS SHALL BE UL OR ETL LISTED/LABELED AS SUITABLE FOR LOCATION AND USE - NO EXCEPTIONS.

C. STARTERS AND ELECTRICAL DEVICES:
  1. MOTOR STARTER CHARACTERISTICS:
    a. ENCLOSURES: NEMA 1, GENERAL PURPOSE ENCLOSURES WITH PADLOCK EARS, EXCEPT IN WET LOCATIONS SHALL BE NEMA 3R WITH CONDUIT HUBS.
    b. TYPE AND SIZE OF STARTER SHALL BE AS RECOMMENDED BY MOTOR MANUFACTURER AND THE DRIVEN EQUIPMENT MANUFACTURER FOR APPLICABLE PROTECTION AND START UP CONDITION.
  2. MANUAL SWITCHES SHALL HAVE PILOT LIGHTS AND ALL REQUIRED SWITCH POSITIONS FOR MULTI SPEED MOTORS. OVERLOAD PROTECTION: MELTING ALLOY OR BI METALLIC TYPE THERMAL OVERLOAD RELAYS, SIZED ACCORDING TO ACTUAL OPERATING CURRENT (FIELD MEASURED).
  3. MAGNETIC STARTERS:
    a. HEAVY DUTY, OIL RESISTANT, HAND-OFF-AUTO (HOA), OR AS INDICATED, AND PILOT LIGHTS, PROPERLY ARRANGED FOR SINGLE SPEED OR MULTI SPEED OPERATION AS INDICATED.
    b. TRIP FREE THERMAL OVERLOAD RELAYS, EACH PHASE, SIZED ACCORDING TO ACTUAL OPERATING CURRENT (FIELD MEASURED).
    c. INTERLOCKS, PNEUMATIC SWITCHES AND SIMILAR DEVICES AS REQUIRED FOR COORDINATION WITH CONTROL REQUIREMENTS OF DIVISION 23 CONTROLS SECTIONS.
    d. BUILT IN PRIMARY AND SECONDARY FUSED CONTROL CIRCUIT TRANSFORMER, SUPPLIED FROM LOAD SIDE OF EQUIPMENT DISCONNECT.
    e. EXTERNALLY OPERATED MANUAL RESET.
    f. UNDER VOLTAGE RELEASE OR PROTECTION FOR ALL MOTORS OVER 20 HP.
  4. MOTOR CONNECTIONS: LIQUID TIGHT, FLEXIBLE CONDUIT, EXCEPT WHERE PLUG IN ELECTRICAL CORDS ARE SPECIFICALLY INDICATED.

D. LOW VOLTAGE CONTROL WIRING:
  1. GENERAL: 14 GAUGE, TYPE THHN, COLOR CODED, INSTALLED IN CONDUIT.
  2. MANUFACTURER: GENERAL CABLE CORP., ALCAN CABLE, AMERICAN INSULATED WIRE CORP., SENATOR WIRE AND CABLE CO., OR SOUTHWIRE CO.

E. DISCONNECT SWITCHES:
  1. FUSIBLE SWITCHES: FOR EQUIPMENT 1/2 HP OR LARGER, PROVIDE FUSED, EACH PHASE; HEAVY DUTY; HORSEPOWER RATED; SPRING LOADED QUICK MAKE, QUICK BREAK MECHANISM; DEAD FRONT LINE SIDE SHIELD; SOLDERLESS LUGS SUITABLE FOR COPPER OR ALUMINUM CONDUCTORS; SPRING REINFORCED FUSE CLIPS; ELECTRO SILVER PLATED CURRENT CARRYING PARTS; HINGED DOORS; OPERATING LEVER ARRANGED FOR LOCKING IN THE "OPEN" POSITION; ARC QUENCHERS; CAPACITY AND CHARACTERISTICS AS INDICATED.
  2. NON FUSIBLE SWITCHES: FOR EQUIPMENT LESS THAN 1/2 HORSEPOWER, SWITCH SHALL BE HORSEPOWER RATED; TOGGLE SWITCH TYPE WITH THERMAL OVERLOAD QUANTITY OF POLES AND VOLTAGE RATING AS REQUIRED.

PART 2 - EXECUTION

2.1 GENERAL

A. WORKMANSHIP SHALL BE PERFORMED BY LICENSED JOURNEYMEN OR MASTER MECHANICS AND SHALL RESULT IN AN INSTALLATION CONSISTENT WITH THE BEST PRACTICES OF TRADES.

B. INSTALL WORK UNIFORM, LEVEL AND PLUMB, IN RELATIONSHIP TO LINES OF BUILDING. DO NOT INSTALL ANY DIAGONAL OR OTHERWISE IRREGULAR WORK UNLESS SO INDICATED ON DRAWINGS OR APPROVED BY ARCHITECT.

2.2 MANUFACTURER'S DIRECTIONS

A. FOLLOW MANUFACTURERS' DIRECTIONS AND RECOMMENDATIONS IN ALL CASES WHERE THE MANUFACTURERS OF ARTICLES USED ON THIS CONTRACT FURNISH DIRECTIONS COVERING POINTS NOT SHOWN ON THE DRAWINGS OR COVERED IN THESE SPECIFICATIONS.

2.3 INSTALLATION

A. COORDINATE THE WORK BETWEEN THE VARIOUS MECHANICAL SECTIONS AND WITH THE WORK SPECIFIED UNDER OTHER DIVISIONS. IF ANY COOPERATIVE WORK MUST BE ALTERED DUE TO LACK OF PROPER SUPERVISION OR FAILURE TO MAKE PROPER AND TIMELY PROVISIONS, THE ALTERNATIONS SHALL BE MADE TO THE SATISFACTION OF THE ENGINEER AND AT THE CONTRACTOR'S COST. COORDINATE WALL AND CEILING WORK WITH THE GENERAL CONTRACTOR, AND HIS SUBCONTRACTORS IN LOCATING CEILING AIR OUTLETS, WALL REGISTERS, ETC.

B. INSPECT ALL MATERIAL, EQUIPMENT, AND APPARATUS UPON DELIVERY AND DO NOT INSTALL ANY DAMAGED OR DEFECTED MATERIALS

2.4 ELECTRICAL REQUIREMENTS

A. MECHANICAL CONTRACTOR SHALL COORDINATE WITH DIVISION 26 WORK TO PROVIDE COMPLETE SYSTEMS AS REQUIRED TO OPERATE ALL MECHANICAL DEVICES INSTALLED UNDER THIS DIVISION OF WORK.

B. INSTALLATION OF ELECTRICAL CONNECTIONS: FURNISH, INSTALL, AND WIRE (EXCEPT AS MAY BE OTHERWISE INDICATED) ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING AND FIRE PROTECTION, ETC., MOTORS AND CONTROLS IN ACCORDANCE WITH THE FOLLOWING SCHEDULE AND IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND WITH RECOGNIZED INDUSTRY PRACTICES, AND COMPLYING WITH APPLICABLE REQUIREMENTS OF UL, NEC, AND NECA'S "STANDARD OF INSTALLATION" TO ENSURE THAT PRODUCTS FULFILL REQUIREMENTS. CAREFULLY COORDINATE WITH WORK PERFORMED UNDER THE MECHANICAL DIVISION OF THESE SPECIFICATIONS.

C. DIVISION 23 HAS RESPONSIBILITIES FOR ELECTRICALLY POWERED OR CONTROLLED MECHANICAL EQUIPMENT WHICH IS SPECIFIED IN DIVISION 23 SPECIFICATIONS OR SCHEDULED ON DIVISION 23 DRAWINGS. THE SPECIFIC DIVISION OF RESPONSIBILITIES BETWEEN DIVISION 23 AND 26 FOR FURNISHING OR WIRING THIS EQUIPMENT IS AS FOLLOWS:
  1. DIVISION 26 MECHANICAL RESPONSIBILITIES:
    a. MOTORS: FURNISH AND INSTALL ALL MOTORS NECESSARY FOR MECHANICAL EQUIPMENT.
    b. DISCONNECTS: PROVIDE THE DISCONNECTS WHICH ARE PART OF FACTORY WIRED DIVISION 23 EQUIPMENT. FACTORY WIRING TO INCLUDE WIRING BETWEEN MOTOR AND DISCONNECT OR COMBINATION STARTER/DISCONNECT.
    c. CONTROLS: DIVISION 23 CONTRACTOR (INCLUDING THE TEMPERATURE CONTROLS SUBCONTRACTOR) IS RESPONSIBLE FOR THE FOLLOWING EQUIPMENT IN ITS ENTIRETY. THIS EQUIPMENT INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
      1) CONTROL RELAYS NECESSARY FOR CONTROLLING DIVISION 23 EQUIPMENT.
      2) CONTROL TRANSFORMERS NECESSARY FOR PROVIDING POWER TO CONTROLS FOR DIVISION 23 EQUIPMENT.
      3) LINE VOLTAGE THERMOSTATS.
      4) LOW OR NON-LOAD VOLTAGE CONTROL COMPONENTS.
      5) REMOTE BULB THERMOSTATS.
      6) NON-LIFE SAFETY RELATED VALVE OR DAMPER ACTUATORS.
      7) FLOAT SWITCHES.
      8) SOLENOID VALVES, EP AND PE SWITCHES.
      9) REFRIGERATION CONTROLS. (DIVISION 26 PROVIDES POWER TO REFRIGERATION PANELS.)
      10) PNEUMATIC THERMOSTATS
    d. FIRE AND LIFE SAFETY EQUIPMENT:
      1) FIRE/SMOKE DAMPERS: DIVISION 23 IS RESPONSIBLE FOR PROVIDING AND PHYSICALLY INSTALLING THE DAMPER AND FOR INSTALLING ANY REQUIRED CONTROL INTERFACE WIRING TO DIVISION 23 CONTROLS.
        a) WHERE FIRE/SMOKE DAMPERS ARE PART OF AN INTEGRATED SMOKE CONTROL SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING DAMPERS WITH NECESSARY END SWITCHES FOR PROOF OF CLOSURE.
        b) WHERE THESE DAMPERS ARE NOT PART OF AN INTEGRATED AREA WIDE SMOKE DETECTION SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING EACH FIRE/SMOKE DAMPER WITH A DEDICATED DUCT DETECTOR INSTALLED PER THE REQUIREMENTS OF THE BUILDING CODE. IF NOT INTEGRAL WITH THE DAMPER ASSEMBLY, THE DETECTOR IS TO BE INSTALLED BY DIV. 23 BUT WIRED FOR DAMPER CONTROL BY DIV. 26.
      2) FIRE SPRINKLER SYSTEM: DIVISION 23 IS RESPONSIBLE FOR PROVIDING NECESSARY CONTROLS INCLUDING FLOW SWITCHES AND ALARM BELLS.
      3) SPECIALIZED FIRE SUPPRESSION SYSTEMS: DIVISION 23 IS RESPONSIBLE FOR PROVIDING NECESSARY SYSTEM CONTROLS AND ANY REQUIRED CONTROL INTERFACE WIRING TO THESE CONTROLS. DIVISION 26 IS RESPONSIBLE FOR BRINGING POWER TO POINT OF CONNECTION WITH THE SYSTEM.

D. DIVISION 26 HAS RESPONSIBILITIES FOR ELECTRICALLY POWERED OR CONTROLLED MECHANICAL EQUIPMENT WHICH IS SPECIFIED IN DIVISION 23 SPECIFICATIONS OR SCHEDULED ON DIVISION 23 DRAWINGS. THE SPECIFIC DIVISION OF RESPONSIBILITIES BETWEEN DIVISION 23 AND 26 FOR FURNISHING OR WIRING THIS EQUIPMENT IS AS FOLLOWS:
  1. DIVISION 26 ELECTRICAL RESPONSIBILITIES:
  2. MOTORS: PROVIDE THE POWER WIRING FOR THE MOTORS.
  3. DISCONNECTS: PROVIDE ALL DISCONNECTS NECESSARY FOR DIVISION 23 MECHANICAL EQUIPMENT WHICH ARE NOT PROVIDED AS PART OF FACTORY WIRED DIVISION 23 EQUIPMENT. PROVIDE POWER WIRING TO ALL DISCONNECTS. IN ADDITION PROVIDE POWER WIRING BETWEEN MOTOR AND DISCONNECT WHEN THE DISCONNECT IS NOT FACTORY INSTALLED. SEE ALSO VARIABLE FREQUENCY DRIVE ABOVE FOR SPECIAL WIRING REQUIREMENTS.
    a. CONTROLS: DIVISION 26 CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER TO CONTROL PANELS AND CONTROL CIRCUIT OUTLETS.
    b. FIRE AND LIFE SAFETY EQUIPMENT:
      1) FIRE/SMOKE DAMPERS: DIVISION 26 IS RESPONSIBLE FOR POWER WIRING TO THE DAMPER AND AS FOLLOWS:
        a) WHERE THESE DAMPERS ARE PART OF AN INTEGRATED SMOKE CONTROL SYSTEM DIVISION 26 IS RESPONSIBLE FOR PROVIDING THE DETECTORS AND FOR ALL FIRE DETECTION SYSTEM WIRING NECESSARY TO INTEGRATE DAMPERS AND RELATED END SWITCHES INTO THE SYSTEM.
        b) WHERE THESE DAMPERS ARE NOT PART OF AN INTEGRATED AREA WIDE SMOKE DETECTION SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING EACH FIRE/SMOKE DAMPER WITH A DEDICATED DUCT DETECTOR INSTALLED PER THE REQUIREMENTS OF THE BUILDING CODE. (SEE SECTION 15880). IF NOT INTEGRAL WITH THE DAMPER ASSEMBLY, THE DETECTOR IS TO BE INSTALLED BY DIV. 23 BUT WIRED FOR DAMPER CONTROL BY DIV. 26.
      2) FIRE SPRINKLER SYSTEM: DIVISION 26 IS RESPONSIBLE FOR PROVIDING POWER WIRING TO FIRE PROTECTION CONTROLS INCLUDING FLOW SWITCHES AND ALARM BELLS.
      3) SPECIALIZED FIRE SUPPRESSION SYSTEMS: DIVISION 26 IS RESPONSIBLE FOR PROVIDING POWER WIRING TO SUPPRESSION SYSTEM AND ITS CONTROLS.
  4. COORDINATE WITH OTHER WORK, INCLUDING WIRES/CABLES, RACEWAY AND EQUIPMENT INSTALLATION, AS NECESSARY TO PROPERLY INTERFACE INSTALLATION OF ELECTRICAL CONNECTIONS FOR EQUIPMENT WITH OTHER WORK.
  5. CONNECT ELECTRICAL POWER SUPPLY CONDUCTORS TO EQUIPMENT CONDUCTORS IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND WIRING DIAGRAMS. MATE AND MATCH CONDUCTORS OF ELECTRICAL CONNECTIONS FOR PROPER INTERFACE BETWEEN ELECTRICAL POWER SUPPLIES AND INSTALLED EQUIPMENT.
  6. MAINTAIN EXISTING ELECTRICAL SERVICE AND FEEDERS TO OCCUPIED AREAS AND OPERATIONAL FACILITIES, UNLESS OTHERWISE INDICATED, OR WHEN AUTHORIZED OTHERWISE IN WRITING BY OWNER, OR ARCHITECT/ENGINEER. PROVIDE TEMPORARY SERVICE DURING INTERRUPTIONS TO EXISTING FACILITIES. WHEN NECESSARY, SCHEDULE MOMENTARY OUTAGES FOR REPLACING EXISTING WIRING SYSTEMS WITH NEW WIRING SYSTEMS. WHEN THAT "CUTTING-OVER" HAS BEEN SUCCESSFULLY ACCOMPLISHED, REMOVE, RELOCATE, OR ABANDON EXISTING WIRING AS INDICATED.
  7. COVER SPLICES WITH ELECTRICAL INSULATING MATERIAL EQUIVALENT TO, OR OF GREATER INSULATION RESISTIVITY RATING, THAN ELECTRICAL INSULATION RATING OF THOSE CONDUCTORS BEING SPLICED.
  8. PREPARE CABLES AND WIRES, BY CUTTING AND STRIPPING COVERING ARMOR, JACKET, AND INSULATION PROPERLY TO ENSURE UNIFORM AND NEAT APPEARANCE WHERE CABLES AND WIRES ARE TERMINATED. EXERCISE CARE TO AVOID CUTTING THROUGH TAPES WHICH WILL REMAIN ON CONDUCTORS. ALSO AVOID "RINGING" COPPER CONDUCTORS WHILE SKINNING WIRE.

E. MOTORS AND MOTOR CONTROL EQUIPMENT: CONFORM TO THE STANDARDS OF THE NEMA. EQUIP MOTORS WITH MAGNETIC OR MANUAL LINE STARTERS WITH OVERLOAD PROTECTION. MOTOR STARTERS AND LINE VOLTAGE CONTROLS SHALL BE INSTALLED UNDER ELECTRICAL SECTION BUT LOCATED AND COORDINATED AS REQUIRED UNDER THIS SECTION OF THE WORK. STARTERS SHALL BE COMBINATION TYPE WITH NON_FUSIBLE DISCONNECT SWITCHES. ALL SINGLE PHASE FRACTIONAL HORSEPOWER MOTORS SHALL HAVE BUILT_IN OVERLOAD PROTECTION.

SECTION 230529 - HANGERS AND SUPPORTS

A. PIPE HANGERS, SUPPORTS, AND GUIDES:
  1. GENERAL:
    a. HANGERS AND SUPPORTS TO BE DESIGNED AND INSTALLED PER SMACNA GUIDELINES.
    b. ASSURE ADEQUATE SUPPORT FOR PIPE AND CONTENTS.
    c. PROVIDE RIGID INSULATION SECTION AT ALL HANGER SUPPORTS.
    d. PROVIDE SEISMIC RESTRAINTS TO MEET LOCAL CODES.
    e. PREVENT VIBRATION OR SWAYING.
    f. PROVIDE SLEEVING FOR ALL PIPING THAT PENETRATES FLOOR SLABS.
    g. PROVIDE FOR EXPANSION AND CONTRACTION.
    h. SUPPORTS OF WIRE, ROPE, WOOD, CHAIN, STRAP PERFORATED BAR OR ANY OTHER MAKESHIFT DEVICE NOT PERMITTED.
    i. COMPLY WITH APPLICABLE REQUIREMENTS AT ANSI B31.1.0 AND B31.2 FOR PIPING.
    j. SUPPORT PIPING INDEPENDENTLY SO THAT EQUIPMENT IS NOT STRESSED BY PIPING WEIGHT OF EXPANSION.
    k. HANGERS AND SUPPORTS SHALL HAVE MINIMUM SAFETY FACTOR OF THREE (3), BASED ON ULTIMATE TENSILE OR COMPRESSIVE STRENGTH, AS APPLICABLE, OF MATERIAL USED.
    l. PRIME COAT EXPOSED STEEL HANGERS AND SUPPORTS. HANGERS AND SUPPORTS LOCATED IN CRAWL SPACES, PIPES SHAFTS AND SUSPENDED CEILING SPACES ARE NOT CONSIDERED EXPOSED
  2. HORIZONTAL PIPING, EXCEPT AS NOTED:
    a. ADJUSTABLE CLEVIS TYPE AND ROD: ALL SERVICES AT OR BELOW 250 DEG F.
    b. ROLLERS OR SLIDE BASES:PIPE STAND, BRACKET, TRAPEZE OR OTHER EQUIVALENT STRUCTURAL SUPPORT. ROLLERS NOT REQUIRED WHERE SPRING HANGERS ARE CALLED FOR.
  3. TRAPEZE HANGERS
    a. NOT PERMITTED FOR:FIRE AND SPRINKLER PIPING.
    b. GUIDE INDIVIDUAL PIPES ON TRAPEZES WITH 1/4 INCH U-BOLT OR SUPERSTRUT 702 PIPE CLAMP. INSTALL THERMAL HANGER SHIELD AT EACH SUPPORT POINT.
  4. INSTALL PIPE ISOLATORS BETWEEN HANGERS AND:
    a. UNINSULATED COPPER TUBING.
    b. WHEREVER ANY PIPE REQUIRES SOUND AND VIBRATION ISOLATION.
  5. MISCELLANEOUS STEEL: PROVIDE MISCELLANEOUS STEEL MEMBERS, BEAMS, BRACKETS, ETC., FOR SUPPORT OF WORK IN THIS DIVISION UNLESS SPECIFICALLY INCLUDED IN OTHER DIVISIONS.
  6. PIPE SUPPORT SPACING: PER IMC SECTION 305.

B. DUCT HANGERS AND SUPPORTS
  1. GENERAL.
    a. SUPPORT HORIZONTAL DUCTS WITH HANGERS OF SIZE AND SPACING AS INDICATED IN PERTINENT SMACNA DUCT CONSTRUCTION STANDARDS. SEAL AROUND ALL SCREWS.
    b. PROVIDE SEISMIC CONSTRAINTS TO MEET LOCAL CODES.
  2. HORIZONTAL DUCT SUPPORTS:
    a. INSTALL HANGERS AT EACH CHANGE IN DIRECTION OF DUCT.
    b. STRAP HANGERS:
      2) EXTEND STRAP DOWN BOTH SIDES OF DUCTS.
      3) TURN UNDER BOTTOM ONE INCH MINIMUM.
      4) METAL SCREW HANGERS TO:
        a) BOTTOM OF DUCT.
        b) UPPER AND LOWER SIDES OF DUCTS.
        c) NOT MORE THAN 12 INCHES ON CENTER.
      5) ANGLE HANGERS:
        a) PROVIDE ANGLE HANGERS FORMED BY EXTENDED VERTICAL BRACING ANGLES.
  3. RECTANGULAR DUCT SUPPORT SPACING:
    a. HORIZONTAL DUCTS: 10'
    b. VERTICAL DUCTS: 12'
    c. TRAPEZE DUCTS: 8'
  4. ROUND DUCT SUPPORT SPACING:
    a. HORIZONTAL DUCTS (<40"□ DIAMETER): 10'
    b. VERTICAL DUSTS: 12'
    c. TRAPEZE DUCTS: 8'

C. HVAC EQUIPMENT
  1. GENERAL:
    a. ALL FANS SHALL BE MOUNTED ON SPRING VIBRATION ISOLATORS.
    b. COORDINATE LOCATION OF ALL EQUIPMENT WITH BUILDING OWNER.

D. ATTACHMENT TO STRUCTURE:
  1. STEEL BEAM ANCHORS.
    a. APPROVED BEAM OR CHANNEL CLAMPS.
    b. DO NOT CUT OR WELD TO STRUCTURAL STEEL WITHOUT WRITTEN APPROVAL OF OWNER.
    c. OTHER METHODS AS DETAILED ON DRAWINGS.
  2. STUD WALL SIDE-WALL SUPPORTS:
    a. TOGGLE BOLTS.
    b. STUDS WELDED TO STRUCTURAL STUDS.
    c. LAG SCREWS INTO WOOD BACKING.
    d. OTHER METHODS.
  3. SUPPORT SPREADERS:
    a. INSTALL SPREADERS SPANNING BETWEEN STRUCTURAL MEMBERS WHEN HANGERS FALL BETWEEN THEM, AND HANGER LOAD IS TOO GREAT FOR SLAB OR DECK ATTACHMENT.
    b. SPREADERS MAY BE ONE OF METHODS LISTED BELOW, OR COMBINATION OF BOTH AS REQUIRED.
      1) FABRICATED FROM STRUCTURAL CHANNEL:END FITTINGS BOLTED OR WELDED. SECURE TO STRUCTURAL MEMBERS AS REQUIRED BY CONSTRUCTION AND AS APPROVED BY STRUCTURAL ENGINEER.
      2) FORMED CHANNELS WITH FITTINGS, SIMILAR TO SUPERSTRUT: SUBMIT MANUFACTURER'S CALCULATIONS FOR INSTALLATION.

SECTION 230553 - IDENTIFICATION

A. AN IDENTIFICATION LABEL SHALL BE PROVIDED FOR THE FOLLOWING TYPES OF EQUIPMENT:
  1. ROOF TOP UNITS.
  2. EXHAUST FANS.
  3. MAKEUP AIR UNITS.
  4. SPLIT SYSTEMS.
  5. CONDENSING UNITS.
  6. KITCHEN HOOD AND EXHAUST SYSTEMS.

B. IDENTIFICATION LABELS SHALL BE BY SETON, OR EQUIVALENT. PROVIDE LABELS & FLOW ARROWS ON ALL DUCT AND PIPING. @ 10' INTERVALS.

C. TEMPERATURE CONTROL PANELS SHALL BE IDENTIFIED WITH ENGRAVED PHENOLIC NAMEPLATES AND EACH CONTROL COMPONENT SHALL BE IDENTIFIED WITH ITS SETPOINTS.

D. ALL MECHANICAL EQUIPMENT INSTALLED ABOVE SUSPENDED CEILINGS SHALL BE MARKED ON THE BOTTOM WITH ITS EQUIPMENT NUMBER MATCHING THE EQUIPMENT SCHEDULE AND CONTROL GRAPHICS.

E. ALL LABELING OF EXTERIOR EQUIPMENT SHALL USE ENGRAVED PHENOLIC LABELS.

F. IDENTIFICATION SHALL CONFORM TO ANSI/ASME A13.1 WHERE APPLICABLE.

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

A. GENERAL:
  1. TAB SHALL BE PERFORMED BY NATIONAL TAB, NORTH KANSAS CITY, MO (WILL TURNBOUGH 314-964-6244). NO EXCEPTIONS.
  2. ADJUSTMENT: EACH PIECE OF EQUIPMENT AND ALL OF THE SYSTEMS SHALL BE ADJUSTED TO INSURE PROPER FUNCTIONING OF ALL CONTROLS, AND SHALL BE LEFT IN OPERATING CONDITION. CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE EXISTING MOTOR SHEAVES AND FAN BELTS AS REQUIRED.
  3. PRELIMINARY OPERATION: THE OWNER RESERVES THE RIGHT TO OPERATE ANY SYSTEMS OR EQUIPMENT PRIOR TO FINAL COMPLETION AND ACCEPTANCE OF THE WORK. SUCH PRELIMINARY OPERATION SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY WORK.

B. AIR DISTRIBUTION SYSTEMS:
  1. BALANCE AND ADJUST AIR DISTRIBUTION SYSTEM TO QUANTITIES INDICATED ON DRAWINGS IN ACCORDANCE WITH ASSOCIATED AIR BALANCE COUNCIL (AABC) MANUAL, LATEST EDITION.
  2. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED INDEPENDENT FIRM SPECIALIZING IN TESTING AND BALANCING. FIRM SHALL BE AN APPROVED TAB CONTRACTOR. TEST REPORTS SHALL BE SUBMITTED IN BOUND FOLDERS AND ON AABC TYPE REPORT FORMS. ALL AIR INLET/OUTLET SHALL BE IDENTIFIED BY DESIGNATIONS ON DRAWINGS.
  3. ALL TESTING DATA SHALL BE PROVIDED IN A MICROSOFT EXCEL COMPATIBLE FORMAT.
  4. DIFFUSER AIR DELIVERY SHALL NOT BE LESS THAN NOR EXCEED BY MORE THAN 10% THE AIR DELIVERY INDICATED ON THE PLAN.
  5. VOLUME DAMPERS IN AIR INLETS/OUTLETS SHALL BE USED ONLY FOR MINOR ADJUSTMENT (LESS THAN 10% OF SPECIFIED CFM WHEN AVAILABLE.)
  6. CONTRACTOR SHALL PROVIDE MANUAL VOLUME DAMPERS IN DUCTS AS REQUIRED.
  7. UPON COMPLETION OF THE INSTALLATION, CONTRACTOR SHALL REBALANCE ANY AIR DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION, INCLUDING TERMINAL AIR UNITS AND AIR OUTLETS.

C. ADDITIONAL NOTES:
  1. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
  2. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
  3. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT.
  4. OWNER TO BE PROVIDED WITH BALANCING REPORT.

SECTION 230700 - HVAC INSULATION

A. MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET. KNAUF ECO FRIENDLY OR JOHNS MANVILLE (FORMALDEHYDE FREE).

B. CLOSED CELL PIPE INSULATION: ASTM C 534 TYPE I. AEROFLEX OR ARMACELL.

C. INSULATING CEMENTS: MINERAL-FIBER, HYDRAULIC-SETTING INSULATING AND FINISHING CEMENT: COMPLY WITH ASTM C 449/C 449M.

D. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A. USE ADHESIVE THAT HAS A VOC CONTENT OF 80 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

E. FSK AND PVDC JACKET ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A FOR BONDING INSULATION JACKET LAP SEAMS AND JOINTS.

F. FSK AND METAL JACKET FLASHING SEALANTS:
  1. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES.
  2. FIRE- AND WATER-RESISTANT, FLEXIBLE, ELASTOMERIC SEALANT.
  3. SERVICE TEMPERATURE RANGE: MINUS 40 TO PLUS 250 DEG F.
  4. COLOR: ALUMINUM.
  5. FOR INDOOR APPLICATIONS, USE SEALANTS THAT HAVE A VOC CONTENT OF 250 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

G. FACTORY APPLIED FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

H. FIELD APPLIED ALUMINUM JACKET: ALUMINUM ROLL-STOCK WITH 3-MIL MOISTURE BARRIER; COMPLYING WITH ASTM C1729. PROVIDE FACTORY-FABRICATED COVERS FOR FITTINGS.

I. TYPE OF INSULATION
  1. DUCT INSULATION: MINERAL-FIBER BLANKET INSULATION. R-6 VALUE. PROVIDE WEATHERPROOF JACKET ON OUTDOOR DUCT. EXTERNALLY INSULATE ALL DUCT WHEN CONCEALED ABOVE CEILING SPACES.
  2. PIPING: PROVIDE THICKNESS PER IMC TABLE 403.2.10
    a. CONDENSATE: CLOSED-CELL TYPE.
    b. REFRIGERANT PIPING: CLOSED-CELL PIPE INSULATION. PROVIDE WEATHERPROOF JACKET ON OUTDOOR PIPING.

J. ADDITIONAL PIPING INSULATION REQUIREMENTS
  1. ALL REFRIGERANT COPPER LINES MUST BE FREE OF EXTRANEOUS CHEMICALS SUCH AS CORROSIVE CLEANERS OR BUILDING MATERIALS' DUST PRIOR TO THE INSTALLATION OF THE INSULATION. THE INSULATION MUST BE CLEAN AND DRY PRIOR TO INSTALLATION.
  2. REFRIGERANT PIPE SHALL BE SEALED WHILE SLIPPING ON INSULATION TO PREVENT FOREIGN MATTER FROM ENTERING THE TUBE.

SECTION 230800 - COMMISSIONING

A. MECHANICAL CONTRACTOR SHALL ALLOCATE ADEQUATE TIME IN THEIR PROPOSAL TO ASSIST IN ALL COMMISSIONING ACTIVITIES AS PRESCRIBED. CONSULT WITH THE GENERAL CONTRACTOR TO DETERMINE THE SPECIFIC COMMISSIONING SCOPE OF WORK.

B. COMMISSIONING WILL BE PERFORMED FOR THE FOLLOWING SYSTEMS:
  1. AIR HANDLING EQUIPMENT INCLUDING PACKAGED EQUIPMENT AND EXHAUST FANS.
  2. SPLIT SYSTEMS.
  3. KITCHEN HOOD, EXHAUST, AND MAKEUP AIR SYSTEMS.
  4. CONTROLS.

SECTION 232300 - REFRIGERANT PIPING

A. COPPER PIPE AND FITTINGS
  1. COPPER TYPE: ASTM B 280, TYPE L (STRAIGHT LENGH) ACR.
  2. WROUGHT-COPPER FITTINGS: ASME B16.22.
  3. WROUGHT-COPPER UNIONS: ASME B16.22.
  4. BRAZING FILLER METALS: AWS A5.8.

B. PIPE JOINT CONSTRUCTION
  1. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," CHAPTER "PIPE AND TUBE."

C. HANGERS AND SUPPORTS
  1. PIPING HANGERS AND SUPPORTS MUST ACCOMMODATE EXPANSION AND CONTRACTION, VIBRATION, DEAD LOAD OF PIPING AND ITS CONTENTS, AND SEISMIC-BRACING REQUIREMENTS.

D. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
  1. NPS 1/2: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
  2. NPS 5/8: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
  3. NPS 1: MAXIMUM SPAN, 72 INCHES; MINIMUM ROD SIZE, 1/4 INCH.

E. SUPPORT MULTI-FLOOR VERTICAL RUNS AT LEAST AT EACH FLOOR.

SECTION 233113 - METAL DUCTS

A. GENERAL: ALL SAFING, DUCTS, DAMPERS, ACCESS DOORS, JOINTS, HANGERS, STIFFENERS, FIRE DAMPERS AND FIRE RETARDING MATERIALS, IN ACCORDANCE WITH REQUIREMENTS OF SMACNA, "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION, AND ALL OTHER AUTHORITIES HAVING JURISDICTION AND AS DESCRIBED HEREIN. ALL SHEET METAL WORK SHALL HAVE A PRESSURE CLASSIFICATION AS FOLLOWS:
  1. SUPPLY DUCT BETWEEN MAIN LOOP AND INLET TO TERMINAL AIR UNIT - 4 INCHES W.G.
  2. SUPPLY DUCTS DOWNSTREAM OF TERMINAL AIR UNITS, AIR HANDLING UNITS AND FANS -2 INCHES W.G.
  3. RETURN AND EXHAUST AIR DUCTS - 2 INCHES W.G.

B. DUCTWORK: UNLESS OTHERWISE SPECIFIED.
  1. COLD ROLLED "COMMERCIAL" QUALITY HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM NO. A653. G90.
  2. DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
  3. FITTINGS: SAME GAUGE AND CONSTRUCTION AS DUCTS. ELBOWS SHALL HAVE CENTERLINE RADIUS NOT LESS THAN 1.5 TIMES WIDTH.
  4. DUCT SUPPORTS AS REQUIRED.
  5. DUCTS WITH TRANSVERSE AND LONGITUDINAL BRACINGS IN ACCORDANCE WITH SMACNA.
  6. DUCTWORK SHALL BE SEALED. JOINTS AND SEAMS SHALL COMPLY WITH SECTION603.9 OF THE IMC.

C. KITCHEN COOKING HOOD AND GREASE EXHAUST.
  1. TYPE I GREASE HOOD EXHAUST DUCTWORK OF MINIMUM 16 GAUGE COLD ROLLED STEEL, OR 18 GA. STAINLESS STEEL WITH LIQUID TIGHT WELDS OR AS NOTED ON PLANS ZERO CLEARANCE U.L. LISTED PREFABRICATED ROUND GREASE DUCT, WITH ACCESS PANELS FOR GREASE CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES.
  2. SLOPE DUCT BACK TOWARDS HOOD AT MINIMUM OF 1/4" PER LINEAL FOOT MAINTAINING 18" CLEARANCE TO COMBUSTIBLE MATERIALS WHERE REQUIRED.
  3. INSTALL GREASE DUCTS IN AN APPROVED FIRE-RATED ENCLOSURE SEPARATED FROM THE EXHAUST DUCT BY A MINIMUM OF 6" AND MAXIMUM 12" VENTILATED ENCLOSURE TO THE OUTSIDE AIR IF REQUIRED BY CODE.
  4. AS AN OPTION, IF APPROVED BY LOCAL CODES, PROVIDE AN APPROVED WRAP SYSTEM IN LIEU OF THE RATED DUCT ENCLOSURE SYSTEM. DUCT WRAP SYSTEM SHALL MEET UL REQUIREMENTS FOR GREASE DUCT ENCLOSURES.

SECTION 233300 - AIR DUCT ACCESSORIES

A. ACCESS DOORS:
  1. FURNISH ACCESS DOOR OF SUFFICIENT SIZE AS REQUIRED, FOR ACCESS, INSPECTION, MAINTENANCE, AND REPLACEMENT TO ALL INSTRUMENTS, CONTROLS AND EQUIPMENT.

B. DAMPERS:
  1. FURNISH ALL DAMPERS WITH LOCKING MECHANISM NECESSARY FOR PROPER CONTROL AND BALANCING OF AIR DISTRIBUTION AS FOLLOWS:
    a. ALL DUCTS WHICH SPLIT IN 2 OR MORE BRANCHES TO SERVE SUPPLY DIFFUSERS.
    b. AT EACH SUPPLY AND RETURN BRANCH DUCT, AS FAR AWAY FROM EACH OUTLET AND INLET AS POSSIBLE.
    c. ADJUSTABLE AND ACCESSIBLE.
    d. ADDITIONALLY AS INDICATED.

C. FIRE/SMOKE DAMPERS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH NFPA STANDARD 90A AND UL STANDARD 555 AND SHALL BE SO LABELED WITH A PERMANENT IDENTIFICATION. FIRE/SMOKE DAMPER SHALL BE LEAKAGE CLASS II, RATED FOR DYNAMIC USE, 165 DEG. FUSIBLE LINK, PROVIDED WITH FACTORY ELECTRIC ACTUATOR AND FACTORY INSTALLED AND PREWIRED DUCT MOUNTED SMOKE DETECTOR & REMOTE CEILING MTD. LED ANUNCIATOR. FIRE/SMOKE DAMPERS SHALL BE CSFM LISTED FOR BOTH FIRE AND SMOKE. RUSKIN OR APPROVED EQUAL.

D. TURNING VANES: GALVANIZED STEEL, DOUBLE THICKNESS TURNING VANES WITH 2 IN. INSIDE RADIUS FOR ALL SQUARE ELBOWS, UNLESS OTHERWISE NOTED.

E. DUCT MTD. SMOKE DETECTORS SHALL BE "SYSTEM SENSOR" DH400 OR EQUIVALENT. PROVIDE SHEET METAL COVER FOR EXTERNALLY MOUNTED DETECTORS.

F. MOTORIZED DAMPERS SHALL BE 'RUSKIN' CD-50 LOW LEAKAGE TYPE WITH ACTUATORS BY 'BELIMO' UNLESS OTHERWISE NOTED

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

A. ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE OF TYPE AND CAPACITY AS INDICATED ON DRAWINGS. STEEL AND/OR EXTRUDED ALUMINUM CONSTRUCTION WITH BAKED ENAMEL FINISH COLOR AS SELECTED BY ARCHITECT. DIFFUSERS TO HAVE NO VISIBLE SCREW HEADS OR CONNECTORS. RETURN GRILLES AND EXHAUST REGISTERS SIMILAR TO SUPPLY.

B. BALANCING DAMPERS SHALL BE PROVIDED IN THE BRANCH DUCT AS FAR AS POSSIBLE FROM ALL SUPPLY AND RETURN AIR DEVICES. THESE SHALL BE ADJUSTABLE AND ACCESSIBLE.

C. OUTLETS FURNISHED SHALL PROVIDE FOR THE REQUIRED CAPACITY WITH NO APPARENT DRAFTS OR EXCESSIVE AIR MOVEMENT. OUTLETS WHICH CAUSE EXCESSIVE AIR MOVEMENT OR DRAFTS SHALL BE REPLACED AT NO COST TO THE OWNER.

D. SEE PLANS AND SCHEDULES FOR DIFFUSER TYPES AND MFR.

E. THE NOISE LEVEL PRODUCED SHALL COMPLY WITH ALL REQUIREMENTS OF THE ACOUSTICAL SPECIFICATION STATED HEREIN. A REPRESENTATIVE SAMPLE SHALL BE TESTED IN ACCORDANCE WITH THE PROCEDURE SPECIFIED HEREIN IN ORDER TO DEMONSTRATE SUCH COMPLIANCE. ALL MEASUREMENTS SHALL BE MADE IN ACCORDANCE WITH AIR DIFFUSION COUNCIL TEST CODE NO. 1062R3, AND ASHRAE STANDARD 36-72. TEST CONDITIONS SHALL BE IN ACCORDANCE WITH THE APPLICABLE STANDARDS. THE TEST RESULTS SHALL BE CERTIFIED BY THE TESTING AGENCY AND SUBMITTED FOR APPROVAL. THE TEST REPORT SHALL INCLUDE A COMPLETE DESCRIPTION OF THE TEST CONDITIONS, MEASUREMENT PROCEDURE AND SAMPLE CALCULATION.

F. THE SOUND POWER LEVEL (PWL RE 10-12 WATTS) OF EACH TYPE AND SIZE OF DIFFUSER SPECIFIED SHALL NOT EXCEED THE VALUES AS SCHEDULED ON DRAWINGS.

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RON S. CHIN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
MECHANICAL SPECIFICATIONS

Scale
NTS

M603

PACKAGED GAS/ELECTRIC DOAS UNIT SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	AREA SERVED	SUPPLY FAN			OSA (CFM)	RETURN AIR CFM	COOLING						GAS HEATING					HEAT PUMP			ELECTRICAL				REF.	WT. (LBS)	REMARKS
					SUPPLY CFM	E.S.P. (IN. WG.)	HP			NOM. TOTAL (TONS)	CAP. TOTAL (MBH)	CAP. SENSIBLE (MBH)	EAT (F) (DB/WB)	LAT (F) (DB/WB)	IEER	INPUT (MBH)	OUTPUT (MBH)	EAT (F)	LAT (F)	THERMAL EFF.	EAT (F)	LAT (F)	COP	V	PH	MCA	MOCP			
DOAS	1	CAPTIVEAIRE	CASRTU2-I.150-18-8T	FOH	2,265	1.0	2	660	1,605	8	64.7	61.9	79.6/63/5	53.3/53.5	20.2	93.9	76.0	31	65	81.0%	65	92	5.9	230	3	36.1	40A	R-410A	1,998	1, 2, 3, 4, 5, 7, 8
DOAS	2	CAPTIVEAIRE	CASRTU3-I.300-24-20T	BOH	4,700	1.0	5	2,125	2,575	20	179.0	171.5	84.5/63.7	49.8/49.7	18.2	254.8	206.4	31	63.8	81.0%	63.8	96	5.4	230	3	89.4	100A	R-410A	2,807	1, 2, 3, 4, 6, 7, 8

NOTES:

1. PROVIDE WITH CASLINK BUILDING MONITORING SYSTEM FOR FUTURE CONNECTION.
2. PROVIDE WITH INLET AND MANIFOLD PRESSURE GAUGES.
3. PROVIDE WITH SMOKE DETECTOR FOR AUTOMATIC SHUT-DOWN OF UNIT UPON SMOKE DETECTION.
4. PROVIDE WITH FAN VFD.
5. PROVIDE WITH DRY BULB ECONOMIZER WITH BAROMETRIC RELIEF.
6. PROVIDE WITH POWER EXHAUST/DRY BULB ECONOMIZER. PROVIDE WITH ECONOMIZER FDD.
7. PROVIDE WITH INSULATED PLENUM CURB. SA/RA OPENINGS SHALL BE FIELD CUT. COORDINATE CURB SA/RA OPENINGS REQUIREMENT WITH MANUFACTURER INSTALLATION MANUAL.
8. SEE M802 & M803 FOR FIELD WIRING.

EXHAUST FAN SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	AREA SERVED	SUPPLY FAN							ELECTRICAL				WT. (LBS.)	REMARKS
					CFM	ESP	TYPE	DRIVE	RPM	BHP	HP	V	PH	HZ	FLA		
EF	1	GREENHECK	USF-6-UB	RESTROOMS	300	0.25	UTLITY SET	BELT	935	-	1/4	230	1	60	3.63	175	1, 2, 3,4
KEF	1	CAPTIVEAIRE	DU85HFA	KITCHEN HOOD	1371	1.0	UPBLAST	DIRECT	1242	0.34	1.0	230	1	60	6.5	139	5, 6, 7
KEF	2	CAPTIVEAIRE	DU85HFA	KITCHEN HOOD	1371	1.0	UPBLAST	DIRECT	1242	0.34	1.0	230	1	60	6.5	139	5, 6, 7

NOTES:

1. PROVIDE WITH WEATHERHOOD.
2. PROVIDE WITH BACKDRAFT DAMPER, GRAVITY OPERATED.
3. EF-1 TO BE INTERLOCK WITH RTU-2.
4. MOTOR MUST BE CAPABLE OF ACCEPTING 230V/1PH OR 208V/1PH.
5. PROVIDE WITH FACTORY CURB, GREASE BOX, ECM WIRING PACKAGE, AND FAN BASE CERAMIC SEAL.
6. PROVIDE WITH UL762 LISTING.
7. PROVIDE ROOFTOP GREASE GUARD. MANUFACTURER SHALL BE "ROOFTOP SOLUTIONS".

AIR CURTAIN SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	AREA SERVED	CFM	VELOCITY	HP	ELECTRICAL				WT. (LBS)	REMARKS
								V	PH	FLA	MOCP		
AC	1	MARS	LPV236-OB	DELIVERY DOOR	900	1800	1/6	120	1	2.4	-	32	1, 2

NOTES:

1. PROVIDE WITH WALL MOUNTING BRACKET.
2. AIR CURTAIN TO BE CONTROLLED BY DOOR SWITCH.

KITCHEN EXHAUST HOOD SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	LENGTH	EXHAUST COLLAR				HOOD CONSTRUCTION	FIRE SYSTEM	FIRE SYSTEM PIPING	WT. (LBS)	REMARKS
					CFM	LENGTH	WIDTH	ESP					
KEH	1	CAPTIVEAIRE	5430 ND-2	7'-10"	1,371	13"	10"	-0.51	430 SS	TANK FS	YES	476	1
KEH	2	CAPTIVEAIRE	5430 ND-2	7'-10"	1,371	13"	10"	-0.51	430 SS	TANK FS	YES	476	1

NOTES:

1. SEE M804-M809 FOR ADDITIONAL REQUIREMENTS AND FIELD WIRING.

DUCT SIZING CHART

MARK NO.	SIZE (IN)
210	6X6 OR 6"
215 TO 380	6X6 OR 6"
381 TO 610	8X8 OR 10"
610 TO 910	10X10 OR 12"
911 TO 1300	12X12 OR 14"
1301 TO 1790	14X14 OR 16"
1791 TO 2000	14X14 OR 16"

FOR COMMERCIAL EXHAUST DUCT AIR VELOCITY SHALL SHALL NOT BE LESS THAN 500 FPM AND NOT EXCEED 2,500 FPM.

DUCT SIZING CHART

MARK NO.	SIZE (IN)
210	10X6 OR 8"
215 TO 380	14X6 OR 10"
381 TO 610	16X8 OR 12"
610 TO 910	20X8 OR 14"
911 TO 1300	24X10 OR 16"
1301 TO 1790	30X10 OR 18"
1791 TO 2000	30X12 OR 20"

FOR LOW VELOCITY SUPPLY AND RETURN DUCT

AIR DISTRIBUTION SCHEDULE

MARK NO.	MANUFACTURE MODEL NUMBER	MODULE SIZE	NECK SIZE	CFM RANGE	MAX NC LEVEL	REMARKS
CD-1	PRICE PDS	24"x24"	6"	60-100	30	NOTE 1,2,3
	PRICE PDS	24"x24"	8"	101-200	30	NOTE 1,2,3
	PRICE PDS	24"x24"	10"	201-375	30	NOTE 1,2,3
	PRICE PDS	24"x24"	12"	376-500	30	NOTE 1,2,3
	PRICE PDS	24"x24"	14"	501-750	30	NOTE 1,2,3
CD-2	PRICE PDS	12"x12"	8"	101-200	30	NOTE 1,2,3
CR-1	PRICE PDR	24"x24"	6"	60-100	30	NOTE 1,3
	PRICE PDR	24"x24"	8"	101-200	30	NOTE 1,3
	PRICE PDR	24"x24"	10"	201-375	30	NOTE 1,3
	PRICE PDR	24"x24"	12"	376-500	30	NOTE 1,3
	PRICE PDR	24"x24"	14"	501-750	30	NOTE 1,3
EG-1	PRICE PDR	12"x12"	8"	101-200	30	NOTE 1,3
RG-1	PRICE 530	26"x16"	SEE PLAN	SEE PLAN	30	NOTE 1

NOTES:

1. FURNISH WITH OFF-WHITE BAKED ENAMEL FINISH UON. COORDINATE EXACT FINISHES WITH ARCH.
2. PROVIDE OPTIONAL INSULATION ON SUPPLY DIFFUSERS. OMIT INSULATION ON RETURN DIFFUSERS.
3. PROVIDE LAY IN TYPE 24x24 BORDER, OTHERWISE COORDINATE BORDER TYPE WITH ARCH. PRIOR TO ORDERING.

CEILING CASSETTE INDOOR UNIT HEAT PUMP SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	CFM	ESP	COOLING CAPACITY (BTUH)	HEATING CAPACITY (BTUH)	ELECTRICAL					PIPING		WT. (LBS.)	REMARKS
								V	PH	HZ	MCA	MOCP	RL	RG		
FC	1	CARRIER	40MBCQ18	420	-	16,000	18,000	POWERED BY THE OUTDOOR UNIT					1/4"	1/2"	44	1

NOTES:

1. PROVIDE WITH WIRED REMOTE CONTROLLER KSACN0501AAA.

OUTDOOR UNIT HEAT PUMP SCHEDULE

ITEM	ITEM NO.	LOCATION	SERVICE	MANUFACTURER / MODEL NUMBER	TYPE	AMBIENT DB (°F)	EER	SEER	HSPF/ COP	REFR.	ELECTRICAL					WT. (LBS.)	REMARKS
											MCA	MOCP	V	PH	HZ		
CU	1	ROOF	FC-1	CARRIER 38MARBQ18AA3	SPLIT SYSTEM	95	12.5	20.0	10.3/2.8	R-410A	16	25	230	1	60	100	1, 2

NOTES:

1. PROVIDE WITH ELASTOMERIC ISOLATION PADS.
2. PROVIDE WITH STANDARD WARRANTY.

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RON S. CHUN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name

SHAKE SHACK - MONTGOMERY VILLAGE

Project Number

SHK-22-007

Description

MECHANICAL SCHEDULES

Scale

NTS

M701

DOAS/RTU FAN SCHEDULE - JOB#5868948

FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL CFM	WEIGHT (LBS)	ESP	ELECTRICAL INFORMATION HP	PHASE	VOLT	MCA	MOCP	COOLING INFORMATION OUTSIDE AIR DB	OUTSIDE AIR WB	MIXED AIR DB	MIXED AIR WB	LEAVING AIR DB	LEAVING AIR WB	LEAVING AIR DP	CAPACITY TOTAL	CAPACITY SENS.	IEER	ISMRE	REHEAT INFORMATION DISCHARGE DB	DISCHARGE WB	CAPACITY DESIRED	CAPACITY MAX	MOISTURE REMOVAL RATE	GAS HEAT INFORMATION GAS TYPE	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	HEAT PUMP INFORMATION ENTERING TEMP	MAX TEMP RISE	DISCHARGE TEMP	COP	NOTES
																DB	WB	DB	WB	DB	WB	DP	TOTAL	SENS.			DB	WB	DESIRED	MAX	RATE	TYPE									
1	DOAS-1 (FDH)	1	CASRTU2-1.150-18-8T	CAPTIVEAIRE	18MF-2-RTU	1605	660	2265	1862	1.000	2.00	3	230	36.1A	40A	95.0°F	67.0°F	80.5°F	63.4°F	53.8°F	53.4°F	53.2°F	64.1 MBH	64.1 MBH	20.2	9.8	75.0°F	61.7°F	53.5 MBH	60 MBH	0 LBS/HR	NATURAL	93919	76074	31°F	7 IN. W.C. - 14 IN. W.C.	65.0°F	27.0°F	92.0°F	5.9	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
2	DOAS-2 (BDH)	1	CASRTU3-1.300-24-20T	CAPTIVEAIRE	24MF-3-RTU	1830	2600	4430	2683	1.000	5.00	3	230	89.4A	100A	95.0°F	67.0°F	86.2°F	63.7°F	48.5°F	48.5°F	48.6°F	180.8 MBH	174.8 MBH	18.2	6.0	68.0°F	58.4°F	97.1 MBH	129.6 MBH	5.4 LBS/HR	NATURAL	242167	196155	40°F	7 IN. W.C. - 14 IN. W.C.	60.2°F	33.0°F	93.0°F	5.4	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17

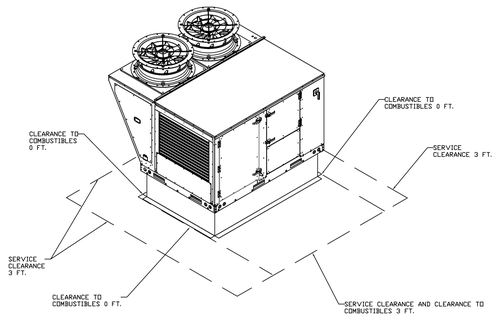
NOTES:
1. INVERTER SCROLL COMPRESSOR WITH INTEGRATED OIL SENSOR. DIGITAL OR STAGED SCROLL NOT AN APPROVED EQUAL
2. DIRECT DRIVE PLENUM BLOWER. BELT DRIVEN BLOWERS ARE NOT ACCEPTABLE
3. INTEGRATED MONITORING VIA CELLULAR CONNECTION BY MANUFACTURER
4. REFRIGERATION PRESSURE MONITORING ON HIGH AND LOW PRESSURE SIDE OF SYSTEM INCLUDED THROUGH DIGITAL INTERFACE
5. EC MOTOR CONDENSING FANS
6. ELECTRONIC EXPANSION VALVE. TXV NOT ACCEPTABLE
7. SUCTION LINE ACCUMULATOR
8. FACTORY COMMISSIONING WITH 5 YEAR PARTS WARRANTY, 25 YEAR WARRANTY ON STAINLESS STEEL HEAT EXCHANGER
9. AVERAGING INTAKE, EVAP AND DISCHARGE TEMPERATURE SENSORS (DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT)
10. 2" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-13 INSULATION+MINIMUM 20GA EXTERIOR W/ 14GA BASE
11. 81% EFFICIENT FURNACE, WITH MODULATING INDUCER TO MAINTAIN CONSTANT COMBUSTION EFFICIENCY ACROSS FIRING RANGE. 6:1 TURNDOWN WITH NG AND 5:1 TURNDOWN WITH LP
12. SUPPLY CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE
13. FULLY MODULATING HOT GAS REHEAT
14. HAIL GUARD FOR CONDENSING COIL
15. RTU ECONOMIZER WITH FIXED DRY BULB CONTROL
16. DOWN DISCHARGE/DOWN RETURN
17. BAROMETRIC RELIEF DAMPER

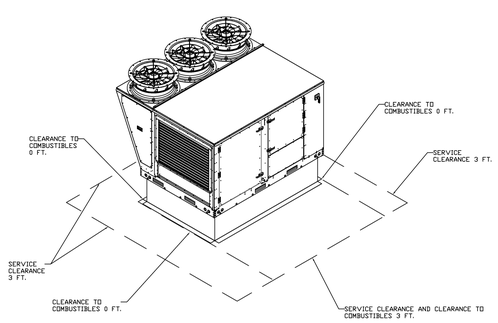
FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	DOAS-1 (FDH)	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE
		1	RTU TOTAL CFM MONITORING
		1	SHIP LOOSE GAS STRAINER 3/4"
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED
		1	2" MERV 13 FILTERS FOR RTU2 (QTY. 4)
		1	2" MERV 8 FILTERS FOR RTU2 (QTY. 4)
		1	OVERHEAT STAT
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE
		1	REMOTE TEMPERATURE AND HUMIDITY SPACE SENSOR
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	OCCUPIED SCHEDULING
		1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI
		1	RTU2 CONVENIENCE OUTLET (GFCI), 15 AMP - REQUIRES SEPARATE 120V CONNECTION. INCLUDES RECEPTACLE, COVER AND J-BOX
		1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI
		1	VAV PACKAGE W/ MANUAL/DDC CONTROL (571 VFD INCLUDED)
		1	8 TON MODULATING COOLING OPTION WITH HEAT PUMP, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	8 TON MODULATING REHEAT OPTION WITH HEAT PUMP - SPACE DEWPOINT CONTROL
		1	RTU2 DOWN DISCHARGE
		1	RTU ECONOMIZER - FIXED DRY BULB CONTROL
		1	RTU2 HAIL GUARD
		1	RTU2 DOWN RETURN
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS)
2	DOAS-2 (BDH)	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE
		1	SHIP LOOSE GAS STRAINER 1"
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED
		1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4)
		1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4)
		1	OVERHEAT STAT
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE
		1	REMOTE TEMPERATURE AND HUMIDITY SPACE SENSOR
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	OCCUPIED SCHEDULING
		1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI
		1	RTU3 CONVENIENCE OUTLET (GFCI), 15 AMP - REQUIRES SEPARATE 120V CONNECTION. INCLUDES RECEPTACLE, COVER AND J-BOX
		1	20 TON MODULATING COOLING OPTION WITH HEAT PUMP, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	20 TON MODULATING REHEAT OPTION WITH HEAT PUMP - SPACE DEWPOINT CONTROL
		1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI
		1	VAV PACKAGE W/ MANUAL/DDC CONTROL (571 VFD INCLUDED)
		1	RTU3 HAIL GUARD
		1	RTU3 DOWN RETURN
		1	POWERED EXHAUST FOR RTU3 - MANUAL CONTROL
		1	RTU3 ECONOMIZER BAROMETRIC RELIEF
		1	RTU3 DOWN DISCHARGE
		1	LOAD REACTOR MOUNTED IN FAN
		1	RTU ECONOMIZER - FIXED DRY BULB CONTROL
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS)

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	DOAS-1 (FDH)	146 LBS	CURB	49.500"W X 75.000"L X 30.000"H ALONG WIDTH, RIGHT INSULATED.
2	# 2	DOAS-2 (BDH)	172 LBS	CURB	59.500"W X 91.000"L X 30.000"H ALONG WIDTH, RIGHT INSULATED.





REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

CAPTIVEAIRE
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com
www.captiveaire.com

Shake Shack - 1491-Montgomery Village (HVAC)-R2
SANTA ROSA, CA, 95405

DATE: 4/10/2023

DWG.#: 5868948

DRAWN BY: joe.shilba

SCALE: 1/2" = 1'-0"

MASTER DRAWING

SHEET NO. 1

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHIN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

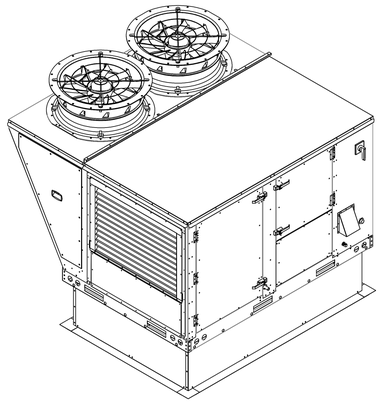
Project Number
SHK-22-007

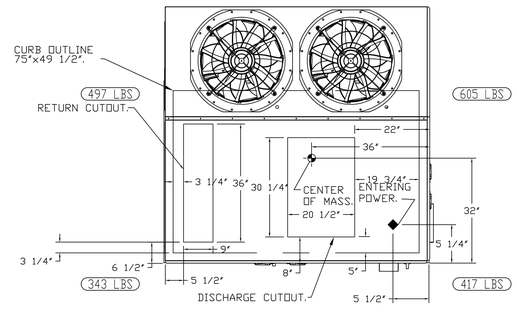
Description
CAPTIVEAIRE DRAWINGS

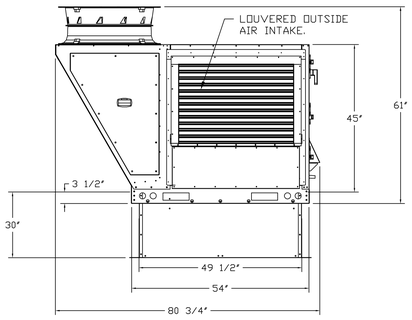
Scale
NTS

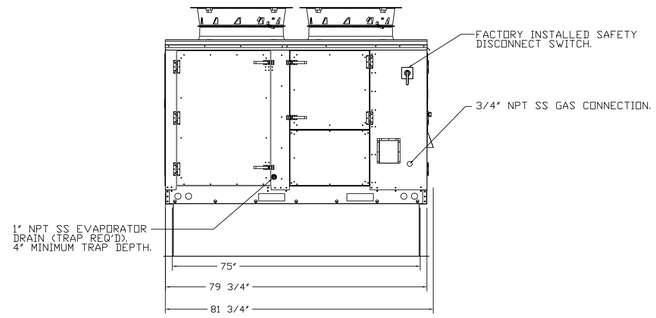
M801

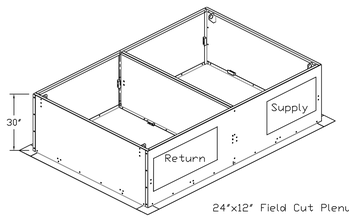
8/25/2023 10:25:34 AM BIM 360://005.4326.600 - Shake Shack - Montgomery Village/005.4326 - SS-1491 - Montgomery Village_M21.rvt



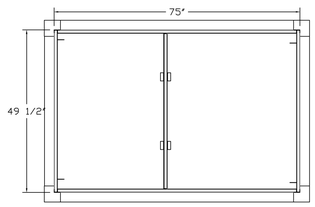


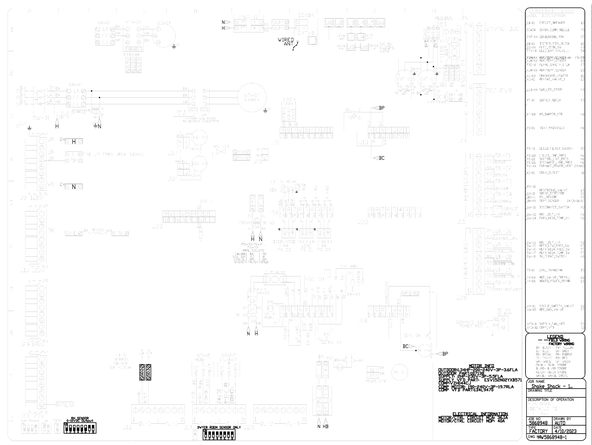


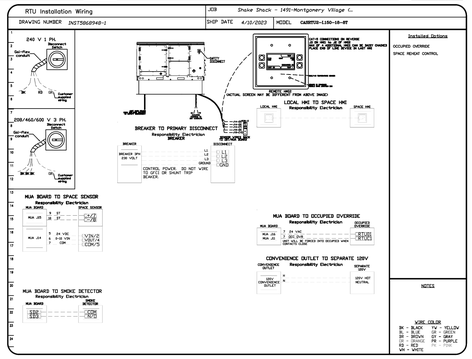




24"x12" Field Cut Plenums







FAN #1 CASRTU2-I.150-18MF-8T - HEATER (DOAS-1 (FOH))

NOTES:

1. DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
2. ( ) DENOTES CORNER WEIGHT.
3. ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

CAPTIVEAIRE

Eastern PA Mechanical

PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com

www.captiveaire.com

Shake Shack - 1491-Montgomery Village (HVAC)-R2

SANTA ROSA, CA, 95405

DATE: 4/10/2023

DWG.#: 5868948

DRAWN BY: joe.shliba

SCALE: 1/2" = 1'-0"

MASTER DRAWING

SHEET NO. 2

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHAN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name

SHAKE SHACK - MONTGOMERY VILLAGE

Project Number

SHK-22-007

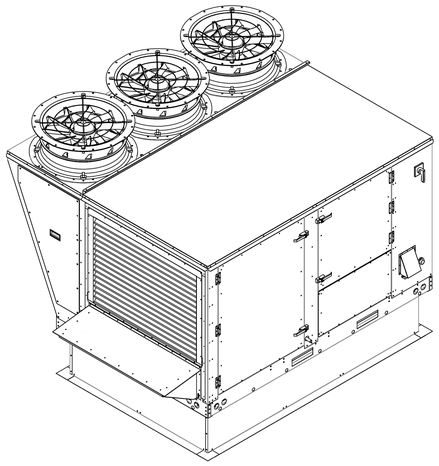
Description

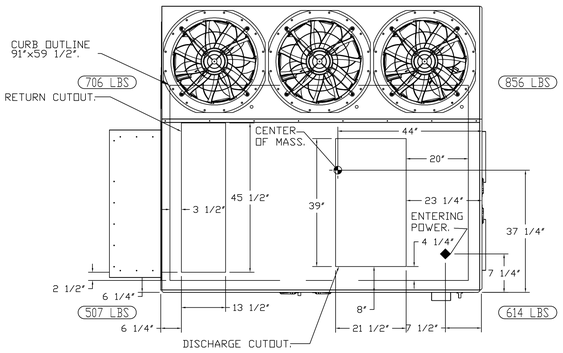
CAPTIVEAIRE DRAWINGS

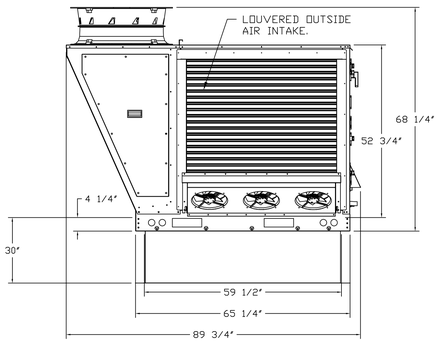
Scale

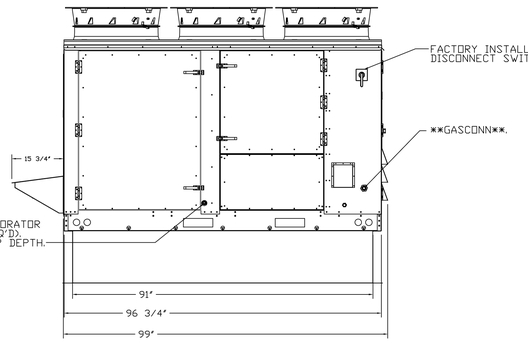
NTS

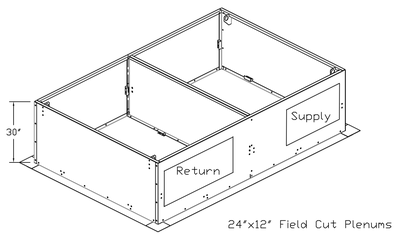
M802



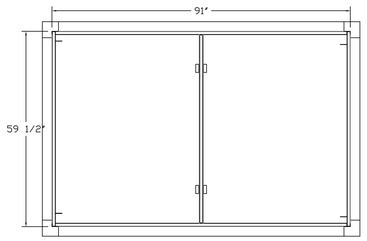


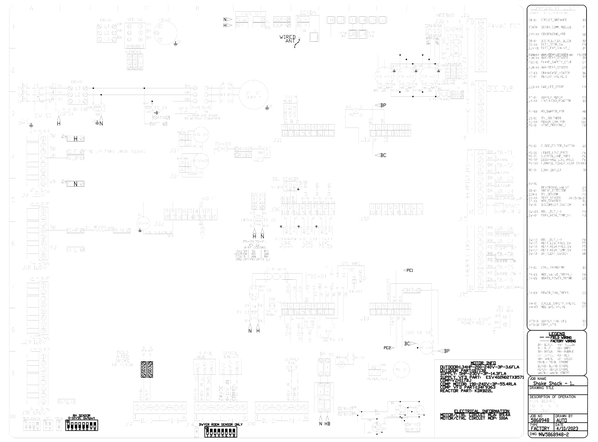


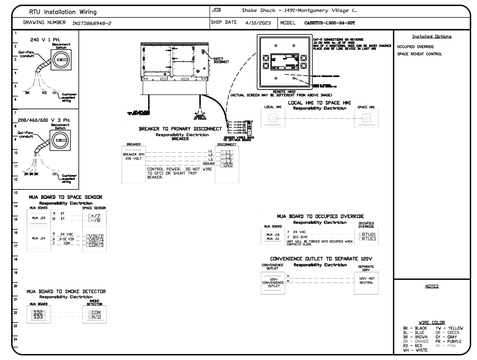




24"x12" Field Cut Plenums







FAN #2 CASRTU3-L300-24MF-20T - HEATER (DOAS-2 (BOH))

NOTES:

1. DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
2. ( ) DENOTES CORNER WEIGHT.
3. ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

REVISIONS

	DESCRIPTION	DATE
△		
△		
△		
△		

CAPTIVEAIRE

Eastern PA Mechanical

PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com

www.captiveaire.com

Shake Shack - 1491-Montgomery Village (HVAC-R2

SANTA ROSA, CA, 95405

DATE: 4/10/2023

DWG.#: 5868948

DRAWN BY: Joe.shilba

SCALE: 1/2" = 1'-0"

MASTER DRAWING

SHEET NO. 3

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
PEAN S. OH-IN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

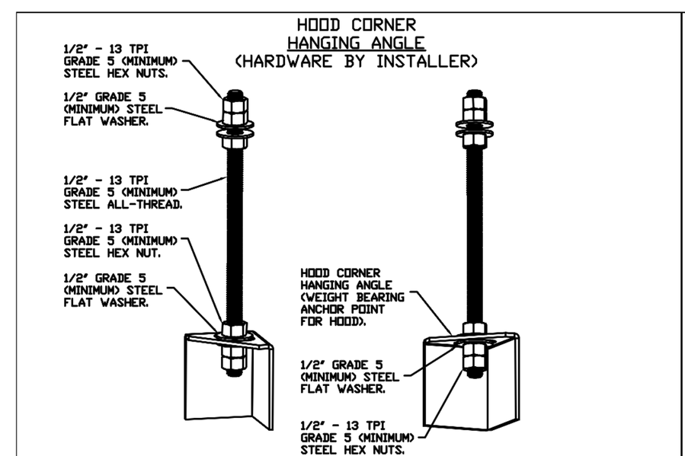
Project Number
SHK-22-007

Description
CAPTIVEAIRE DRAWINGS

Scale
NTS

M803

8/25/2023 10:25:41 AM BIM 360://005-4326.000 - Shake Shack - Montgomery Village/005-4326 - SS 1491 - Montgomery Village_M21.rvt



HANGING ANGLE DETAILS

HOOD STYLE / MODEL	450 DEGREES cfm/ft.	600 DEGREES cfm/ft.	700 DEGREES cfm/ft.
CANOPY ND-2	150	200	250
CANOPY ND-2 W/ END PANELS	105	140	175
SLOPED SND-2	228	294	–
ISLAND ND-2WI	269	300	350
ISLAND ND-2I	346	422	475

ETL HOOD LISTING DETAIL

EXHAUST CFM = LENGTH OF HOOD X CFM/LIN.FT. (LOAD)

SUPPLY CFM = EXHAUST CFM X PERCENTAGE REQUIRED

$$\text{TOTAL DUCT AREA (sq. in.)} = 144 \times \frac{\text{CFM}}{\text{FPM}(*)}$$

$$\text{DUCT LENGTH} = \frac{\text{TOTAL DUCT AREA}}{\text{DUCT WIDTH}}$$

*CAPTIVEAIRE VENTILATOR DUCT SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 1000 FPM.

CALCULATIONS UTILIZED

CAPTIVE-AIRE HOODS BUILT IN COMPLIANCE WITH:

LISTED #3054804-001 & #3054804-002

STANDARD 710

BUILT IN ACCORDANCE WITH NFPA No. 96

Listed under ETL File number 3054804-001/002

BUILDING CODES

CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" INSULATED STANDOFF

CLEARANCE TO COMBUSTIBLES

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVEAIRE HOOD PER MECHANICAL CONTRACTOR'S PLANS.
5. COOKING EQUIPMENT TO SHUT OFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHT FIXTURES SHOWN INSTALLED BY CAPTIVEAIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES ARE BY ELECTRICAL CONTRACTOR.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SEISMIC RESTRAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED REPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

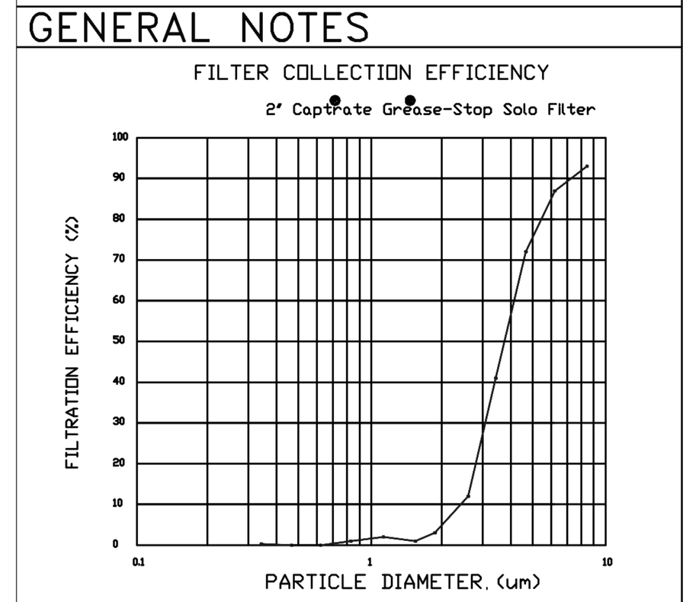
BALANCE

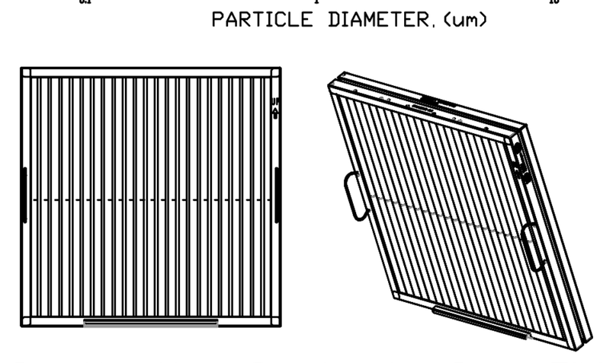
11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

ADDITIONAL

14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

GENERAL NOTES





CaptiveAire Captrate Solo Filter
ETL Listed Grease Extracting Filters
Made From 430 Stainless Steel

FILTER DETAIL

FOR QUESTIONS, CALL THE
Eastern PA Mechanical
REGION 108
PHONE: (267) 504-4126
EMAIL: reg108@captiveaire.com

HOOD INFORMATION – JOB#6119232

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM – RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	HOOD CONSTRUCTION	HOOD CONFIG END TO END	ROW
1	LEFT	5430 ND-2	CAPTIVEAIRE	7' 10"	600 DEG	I	HEAVY	175	1371	10"	13"	4"		1371	1519	-0.515"	430 SS WHERE EXPOSED	LEFT	ALONE
2	RIGHT	5430 ND-2	CAPTIVEAIRE	7' 10"	600 DEG	I	HEAVY	175	1371	10"	13"	4"		1371	1519	-0.515"	430 SS WHERE EXPOSED	RIGHT	ALONE

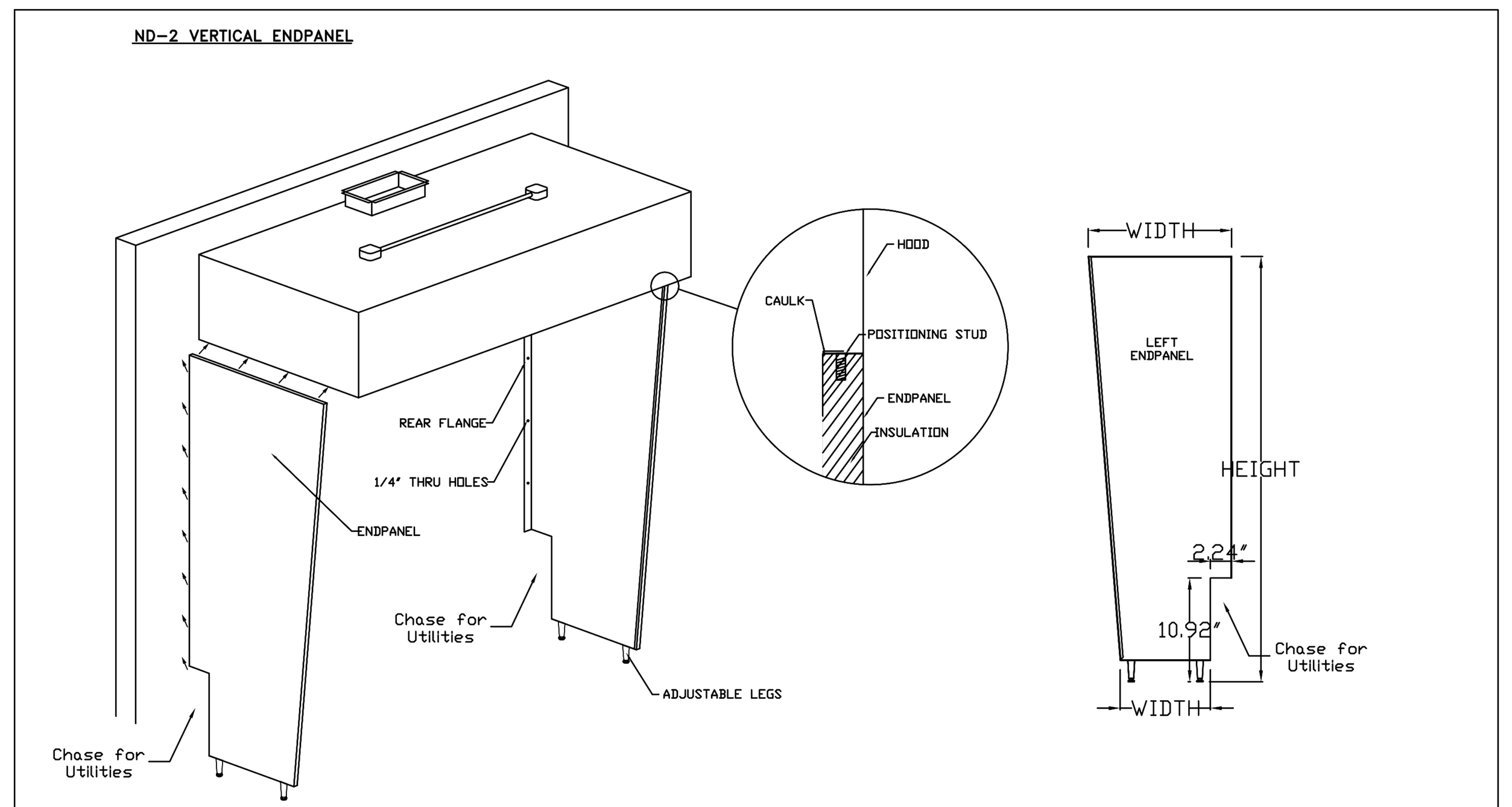
HOOD INFORMATION

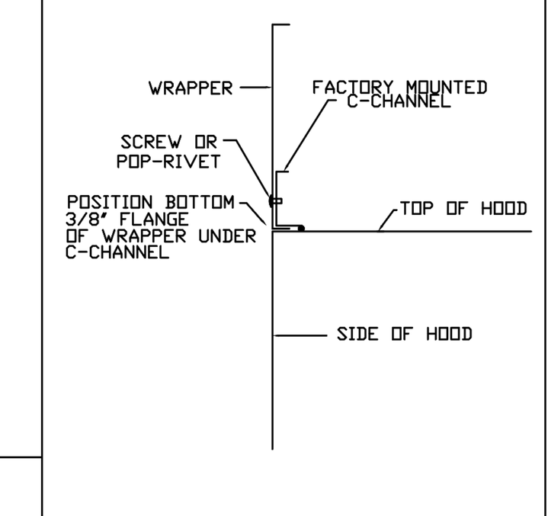
HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	UTILITY CABINET(S) LOCATION	SIZE	FIRE SYSTEM TYPE	FIRE SYSTEM SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	LEFT	CAPTRATE SOLO FILTER	5	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO							YES	457 LBS
2	RIGHT	CAPTRATE SOLO FILTER	5	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	RIGHT	12"x54"x30"	TANK FS	4.0/4.0/4.0	SC-220110MA	1 LIGHT 1 FAN	YES	881 LBS

HOOD OPTIONS

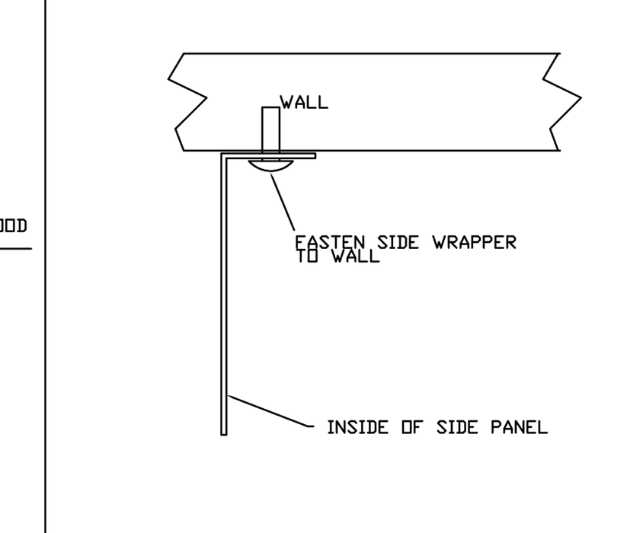
HOOD NO	TAG	OPTION
1	LEFT	FIELD WRAPPER 6.00" HIGH FRONT, LEFT.
		INSULATION FOR BACK OF HOOD.
		RISER SENSOR INSTALL 6IN PLEN.
		LEFT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.
2	RIGHT	FIELD WRAPPER 6.00" HIGH FRONT, RIGHT.
		INSULATION FOR BACK OF HOOD.
		RISER SENSOR INSTALL 6IN PLEN.
		RIGHT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.

ND-2 VERTICAL ENDPANEL

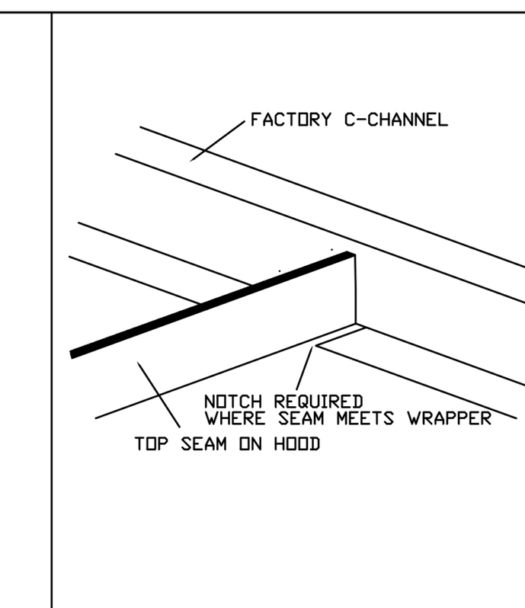




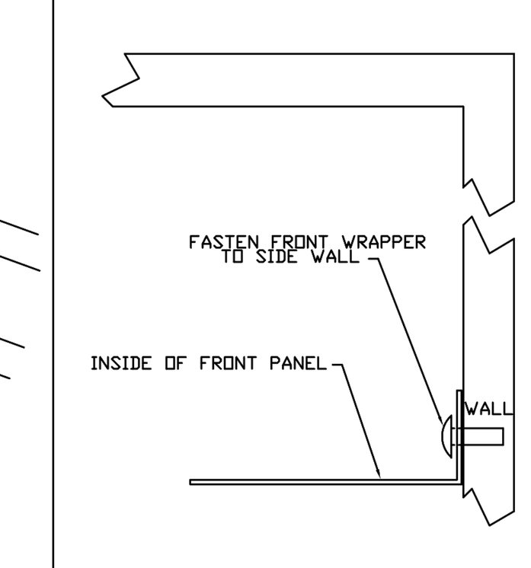
WRAPPER DETAIL



REAR WALL ATTACHMENT

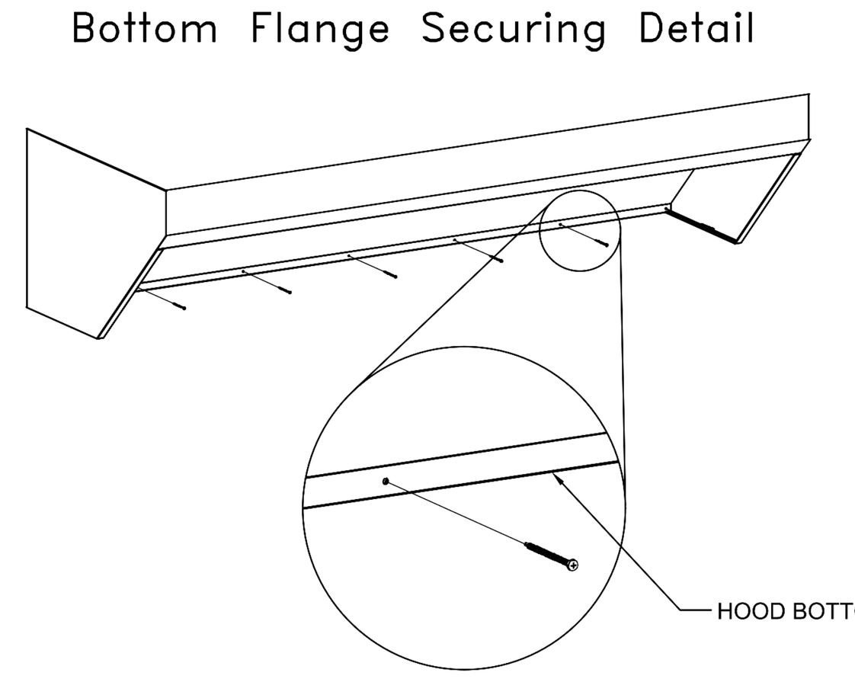


TOP HOOD SEAM DETAIL



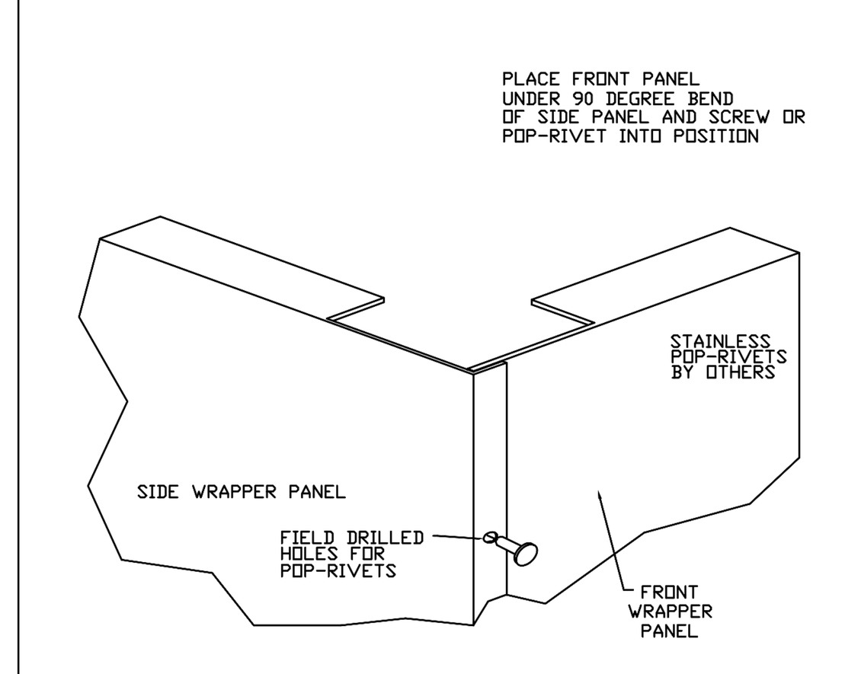
SIDE WALL ATTACHMENT

Bottom Flange Securing Detail

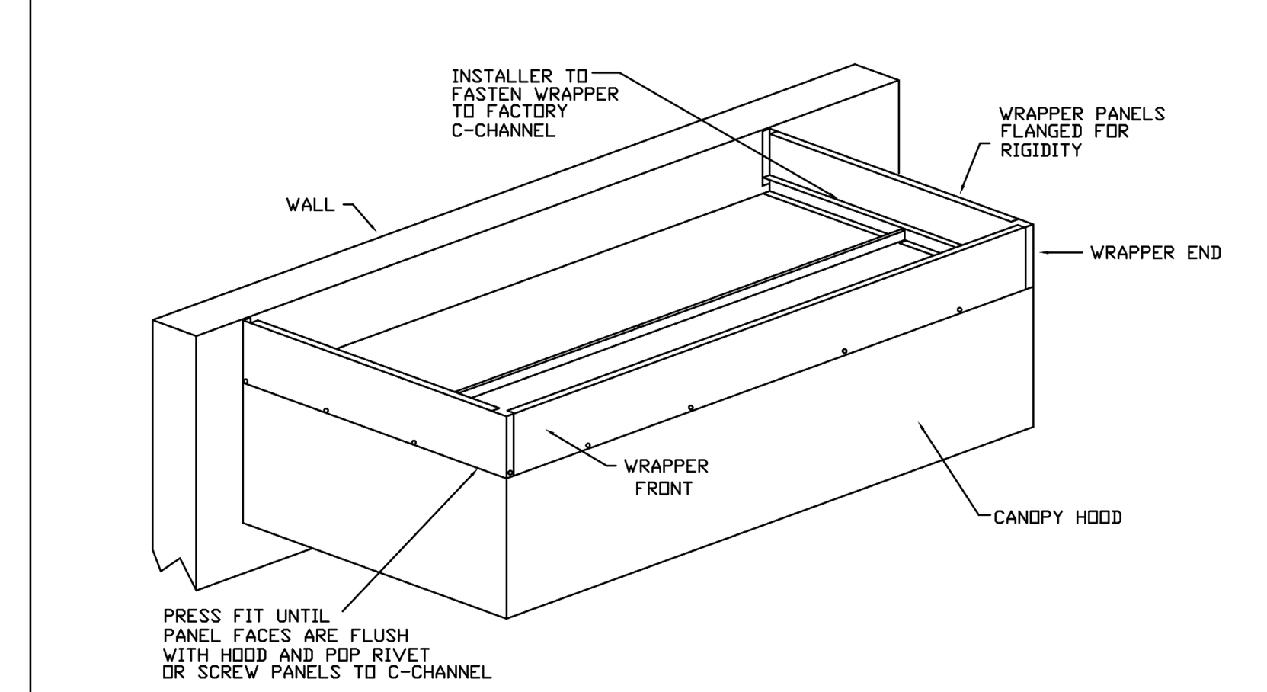


Secure the bottom of the hood to the rear wall using 1404 Evergreen Quik-Fastener. Use a minimum of 1 fastener every 16"on the bottom flange. For walls with metal studs, use a minimum of 1 fastener on the bottom flange at each stud

Only Use SIL-BOND RTV 4500 silicone sealent on hood



FRONT CORNER ASSEMBLY



COMPLETED WRAPPER ASSEMBLY

REVISIONS DESCRIPTION	DATE:
△	
△	
△	
△	

CAPTIVEAIRE
www.captiveaire.com
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1
SANTA ROSA, CA, 95405

DATE: 7/20/2023
DWG.#: 6119232
DRAWN BY: joe.shiiba
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO. 1

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

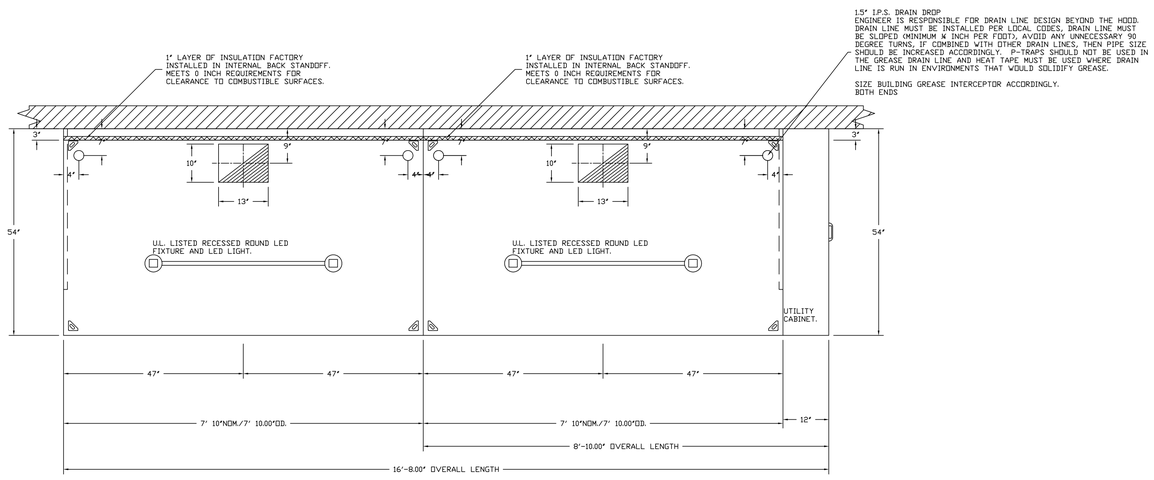
Project Number
SHK-22-007

Description
CAPTIVEAIRE DRAWINGS

Scale
NTS

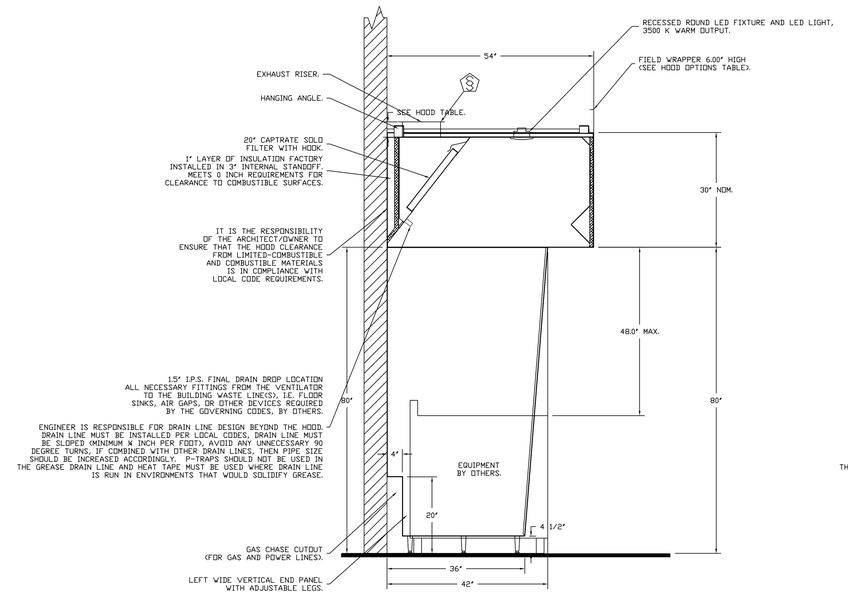
M804

8/25/2023 10:25:44 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

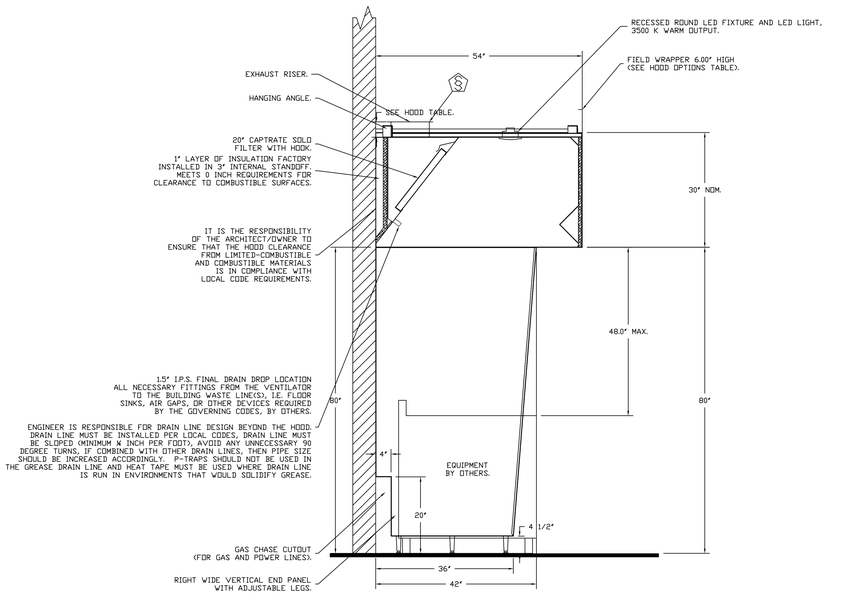


PLAN VIEW – HOOD #1 (LEFT)
7' 10.00" LONG 5430ND-2

PLAN VIEW – HOOD #2 (RIGHT)
7' 10.00" LONG 5430ND-2



SECTION VIEW – MODEL 5430ND-2
HOOD – #1 (LEFT)



SECTION VIEW – MODEL 5430ND-2
HOOD – #2 (RIGHT)

REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

CAPTIVEAIRE

PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com www.captiveaire.com

Eastern PA Mechanical

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1
SANTA ROSA, CA, 95405

DATE: 7/20/2023

DWG.#: 6119232

DRAWN BY: joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 2

8/25/2023 10:25:47 AM BIM 360://005-4326.000- Shake Shack - Montgomery Village/005-4326- SS 1491 - Montgomery Village_M21.rvt

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER RON S. CHIN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
CAPTIVEAIRE DRAWINGS

Scale
NTS

M805

FIRE SYSTEM INFORMATION – JOB#6119232

FIRE SYSTEM NO	TAG	TYPE	SIZE	FLOW POINTS	INSTALLATION	
					SYSTEM	LOCATION ON HOOD
1		TANK FS	4.0/4.0/4.0	46	FIRE CABINET RIGHT	RIGHT, HOOD 2

GAS VALVE(S)

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1		SC ELECTRICAL	2.000	CAPTIVEAIRE SYSTEMS

NOTES
- FIELD PIPE DROPS AS SHOWN
  PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 2 60IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS FIRE SYSTEM COMPLIES WITH U.L. 300 REQUIREMENTS.

- OL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

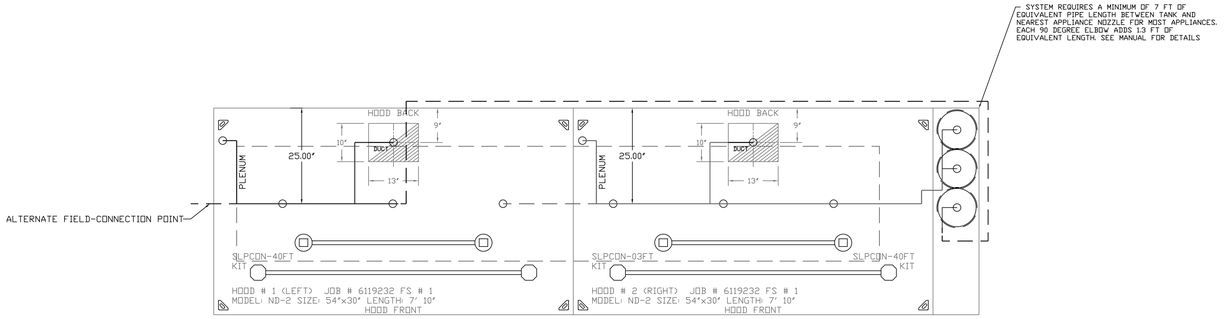
JOB #: 6119232.
JOB NAME: SHAKE SHACK -1491 - MONTGOMERY VILLAGE(KITCHEN)-R1.

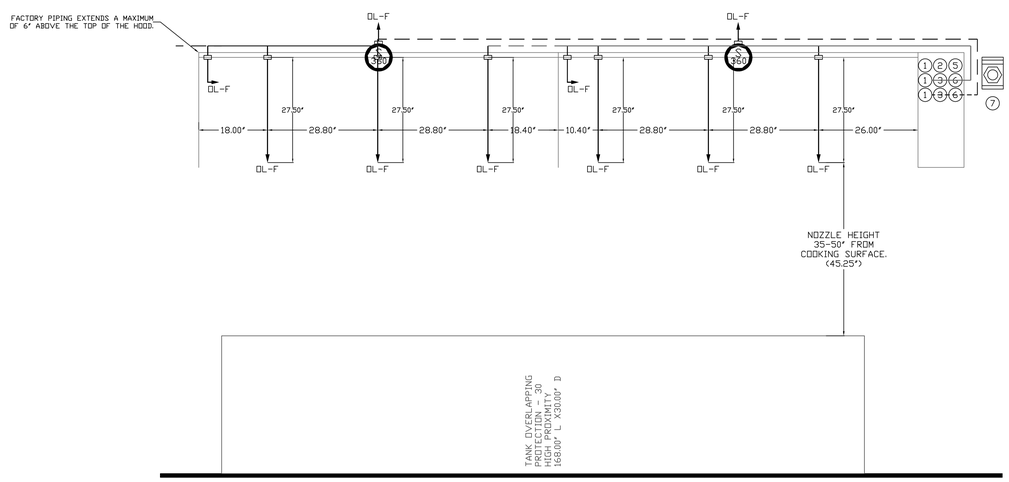
SYSTEM SIZE: TANK-SP-3 TOTAL FP REQUIRED: 46.
HOOD # 1 7' 10.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 2 7' 10.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".
HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.





REVISIONS

	DESCRIPTION	DATE:
△		
△		
△		
△		

CAPTIVEAIRE
www.captiveaire.com
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1
SANTA ROSA, CA, 95405

DATE: 7/20/2023
DWG.#: 6119232
DRAWN BY: Joe.shilloa
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 3

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
REZA S. CHEN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE
Project Number
SHK-22-007
Description
CAPTIVEAIRE DRAWINGS
Scale
NTS

M806

8/25/2023 10:25:52 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

EXHAUST FAN INFORMATION – JOB#6119232

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	KEF-1 (LEFT)	1	DUB5HFA	CAPTIVEAIRE	1371	1.000	1242	TEAO-ECM	1.000	0.3440	1	230	6.5	434 FPM	98	9.6
2	KEF-2 (RIGHT)	1	DUB5HFA	CAPTIVEAIRE	1371	1.000	1242	TEAO-ECM	1.000	0.3440	1	230	6.5	434 FPM	98	9.6

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	KEF-1 (LEFT)	1	GREASE BOX
		1	FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS
		1	ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION
		1	2 YEAR PARTS WARRANTY
2	KEF-2 (RIGHT)	1	GREASE BOX
		1	FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS
		1	ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION
		1	2 YEAR PARTS WARRANTY

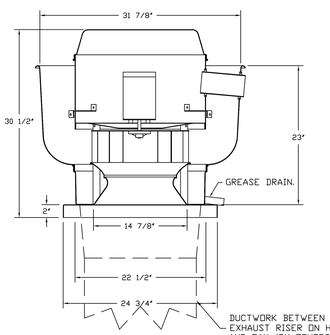
FAN ACCESSORIES

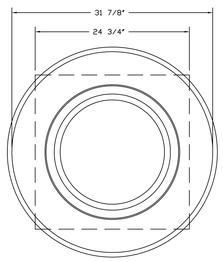
FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	KEF-1 (LEFT)	YES						
2	KEF-2 (RIGHT)	YES						

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF-1 (LEFT)	32 LBS	CURB	23.000"W X 23.000"L X 20.000"H.
2	# 2	KEF-2 (RIGHT)	32 LBS	CURB	23.000"W X 23.000"L X 20.000"H.

FANS #1 (KEF-1 (LEFT)), #2 (KEF-2 (RIGHT)) - DUB5HFA EXHAUST FAN





TOP VIEW

FEATURES:

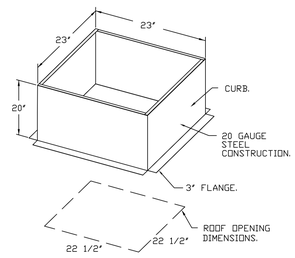
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

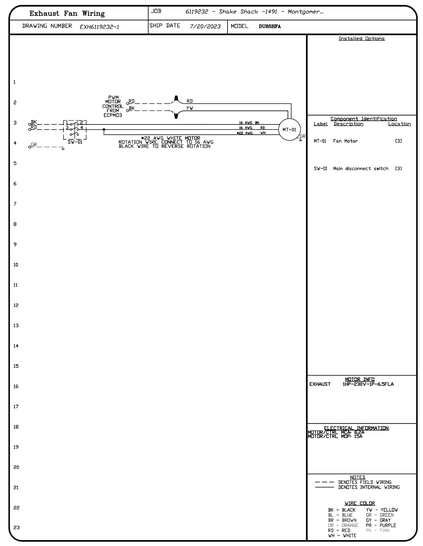
NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

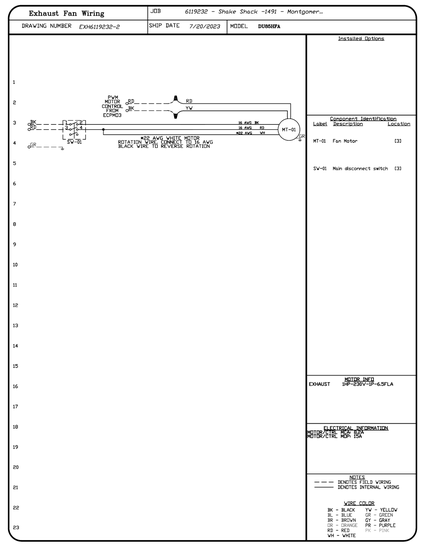
ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS

- GREASE BOX.
- FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS.
- ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
- 2 YEAR PARTS WARRANTY.







REVISIONS

	DESCRIPTION	DATE:
1		
2		
3		
4		

CAPTIVEAIRE
www.captiveaire.com
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1
SANTA ROSA, CA, 95405

DATE: 7/20/2023

DWG.#: 6119232

DRAWN BY: joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 4

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
Foodservice Equipment, Supplies and Design
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△	Date	Description
	08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
REN S. CHIN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
CAPTIVEAIRE DRAWINGS

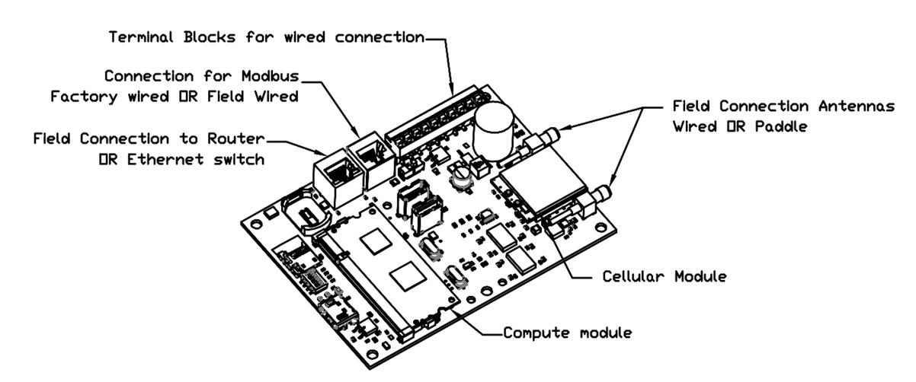
Scale
NTS

M807

8/25/2023 10:25:55 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS-1491 - Montgomery Village_M21.rvt

ELECTRICAL PACKAGE – JOB#6119232

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED					
				LOCATION	QUANTITY		FAN TAG	TYPE	ϕ	HP	VOLT	FLA
1		SC-220110MA	UTILITY CABINET RIGHT	UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS THERMOSTATIC CONTROL W/ RELAY ON/OFF WITH SUPPLY	KEF-1 (LEFT)	EXHAUST	1	1.000	230	6.5
				HOOD # 2	1 FAN		KEF-2 (RIGHT)	EXHAUST	1	1.000	230	6.5



CASlink Monitor and Control

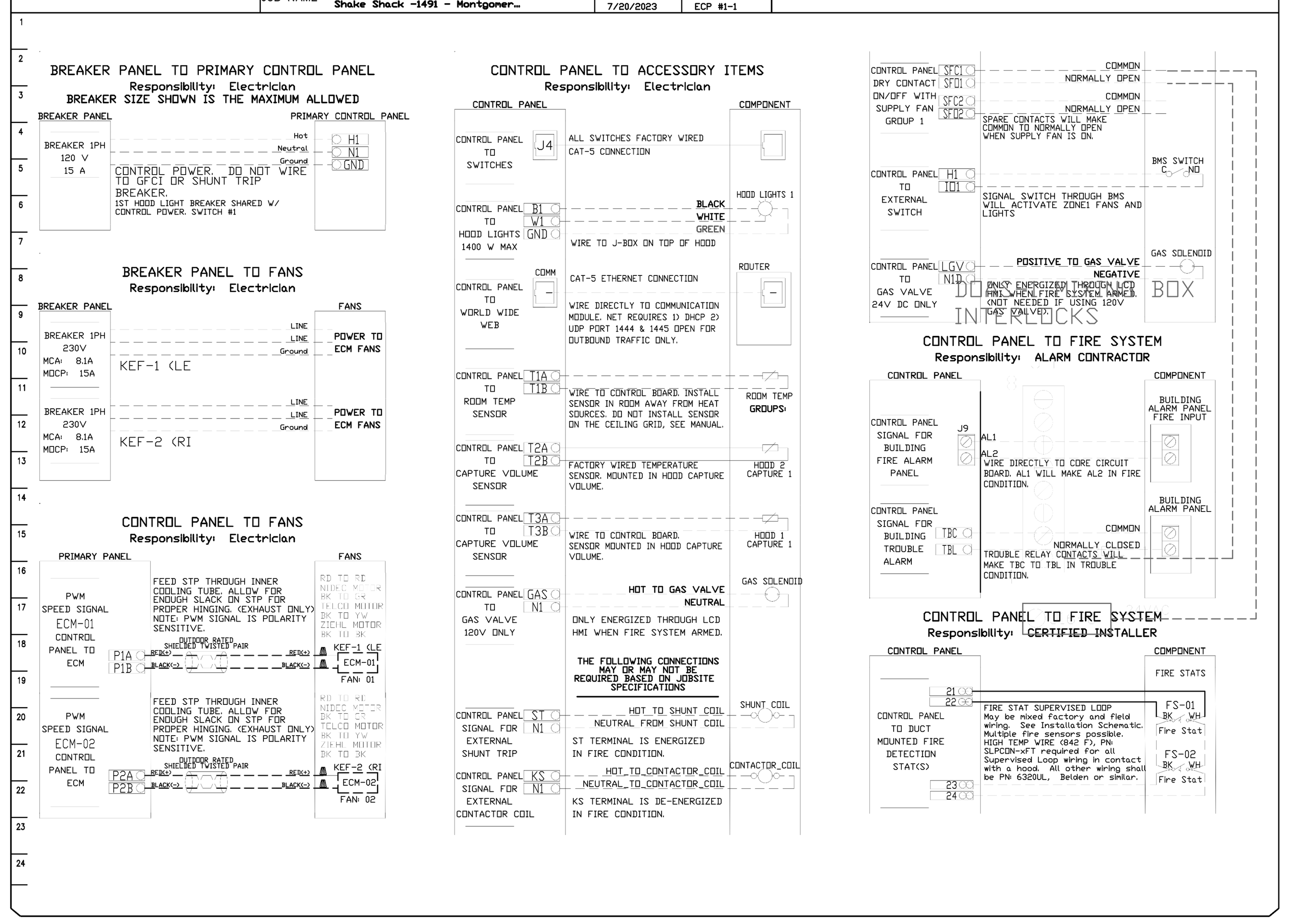
- *Hood control panel to support communications to cloud-based Building Management System.*
- *Hood Control Panel to allow cloud-based Building Management System to monitor real time parameters outlined as MONITOR in the points list.*
- *Hood Control Panel to allow cloud-based Building Management System to control parameters outlined as CONTROL in the points list.*
- *Hood Control Panel to allow cloud-based Building Management System to implement SYSTEM ECONOMIZER control strategies for fully integrated Building Management.*

MONITORING AND CONTROL POINTS LIST

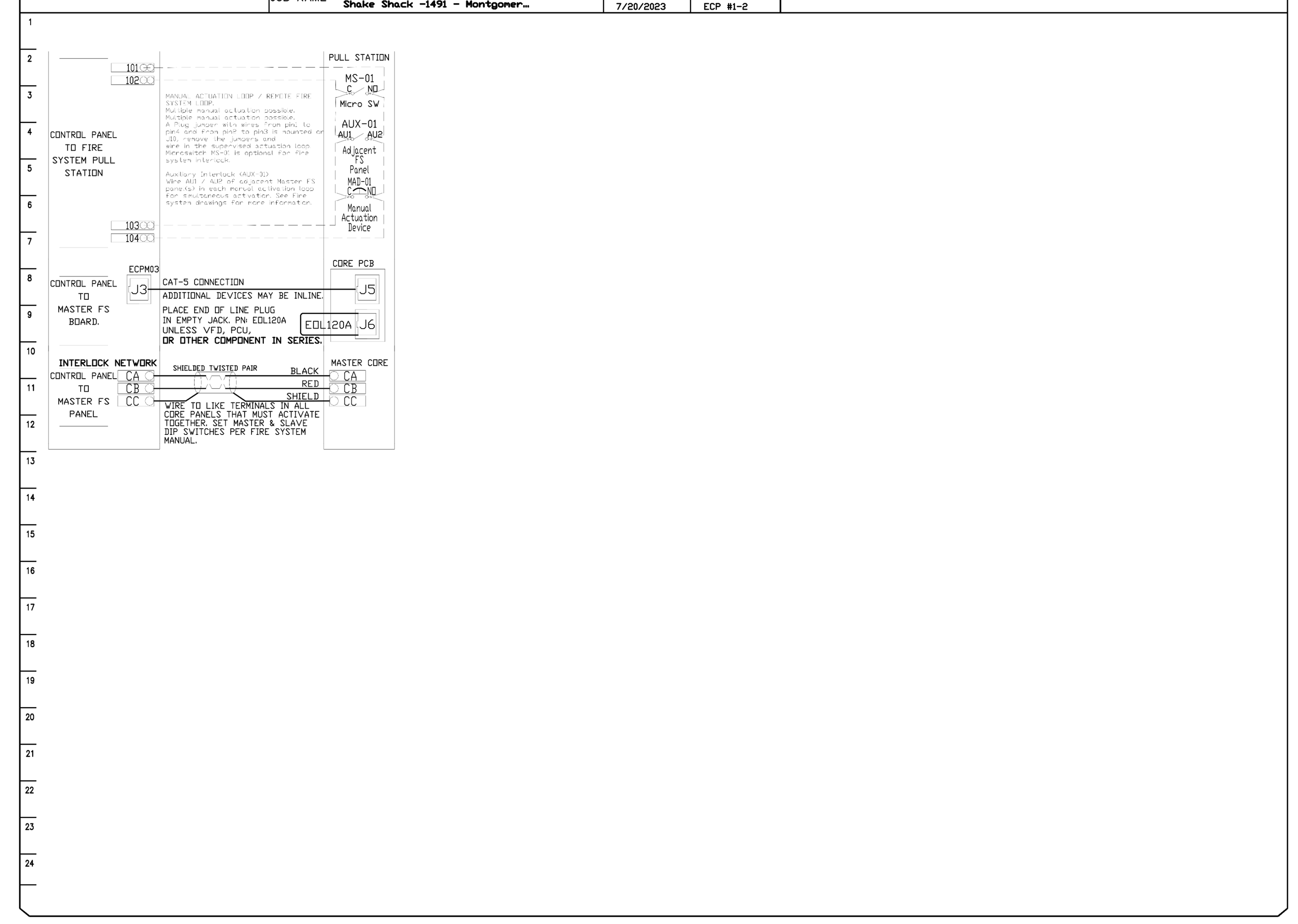
DCV Packages	Function
Room Temperature	MONITOR
Duct Temperature(s)	MONITOR
MUA Discharge Temperature	MONITOR
Kitchen RTU Discharge Temperature	MONITOR
Fan Speed	MONITOR
Fan Amperage	MONITOR
Fan Power	MONITOR
VFD Faults	MONITOR
Controller Faults	MONITOR
Fan Faults	MONITOR
Fan Status	MONITOR
PCU Faults	MONITOR
PCU Filter Clog Percentages	MONITOR
Fire Condition	MONITOR
CORE Fire System	MONITOR
Building Pressures	MONITOR
Prep Time Button	MONITOR & CONTROL
Fans Button	MONITOR & CONTROL
Lights Button	MONITOR & CONTROL
Wash Button	MONITOR & CONTROL

SC Packages	Function
Room Temperature(s)	MONITOR
Duct Temperature(s)	MONITOR
MUA DIscharge Temperature	MONITOR
Kitchen RTU Discharge Temperature	MONITOR
Controller Faults	MONITOR
Fan Faults	MONITOR
Fan Status	MONITOR
PCU Faults	MONITOR
PCU Filter Clog Percentages	MONITOR
Fire Condition	MONITOR
CORE Fire System	MONITOR
Building Pressures	MONITOR
Fans Button(s)	MONITOR & CONTROL
Lights Button(s)	MONITOR & CONTROL
Wash Button	MONITOR & CONTROL

JOB NO 6119232 | MODEL NUMBER SC-220110MA | JOB NAME Shake Shack -1491 - Montgomer... | DATE 7/20/2023 | SCHEMATIC TYPE INSTALL | DWG NO ECP #1-1



JOB NO 6119232 | MODEL NUMBER SC-220110MA | JOB NAME Shake Shack -1491 - Montgomer... | DATE 7/20/2023 | SCHEMATIC TYPE INSTALL | DWG NO ECP #1-2



JOB NO 6119232 | MODEL NUMBER SC-220110MA | JOB NAME Shake Shack -1491 - Montgomer... | DATE 7/20/2023 | SCHEMATIC TYPE INSTALL | DWG NO ECP #1-3

DESCRIPTION OF OPERATION: Fire System #1 TANK FS - 4.0/4.0/4.0.

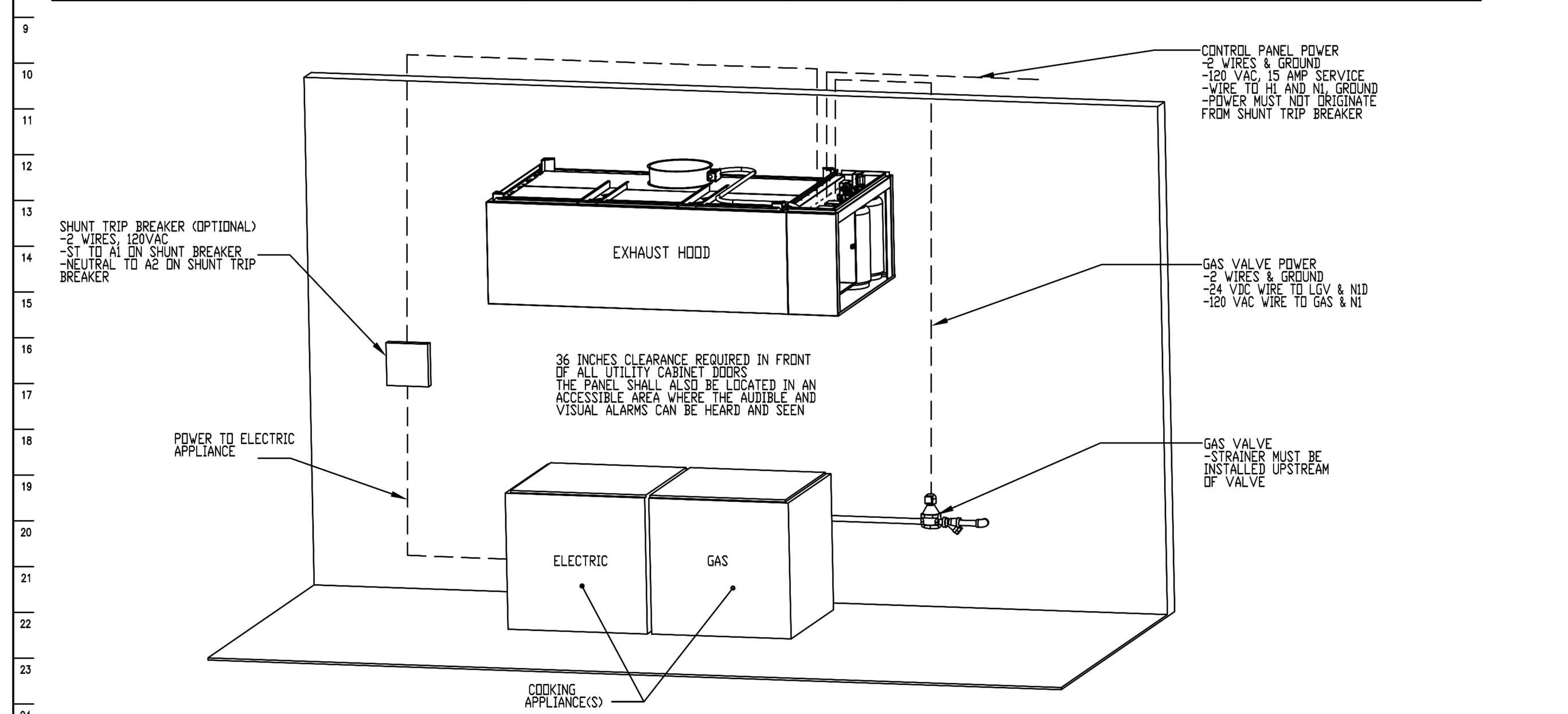
TANK PROTECTION ELECTRICAL DETAIL

02/10/2021 Rev. 2

FS-1: MASTER

ELECTRICIAN:
1. WIRE MAIN CONTROL PANEL PER INCLUDED SCHEMATIC
2. WIRE ALL FANS PER INCLUDED SCHEMATIC
3. WIRE SHUNT TRIP BREAKER (OPTIONAL)
4. WIRE UDS APPLIANCE KILL SWITCH, IF EQUIPPED (OPTIONAL)
5. WIRE GAS VALVE

ELECTRICAL CONTRACTOR REQUIREMENT					
ITEM	CONNECTION IN PANEL	CONNECTION IN DEVICE	VOLTAGE	AMPERAGE	COMMENTS
SHUNT TRIP BREAKER (OPTIONAL)	ST & N1	BREAKER COIL (A1 & A2)	120 VAC	< 4 AMPS	ST TO A1 ON SHUNT BREAKER COIL, AND NEUTRAL TO A2 ON SHUNT TRIP BREAKER COIL
CONTROL PANEL POWER	H1 & N1 + GROUND	CIRCUIT BREAKER	120 VAC	15 AMPS	CONTROL PANEL POWER MUST NOT BE RUN THROUGH SHUNT TRIP BREAKER
UDS APPLIANCE KILL SWITCH (OPTIONAL)	KTS & N1	KTS & N1	120 VAC	< 4 AMPS	KILL SWITCH TERMINALS MUST BE IN SERIES WITH OTHER KILL SWITCHES
REMOTE 120VAC ANSUL AUTOMAN (OPTIONAL)	AU1, AU2	SOLENOID	120 VAC	< 6 AMPS	120V TO AU1, AU2 TO ANSUL ELECTRIC AUTOMAN, ANSUL SOLENOID TO NEUTRAL
GAS VALVE	LGV & N1D (IF 24 VDC) GAS & N1 (IF 120 VAC)	RED/RED/GREEN	24 VDC OR 120 VAC	< 1.0 AMPS	IF 24 VDC - 2 WIRES & GROUND, N1D TO RED, LGV TO RED, AND GREEN TO GROUND IF 120 VAC - 2 WIRES & GROUND GAS TO RED, N1 TO RED, AND GREEN TO GROUND



NOTE: SEE INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR FURTHER INSTRUCTIONS

JOB NO 6119232 | MODEL NUMBER SC-220110MA | JOB NAME Shake Shack -1491 - Montgomer... | DATE 7/20/2023 | SCHEMATIC TYPE INSTALL | DWG NO ECP #1-4

DESCRIPTION OF OPERATION: Fire System #1 TANK FS - 4.0/4.0/4.0.

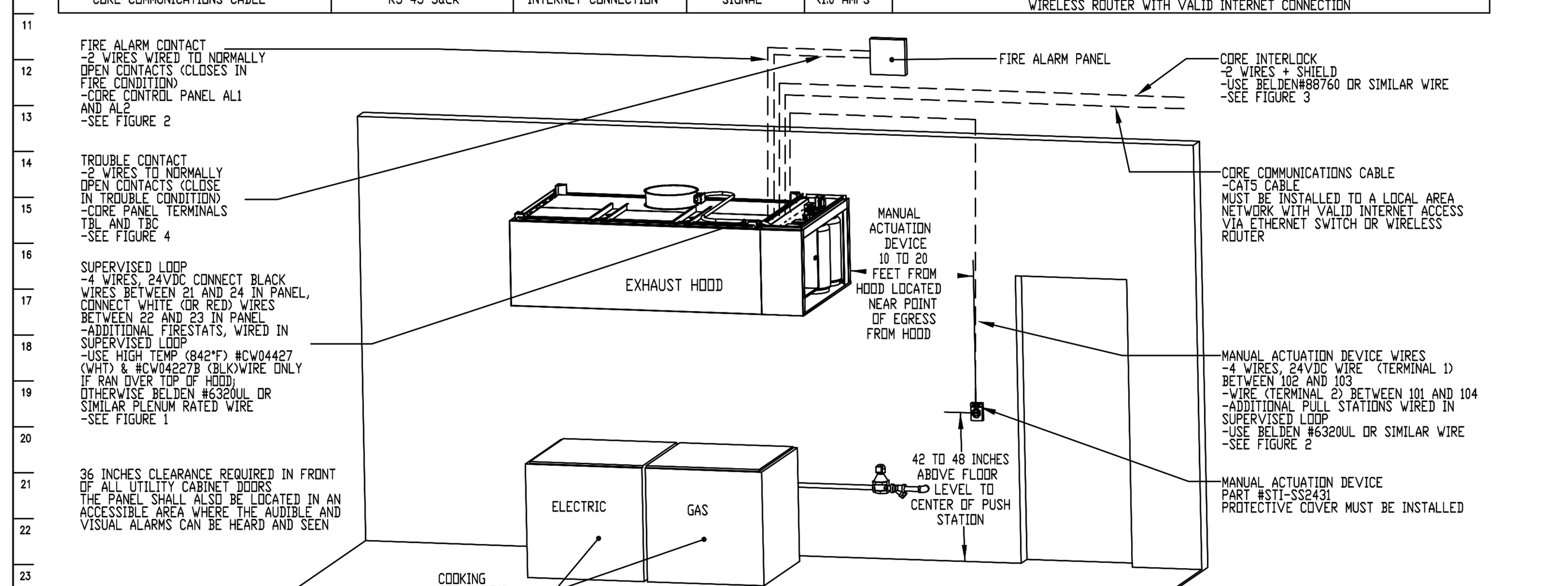
TANK PROTECTION LOW-VOLTAGE DETAIL

02/10/2021 Rev. 2

FS-1: MASTER

ALARM CONTRACTOR:
1. WIRE MANUAL ACTUATION DEVICE(S), REMOTE FIRESTAT(S), CORE INTERLOCK(S), FIRE SENSOR(S) AND FIRE ALARM CONTACTS
2. COMPLETE FINAL HOOKUP OF SYSTEM
3. VERIFY FINAL FIRE SYSTEM TEST

ALARM CONTRACTOR REQUIREMENT					
ITEM	CONNECTION IN PANEL	CONNECTION ON DEVICE	VOLTAGE	AMPERAGE	COMMENTS
MANUAL ACTUATION DEVICE(S)	101 AND 104 102 AND 103	1 & 2	24 VDC	< 1.0 AMPS	WIRE MANUAL ACTUATION DEVICE TERMINAL 1 BETWEEN CORE PANEL TERMINALS 102 AND 103 WIRE MANUAL ACTUATION DEVICE TERMINAL 2 BETWEEN CORE PANEL TERMINALS 101 AND 104 JUMPER 101 TO 104 AND 102 TO 103 IF NO MANUAL ACTUATION DEVICE IS INSTALLED
MANUAL ACTUATION DEVICE COVER	N/A	N/A	N/A	N/A	MANUAL ACTUATION DEVICE COVER MUST BE INSTALLED IF SURFACE MOUNTED, USE COVER EXTENSION STI-6531B
REMOTE FIRESTAT SENSOR(S)	21 AND 24 22 AND 23	BLACK AND WHITE	24 VDC	< 1.0 AMPS	WIRE FIRE SENSOR WHITE WIRES BETWEEN HOOD CORE PANEL TERMINALS 22 AND 23 WIRE FIRE SENSOR BLACK WIRE BETWEEN HOOD CORE PANEL TERMINALS 21 AND 24 HIGH TEMP (842°F) #CW04427 (WHT) & #CW04427B (BLK)WIRE OR SIMILAR ONLY IF RAN OVER TOP OF HOOD; OTHERWISE BELDEN #6320UL OR SIMILAR PLENUM RATED WIRE; SEE FIGURE 1
FIRE ALARM CONTACT	AL1, AL2	VARIES	50V MAX (AC/DC)	UP TO 1 AMP	FIRE ALARM RELAY CONTACTS FOR BUILDING FIRE ALARM LOCATED IN THE CORE ELECTRICAL CONTROL PANEL
CORE INTERLOCK(S)	ILA, ILB, ILC	ILA, ILB, ILC	RS-485 COMMUNICATIONS SIGNAL		CORE SYSTEM (1) ILA, TO CORE SYSTEM (2) ILA. CORE SYSTEM (1) ILB, TO CORE SYSTEM (2) ILB. CORE SYSTEM (1) ILC, TO CORE SYSTEM (2) ILC. USE BELDEN# 88760 OR SIMILAR WIRE
TROUBLE CONTACT	TBC, TBL, TOK	VARIES	MAX 120 VAC	UP TO 6 AMPS	WIRE TO TBL & TBC NORMALLY OPEN CONTACT, CLOSES IN TROUBLE CONDITION
CORE COMMUNICATIONS CABLE	RJ-45 Jack	INTERNET CONNECTION	SIGNAL	<1.0 AMPS	TYPICAL CONNECTION CAT5 CABLE TO LOCAL AREA NETWORK VIA ETHERNET SWITCH OR WIRELESS ROUTER WITH VALID INTERNET CONNECTION



ATTENTION: LOW-VOLTAGE DC OR SIGNALING WIRE SHOULD BE ROUTED IN SEPARATE CONDUIT FROM ALL AC SOURCES

NOTE: SEE INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR FURTHER INSTRUCTIONS

REVISIONS

DESCRIPTION	DATE

CAPTIVEAIRE

Eastern PA Mechanical

PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: mg108@captiveaire.com

www.captiveaire.com

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1

SANTA ROSA, CA, 95405

DATE: 7/20/2023

DWG.#: 6119232

DRAWN BY: joe.shiiba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 6

SHAKE SHACK

2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States

Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.

2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com

Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark

505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER RON S. CHIN M26613 MECHANICAL STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

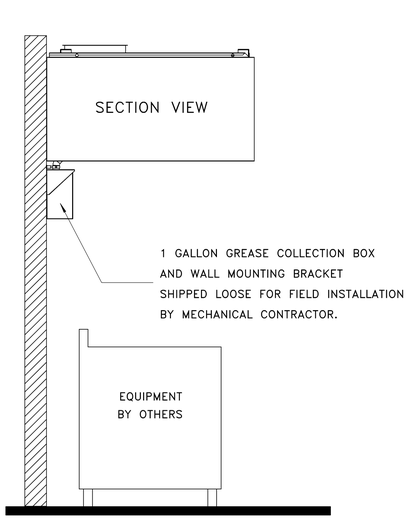
Project Number
SHK-22-007

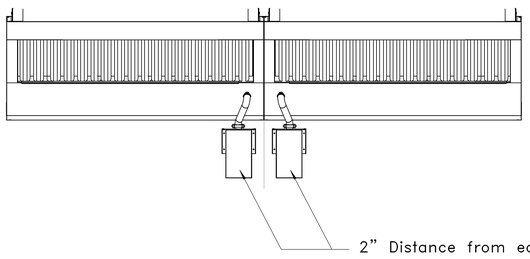
Description
CAPTIVEAIRE DRAWINGS

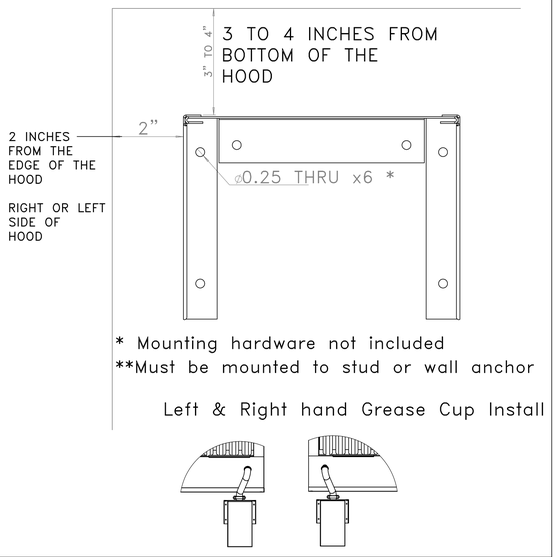
Scale
NTS

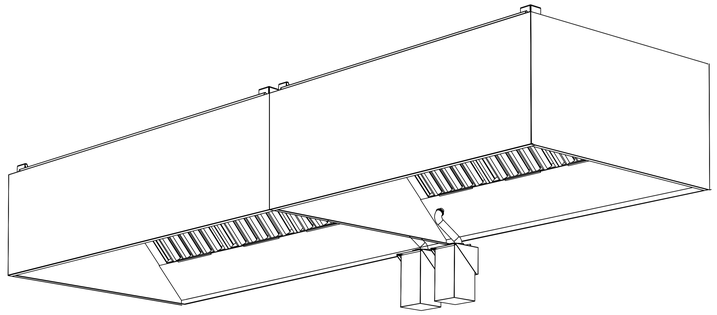
M808

8/25/2023 10:25:58 AM BIM 360://005.4326.000 - Shake Shack - Montgomery Village/005.4326 - SS 1491 - Montgomery Village_M21.rvt

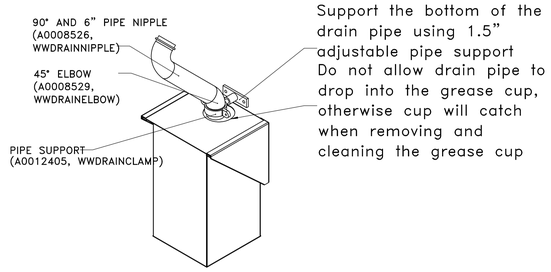




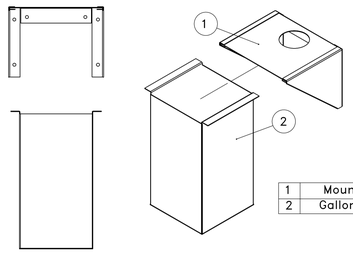




One Gallon Grease Cup Installation



Gallon Grease Cup Assembly



1	Mounting Bracket
2	Gallon Grease Cup

1 GALLON GREASE COLLECTION BOX
AND WALL MOUNTING BRACKET
SHIPPED LOOSE FOR FIELD INSTALLATION
BY MECHANICAL CONTRACTOR.

Instructions below outline single, or dual, one gallon grease cup installation for ND-2 hood models.

The one gallon grease cup comes as an assembly of stainless steel wall mounting bracket and one gallon cup. The mounting bracket should be installed 2" from the edge of the containment plenum and 3"-4" below the bottom of the hood.

Piping from the hood grease drain should route to the opening of the grease cup, but not into the cup, otherwise the cup will not be able to be removed and emptied.

REVISIONS

	DESCRIPTION	DATE
△		
△		
△		
△		

CAPTIVEAIRE
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com
www.captiveaire.com

Shake Shack -1491 - Montgomery Village(KITCHEN)-R1
SANTA ROSA, CA, 95405

DATE: 7/20/2023

DWG.#: 6119232

DRAWN BY: joe.shiiba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 5

SHAKE SHACK
2424 Magowan Dr., STE. C1
Santa Rosa, Ca 95405

Gensler
500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

INFRASTRUCTURE FACTOR CONSULTING, INC.
2361 Rosecrans Ave. Suite 368, El Segundo, CA 90245
P: 310.725.1500 F: 310.725.0215 www.iFactor.com
Contact:
Yves Yanuaria
Tel 323.617.0332

TriMark
505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392

△ Date	Description
08/25/2023	ISSUE FOR CONSTRUCTION

Seal / Signature

REGISTERED PROFESSIONAL ENGINEER
RON S. CHIN
M26613
MECHANICAL
STATE OF CALIFORNIA

Project Name
SHAKE SHACK - MONTGOMERY VILLAGE

Project Number
SHK-22-007

Description
CAPTIVEAIRE DRAWINGS

Scale
NTS

M809

8/25/2023 10:26:01 AM BIM 360://005-4326-000 - Shake Shack - Montgomery Village/005-4326 - SS-1491 - Montgomery Village_M21.rvt