

MECHANICAL SHEET INDEX

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RESPONSIBILITY MATRIX

DESCRIPTION	FURNISHED		INSTALLED		REMARKS
	GC	OWNER	GC	OWNER	
DIVISION 23: HEATING, VENTILATING, AND AIR CONDITIONING					
23.1 HVAC DUCTWORK AND PIPING IDENTIFICATION					
HVAC DUCTWORK SYSTEM IDENTIFICATION					
PIPING SYSTEM IDENTIFICATION					
UTILITY SHUT OFF IDENTIFICATION IN KITCHEN					
VALVE TAGS AND CHART					
23.2 ROOF CURBS					
EXHAUST FAN CURBS					
ROOFTOP UNIT CURBS					
CONDENSING UNIT CURBS					
KITCHEN EXHAUST FAN CURBS					
23.3 HVAC DUCTWORK SYSTEM COMPONENTS					
HVAC DUCTWORK					
GREASE DUCTWORK					
OUTSIDE AIR DUCTWORK					
SUPPLY AND RETURN AIR DUCTWORK					
RESTROOM EXHAUST AIR DUCTWORK					
INSULATION AND FIRE WRAP					
DAMPERS					
SMOKE DETECTORS					
SUPPLY, RETURN, AND EXHAUST GRILLS AND REGISTERS					
23.4 MECHANICAL PIPING SYSTEM COMPONENTS					
WALK-IN COOLER AND FREEZER CONDENSER REFRIGERANT LINE SETS					
REFRIGERANT PIPING FOR HVAC EQUIPMENT					
VALVES AND ACCESSORIES (E.G. AIR VENTS)					
23.5 HVAC EQUIPMENT					
RESTROOM EXHAUST FAN					
KITCHEN EXHAUST FAN WITH CURB EXTENSION					
DUCTED AND NON-DUCTED HEATING AND COOLING UNITS					
WALK-IN COOLER AND FREEZER CONDENSING UNITS					
23.6 KITCHEN EXHAUST WITH FIRE SUPPRESSION SYSTEM					
HOOD CONTROL PANEL					
REMOTE HOOD SWITCHES IN OFFICE					
KITCHEN EXHAUST HOOD					
STRUCTURAL SUPPORT					
ELECTRICAL AND CONTROL WIRING					
TANK SYSTEM					
TANK SYSTEM WIRING AND UTILITIES CONNECTION					
TANK SYSTEM GAS VALVE					
PULL STATION					
23.7 MECHANICAL SAFETY SENSORS					
CO2 MONITOR					
23.8 COMMISSIONING ACTIVITIES					
GREASE EXHAUST WATER LEAKAGE TEST					
TEST AND BALANCE (TAB) REPORT					
GENERAL NOTES:					
1. INFORMATION CONTAINED WITHIN IS BASED ON OUR INTERPRETATION OF THE FINAL EXECUTED WORK LETTER.					
2. CONTRACTOR TO CONFIRM ALL SCOPE WITH FINAL WORK LETTER PRIOR TO PROCUREMENT OF EQUIPMENT.					
REMARKS:					
A. WALK-IN COOLER AND FREEZER CONDENSING UNITS FURNISHED AND INSTALLED BY OWNER VENDOR.					
B. GENERAL CONTRACTOR TO COORDINATE TANK INSTALLATION TIME WITH OWNER VENDOR AND FACILITATE SYSTEM SIGN-OFF.					

SUBMITTAL MATRIX

SUBMITTAL DESCRIPTION	Required Review Time (Business Days)	Architect of Record	Shake Shack	Physical Sample Required	Submittal for Record	Submittal for Record Only
Diffusers, Grills & Registers	5	X			X	
Ductwork Layout (if there are significant changes in field)	5	X			X	
HVAC Equipment (if Captive Air - Submitted by Owner Vendor directly to Owner/AOR prior to construction)	5	X			X	
MEP Tests, Start-Up, and Programming Reports	5	X			X	

GENERAL NEW NOTES:

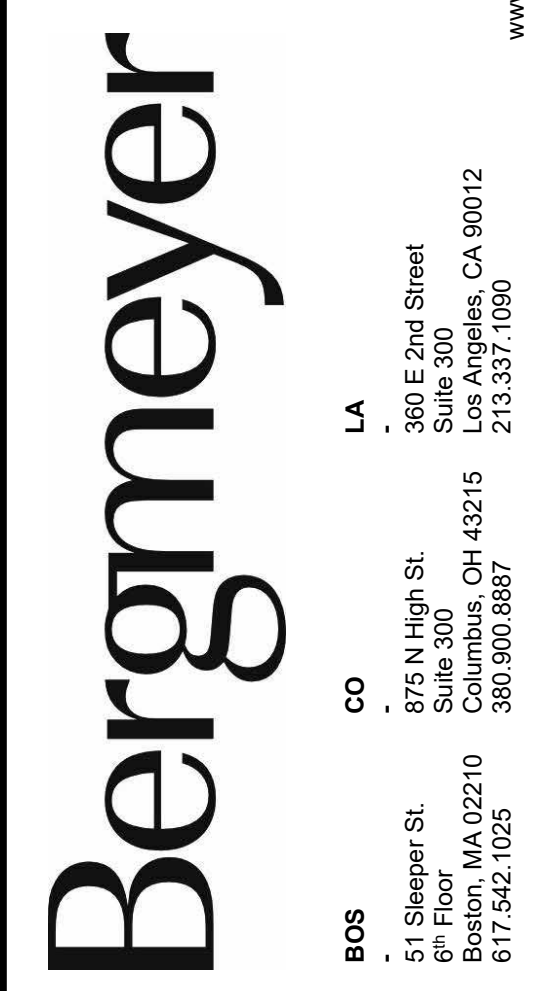
- PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
- COORDINATE THE INSTALLATION OF THE MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE A NEAT AND ORDERLY INSTALLATION. INSTALL DUCTWORK AND PIPING AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. ANY MODIFICATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.
- PROVIDE TEMPORARY BARRIERS TO CONTAIN DUST AND DEBRIS RESULTING FROM THE PERFORMANCE OF THE WORK TO THE AREA WHERE WORK IS BEING PERFORMED.
- ALL MECHANICAL EQUIPMENT SHOWN ON THE MECHANICAL PLANS SHALL BE PROVIDED BY DIVISION 23 UNLESS OTHERWISE NOTED.
- NEW MECHANICAL EQUIPMENT, DUCTWORK AND PIPING ARE SHOWN AT APPROXIMATE LOCATIONS. FIELD MEASURE FINAL DUCTWORK AND PIPING LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED TO FIT THE DUCTWORK AND PIPING WITHIN THE AVAILABLE SPACE. VERIFY THAT FINAL EQUIPMENT LOCATIONS MEET MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
- REFER TO ARCHITECTURAL DRAWINGS FOR RELATED CONSTRUCTION DETAILS AS APPLICABLE TO THE HVAC SYSTEM. VERIFY CHASES AND PENETRATIONS SHOWN ON ARCHITECTURAL DRAWINGS THAT ARE INTENDED FOR DUCTWORK AND PIPING MEET REQUIREMENTS.
- COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
- INDOOR AIR QUALITY MEASURES: PROTECT INSIDE OF (INSTALLED AND DELIVERED) DUCTWORK AND HVAC UNITS FROM EXPOSURE TO DUST, DIRT, PAINT AND MOISTURE. REPLACE INSULATION THAT HAS BECOME WET AT ANY TIME DURING CONSTRUCTION, DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ANY TEARS OR JOINTS OF INTERNAL FIBERGLASS INSULATION. REMOVE DEBRIS FROM CEILING/RETURN AIR PLENUM INCLUDING DUST. AN INDEPENDENT PROFESSIONAL DUCT CLEANING COMPANY SHALL VACUUM CLEAN ANY DUCTWORK CONNECTED TO HVAC UNITS THAT WERE OPERATED DURING THE CONSTRUCTION PERIOD AFTER NEW FILTERS ARE INSTALLED AND PRIOR TO TURNING SYSTEM OVER TO THE OWNER. THE INTERNAL SURFACES AND ASSOCIATED COILS OF ANY HVAC UNITS THAT WERE OPERATED SHALL ALSO BE CLEANED.
- INSTALL DUCTWORK AND PIPING PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
- OVERHEAD HANGERS AND SUPPORTS FOR EQUIPMENT, DUCTWORK AND PIPING SHALL BE FASTENED TO BUILDING JOISTS OR BEAMS. DO NOT ATTACH HANGERS AND SUPPORTS TO THE ABOVE FLOOR SLAB OR ROOF EXCEPT WHERE CONCRETE INSERTS IN CONCRETE SLABS ARE ALLOWED BY THE SPECIFICATIONS.
- COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
- SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
- COORDINATE THE EXACT MOUNTING SIZE AND FRAME TYPE OF DIFFUSERS, REGISTERS AND GRILLES WITH THE SUPPLIER TO MEET THE CEILING, WALL AND DUCT INSTALLATION REQUIREMENTS.
- ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
- PAINT PORTIONS OF DUCTWORK AND INSULATION THAT ARE EXPOSED TO VIEW BY THE INSTALLATION OF DIFFUSERS, REGISTERS, AND GRILLES IN CEILINGS OR WALLS FLAT BLACK. PORTIONS INCLUDE BOTH THE INTERIOR OF UNLINED DUCTWORK AND THE EXTERIOR OF DUCTWORK AND INSULATION.
- LOCATE AND SET THERMOSTATS AND HUMIDISTATS AT LOCATIONS SHOWN ON PLANS. VERIFY EXACT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. INSTALL DEVICES WITH TOP OF DEVICE AT MAXIMUM 48" AFF TO MEET ADA REQUIREMENTS UNLESS NOTED OTHERWISE ON PLANS. PROVIDE INSULATED BACKING FOR THERMOSTATS MOUNTED ON EXTERIOR BUILDING WALLS. INSTALL WIRING IN CONDUIT PROVIDED BY DIVISION 26. AT A MINIMUM, PROVIDE CONDUIT IN THE WALL FROM THE JUNCTION BOX TO 6" ABOVE THE CEILING.
- COORDINATE THE LOCATION AND ELEVATION OF WALL-MOUNTED DEVICES WITH PRESENTATION BOARDS, DISPLAY CABINETS, SHELVES OR OTHER COMPONENTS SHOWN ON THE ARCHITECTURAL DRAWINGS THAT ARE TO BE INSTALLED UNDER OTHER DIVISIONS. CONTRACTOR WILL NOT BE REIMBURSED FOR RELOCATION OF WALL-MOUNTED DEVICES CAUSED BY A LACK OF COORDINATION.
- PROVIDE A MANUAL BALANCING DAMPER IN EACH DUCT TAKEOFF FROM SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
- PROVIDE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKEOFF FITTING FOR BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS AND GRILLES. PROVIDE WITH INTEGRAL MANUAL BALANCING DAMPER AND LOCKING QUADRANT WHERE INDICATED ON PLANS.
- BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
- REFER TO SPECIFICATIONS FOR DUCTWORK AND PIPING INSULATION REQUIREMENTS. DUCT SIZES ON MECHANICAL PLANS INDICATE CLEAR INSIDE AIRFLOW DIMENSIONS. INCREASE SHEET METAL SIZES ACCORDINGLY TO ACCOUNT FOR THICKNESS OF DUCT LINER.
- FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORTED TO AVOID SHARP BENDS AND SAGGING. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- PROVIDE EQUIPMENT VENTS AND FLUES PER EQUIPMENT MANUFACTURERS RECOMMENDATIONS AND EQUIPMENT SPECIFICATIONS. KEEP PENETRATIONS THROUGH ROOF A MINIMUM OF 10'-0" FROM HVAC EQUIPMENT FRESH AIR INLETS AND 2'-0" FROM ROOF PARAPETS.
- PROVIDE TYPE I GREASE HOOD EXHAUST DUCTWORK OF MINIMUM 16 GAUGE BLACK IRON WITH LIQUID TIGHT WELDS, WITH ACCESS PANELS FOR GREASE CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES. SLOPE DUCT BACK TOWARDS HOOD AT MINIMUM OF 1/4" PER LINEAL FOOT MAINTAINING 18" CLEARANCE TO COMBUSTIBLE MATERIALS. INSTALL GREASE DUCTS IN AN APPROVED FIRE-RATED ENCLOSURE SEPARATED FROM THE EXHAUST DUCT BY A MINIMUM OF 6" AND MAXIMUM OF 12". VENTILATE ENCLOSURE TO THE OUTSIDE AIR IF REQUIRED BY CODE. 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.
- PROVIDE A NEW SET OF AIR FILTERS IN UNITS PRIOR TO TESTING, ADJUSTING AND BALANCING AND BEFORE TURNING SYSTEM(S) OVER TO OWNER.
- TEMPORARY INSTALLATIONS OF INFECTION CONTROL MEASURES DURING CONSTRUCTION SHALL BE COORDINATED WITH THE FACILITY'S INFECTION CONTROL STAFF. PRIOR TO CONSTRUCTION PROVIDE ALL REQUIRED TEMPORARY INSTALLATIONS, INCLUDING DETAILS OF THE INFECTION CONTROL MEASURES SUCH AS TEMPORARY BARRIERS AND MEMBRANES, PORTABLE EXHAUST FANS AND TEMPORARY DUCTWORK. TEMPORARY INSTALLATIONS MUST NOT HAVE A NEGATIVE IMPACT ON EXISTING SYSTEMS NOR CAUSE UNSAFE CONDITIONS. TEMPORARY INSTALLATIONS SHALL MAINTAIN ADEQUATE EGRESS AND SHALL NOT OBSTRUCT EXISTING EXITS. CREATE A FIRE HAZARD OR REDUCE REQUIRED FIRE RESISTANCE. TEMPORARY VENTILATION SYSTEMS SHALL NOT CAUSE THE AIR BALANCE OF ADJACENT ROOMS OR SPACES TO BE IMPACTED OR ALTER THE PERFORMANCE OF PERMANENT BUILDING VENTILATION SYSTEMS. AIRFLOW MEASUREMENTS SHALL BE TAKEN TO VERIFY ADJACENT ROOMS OR SPACES ARE NOT IMPACTED.

MECHANICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

V2.06

STANDARD MOUNTING HEIGHT		HVAC DUCTWORK AND ACCESSORIES		PIPING SYMBOLS																																																																																																																																																																																																																																																																																																	
<p>THERMOSTATS (USER ADJUSTABLE/TOP OF DEVICE) 48"</p> <p>CONTROLS (TOP OF DEVICE) 48"</p>		<p>LINEAR SLOT DIFFUSER</p> <p>INSULATED FLEXIBLE DUCT (MAX. 5'-0" LONG)</p> <p>BRANCH DUCT WITH 45° RECTANGLE-ROUND BRANCH FITTING AND MANUAL VOLUME DAMPER</p> <p>ELBOW WITH TURNING VANES</p> <p>BRANCH DUCT WITH BELL-MOUTH FITTING & MANUAL VOLUME CONTROL DAMPER</p> <p>RETURN, EXHAUST, OR OUTSIDE AIR DUCT UP</p> <p>RETURN, EXHAUST, OR OUTSIDE AIR DUCT DOWN</p> <p>SUPPLY AIR DUCT UP</p> <p>SUPPLY AIR DUCT DOWN</p> <p>EQUIPMENT WITH FLEXIBLE DUCT CONNECTION</p> <p>10" (NECK SIZE) CSD-1 (TYPE) 300 CFM (CFM OF SUPPLY DIFFUSER OR REGISTER)</p> <p>24x24 (NECK SIZE) CEG-1 (TYPE) 800 CFM (CFM OF EXHAUST GRILLE)</p> <p>MANUAL VOLUME DAMPER</p> <p>SQUARE TO ROUND TRANSITION</p> <p>DUCT MOUNTED SMOKE DETECTOR (SD-SUPPLY/RD-RETURN)</p> <p>ROUND DUCT TAG INDICATING DIAMETER</p> <p>RECTANGULAR DUCT TAG INDICATING INTERNAL DUCT DIMENSIONS.</p> <p>FLAT OVAL DUCT TAG INDICATING INTERNAL DUCT DIMENSIONS</p> <p>RISER DESIGNATION</p> <p>FIRE DAMPER</p> <p>FIRE SMOKE DAMPER</p> <p>SMOKE DAMPER</p> <p>VOLUME DAMPER</p> <p>MOTORIZED DAMPER</p> <p>BACKDRAFT DAMPER</p>	<p>DIRECTION OF FLOW</p> <p>CONTROL VALVE</p> <p>THREE-WAY CONTROL VALVE</p> <p>SHUTOFF VALVE</p> <p>CHECK VALVE</p> <p>BALANCING VALVE WITH PRESSURE PORTS</p> <p>TRIPLE DUTY VALVE WITH PRESSURE PORTS</p> <p>STRAINER</p> <p>STRAINER WITH BLOWDOWN VALVE</p> <p>RELIEF / SAFETY VALVE</p> <p>SOLENOID VALVE</p> <p>PRESSURE REDUCING VALVE</p> <p>GAS PRESSURE REGULATOR</p> <p>THERMOSTATIC MIXING VALVE</p> <p>PIPE ANCHOR</p> <p>EXPANSION JOINT</p> <p>PIPE GUIDE</p> <p>PIPING SUPPORT</p> <p>F & T TRAP</p> <p>BUCKET TRAP</p> <p>THERMOSTATIC TRAP</p> <p>BACKFLOW PREVENTER</p> <p>PRESSURE GAUGE</p> <p>THERMOMETER</p> <p>PRESSURE AND TEMPERATURE TEST PLUG</p> <p>UNION</p> <p>FLANGE CONNECTION</p> <p>VACUUM RELIEF VALVE</p> <p>AUTOMATIC AIR VENT</p> <p>MANUAL AIR VENT</p> <p>PRESSURE / VACUUM SWITCH</p> <p>CLEANOUT</p> <p>CAP</p> <p>ELBOW UP</p> <p>ELBOW DOWN</p> <p>TEE UP</p> <p>TEE DOWN</p> <p>ELBOW UP WITH SHUT-OFF VALVE (SOV)</p> <p>ELBOW DOWN WITH SHUT-OFF VALVE (SOV)</p> <p>TEE UP WITH SHUT-OFF VALVE (SOV)</p> <p>TEE DOWN WITH SHUT-OFF VALVE (SOV)</p> <p>REDUCER</p> <p>RECIRCULATION PUMP</p> <p>P-TRAP</p> <p>GAS COCK</p> <p>TOP BEAM CLAMP</p> <p>TRAPEZE HANGER</p> <p>FLEXIBLE CONNECTION</p>																																																																																																																																																																																																																																																																																																		
<p>ANNOTATION</p> <p>MECHANICAL PLAN NOTE CALLOUT</p> <p>MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)</p> <p>CONNECTION POINT OF NEW WORK TO EXISTING</p> <p>DETAIL REFERENCE. UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER</p> <p>SECTION CUT DESIGNATION</p>		<p>ABBREVIATIONS</p> <table border="0"> <tr> <td>A/C</td><td>AIR CONDITIONING</td> <td>H/TG</td><td>HEATING</td> </tr> <tr> <td>ACC</td><td>AIR COOLED CHILLER</td> <td>HWP</td><td>HEATING WATER PUMP</td> </tr> <tr> <td>ACCU</td><td>AIR COOLED CONDENSING UNIT</td> <td>I/W</td><td>INCHES OF WATER COLUMN</td> </tr> <tr> <td>AFC</td><td>ABOVE FINISHED CEILING</td> <td>L</td><td>LEAVING AIR</td> </tr> <tr> <td>AFF</td><td>ABOVE FINISHED FLOOR</td> <td>LAT</td><td>TEMPERATURE</td> </tr> <tr> <td>AFG</td><td>ABOVE FINISHED GRADE</td> <td>LDB</td><td>LEAVING DRY BULB</td> </tr> <tr> <td>AHJ</td><td>AUTHORITY HAVING JURISDICTION</td> <td>LP</td><td>LOW PRESSURE</td> </tr> <tr> <td>AHU</td><td>AIR HANDLING UNIT</td> <td>LWB</td><td>LEAVING WET BULB</td> </tr> <tr> <td>AI</td><td>ANALOG INPUT</td> <td>LWT</td><td>LEAVING WATER TEMPERATURE</td> </tr> <tr> <td>AO</td><td>ANALOG OUTPUT</td> <td>MAU</td><td>MAKE-UP AIR UNIT</td> </tr> <tr> <td>AP</td><td>ACCESS PANEL</td> <td>MAX</td><td>MAXIMUM</td> </tr> <tr> <td>ARD</td><td>AIR PRESSURE DROP</td> <td>MBH</td><td>1000 BTU PER HOUR</td> </tr> <tr> <td>AWG</td><td>AMERICAN WIRE GAUGE</td> <td>MD</td><td>MOTORIZED DAMPER</td> </tr> <tr> <td>B</td><td>BOILER</td> <td>MFR</td><td>MANUFACTURER</td> </tr> <tr> <td>BAS</td><td>BUILDING AUTOMATION SYSTEM</td> <td>MIN</td><td>MINIMUM</td> </tr> <tr> <td>BB</td><td>BACKBONE</td> <td>N/A</td><td>NOT APPLICABLE</td> </tr> <tr> <td>BD</td><td>BACKDRAFT DAMPER</td> <td>N/C</td><td>NORMALLY CLOSED</td> </tr> <tr> <td>BD</td><td>BLOWDOWN</td> <td>N/O</td><td>NORMALLY OPEN</td> </tr> <tr> <td>BFC</td><td>BELOW FINISHED CEILING</td> <td>NOM</td><td>NOMINAL</td> </tr> <tr> <td>BFF</td><td>BELOW FINISHED FLOOR</td> <td>NOI</td><td>NOISE CRITERIA</td> </tr> <tr> <td>BFG</td><td>BELOW FINISHED GRADE</td> <td>NF</td><td>NON-FUSED</td> </tr> <tr> <td>BFP</td><td>BOILER FEED PUMP</td> <td>NIC</td><td>NOT IN CONTRACT</td> </tr> <tr> <td>BHP</td><td>BRAKE HORSEPOWER</td> <td>NOI</td><td>NOISE CRITERIA</td> </tr> <tr> <td>BI</td><td>BINARY INPUT</td> <td>OA</td><td>OUTSIDE AIR</td> </tr> <tr> <td>BO</td><td>BINARY OUTPUT</td> <td>PICV</td><td>PRESSURE INDEP. 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GPM	GALLONS PER MINUTE	WB	WET BULB																																																																																																																																																																																																																																																																																																		
HOA	HAND-OFF-AUTOMATIC	WC	WATER COLUMN																																																																																																																																																																																																																																																																																																		
HP	HORSEPOWER	WPD	WATER PRESSURE DROP																																																																																																																																																																																																																																																																																																		
		XP	EXPLOSION PROOF																																																																																																																																																																																																																																																																																																		
<p>ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS. REFER TO DUCTWORK SPECIFICATIONS FOR DUCTWORK INSULATION AND LINER INFORMATION.</p>		<p>HVAC CONTROL DEVICES</p> <p>HUMIDISTAT</p> <p>THERMOSTAT</p> <p>CARBON MONOXIDE SENSOR</p> <p>CARBON DIOXIDE SENSOR</p> <p>DIFFERENTIAL PRESSURE SENSOR</p> <p>FLOW SWITCH</p> <p>HUMIDITY SENSOR</p> <p>PULL STATION</p> <p>STATIC PRESSURE</p> <p>SWITCH</p> <p>TEMPERATURE SENSOR</p>																																																																																																																																																																																																																																																																																																			

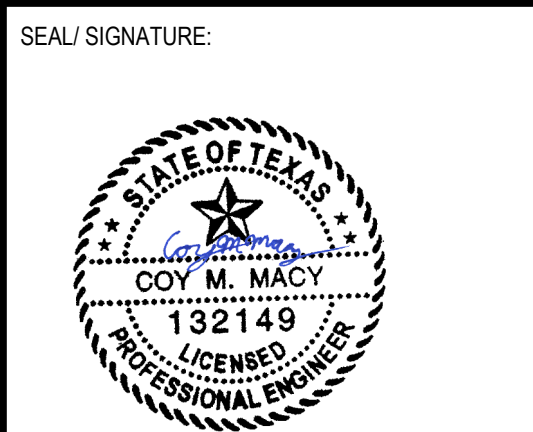


CONSULTANTS:

HENDERSON
ENGINEERS

1345 LEXENA DRIVE, SUITE 300
LEXENA, KS 66214
TEL 913.742.3000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM

TX. CORPORATE NO. F-001236
EXPIRES 9/30/2026



10/3/2025

1	HEI	2025-09-29	IFC SET
A	HEI	2025-08-18	ADDENDUM A
	HEI	2025-02-18	PERMIT BID SET
	HEI	2025-01-28	75% SET



SHAKE SHACK
MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX
77096
SHACK #1651

ADDENDUM A

MECHANICAL GENERAL INFORMATION

DRAWN BY: Author
CHECKED BY: Checker
JOB NO: 20240294.00

M001

NO.	BY	DATE	DESCRIPTION
1	HEI	2025-09-29	IFC SET
A	HEI	2025-08-18	ADDENDUM A
	HEI	2025-02-18	PERMIT BID SET
	HEI	2025-01-28	75% SET



SHAKE SHACK
MEYERLAND, TX

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77096
SHACK #1651

ADDENDUM A

MECHANICAL FLOOR PLAN

DRAWN BY: Author
CHECKED BY: Checker
JOB NO: 20240294.00

M101

MECHANICAL GENERAL NOTES:

- DO NOT ROUTE ANY DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS.
- REFER TO SHEET M001 FOR ADDITIONAL GENERAL NOTES AND REQUIREMENTS.
- REFER TO DETAILS AND SCHEDULES SHEETS FOR FURTHER INFORMATION.
- MOUNT ALL THERMOSTATS AND SENSORS CONTROLLING HVAC EQUIPMENT AT 48" AFF UNLESS OTHERWISE NOTED.

LANDLORD TO PROVIDE ROOF OPENINGS FOR EXHAUST AIR UNITS. TENANT CONTRACTOR TO COORDINATE WITH LANDLORD AND PROVIDE REQUIRED OPENING SPECIFICATIONS.

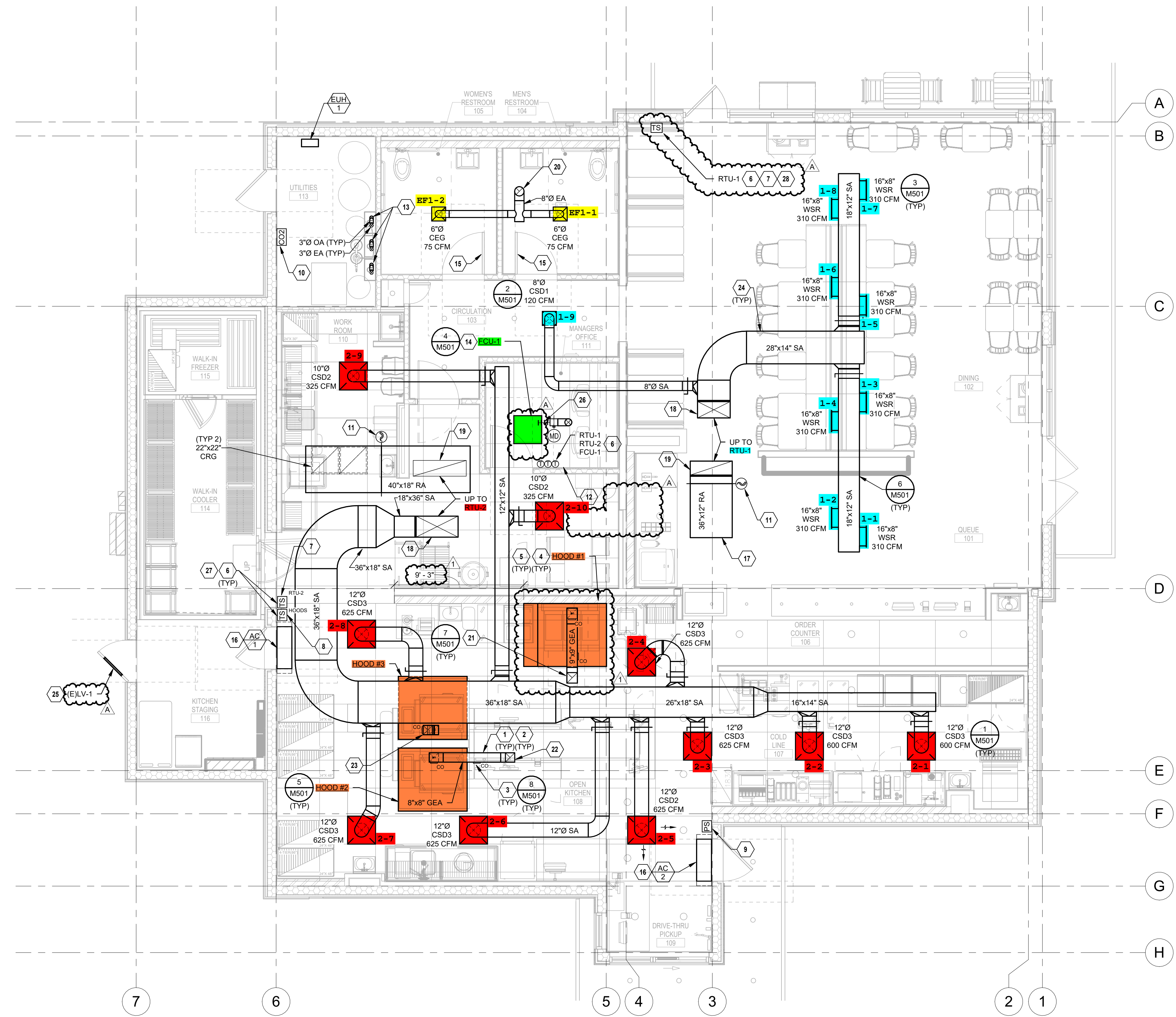
WALK-IN COOLER/FREEZER INFORMATION:

THE WALK IN COOLER VOLUME IS 1018 FT3 AND IS PROVIDED WITH A 1 1/4 HP COMPRESSOR LOCATED ON THE ROOF AND 11.0 LBS OF R448/449 REFRIGERANT.

THE WALK IN FREEZER VOLUME IS 358 FT3 AND IS SUPPLIED WITH A 2 1/3 HP COMPRESSOR LOCATED ABOVE THE FREEZER AND 11.0 LBS OF R448/449 REFRIGERANT.

MECHANICAL PLANS NOTES:

- TYPE I GREASE HOOD EXHAUST DUCTWORK SHALL BE MINIMUM 18 GAUGE STEEL OR MINIMUM 18 GAUGE STAINLESS STEEL WITH LIQUID TIGHT WELDS.
- INSTALL ACCESS PANELS FOR CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES. TRANSITION GREASE DUCTWORK AS REQUIRED TO HOOD AND FAN CONNECTIONS. PROVIDE 45° MAX OFFSETS AS REQUIRED TO COORDINATE WITH STRUCTURE. PROVIDE RADIUS ELBOWS WITHOUT TURNING VANES. SLOPE HORIZONTAL GREASE DUCT BACK TOWARDS HOOD AT MINIMUM OF 1/4" PER LINEAL FOOT. GREASE DUCTS SHALL BE CONTAINED IN A UL APPROVED GREASE DUCT WRAP SYSTEM.
- INSTALL "DUCTIMATE ULTIMATE DOORS" ON GREASE DUCT FOR CLEANING IN LOCATION(S) SHOWN AT A MINIMUM AND AS REQUIRED BY NFPA 96 AND LOCAL CODES.
- TYPE I HOODS SHALL BE FURNISHED COMPLETE WITH INTERNALLY PIPED FIRE SUPPRESSION SYSTEM AND EXTERNAL FOAM SUPPLY BOTTLES WITH REMOTE PULL CONTROLS AND IN COMPLIANCE WITH NFPA 96, DIVISION 23 SHALL COORDINATE COMPLETE INSTALLATION WITH FIRE PROTECTION CONTRACTOR TO MEET APPROVAL OF LOCAL INSPECTOR AND CODE COMPLIANCE INCLUDING TESTING.
- HOOD SHALL OVERHANG THE COOKING SURFACE BY AT LEAST 6" ON BOTH SIDES.
- MOUNT THERMOSTATS, HUMIDITY SENSORS, AND TEMPERATURE SENSOR(S) ON WALL. THERMOSTATS AND SENSOR(S) SHALL BE LABELED TO MATCH THE UNIT TAG AND CORRESPOND TO THE ELECTRICAL LEGEND IN THE ELECTRICAL PANELBOARD SERVING THE EQUIPMENT. COORDINATE COLOR WITH ARCHITECT.
- COMBINATION TEMPERATURE SENSOR AND HUMIDITY SENSOR.
- MOUNT TEMPERATURE SENSOR PROVIDED WITH KITCHEN EXHAUST HOODS ON WALL.
- INSTALL HOOD FIRE SUPPRESSION MANUAL PULL STATION. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH FIRE SUPPRESSION SYSTEM INSTALLER AND THE ARCHITECT.
- CARBON DIOXIDE SENSOR WITH REMOTE ALARM REPEATER FURNISHED BY OWNER'S CO2 VENDOR AND LOCATED AT 12' AFF. THE SENSOR SHALL BE EQUIPPED WITH A LOCAL AUDIBLE AND VISUAL ALARM. THE LOW LEVEL ALARM SHALL ACTIVATE THE LOCAL AUDIBLE AND VISUAL ALARM. IF THE BUILDING HAS A FIRE ALARM, PROVIDE THE APPROPRIATE FIRE ALARM INTERFACE MODULE TO INTERLOCK WITH THE BUILDING FIRE ALARM SYSTEM. THE HIGH-LEVEL CO2 ALARM SHALL SIGNAL BUILDING FIRE ALARM WHEN EQUIPPED. LOW LEVEL ALARM - 0.5% ± 5,000 PPM. HIGH LEVEL ALARM - 3.0% ± 30,000 PPM.
- INSTALL DUCT SMOKE DETECTOR IN RETURN AIR PLENUM.
- INSTALL EMERGENCY ALARM IN MANAGER'S OFFICE TO INDICATE CARBON MONOXIDE AND CARBON DIOXIDE DETECTION IN MECHANICAL ROOM. PROVIDE LIGHT IN OFFICE WITH TAG FOR EACH ALARM.
- PROVIDE COMBUSTION AIR AND EXHAUST PIPE AND ROUTE TO CONCENTRIC VENT THROUGH ROOF.
- REFRIGERANT PIPING UP TO CU-1 ON ROOF, REF 1/M150.
- CONTRACTOR TO COORDINATE 1" UNDERCUT ON DOOR FOR EXHAUST AIR PATH.
- AIR CURTAIN MOUNTED ABOVE DOOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE 1/4" GALVANIZED CONSTRUCTION HARDWARE CLOTH SCREEN OVER OPEN END OF RETURN DUCT. PROVIDE DUCT LINER IN BOOT. RETURN AIR DUCT SHALL BE MINIMUM 36" HORIZONTAL EXTENSION FOR SOUND ATTENUATION.
- PROVIDE SA DUCT THROUGH ROOF. FULL SIZE OF UNIT OPENING, AND CONNECT TO UNIT WITH FLEXIBLE CONNECTOR. TRANSITION 45 DEGREES THROUGH ROOF CURB.
- PROVIDE EA DUCT THROUGH ROOF. FULL SIZE OF UNIT OPENING, AND CONNECT TO UNIT WITH FLEXIBLE CONNECTOR. TRANSITION 45 DEGREES THROUGH ROOF CURB.
- PROVIDE EA DUCT THROUGH ROOF. TRANSITION TO EXHAUST FAN INLET SIZE WITHIN CURB.
- 9"x9" GREASE EXHAUST DUCT UP TO KEF-1 ON ROOF.
- 8"x8" GREASE EXHAUST DUCT UP TO KEF-3 ON ROOF.
- ROUTE DUCTWORK LEVEL, TIGHT TO STRUCTURE, AND ABOVE LIGHTS. COORDINATE WITH STORM DRAINAGE, STRUCTURAL AND ELECTRICAL CONTRACTORS.
- VERIFY THAT LOUVERS COMPLY WITH ALL LOCAL CODES REQUIREMENTS FOR RESISTANCE TO WIND-DRIVEN RAIN.
- TRANSITION 6" OUTDOOR AIR DUCT TO 4" FLEXIBLE DUCTWORK AND CONNECT TO UNIT.
- PROVIDE LOOKABLE ACRYLIC TEMPERATURE SENSOR COVER FOR SENSORS IN KITCHEN AREA.
- DINING ROOM TEMPERATURE SENSOR SHALL BE SURFACE MOUNT TYPE TO MINIMIZE AFFECTS OF EXTERIOR WALL HEAT GAIN/LOSS.



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

ALL GREASE DUCT TO BE WATER TESTED BY ENVIROMATIC AT MECHANICAL CONTRACTOR'S EXPENSE. CONTACT OWNER'S NATIONAL ACCOUNT VENDOR:

ENVIROMATIC
DON PFLEDERER
1.800.325.8476
inspections@enviromatic.com

THE BUILDING'S HVAC SYSTEMS SHALL BE BALANCED BY NATIONAL TAB (NO EXCEPTIONS) AND CONTRACTED BY THE GENERAL CONTRACTOR.

CONTACT:
WILL TURNBOUGH
will@nationaltab.com
855-682-6822 ext704

- MECHANICAL PLAN NOTES:**
- 1 PROVIDE WATER HEATER CONCENTRIC VENT KIT SPECIFIED IN THE WATER HEATER INSTALLATION MANUAL.
 - 2 MAINTAIN ALL OUTSIDE AIR INTAKES A MINIMUM OF 10'-0" RADIUS FROM EXHAUST.
 - 3 CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. SINGLE LINESET SHOWN FOR CLARITY. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
 - 4 TURN DOWN #9 INTAKE AND END OPEN OVER ROOF (MIN. 24") WITH INSECT SCREEN.
 - 5 CONTRACTOR SHALL COORDINATE WITH NATIONAL TAB TO PROVIDE UV-PH INDOOR AIR PURIFICATION SYSTEM, MODEL PHI-PKG-24V. INSTALL IN UNIT BLOWER COMPARTMENT PER MANUFACTURER'S INSTRUCTIONS.
 - 6 AREA RESERVED FOR REFRIGERATION CONDENSER(S) PROVIDED BY KITCHEN EQUIPMENT CONTRACTOR. COORDINATE EQUIPMENT LOCATION AND CONDENSER INSTALLATION WITH KITCHEN EQUIPMENT CONTRACTOR.
 - 7 REFERENCE PLUMBING DRAWINGS FOR CONDENSATE DRAIN ROUTING AND TERMINATION REQUIREMENTS.



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

CONSULTANTS:
HENDERSON
 ENGINEERS
 8345 LENEXA DRIVE, SUITE 300
 LENEXA, KS 66214
 TEL. 913.742.5000 FAX 913.742.5001
 WWW.HENDERSONENGINEERS.COM
 245504192
 TX CORPORATE NO. F-001236
 EXPIRES 9/30/2026

SEAL SIGNATURE:

 COY M. MACY
 132149
 PROFESSIONAL ENGINEER
 STATE OF TEXAS

10/3/2025

NO.	BY	DATE	DESCRIPTION
1	HEI	2025-09-29	IFC SET
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	HEI	2025-02-18	PERMIT BID SET
	HEI	2025-01-28	75% SET



SHAKE SHACK
 MEYERLAND, TX

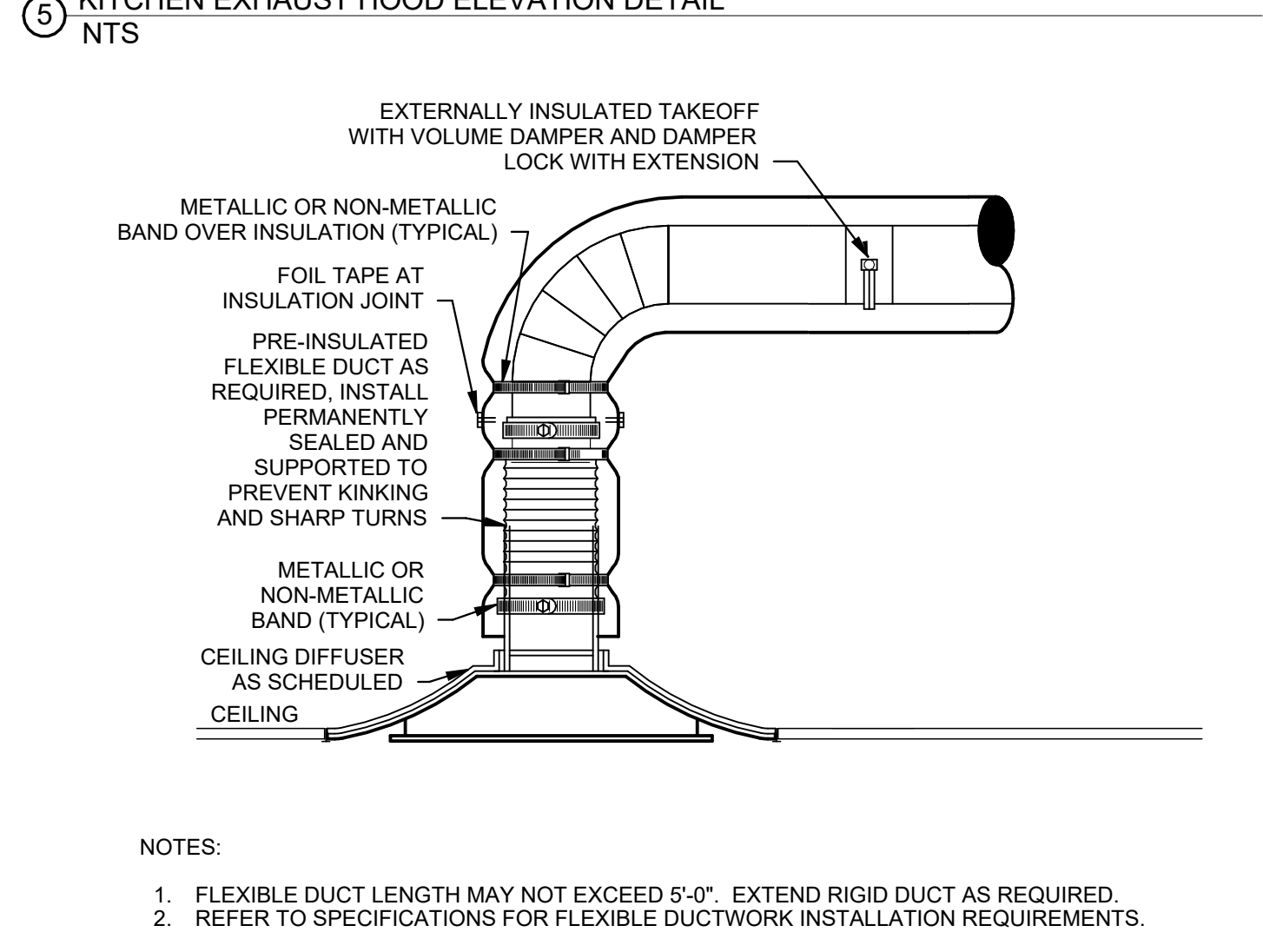
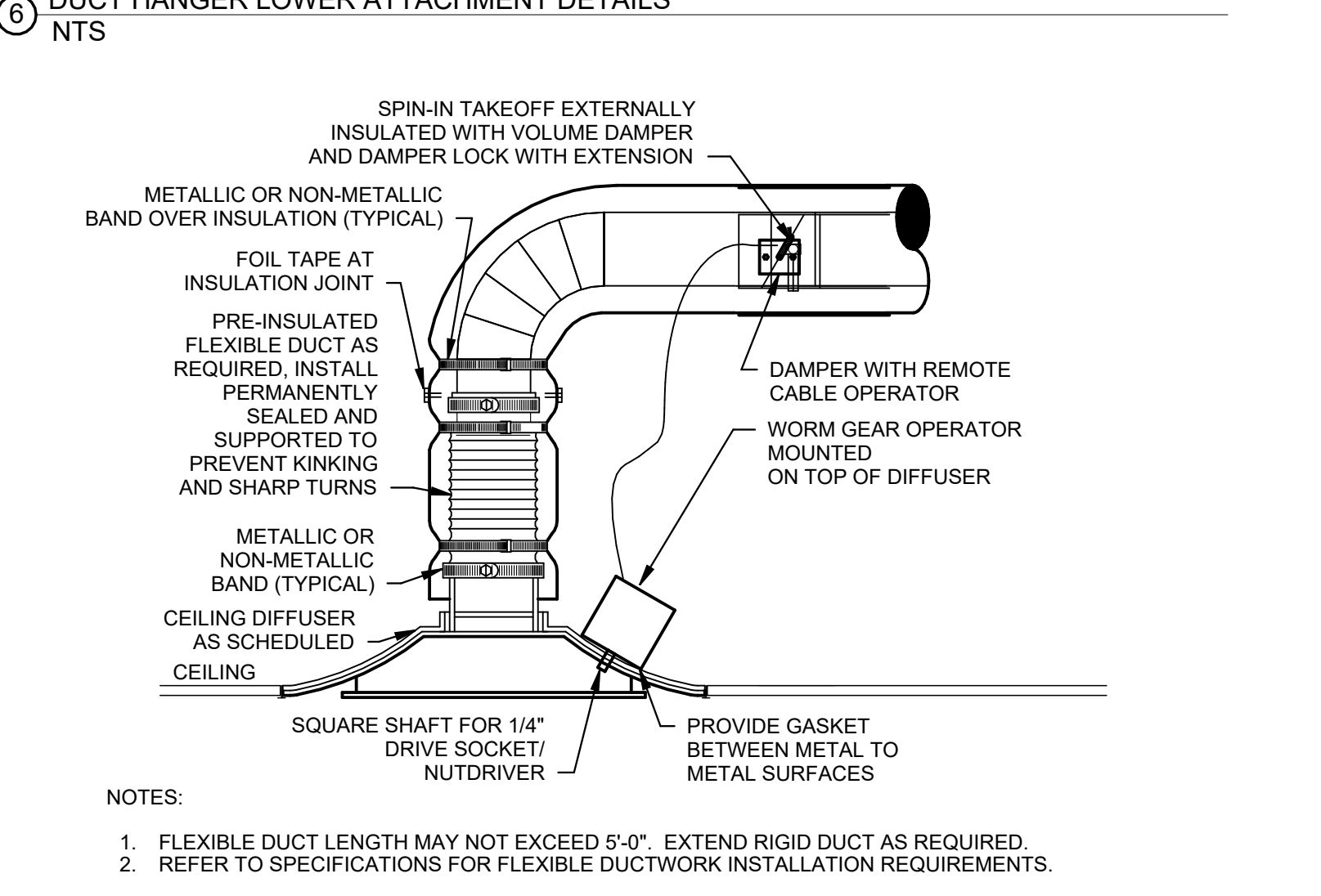
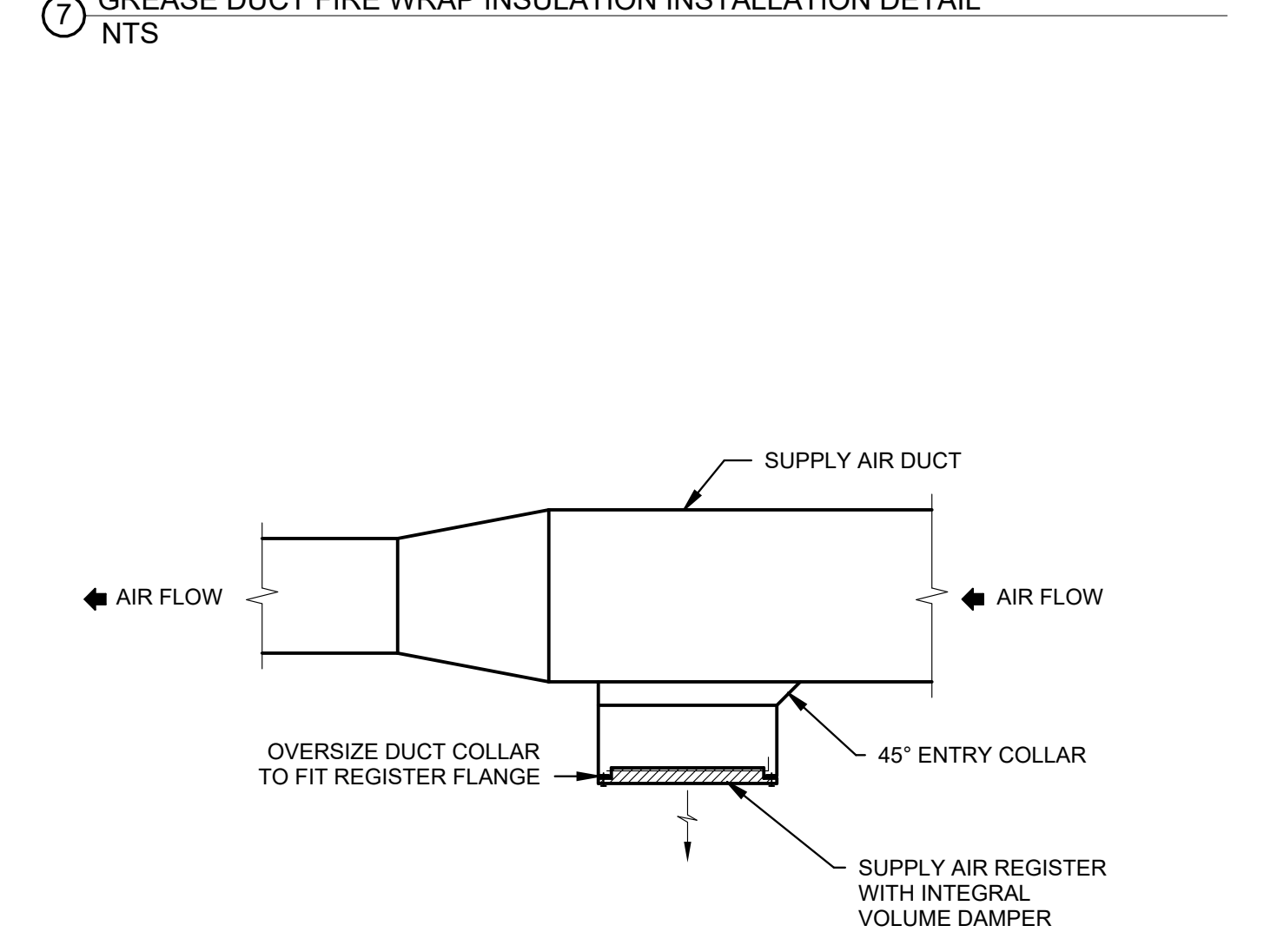
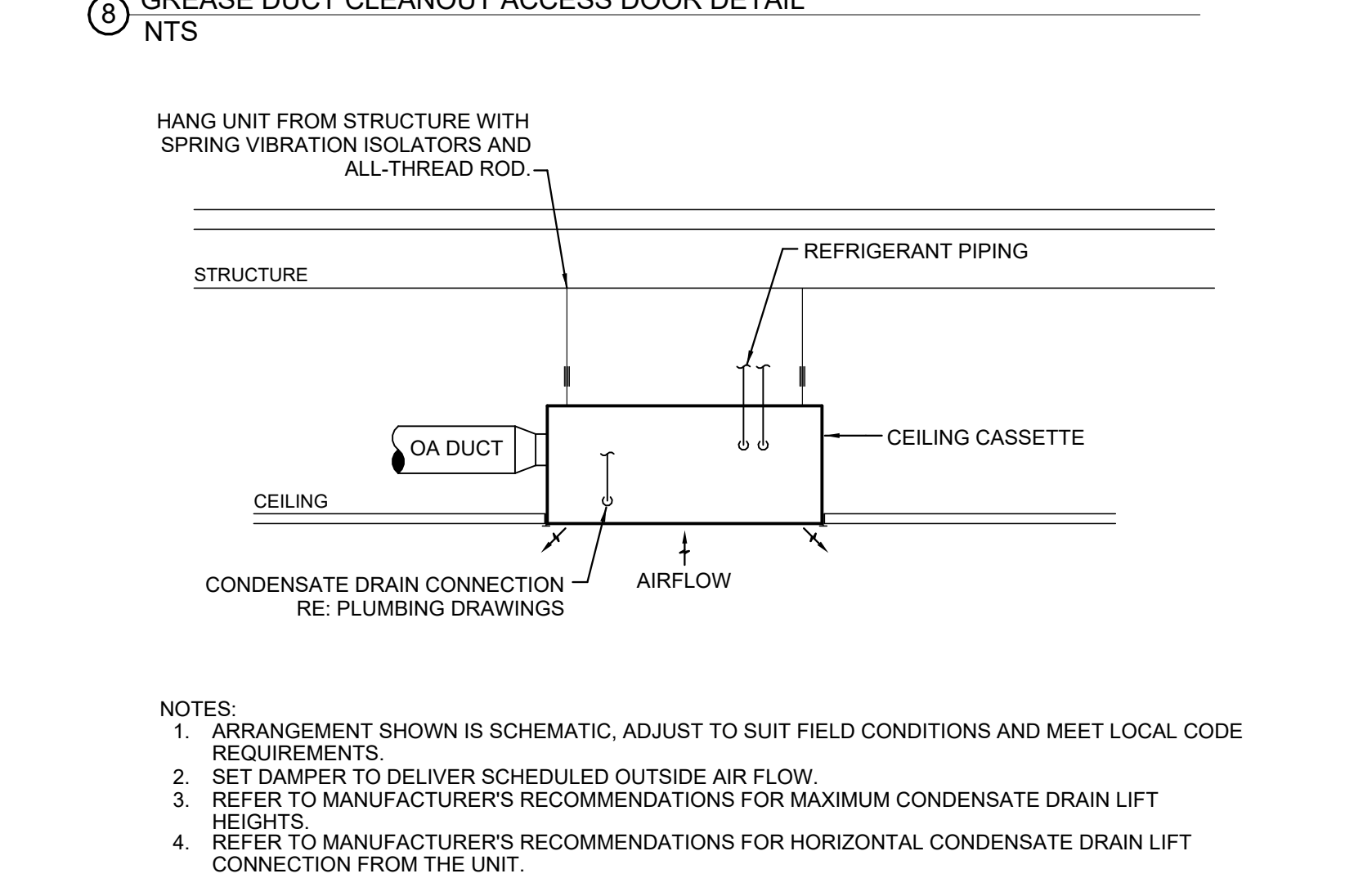
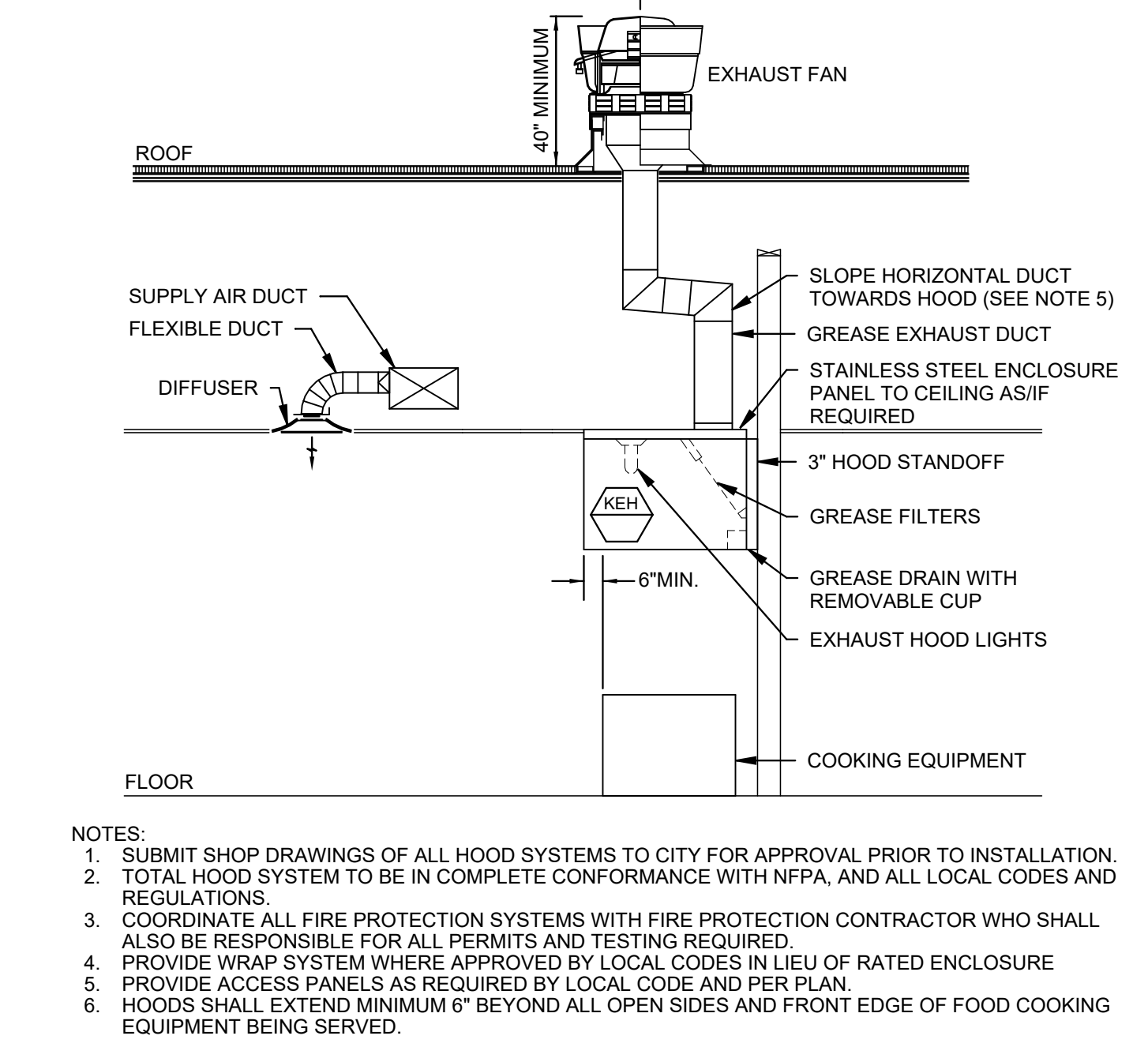
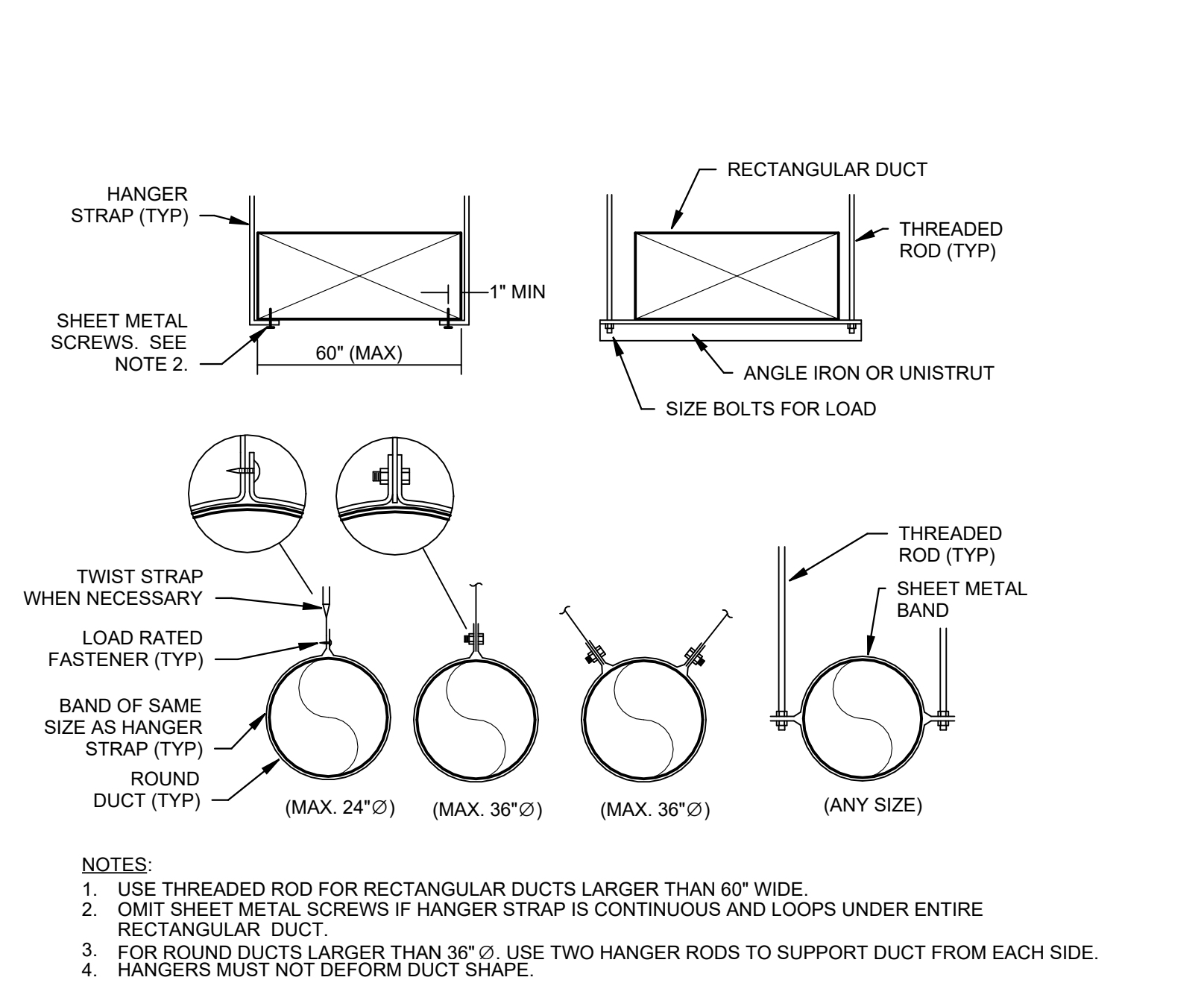
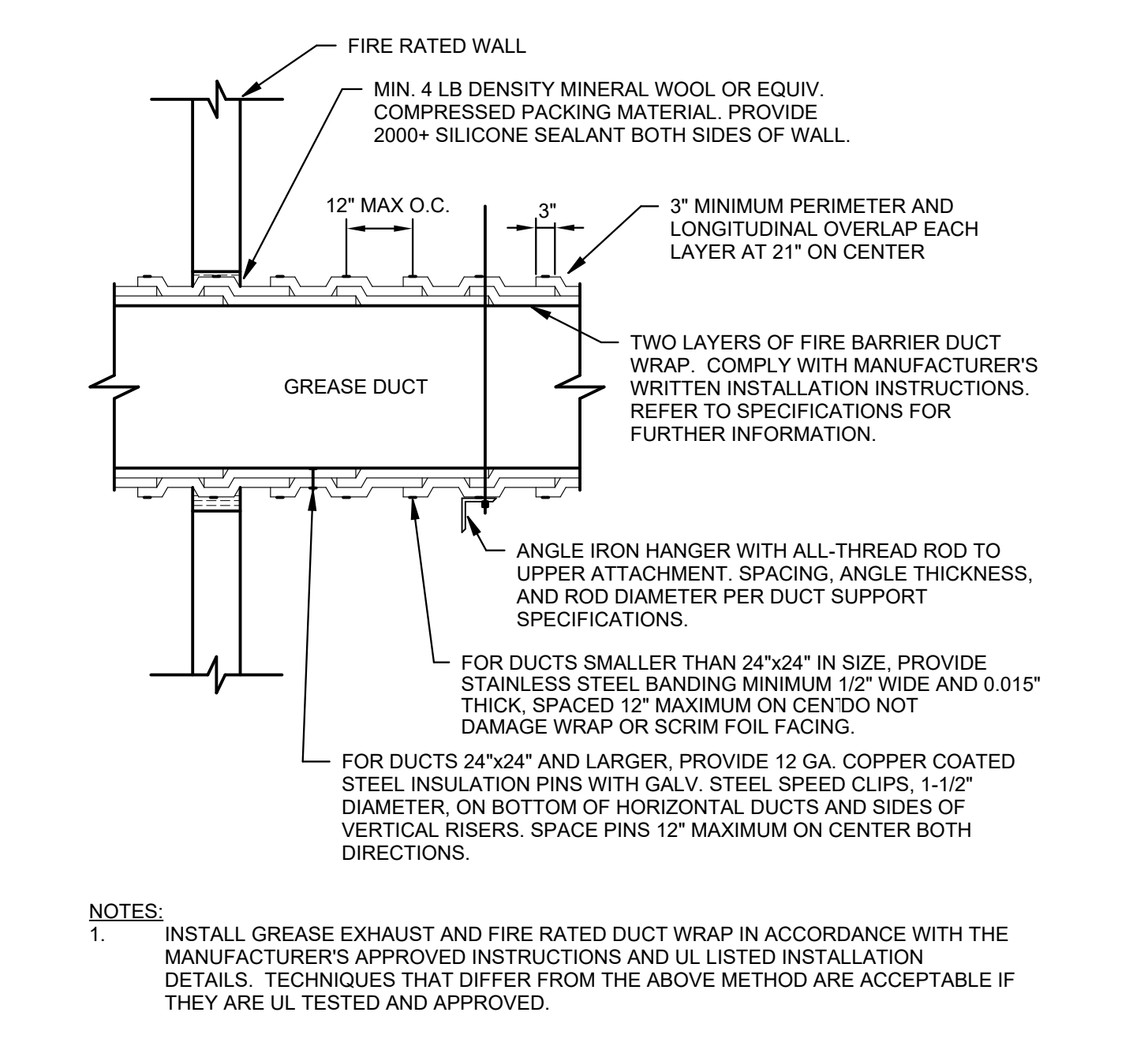
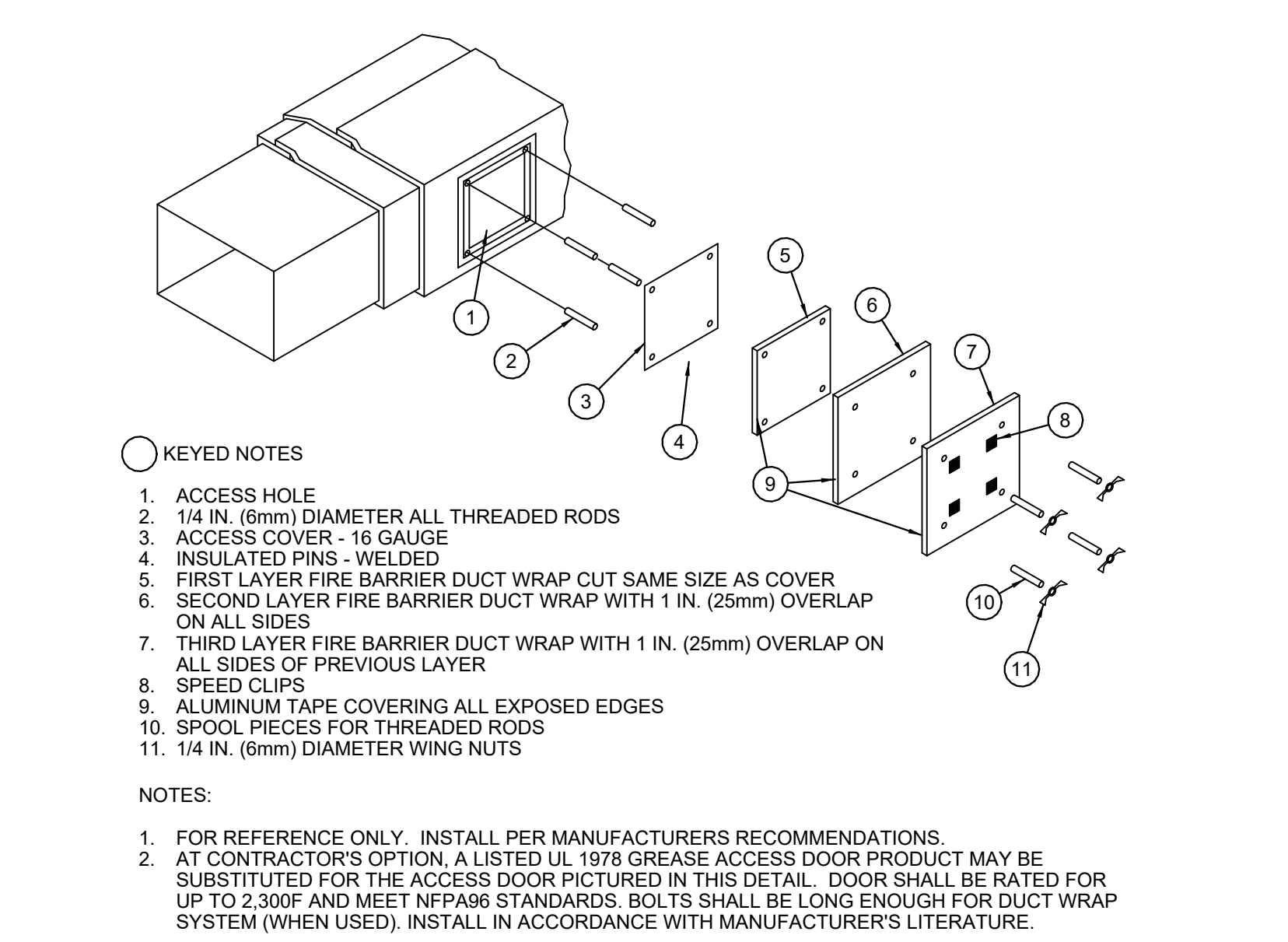
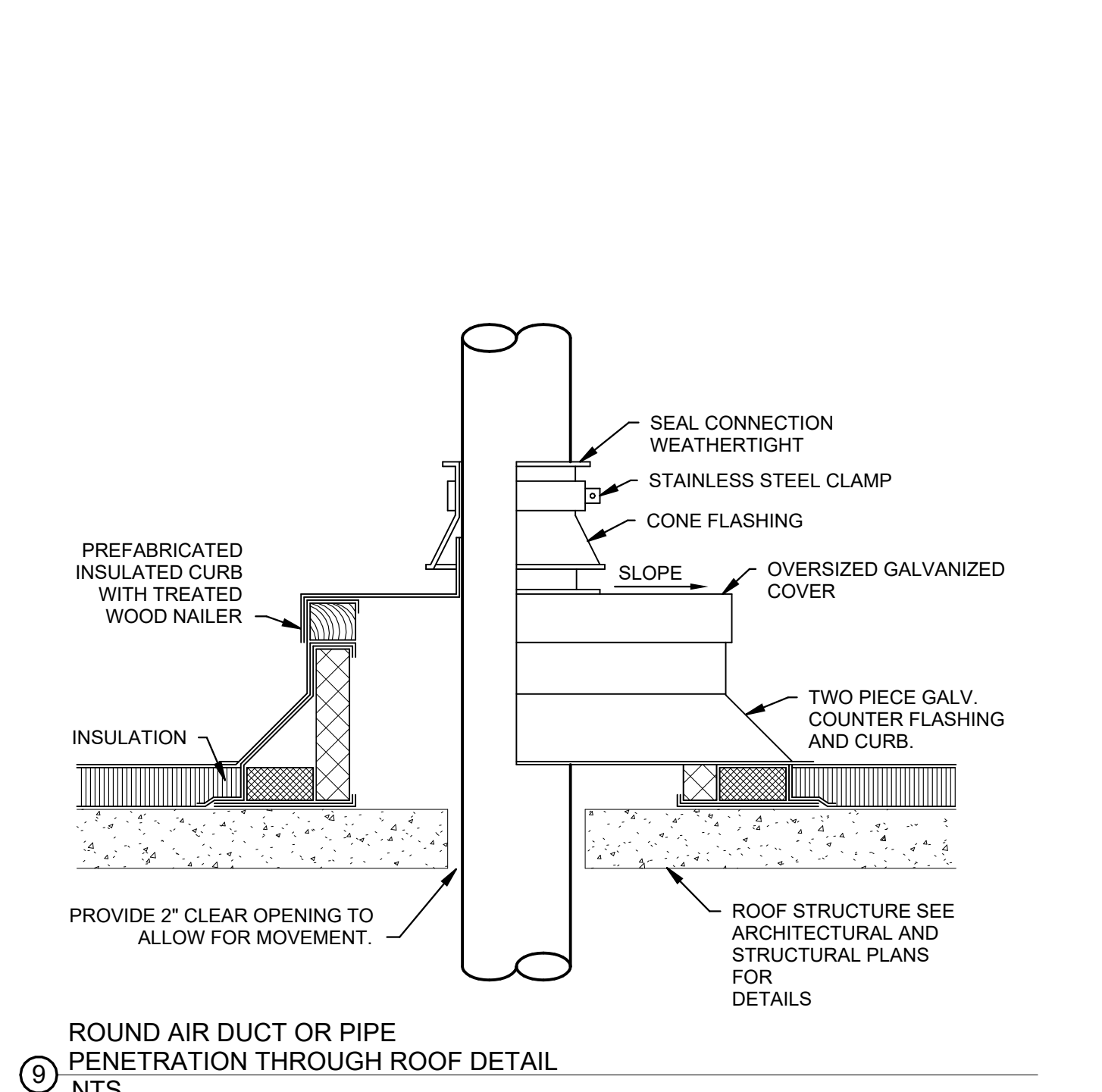
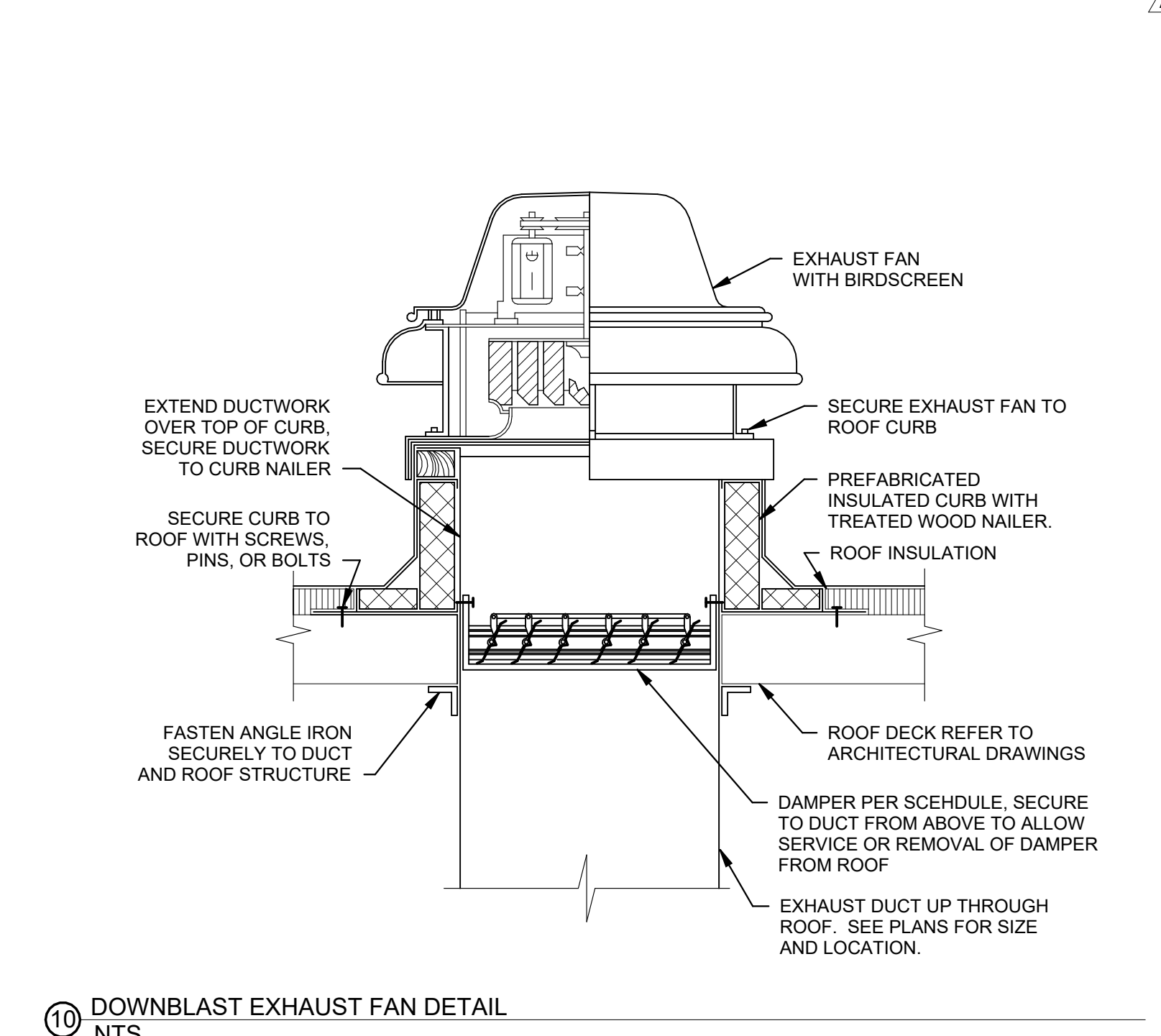
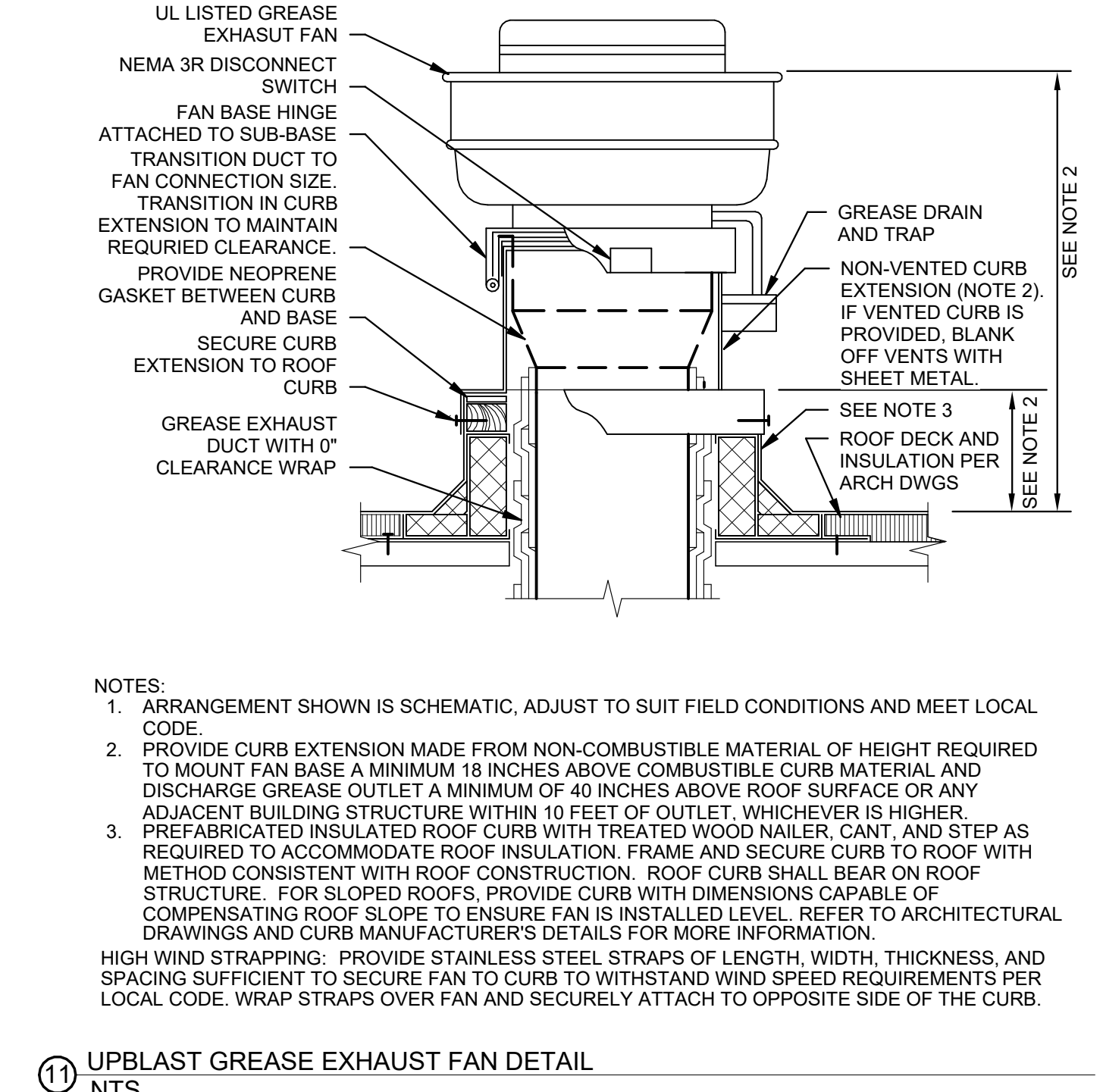
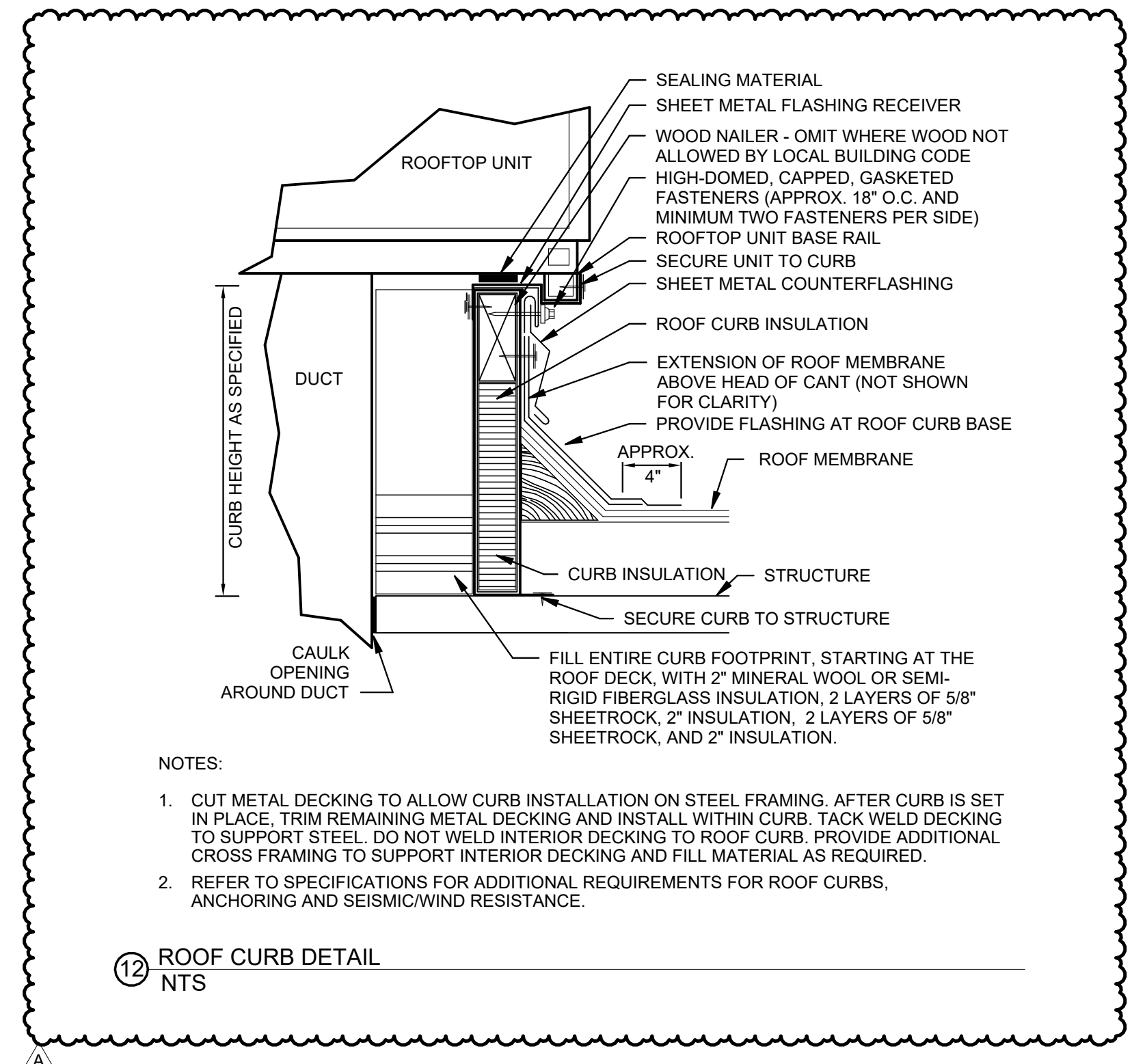
8815 W. LOOP SOUTH, HOUSTON, TX
 77096
 SHACK #1651

ADDENDUM A

MECHANICAL ROOF PLAN

DRAWN BY: _____ Author
 CHECKED BY: _____ Checker
 JOB NO: 20240294.00

M150



NO.	BY	DATE	DESCRIPTION
1	HEI	2025-09-29	IFC SET
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	HEI	2025-01-28	75% SET



SHAKE SHACK
MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX
77096
SHACK #1651

ADDENDUM A

MECHANICAL DETAILS

DRAWN BY: Author
CHECKED BY: Checker
JOB NO: 20240294.00

M501

Division 23: HEATING, VENTILATING, AND AIR CONDITIONING

- 1. GENERAL INSTRUCTIONS
- A. GENERAL REQUIREMENTS

All requirements under Division 01 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 01, this section and division take precedence. Become thoroughly familiar with all its conditions as requirements that affect this division, section, or both. Work required under this division includes all materials, equipment, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate the function of each system as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and any portion of work described in one shall be provided as if described in both. In the event of discrepancies, notify the Engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including standards and conditions. They convey the scope of work, including the intended general arrangement of the systems without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory, and properly operating system.

B. DEFINITIONS

Division: References contained in this specification follow the numbering system defined in the Construction Specifications Institute (CSI) MasterFormat 2004 Edition. Specification Divisions 01 through 13 provided with this project may reference the CSI MasterFormat 1995 Edition. The corresponding division references between the 2004 Edition and 1995 Edition are as follows:

2004 Edition	1995 Edition
1. Division 21 - Duct Suppression	Division 15
2. Division 22 - Plumbing	Division 10
3. Division 23 - HVAC	Division 10
4. Division 24 - Electrical	Division 16
5. Division 27 - Communications	Division 16
6. Division 28 - Electronic Safety and Security	Division 16

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations."

Install: "to perform all operations at the project site including, but not limited to, the actual unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up, and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install."

Furnished by Owner (or Owner-Furnished) or Furnished by Others: "an item furnished by the Owner or under other divisions or contracts, and installed under the requirements of this division, complete and ready for intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division."

Engineer: Where referenced in this division, "Engineer" is the Engineer of Record and the Design Professional for the work under this division, and is a consultant to, and an authorized representative of the Architect, as defined in the General and/or Supplementary Conditions. When used in this division, Engineer means increased involvement by and obligations to the Engineer, in addition to involvement by and obligations to the Architect.

AHJ: The local code and/or inspection agency (Authority) Having Jurisdiction over the work.

NRTL: Nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project. Nationally recognized testing laboratories and standards listed are used only to present the characteristics required and are not intended to restrict the use of other NRTLs that are acceptable to the AHJ and standards that meet the specified criteria.

Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Substitutions require approval by the Engineer. Substitutions require approval by the Engineer.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

The terms "approved equal," "equivalent," or "equal" are used synonymously and shall mean "accepted, or acceptable to the Engineer as equivalent to the item or manufacturer specified." The term "approved" shall mean labeled, listed, or both, by an NRTL, and acceptable to the AHJ over this project.

C. PREBID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to comply with this requirement shall not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

D. MATERIAL AND WORKMANSHIP

Provide new material, equipment, and apparatus under this contract unless otherwise stated herein, of best quality normally used for the purpose in good commercial practice, and free from defects. Install material and equipment in accordance with the manufacturer's installation instructions. Model numbers listed in the specifications or shown on the drawings are not necessarily intended to designate the required trim, written descriptions of the trim govern model numbers.

Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States or certified to meet the specified ASTM and ANSI standards.

Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the Architect and Engineer. Workmanship shall be the finest possible by experienced mechanics. Installations shall comply with applicable codes and laws.

The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal noise caused by rattling equipment, piping, ducts, air devices, and squeaks in rotating components shall not be acceptable. Materials and equipment shall be of commercial specification grade in quality. Light duty and residential grade equipment shall not be accepted unless otherwise indicated.

Remove from the premises waste material present as a result of work, including cartons, crating, paper, stickers, and/or excavation material not used in backing, etc. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.

Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction. Provide all safety lights, guards, and warning signs required for the performance of the work and for the safety of the public.

E. MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers are listed alphabetically and not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

F. COORDINATION

Coordinate work with that of other trades so that the various components of the systems are installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. Components which are installed without respect to the above shall be relocated at no additional cost to the Owner.

Unless otherwise indicated, the General Contractor shall provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the General Contractor with information where chases and openings are required. Contractor shall keep informed as to the work of other trades engaged in the construction of the project and shall execute work in a manner as to not interfere with or delay the work of other trades.

Figured dimensions shall be taken in reference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor shall be held responsible for errors that could have been avoided by proper checking and inspection. Components shall be rejected at no additional cost to the Owner.

G. ORDINANCES AND CODES

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the following:

- 1. National Electrical Code (NEC)
- 2. National Fire Protection Association (NFPA)
- 3. Underwriters Laboratories (UL)
- 4. Occupational Safety and Health Administration (OSHA)
- 5. American Society of Mechanical Engineers (ASME)
- 6. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- 7. American National Standards Institute (ANSI)
- 8. American Society of Testing and Materials (ASTM)
- 9. Other national standards and codes where applicable.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the attention of the Architect and Engineer for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for, and furnish certificates of inspection to Owner.

H. PROTECTION OF EQUIPMENT AND MATERIALS

Store and protect from damage equipment and materials delivered to job site. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dust, dirt, paint, water, or physical damage. Replace insulation that has become wet at any time during construction. Drying the insulation is not acceptable. Seal any tears or joints of internal fiberglass insulation. Equipment and material damaged by construction activities shall be rejected and Contractor shall furnish new equipment and material of a like kind at his own expense.

Keep premises broom clean of foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work. Remove debris from ceiling/return air plenum, including dust.

Plug, seal, or cap open ends of ductwork and piping systems while stored and installed during construction when not in use to prevent accumulation of debris into the systems. Remove temporary protection prior to starting equipment and turning the system over to the owner.

I. SUBSTITUTIONS

Materials, products, equipment, and systems described in the Bidding Documents establish a standard of required function, dimension, appearance, quality and structural engineer. For post-tension slabs, any slab and closely coordinate all core drill locations with Architect and Structural Engineer prior to performing any work. Obtain approval from Architect and Structural Engineer for all core drills and penetrations at least four days prior to performing work. Penetrations shall be made as small as possible while maintaining required clearances between the building element penetrations and the duct system that adjustments be made to match the adjacent construction including fire ratings, if applicable. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the Architect.

Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, Architect, and Owner the following:

- 1. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects unless stated otherwise in the substitution request.
- 2. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance services, and sourcing of replacement parts and materials.
- 3. Proposed substitution has received necessary approvals of authorities having jurisdiction.
- 4. Same warranty will be furnished for proposed substitution as for specified Work.
- 5. If installed substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.
- 6. Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation. No substitution will be considered prior to receipt of bids unless written request for approval is bid has been received by the Engineer at least ten (10) calendar days prior to the date for receipt of bids.

If the proposed substitution is approved prior to receipt of bids, such approval will be stated in an addendum. Bidders shall not rely upon approval of a substitution until such time as the substitution is approved in writing. No substitutions will be considered after the contract is awarded unless specifically provided in the contract documents.

J. SUBMITTALS

Assemble and submit for review shop drawings, material lists, manufacturer product literature for equipment to be furnished, and items requiring coordination between contractors under this contract. Provide submittals in sufficient detail so as to demonstrate compliance with these contract documents and the design concept. Prior to transmitting submittals, verify that the equipment submitted is mutually compatible and suitable for the intended use, will fit the available space, and maintain manufacturer recommended service clearances. If the size of equipment furnished makes necessary any change in location or configuration, submit a shop drawing showing the proposed layout.

Transmit submittals as early as required to support the project schedule. Allow for two weeks Engineer review time, plus to/from mailing time via the Architect, plus a duplication of this time for resubmittal, if required. Only those sections require resubmission.

Submittals shall contain the project name, applicable specification section, submittal date, equipment identification acronym as used on the drawings, and the Contractor's stamp. The stamp shall certify that the submittal has been checked by the Contractor, complies with the drawings and specifications, and is coordinated with other trades. Manufacturer product literature shall include shop drawings, fasteners ready for installation, concrete/bricks, flash sealers, flush sealers, and other materials. Performance criteria, and accessories that are being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

Submittals and shop drawings shall not contain the firm name, logo, seal, or signature of the Engineer. They shall not be copies of the work product of the Engineer. If the Contractor desires to use elements of such product, refer to paragraph "Electronic Drawing Files" for procedures to be used.

Separate submittals according to individual specification sections. Illegible submittals will be rejected and returned without review. Catalog data shall be properly bound, identified, indexed and tabbed in a 3-ring binder. Each item and model number shall be clearly marked and accessories indicated. Label the catalog data with the equipment identification acronym or number as used on the drawings and include performance curves, capacities, sizes, weights, materials, finishes, wiring diagrams, electrical requirements and deviations from specified standards. For equipment with motor starters or VFDs, include short circuit current ratings. Mark out inapplicable items. Shop drawings will be returned without review if the above mentioned requirements are not met.

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E. ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal piping, conduit, and rough-in except in unfinished areas and where otherwise shown.

F. STRUCTURALSUPPORT SYSTEMS

Structural steel used for support of equipment, ductwork and piping shall be new, clean, and conform to ASTM Designation A-36.

Support mechanical components from the building structure. Do not support mechanical components from ceilings, other mechanical or electrical components, and other non-structural elements.

G. PRE-ENGINEERED ROOF EQUIPMENT SUPPORTS AND CURBS

Provide prefabricated equipment support rails and roof curbs manufactured by AES Industries, Custom Curb, Inc., Pate Company, Thybar or approved equal. Provide with fully mitered raised cant and step to match roof insulation thickness, welded, minimum 18 gauge galvanized steel with internally reinforced to load bearing factors of equipment being supported, minimum 1-1/2 inch thick, 3 pound rigid insulation internal to sheathing insulation where required. Minimum installed seal width, and minimum 18 gauge jacket with counterflashing where equipment does not fully cover the equipment support. Provide sloped roof equipment supports to enable level installation. Provide rigid backing material behind cant to maintain cant slope. Provide multiple support rails to uniformly support the equipment. Attach to roof structure according to manufacturer's installation instructions.

Attach equipment directly to pre-engineered roof equipment support using one of the following methods:

1. Hold-Down Brackets: Coordinate with the curbs manufacturer to determine the quantity and size of hold-down brackets and fasteners, with installation instructions for each unit meet a Building Design Risk Category of I and a Design Wind Speed of 139 mph.

H. ACCESS PANELS AND DOORS

Refer to Architectural documents for specification of access panels and doors.

Provide access doors for all concealed equipment and duct and piping accessories that require service where indicated or as

ROOFTOP UNIT CONTROL MATRIX						
CONTROL FEATURE	UNITS	RTU-1 SETPOINT OR Y/N	RTU-2 SETPOINT OR Y/N	NOTES		
CONTROL STRATEGY		Y	Y			
SPACE TEMPERATURE CONTROL		Y	Y			
HEATING AND COOLING SET POINTS						
COOLING MODE ENABLE - SPACE TEMPERATURE - OCCUPIED SETPOINT	"F DB	75	75			
COOLING MODE ENABLE - SPACE TEMPERATURE - UNOCCUPIED SETPOINT	"F DB	80	80			
COOLING - SUPPLY AIR TEMPERATURE SETPOINT	"F DB	55	55			
HEATING MODE ENABLE - SPACE TEMPERATURE - OCCUPIED SETPOINT	"F DB	70	70			
HEATING MODE ENABLE - SPACE TEMPERATURE - UNOCCUPIED SETPOINT	"F DB	60	60			
HEATING - SUPPLY AIR TEMPERATURE SETPOINT	"F DB	85	85			
DEAD BAND - MINIMUM HEATING AND COOLING TEMPERATURE SETPOINT DIFFERENCE	"F DB	5	5			
DEHUMIDIFICATION SETPOINT HUMIDITY SENSOR FEEDBACK	"RH"	50	50			
DEHUMIDIFICATION - REHEAT CONTROL - SUPPLY AIR TEMPERATURE SETPOINT	"F DB	70	70	F		
PROGRAMMED CONTROL FEATURES						
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT		Y	Y	B		
OPTIMUM START SEQUENCE		Y	Y			
EQUIPMENT COMPONENTS, ACCESSORIES AND CONTROL FEATURES						
COOLING COIL (DX - MODULATING CAPACITY)		Y	Y	K		
DEHUMIDIFICATION - MODULATING HOT GAS REHEAT		Y	Y			
HEATING - NATURAL GAS - MODULATING		Y	Y	K		
RETURN AIR PATH WITH MOTORIZED RETURN AIR DAMPER FOR UNOCCUPIED OPERATION		Y	Y	D, T		
OUTSIDE AIR DAMPER - MOTOR OPERATED		Y	Y	J, T		
RELIEF/EXHAUST AIR DAMPER - BAROMETRIC		Y	N			
RELIEF/EXHAUST AIR DAMPER - MOTOR OPERATED		N	Y	J		
OUTSIDE/SUPPLY AIR AIRFLOW MONITORING		Y	Y	F		
REMOTE TEMPERATURE SENSOR		N	Y	B		
REMOTE COMBINATION TEMPERATURE AND HUMIDITY SENSOR		Y	N	B		
INTEGRATED ECONOMIZER - DIFFERENTIAL ENTHALPY ENABLE (OA ENTHALPY < RA ENTHALPY)	BTULB	Y	Y	U		
SUPPLY FAN CONTROL METHODS						
ON DURING OCCUPIED MODE		Y	Y			
CYCLE WITH LOADS DURING UNOCCUPIED HOURS		Y	Y			
VARIABLE VOLUME - STAGED FAN CONTROL IN RESPONSE TO ACTIVE COOLING COIL STAGES		Y	Y	K, V		
SAFETIES, INTERLOCKS, AND ALARMS						
GAS VALVE SAFETY		Y	Y	F		
RETURN AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	Y	E		
LOW LIMIT FREEZE/STAT - FREEZE/DEFROST SAFETY SHUTDOWN		Y	Y	F		
DIFFERENTIAL PRESSURE SWITCH - FILTER CHANGE ALARM		Y	Y	F		
FIRE ALARM CONTROL PANEL - SAFETY SHUTDOWN INTERLOCK		Y	Y	F		
OUTSIDE AIR DAMPER END SWITCH - SAFETY SHUTDOWN		Y	Y	S		
KITCHEN EXHAUST SYSTEM INTERLOCK		Y	Y	L		

GRILLE, REGISTER, AND DIFFUSER SCHEDULE									
MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION MATERIAL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX. NC	NOTES
CEG	E.H. PRICE	EXHAUST GRILLE W/ DAMPER	80D	STEEL	EGGCRATE	SURFACE	12x12	30	A B C F G H
CRG	E.H. PRICE	RETURN GRILLE	80	STEEL	EGGCRATE	LAY-IN	24x24	30	A B C F H
CSD1	E.H. PRICE	SUPPLY DIFFUSER	SCD	STEEL	SQUARE CONE	SURFACE	12x12	30	A B C F H J K L
CSD2	E.H. PRICE	SUPPLY DIFFUSER	SCD	STEEL	SQUARE CONE	LAY-IN	24x24	30	A B C F H K
CSD3	E.H. PRICE	SUPPLY DIFFUSER	PODR	STEEL	PERFORATED	LAY-IN	24x24	30	A B C F H K
WSR	E.H. PRICE	SUPPLY REGISTER W/ DAMPER	520D	STEEL	LOUVERED FACE	WALL OR DUCT	(SEE PLANS)	30	A B C D E F G H

PROJECT DESIGN CONDITIONS											
CLIMATE CONDITIONS			WEATHER STATION			REFERENCE			BUILDING OPERATING HOURS:		
WEATHER STATION:			HOUSTON DUNN, TX, USA			2021 ASHRAE			MONDAY - FRIDAY		
CLIMATE ZONE:			2A						TBD BY OWNER		
ASHRAE HEATING:			99.6%			32 "F DB			SATURDAY		
ASHRAE COOLING:			0.4%			99.8 "F DB 77.0 "F WB			TBD BY OWNER		
DEHUMIDIFICATION:			1.0%			77.2 "F DP 142.7 g/ft ³ 81.8 "F DB			SUNDAY		

SPACE / UNIT DESCRIPTION	COOLING / DEHUMIDIFICATION						SET POINTS				HUMIDIFICATION			ZONE VENTILATION RESET			SPACE OPERATING HOURS			NOTES							
	OCC		UNOCC		MAX		OCC		UNOCC		MIN		MAX		CONTROL METHOD		BASE PPM		MAXIMUM PPM		M-F		SAT		SUN		
	"F	"F	"F	"F	RH %	RH %	"F	"F	"F	"F	RH %	RH %	"F	"F	PPM	PPM	PPM	PPM	PPM		PPM	DAYS	DAYS	DAYS	DAYS	DAYS	
DINING AREAS	75	80	50%	NA	70	60	NA	70	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD	TBD	TBD	TBD	TBD	A-C	
OFFICES	75	80	50%	NA	70	60	NA	70	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD	TBD	TBD	TBD	TBD	A-C	
MECHANICAL ROOM	NA	NA	NA	NA	70	60	NA	70	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD	TBD	TBD	TBD	TBD	A-C	
KITCHEN/BOH	75	80	50%	NA	70	60	NA	70	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD	TBD	TBD	TBD	TBD	A-C	

NOTES:
A. ZONE LEVEL SET POINT CONDITIONS SHALL BE AS SCHEDULED UNLESS OTHERWISE SCHEDULED OR NOTED ON THE DRAWINGS FOR ROOM SPECIFIC SPACE CONDITIONS.
B. ZONE LEVEL OCCUPANCY HOUR SCHEDULE SHALL BE PER BUILDING OPERATING HOURS UNLESS OTHERWISE SCHEDULED.
C. ZONE LEVEL CONTROLS SHALL BE CAPABLE OF OPERATING WITH INDEPENDENT OCCUPANCY SCHEDULES.

ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)																														
MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	SUPPLY FAN										COOLING COIL						HEAT EXCHANGER				ELECTRICAL	WEIGHT (LBS)	NOTES			
					CFM	ESP (IN)	HP (Y/N)	VFD (Y/N)	TH (MBH)	SH (MBH)	EAT (F DB)	(F WB)	(F DB)	(F WB)	REFR TYPE	MIN EFF (IEER)	MIN NO STAGES	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (F DB)	LAT (F DB)	MIN NO STAGES	O/A CFM				VIPH	MCA	MOCP
RTU-1	CAPTIVEAIRE	CAS-HVAC3-1-200-20-15T	15	SINGLE ZONE	2,600	0.8	3	Y	166.5	103.2	88.4	71.1	52.4	50.8	R454B	18.8	3	99.6	123.0	81	60.5	85	2	1400	208/3	64	70	NF	2526	A-O
RTU-2	CAPTIVEAIRE	CAS-HVAC3-1-250-24-20T	20	SINGLE ZONE	5,600	0.8	7.5	Y	234.2	169.2	82.1	67.2	55.2	53.6	R454B	18.2	3	156.4	193.1	81	55	85	2	1600	208/3	99	110	NF	2790	A-O

UNIT HEATER SCHEDULE (ELECTRIC)							
MARK	MANUFACTURER	MODEL	OUTPUT (KW)	MIN. NO. OF STAGES	CFM	VIPH	NOTES
ELH-1	QMARK	MUH05-81	5	1	350	208/1	A C D E F H

NOTES:
A. MOUNT 8 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH FACTORY INSTALLED THERMOSTAT.
C. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE IN ARCHITECTURAL SET.
D. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR WALL MOUNTING.
E. PROVIDE FACTORY INSTALLED DISCONNECT SWITCH.
F. SUPPORT UNIT AS RECOMMENDED BY UNIT MANUFACTURER.
G. FURNISH WITH RECESSED MOUNTING ENCLOSURE.
H. PROVIDE WITH WALL MOUNTED LINE VOLTAGE THERMOSTAT.

FAN COIL UNIT SCHEDULE (HEAT PUMP)																											
MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	SUPPLY FAN										COOLING COIL						HEATING COIL				ELECTRICAL	WEIGHT (LBS)	NOTES
					CFM	ESP (IN)	HP (Y/N)	VFD (Y/N)	TH (MBH)	SH (MBH)	EAT (F DB)	(F WB)	(F DB)	(F WB)	REFR TYPE	MIN EFF (IEER)	MIN NO STAGES	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (F DB)	LAT (F DB)	MIN NO STAGES	O/A CFM			
FCU-1	CARRIER	40MBC018	420	0.025	0.061	10.6	9.1	76.8	63.9	57.0	55.5	R410A	9.2	13.8	64.6	85	40	208/1	N/A	N/A	N/A	N/A	18	25	208 / 1	102.5	A-1

NOTES:
A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. ASSOCIATED CONDENSING UNIT SHALL BE BY THE SAME MANUFACTURER.
C. FOR COOLING, EQUIPMENT SIZED FOR 95°F AMBIENT TEMPERATURE. HEAT PUMP HEATING CAPACITY BASED ON AMBIENT TEMPERATURE LISTED.
D. PROVIDE UNIT WITH CLEANABLE AIR FILTERS.
E. PROVIDE WITH 7 DAY PROGRAMMABLE THERMOSTAT WITH STAGED HEATING AND COOLING CAPABILITY AS REQUIRED FOR OPERATION OF HEATING AND COOLING CONTROLS.
F. DISCONNECT SWITCH FURNISHED BY DIVISION 26 CONTRACTOR.
G. PROVIDE SINGLE POINT POWER CONNECTION.
H. PROVIDE WITH SPRING VIBRATION ISOLATION AND ALL-THREAD HANGING RODS.
I. REFERENCE PLUMBING PLANS FOR CONDENSATE DRAIN PIPING FROM UNIT.

BUILDING AIR BALANCE SUMMARY NORMAL OPERATION				
UNIT NO.	SUPPLY (CFM)	OUTDOOR (CFM)	EXHAUST (CFM)	PERCENT O/A/S
RTU-1	2,600	1,400	--	54%
RTU-2	5,600	1,600	--	29%
FCU-1	420	40	--	10%
KEF-1	--	--	860	--
KEF-2	--	--	738	--
KEF-3	--	--	738	--
EF-1	--	--	150	--
TOTALS	8,620	3,040	2,486	--
TOTAL AIRFLOW AVAILABLE FOR PRESSURIZATION (CFM)				554
PERCENT POSITIVE PRESSURIZATION				18.2%

BUILDING AIR BALANCE SUMMARY ECONOMIZER MODE				
UNIT NO.	SUPPLY (CFM)	OUTDOOR (CFM)	EXHAUST (CFM)	PERCENT O/A/S
RTU-1	2,600	2,600	--	100%
RTU-2	5,600	5,600	--	100%
FCU-1	420	40	--	10%
KEF-1	--	--	860	--
KEF-2	--	--	738	--
KEF-3	--	--	738	--
EF-1	--	--	150	--
RELIEF RTU-1	--	--	1,200	--
RELIEF RTU-2	--	--	4,000	--
TOTALS	8,620	8,240	7,686	--
TOTAL AIRFLOW AVAILABLE FOR PRESSURIZATION (CFM)				554
PERCENT POSITIVE PRESSURIZATION				6.7%

HEAT PUMP CONDENSING UNIT SCHEDULE																		
MARK	SERVICE AREA	MANUFACTURER	MODEL	REFR TYPE	COOLING CAPACITY			HEATING CAPACITY			ELECTRICAL	WEIGHT (LBS)	NOTES					
					TH (MBH)	SH (MBH)	EAT (F DB)	(F WB)	(F DB)	(F WB)				REFR TYPE	MIN EFF (SEER)	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)
CU-1	FCU-1	CARRIER	38MARBO18AA3	R410A	10.6	9.0	19.0	9.2	13.8	3.3	18	25	208 / 1	102.5	A-1			

NOTES:
A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. EQUIPMENT CAPACITY SCHEDULED IS MINIMUM CAPACITY THAT MUST BE PROVIDED AT AMBIENT TEMPERATURE INDICATED.
C. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT QUANTITY AND SIZE OF REFRIGERANT PIPING.
D. PROVIDE LIQUID LINE FILTER DRYER AND SIGHT GLASS.
E. PROVIDE PREFABRICATED EQUIPMENT SUPPORT RAILS.
F. DISCONNECT SWITCH FURNISHED BY DIVISION 26 CONTRACTOR.
G. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
H. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.

AIR CURTAIN SCHEDULE														
MARK	SERVICE AREA	MANUFACTURER	MODEL	LENGTH (IN)	MAX AIRFLOW (CFM)	HEATING CAPACITY (KW)		MOTOR	VIPH/Hz	NOTES				
						MIN EFF (SEER)	MIN OUT (MBH)							
AC-1	SERVICE ENTRY	MARS	STD2	36	1379	N/A	1/2	115/1		A-F				
AC-2	SERVICE ENTRY	MARS	STD2	36	1379	N/A	1/2	115/1		A-F				

NOTES:
A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. MOUNT UNIT PER MANUFACTURER'S RECOMMENDATIONS TO FACE OF WALL AND SUPPORT VERTICALLY.
C. PROVIDE INTEGRAL STARTER AND DISCONNECT SWITCH.
D. REFER TO SEQUENCE OF OPERATION FOR UNIT CONTROLS.
E. PROVIDE AIR CURTAIN WITH NORMALLY CLOSED DOOR LIMIT SWITCH FOR INSTALLATION ON DOOR. THE AIR CURTAIN SHALL ENERGIZE WHEN DOOR OPENS.
F. PROVIDE WITH DELAY MICROSWITCH WITH ADJUSTABLE DELAY TIMERS PRE MOUNTED IN THE AIR CURTAIN CONTROL PANEL.
G. PROVIDE WITH INTEGRAL THERMOSTAT.

FAN SCHEDULE														
MARK	SERVICE	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	DRIVE	MIN. HP	FAN RPM	VFD (Y/N)	ELECTRICAL			NOTES
											DISC.	STARTER	STARTER	
EF-1	TOILETS	GREENHECK	ROOF	G-097-VG	150	0.5	DIRECT	1/4	1236	N	120/1	NF	N/A	A-E

NOTES:
A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. PROVIDE WITH MINIMUM 12" HIGH ROOF CURB, BIRDSCREEN AND BACKDRAFT DAMPER.
C. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
D. INTERLOCK FAN OPERATION WITH TIME CLOCK.
E. PROVIDE WITH MANUFACTURER'S FAN SPEED CONTROLLER FOR BALANCING PURPOSES.

OUTSIDE AIR REQUIREMENTS, ASHRAE 62.1																
SYSTEM DESIGNATION	SYSTEM TYPE	SINGLE-ZONE SYSTEMS ONLY				MULTI-ZONE SYSTEMS ONLY				FLOOR AREA SERVED BY SYSTEM [A _s] (SF)	SYSTEM AVERAGED AREA BASED OUTDOOR AIR RATE (CFM/SF)	SYSTEM POPULATION [P _s] (PEOPLE)	SYSTEM AVERAGED PEOPLE BASED OUTDOOR AIR RATE (CFMP)	REQUIRED OA INTAKE FLOW [V _o] (CFM)	DESIGN OA INTAKE FLOW (CFM)	REQUIRED DCV OA RESET AIRFLOW [V _o] (CFM)
		SINGLE ZONE SYSTEM ASSOCIATED VENTILATION ZONE	SINGLE ZONE WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS [E _z]	SYSTEM VENTILATION EFFICIENCY [E _v]	SYSTEM VENTILATION EFFICIENCY [E _v]											
RTU-1	SINGLE ZONE	DINING	0.80	-	0.180	60	7.50	803	1,400	N/A						
RTU-2	SINGLE ZONE	KITCHEN	0.80	-	0.120	460	7.50	460	1,600	N/A						
FCU-1	SINGLE ZONE	OFFICE	0.80	-	0.060	2	5.00	18	40	N/A						
TOTALS												1,283	3,040	0		

GENERAL NOTES:
1. VENTILATION CALCULATIONS BASED ON ASHRAE STANDARD 62.1-2019.
2. SYSTEM POPULATIONS BASED ON MAX SEATING AND/OR CODE MAXIMUM VALUES.
3. SINGLE ZONE SYSTEMS (V_{o1} + V_{o2}): SYSTEM VENTILATION EFFICIENCY CALCULATION IS NOT REQUIRED FOR SINGLE ZONE SYSTEMS. WORST CASE AIR DISTRIBUTION EFFECTIVENESS BETWEEN HEATING AND COOLING MODES OF OPERATION IS SHOWN IN TABLE.
4. MULTI-ZONE RECIRCULATING SYSTEMS: ASHRAE 62.1-2019 CALCULATOR USED TO DETERMINE VENTILATION AIRFLOW IN COMPLIANCE WITH SIMPLIFIED VRP AND APPENDIX A. VENTILATION RATE SHOWN IS ACTUAL CALCULATED WITH CORRECTION FACTORS INCLUDED. EACH ZONE IS CALCULATED BASED ON THE SIMPLIFIED PROCEDURE FOR ZONE AIR DISTRIBUTION EFFECTIVENESS OR ITS WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS, PER APPENDIX A (HEATING/COOLING) AS PART OF CALCULATIONS TO FIND E_v.

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CONSULTANTS:
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8345 LEXENA DRIVE, SUITE 300
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WWW.H

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 END-3	228	294	-
ISLAND ND-2W	269	300	350
ISLAND ND-2I	346	422	475

ETL HOOD LISTING DETAIL

EXHAUST DUCT = LENGTH OF HOOD X STAINLESS STEEL
 SUPPLY CFM = EXHAUST CFM X PERCENTAGE REQUIRED
 TOTAL DUCT AREA (sq. ft.) = 144.0

CAPTIVE-AIRE HOODS BUILT IN COMPLIANCE WITH:

UL LISTED HOODS
 INTERTEK LISTED HOODS
 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 HANGING MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVE-AIRE HOOD FOR 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 CAPTIVE-AIRE 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 RESPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, RESTRICTIONS, AND ADMINISTRATION OF CODE REQUIREMENTS TO OTHER REQUIREMENTS TO BE RELEASED FOR PRODUCTION OF EQUIPMENT SHOWN.
11. RESTRAINTS SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.
12. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN TO DRAIN AREA.
13. RESTRAINTS SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.
14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. HOODS AND "STANDOFF" COVERED BY THIS DOCUMENT AVAILABLE FROM THE FACTORY PRIOR TO INSTALLATION.

GENERAL NOTES

FILTER COLLECTION EFFICIENCY

2" CaptiveAir Grease-Stop Solo Filter

CaptiveAire Captivate 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@captveaire.com

HOOD INFORMATION - JOB#7292270

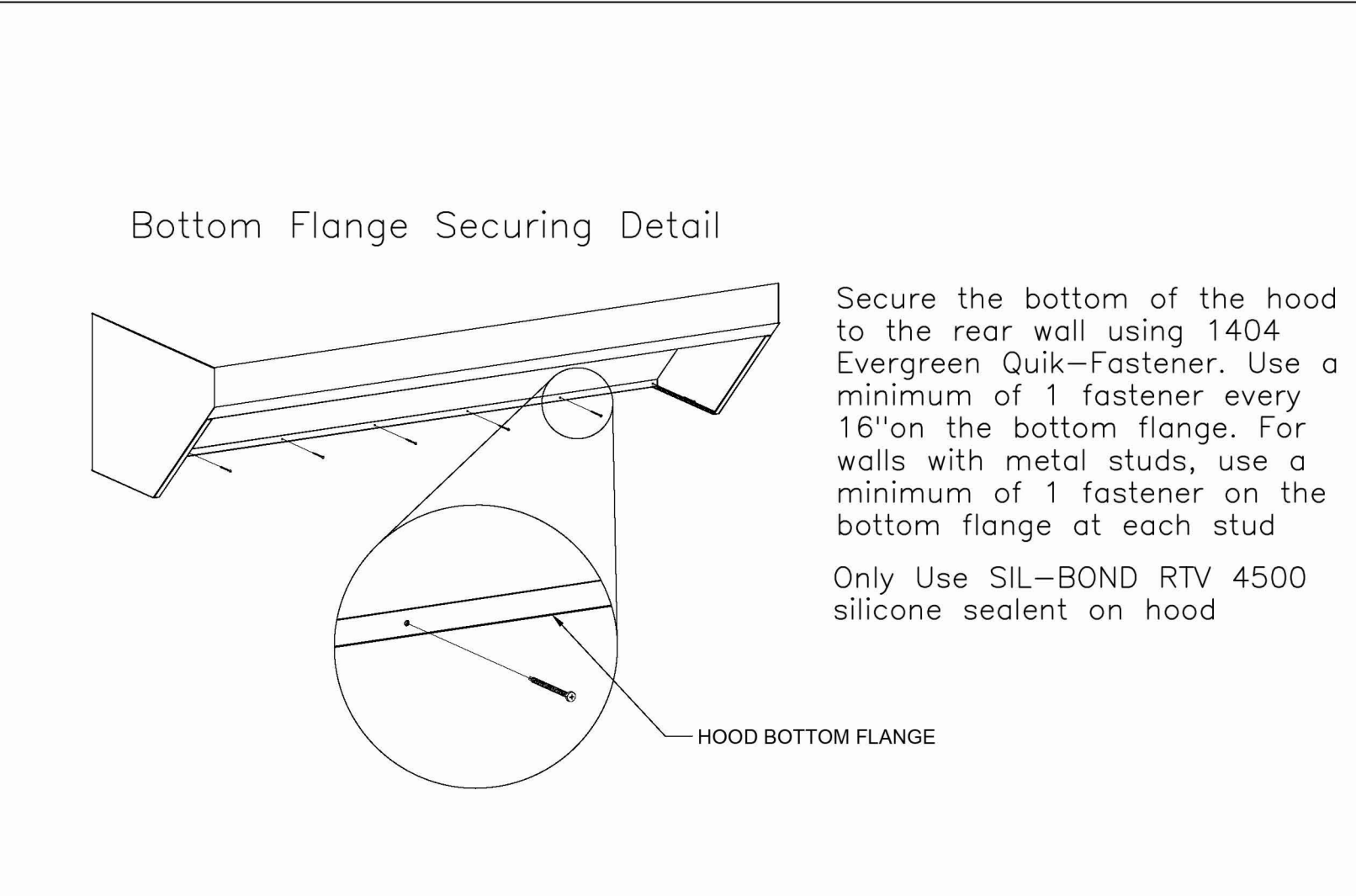
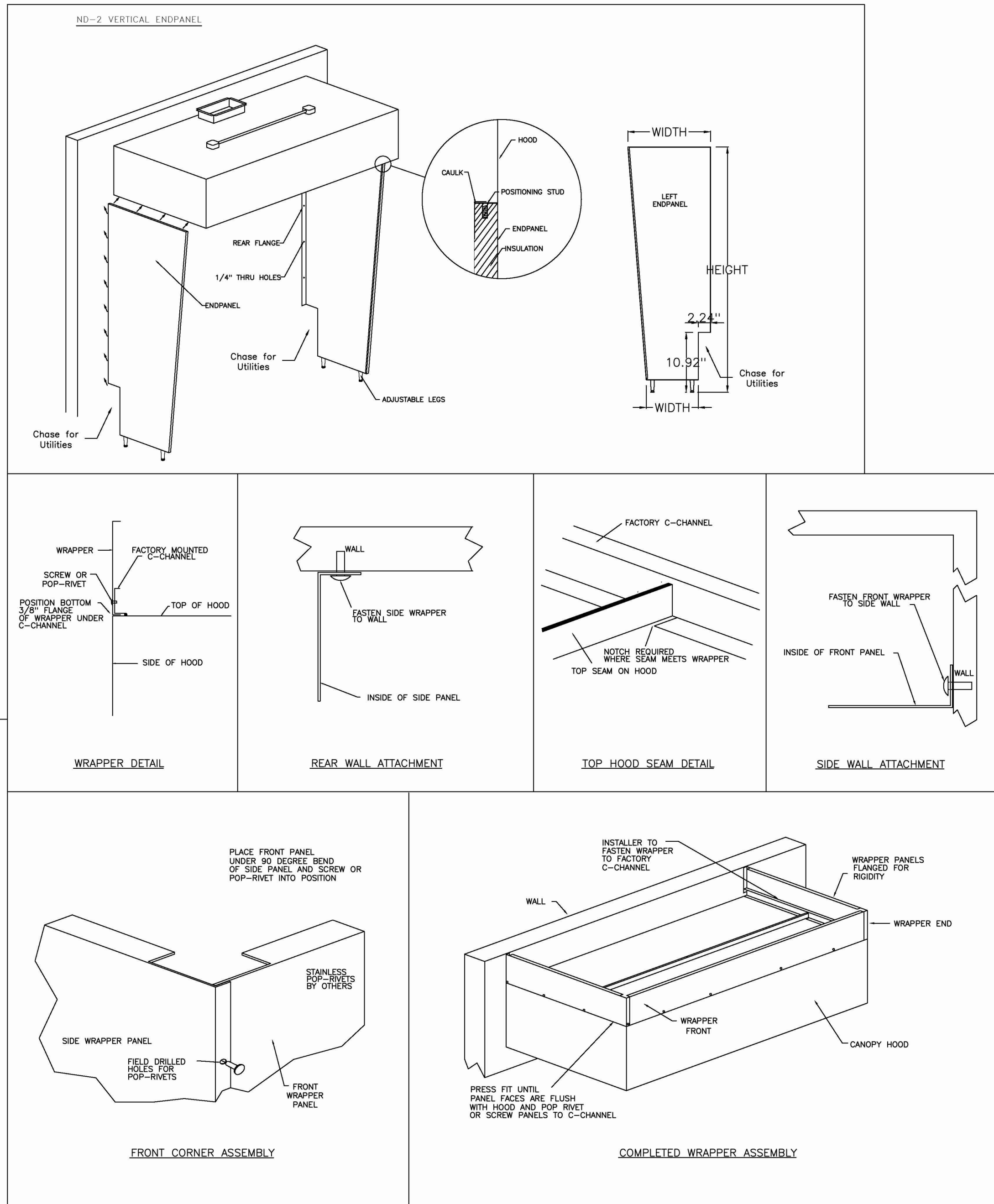
HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)				HOOD CONSTRUCTION	HOOD CONFIG			
										WIDTH	LENG	HEIGHT	DIA		CFM	VEL	SP	END TO END
1	FRYER	5430 ND-2	CAPTIVEAIRE	4' 11"	450 DEG	I	MEDIUM	175	860	9"	9"	4"	860	1529	-0.494"	430 SS WHERE EXPOSED	ALONE	ALONE
2	GRILL(South)	5430 ND-2	CAPTIVEAIRE	4' 11"	450 DEG	I	MEDIUM	150	738	8"	8"	4"	738	1660	-0.417"	430 SS WHERE EXPOSED	ALONE	FRONT
3	GRILL(North)	5430 ND-2	CAPTIVEAIRE	4' 11"	450 DEG	I	MEDIUM	150	738	8"	8"	4"	738	1660	-0.417"	430 SS WHERE EXPOSED	ALONE	BACK

HOOD INFORMATION

HOOD NO	TAG	TYPE	FILTER(S)			LIGHT(S)			UTILITY CABINET(S)			FIRE SYSTEM PIPING	HOOD HANGING WEIGHT					
			QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	LOCATION	SIZE			TYPE	SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	
1	FRYER	CAPTIVATE SOLO FILTER	3	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"x54"x30"	TANK FS	4.0/4.0/4.0	SC-230110MA	1 LIGHT 1 FAN	YES	747 LBS	
2	GRILL(South)	CAPTIVATE SOLO FILTER	3	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO								YES	356 LBS
3	GRILL(North)	CAPTIVATE SOLO FILTER	3	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO								YES	356 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	FRYER	FIELD WRAPPER 12.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
		LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS.
2	GRILL(South)	INSULATION FOR BACK OF HOOD.
		RISER SENSOR INSTALL 6IN PLEN.
		FIELD WRAPPER 12.00" HIGH FRONT, LEFT, RIGHT.
3	GRILL(North)	LEFT END STANDOFF (FINISHED) 1" WIDE 54" LONG INSULATED.
		INSULATION FOR BACK OF HOOD.
		RISER SENSOR INSTALL 6IN PLEN.



REVISIONS

NO.	DESCRIPTION	DATE
1	HEI 2025-09-29 IFC SET	
A	HEI 2025-08-18 ADDENDUM A	
HEI	2025-02-18 PERMIT BID SET	
HEI	2025-01-28 75% SET	

CAPTIVEAIRE
 Eastern PA Mechanical
 225 E City Line Avenue, Suite #105, Bala Cynwyd, PA, 19004 PHONE: (267) 504 - 4126 EMAIL: reg108@captveaire.com

Shack Shack - 1651 - Meyerland, TX (Kitchen)

DATE: 1/24/2025
DWG.#: 7292270
DRAWN BY: Joe.shiiba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO.
 1

NOTE:
 THE DOCUMENTATION CONTAINED ON THIS SHEET WAS NOT PREPARED BY HENDERSON ENGINEERS AND IS INCLUDED IN THIS SET FOR REFERENCE ONLY. HENDERSON ENGINEERS REVIEWED THE DOCUMENTATION ON THIS SHEET FOR GENERAL COMPLIANCE WITH DESIGN INTENT. SUPPLIER IS RESPONSIBLE THAT ALL FURNISHED EQUIPMENT ON THIS SHEET COMPLIES WITH APPLICABLE LOCAL, STATE, AND FEDERAL LAWS, CODES, AND REGULATIONS.

Bergmeyer

CONSULTANTS:

SEAL SIGNATURE:

FOR REFERENCE ONLY

1 HEI 2025-09-29 IFC SET
 A HEI 2025-08-18 ADDENDUM A
 HEI 2025-02-18 PERMIT BID SET
 HEI 2025-01-28 75% SET

SHAKE SHACK

SHAKE SHACK MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX 77096
 SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author
 CHECKED BY: Checker
 JOB NO: 20240294.00

M701

FIRE SYSTEM INFORMATION - JOB#7292270					
FIRE SYSTEM NO	TAG	TYPE	SIZE	MAX FP	DESIGN FP
1		TANK FS	4.0/4.0/4.0	60	54

INSTALLATION	
SYSTEM	LOCATION ON HOOD
FIRE CABINET LEFT	LEFT, HOOD 1

CAS 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 #: 7292270.
JOB NAME: SHAKE SHACK-1651-MEYERLAND,TX(KITCHEN).

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 54. MAXIMUM FP: 60.

HOOD # 1 4' 11.00" LONG x 54" WIDE x 30" HIGH.

RISER # 1 SIZE: 9" x 9"

HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.

HOOD # 2 4' 11.00" LONG x 54" WIDE x 30" HIGH.

RISER # 1 SIZE: 8" x 8"

HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

HOOD # 3 4' 11.00" LONG x 54" WIDE x 30" HIGH.

RISER # 1 SIZE: 8" x 8"

HOOD # 3 METAL BLOW-OFF CAPS INCLUDED.

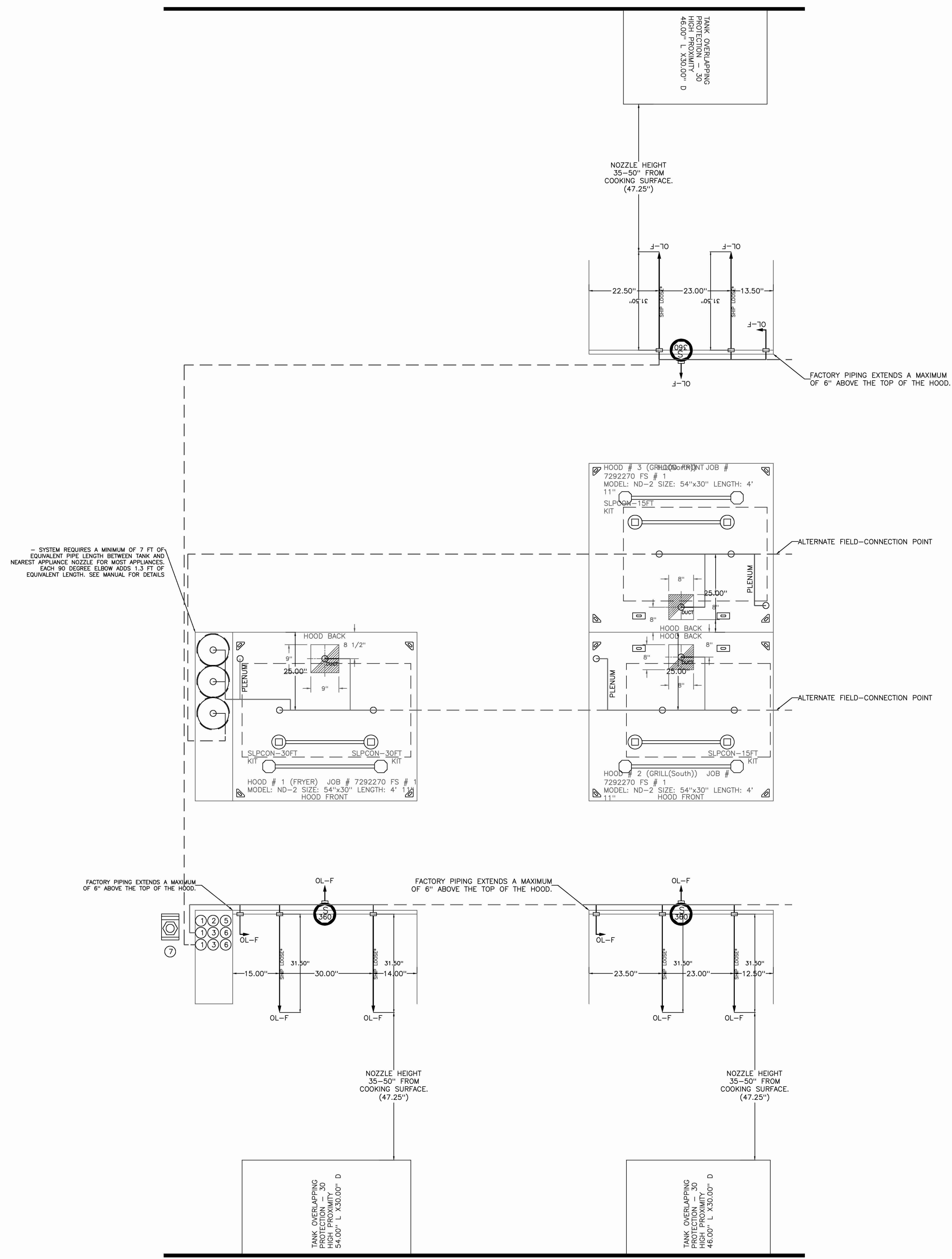
- HEAVY-DUTY APPLIANCES (RATED 600F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.

- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	10
DEDICATED NOZZLE APPLIANCE BRANCH	10

LEGEND - FIRE CABINET TANK SYSTEM

- 4 GALLON TANK.
- PRIMARY ACTUATOR RELEASE.
- SECONDARY ACTUATOR RELEASE.
- PRESSURE SUPERVISION SWITCH.
- PRIMARY HOSE ASSEMBLY.
- SECONDARY HOSE ASSEMBLY.
- REMOTE MANUAL ACTUATION DEVICE.



REVISIONS	
DESCRIPTION	DATE

CAPTIVEAIRE
www.captiveaire.com

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Shake Shack - 1651 - Meyerland, TX (Kitchen)

DATE: 1/24/2025

DWG.#: 7292270

DRAWN BY: Joe.shiiba

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

MASTER DRAWING

SHEET NO. 4

NOTE:
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Bergmeyer

CONSULTANTS:

SEAL SIGNATURE:

FOR REFERENCE ONLY

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375 N High St.
Boston, MA 02210
617.542.1025

CO
360 E 20th Street
Los Angeles, CA 90012
213.337.1090

LA
www.bergmeyer.com

NO.	BY	DATE	DESCRIPTION
1	HEI	2025-09-29	IFC SET
A	HEI	2025-08-18	ADDENDUM A
	HEI	2025-02-18	PERMIT BID SET
	HEI	2025-01-28	75% SET

SHAKE SHACK

SHAKE SHACK
MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX
77096
SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author

CHECKED BY: Checker

JOB NO: 20240294.00

M704

EXHAUST FAN INFORMATION - JOB#7292270

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	1	DU50HFA	CAPTIVEAIRE	860	1.000	1460	TEAO-ECM	0.500	0.3220	1	208	3.8	327 FPM	79	14.6
2	KEF-2	1	DU50HFA	CAPTIVEAIRE	738	1.000	1419	TEAO-ECM	0.500	0.2950	1	208	3.8	281 FPM	79	13.9
3	KEF-3	1	DU50HFA	CAPTIVEAIRE	738	1.000	1419	TEAO-ECM	0.500	0.2950	1	208	3.8	281 FPM	79	13.9

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	KEF-1	1	GREASE BOX
		1	ECM WIRING PACKAGE - EXHAUST - MODBUS CONTROL -MSC- (TELCO), CCW ROTATION
		1	FAN BASE CERAMIC SEAL - DU/DR50HFA - INSTALLED AT PLANT - FOR GREASE DUCTS
2	KEF-2	1	GREASE BOX
		1	ECM WIRING PACKAGE - EXHAUST - MODBUS CONTROL -MSC- (TELCO), CCW ROTATION
		1	FAN BASE CERAMIC SEAL - DU/DR50HFA - INSTALLED AT PLANT - FOR GREASE DUCTS
3	KEF-3	1	GREASE BOX
		1	ECM WIRING PACKAGE - EXHAUST - MODBUS CONTROL -MSC- (TELCO), CCW ROTATION
		1	FAN BASE CERAMIC SEAL - DU/DR50HFA - INSTALLED AT PLANT - FOR GREASE DUCTS

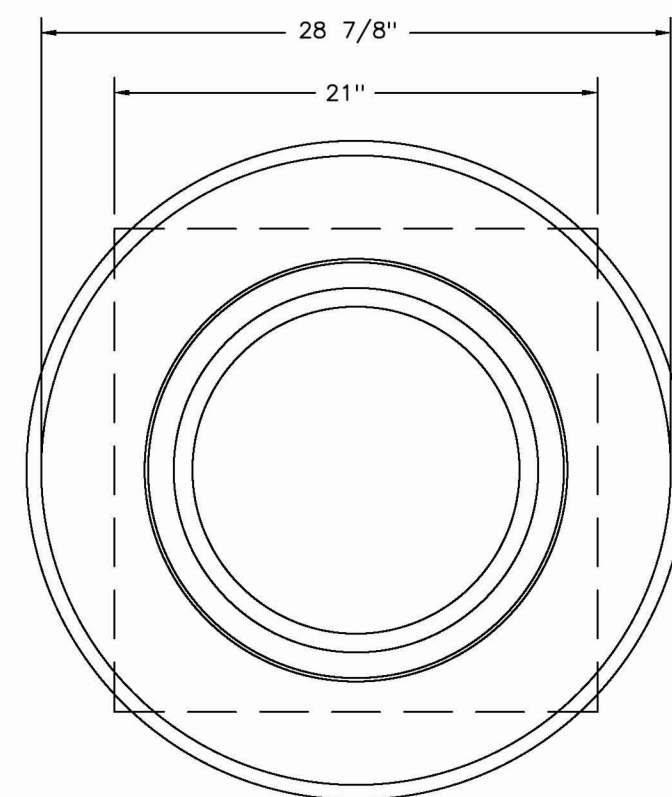
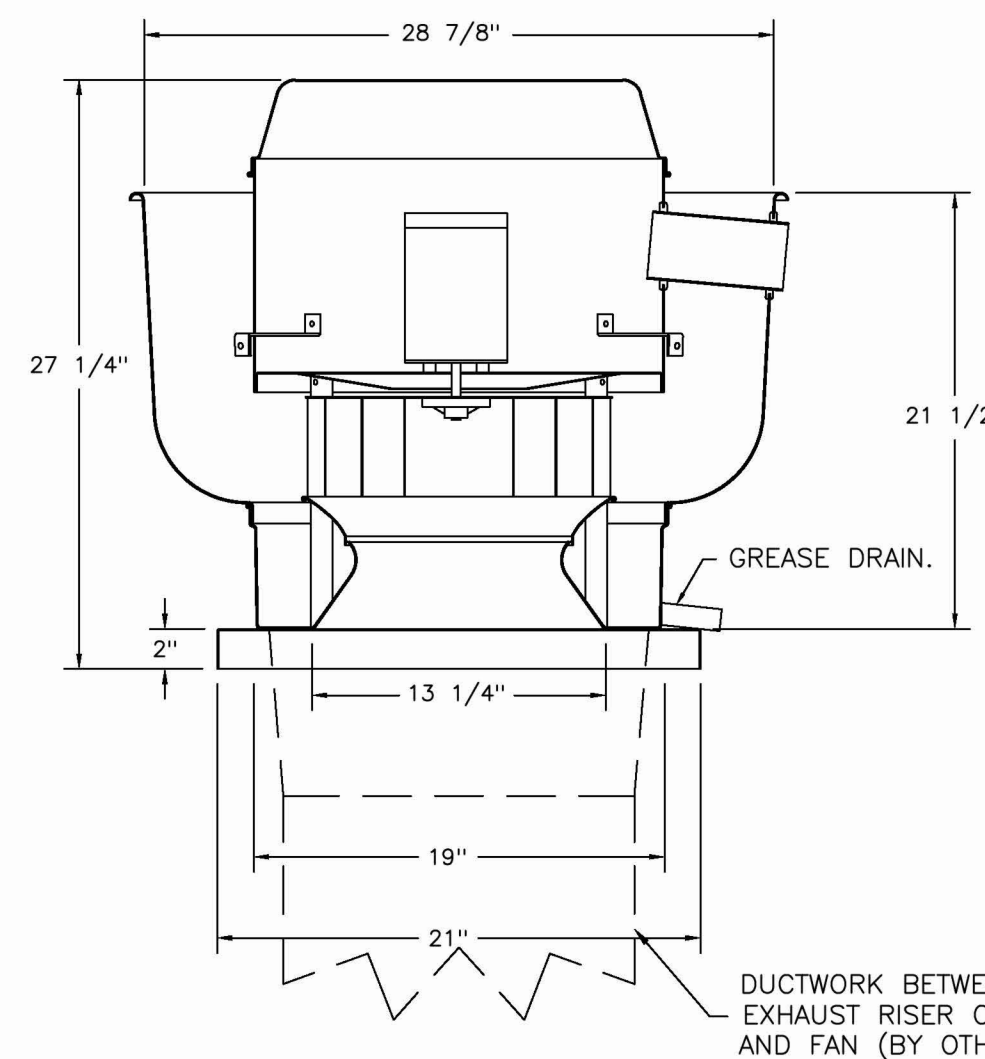
FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST				SUPPLY		
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	KEF-1	YES						
2	KEF-2	YES						
3	KEF-3	YES						

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF-1	34 LBS	CURB	19.500"W X 19.500"L X 24.000"H HINGED.
2	# 2	KEF-2	34 LBS	CURB	19.500"W X 19.500"L X 24.000"H HINGED.
3	# 3	KEF-3	34 LBS	CURB	19.500"W X 19.500"L X 24.000"H HINGED.

FANS #1 (KEF-1), #2 (KEF-2), #3 (KEF-3) - DU50HFA EXHAUST FAN



TOP VIEW

FEATURES:

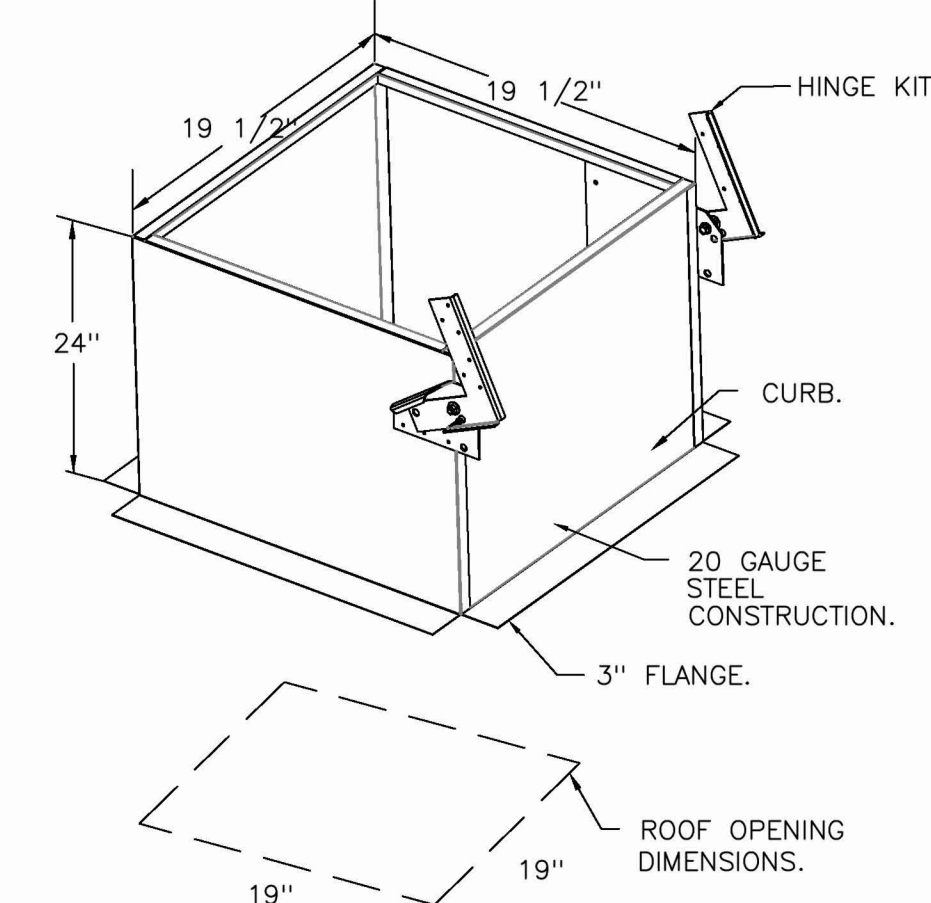
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL702 AND ULC-5645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT 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 DEGRADING 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

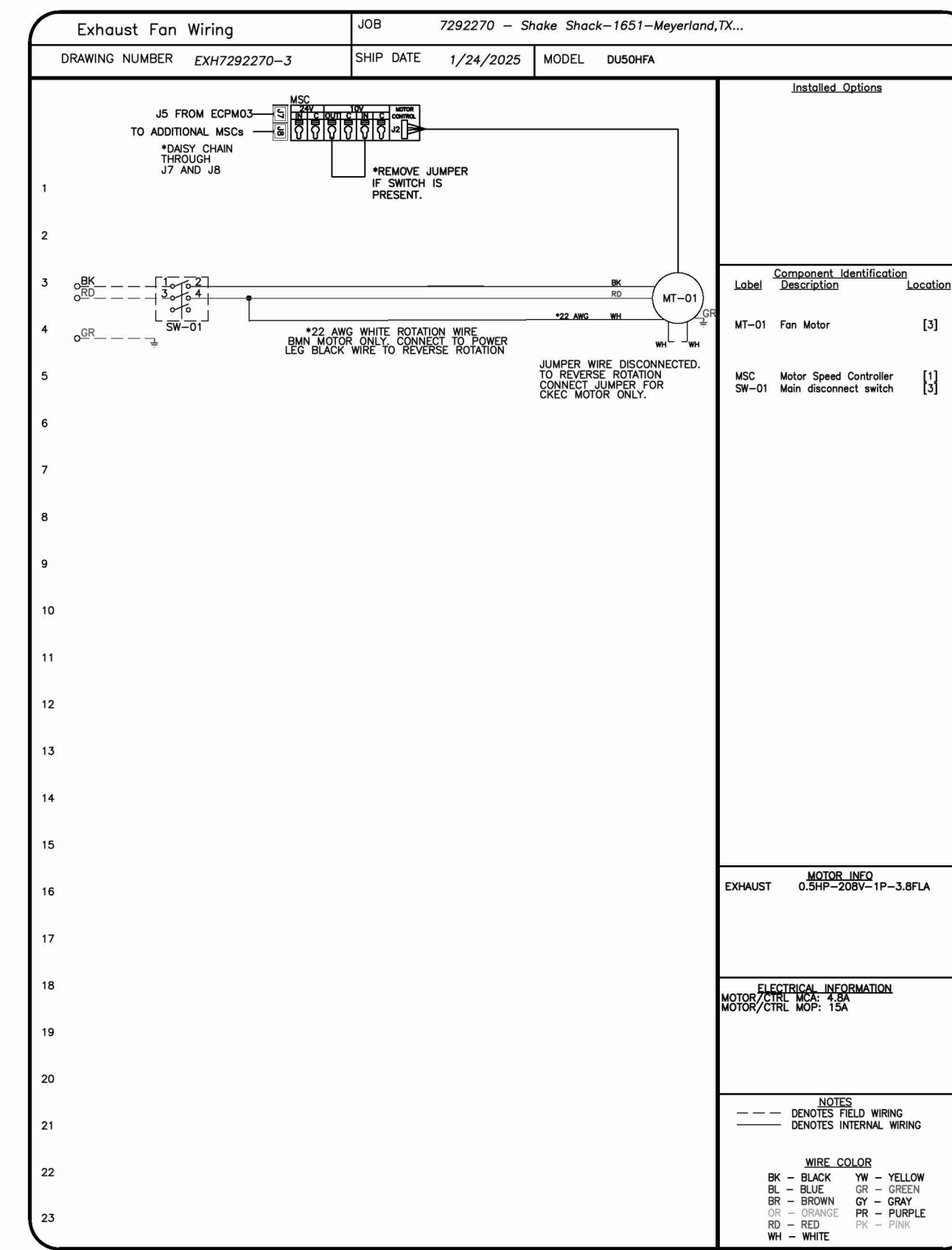
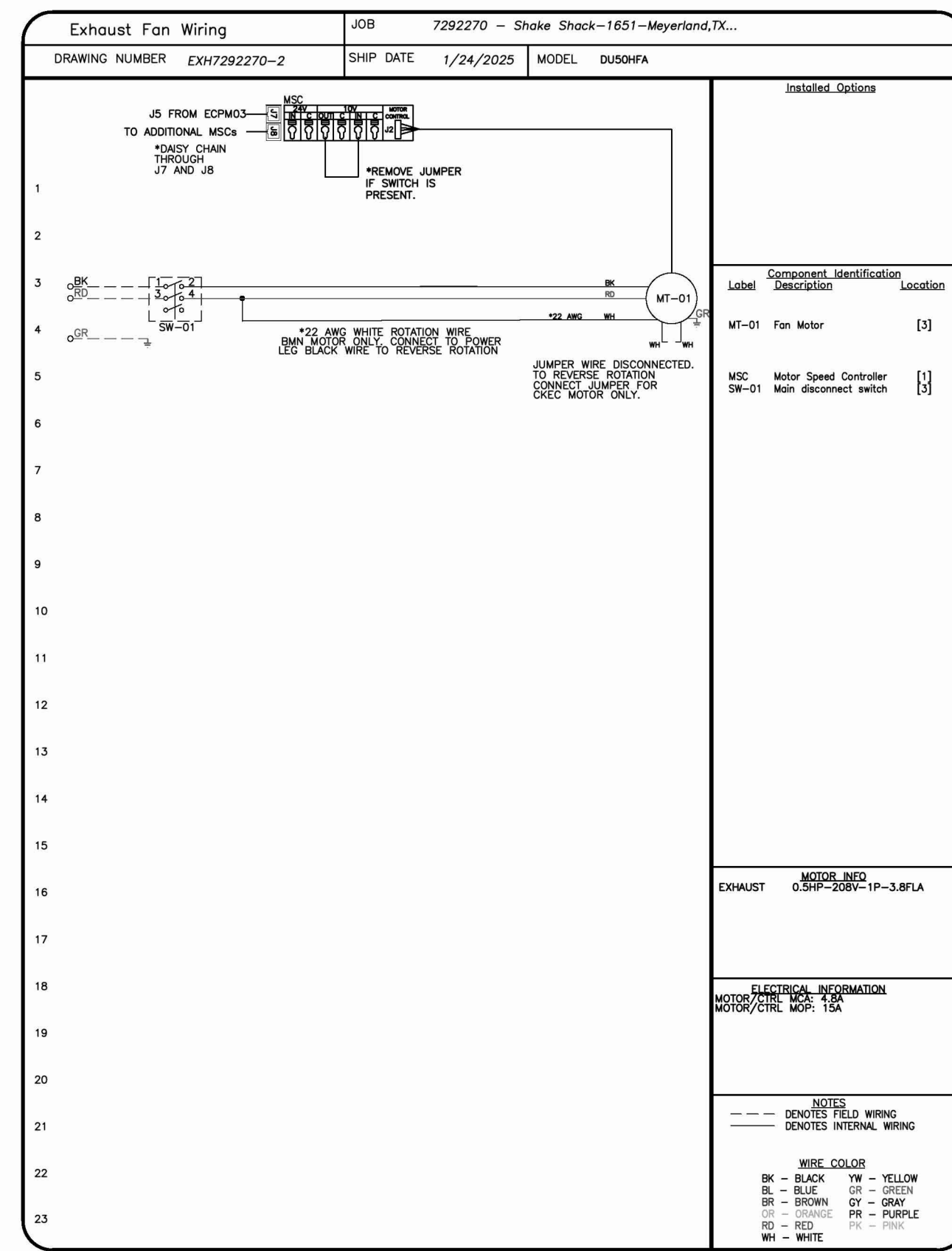
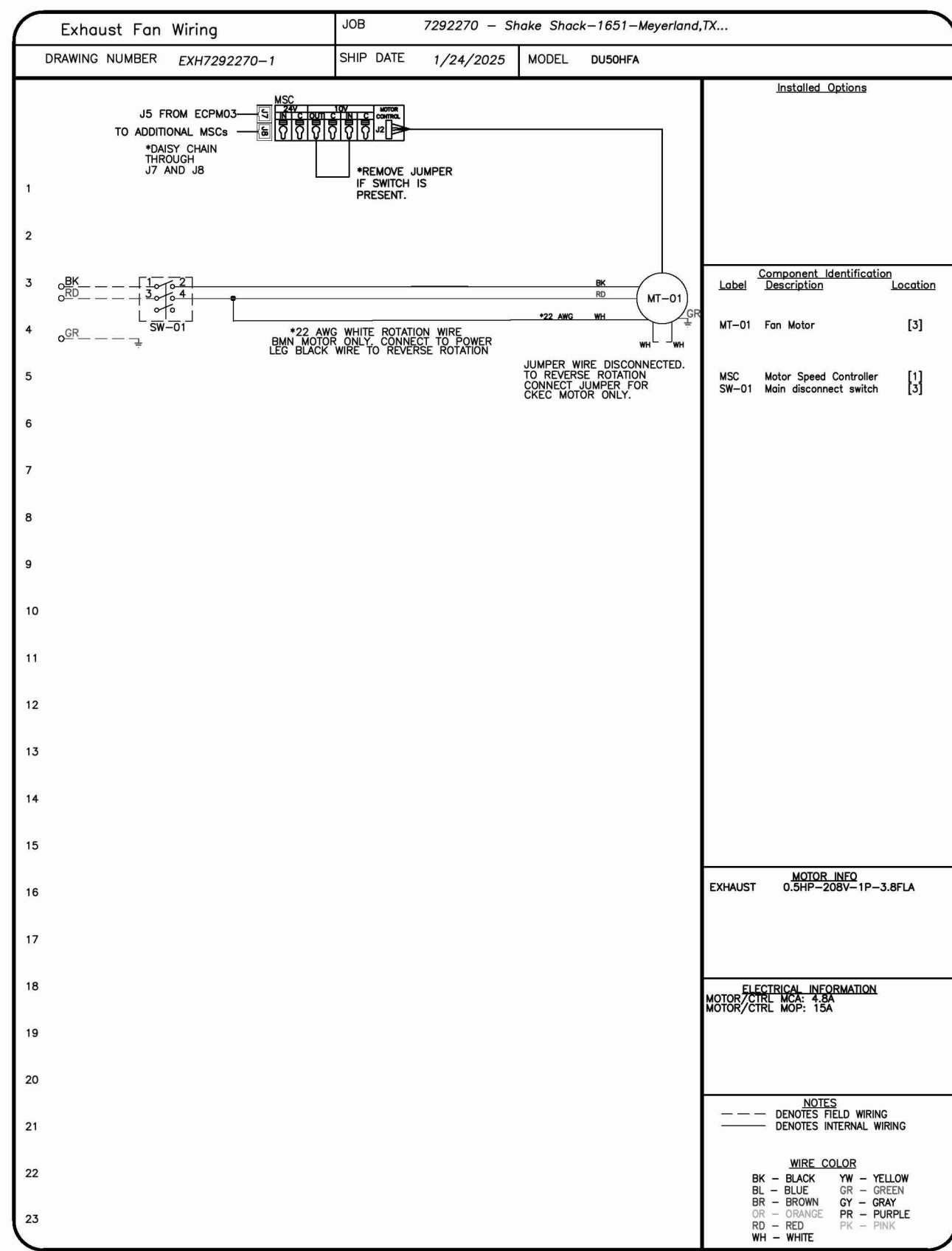
- GREASE BOX
- ECM WIRING PACKAGE - EXHAUST - MODBUS CONTROL -MSC- (TELCO), CCW ROTATION
- FAN BASE CERAMIC SEAL - DU/DR50HFA - INSTALLED AT PLANT - FOR GREASE DUCTS.
- 2 YEAR PARTS WARRANTY.



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVEAIRE
Eastern PA Mechanical
225 E City Line Avenue, Suite #105, Blair Cymmyd, PA, 19004
PHONE: (267) 504-4178 EMAIL: reg.108@captivaire.com



Shake Shack - 1651 - Meyerland, TX (Kitchen)

DATE: 1/24/2025
DWG.#: 7292270
DRAWN BY: Joe.shiiba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 5

NOTE:
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Bergmeyer

CONSULTANTS:

SEAL SIGNATURE:

FOR REFERENCE ONLY

1 HEI 2025-09-29 IFC SET
A HEI 2025-08-18 ADDENDUM A
HEI 2025-02-18 PERMIT BID SET
HEI 2025-01-28 75% SET

SHAKE SHACK
MEYERLAND, TX

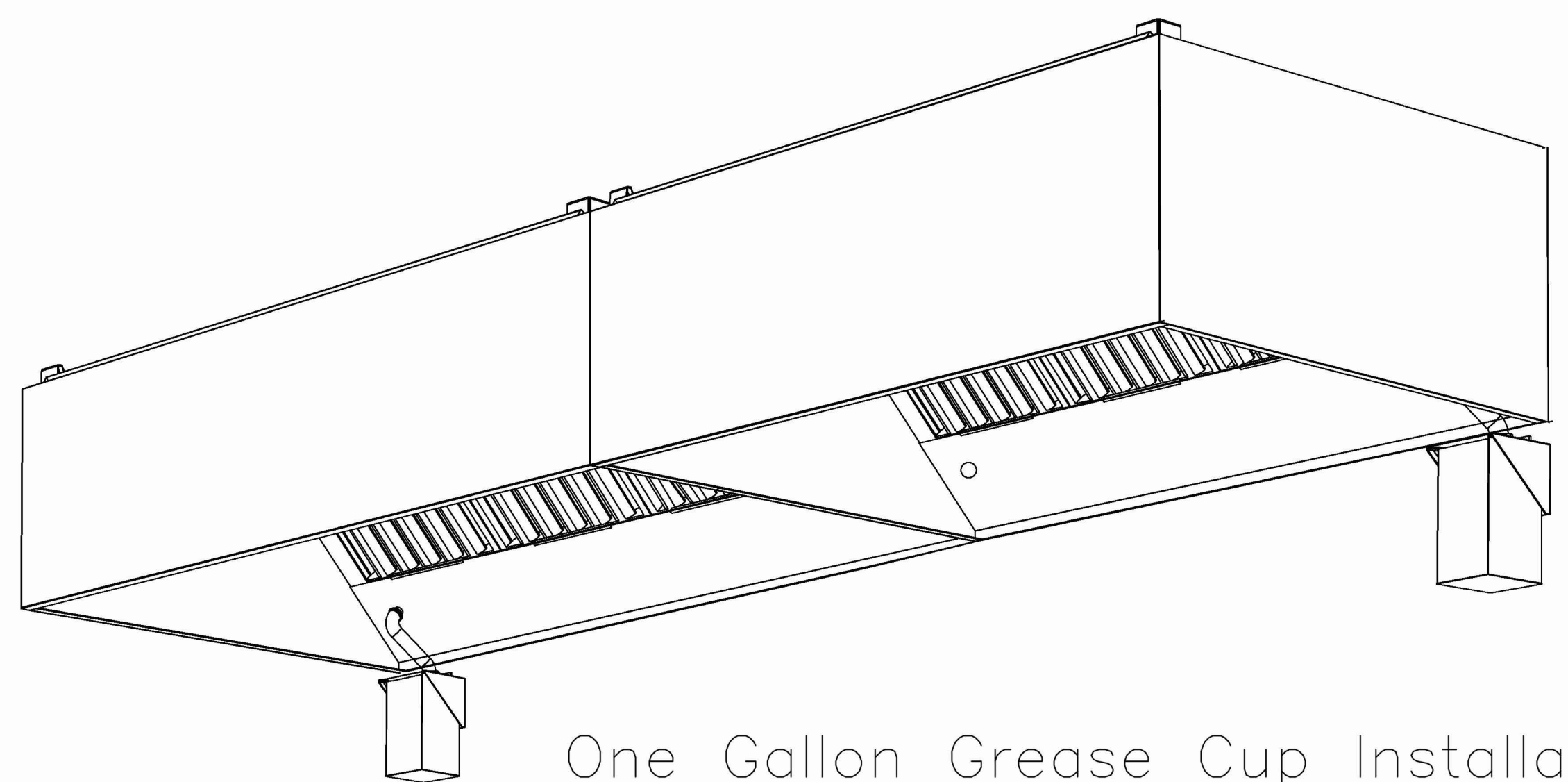
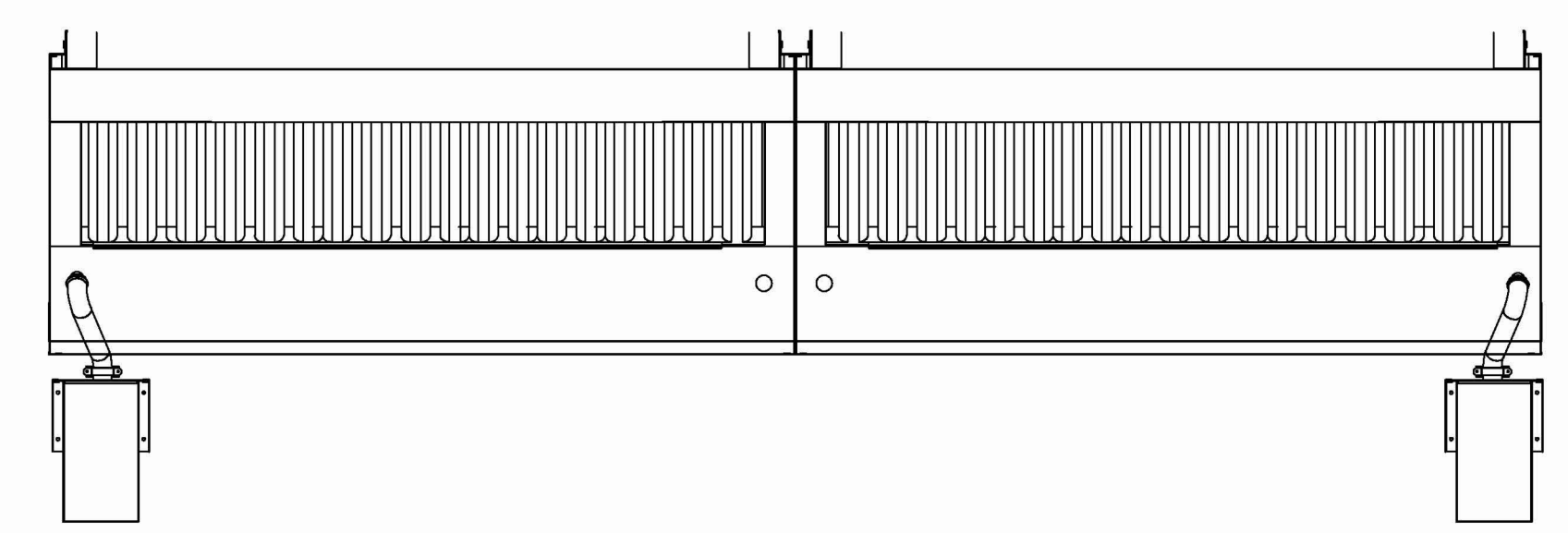
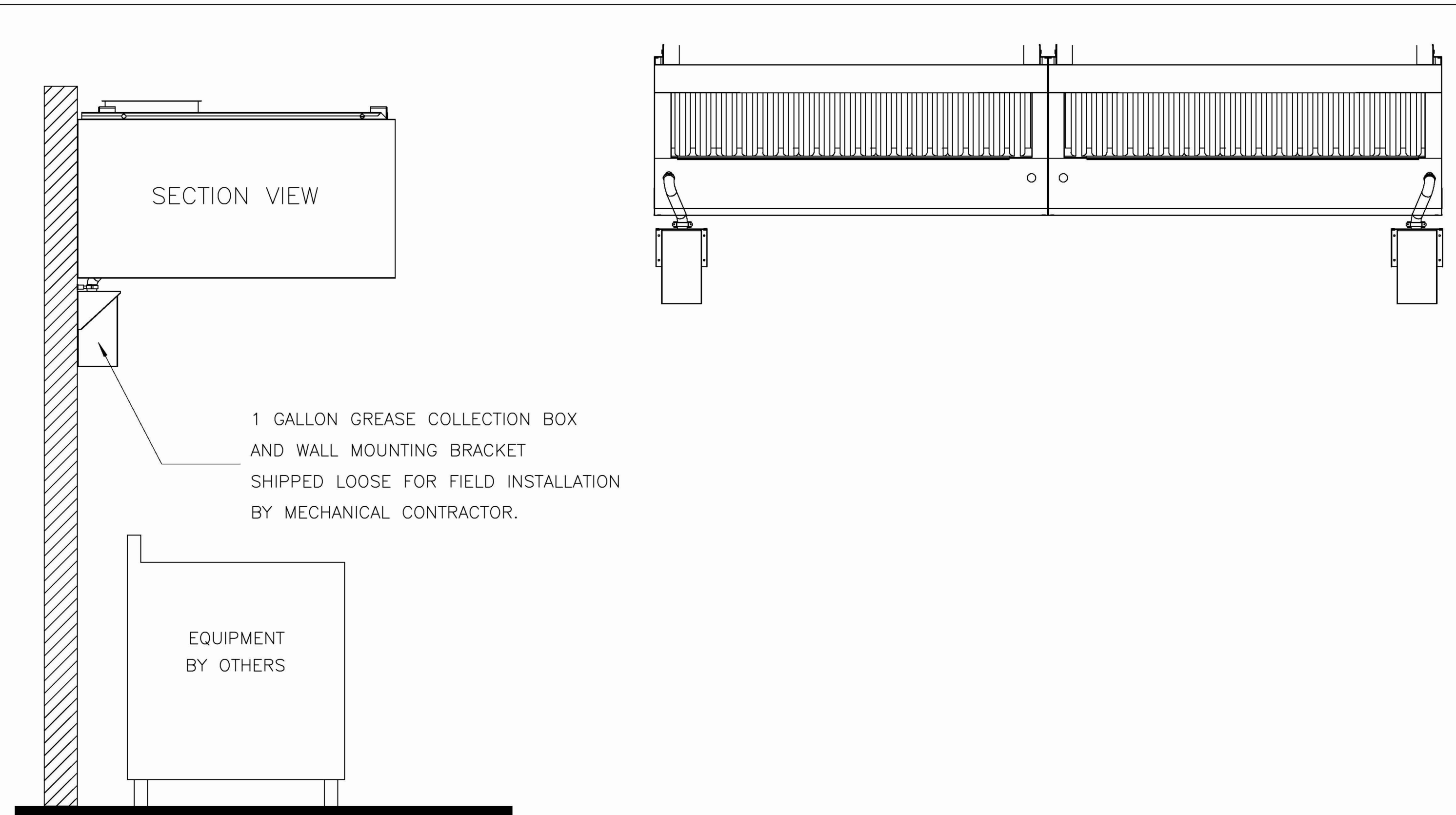
8815 W. LOOP SOUTH, HOUSTON, TX
77096
SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author
CHECKED BY: Checker
JOB NO: 20240294.00

M705

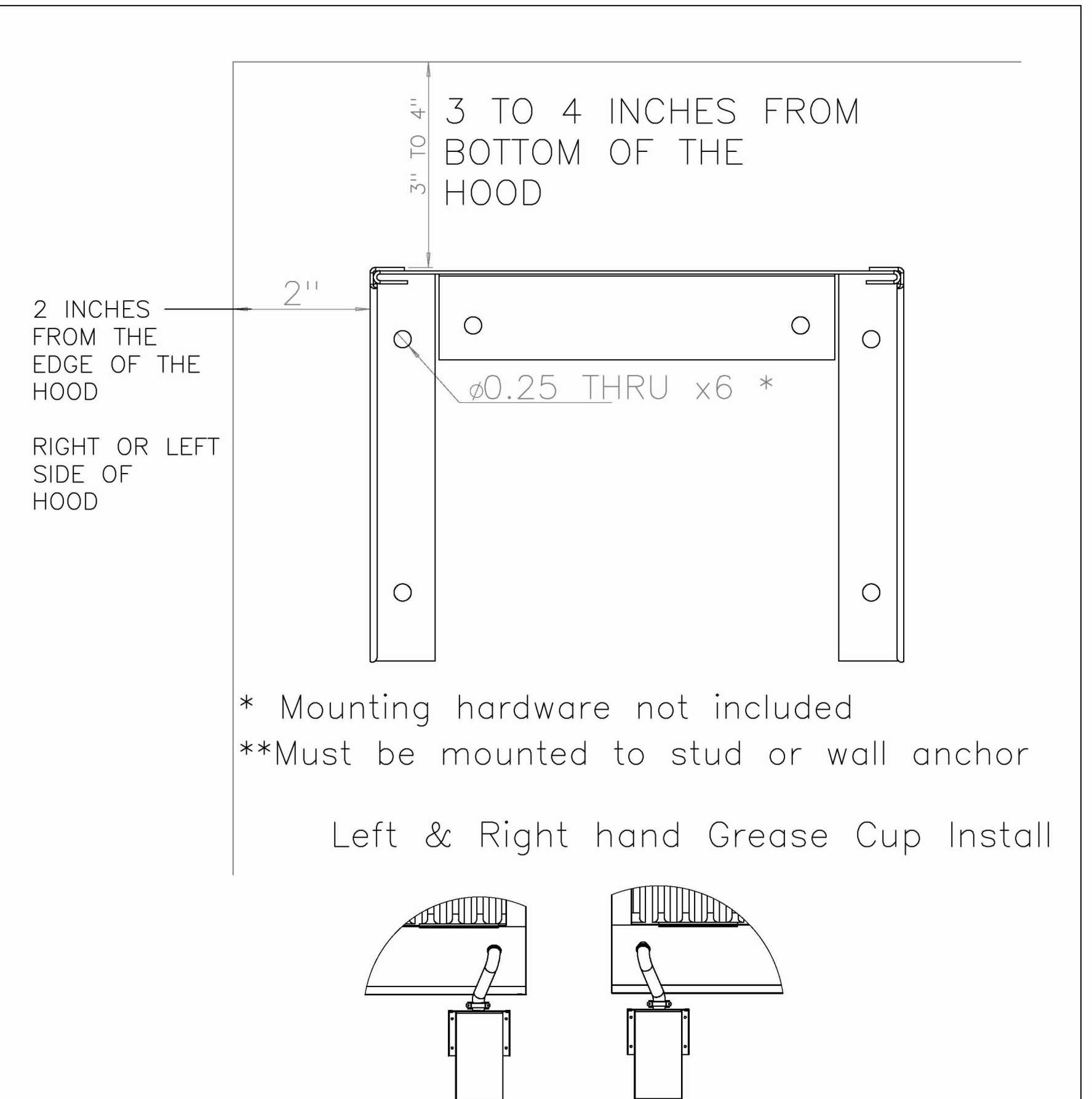


One Gallon Grease Cup Installation

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

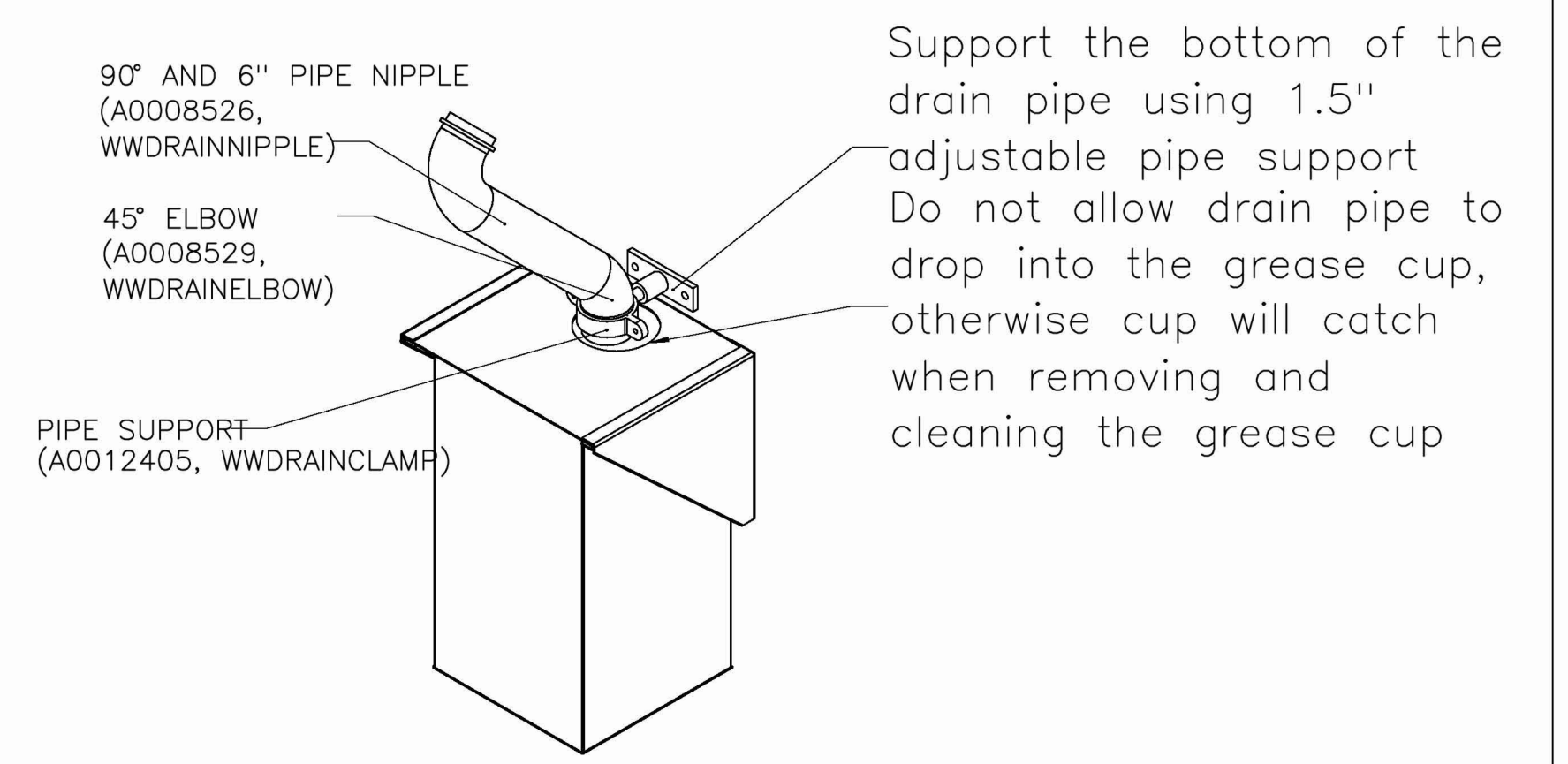
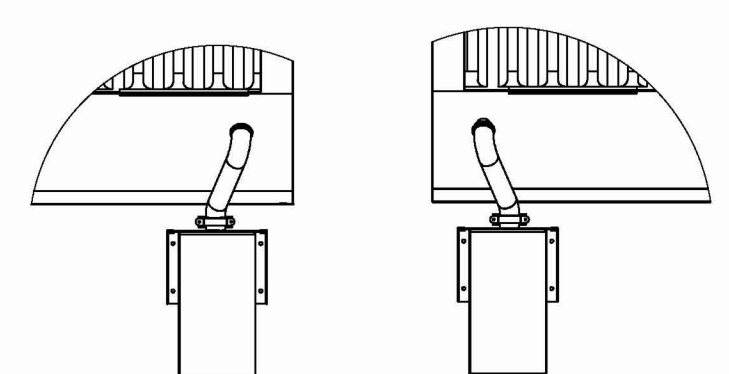
The one gallon grease cup comes as an assembly of stainless steel wall mounting bracket and one gallon cup. The mounting bracket should be installed 2" from the edge of the containment plenum and 3"-4" below the bottom of the hood.

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.



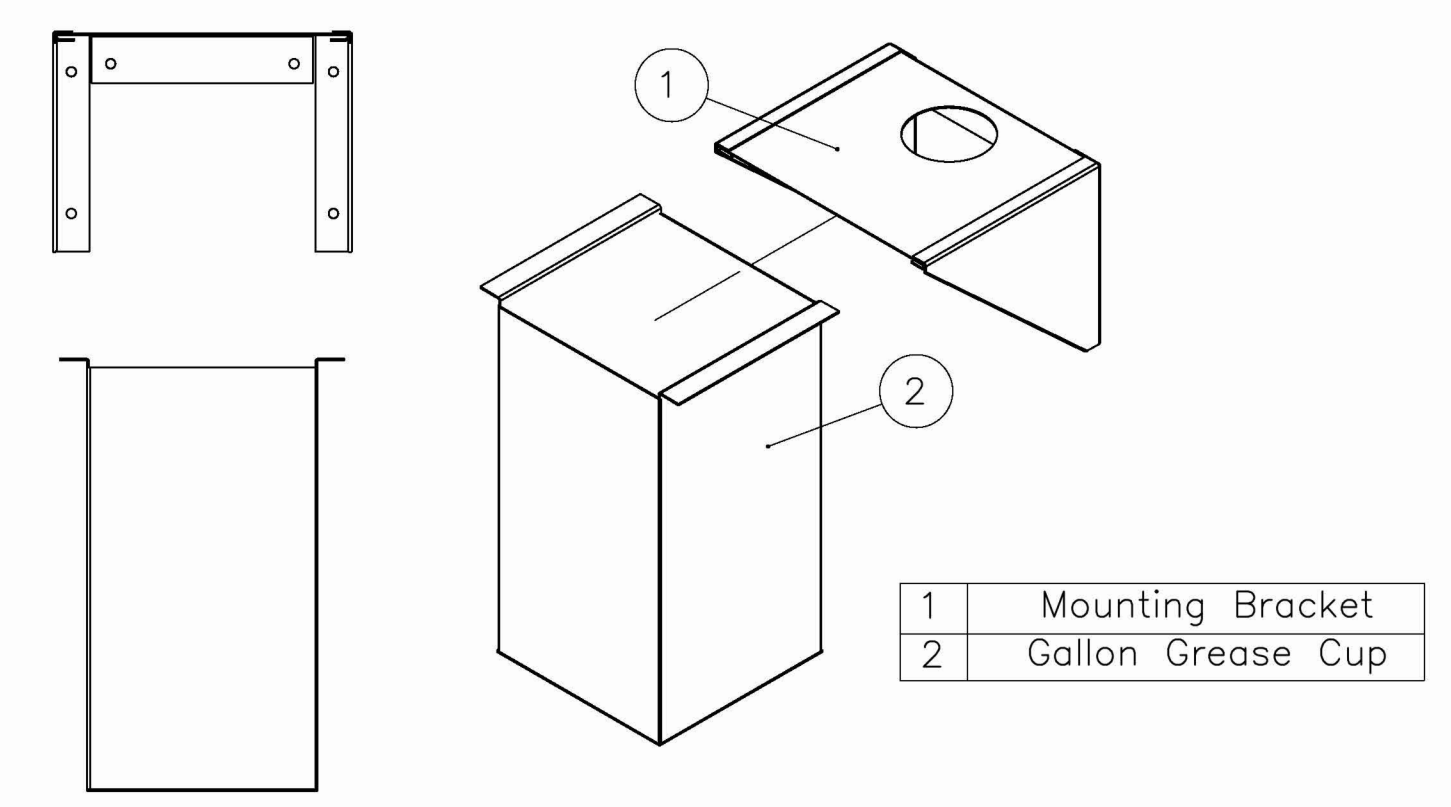
* Mounting hardware not included
**Must be mounted to stud or wall anchor

Left & Right hand Grease Cup Install



Support the bottom of the drain pipe using 1.5" adjustable pipe support. Do not allow drain pipe to drop into the grease cup, otherwise cup will catch when removing and cleaning the grease cup.

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.

REVISIONS	
DESCRIPTION	DATE

CAPTIVE
www.captiveaire.com

Eastern PA Mechanical
225 E City Line Avenue, Suite #105, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4178 EMAIL: reg108@captiveaire.com

Shake Shack - 1651 - Meyerland, TX (Kitchen)

DATE: 1/24/2025

DWG.#: 7292270

DRAWN BY: Joe.shiiba

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

MASTER DRAWING

SHEET NO. 7

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Columbus, OH 43215
380 900 8867
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www.bergmeyer.com

CONSULTANTS:

SEAL SIGNATURE:

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	HEI	2025-02-18	PERMIT BID SET
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SHAKE SHACK

SHAKE SHACK
MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX
77096
SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author
CHECKED BY: Checker
JOB NO: 20240294.00

M707

DOAS/RTU FAN SCHEDULE - JOB#7296294

FAN INFORMATION										ELECTRICAL INFORMATION				COOLING INFORMATION				REHEAT INFORMATION				GAS HEAT INFORMATION				NOTES																					
FAN UNIT NO.	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL WEIGHT (LBS)	ESP	HP	PHASE	VOLTS	MCA	MDCP	OUTSIDE AIR DB	MINED AIR WB	LEAVING AIR DB	LEAVING AIR WB	TOTAL SENS.	IEER	ISMRE	DISCHARGE DB	WB	CAPACITY DESIRED	MAX	MOISTURE REMOVAL RATE	GAS TYPE	INPUT BTUH	OUTPUT BTUH	TEMP RISE	REQUIRED INPUT GAS PRESSURE	ROOM AREA (FT ²)	AIRFLOW (CFM)	HEIGHT (FT)	VELOCITY	NOTES											
1	RTU-1	1	CAS-HVAC3-1200-20-15T	CAPTIVEAIRE	20P-3	1200	1400	2600	2526	0.800	3.00	3	208	64A	70A	99.8°F	77.0°F	88.4°F	71.1°F	44.0°F	44.1°F	204.4	MBH	125.1	MBH	18.8	5.7	75.0°F	62.5°F	91.9	MBH	129.6	MBH	6.93	LBS/HR	NATURAL	129510	104903	36°F	7	IN. W.C. - 14	IN. W.C.	587.4	1057	7.2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	
2	RTU-2	1	CAS-HVAC3-1250-24-20T	CAPTIVEAIRE	24M-3	1250	1600	3600	2790	0.800	7.50	3	208	99A	110A	99.8°F	77.0°F	82.1°F	67.2°F	52.0°F	51.9°F	255.6	MBH	183.8	MBH	18.2	6.0	71.0°F	61.1°F	119.8	MBH	129.6	MBH	6.42	LBS/HR	NATURAL	205452	166416	27°F	7	IN. W.C. - 14	IN. W.C.	587.4	1057	7.2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	

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. TXV NOT ACCEPTABLE.
 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, EXHAUST AND DISCHARGE TEMPERATURE SENSORS. DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT.
 10. 8" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-13 INSULATION-MINIMUM 20GA EXTERIOR W/ 14GA BASE.
 11. BOX EFFICIENT FURNACE WITH MODULATING INPUT 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 HEATER.
 14. 13 DEGREE LOW AMBIENT OPERATION.
 15. HAIL GUARD FOR CONDENSING COIL.
 16. RTU ECONOMIZER WITH DIFFERENTIAL ENTHALPY CONTROL.
 17. BAROMETRIC RELIEF DAMPER.
 18. DOWN DISCHARGE/DOWN RETURN.
 19. MINIMUM ROOM AREA ASSUMED 7.2' SUPPLY DIFFUSER HEIGHT AND IS CALCULATED PER UL60335-2-40 4TH ED. VALUES BASED ON FACTORY CHARGE. ACTUAL SITE CHARGE MAY DIFFER.

FOR QUESTIONS, CALL THE Eastern PA Mechanical REGION 109 PHONE: (877) 504 - 4126 EMAIL: reg109@captiveaire.com

FAN OPTIONS

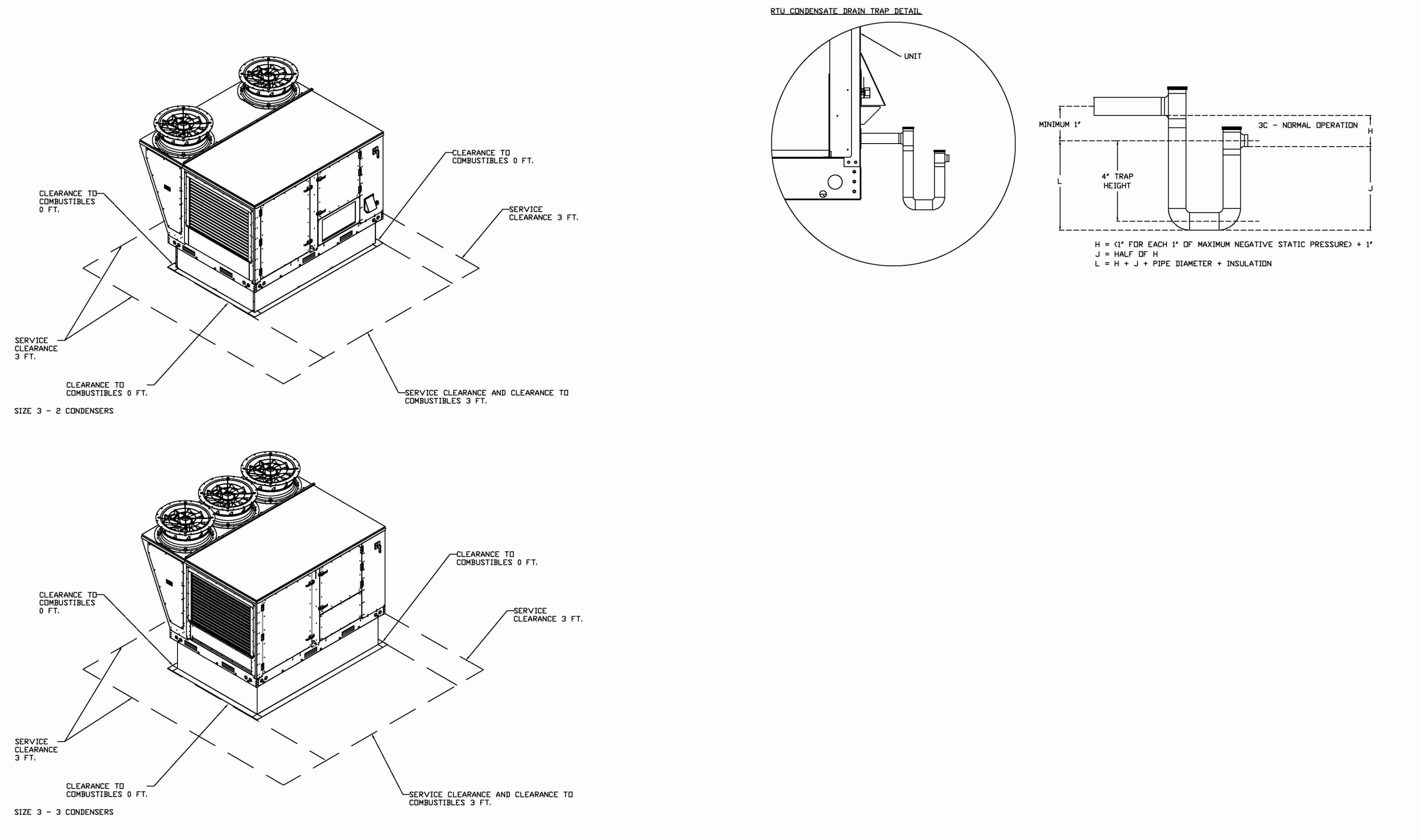
FAN UNIT NO.	TAG	QTY	DESCRIPTION
1	RTU-1	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" W.C., 1 FURNACE
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU, 750VA TRANSFORMER USED, IF A NON-DCV PREWIRE CONTROL IS THIS UNIT, THE 80V, 847" MAX. OR 120V PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE.
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED
		1	CONSTRUCTION MODE - MODIFIES START-UP SETTINGS TO ALLOW TEMPERING A BUILDING STILL UNDER CONSTRUCTION.
		1	RTU BLOWER DOOR SWITCH
		1	RTU3 DOWN DISCHARGE
		1	2" SERV 13 FILTERS FOR RTU3 (QTY. 4)
		1	2" SERV 8 FILTERS FOR RTU3 (QTY. 4)
		1	OVERHEAT STAT
		1	TOTAL CFM MONITORING
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE
		1	15 TON MODULATING COOLING OPTION, 208/230V, R454B REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	R454B LEAK DETECTOR OPTION FOR RTU3
		1	LOW AMBIENT COOLING OPERATION - DOWN TO 0° AMBIENT
2	RTU-2	1	RTU RETURN MOUNTED SMOKE DETECTOR AND SAMPLING TUBE - FACTORY INSTALLED
		1	OCCUPIED SCHEDULING
		1	INTAKE FIRESTAT SET TO 135°F
		1	FREEZE/STAT
		1	DISCHARGE FIRESTAT SET TO 240°F
		1	15 TON MODULATING REHEAT OPTION - SPACE BEWPOINT CONTROL - R454B
		1	RTU3 CURB BUET HANGER
		1	120V FIRE INPUT
		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	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY CONTROL
		1	RTU3 ECONOMIZER BAROMETRIC RELIEF
		1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI
		1	RTU3 HAIL GUARD
		1	RTU3 DOWN RETURN
2	RTU-2	1	LOAD REACTOR MOUNTED IN FAN
		1	3 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)
		1	EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET
		1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" W.C., 1 FURNACE
		1	SHIP LOOSE GAS STRAINER 1"
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU, 750VA TRANSFORMER USED, IF A NON-DCV PREWIRE CONTROL IS THIS UNIT, THE 80V, 847" MAX. OR 120V PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE.
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED
		1	CONSTRUCTION MODE - MODIFIES START-UP SETTINGS TO ALLOW TEMPERING A BUILDING STILL UNDER CONSTRUCTION.
		1	RTU BLOWER DOOR SWITCH
		1	RTU3 DOWN DISCHARGE
		1	2" SERV 13 FILTERS FOR RTU3 (QTY. 4)
		1	2" SERV 8 FILTERS FOR RTU3 (QTY. 4)
		1	OVERHEAT STAT
		1	TOTAL CFM MONITORING
1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE		
1	20 TON MODULATING COOLING OPTION, 208/230V, R454B REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS		
1	R454B LEAK DETECTOR OPTION FOR RTU3		
1	LOW AMBIENT COOLING OPERATION - DOWN TO 0° AMBIENT		
1	VAV PACKAGE W/ MANUAL/DCV CONTROL (571 VFD INCLUDED)		
1	OCCUPIED SCHEDULING		
1	INTAKE FIRESTAT SET TO 135°F		
1	FREEZE/STAT		
1	DISCHARGE FIRESTAT SET TO 240°F		
1	20 TON MODULATING REHEAT OPTION - SPACE BEWPOINT CONTROL - R454B		
1	120V FIRE INPUT		
1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS		
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	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY CONTROL		
1	RTU3 ECONOMIZER BAROMETRIC RELIEF		
1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI		
1	RTU3 HAIL GUARD		
1	ZIEHL POWERED EXHAUST FOR RTU3 - MANUAL CONTROL, 3000 CFM MAX AT 0"		
1	RTU3 DOWN RETURN		
1	LOAD REACTOR MOUNTED IN FAN		
1	RTU3 CURB BUET HANGER		
1	3 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)		
1	EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET		

CURB ASSEMBLIES

NO.	DN	TAG	WEIGHT	ITEM	SIZE
1	# 1	RTU-1	104 LBS	CURB	59.500"V X 91.000" X 14.000" INSULATED.
2	# 2	RTU-2	104 LBS	CURB	59.500"V X 91.000" X 14.000" INSULATED.

HMI SCHEDULE

UNIT NUMBER	HMI #	HMI LOCATION	TEMP AVERAGING	MODBUS ADDRESS
FAN #1	HMI #1 - UNIT	IN UNIT	NOT AVERAGED	55
FAN #1	HMI #2 - SPACE	KITCHEN	AVERAGED	56
FAN #1	HMI #3 - SPACE	MANAGERS OFFICE	AVERAGED	57
FAN #2	HMI #1 - UNIT	IN UNIT	NOT AVERAGED	55
FAN #2	HMI #2 - SPACE	KITCHEN	AVERAGED	56
FAN #2	HMI #3 - SPACE	MANAGERS OFFICE	NOT AVERAGED	57



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVEAIRE
 Eastern PA Mechanical
 www.captiveaire.com
 226 E City Line Avenue, Suite #103, Bala Cynwyd, PA 19004 PHONE: (267) 504 - 4126 EMAIL: reg109@captiveaire.com

Shacke Shocck-1651-Meyerland, TX(HVAC)-R1
 HOUSTON, TX, 77096

DATE: 1/23/2025
DWG.#: 7296294
DRAWN BY: Joe.shiloba
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO.
 1

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Bergmeyer
 CONSULTANTS:
 SEAL SIGNATURE:
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 A HEI 2025-08-18 ADDENDUM A
 HEI 2025-02-18 PERMIT BID SET
 HEI 2025-01-28 75% SET

SHAKE SHACK MEYERLAND, TX
 8815 W. LOOP SOUTH, HOUSTON, TX 77096
 SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author
 CHECKED BY: Checker
 JOB NO: 20240294.00

M708

360 E 20th Street
 215.337.1090
 275 N High St.
 Columbus, OH 43210
 617.542.1025

RTU Installation Wiring
 DRAWING NUMBER: INST7296294-2
 JOB: Shake Shack-1651-Meyerland, TX(HVAC)-R1
 SHEET NO.: 3
 SHEET TITLE: RTU-2
 SHEET DATE: 1/23/2025
 MODEL: CM-RTU-3-1651-01-001

REVISIONS

NO.	BY	DATE	DESCRIPTION
1	HEI	2025-09-29	IFC SET
A	HEI	2025-08-18	ADDENDUM A
	HEI	2025-02-18	PERMIT BID SET
	HEI	2025-01-28	75% SET

CAPTIVEAIRE
 Eastern PA Mechanical
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SHAKE SHACK-1651-Meyerland, TX(HVAC)-R1
 HOUSTON, TX, 77096

DATE: 1/23/2025
DWG.#: 7296294
DRAWN BY: Joe.shilba
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO.
 3

NOTES:

- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
- DENOTES CORNER WEIGHT.
- ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.
- CONNECTION FROM BREAKER TO UNITS SAFETY DISCONNECT SWITCH TO BE COPPER WIRE ONLY.
- EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET.

*NOTE: INTEGRAL CO2 MONITORING AND CONTROL CAPABILITIES FOR ALL SPACE MOUNTED THERMOSTATS.

NOTE:
 THE DOCUMENTATION CONTAINED ON THIS SHEET WAS NOT PREPARED BY HENDERSON ENGINEERS AND IS INCLUDED IN THIS SET FOR REFERENCE ONLY. HENDERSON ENGINEERS REVIEWED THE DOCUMENTATION ON THIS SHEET FOR GENERAL COMPLIANCE WITH DESIGN INTENT. SUPPLIER IS RESPONSIBLE THAT ALL FURNISHED EQUIPMENT ON THIS SHEET COMPLIES WITH APPLICABLE LOCAL, STATE, AND FEDERAL LAWS, CODES, AND REGULATIONS.

Bergmeyer

CONSULTANTS:

SEAL SIGNATURE:

FOR REFERENCE ONLY

1 HEI 2025-09-29 IFC SET
 A HEI 2025-08-18 ADDENDUM A
 HEI 2025-02-18 PERMIT BID SET
 HEI 2025-01-28 75% SET

SHAKE SHACK

SHAKE SHACK MEYERLAND, TX

8815 W. LOOP SOUTH, HOUSTON, TX 77096
 SHACK #1651

ADDENDUM A

CAPTIVEAIRE DRAWINGS

DRAWN BY: Author
 CHECKED BY: Checker
 JOB NO: 20240294.00

M710