

SHEET NUMBER	SHEET NAME
M001	MECHANICAL ABBREVIATIONS & SYMBOLS
M101	MECHANICAL FLOOR PLAN
M102	MECHANICAL REFRIGERATION PIPING AND LAYOUT PLAN
M150	MECHANICAL ROOF PLAN
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS
M590	MECHANICAL SPECIFICATIONS
M591	MECHANICAL SPECIFICATIONS
M592	MECHANICAL SPECIFICATIONS
M601	MECHANICAL SCHEDULES
M701	CAPTIVEAIRE DRAWINGS
M702	CAPTIVEAIRE DRAWINGS
M703	CAPTIVEAIRE DRAWINGS
M704	CAPTIVEAIRE DRAWINGS
M705	CAPTIVEAIRE DRAWINGS
M706	CAPTIVEAIRE DRAWINGS
M707	CAPTIVEAIRE DRAWINGS
M708	CAPTIVEAIRE DRAWINGS
M709	CAPTIVEAIRE DRAWINGS

**MECHANICAL AND PLUMBING EQUIPMENT COMPONENTS  
EARTHQUAKE LOAD RESISTANCE**

LISTING OF EQUIPMENT AND SYSTEM COMPONENTS	Occupancy Category (II)				Seismic Design Category (D)		COMMENTS
	ANCHORAGE TO FLOORS, ROOFS, ETC. (See Note 1 below)	SWAY BRACING (See Note 1 below)	LOCATION OF PROFESSIONALLY SEALED ANCHORAGE AND SWAY BRACING DETAILS	ON CONST. DOCUMENTS	SUBSEQUENT SUBMITTAL Drawing No. or Spec. Section	Permit & Plans (See Note 2 below)	
FIRE PROTECTION, DETECTION & ALARM EQUIPMENT & SYSTEM COMPONENTS: * See Chapter 4, Table 4.1 Fire Sprinkler Piping							N/A, no Fire Sprinkler listed in this scope of work.
Smoke Control							N/A, no Smoke Control in the project
HAZARDOUS EQUIPMENT & SYSTEM COMPONENTS: * See Chapter 4, Table 4.1 Exterior Gas Piping	X	X	P501, P591 SEC. 220458				7
OTHER EQUIPMENT & SYSTEM COMPONENTS NEEDED FOR CONTINUED OPERATION OF OCCUPANCY CATEGORY IV FACILITIES OR WHOSE FAILURE COULD IMPAIR THEIR CONTINUED OPERATION * See Chapter 4, Table 4.1							N/A, no Occupancy Category IV in the project
OTHER GENERAL EQUIPMENT & SYSTEM COMPONENTS: Existing RTUs, Ceiling Exhaust Fan, Wall mounted Air Curtain	X						N/A, no RTU or ceiling fan work in the project. Existing system to remain. Note 8
Kitchen Grease Hood	X		S160, S401				
Kitchen Exhaust Fan	X	X	M704				
ROOF TOP COMPONENTS Existing RTUs, Ceiling Exhaust Fan RTU, EF, COND, ASHP > 400 lbs. RTU, EF, COND, ASHP < 400 lbs.	X	X	M707, M501, M590 SEC. 230548				
EQUIPMENT SUSPENDED FROM STRUCTURE FC > 20 lbs. FC < 20 lbs.	X	X	M501, M590 SEC. 230548				
Ductwork	X						3, 6
Air Devices	X		M501				4, 5, 6

Notes:  
1. It is the basic intent of this Code Block to declare whether or not anchorage and sway bracing is being provided on the project. If so, to declare whether or not the details are shown on the plans or will be shown on a subsequent submission. If seismic restraint of a component is not required by code this should be stated in the comments. If seismic restraint, which is not required by code, is being provided due to owner/designer requirements this should also be stated in the comments.  
2. Plans signed and sealed by a Missouri Professional Engineer along with a separate permit application need to be submitted to the County a minimum of two weeks prior to the planned installation to allow for plan review and distribution to the Inspector. Additional time may be needed if such submissions are deficient.  
3. Table 4.4, Item 3, Exemption "c".  
4. Components shall be positively attached with mechanical fasteners.  
5. Refer to installation detail on drawing M501, detail 6.  
6. Table 4.4, Item 1, Exemption "c".  
7. Table 4.4, Item 5, Exemption "b".  
8. Air curtain to positively attach to wall per manufacturer instructions.



**RESPONSIBILITY MATRIX**

THIS SCHEDULE IS PROVIDED FOR QUICK REFERENCE ONLY.  
THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS.  
CONFLICTS BETWEEN THIS SCHEDULE AND THE REST OF THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION PRIOR TO BEGINNING WORK.

DESCRIPTION NOTE TO ARCHITECT: INDICATED RESPONSIBILITIES IS TYPICAL AND REQUIRES REFINEMENT PER PROJECT. REMOVE LINE ITEMS NOT SPECIFIC TO THIS PROJECT. REMOVE THIS NOTE PRIOR TO SUBMISSION.	FURNISHED			INSTALLED			REMARKS
	GENERAL CONTRACTOR	OWNER	LANDLORD	GENERAL CONTRACTOR	OWNER	LANDLORD	
<b>DIVISION 23: HEATING, VENTILATING, AND AIR CONDITIONING</b>							
<b>23.1 HVAC DUCTWORK AND PIPING IDENTIFICATION</b>							
23.1.1 HVAC DUCTWORK SYSTEM IDENTIFICATION	X			X			
23.1.2 PIPING SYSTEM IDENTIFICATION	X			X			
23.1.3 UTILITY SHUT OFF IDENTIFICATION IN KITCHEN	X			X			
23.1.4 VALVE TAGS AND CHART	X			X			
23.1.5 HVAC DAMPER IDENTIFICATION	X			X			
<b>23.2 ROOF CURBS</b>							
23.2.1 EXHAUST FAN CURBS	X			X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.2 ROOFTOP UNIT CURBS		X		X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.3 CONDENSING UNIT CURBS	X			X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.4 MAKE UP AIR AND DOAS UNIT CURBS		X		X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
23.2.5 KITCHEN EXHAUST FAN CURBS		X		X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING, CURBS, AND ACCESSORIES
<b>23.3 HVAC DUCTWORK SYSTEM COMPONENTS</b>							
23.3.1 HVAC DUCTWORK	X			X			
23.3.2 INSULATION AND FIRE WRAP	X			X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE TENANT FIT OUT FROM LANDLORD POINT OF CONNECTION
23.3.3 DAMPERS	X			X			
23.3.4 SMOKE DETECTORS	X			X			
23.3.5 SUPPLY, RETURN, AND EXHAUST GRILLS AND REGISTERS	X			X			
<b>23.4 MECHANICAL PIPING SYSTEM COMPONENTS</b>							
23.4.1 WALK-IN COOLER AND FREEZER REFRIGERATION		X			X		WALK-IN COOLER AND FREEZER SUPPLIED BY VENDOR NO. 103 GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE PIPING INSTALLATION AND FINAL CONNECTION
23.4.2 REFRIGERATION FOR OTHER HVAC EQUIPMENT	X			X			
23.4.3 CHILLED WATER	X			X			
23.4.4 CONDENSER WATER	X			X			
23.4.5 HEATING HOT WATER	X			X			
23.4.6 VALVES AND ACCESSORIES (E.G. AIR VENTS)	X			X			
<b>23.5 HVAC EQUIPMENT</b>							
23.5.1 SUPPLY FAN		X		X			
23.5.2 TOILET EXHAUST FAN	X			X			
23.5.3 KITCHEN EXHAUST FAN		X		X			SUPPLIED BY VENDOR NO. 102
23.5.4 DUCTED AND NON-DUCTED HEATING AND COOLING UNITS		X		X			
23.5.5 MAKE UP AIR AND DOAS UNITS		X		X			SUPPLIED BY VENDOR NO. 102
23.5.6 ELECTRIC PATIO HEATERS	X			X			
23.5.7 HVAC CONDENSING UNITS		X		X			
23.5.8 REFRIGERATION CONDENSING UNITS		X		X			
23.5.9 RGF PHI SYSTEM	X			X			GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 7 VENDOR SUBSTITUTION IS NOT PERMITTED
<b>23.6 KITCHEN EXHAUST WITH FIRE SUPPRESSION SYSTEM</b>							
23.6.1 HOOD CONTROL PANEL		X		X			SUPPLIED BY VENDOR NO. 102
23.6.2 KITCHEN EXHAUST HOOD		X		X			SUPPLIED BY VENDOR NO. 102
23.6.3 STRUCTURAL SUPPORT	X			X			
23.6.4 ELECTRICAL AND CONTROL WIRING	X			X			
23.6.5 ANSUL OR TANK FIRE SUPPRESSION SYSTEM		X		X			SUPPLIED BY VENDOR NO. 102 GENERAL CONTRACTOR TO COORDINATE AND FACILITATE SYSTEM SIGN-OFF
23.6.6 ANSUL OR TANK WIRING AND UTILITIES CONNECTION	X			X			
23.6.7 ANSUL OR TANK GAS VALVE		X		X			SUPPLIED BY VENDOR NO. 102
<b>23.7 COMMISSIONING ACTIVITIES</b>							
23.7.1 GREASE EXHAUST WATER LEAKAGE TEST	X			X			GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 6 VENDOR SUBSTITUTION IS NOT PERMITTED
23.7.2 TESTING AIR BALANCE (TAB) REPORT	X			X			GENERAL CONTRACTOR TO PURCHASE FROM VENDOR NO. 7 VENDOR SUBSTITUTION IS NOT PERMITTED

**SUBMITTAL MATRIX**

GENERAL CONTRACTORS TO ALSO REVIEW ARCHITECTURAL SPECIFICATIONS AS NOTED IN PLAN SECTION 700 OF THE ARCHITECTURAL PACKAGE FOR REQUIRED SUBMITTALS THAT MIGHT NOT BE LISTED BELOW.

SUBMITTAL DESCRIPTION	Required, Review, Time (Business Day)	Architect Approval	Shop Drawing Sample Required	Physical Sample Required	Submit for Record	Submit for Record Only
Anchor Bolts Shops	5	X			X	
ATAS-Detailed Shop DWGS(Submitted by Owner Vendor to Owner/AOR prior to const.)	5	X			X	
Concrete Mix Design	5	X			X	
Construction Prefunctional Checklists	5	X			X	
Decorative Metal Shop Drawings	5	X			X	
Difusers, Grills & Registers	5	X			X	
Doors, Frames & Hardware	7	X			X	
Ductwork Layout (if there are significant changes in field)	5	X			X	
Electrical Distribution Equipment	5	X			X	
Elevator & Vertical Transportation Shop Drawings	5	X			X	
Epoxy Floor	5	X			X	
Fire Alarm Shop Drawings & Device Cut Sheets	5	X			X	
Fire Sprinkler Shop Drawings, Hydraulic Calculations & Device Cut Sheets	5	X			X	
HVAC Equipment(if Carrier - Submitted by Owner Vendor to Owner/AOR prior to const.)	5	X			X	
Light Fixtures(Submitted by Owner Vendor to Owner/AOR prior to construction)	5	X			X	
MEP Tests, Start-Up, and Programming Reports	5	X			X	
Millwork - Material Submittals (if differs from spec)	5	X	X	X		
Millwork - Shop Drawings (custom items & design features only)	5	X				
Restroom Partitions	5	X			X	
Plumbing Fixtures	5	X			X	
Railing Shop Drawings	5	X			X	
Rebar	5	X			X	
Stair Shop Drawings	5	X			X	
Structural Steel Shop Drawings	7	X			X	
Storefront - product data Submittal (if different from specified)	5	X			X	
Storefront - Shop Drawings	5	X			X	
Tile (if differs from spec)	5	X			X	
Window Film	5	X			X	

**SYMBOLS**

**HEATING-VENTILATING-AIR CONDITIONING**

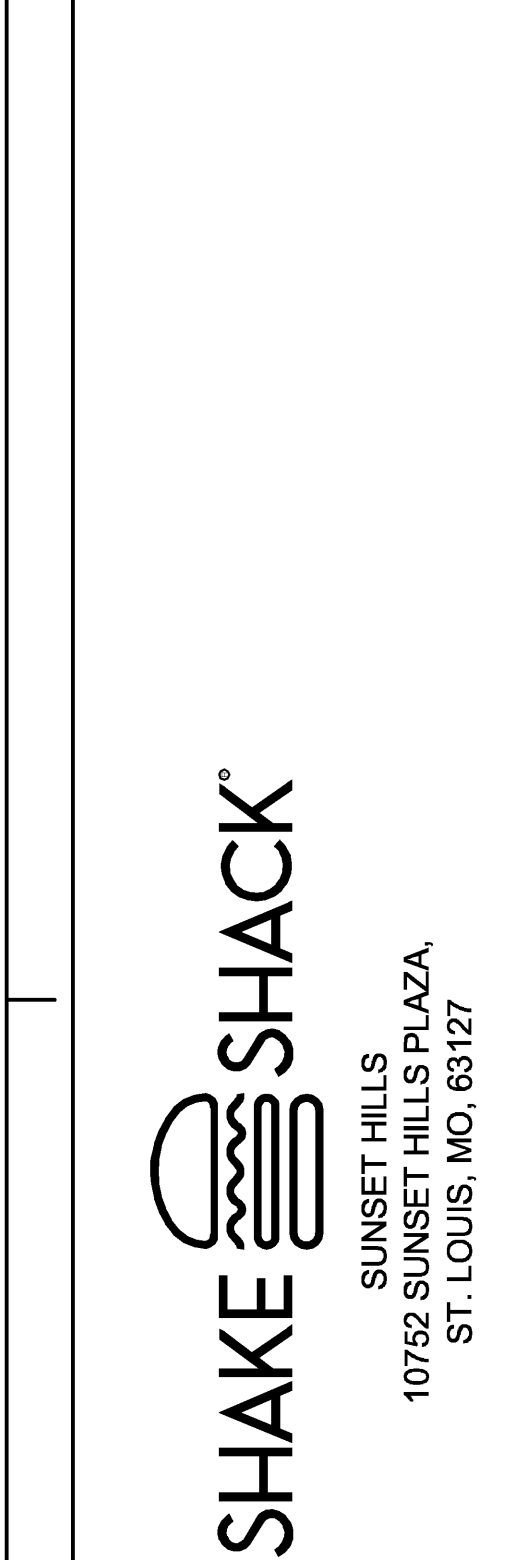
SYMBOL	DESCRIPTION
	THERMOSTAT
	REMOTE SENSOR
	SUPPLY DIFFUSER
	RETURN OR EXHAUST GRILLE
	SUPPLY OR FRESH AIR DUCT (SA OR FA)
	RETURN OR EXHAUST AIR DUCT (RA OR EA)
	RECTANGULAR DUCT FIRST FIGURE IS SIDE SHOWN
	ROUND DUCT
	VOLUME DAMPER (ELEV AND PLAN)
	TURNING VANES
	SUPPLY REGISTER OR GRILLE (R OR G)
	RETURN REGISTER OR GRILLE (R OR G)
	FRESH AIR INTAKE (FA)
	SQUARE CEILING DIFFUSER (SUPPLY)
	FAN COIL UNIT AND MARK
	MOTORIZED DAMPER
	REFRIGERANT LIQUID LINE
	REFRIGERANT SUCTION LINE



ZEBRA ARCHITECTURE, PLLC  
14614 N KIERLAND BLVD., SUITE N300  
SCOTTSDALE, ARIZONA 85254  
PHONE: 480.912.1169  
zbrglobal



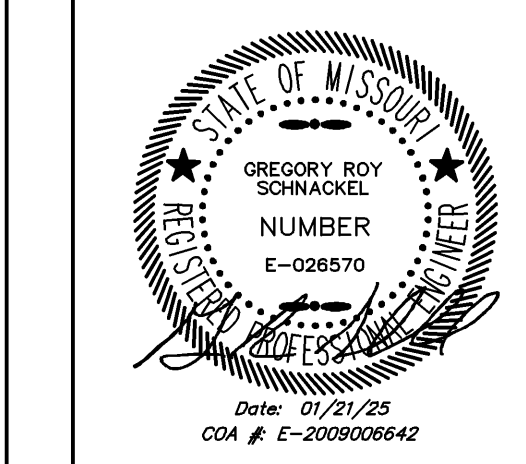
STORE NO:  
**MO #1632**



**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I

STATUS: IFC SET



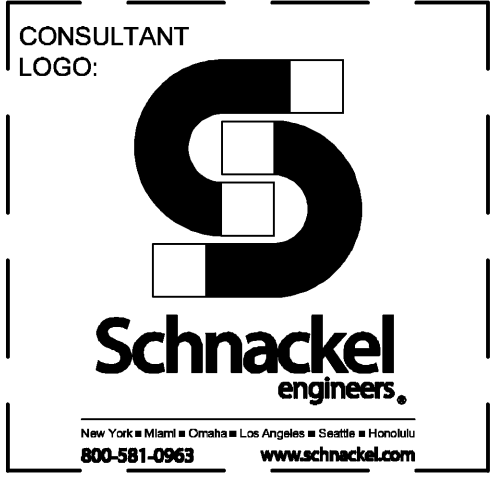
FIELD VERIFICATION:  
The Contractor shall verify all listed dimensions and conditions at the project site and notify Zebra Architecture, PLLC of any discrepancies, omissions, or discrepancies before beginning or fabricating any work. Do not scale from drawings.

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**SHEET NAME:  
MECHANICAL ABBREVIATIONS & SYMBOLS**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: RAS SCALE:

SHEET NO.:  
**M001**



STORE NO:  
**MO #1632**



SUNSET HILLS  
10752 SUNSET HILLS PLAZA  
ST. LOUIS, MO, 63127

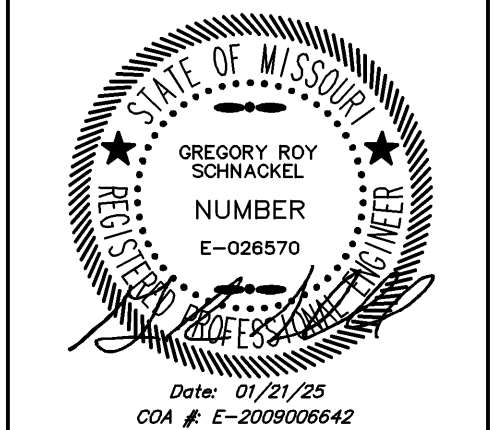
- GENERAL NOTES:**
- EXISTING CONDITIONS ARE BASED ON RECORD DRAWINGS PROVIDED BY THE OWNER AND/OR LIMITED FIELD VERIFICATION BY OTHERS. CONTRACTOR SHALL ADJUST TO ACTUAL FIELD CONDITIONS AT NO ADDITIONAL EXPENSE TO THE PROJECT.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS PRIOR TO SUBMITTING THE BID. NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR ANY EXTRAS DUE TO THE CONTRACTOR'S FAILURE TO VISIT THE PROJECT SITE PRIOR TO SUBMITTING THE BID. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER FOR RESOLUTION.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH DEMOLITION WORK PRIOR TO BIDDING AND START OF WORK. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ALL EXISTING AS REQUIRED FOR INSTALLATION/CONSTRUCTION NEW WORK.
  - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT AND LOCAL CODES.
  - MECHANICAL CONTRACTOR SHALL FIELD COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL POWER REQUIREMENTS.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.
  - ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE WITH CONNECTIONS IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE INTENT OF THE INSTALLATION WHILE THE SPECIFICATIONS AND EQUIPMENT LIST DENOTE THE TYPE AND QUALITY OF MATERIAL AND WORKMANSHIP TO BE USED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE HIGHER AND/OR MORE COSTLY STANDARD SHALL APPLY. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS REGARD ON BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.
  - COORDINATE DUCT ROUTING AND HEIGHTS WITH GENERAL CONTRACTOR. VERIFY ALL CLEARANCES BEFORE STARTING WORK.
  - THE CONTRACTOR SHALL INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT AS REQUIRED TO COMPLY WITH ALL APPLICABLE CODES. PRESERVE CEILING HEIGHTS AND HEADROOM AND MAKE ALL EQUIPMENT REQUIRING MAINTENANCE OR REPAIR ACCESSIBLE.
  - ALL DUCT CONNECTIONS TO HVAC EQUIPMENT MUST BE MADE WITH FLEXIBLE CONNECTORS.
  - DO NOT ATTACH ANYTHING TO DECK ABOVE. ATTACH TO STRUCTURE (I.E. BEAMS, JOISTS) OR DUCT WORKERS SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE. ALL CONNECTIONS TO JOISTS SHALL BE MADE AT THE TOP CORNER.
  - ALL DUCT DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS. ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER OR WRAPPED WITH 1-1/2" THICK FIRE RETARDANT FIBERGLASS WITH A REINFORCED ALUMINUM FOIL JACKET AND SHALL BE APPROVED FOR USE BY SHAWWA AND INSTALLED TO MATCH THE SURROUNDING AREA. DUCT WRAP INSULATION IS NOT PERMITTED IN THESE AREAS.
  - ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK VISIBLE TO THE PUBLIC SHALL BE INTERNALLY LINED AND SEALED WITH DUCT SEALER COMPLETELY CONCEALED. ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE.
  - PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED ENERGY FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. LOCATE CONTROL ACCESSIBLE TO TENANT'S PREMISES.
  - REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
  - TENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITIES LOCATED ON THE PREMISES. TENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS RELATING TO THE RELOCATION OF, DAMAGE TO, REPAIR OF ANY EXISTING UTILITIES AND/OR IMPROVEMENTS WHICH ARE DAMAGED AS A RESULT OF TENANT'S WORK IN OR AROUND THE PREMISES.
  - ALL ROOFING WORK SHALL BE PERFORMED BY LANDLORD'S APPROVED ROOFING CONTRACTOR AT TENANT'S EXPENSE, IF REQUIRED IN LEASE OR TENANT CRITERIA MANUAL.
  - ROOF MOUNTED EQUIPMENT SHALL BE LABELED WITH THE TENANT NAME AND SPACE NUMBER WITH HIGH WEATHER PROOF LETTERS.
  - ALL GREASE SHALL BE PROVIDED WITH 3" FOIL FACED THERMAL-CERAMIC INSULATION FOR GREASE DUCTS. INSULATION SHALL MEET NFPA 96 AND ASTM E 2336 REQUIREMENTS.
  - GREASE DUCT LEAKAGE TESTING MUST BE PERFORMED PRIOR TO CONCEALMENT OF THE DUCTWORK.
  - MECHANICAL CONTRACTOR SHALL PROVIDE TENANT WITH A WRITTEN ONE (1) YEAR WARRANTY ON ALL HANDS PROVIDED AND / OR INSTALLED. THE WARRANTY SHALL INCLUDE ALL LABOR, MATERIALS AND THREE (3) ROUTINE SERVICES INCLUDING FILTER CHANGES DURING A ONE (1) YEAR PERIOD.
  - AT THE COMPLETION OF CONSTRUCTION AN NEBS, AABC OR TABB CERTIFIED AIR BALANCE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND LANDLORD. PRIOR TO SCHEDULING BALANCING, COORDINATE WITH LANDLORD'S FIELD REPRESENTATIVE FOR THE VENDOR LISTED BELOW. IF APPROVED, THE BALANCING SHALL BE COMPLETED BY NATION TAB. CONTACT WILL TURNROURH AT WILLBURNATIONAL.TAB.COM OR 314-854-5244 NATIONAL TAB TO ALSO PERFORM COMMISSIONING FOR ALL SHAKE SHACK PROVIDED UNITS.
  - PARTS OF THE BASE BUILDING SYSTEMS THAT FALL INTO LEASE LINE SHALL REMAIN UNDISTURBED UNLESS NOTED OTHERWISE.
  - PROVIDE ALL NECESSARY WIRING, RELAYS, DETECTORS, COMPONENTS, ETC., FOR FIRE ALARM OR CONTROL SYSTEM INTERLOCK IF APPLICABLE. VERIFY WITH BUILDING PERSONNEL BEFORE BID.

- HVAC NOTES:**
- OPEN END RETURN AIR DUCT. PROVIDE OPENING WITH 1/4" MESH GALVANIZED SCREEN.
  - CONTRACTOR SHALL UNDERCUT DOOR 3/4".
  - PROVIDE 10/10 EXHAUST AIR DUCT UP TO EF-3 ON ROOF.
  - NEW CAPTIVEAIRE EXHAUST HOOD TO BE FURNISHED BY OWNER FOR INSTALLATION BY THE MECHANICAL CONTRACTOR. SEE CAPTIVEAIRE SHEETS M701 THROUGH M709 FOR ADDITIONAL INFORMATION. BALANCE HOOD EXHAUST AS NOTED ON CAPTIVEAIRE SHEET. VERIFY ALL MANUFACTURER AND CODE REQUIRED CLEARANCES ARE MAINTAINED. NOTIFY ARCHITECT IF ANY CONFLICTS OCCUR.
  - TRANSITION FROM HOOD EXHAUST COLLAR AS INDICATED ON PLANS AND EXTEND KITCHEN HOOD GREASE EXHAUST DUCTWORK AS INDICATED ON THE PLANS UP TO CORRESPONDING GREASE EXHAUST FAN ON ROOF. SEE SHEET M150 FOR CONTINUATION. GREASE DUCT SHALL BE WRAPPED WITH TWO (2) LAYERS OF THERMAL CERAMIC FAST WRAP XL 1 1/2" THICK WITH 3" PERFORATED AND LONGITUDINAL OVERLAPS OR EQUIVALENT U.L. LISTED GREASE DUCT WRAP FOR ZERO CLEARANCE TO COMBUSTIBLES. REFER TO SHEET M501, DETAIL 2, FOR ADDITIONAL INFORMATION. TYPICAL.
  - PROVIDE CLEANOUTS ON GREASE DUCTWORK AS REQUIRED BY CODE. REFERENCE SHEET M501, DETAIL 1 FOR ADDITIONAL INFORMATION. TYPICAL OF GREASE EXHAUST DUCTWORK. TYPICAL.
  - DUCTWORK TO BE INSTALLED AS HIGH AS CONDITIONS ALLOW. COORDINATE ROUTING AND MOUNTING HEIGHT WITH LIGHTING FIXTURES AND ARCHITECT. NOTIFY THE ARCHITECT OF ANY CONFLICTS AND COORDINATE WITH THE CONSTRUCTION MANAGER.
  - PROVIDE REMOTE VOLUME DAMPER AS INDICATED ON PLANS. REFERENCE SHEET M501, DETAIL 3, FOR ADDITIONAL INFORMATION. TYPICAL OF DIFFUSERS/GRILLES INSTALLED IN OVP. BOARD CEILINGS.
  - PROVIDE NEW FC UNIT AS NOTED ON PLANS AND AS SCHEDULED ON SHEET M501.
  - PROVIDE REFRIGERANT LINES FROM AS4P-1 ON ROOF TO FC-1 IN KITCHEN OFFICE. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
  - COORDINATE WITH CAPTIVEAIRE ON REMOTE SENSORS AND COMFORT CONTROLS PACKAGE THAT IS TO BE INSTALLED IN THE OFFICE. MOUNT SENSOR AND CONTROLS AT 48" ABOVE FINISHED FLOOR AND AS INDICATED ON THE PLANS. COORDINATE LOCATION WITH CONSTRUCTION MANAGER AND WALL GRAPHICS LAYOUT. REFERENCE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION.
  - HOOD MANUFACTURER TO PROVIDE A "KIT" TO FASTEN THE BOTTOM FLANGE OF THE HOOD TO THE WALL, WITH ONE FASTENER PER STUD WALL. SIL-BOND 871 4500 ALUMINUM SILICONE SEALANT OR APPROVED SIMILAR, TO BE APPLIED BY GENERAL CONTRACTOR / HOOD INSTALLER FOR ANY REMAINING SMALL GAPS. HOOD FASTENING "KIT" DETAIL TO BE INCLUDED IN DRAWINGS. REFERENCE SHEET M501, DETAIL 15, FOR ADDITIONAL INFORMATION.
  - BALANCE DAMPER TO PROVIDE THE AIRFLOW INDICATED ON SHEET M150 CFM.
  - REFERENCE SHEETS FOR MOTORIZED DAMPER CONTROL. MOUNT CAPTIVEAIRE ROOM TEMPERATURE SENSOR FURNISHED WITH KITCHEN HOODS ON WALL AS INDICATED ON THE PLANS AND AS SPECIFIED BY THE MANUFACTURER.
  - OPEN END TRANSFER AIR DUCT. PROVIDE OPENING WITH 1/4" MESH GALVANIZED SCREEN.
  - CONTRACTOR TO PROVIDE A CARBON DIOXIDE SENSING SYSTEM AS REQUIRED UNDER 2021 IFC SECTION 503.7. COORDINATE INSTALLATION AND LOCATION WITH CONSTRUCTION MANAGER.
  - DUCTWORK TO BE ROUTED BELOW BEAM. FIELD VERIFY EXACT CONDITIONS. NOTIFY ARCHITECT AND ENGINEER IF CONFLICT OCCURS.

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	11/05/24	REVISION B
D	12/12/24	REVISION D
1	01/22/25	REVISION 1

STATUS: IFC SET

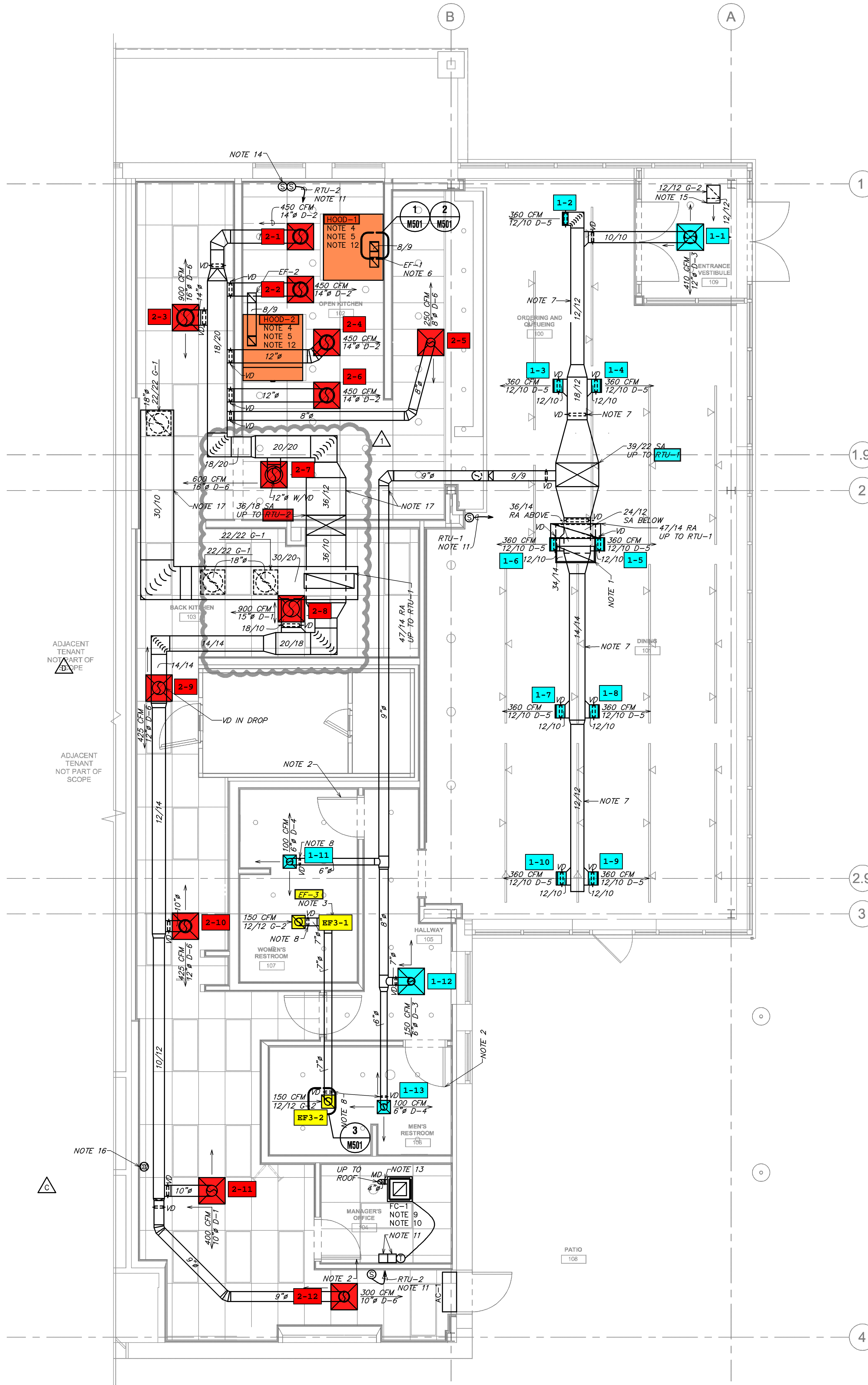


**FIELD VERIFICATION:**  
The Contractor shall verify all field dimensions and locations of the project and verify Zebra Architecture, PLLC drawings for the information herein to be reproduced, distributed or otherwise without the written consent of Zebra Architecture, PLLC.

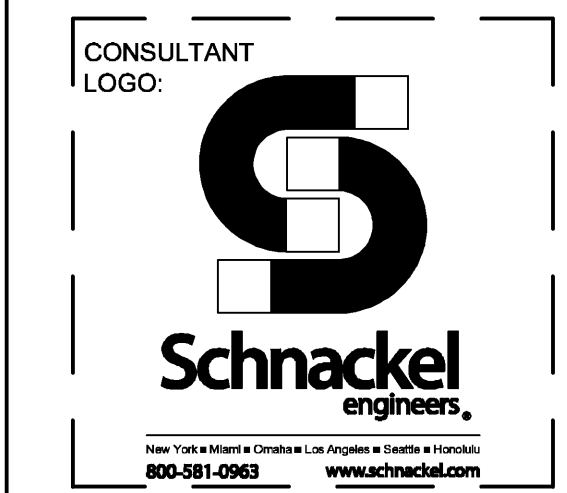
SHEET NAME:  
**MECHANICAL FLOOR PLAN**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: RAS SCALE:

SHEET NO.:  
**M101**



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



STORE NO:  
**MO #1632**

**SHAKE SHACK**  
SUNSET HILLS  
10752 SUNSET HILLS PLAZA  
ST. LOUIS, MO, 63127

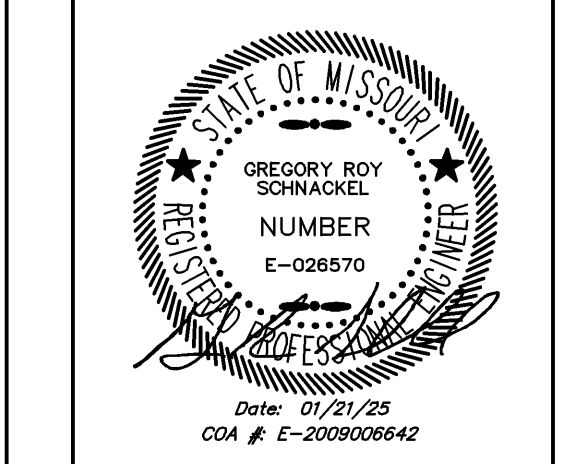
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- EXISTING CONDITIONS ARE BASED ON RECORD DRAWINGS PROVIDED BY THE OWNER AND/OR LIMITED FIELD VERIFICATION BY OTHERS. CONTRACTOR SHALL ADJUST TO ACTUAL FIELD CONDITIONS AT NO ADDITIONAL EXPENSE TO THE PROJECT.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS PRIOR TO SUBMITTING THE BID. NO DISCREPANCIES WILL BE PROVIDED FOR ANY EXTRAS DUE TO THE CONTRACTOR'S FAILURE TO VISIT THE PROJECT SITE PRIOR TO SUBMITTING THE BID. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER FOR RESOLUTION.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH DEMOLITION WORK PRIOR TO BIDDING AND START OF WORK. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ALL EXISTING AS REQUIRED FOR INSTALLATION/CONSTRUCTION NEW WORK.
  - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT AND LOCAL CODES.
  - MECHANICAL CONTRACTOR SHALL FIELD COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL POWER REQUIREMENTS.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.
  - ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE WITH CONNECTIONS IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE INTENT OF THE INSTALLATION WHILE THE SPECIFICATIONS AND EQUIPMENT LIST DENOTE THE TYPE AND QUALITY OF MATERIALS AND WORKMANSHIP TO BE USED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE HIGHER AND/OR MORE COSTLY STANDARD WILL APPLY. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS REGARD ON BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.
  - COORDINATE DUCT ROUTING AND HEIGHTS WITH GENERAL CONTRACTOR. VERIFY ALL CLEARANCES BEFORE STARTING WORK.
  - THE CONTRACTOR SHALL INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT AS REQUIRED TO CONFORM TO THE STRUCTURE. AVOID OBSTRUCTIONS. PRESERVE CEILING HEIGHTS AND HEADROOM AND MAKE ALL EQUIPMENT REQUIRING MAINTENANCE OR REPAIR ACCESSIBLE.
  - ALL DUCT CONNECTIONS TO HVAC EQUIPMENT MUST BE MADE WITH FLEXIBLE CONNECTORS.
  - DO NOT ATTACH ANYTHING TO DECK ABOVE. ATTACH TO STRUCTURE (I.E., BEAMS, JOISTS) ONLY. DUCT HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE. ALL CONNECTIONS TO JOISTS SHALL BE MADE AT THE TOP CORO.
  - ALL DUCT DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS. ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER OR WRAPPED WITH 1-1/2" THICK FIRE RETARDANT FIBERGLASS WITH A REINFORCED ALUMINUM FOIL JACKET AND SHALL BE APPROVED FOR USE BY SHAWNA AND MAINTAIN RETURN AIR TRANSFER DUCTS AND RETURN DUCTWORK WITHIN 10 FEET OF THE UNIT FAN SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER.
  - ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK VISIBLE TO THE PUBLIC SHALL BE INTERNALLY LINED AND PAINTED TO MATCH THE SURROUNDING AREA. DUCT WRAP INSULATION IS NOT PERMITTED IN THESE AREAS.
  - EXPOSED SPIRAL DUCT TO BE GALVANIZED FINISH, FREE FROM SCRATCHES, DENTS OR BLEMISHES AND PAINTED TO MATCH THE SURROUNDING AREA. DUCT SHALL BE INTERNALLY LINED AND SEALED WITH DUCT SEALER COMPLETELY CONCEALED WITHIN THE DUCT JOINT. NO EXPOSED SEALER OR TAPE WILL BE ACCEPTED.
  - ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE.
  - PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITE ENERTECH FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. LOCATE CONTROLLER ABOVE ACCESSIBLE CEILING LOCATION.
  - REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
  - THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITY RISERS AND/OR OTHER IMPROVEMENTS LOCATED ON THE PREMISES PRIOR TO BIDDING. TENANT'S CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL COSTS RELATING TO THE RELOCATION OF, DAMAGE TO, REPAIR OF ANY EXISTING UTILITY RISERS AND/OR IMPROVEMENTS WHICH ARE DAMAGED AS A RESULT OF TENANT'S WORK IN OR AROUND THE PREMISES.
  - ALL ROOFING WORK SHALL BE PERFORMED BY LANDLORD'S APPROVED ROOFING CONTRACTOR AT TENANT'S EXPENSE, IF REQUIRED IN LEASE OR TENANT CRITERIA MANUAL.
  - ROOF MOUNTED EQUIPMENT SHALL BE LABELED WITH THE TENANT NAME AND SPACE NUMBER WITH 3" HIGH WEATHER PROOF LETTERS.
  - ALL GREASE EXHAUST SHALL BE PROVIDED WITH 3" FOIL FACED THERMAL-CERAMIC INSULATION FOR GREASE DUCTS. INSULATION SHALL MEET NFPA 96 AND ASTM E 2336 REQUIREMENTS.
  - GREASE DUCT LEAKAGE TESTING MUST BE PERFORMED PRIOR TO CONCEALMENT OF THE DUCTWORK.
  - MECHANICAL CONTRACTOR SHALL PROVIDE TENANT WITH A WRITTEN ONE (1) YEAR MANUFACTURER'S WARRANTY ON ALL HVAC EQUIPMENT PROVIDED AND / OR INSTALLED. THE WARRANTY SHALL INCLUDE ALL LABOR, MATERIALS AND THREE (3) ROUTINE SERVICES INCLUDING FILTER CHANGES DURING A ONE (1) YEAR PERIOD.
  - AT THE COMPLETION OF CONSTRUCTION AN NEBS, AABC OR TABB CERTIFIED AIR BALANCE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND LANDLORD. PRIOR TO SCHEDULING BALANCING COORDINATE WITH LANDLORD'S FIELD REPRESENTATIVE FOR THE VENDOR LISTED BELOW. IF APPROVED, THE BALANCING SHALL BE COMPLETED BY NATION TAB. CONTACT WILL TURNBOUR AT WILLTURNBOUR@NATIONTAB.COM OR 314-954-6244. NATIONAL TAB TO ALSO PERFORM COMMISSIONING FOR ALL SHAKE SHACK PROVIDED UNITS.
  - PARTS OF THE BASE BUILDING SYSTEMS THAT FALL INTO LEASE LINE SHALL REMAIN UNDISTURBED UNLESS NOTED OTHERWISE.
  - PROVIDE ALL NECESSARY WIRING, RELAYS, DETECTORS, COMPONENTS, ETC., FOR FIRE ALARM OR CONTROL SYSTEM INTERLOCK IF APPLICABLE. VERIFY WITH BUILDING PERSONNEL BEFORE BID.

- HVAC NOTES:**
- PROVIDE REFRIGERANT LINES FROM ASHP-1 ON ROOF TO FC-1 IN KITCHEN OFFICE AS NOTED ON PLANS. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE. ADJUST ROUTING AS NECESSARY IN FIELD FOR ANY OBSTACLES. COORDINATE EXACT LOCATION AND ROUTING WITH CONSTRUCTION MANAGER.
  - KITCHEN EQUIPMENT CONTRACTOR TO PROVIDE REFRIGERANT LINES FROM CONDENSING UNIT ON ROOF TO KITCHEN EQUIPMENT AS NOTED ON PLANS. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE. ADJUST ROUTING AS NECESSARY IN FIELD FOR ANY OBSTACLES. COORDINATE EXACT LOCATION AND ROUTING WITH CONSTRUCTION MANAGER AND LANDLORD.

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
1	01/22/25	REVISION 1

STATUS: IFC SET



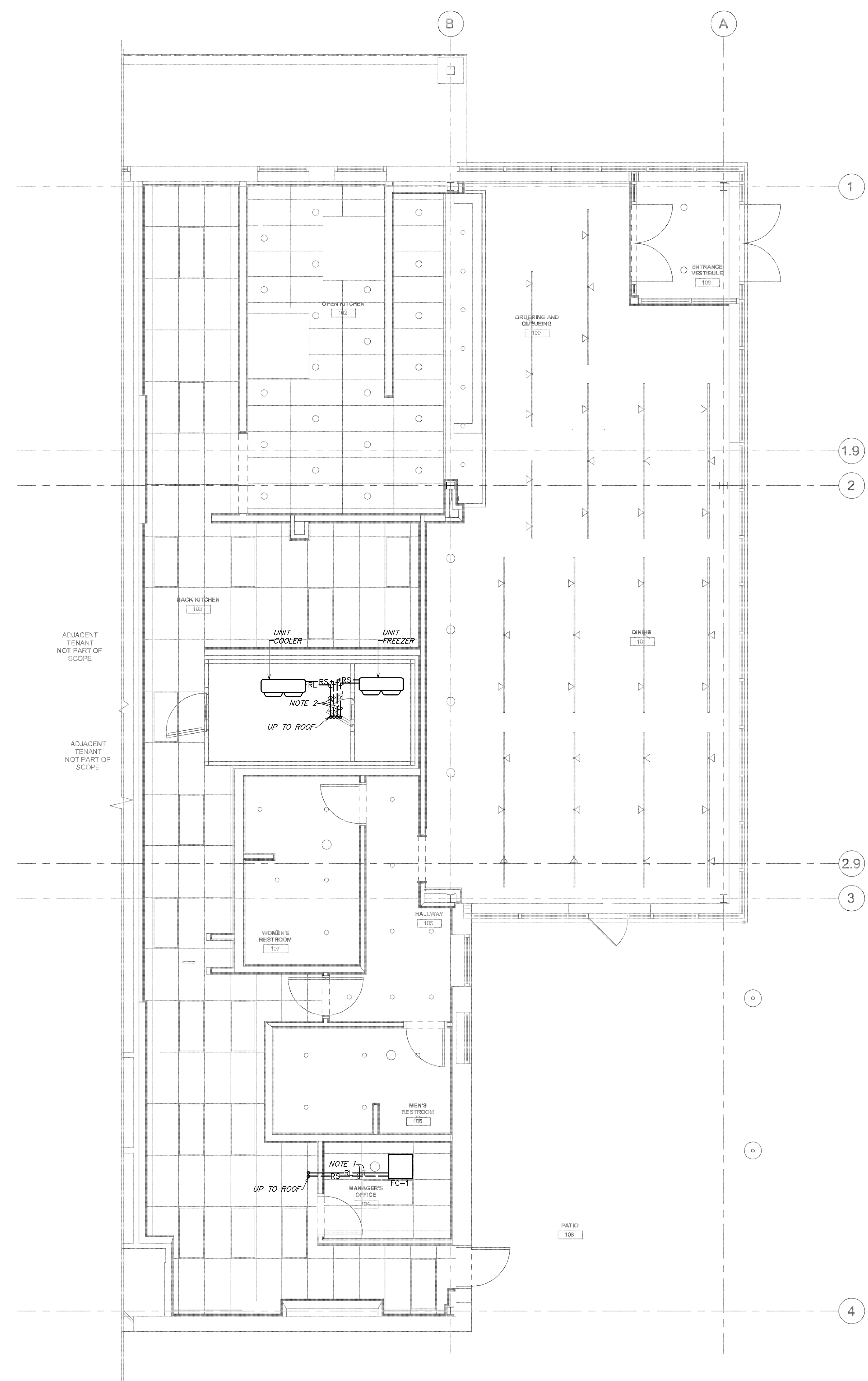
**FIELD VERIFICATION:**  
The Contractor shall verify all signed dimensions and locations at the project site and notify Zebra Architecture, PLLC in writing of any discrepancies before beginning or fabricating any work. Do not scale from drawings.

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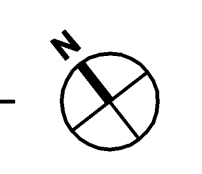
SHEET NAME:  
**MECHANICAL REFRIGERATION PIPING AND LAYOUT PLAN**

DATE: 09/24/2024 PROJECT NO.: 39039  
DRAWN: RAS SCALE:

SHEET NO.: **M102**



**1 MECHANICAL REFRIGERANT PIPING LAYOUT PLAN**  
SCALE: 1/4" = 1'-0"





STORE NO:  
**MO #1632**

**SHAKE SHACK**  
SUNSET HILLS  
10752 SUNSET HILLS PLAZA  
ST. LOUIS, MO, 63127

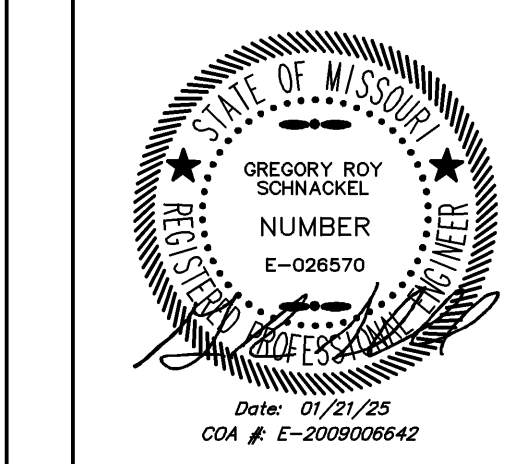
- GENERAL NOTES:**
- EXISTING CONDITIONS ARE BASED ON RECORD DRAWINGS PROVIDED BY THE OWNER AND/OR LIMITED FIELD VERIFICATION BY OTHERS. CONTRACTOR SHALL ADJUST TO ACTUAL FIELD CONDITIONS AT NO ADDITIONAL EXPENSE TO THE PROJECT.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS PRIOR TO SUBMITTING THE BID. NO DISCREPANCIES WILL BE PROVIDED FOR ANY EXTRAS DUE TO THE CONTRACTOR'S FAILURE TO VISIT THE PROJECT SITE PRIOR TO SUBMITTING THE BID. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER FOR RESOLUTION.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH DEMOLITION WORK PRIOR TO BIDDING AND START OF WORK. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ALL EXISTING AS REQUIRED FOR INSTALLATION/CONSTRUCTION NEW WORK.
  - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT AND LOCAL CODES.
  - MECHANICAL CONTRACTOR SHALL FIELD COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL POWER REQUIREMENTS.
  - ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.
  - ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE WITH CONNECTIONS IN THE REQUIRED LOCATION. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS REGARD ON BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.
  - COORDINATE DUCT ROUTING AND HEIGHTS WITH GENERAL CONTRACTOR. VERIFY ALL CLEARANCES BEFORE STARTING WORK.
  - THE CONTRACTOR SHALL INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT AS REQUIRED TO CONFORM TO THE STRUCTURE. VOID OBSTRUCTIONS, PRESERVE CEILING HEIGHTS AND HEADROOM AND MAKE ALL EQUIPMENT REQUIRING MAINTENANCE OR REPAIR ACCESSIBLE.
  - ALL DUCT CONNECTIONS TO HANG EQUIPMENT MUST BE MADE WITH FLEXIBLE CONNECTORS.
  - DO NOT ATTACH ANYTHING TO DECK ABOVE. ATTACH TO STRUCTURE (I.E. BEAMS, JOISTS) ONLY. DUCT HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE. ALL CONNECTIONS TO JOISTS SHALL BE MADE AT THE TOP CORO.
  - ALL DUCT DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS. ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER OR WRAPPED WITH 1-1/2" THICK FIRE RETARDANT FIBERGLASS WITH A REINFORCED ALUMINUM FOIL JACKET AND SHALL BE APPROVED FOR USE BY SMOGA AND NAIMS. RETURN AIR TRANSFER DUCTS AND RETURN DUCTWORK WITHIN 10 FEET OF THE UNIT FAN SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER.
  - ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK VISIBLE TO THE PUBLIC SHALL BE INTERNALLY LINED AND PAINTED TO MATCH THE SURROUNDING AREA. DUCT WRAP INSULATION IS NOT PERMITTED IN THESE AREAS.
  - EXPOSED SPIRAL DUCT TO BE GALVANIZED FINISH, FREE FROM SCRATCHES, DENTS OR BLEMISHES AND PAINTED TO MATCH THE SURROUNDING AREA. DUCT SHALL BE INTERNALLY LINED AND SEALED WITH DUCT SEALER COMPLETELY CONCEALED WITHIN THE DUCT JOINT. NO EXPOSED SEALER OR TAPE WILL BE ACCEPTED.
  - ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE.
  - PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED ENERGY FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. LOCATE CONTROLLER ACCESSIBLE TO THE LANDLORD'S FIELD REPRESENTATIVE.
  - REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
  - TEENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITIES AND OTHER IMPROVEMENTS LOCATED ON THE PREMISES PRIOR TO BIDDING. TENANT'S CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL COSTS RELATING TO THE RELOCATION OF, DAMAGE TO, REPAIR OF ANY EXISTING UTILITY LINES AND/OR IMPROVEMENTS WHICH ARE DAMAGED AS A RESULT OF TENANT'S WORK IN OR AROUND THE PREMISES.
  - ALL ROOFING WORK SHALL BE PERFORMED BY LANDLORD'S APPROVED ROOFING CONTRACTOR AT TENANT'S EXPENSE, IF REQUIRED IN LEASE OR TENANT CRITERIA MANUAL.
  - ROOF MOUNTED EQUIPMENT SHALL BE LABELED WITH THE TENANT NAME AND SPACE NUMBER WITH HIGH WEATHER PROOF LETTERS.
  - ALL GREASE SHALL BE PROVIDED WITH 3" FOIL FACED THERMAL-CERAMIC INSULATION FOR GREASE DUCTS. INSULATION SHALL MEET NFPA 96 AND ASTM E 2336 REQUIREMENTS.
  - GREASE DUCT LEAKAGE TESTING MUST BE PERFORMED PRIOR TO CONCEALMENT OF THE DUCTWORK.
  - MECHANICAL CONTRACTOR SHALL PROVIDE TENANT WITH A WRITTEN ONE (1) YEAR MANUFACTURER'S WARRANTY ON ALL PROVIDED AND / OR INSTALLED. THE WARRANTY SHALL INCLUDE ALL LABOR, MATERIALS AND THREE (3) ROUTINE SERVICES INCLUDING FILTER CHANGES DURING A ONE (1) YEAR PERIOD.
  - AT THE COMPLETION OF CONSTRUCTION AN NEBS, AABC OR TABB CERTIFIED AIR BALANCE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND LANDLORD. PRIOR TO SCHEDULING SCHEDULING WITH LANDLORD'S FIELD REPRESENTATIVE FOR THE VENDOR LISTED BELOW. IF APPROVED, THE BALANCING SHALL BE COMPLETED BY NATION TAB. CONTACT WILL TURNBOUR AT WILLTURNBOUR.COM OR 314-954-5244. NATIONAL TAB TO ALSO PERFORM COMMISSIONING FOR ALL SHAKE SHACK PROVIDED UNITS.
  - PARTS OF THE BASE BUILDING SYSTEMS THAT FALL INTO LEASE LINE SHALL REMAIN UNDISTURBED UNLESS NOTED OTHERWISE.
  - PROVIDE ALL NECESSARY WIRING, RELAYS, DETECTORS, COMPONENTS, ETC., FOR FIRE ALARM OR CONTROL SYSTEM INTERLOCK IF APPLICABLE. VERIFY WITH BUILDING PERSONNEL BEFORE BID.

- HVAC NOTES:**
- NEW CAPTIVEAIRE RTU TO BE FURNISHED BY OWNER FOR INSTALLATION BY MECHANICAL CONTRACTOR. SEE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION. FIELD VERIFY EXACT LOCATION.
  - NEW CAPTIVEAIRE GREASE EXHAUST FAN TO BE FURNISHED BY OWNER FOR INSTALLATION BY MECHANICAL CONTRACTOR. SEE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION. CONTRACTOR SHALL FIELD VERIFY THAT THE LOCATION SHOWN IS A MINIMUM OF 10'-0" FROM ANY OUTDOOR AIR INTAKE. DUCT SMOKE DETECTOR ON RETURN SIDE DUCT AND SHUTDOWN RELAY SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR FOR INSTALLATION BY THE MECHANICAL CONTRACTOR. ALL WIRING SHALL BE BY THE ELECTRICAL CONTRACTOR.
  - RFC ENVIRONMENTAL GROUP, INC. AIR PURIFICATION SYSTEM TO BE PROVIDED BY NTAB. REFER TO RESPONSIBILITY MATRIX ON SHEET M801 FOR ADDITIONAL INFORMATION. SHEET M801 FOR SCHEDULE, AND SHEET M892 FOR SPECIFICATIONS.
  - PROVIDE NEW EXHAUST FAN AS NOTED ON PLANS AND SCHEDULED ON SHEET M801. THE CONTRACTOR SHALL FIELD VERIFY THAT THE LOCATION SHOWN IS A MINIMUM OF 10'-0" FROM ANY OUTDOOR AIR INTAKE.
  - PROVIDE ASHP AS NOTED ON PLANS AND SCHEDULED ON SHEET M801.
  - PROVIDE REFRIGERANT LINES FROM ASHP-1 ON ROOF TO FC-1 IN KITCHEN OFFICE. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
  - KITCHEN EQUIPMENT CONTRACTOR TO PROVIDE REFRIGERANT LINES FROM CONDENSING UNIT TO KITCHEN EQUIPMENT AS NOTED ON PLANS. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE. ADJUST ROUTING AS NECESSARY IN FIELD FOR ANY OBSTACLES. COORDINATE EXACT LOCATION AND ROUTING WITH CONSTRUCTION MANAGER AND LANDLORD.
  - PROVIDE ROOF CAP TERMINATION FOR OUTDOOR AIR INTAKE FOR FC-1. CONTRACTOR SHALL FIELD VERIFY THAT THE LOCATION IS A MINIMUM OF 10'-0" FROM ANY EXHAUST/FLUE TERMINATION.

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
1	01/22/25	REVISION 1

STATUS: IFC SET



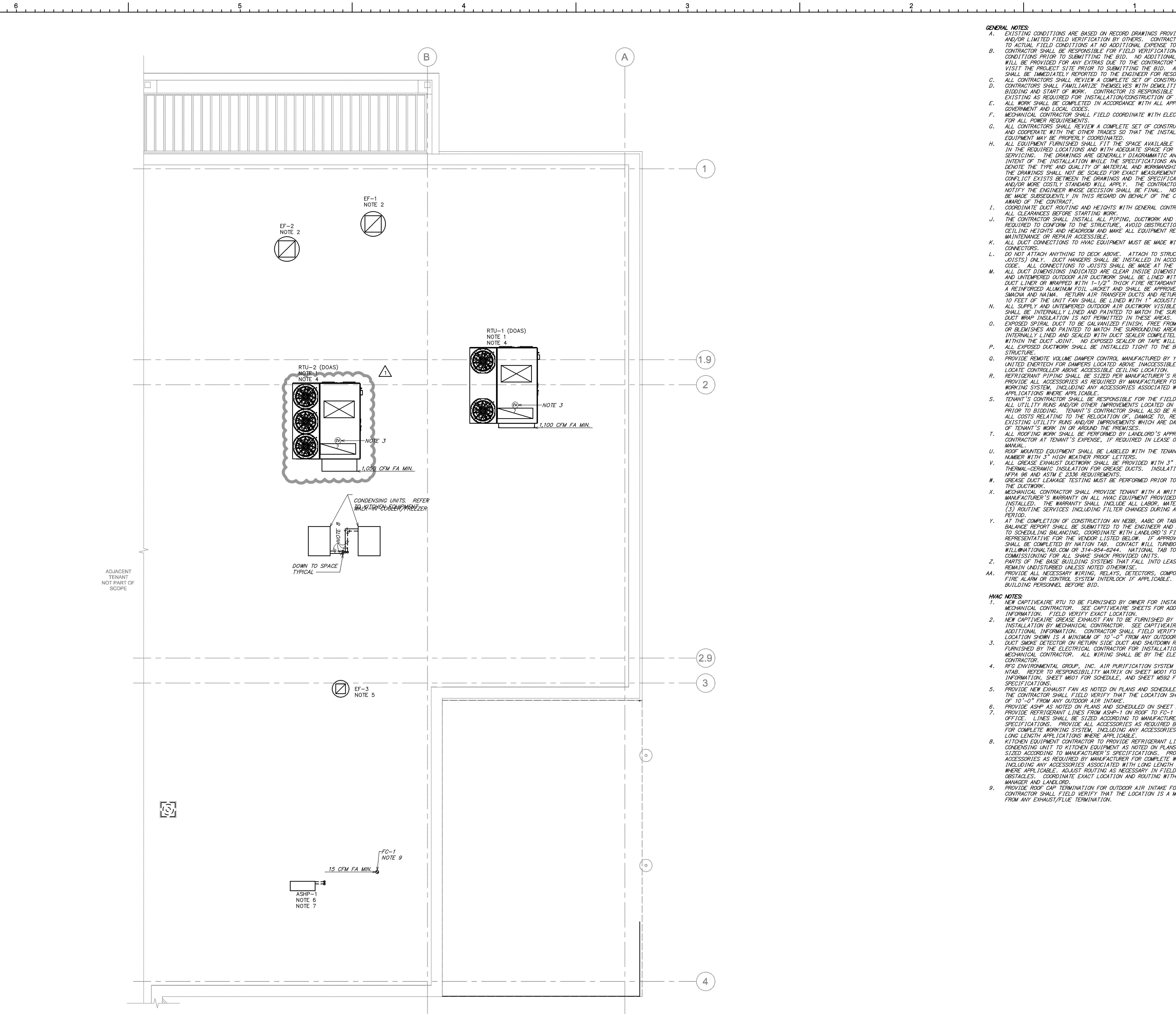
**FIELD VERIFICATION:**  
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SHEET NAME:  
**MECHANICAL ROOF PLAN**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: RAS SCALE:

SHEET NO.:  
**M150**

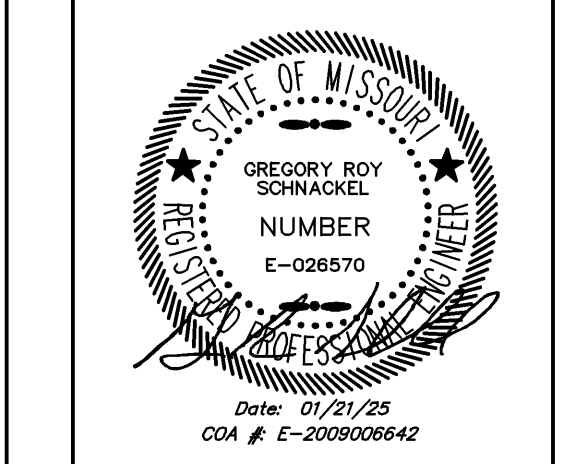


**1 MECHANICAL ROOF PLAN**  
SCALE: 1/4" = 1'-0"

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
1	01/22/25	REVISION 1

STATUS: IFC SET

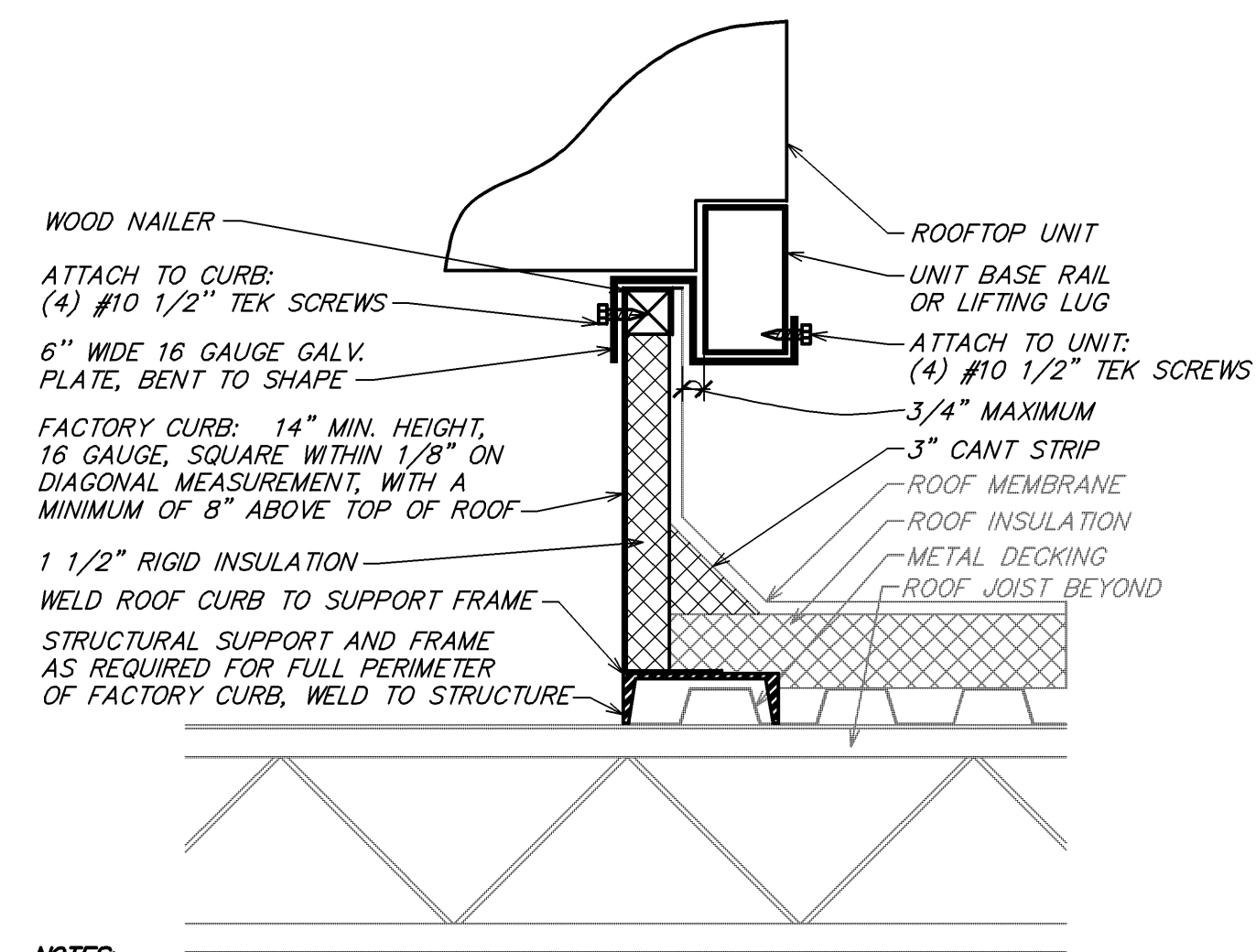


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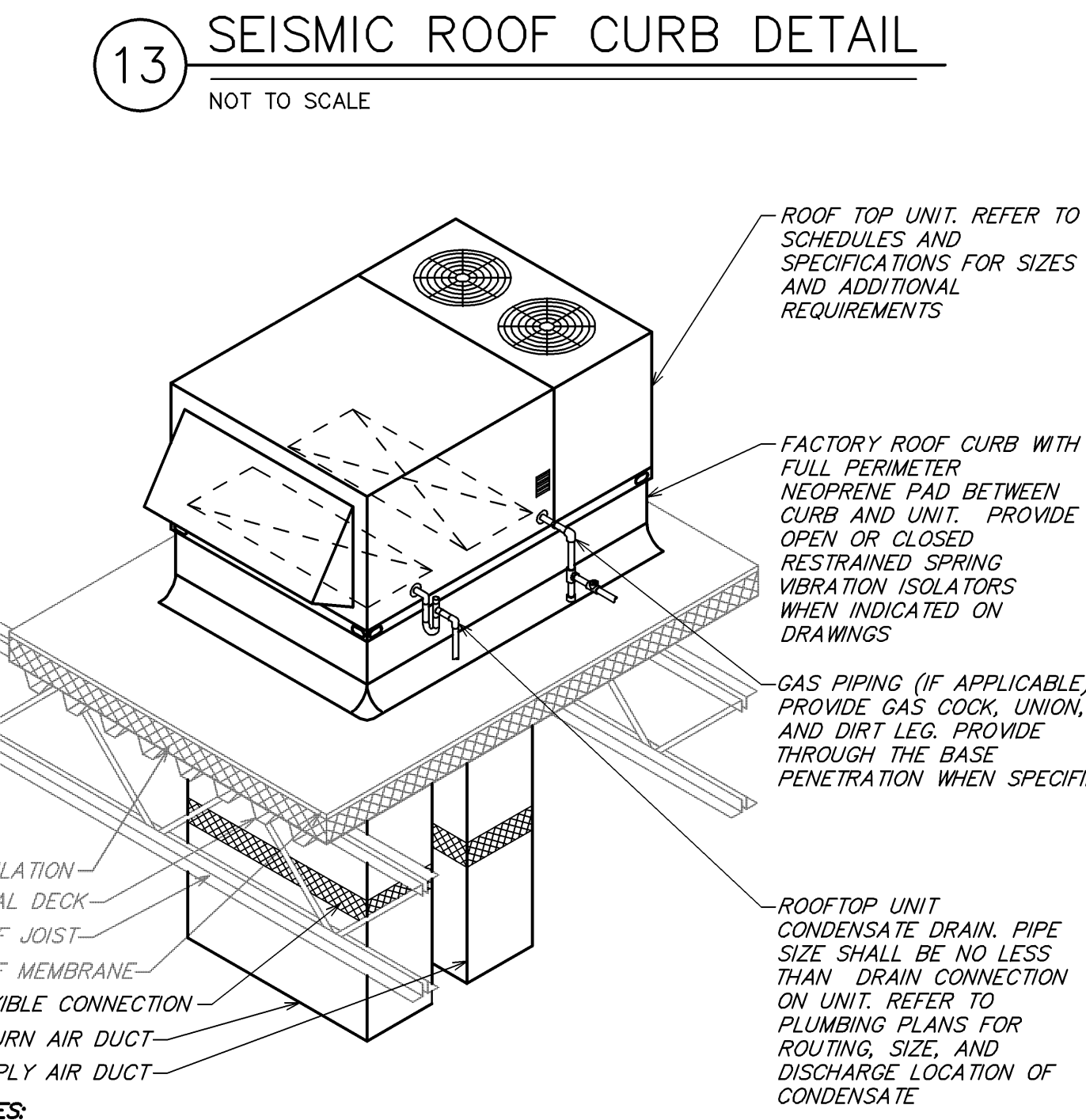
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SHEET NAME: **MECHANICAL DETAILS**

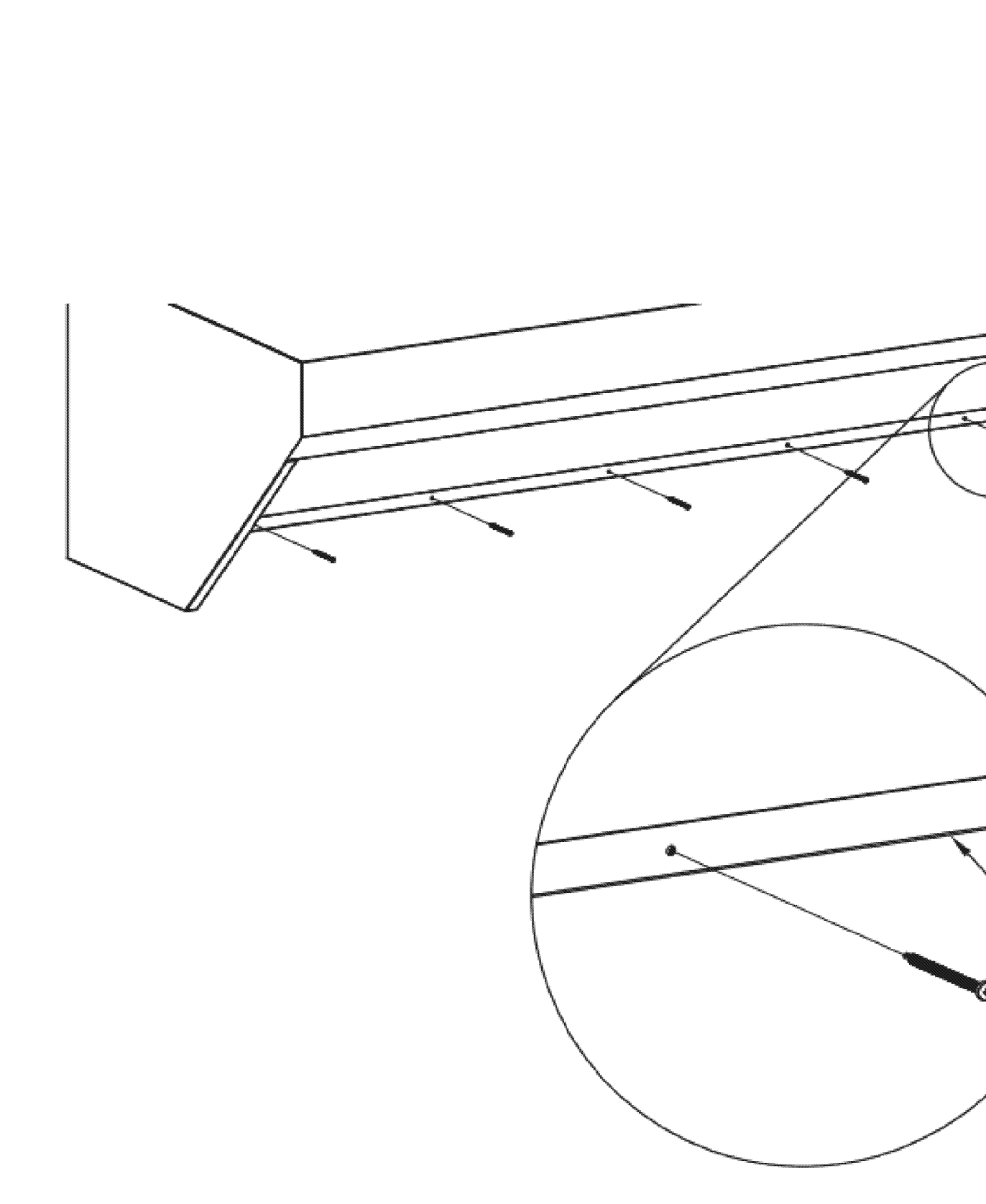
DATE: 09/24/2024 PROJECT NO: 39038  
DRAWN: RAS SCALE:  
SHEET NO: **M501**



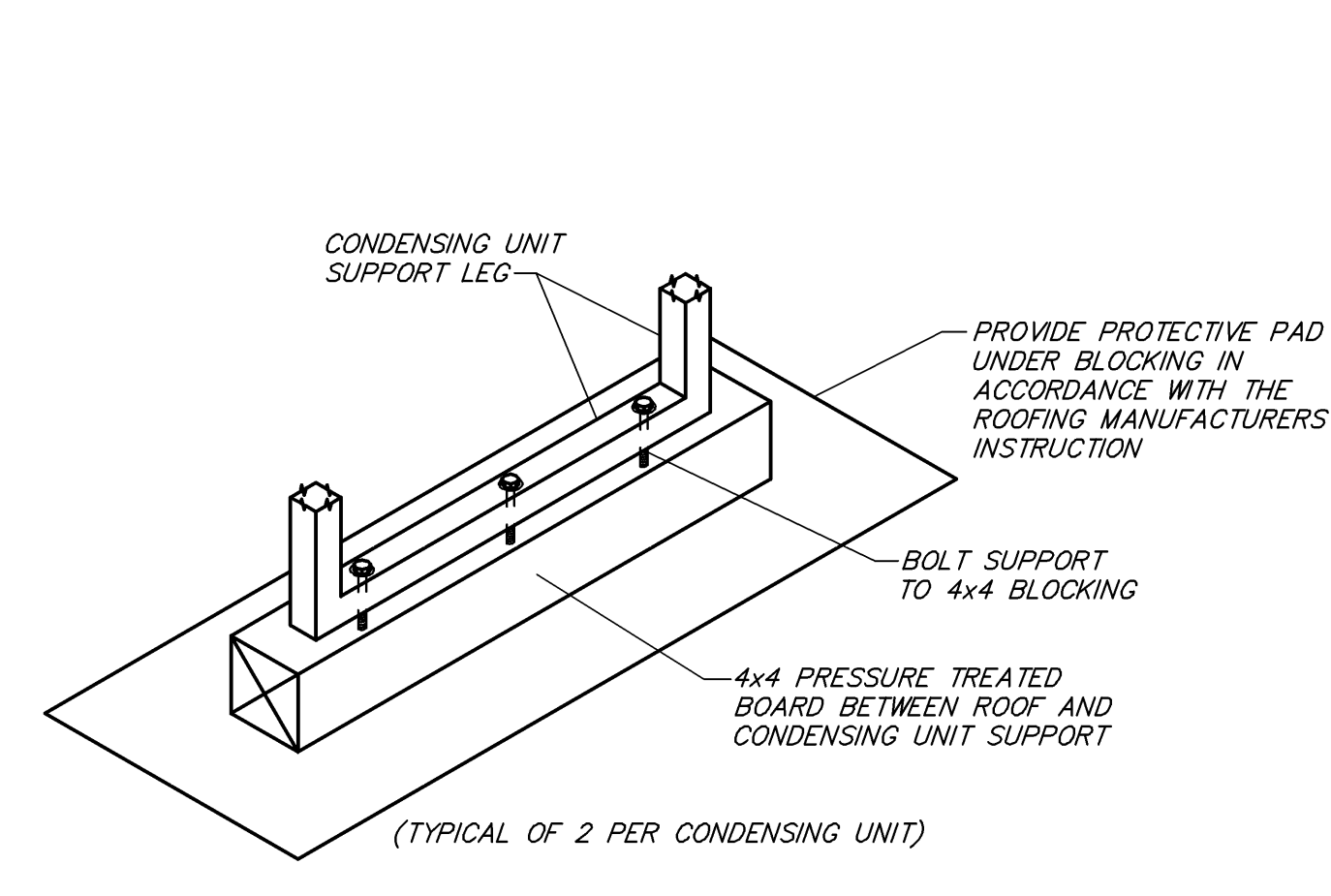
**NOTES:**  
1. USE A MINIMUM OF (1) PLATE PER SIDE OF UNIT.  
2. PLATE MUST BE PAINTED WHERE IT CONTACTS RAIL.  
3. USE (6) SCREWS TO SECURE PLATE, NO SMALLER THAN #10x1/2"  
4. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF, AND COMPLIANCE WITH ALL LOCAL CODES.  
5. CUT AND PATCH EXISTING ROOFING AS REQUIRED FOR NEW CURB INSTALLATION.  
6. CURB SHALL BE SHIMMED LEVEL. PROVIDE TAPERED ROOF CURB IF REQUIRED.



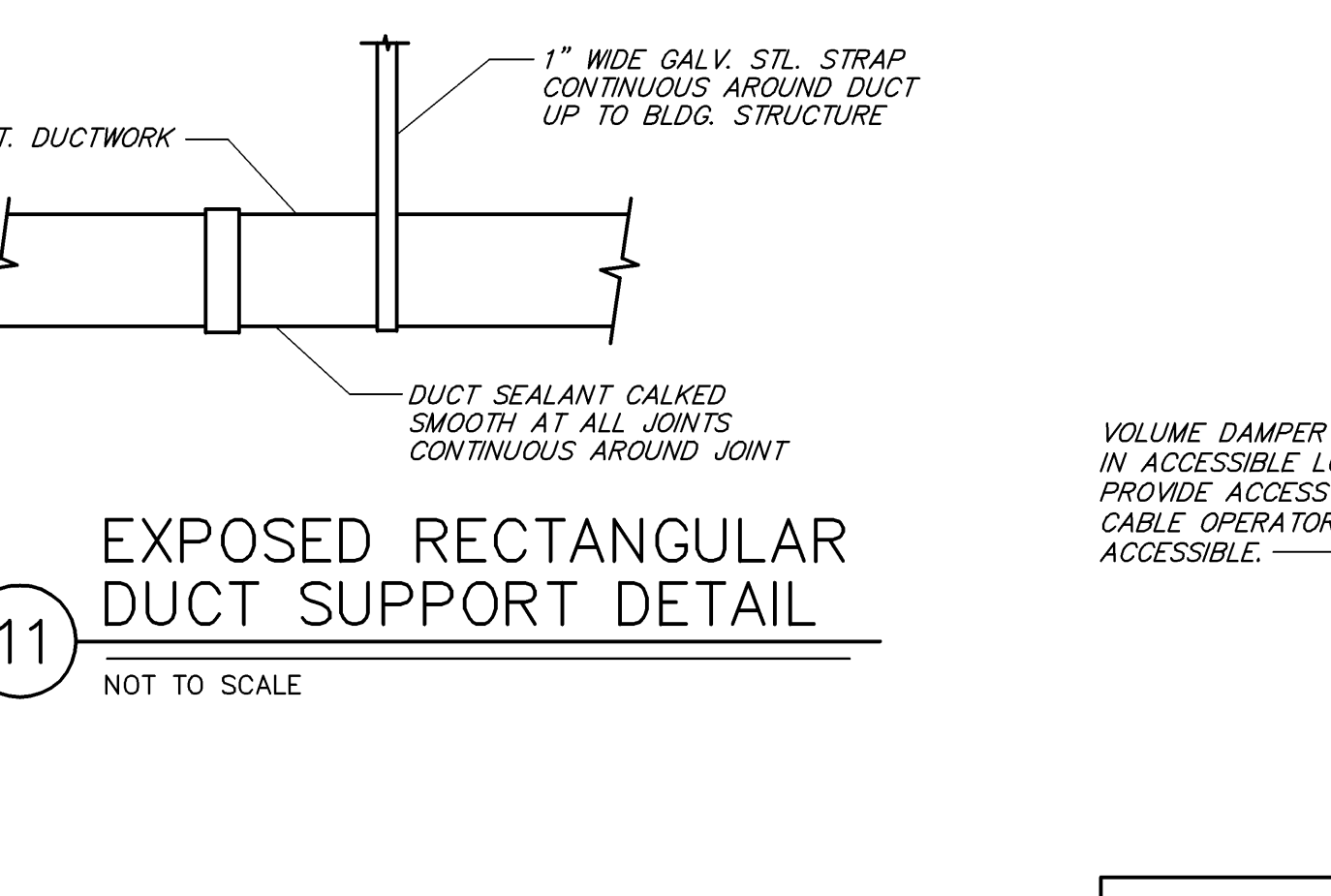
**NOTES:**  
1. PROVIDE THROUGH CURB ELECTRICAL CONNECTIONS. NO ROOF PENETRATIONS OF ELECTRICAL CONDUITS WILL BE ACCEPTABLE.  
2. DUST SMOKE DETECTOR SHALL BE MOUNTED AND INSTALLED PER LOCAL CODES.



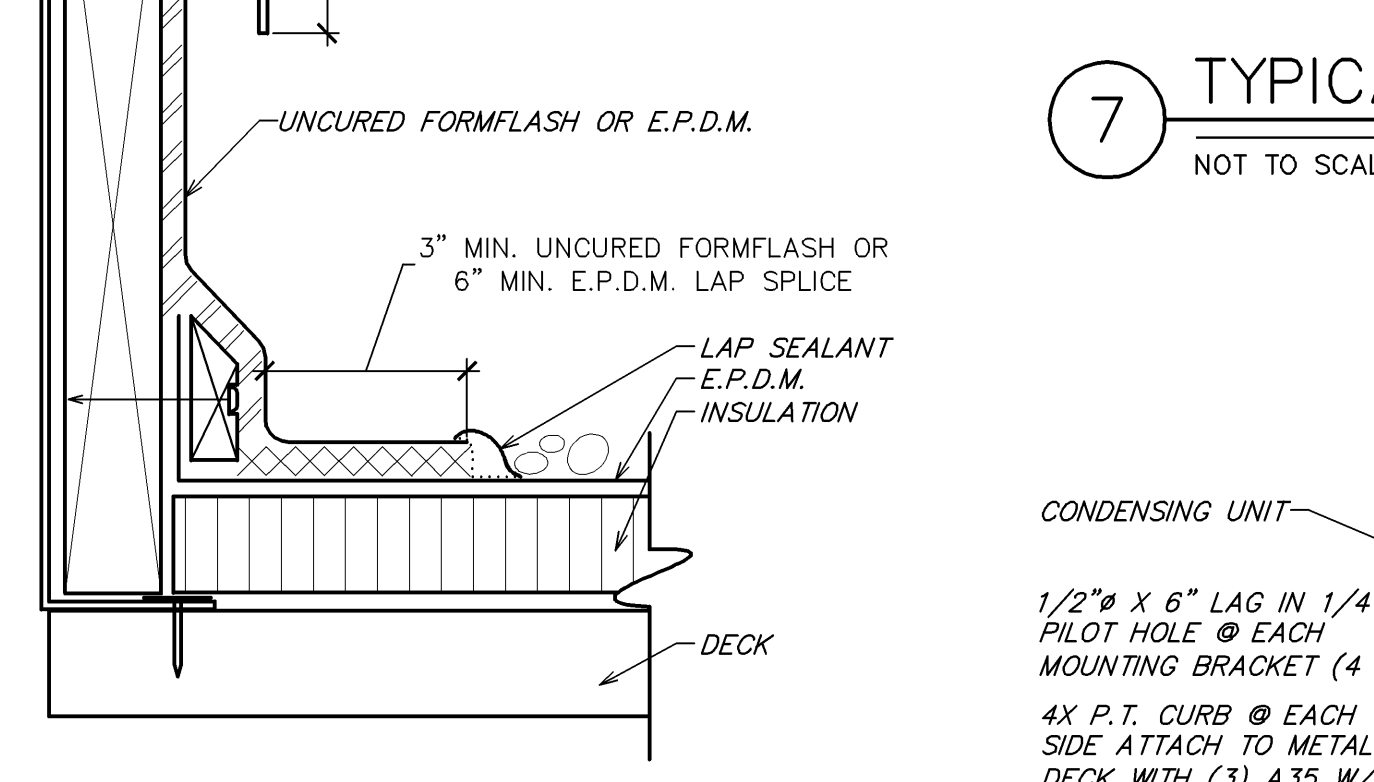
**15 HOOD FASTENING DETAIL**  
NOT TO SCALE



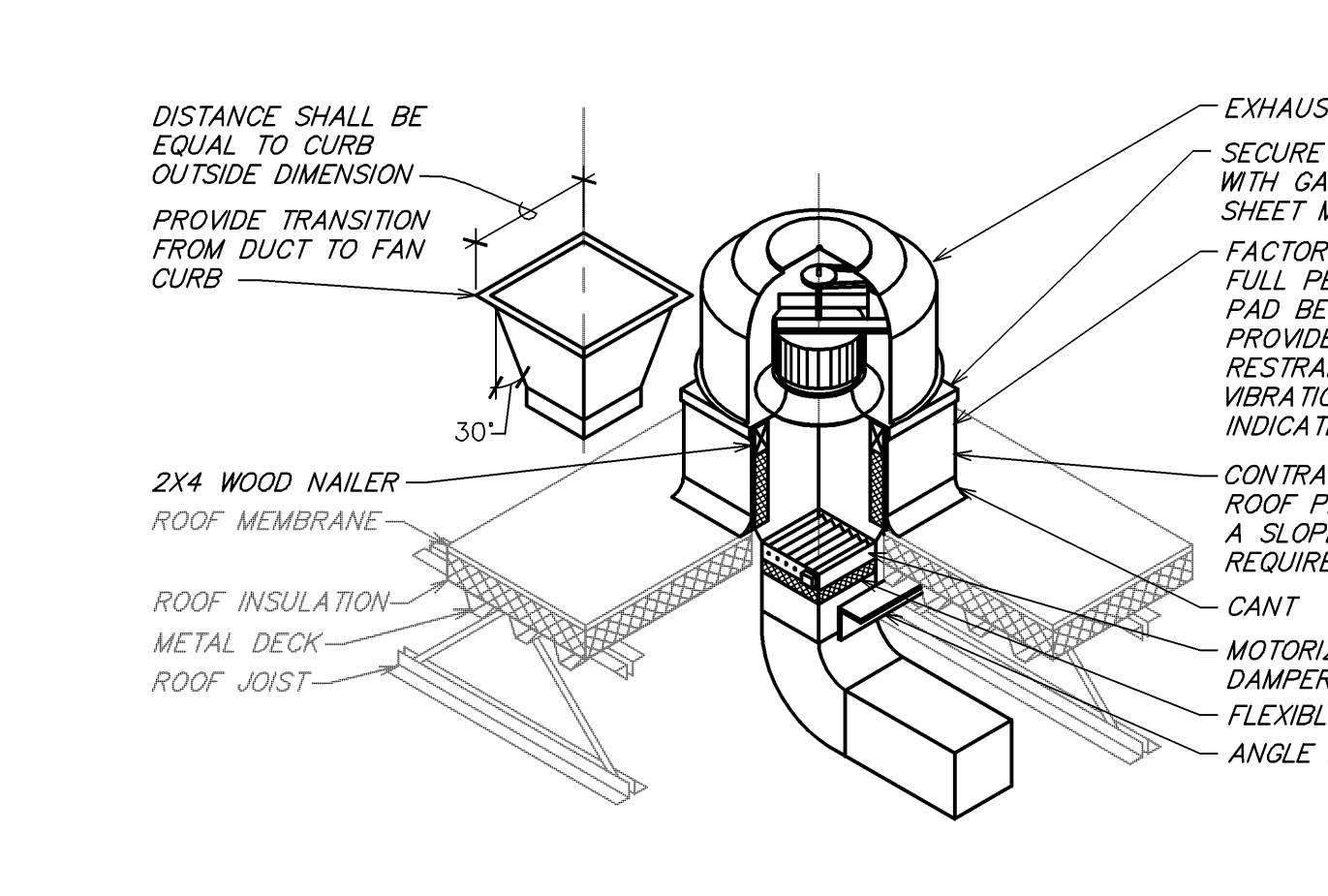
**10 CONDENSING UNIT SUPPORT DETAIL**  
NOT TO SCALE



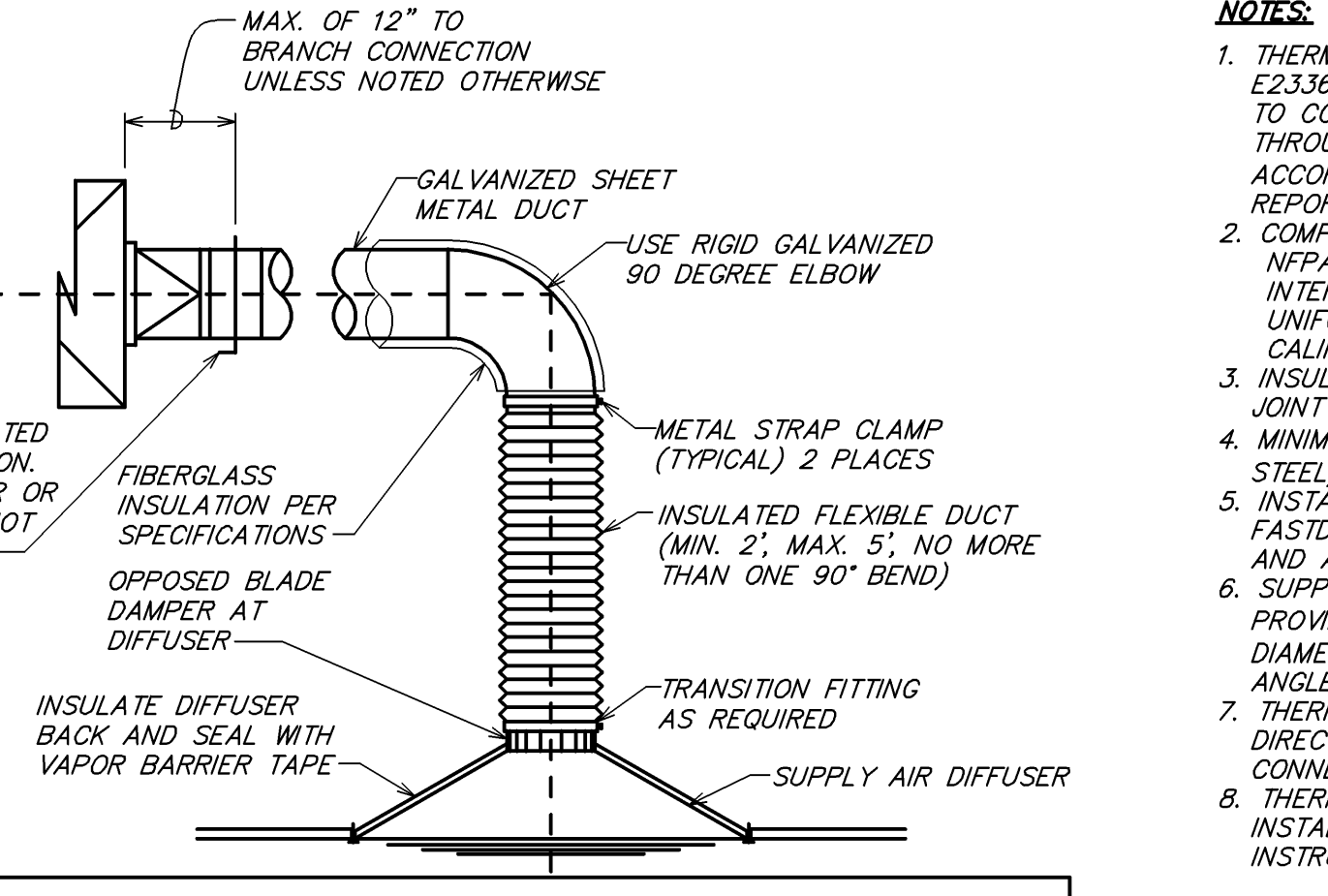
**SEISMIC REQUIREMENT NOTES:**  
A. AIR TERMINALS WEIGHING LESS THAN 20 POUNDS SHALL BE POSITIVELY ATTACHED TO THE MAIN RUNNER.  
B. AIR TERMINALS WEIGHING BETWEEN 20 POUNDS AND 56 POUNDS SHALL HAVE TWO 12 GAUGE HANGER WIRES CONNECTED FROM THE TERMINAL TO THE STRUCTURE ABOVE AND SHALL BE POSITIVELY ATTACHED TO THE MAIN RUNNER. THE HANGER WIRES MAY BE SLACK.  
C. AIR TERMINALS WEIGHING MORE THAN 56 POUNDS SHALL HAVE INDEPENDENT SUPPORT FROM THE STRUCTURE ABOVE.  
D. HANGER WIRES SHALL MEET THE SAME INSTALLATION REQUIREMENTS AS VERTICAL SUSPENSION WIRES.



**12 CURB FLASHING DETAIL**  
NOT TO SCALE

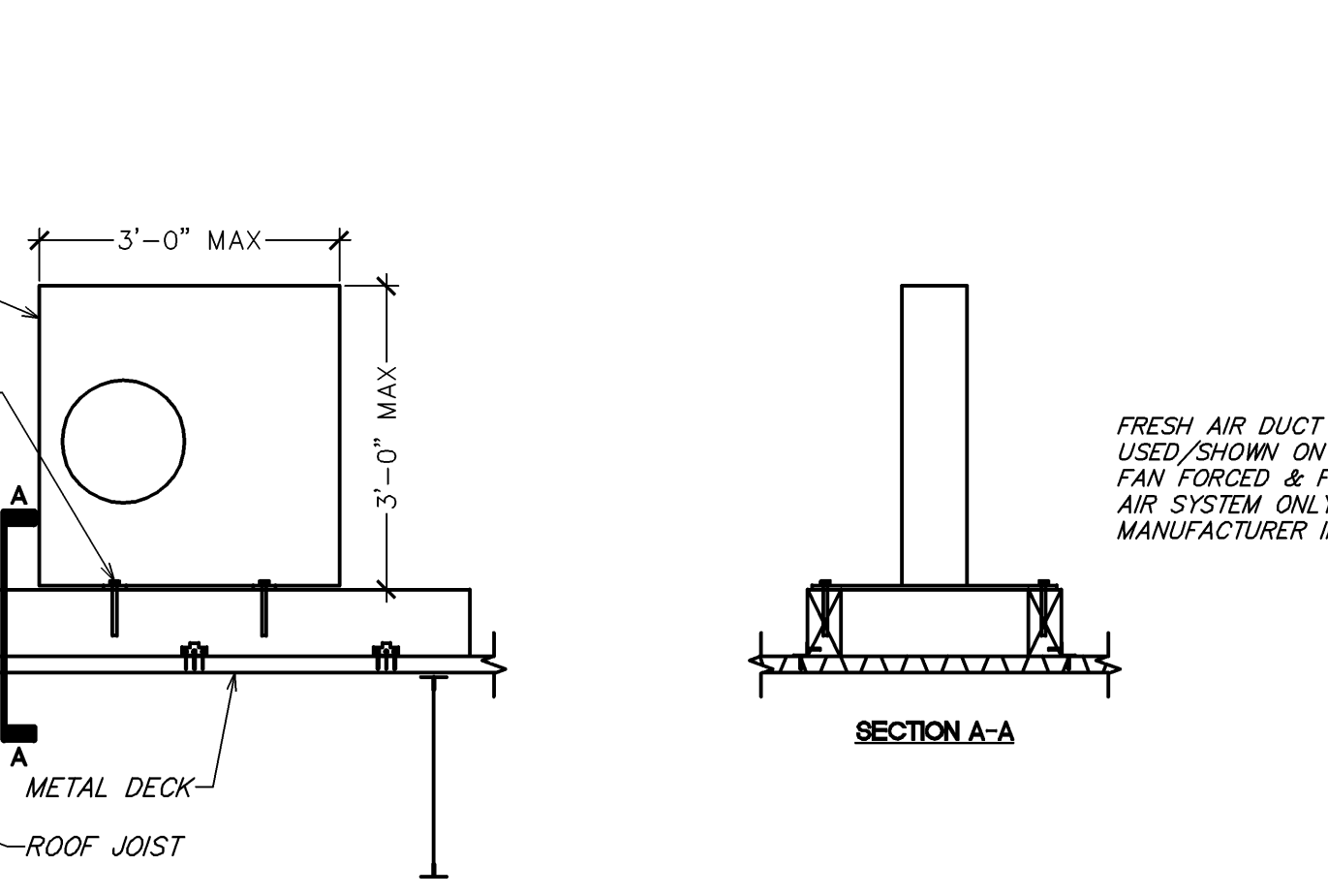


**6 ROOF EXHAUST FAN DETAIL**  
NOT TO SCALE

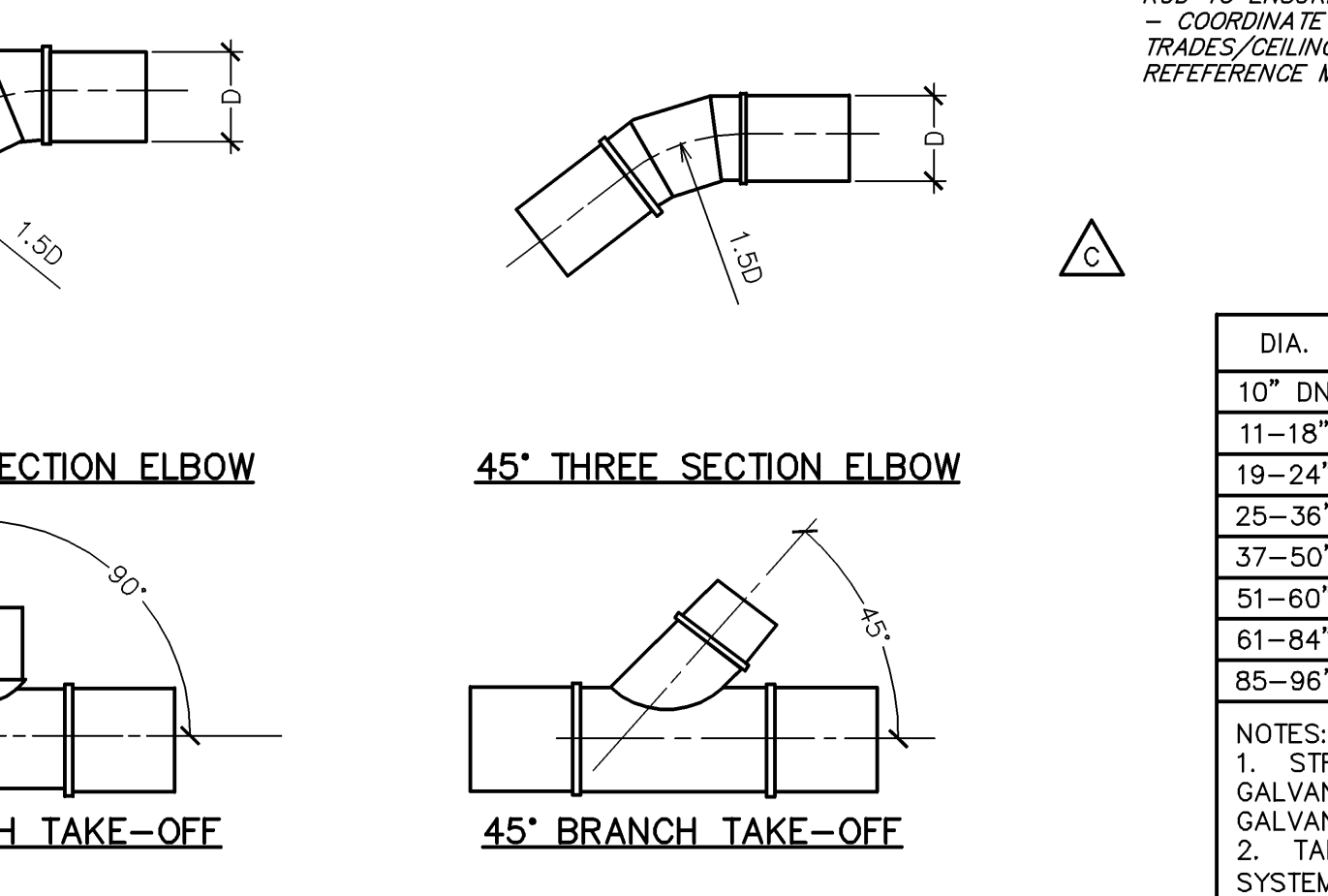


**SEISMIC REQUIREMENT NOTES:**  
A. AIR TERMINALS WEIGHING LESS THAN 20 POUNDS SHALL BE POSITIVELY ATTACHED TO THE MAIN RUNNER.  
B. AIR TERMINALS WEIGHING BETWEEN 20 POUNDS AND 56 POUNDS SHALL HAVE TWO 12 GAUGE HANGER WIRES CONNECTED FROM THE TERMINAL TO THE STRUCTURE ABOVE AND SHALL BE POSITIVELY ATTACHED TO THE MAIN RUNNER. THE HANGER WIRES MAY BE SLACK.  
C. AIR TERMINALS WEIGHING MORE THAN 56 POUNDS SHALL HAVE INDEPENDENT SUPPORT FROM THE STRUCTURE ABOVE.  
D. HANGER WIRES SHALL MEET THE SAME INSTALLATION REQUIREMENTS AS VERTICAL SUSPENSION WIRES.

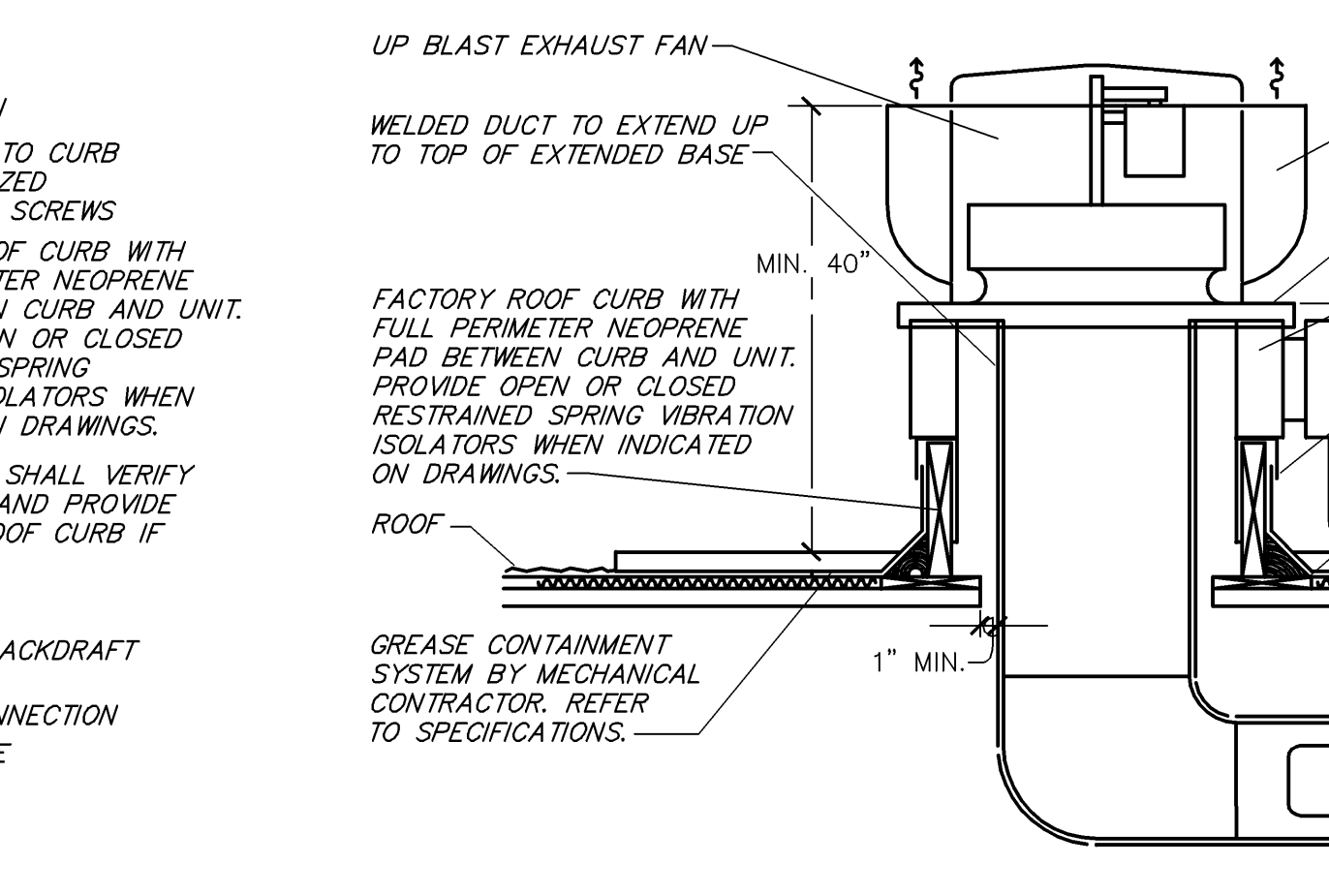
**7 TYPICAL DIFFUSER CONNECTION - SEISMIC**  
NOT TO SCALE



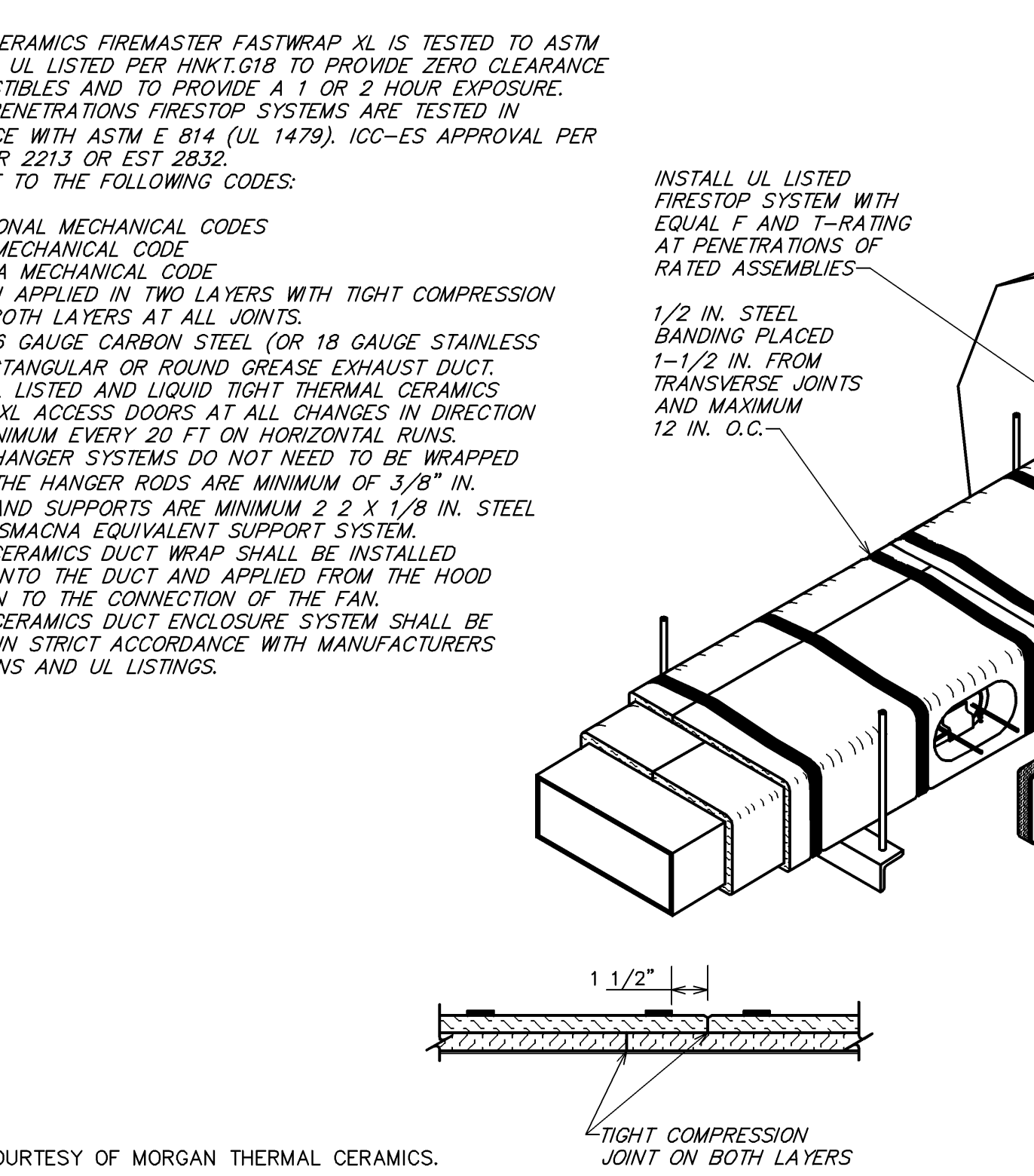
**8 CONDENSING UNIT ANCHOR DETAIL (METAL)**  
NOT TO SCALE



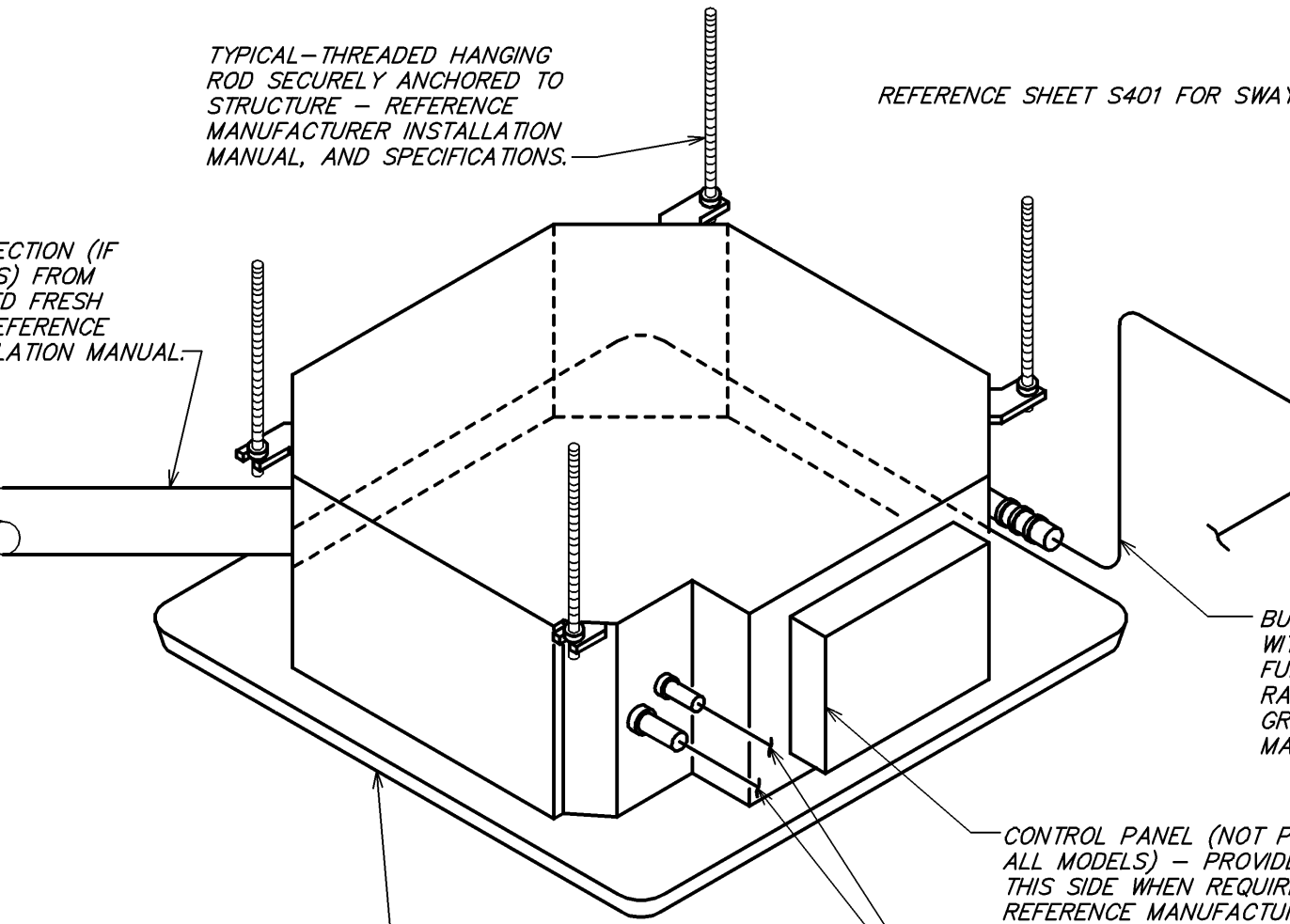
**9 TYPICAL ROUND DUCT FITTINGS**  
NOT TO SCALE



**1 KITCHEN HOOD EXHAUST FAN**  
NOT TO SCALE



**2 FIREMASTER FASTWRAP XL DETAIL**  
NOT TO SCALE



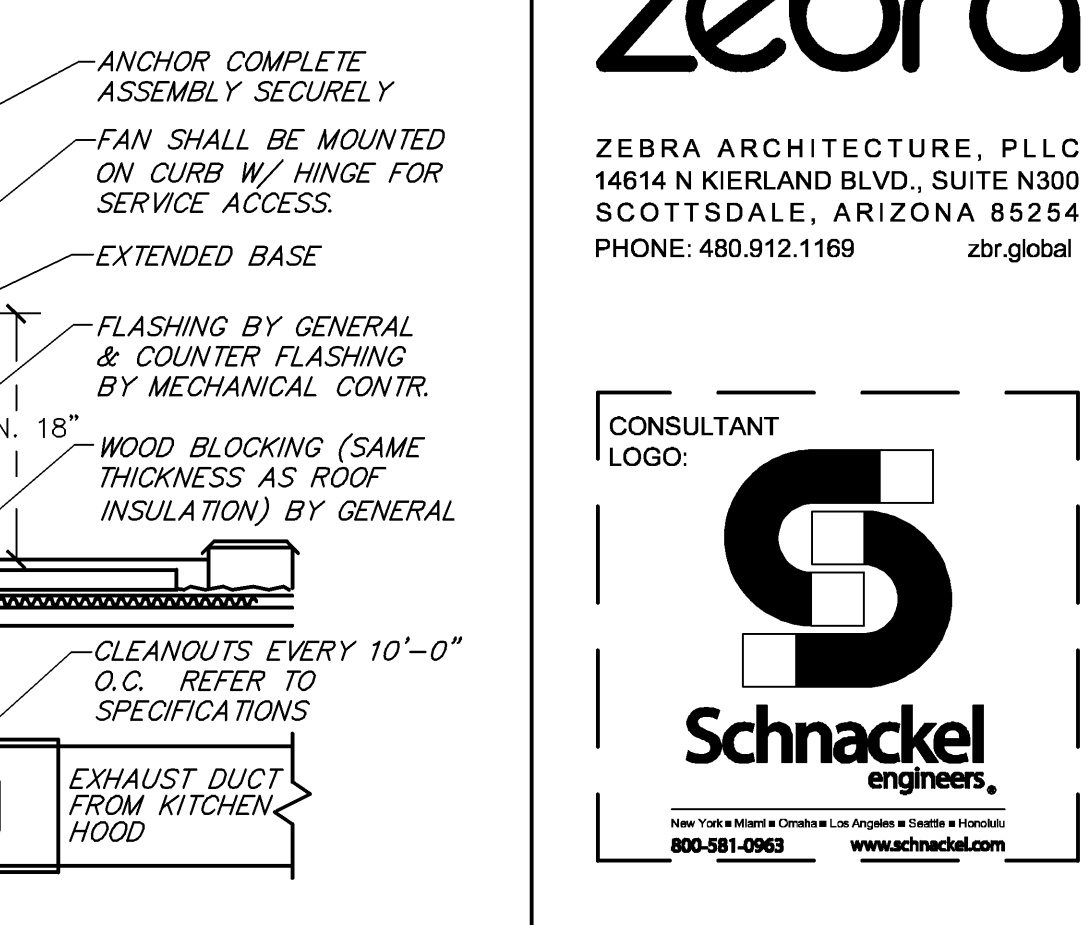
**3 CASSETTE UNIT**  
NOT TO SCALE

**ROUND DUCT HANGER TABLE**

DIA.	WIRE DIA.	ROD	STRAP
10" DN	ONE 12 GA.	1/4"	1" x 22 GA.
11-18"	TWO 12 GA. OR ONE 8 GA.	1/4"	1" x 22 GA.
19-24"	TWO 10 GA.	1/4"	1" x 22 GA.
25-36"	TWO 8 GA.	3/8"	1" x 20 GA.
37-50"	-	TWO 3/8"	TWO 1" x 20 GA.
51-60"	-	TWO 3/8"	TWO 1" x 18 GA.
61-84"	-	TWO 3/8"	TWO 1" x 16 GA.
85-96"	-	TWO 1/2"	TWO 1 1/2" x 16 GA.

**NOTES:**  
1. STRAPS ARE GALVANIZED STEEL; RODS ARE UNCOATED OR GALVANIZED STEEL; WIRE IS BLACK ANNEALED, BRIGHT BASIC OR GALVANIZED STEEL; ALL ARE ALTERNATIVES.  
2. TABLE ALLOWS FOR CONVENTIONAL WALL THICKNESS, AND JOINT SYSTEMS PLUS ONE LB/SP OF INSULATION WEIGHT. IF HEAVIER DUCTS ARE TO BE INSTALLED, ADJUST HANGER SIZES TO BE WITHIN THEIR LOAD LIMITS.

**4 ROUND DUCT HANGER TABLE**  
NOT TO SCALE

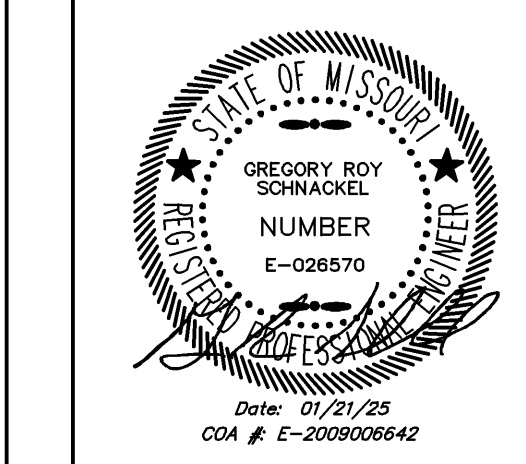


**5 REMOTE VOLUME DAMPER CONTROLLER**  
NOT TO SCALE

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I

STATUS: IFC SET

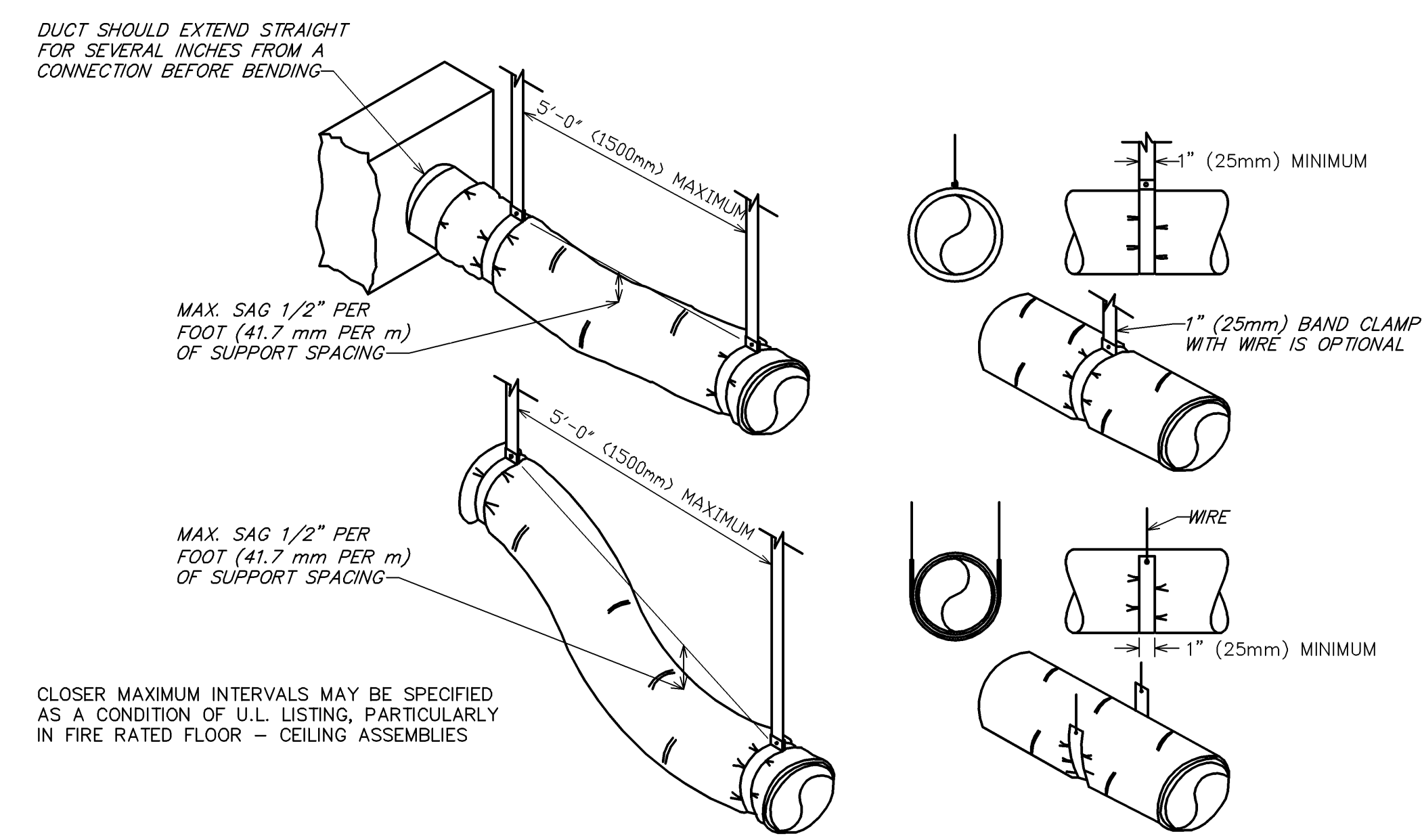


**FIELD VERIFICATION:**  
The Contractor shall verify all figured dimensions and conditions at the project site and notify Zebra Architecture, PLLC of any discrepancies, omissions, errors or discrepancies before beginning or fabricating any work. Do not scale from drawings.

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SHEET NAME:  
**MECHANICAL DETAILS**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: SCALE:  
SHEET NO.: **M502**



1 FLEXIBLE DUCT SUPPORTS  
NOT TO SCALE

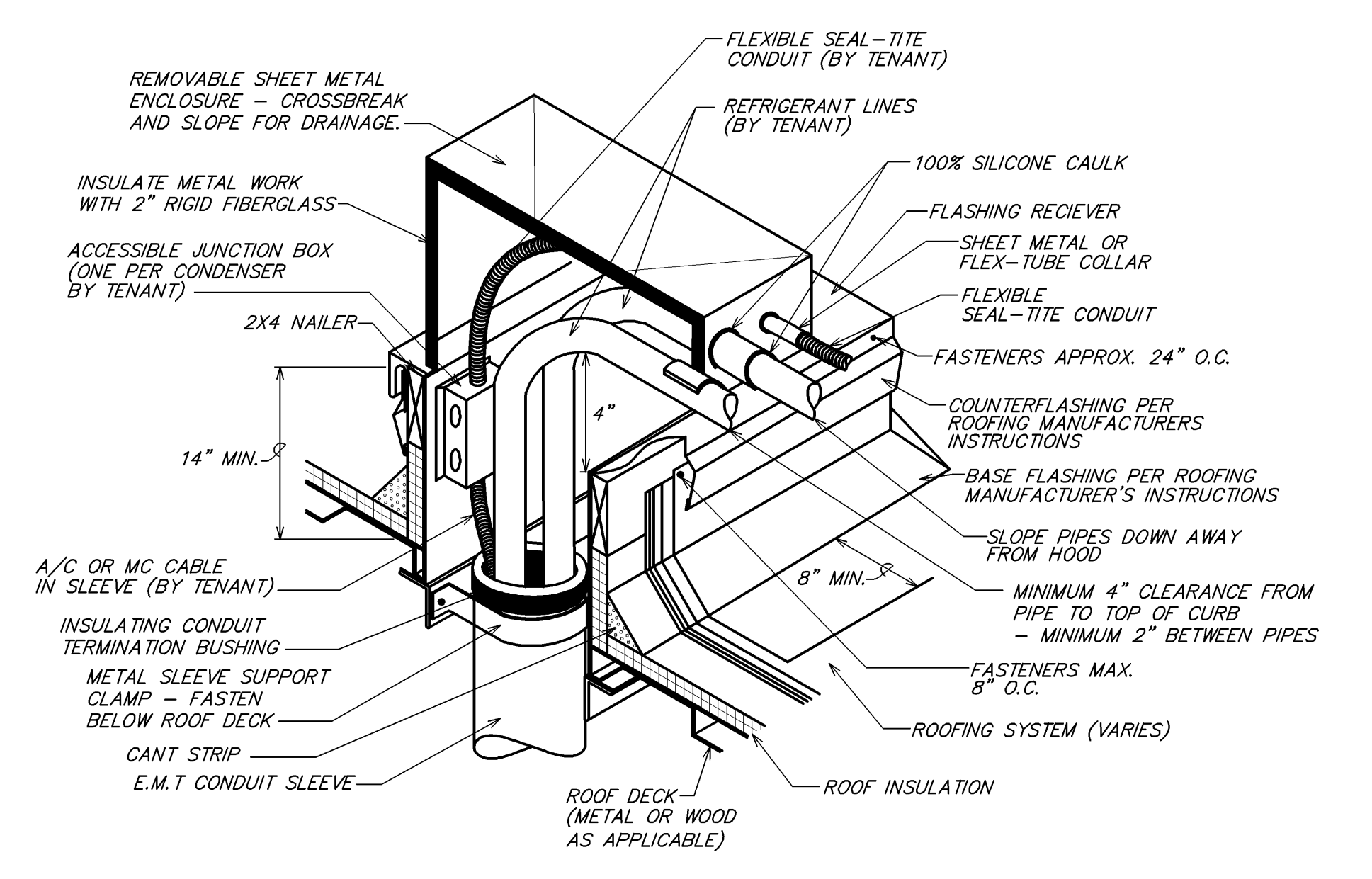
MAXIMUM HALF OF DUCT DIMETER	PAIR AT 10 FT. SPACING		PAIR AT 8 FT. SPACING		PAIR AT 5 FT. SPACING		PAIR AT 4 FT. SPACING	
	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD
P/2 = 30"	1" x 22 GA.	10 GA. (.135")	1" x 22 GA.	10 GA. (.135")	1" x 22 GA.	12 GA. (.106")	1" x 22 GA.	12 GA. (.106")
P/2 = 72"	1" x 18 GA.	3/8"	1" x 20 GA.	1/4"	1" x 22 GA.	1/4"	1" x 22 GA.	1/4"
P/2 = 96"	1" x 16 GA.	3/8"	1" x 18 GA.	3/8"	1" x 20 GA.	3/8"	1" x 22 GA.	1/4"
P/2 = 120"	1 1/2" x 16 GA.	1/2"	1" x 16 GA.	3/8"	1" x 18 GA.	3/8"	1" x 20 GA.	1/4"
P/2 = 168"	1 1/2" x 16 GA.	1/2"	1 1/2" x 16 GA.	1/2"	1" x 16 GA.	3/8"	1" x 18 GA.	3/8"
P/2 = 192"	---	1/2"	1 1/2" x 16 GA.	1/2"	1" x 16 GA.	3/8"	1" x 16 GA.	3/8"
P/2 = 193" UP	SPECIAL ANALYSIS REQUIRED							

WHEN STRAPS ARE LAP JOINED USE THESE MINIMUM FASTENERS:

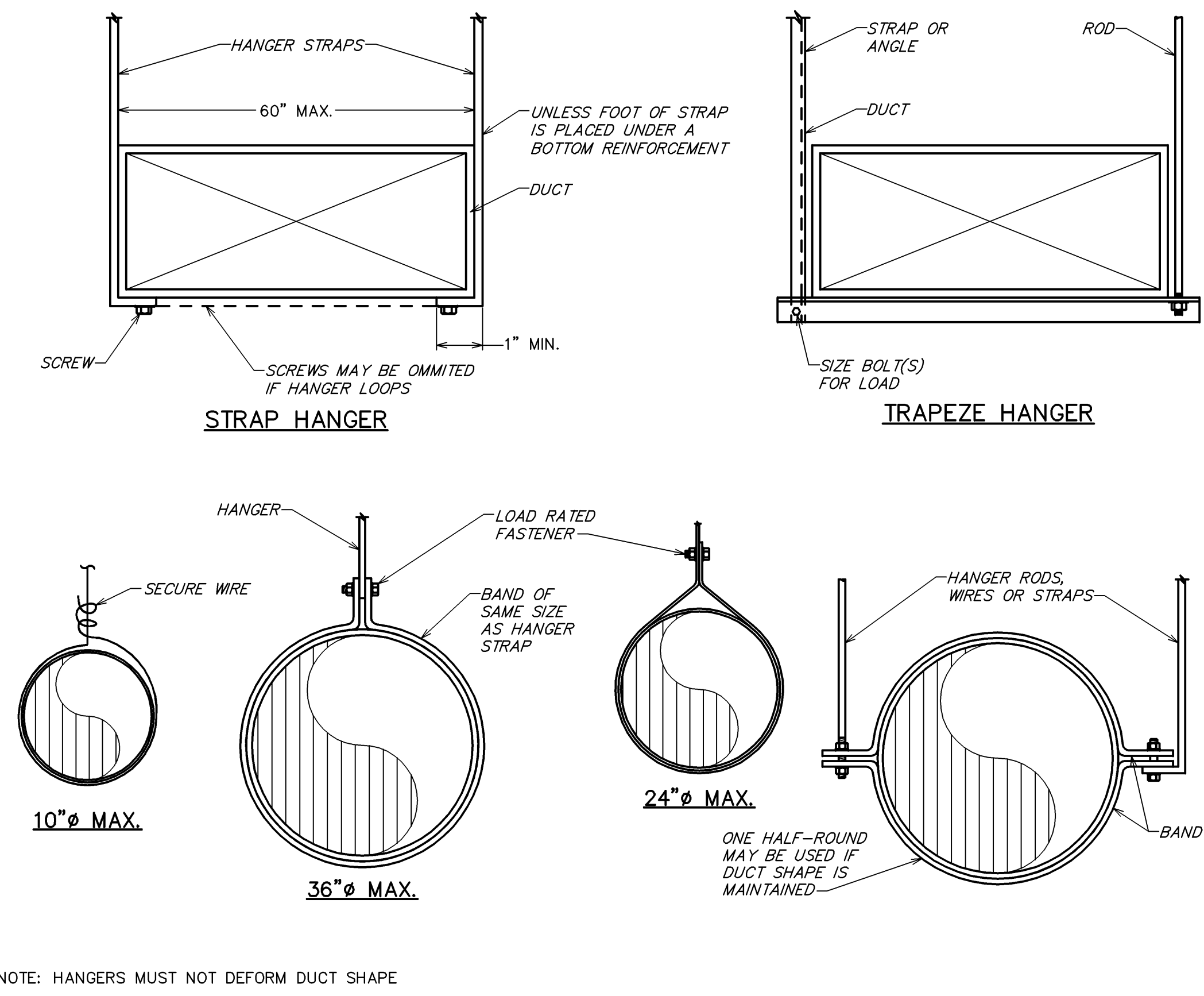
STRAP	SINGLE HANGER MAXIMUM ALLOWABLE LOAD	
	STRAP	WIRE OR ROD (DIA.)
1" x 18, 20, 22 GA. - TWO #10 OR ONE 1/4" BOLT	1" x 22 GA. - 260 LBS.	0.106" - 80 LBS.
1" x 16 GA. - TWO 1/4" DIA.	1" x 20 GA. - 320 LBS.	0.135" - 120 LBS.
1" x 16 GA. - TWO 3/8" DIA.	1" x 18 GA. - 420 LBS.	0.162" - 160 LBS.
1 1/2" x 16 GA. - 700 LBS.	1" x 16 GA. - 700 LBS.	1/4" - 270 LBS.
1 1/2" x 16 GA. - 1100 LBS.	1 1/2" x 16 GA. - 1100 LBS.	3/8" - 680 LBS.
		1/2" - 1250 LBS.
		5/8" - 2000 LBS.
		3/4" - 3000 LBS.

NOTES:  
1. DIMENSIONS OTHER THAN GAUGE ARE IN INCHES.  
2. TABLES ALLOW FOR DUCT WEIGHT, 1 LB./SF INSULATION WEIGHT AND NORMAL REINFORCEMENT AND TRAPEZE WEIGHT, BUT NO EXTERNAL LOADS.  
3. STRAPS ARE GALVANIZED STEEL; OTHER MATERIALS ARE UNCOATED STEEL.  
4. ALLOWABLE LOADS FOR P/2 ASSUME THAT DUCTS ARE 16 GA. MAXIMUM, EXCEPT THAT WHEN MAXIMUM DUCT DIMENSION (W) IS OVER 60" THEN P/2 MAXIMUM IS 1.25 W.  
5. 12, 10 OR 9 GA. WIRE IS STEEL OF BLACK ANNEALED, BRIGHT BASIC OR GALVANIZED TYPE.  
6. DUCTS SHALL BE SUPPORTED AT INTERVALS NOT EXCEEDING 10 FEET.

2 RECTANGULAR DUCT HANGER TABLE  
NOT TO SCALE



5 CONDENSER REFRIGERANT LINE PIPING AND POWER THROUGH ROOF DECK  
NOT TO SCALE



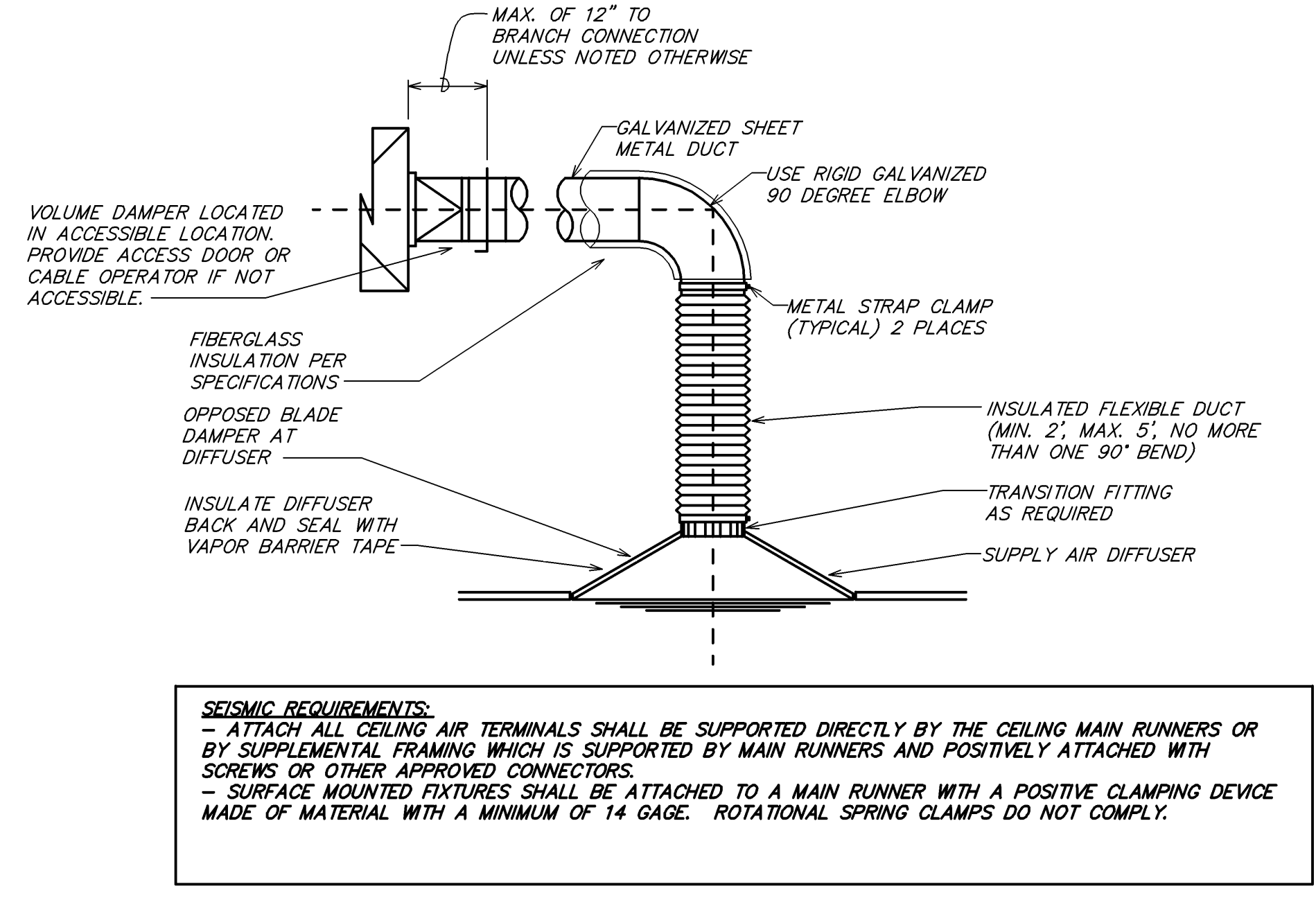
6 DUCT HANGER DETAIL  
NOT TO SCALE

**SEISMIC BRACING AND SIZING**

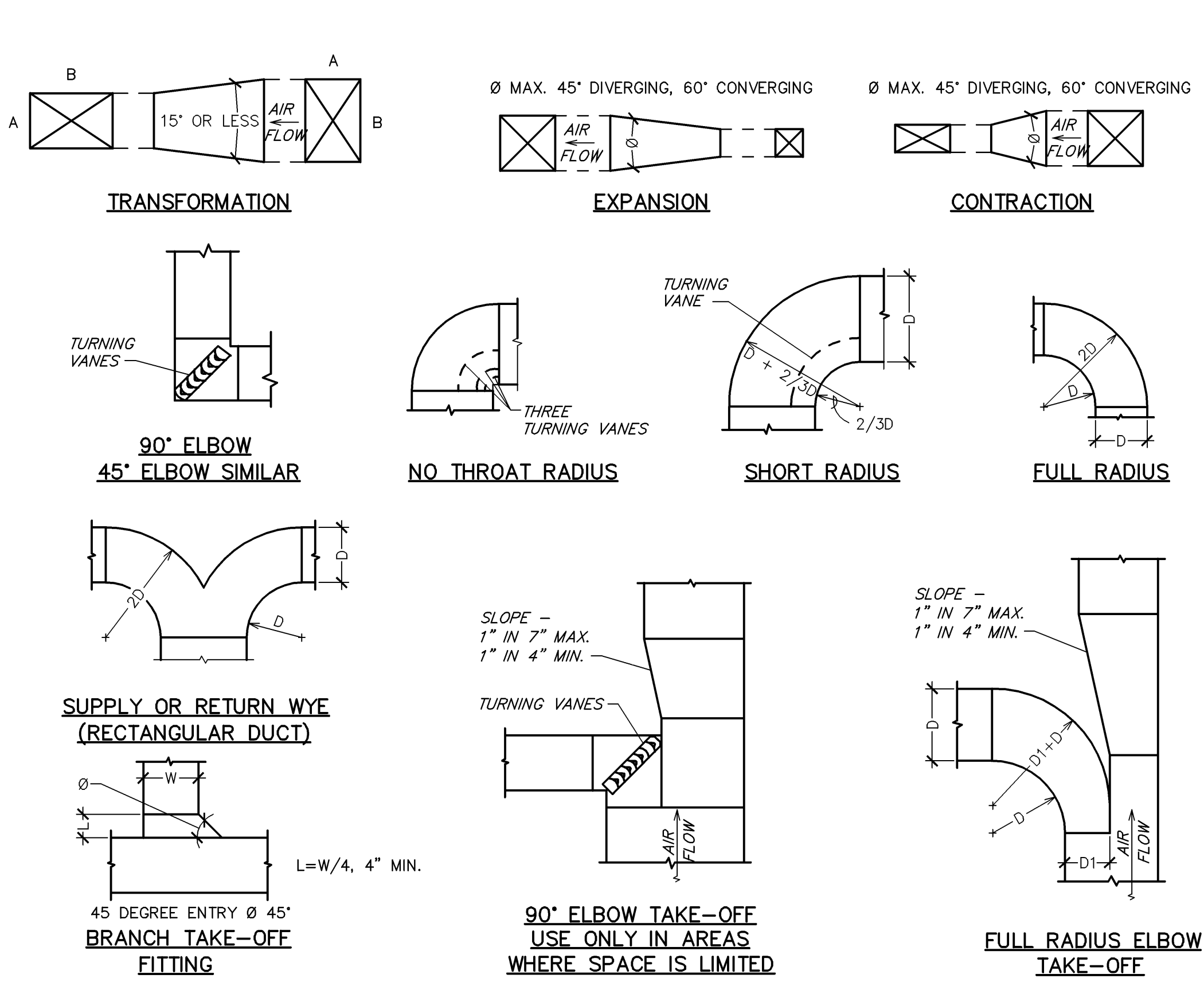
BRACE SIZING		BRACING SPACING		
BRACE SIZE	MAXIMUM LENGTH	PIPE SIZE	MAXIMUM HANGER SPACING	MAXIMUM BRACE SPACING*
2" x 2" x 3/16" ANGLE	6'-0"	UP TO 1 1/2"	7'-0"	NOT REQUIRED
2 1/8" x 2 1/8" x 3/16" ANGLE	8'-0"	2"	10'-0"	NOT REQUIRED
3" x 3" x 3/16" ANGLE	10'-0"	2 1/2" TO 3"	10'-0"	7'-0"
3 1/2" x 3 1/2" x 1/4" ANGLE	11'-6"	4" AND UP	10'-0"	10'-0"
4" x 4" x 1/4" ANGLE	13'-0"			
3" DIAM. PIPE	13'-0" TO 18'-0"			

NOTES:  
A. DUCTS WHICH ARE LARGER THAN 6 SQUARE FEET IN CROSS SECTION AREA SHALL BE BRACED LATERALLY 7'-0" ON CENTERS WITH 2" x 2" x 3/16" ANGLE.  
B. BRACING CAN BE OMITTED ON ALL PIPING SUSPENDED BY INDIVIDUAL HANGERS 12" OR LESS IN LENGTH FROM THE TOP OF PIPE TO THE BOTTOM OF THE SUPPORT FOR THE HANGER.

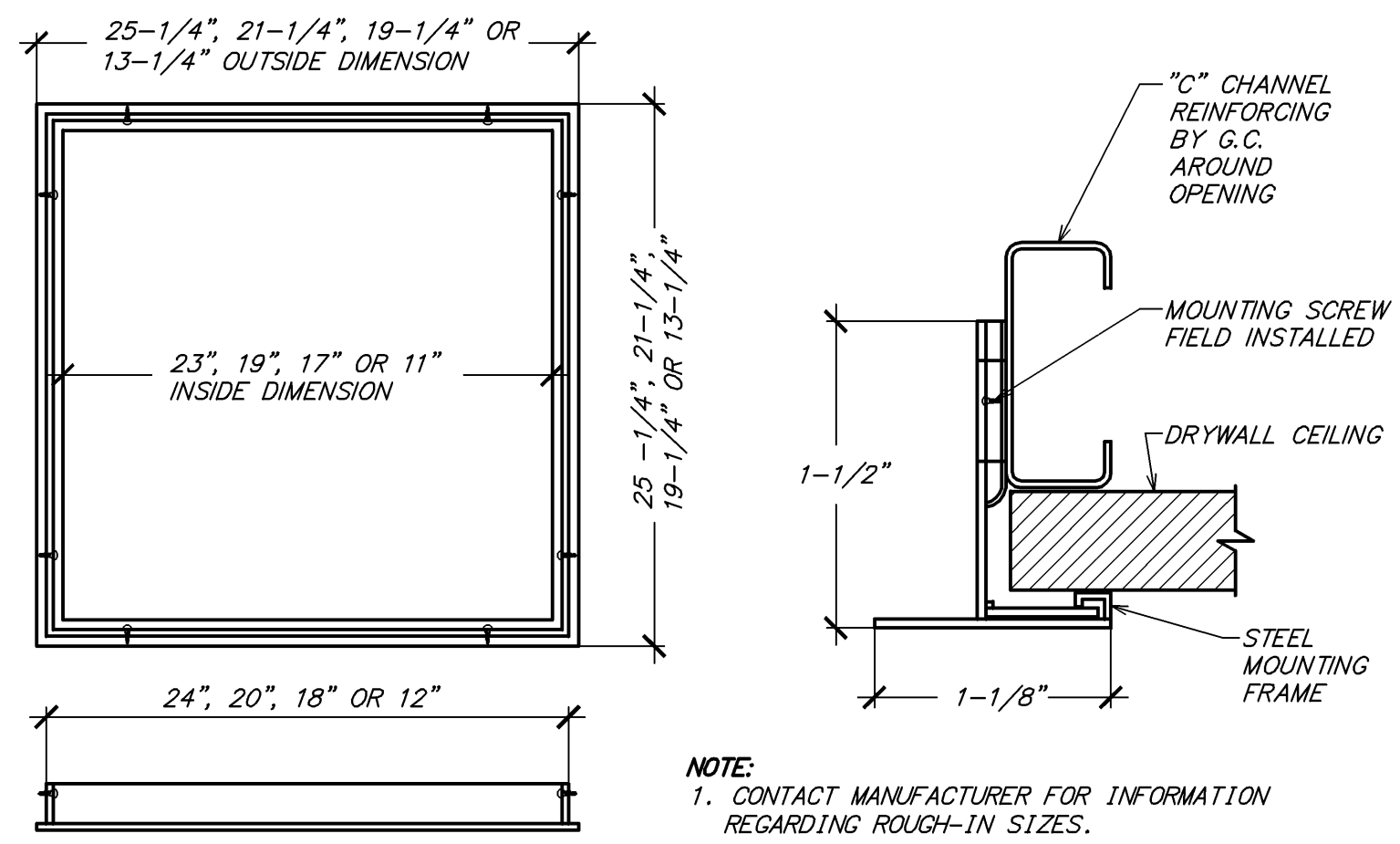
4 SEISMIC BRACE SCHEDULE  
NOT TO SCALE



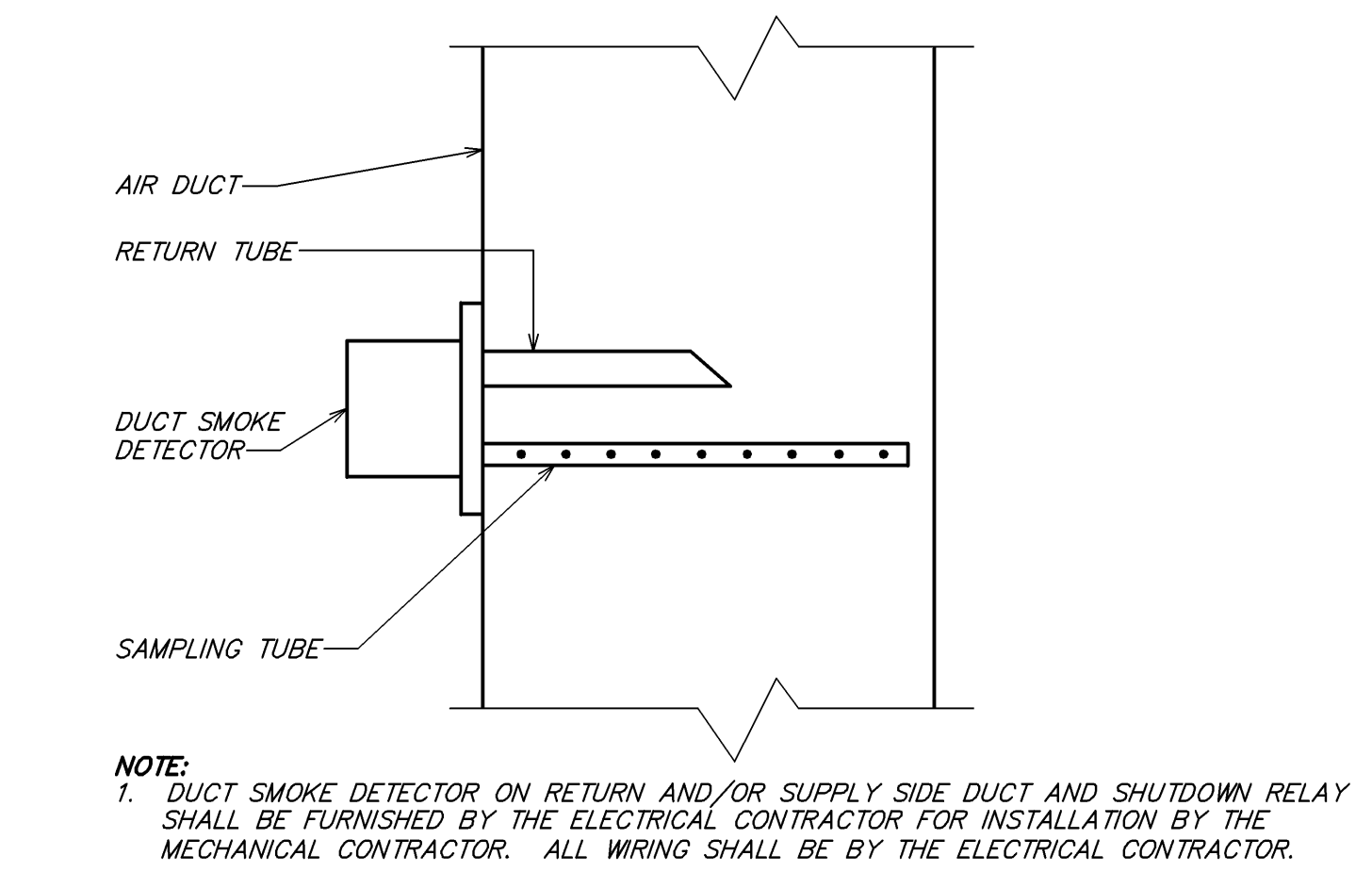
8 TYPICAL DIFFUSER-DRYWALL CEILING-SEISMIC  
NOT TO SCALE



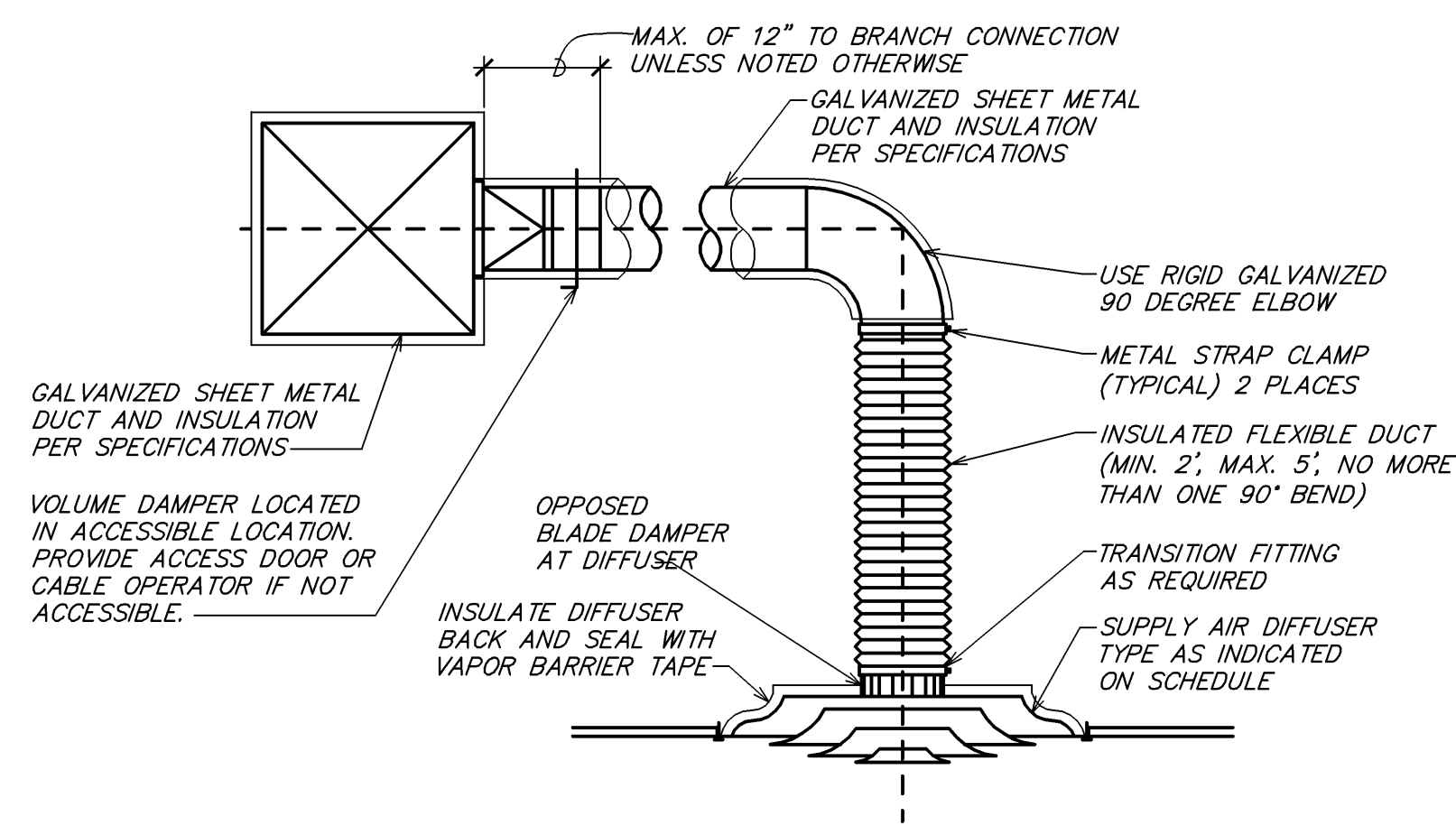
9 DUCTWORK DETAILS  
NOT TO SCALE



7 TYPICAL DRYWALL MOUNTING FRAME DETAIL  
NOT TO SCALE



10 DUCT SMOKE DETECTOR DETAIL  
NOT TO SCALE



3 TYPICAL DIFFUSER CONNECTION  
NOT TO SCALE



SECTION 230993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

- 1.01 SECTION INCLUDES
A. This Section defines the manner and method by which controls function.
B. This Section provides the intended sequence of operation for each piece of controlled equipment.
C. RELATED REQUIREMENTS
A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
1.03 SYSTEM DESCRIPTION
A. Equipment performance, controls and accessories shall be as specified on the Drawings and specified herein.
1.04 SUBMITTALS
A. Sequence of Operation Documentation. Submit written sequence of operation for entire HVAC system and each piece of equipment.

individually programmable for each heat pump. END OF SECTION

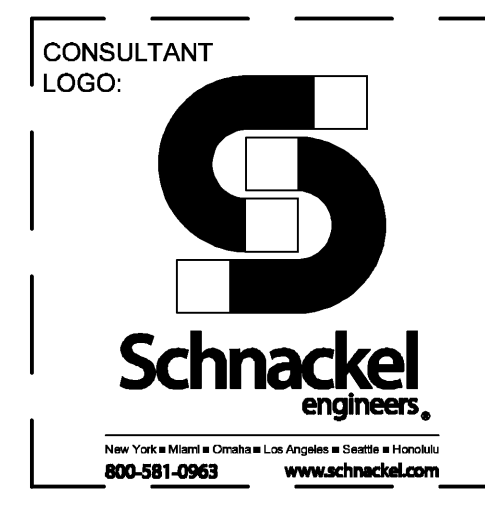
SECTION 230800 - COMMISSIONING OF HVAC

- 1.01 SUMMARY
A. Commissioning to be Completed by National Test and Balance.
B. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.
1.02 RELATED REQUIREMENTS
A. Section 23 0993 - Sequence of Operations for HVAC Controls.
1.03 REFERENCE STANDARDS
A. ASHRAE Guideline 1.1 - The HVAC Commissioning Process; 2012.
1.04 SUBMITTALS
A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

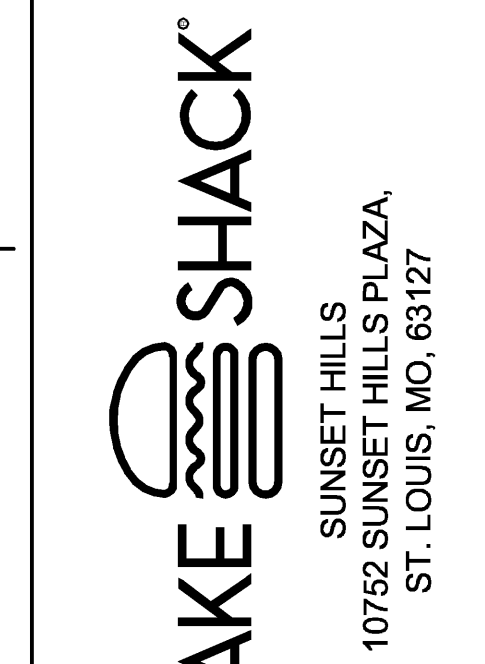
- 2.04 FILTER-DRIERS
A. Manufacturers:
1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sporlan Valve Company.
B. Performance:
1. Flow Capacity - Liquid Line: As required by capacities indicated on the manufacturer's data sheet.
2. Flow Capacity - Suction Line: As required by capacities indicated on the manufacturer's data sheet.
2.05 EXPANDED VALVE MANIFOLD
A. Manufacturers:
1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sporlan Valve Company.
B. Angle of Straight Through Type: ARI 750; design suitable for refrigerant; brass body; internal or external equalizer; bleed hole; adjustable superheat setting; replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb.
3.01 INSTALLATION
A. Install refrigeration specialties in accordance with manufacturer's instructions.
B. Refrigeration penetrations shall be flashed and weather sealed by the roofing contractor's authorized roofing contractor at this Contractor's expense.
3.02 FIELD QUALITY CONTROL
A. Test refrigeration system in accordance with ASME B31.5.
END OF SECTION
SECTION 233100 - HVAC DUCTS AND CASINGS
PART 1 GENERAL
1.01 SECTION INCLUDES
A. Metal ductwork.
B. Rigid ductwork.
C. Round spiral ductwork.
D. Double wall insulated round ductwork.
E. Kitchen hood exhaust ductwork.
1.02 PERFORMANCE REQUIREMENTS
A. No variation of duct configuration or sizes permitted except by written permission.
B. The control system shall be tested in accordance with ASHRAE 155.
1.03 SUBMITTALS
A. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start work for all systems.
1.04 REGULATORY REQUIREMENTS
A. Construct ductwork in accordance with NFPA 90B, NFPA 90A, and NFPA 96 standards.
B. Code or utility company requirements shall supersede any conflicting requirements.
1.05 FIELD CONDITIONS
A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
B. Maintain temperatures within acceptable range during and after installation of duct sealant.



ZEBRA ARCHITECTURE, PLLC
1450 N KIERLAND BLVD., SUITE 1300
COTTSDALE, ARIZON 85254
PHONE: 480.912.1169 zbrg@aol.com



STORE NO:
MO #1632

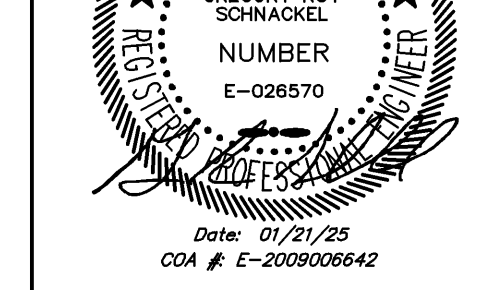


SUNSET HILLS PLAZA
10752 SUNSET HILLS BLVD.
ST. LOUIS, MO 63127

REVISIONS

Table with columns: NO, DATE, DESCRIPTION. Contains revision entries 1 through 11.

STATUS: IFC SET



FIELD VERIFICATION:
A. Manufacturer in accordance with SMACNA HVAC Duct Construction Standards - Metal and Nonmetallic Flexible Ductwork.
B. Round Spiral Ductwork: Machine made from round spiral lockseam duct with light gauge metal and steel reinforcement.
C. Double Wall Insulated Round Ducts: Round spiral lockseam duct with galvanized steel outer wall, 1 inch thick fiberglass insulation, perforated galvanized steel inner wall with 1/2 inch fiberglass insulation.

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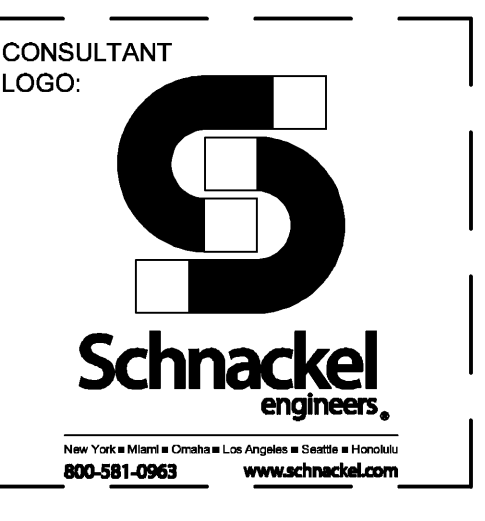
MECHANICAL SPECIFICATIONS

Table with columns: DATE, PROJECT NO, DRAWN, SCALE. Contains project information.

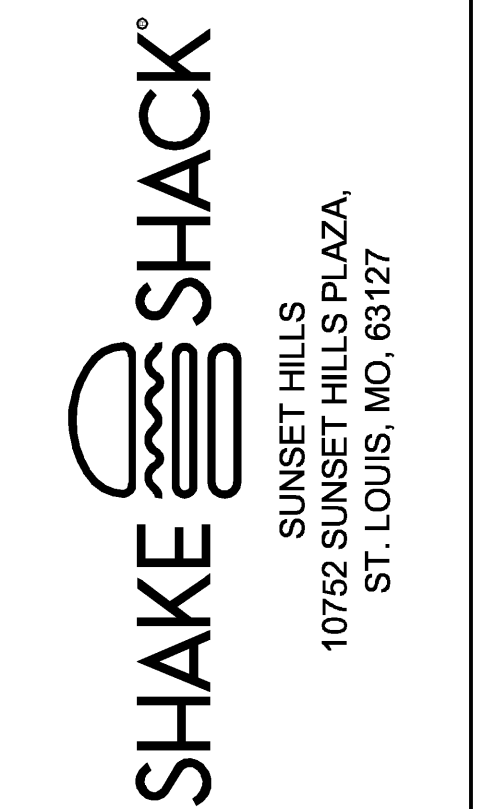
SHEET NO: M591



ZEBRA ARCHITECTURE, PLLC  
1451 N. KIERLAND BLVD., SUITE 1300  
SCOTTSDALE, ARIZONA 85254  
PHONE: 480.912.1169 zbrglobal

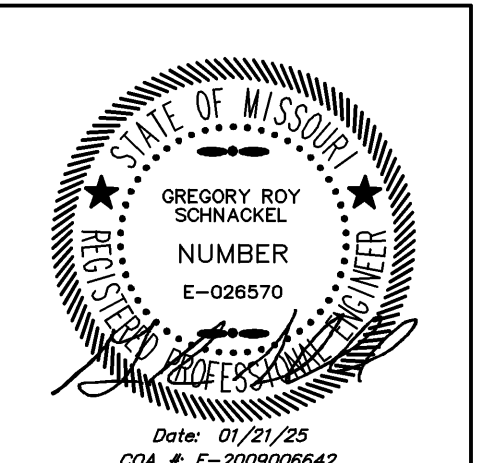


STORE NO:  
**MO #1632**



SUNSET HILLS  
10752 SUNSET HILLS PLAZA  
ST. LOUIS, MO, 63127

REVISIONS table with columns: NO, DATE, DESCRIPTION



FIELD VERIFICATION  
The Contractor shall verify all field dimensions and conditions of the project site and verify design accuracy, discrepancies before beginning or fabricating any work.

SHEET NAME: MECHANICAL SPECIFICATIONS  
DATE: 09/24/2024 PROJECT NO: 39038  
DRAWN: RAS SCALE:

SHEET NO.: **M592**

SECTION 233423 - HVAC POWER VENTILATORS

- 1.01 SECTION INCLUDES
A. Roof exhausters.
B. Kitchen range hood exhausters.
2.01 MANUFACTURERS
A. Greenheck; Loren Cook Company; PemBary; CaptivaAire.
2.02 POWER VENTILATORS - GENERAL
A. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.
2.03 ROOF EXHAUSTERS AND VENTILATORS
A. Fan Unit: In-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
B. Roof Curb: 20 inch high above the finished roof surface (compensate for roof insulation thickness at fan location) self-flashing of galvanized steel or aluminum construction with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed non-strip.
C. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protection.
D. Backdraft Damper: Motor actuated (or gravity damper) if depicted on design drawings, aluminum multiple blade construction, full edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
E. Shaoves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor shaves selected as required per design drawings.
F. Kitchen hood exhausters shall be upblast with grease trap, ventilated double wall curb and hinged curb adapter base for cleaning. Hood exhausters shall comply with requirements of NFPA 96.

- PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Provide shaves required for final air balance at no additional expense to the project.
C. Secure roof and wall exhausters with cadmium plated steel lag screws to roof curb or structure.
D. Extend ducts to roof and wall exhausters into roof curb or wall structure.
E. Install backdraft dampers (gravity or motorized as depicted on design drawings) on inlet to roof and wall exhausters.
F. All roofing penetrations shall be flashed and weather sealed by the roofing manufacturer's authorized roofing contractor at this Contractor's expense. This Contractor shall contract with the factory authorized roofing contractor for the specific roofing system applicable to this project. The use of an unauthorized roofing contractor may result in removal and replacement of the penetration systems at this Contractor's expense.

END OF SECTION

SECTION 233700 - AIR OUTLETS AND INLETS

- 1.01 SECTION INCLUDES
A. Rectangular ceiling diffusers.
B. Perforated face ceiling diffusers.
C. Grid core exhaust and return grilles.
D. Wall registers and grilles.
1.02 SUBMITTALS
A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, accessories, and noise level.
1.03 QUALITY ASSURANCE
A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
B. Test and rate lower performance in accordance with AMCA 500-L.
C. Code requirements shall supersede any conflicts or requirements of this Section.
1.04 QUALIFICATIONS
A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section, with minimum five years of documented experience.

- PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Tlus; Knueper; Price Industries; Nalor Industries Inc.; Hart & Cooley; Ruskin; Greenheck.
2.02 RECTANGULAR CEILING DIFFUSERS
A. Type: Square, adjustable pattern, stamped, multi-core, or architectural plaque diffuser to discharge air in 360 degree pattern with sectorizing blades where indicated.
B. Frame: Inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame. (To allow lift-out removal of the diffuser without removal of the plaster frame.)
C. Fabrication: Steel with baked enamel off-white finish.
D. Accessories: Opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
2.03 PERFORATED FACE CEILING DIFFUSERS
A. Type: Perforated face with removable face.
B. Frame: Inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame. (To allow lift-out removal of the diffuser without removal of the plaster frame.)
C. Fabrication: Steel with steel frame and baked enamel off-white finish.
D. Accessories: Opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
2.04 GRID CORE EXHAUST AND RETURN GRILLES
A. Type: 1-1/4 inch louvers.
B. Fabrication: Aluminum with factory off-white enamel finish.
C. Frame: 1-1/4 inch margin with countersunk screw mounting.
D. Frame: Channel loy-in frame for suspended grid ceilings where face size exceeds 18 x 18 inch.
E. Damper: If specified on drawings; integral, gang-operated, opposed blade type with removable key operator, operable from face.
2.05 WALL SUPPLY REGISTERS/GRILLES
A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, horizontal face, double deflection.
B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
C. Fabrication: Steel with 20 gage minimum frame and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory off-white enamel finish.
D. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.
E. Rough Service: Provide front pivoted or welded in place blades, securely fastened to be immobile.

- PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
C. Install diffusers to ductwork with air tight connection.
D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille or register assembly.
E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION

SECTION 237143 - PACKAGED OUTDOOR ROOF TOP UNITS - GAS FIRED

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Packaged roof top units.
B. Thermostat controls.
C. Roof mounting curbs.
D. Economizer.
E. Power exhaust.
PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Carrier Corporation; Trane Inc.; Lennox Industries; York; AARON Incorporated.
2.02 AIR CONDITIONING UNITS
A. General: Roof mounted units having gas burner and electric refrigeration.
B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame; supply fan, heat exchanger and burner, controls, air filter, refrigerant cooling coil and compressor, dry bulb economizer and power exhaust fan where indicated on the Drawings, condenser coil and condenser fan.
C. Electrical Characteristics: As scheduled on the Drawings.
D. Disconnect Switch: Factory mount disconnect switch on equipment.
2.03 FABRICATION
A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners or doors with piano hinges with locking handles. Structural members shall be minimum 18 gage, with access doors or panels of minimum 20 gage.
B. Insulation: One inch thick neoprene coated glass fiber with edges protected from erosion.
C. Heat Exchangers: Aluminumized steel or stainless steel where indicated on the Drawings, if welded construction.
D. Supply Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch motor pulley, and rubber isolated hinged motor or direct drive as indicated. Isolate complete fan assembly.
E. Air Filters: 2 inch thick disposable media in metal frames.
F. Roof Mounting Curb: Galvanized steel, channel frame, insulated with gaskets, and rain diverter. Provide roof curb of adequate height to provide a unit mounting height of 12" or greater above the top of the roof surface with the curb mounted to the building structure. Roof curb height must compensate for the roof insulation thickness to meet this requirement.
G. Vibration Isolation Curb: Only when indicated on the Drawings.
2.04 BURNER
A. Gas Burner: Induced draft or forced draft type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off pilot.
B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and other air flow proven and slight delay, allow gas valve to open.
C. High Limit Control: Temperature sensor with fixed spot at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.
D. Supply Fan Control: Temperature sensor sensing bonnet temperatures and independent of burner controls, with provisions for continuous fan operation.
2.05 EVAPORATOR COIL
A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons capacity and less, and thermostatic expansion valves and orifice meter circuiting for units 7.0 tons cooling capacity and larger.
2.06 COMPRESSOR
A. Provide hermetic or semi-hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety

- controls, motor overload protection, suction and discharge service valves and gage ports, and filter drier.
B. Five minute timed off circuit to delay compressor start.
C. Outdoor thermostat to energize compressor above 35 degrees Fahrenheit.
2.07 CONDENSER COIL
A. Provide copper tube aluminum fin coil assembly with subcooling runs and coil guard.
B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor.
2.08 MIXED AIR CASING
A. Dampers: Provide outside, return, and relief dampers with damper operator and control package to automatically vary outside air quantity. Outside air damper to fall to closed position. Relief dampers may be gravity balanced.
B. Gaskets: Provide light fitting dampers with edge gaskets maximum leakage 5 percent at 2 inches pressure differential.
C. Damper Operator: 24 volt with gear train sealed in oil.
D. Damper Operator, Units 7.5 Ton Cooling Capacity and Larger: 24 volt with gear train sealed in oil with spring return on.
E. Mixed Air Controls: Maintain selected supply air temperature and return dampers to minimum position on call for heating and above 75 degrees F ambient, or when ambient air temperature exceeds return air temperature.
2.09 INTEGRATED ECONOMIZER
A. Economizer shall be furnished and installed complete with outside air and relief dampers and controls.
B. Provide low-leakage opposed blade dampers
1. Meet all leakage requirements of applicable energy code.
C. Economizer shall be capable of introducing up to 100% outdoor air for minimum ventilation as well as free cooling.
D. Damper actuator shall be electric, fully modulating design.
E. Economizer outdoor hood shall be pre-painted and fully integrated with the unit.
F. Dry Bulb Control: Provide dry bulb sensor capable of measuring temperature of minimum position on call for heating and above 75 degrees F ambient, or when ambient air temperature exceeds return air temperature.
G. Provide economizer Fault Detection and Diagnostics (FDD).
2.10 POWER EXHAUST
A. Package shall include exhaust fan(s) and damper for units with economizer to control over-pressurization of building including integral pressure controls.
2.11 WATER LEVEL MONITORING DEVICE
A. Water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the equipment served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted.
2.12 OPERATING CONTROLS
A. Provide low voltage, adjustable thermostat to control heater stages in sequence with delay between stages, compressor and condenser fan, and supply fan to maintain temperature setting.
1. Include system selector switch (heat-off-auto-cool) and fan control switch (auto-on).
2. The Mechanical Contractor shall provide all control wiring between thermostat and unit control panel and any required remote sensors.
3. Locate thermostat in room as shown.
4. Electric solid state microcomputer based room thermostat, located as indicated. Provide remote sensors when indicated on the Drawings.
a. Room thermostat shall incorporate:
1. Automatic switching from heating to cooling.
2. Preferential rate control to minimize overshoot and deviation from set point.
3. Automatic Start Capabilities: Controls shall be capable of automatically adjusting the delay start time of the HVAC system in order to bring each space to the desired occupied temperature immediately prior to scheduled occupancy.
4. Set-up for four separate temperatures per day.
5. Instant override of set point for continuous or timed period from one hour to 31 days.
6. Short cycle protection.
7. Programming based on weekdays, Saturday and Sunday.
8. Switch selection features including imperial or metric display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on.
b. Room thermostat display shall include:
1. Time of day.
2. Actual room temperature.
3. Programmed temperature.
4. Day of week.
5. System mode indication: heating, cooling, auto, off, fan auto, fan on.
6. Stage (heating or cooling) operation.

- PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions and NFPA 90A.
B. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level, install roof mounting curb so that it bears on the building structure, not on top of the roof deck or roofing materials. Provide restraints where required by local codes.
C. Provide cooling condensate drain piping (and overflow piping if required) to approved location. Condensate piping shall be Schedule 40 galvanized steel pipe, Type L copper tube, or PVC. Contractor shall verify the selected material meets with the approval of all State, local authorities and utility company requirements. Verification of compliance of the selected piping material is the sole responsibility of the installing Contractor.
1. Condensate piping located within the building shall be insulated with 1/2 inch thick glass fiber or flexible elastomeric cellular foam insulation. Only metallic piping systems will be allowed in return air plenum ceiling space.
END OF SECTION
SECTION 238127 - SMALL SPLIT-SYSTEM HEATING AND COOLING
PART 1 GENERAL
1.01 SECTION INCLUDES
A. Air-source heat pumps.
B. Indoor ductless fan & coil units.
C. Controls.
D. Room thermostats.
PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Carrier Corporation; Trane Inc.; YORK; Lennox Industries
2.02 SYSTEM DESIGN
A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units. Listed units.
1. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line. Size as recommended by the manufacturer. All refrigerant line shall be indicated on the Drawings are approximate and shall be adjusted as required based on the actual equipment provided to meet the manufacturer's recommended line sizing at no additional expense.
B. Performance Requirements: Equipment performance, efficiency and accessories shall be as scheduled on the Drawings and specified herein. Inclusion in both locations is not a prerequisite to inclusion in the Contract. Equipment and accessories specified in either location shall be included in the Contract. Provide all necessary accessories and connections as required for a complete, functional system. Efficiency shall not be less than requirements of the units specified or indicated on the drawings, or the applicable local energy code.
2.03 INDOOR UNITS FOR DUCTLESS SYSTEMS
A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.
B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
1. Construction and Ratings: In accordance with ARI 210/240 and UL listed.
2.04 OUTDOOR UNITS
A. Outdoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, with compressor and condenser.
1. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
2. Construction and Ratings: In accordance with ARI 210/240 with testing in accordance with ASHRAE Std 23 and UL listed.
B. Compressor: ARI 220; hermetic, 3600 rpm (multi-speed when indicated on the Drawings) resiliently mounted with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drive. Provide time delay control to prevent short cycling.
C. Air Cooled Condenser: ARI 520; Aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
D. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermocouple fan (in liquid line).
1. Provide thermostatic expansion valves.
2. Provide heat pump reversing valves on all heat pump units.
E. Operating Controls:
1. Control by room thermostat to maintain room temperature setting.
2. Low Ambient Kill: On all systems not provided with economizer controls, provide refrigerant pressure setting to cycle condenser fan on when condenser refrigerant pressure is above 285 psig and off when pressure drops below 140 psig for operation to 0 degrees F.
F. Mounting Pad: Poured in place concrete, precast concrete or resin composite pad, minimum 4 inches thick, square.
2.05 ACCESSORY EQUIPMENT
A. Room Thermostat: Wall-mounted, electric solid state microcomputer based room thermostat with remote sensor to maintain temperature setting; low-voltage; with following features:
1. System selector switch (heat-off-cool) and fan control switch (auto-on).
2. Automatic switching from heating to cooling.
3. Preferential rate control to minimize overshoot and deviation from setpoint.
4. Automatic Start Capabilities: Controls shall be capable of automatically adjusting the delay start time of the HVAC system in order to bring each space to the desired occupied temperature immediately prior to scheduled occupancy.
5. Set-up for four separate temperatures per day.
6. Instant override of setpoint for continuous or timed period from one hour to 31 days.
7. Short cycle protection.
8. Programming based on every day of the week.
9. Selection features including degree F or degree C display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
10. Battery replacement without program loss.
11. Thermostat display:
a. Time of day.
b. Actual room temperature.
c. Programmed temperature.
d. Day of week.
e. System mode.

- PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.
B. Install in accordance with NFPA 90A and NFPA 90B as applicable.
C. Provide cooling condensate drain piping (and overflow piping if required) to approved location. Condensate piping shall be Schedule 40 galvanized steel pipe, Type L copper tube, or PVC pipe (non-plenum applications). Contractor shall verify the selected material meets with the approval of all State, local authorities and utility company requirements. Verification of compliance of the selected piping material is the sole responsibility of the installing Contractor. Only metallic piping systems will be allowed in return air plenum ceiling space.
D. Install refrigeration systems in accordance with ASHRAE Std 15. Provide filter drier, sight glass and isoland valve on outdoor units and sight glass and expansion valve on indoor units.
E. All thermostat, humidistat (if required), damper interlock and other low voltage control wiring shall be installed by the Mechanical Contractor. The Electrical Contractor will furnish only the power system connections shown on the Electrical Drawings. All other control and interlock wiring is the responsibility of the Mechanical Contractor.
END OF SECTION

- C. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems. Complete with metal con with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
F. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
G. Use double nuts and lock washers on threaded rod supports.
H. Connect flexible ducts to metal ducts with draw bands.
I. Support flexible duct runs every five feet in the horizontal direction to avoid sags and sags.
J. Connect terminal units to supply ducts with one foot maximum length of flexible duct held in place with strap or clamp. Longer duct lengths are acceptable if depicted on the design drawings and allowed per local code.
K. Maximum of one 90 degree bend or equivalent will be allowed in flexible duct runs.
L. Daring construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system. All exposed ducts in finished areas must be completely free from all dents or imperfections in the galvanized coating and shall be sealed CAREFULLY AND NEATLY with duct sealer completely contained within the joint. Duct wrap will not be permitted in exposed locations. If round duct is indicated in exposed locations, it must be spiral. No exposed duct sealer, tape or longitudinal joints will be permitted in exposed finished areas. Line of exposed supply air ductwork.
N. Kitchen hood exhaust, Type 1: Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.
O. For all hood systems, perform all required regulatory duct leakage and weld tests in the presence of the code official, including but not limited to light tests and smoke tests, to demonstrate the integrity of the duct construction prior to the installation of any insulation that prevents visual inspection of the ductwork on all sides.
P. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out.
Q. All roofing penetrations shall be flashed and weather sealed by the roofing manufacturer's authorized roofing contractor at this Contractor's expense. This Contractor shall contract with the factory authorized roofing contractor for the specific roofing system applicable to this project. The use of an unauthorized roofing contractor may result in removal and replacement of the penetration systems at this Contractor's expense.

- 3.03 CLEANING
A. Clean duct system and force air at high velocity through duct to remove accumulated dust or clean with high power vacuum machine. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.
3.04 SCHEDULE
A. Ductwork Material: The Contractor may use any of the following ductwork materials, at his option, provided the selected material meets with the approval of all State, local authorities and utility company requirements and complies with the requirements of the selected piping material is the sole responsibility of the installing Contractor.
1. Low Velocity Supply (Heating Systems): Galvanized Steel, Aluminum.
2. Low Velocity Supply (System with Cooling Coils): Galvanized Steel, Aluminum.
3. Return and Relief: Galvanized Steel, Aluminum.
4. General Exhaust: Galvanized Steel, Aluminum.
5. Outside Air Intake: Galvanized Steel.
6. Kitchen Hood Exhaust, Type 1: Carbon Steel, Stainless Steel, Constructed per NFPA 96.
C. Ductwork Pressure Class:
1. Low Velocity Supply (Heating Systems): Scheduled System ESP +0.25", round up to next higher pressure class.
2. Low Velocity Supply (Systems with Cooling): Scheduled System ESP +0.5", round up to next higher pressure class.
3. Return and Relief: 1 inch.
4. General Exhaust: Scheduled System ESP +1.0", round up to next higher pressure class.
5. Outside Air Intake: 1 inch.
6. Kitchen Hood Exhaust: See drawings for maximum fan static pressure plus 50% addition.
END OF SECTION
SECTION 233300 - AIR DUCT ACCESSORIES
PART 1 GENERAL
1.01 SECTION INCLUDES
A. Air turning devices/extractors.
B. Volume control dampers.
C. Flexible duct connections.
D. Duct access doors.
PART 2 PRODUCTS
2.01 AIR TURNING DEVICES/EXTRACTORS
A. Manufacturers: Krueger; Ruskin Company; Titus.
B. Multi-Blade Device with Adjustable Blade Dimension: steel or aluminum construction; with individually adjustable blades, mounting straps.
2.02 VOLUME CONTROL DAMPERS
A. Manufacturers: Louvers & Dampers, Inc.; Nalor Industries Inc.; Ruskin Company; Fretico Inc.
B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
C. Single Blade Damper: Fabricate for duct sizes up to 8 x 30 inch.
D. Multi-Blade Damper: Fabricate for opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide all-impregnated nylon or sintered bronze bearings.
F. The contractor shall provide either a mechanical or electrical cable operated system wherever dampers are located in non-accessible areas.
1. Mechanical cable operator system shall be similar and equal to Young Regulator Company Regulator Cable Control system including damper, flexible cable with casing and concealed ceiling regulator control.
2. Electrically operated damper control system shall be similar and equal to United Eiertech Corporation, "Power Balance" system including motor operated damper, RU-11 plenum rated cabling and flush ceiling or wall mounted RU-11 jock in remote plate. Include one hand held battery pack operator pack to be delivered to the Owner upon completion of the balancing.
2.03 FLEXIBLE DUCT CONNECTIONS
A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
B. Flexible Duct Connections: Fabric crimped into metal edging strip.
1. Fabric: UL listed neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
2. Gasket: Net Fabric Width: Approximately 2 inches wide.
3. Net Fabric Width: 2 inches wide, 24 gage thick galvanized steel.
2.04 DUCT ACCESS DOORS
A. Manufacturers: Asador Products Inc.; Nalor Industries Inc.; Ruskin Company; SEMCO Incorporated.
B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
C. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.
1. Less than 12 inches Square. Secure with ash locks.
2. Up to 18 inches Square. Provide two hinges and two ash locks.
D. Access doors with sheet metal screw fasteners are not acceptable.
PART 3 EXECUTION
3.01 INSTALLATION
A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Duct construction and pressure class.
B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 12 x 12 inch size for balancing dampers only. Review locations prior to fabrication.
C. Provide balancing dampers and control elements at accessible areas wherever possible to avoid access doors. Provide ceiling access doors for access to all dampers and control elements located above inaccessible ceiling areas. Provide minimum 12 x 12 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 12 x 12 inch size for balancing dampers only. Review locations prior to fabrication.
D. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
E. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly. Do not locate dampers closer than 5 feet or 10 duct diameters from the air terminal device, whichever is greater.
F. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
G. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

- AIR PURIFICATION DEVICES
Model: PHI-PK014-24V Specifications
LISTING: UL 1598:2008 (3rd Edition)
FACTORY UV-PHI CELL
INSTALLATION: RTU PACKAGED UNIT / BLOWER CABINET
PART 1 GENERAL
1.01 SUMMARY
A. This section includes hydro-peroxide, Super-Oxide Ions, & Hydroxide Ion's delivered via PHI technology through packaged heating and cooling units capable of supplying 3,000 to 40,000 CFM of supply air to the indoor space.
1.02 QUALITY ASSURANCE
A. All models shall be UL listed and comply with safety standards UL 1598:2008 (3rd Edition) and CSA Standard C22.2 No. 250.0:2008.
1.03 WARRANTY
A. All units shall be provided with the following standard warranties:
1. 2-year or 18,000 hours from initial startup. National TAB provided service plan. The phi cell light replacements are provided/installed at no cost if National TAB is providing Renew-Cr Service after initial installation.
B. This warranty shall not apply if:
1. The equipment is not installed by a qualified installer per the manufacturer's installation instructions shipped with the product.
2. The equipment is misused or neglected, or not maintained per the manufacturer's maintenance instructions.
3. The equipment is not operated within its published capacity.
4. The invoice is not paid within the terms of the sales agreement.
PART 2 PRODUCTS
2.01 GENERAL
A. MULTI-ZONE one piece packaged PHI Unit-Air Purification System.
2.02 HOUSING
A. Unit(s) shall be constructed of aluminum structural pop-rivets. All metal shall be CNC bent for precise assembly.
1. Quad Metallic Target
2. 10" x 10" bulb
3. Electronic Enclosure (24VAC Input Power Jack)
4. Mechanical mounting feet for easy placement and installation in the Blower Cabinet.
END OF SECTION

SEE OTHER SHEETS

ROOM #	NAME	Az AREA (FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANCY CATEGORY	TABLE 403.3.1.1 R <sub>p</sub> PEOPLE/DA (CFM/PER)	TABLE 403.3.1.1 R <sub>a</sub> AREA/DA (CFM/FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANT DENSITY (#/1000 FT <sup>2</sup> )	Pz (F)	Rz/Pz	Ra/Pz	Vbz (CFM)	TABLE 403.3.1.1.2 E <sub>z</sub> (CFM)	Voz (CFM)	Vpz MAX SUPPLY (CFM)	Vpzm MIN SUPPLY (CFM)	Z <sub>p</sub>	TABLE 403.3.1.1.2.3 E <sub>v</sub>
100	VESTIBULE	69	NO LISTING	0.0	0.00	0	0	0	0	0	0.80	0	410	410	0.000	1.00
101	QUEUING	486	DINING ROOMS	7.5	0.18	70	35	263	87	350	0.80	437	1300	1300	0.337	0.81
102	DINING	738	DINING ROOMS	7.5	0.18	70	52	390	133	523	0.80	654	1940	1940	0.337	0.81
107	WOMEN'S RESTROOM	132	NO LISTING	0.0	0.00	0	0	0	0	0	0.80	0	100	100	0.000	1.00
108	HALLWAY	112	CORRIDORS	0.0	0.00	0	0	0	7	7	0.80	8	150	150	0.066	1.00
109	MEN'S RESTROOM	110	NO LISTING	0.0	0.00	0	0	0	0	0	0.80	0	100	100	0.000	1.00
		1,465		0.0	0.00	0	87	653	227	880		1090	4000	4000	0.337	0.81

OUTDOOR AIR CALCULATIONS PER EQUATION 4-1:  
 SYMBOL VALUE DESCRIPTION  
 P<sub>s</sub> = 87 SYSTEM POPULATION  
 SP<sub>z</sub> = 87 ZONE POPULATION  
 D = 1.00 OCCUPANT DIVERSITY  
 V<sub>ou</sub> = 880 UNCORRECTED OUTDOOR AIR INTAKE  
 Z<sub>p</sub> (max) = 0.337 ZONE PRIMARY OUTDOOR AIR FRACTION (MAXIMUM)  
 E<sub>v</sub> = 0.81 SYSTEM VENTILATION EFFICIENCY  
 V<sub>ps</sub> = 4000 ZONE PRIMARY AIRFLOW  
 V<sub>ot</sub> = 1,082 CODE REQUIRED OUTDOOR AIRFLOW RATE, CFM  
 V<sub>od</sub> = 1,100 DESIGN OUTDOOR AIRFLOW RATE, CFM

ROOM #	NAME	Az AREA (FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANCY CATEGORY	TABLE 403.3.1.1 R <sub>p</sub> PEOPLE/DA (CFM/PER)	TABLE 403.3.1.1 R <sub>a</sub> AREA/DA (CFM/FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANT DENSITY (#/1000 FT <sup>2</sup> )	Pz (F)	Rz/Pz	Ra/Pz	Vbz (CFM)	TABLE 403.3.1.1.2 E <sub>z</sub> (CFM)	Voz (CFM)	Vpz MAX SUPPLY (CFM)	Vpzm MIN SUPPLY (CFM)	Z <sub>p</sub>	TABLE 403.3.1.1.2.3 E <sub>v</sub>
103	ORDER	120	DINING ROOMS	7.5	0.18	70	0	0	0	0	0.80	111	250	250	0.446	0.70
104	COOKLINE	289	KITCHEN (COOKING)	7.5	0.12	20	6	45	35	80	0.80	100	2400	2400	0.042	1.00
105	ICE	192	KITCHEN (COOKING)	7.5	0.12	20	4	30	23	53	0.80	66	800	800	0.074	1.00
106	DISH	206	KITCHEN (COOKING)	7.5	0.12	20	5	38	29	62	0.80	78	900	900	0.086	1.00
111	STORAGE	358	STORAGE ROOMS	0.0	0.12	0	1	0	43	43	0.80	54	350	350	0.057	1.00
112	UTILITY	300	STORAGE ROOMS	0.0	0.12	0	2	0	36	36	0.80	45	600	600	0.073	1.00
		1,465		0.0	0.12	0	27	180	183	363		454	6000	6000	0.446	0.70

OUTDOOR AIR CALCULATIONS PER EQUATION 4-1:  
 SYMBOL VALUE DESCRIPTION  
 P<sub>s</sub> = 27 SYSTEM POPULATION  
 SP<sub>z</sub> = 27 ZONE POPULATION  
 D = 1.00 OCCUPANT DIVERSITY  
 V<sub>ou</sub> = 380 UNCORRECTED OUTDOOR AIR INTAKE  
 Z<sub>p</sub> (max) = 0.446 ZONE PRIMARY OUTDOOR AIR FRACTION (MAXIMUM)  
 E<sub>v</sub> = 0.70 SYSTEM VENTILATION EFFICIENCY  
 V<sub>ps</sub> = 6000 ZONE PRIMARY AIRFLOW  
 V<sub>ot</sub> = 615 CODE REQUIRED OUTDOOR AIRFLOW RATE, CFM  
 V<sub>od</sub> = 1,050 DESIGN OUTDOOR AIRFLOW RATE, CFM

ROOM #	NAME	Az AREA (FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANCY CATEGORY	TABLE 403.3.1.1 R <sub>p</sub> PEOPLE/DA (CFM/PER)	TABLE 403.3.1.1 R <sub>a</sub> AREA/DA (CFM/FT <sup>2</sup> )	TABLE 403.3.1.1 OCCUPANT DENSITY (#/1000 FT <sup>2</sup> )	Pz (F)	Rz/Pz	Ra/Pz	Vbz (CFM)	TABLE 403.3.1.1.2 E <sub>z</sub> (CFM)	Voz (CFM)	Vpz MAX SUPPLY (CFM)	Vpzm MIN SUPPLY (CFM)	Z <sub>p</sub>	TABLE 403.3.1.1.2.3 E <sub>v</sub>
110	MANAGERS OFFICE	73	OFFICE SPACES	6.5	0.08	5	2	10	4	14	0.80	18	350	350	0.051	1.00

OUTDOOR AIR CALCULATIONS PER EQUATION 4-1:  
 SYMBOL VALUE DESCRIPTION  
 P<sub>s</sub> = 2 SYSTEM POPULATION  
 SP<sub>z</sub> = 2 ZONE POPULATION  
 D = 1.00 OCCUPANT DIVERSITY  
 V<sub>ou</sub> = 14 UNCORRECTED OUTDOOR AIR INTAKE  
 Z<sub>p</sub> (max) = 0.051 ZONE PRIMARY OUTDOOR AIR FRACTION (MAXIMUM)  
 E<sub>v</sub> = 1.00 SYSTEM VENTILATION EFFICIENCY  
 V<sub>ps</sub> = 350 ZONE PRIMARY AIRFLOW  
 V<sub>ot</sub> = 14 CODE REQUIRED OUTDOOR AIRFLOW RATE, CFM  
 V<sub>od</sub> = 15 DESIGN OUTDOOR AIRFLOW RATE, CFM

## 1 OUTSIDE AIR CALCULATIONS

### Air System Sizing Summary for BLOCK LOAD

10/11/2024  
02:28PM

Project Name: 240413hvac\_V2\_for\_FA\_20241011141341-FAFinal  
 Prepared by: Schnackel Engineers

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**Air System Information**

Air System Name: **BLOCK LOAD**      Number of zones: **1**  
 Equipment Class: **PKG ROOF**      Floor Area: **3201.0** ft<sup>2</sup>  
 Air System Type: **SZCAV**      Location: **Orlando, Florida**

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**Sizing Calculation Information**  
 Zone and Space Sizing Method:

Zone CFM: **Peak zone sensible load**  
 Space CFM: **Individual peak space loads**

Calculation Months: **Jan to Dec**  
 Sizing Data: **Calculated**

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**Central Cooling Coil Sizing Data**

Total coil load	28.1 Tons	Load occurs at	Aug 1700
Total coil load	337.4 MBH	OA DB / WB	92.3 / 75.6 °F
Sensible coil load	253.0 MBH	Entering DB / WB	78.7 / 65.6 °F
Coil CFM at Aug 1700	10127 CFM	Leaving DB / WB	55.5 / 54.3 °F
Max block CFM	10127 CFM	Coil ADP	52.9 °F
Sum of peak zone CFM	10127 CFM	Bypass Factor	0.100
Sensible heat ratio	0.750	Resulting RH	50 %
ft <sup>3</sup> /Ton	113.9	Design supply temp.	55.0 °F
BTU/(hr-ft <sup>2</sup> )	105.4	Zone T-stat Check	1 of 1 OK
Water flow @ 10.0 °F rise	N/A	Max zone temperature deviation	0.0 °F

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**Central Heating Coil Sizing Data**

Max coil load	125.9 MBH	Load occurs at	Des Htg
Coil CFM at Des Htg	10127 CFM	BTU/(hr-ft <sup>2</sup> )	39.3
Max coil CFM	10127 CFM	Ent. DB / Lvg DB	65.9 / 77.5 °F
Water flow @ 20.0 °F drop	N/A		

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**Supply Fan Sizing Data**

Actual max CFM	10127 CFM	Fan motor BHP	1.66 BHP
Standard CFM	10088 CFM	Fan motor kW	1.32 kW
Actual max CFM/ft <sup>2</sup>	3.16 CFM/ft <sup>2</sup>	Fan static	0.60 in wg

## 2 LOAD CALCULATIONS

### RTU/ACU CONTROL MATRIX

SETPOINT/CONTROL	RTU-1 DINING	RTU-2 KITCHEN	FC-1 OFFICE
*SETPOINTS*			
COOLING - OCCUPIED SETPOINT	75 F	75 F	75 F
COOLING - UNOCCUPIED SETPOINT	80 F	80 F	80 F
HEATING - OCCUPIED SETPOINT	70 F	70 F	70 F
HEATING - UNOCCUPIED SETPOINT	60 F	60 F	60 F
ECONOMIZER UPPER LIMIT SETPOINT	65 F	65 F	NA
*ACCESSORIES*			
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT	YES	YES	YES
REMOTE TEMPERATURE SENSOR	YES	YES	NO
MOTORIZED OUTDOOR AIR DAMPER	YES	YES	YES
INTEGRATED ECONOMIZER	YES	YES	NO
ECONOMIZER FAULT DETECTION	YES	YES	NO
BAROMETRIC RELIEF	YES	NO	NO
POWERED EXHAUST RELIEF	NO	YES	NO
DEHUMIDIFICATION (HOT GAS REHEAT)	YES	YES	NO
*ON DURING OCCUPIED MODE*			
ON DURING OCCUPIED MODE	YES	YES	YES
*VARIABLE VOLUME - MODULATE FAN SPEED*			
VARIABLE VOLUME - MODULATE FAN SPEED	YES	YES	YES
*SAFETIES AND INTERLOCKS*			
RETURN AIR SMOKE DETECTOR	YES	YES	NO
LOW LIMIT FREEZE/STAT	YES	YES	YES
FIRE ALARM CONTROL PANEL INTERLOCK	YES	YES	YES
KITCHEN EXHAUST SYSTEM INTERLOCK	YES	YES	YES

### AIR BALANCE SCHEDULE

EQUIPMENT TAG	SUPPLY AIRFLOW (CFM)	OUTDOOR AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	EXHAUST AIRFLOW (CFM)	OA/SA (%)	REMARKS
RTU-1	4,000	1,100	2,900		28%	FOH
RTU-2	6,000	1,050	4,950		18%	BOH
FC-1	350	15	335		4%	OFFICE
EF-1				700		HOOD-1
EF-2				740		HOOD-2
EF-3				300		RESTROOMS
TOTAL =	10,350	2,165	8,185	1,740		
RESULTING BUILDING PRESSURIZATION = 425 CFM						
PRESSURIZATION PERCENTAGE = 4.1 %						

CARRIER EQUIPMENT SHALL BE OBTAINED THROUGH SHAKE SHACK NATIONAL ACCOUNT. CONTACT CARRIER CORPORATION FOR PROPOSALS:  
 KEN REVILLA  
 CARRIER RETAIL STRATEGIC ACCOUNTS  
 EMAIL: KEN.REVILLA@CARRIER.COM  
 PHONE: (954) 218-0070

### AIR CURTAINS

MARK	LENGTH (N)	AIRFLOW (CFM)	HEATER		FANS		ELECTRICAL			MANUFACTURER	MODEL NUMBER	REMARKS	
			IN (KW)	OUT (MBH)	TEMP. RISE (°F)	QTY	HP	CIRCUIT (QTY)	VOLT				PH
AC-1	36.0	1,379	NA	NA	NA	1	1/2	1	115	1	MARS	STD236	[1-4]

REMARKS:  
 1. PROVIDE AUTOMATIC DOOR SWITCH.  
 2. PROVIDE MOTOR CONTROL PANEL.  
 3. VERIFY FINAL COLOR/FINISH WITH ARCHITECT.  
 4. FIELD VERIFY AND COORDINATE WITH ARCHITECT ON METHOD AND TYPE OF MOUNTING.

### ROOF TOP UNITS

MARK	COOLING		HEATING		SUPPLY AIR (CFM)	EXT. S.P. (IN)	ELECTRICAL			WEIGHT (LBS)	SEER /EER	MODEL NUMBER	REMARKS	
	SEN (MBH)	TOT (MBH)	COOL (TON)	IN (MBH)			FAN BHP	VOLT	PH					MCA
RTU-1	-	-	-	-	-	-	-	-	-	-	-	-	CAPTIVEAIRE	[1-2]
RTU-2	-	-	-	-	-	-	-	-	-	-	-	-	CAPTIVEAIRE	[1-2]

COOLING CAPACITIES ARE BASED ON AHRI STANDARD 210/240 OR 340/360: 80F DB/ 67F WB INDOOR ENTERING AIR TEMPERATURE, 95F DB AIR ENTERING OUTDOOR FAN. SCHEDULED UNIT MAY DIFFER FROM AHRI STANDARD CFM.

REMARKS:  
 1. PROVIDE EQUIPMENT WITH SCOR GREATER THAN THE AVAILABLE FAULT CURRENT AT THE EQUIPMENT OR UPSTREAM PANELBOARD. REFER TO THE ELECTRICAL ONE LINE DIAGRAM AND PANEL SCHEDULES FOR AVAILABLE FAULT CURRENT AT UPSTREAM PANELBOARD.  
 2. REFERENCE CAPTIVEAIRE DRAWINGS FOR ADDITIONAL INFORMATION.

### AIR SOURCE HEAT PUMPS

MARK	LOCATION	SERVES	NOMINAL COOL (TONS)	HEATING AT 47F (MBH)	ELECTRICAL			SEER /EER	HSPF /COP	MANUFACTURER	MODEL NUMBER	REMARKS	
					VOLT	PH	MCA						MOCP
ASHP-1	ROOF	FC-1	3/4	10.0	208	1	15.0	15	20.5/-	10.8/-	CARRIER	38MARB009	[1]

REMARKS:  
 1. PROVIDE EQUIPMENT WITH SCOR GREATER THAN THE AVAILABLE FAULT CURRENT AT THE EQUIPMENT OR UPSTREAM PANELBOARD. REFER TO THE ELECTRICAL ONE LINE DIAGRAM AND PANEL SCHEDULES FOR AVAILABLE FAULT CURRENT AT UPSTREAM PANELBOARD.

### DUCTLESS SPLIT SYSTEMS

MARK	NOMINAL (TONS)	COOLING		HEATING		SUPPLY AIR (CFM)	FAN (WATT)	ELECTRICAL			SEER /EER	CARRIER MODEL NUMBER	REMARKS
		TOT (MBH)	SEN (MBH)	COOL (MBH)	HEAT (MBH)			VOLT	PH	MCA			
FC-1	3/4	11.73	8.79	10.00	350	45	208	1	0.2	N/A	20.5/-	40MBC009	[1-3]

REMARKS:  
 1. VERIFY UNIT IS PROVIDED WITH CONDENSATE PUMP.  
 2. INDOOR UNIT POWER PROVIDED FROM OUTDOOR UNIT.  
 3. PROVIDE NEW, WIRED, FULLY DIGITAL, 7 DAY PROGRAMMABLE TYPE THERMOSTAT WITH AUTO CHANGE OVER AND AUTO SET BACK.

### DIFFUSERS, GRILLES AND REGISTERS

MARK	SERVICE	LOCATION	CEILING TYPE	MOUNTING TYPE	MANUFACTURER	MODEL NUMBER	REMARKS
D-1	SUPPLY	CEILING	AC TILE	LAY-IN	TITUS	TMS XX 24x24 3 26	[1,2,6]
D-2	SUPPLY	CEILING	AC TILE	LAY-IN	TITUS	PAR XX 24x24 3 26	[1,2,6]
D-3	SUPPLY	CEILING	AC TILE	LAY-IN	TITUS	OMNI XX 24x24 3 26	[1,2,4,6,7]
D-4	SUPPLY	CEILING	AC TILE	LAY-IN	TITUS	OMNI XX 12x12 3 26	[1,2,4,6,7]
D-5	SUPPLY	DUCT	NA	SURFACE	TITUS	300R X X 1 26	[1,5,6]
D-6	SUPPLY	CEILING	AC TILE	LAY-IN	TITUS	TDC XX 3 24x24 2 26	[1,2,5]
G-1	RETURN	CEILING	AC TILE	LAY-IN	TITUS	50F X X 3 26	[1,3,5,6]
G-2	VARIES	CEILING	GYP. BOARD	SURFACE	TITUS	50F X X 1 26	[1,3-7]

REMARKS:  
 1. TITUS IS THE BASE OF DESIGN. KRUEGER, PRICE, NAILOR, CARNES ARE EQUAL. NO EXCEPTIONS.  
 2. SEE PLAN FOR NECK SIZE.  
 3. PROVIDE 1/2" X 1/2" X 1" CORE.  
 4. PROVIDE WITH MODEL TRM FRAME.  
 5. SEE PLAN FOR SIZE.  
 6. DIFFUSERS/GRILLES SHALL BE FINISHED TO MATCH CEILING/WALL/EXPOSED DUCT COLOR. COORDINATE WITH ARCHITECT.  
 7. PROVIDE DIFFUSERS AND GRILLES WITH NO EXCESS MOUNTING SCREWS.

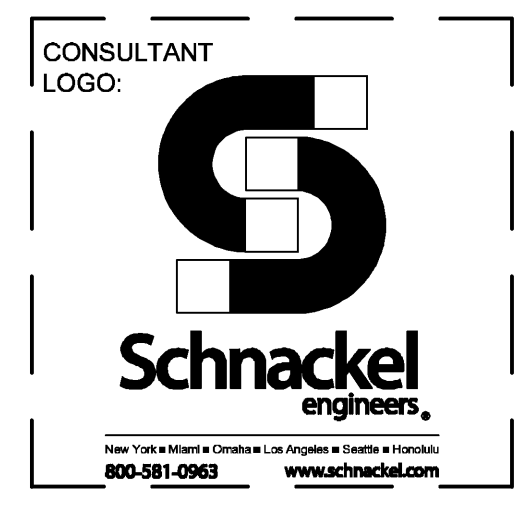
### EXHAUST FANS

MARK	LOCATION	SERVICE	AIRFLOW (CFM)	EXTERNAL STATIC (IN H2O)	SONES	MOTOR DATA			RPM	MANUFACTURER	MODEL NUMBER	REMARKS	
						FAN (HP)	VOLT	PH					
EF-1	ROOF	HOOD 1	-	-	-	-	-	-	-	-	-	CAPTIVEAIRE	[4]
EF-2	ROOF	HOOD 2	-	-	-	-	-	-	-	-	-	CAPTIVEAIRE	[4]
EF-3	ROOF	RESTROOMS	300	0.50	7.2	1/8	115	1	1,550	GREENHECK	G-095-D	[1-3]	

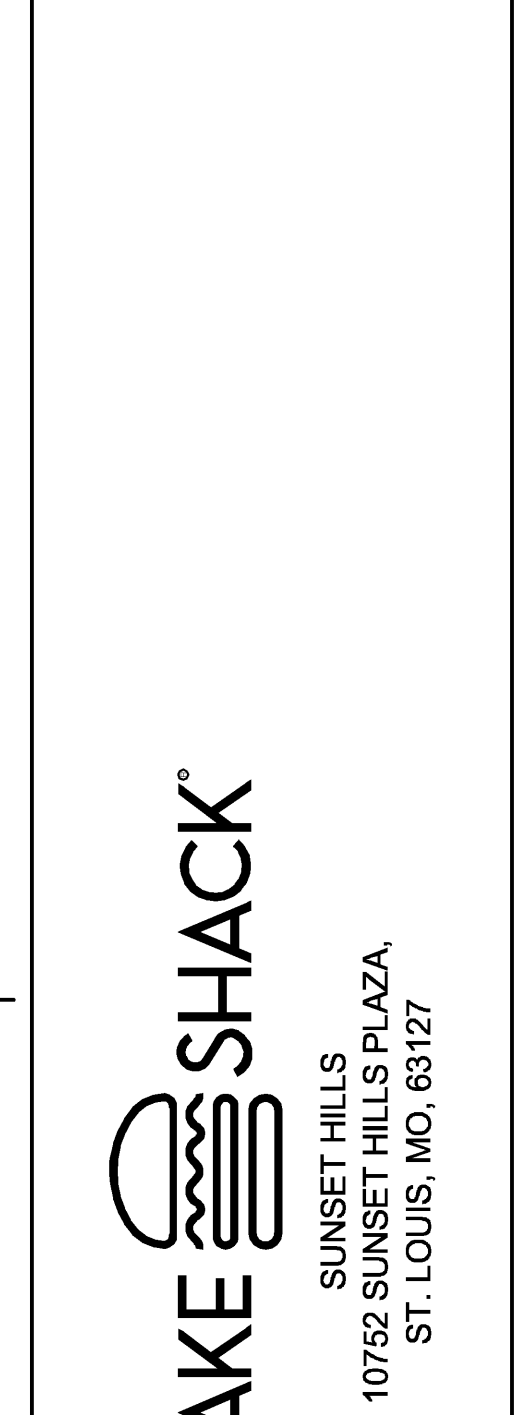
REMARKS:  
 1. PROVIDE SOLID STATE SPEED CONTROL.  
 2. PROVIDE MOTORIZED BACKDRAFT DAMPER.  
 3. PROVIDE MINIMUM 18 INCH HEIGHT ROOF CURB.  
 4. REFERENCE CAPTIVEAIRE DRAWINGS FOR ADDITIONAL INFORMATION.

### UV SYSTEMS

UNIT NO.	PLACEMENT	PHI CELL MODEL #	UV/CELL SIZE	RANGE	INDOOR PPM TARGET	SIZE	TRANSFORMER	POWER	IN-VOLT	OUT-VOLT	MCA	WEIGHT (LBS.)
RTU-1	BLOWER CABINET	PHI-PKG14-24V	14"	3,000-8000 CFM	< 0.02 PPM	2.25"W x 19.5"L x 1.75"D	SHIP LOOSE	11W	115 VAC	24 VAC	0.50A	2 LBS
RTU-2	BLOWER CABINET	PHI-PKG14-24V	14"	3,000-8000 CFM	< 0.02 PPM	2.25"W x 19.5"L x 1.75"D	SHIP LOOSE	11W	115 VAC	24 VAC	0.50A	2 LBS



STORE NO: **MO #1632**



### REVISIONS

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
1	01/	

REVISIONS

NO.	DATE	DESCRIPTION

**CAPTIVEAIRE**

Eastern, P.A. Mechanical  
226 E City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004-1126 EMAIL: reg108@captiveaire.com

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

**HOOD INFORMATION - JOB#7072639**

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	Hood (Fryer)	5430 ND-2	CAPTIVEAIRE	4' 0"	600 DEG	I	HEAVY	175	700	8'	8'	4'	700	1575	-0.375'	430 SS WHERE EXPOSED	ALONE	ALONE
2	Hood (Grill)	5430 ND-2	CAPTIVEAIRE	5' 0"	450 DEG	I	MEDIUM	150	750	9'	8'	4'	750	1500	-0.330'	430 SS WHERE EXPOSED	ALONE	ALONE

**HOOD INFORMATION**

HOOD NO	TAG	TYPE	FILTER(S)		EFFICIENCY @ 7 MICRONS	QTY	LIGHT(S)		WIRE GUARD	LOCATION	SIZE	UTILITY CABINET(S)		FIRE SYSTEM PIPING	HOOD HANGING WEIGHT		
			QTY	HEIGHT			LENGTH	TYPE				FIRE SYSTEM	SIZE			ELECTRICAL MODEL #	SWITCHES QUANTITY
1	Hood (Fryer)	CAPRATE SLDL FILTER	2	20"	20"	85% SEE FILTER SPEC	1	RECESSED ROUND	NO	RIGHT	12"x54"x30"	TANK FS	4.0/4.0	SC-320110MA	1 LIGHT 1 FAN	YES	622 LBS
2	Hood (Grill)	CAPRATE SLDL FILTER	3	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO							YES	466 LBS

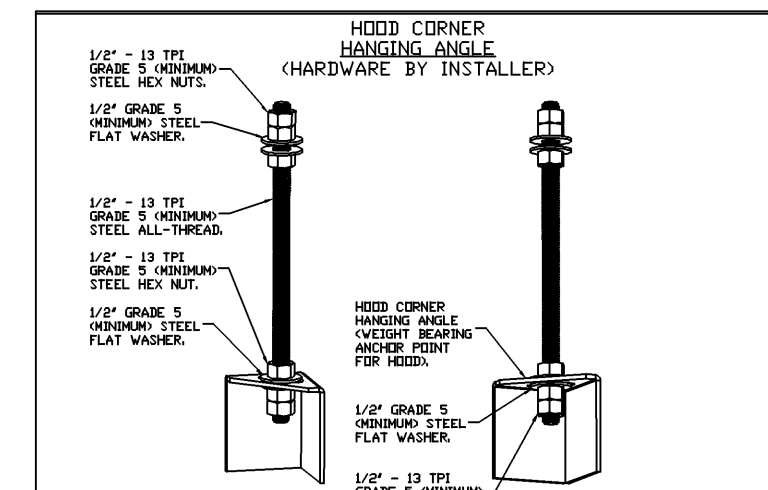
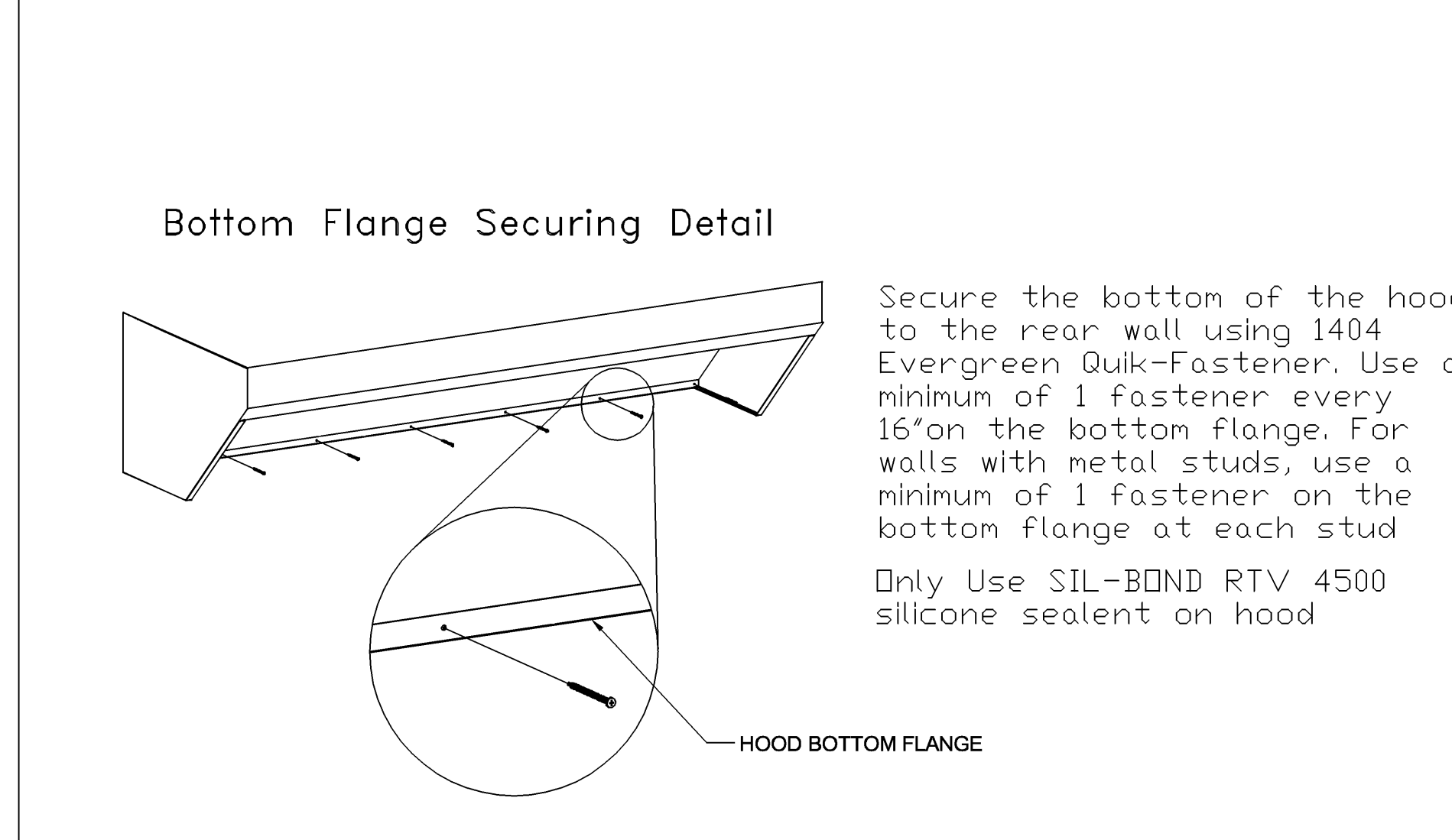
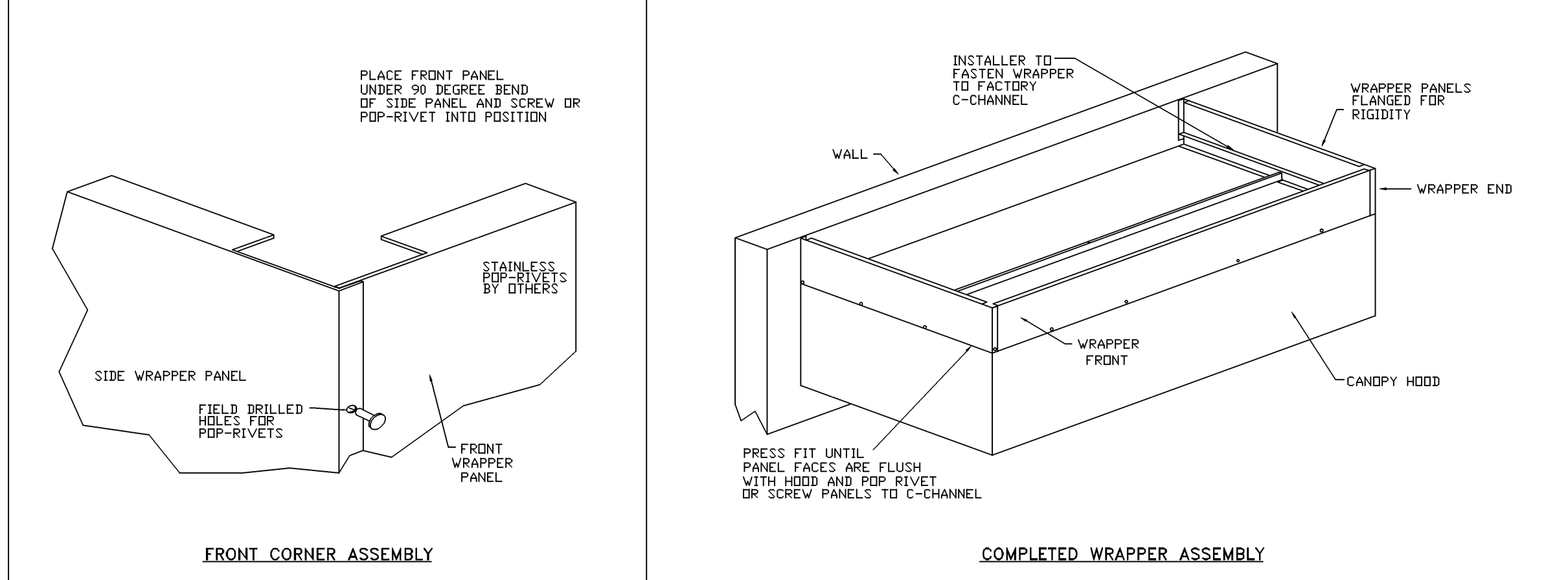
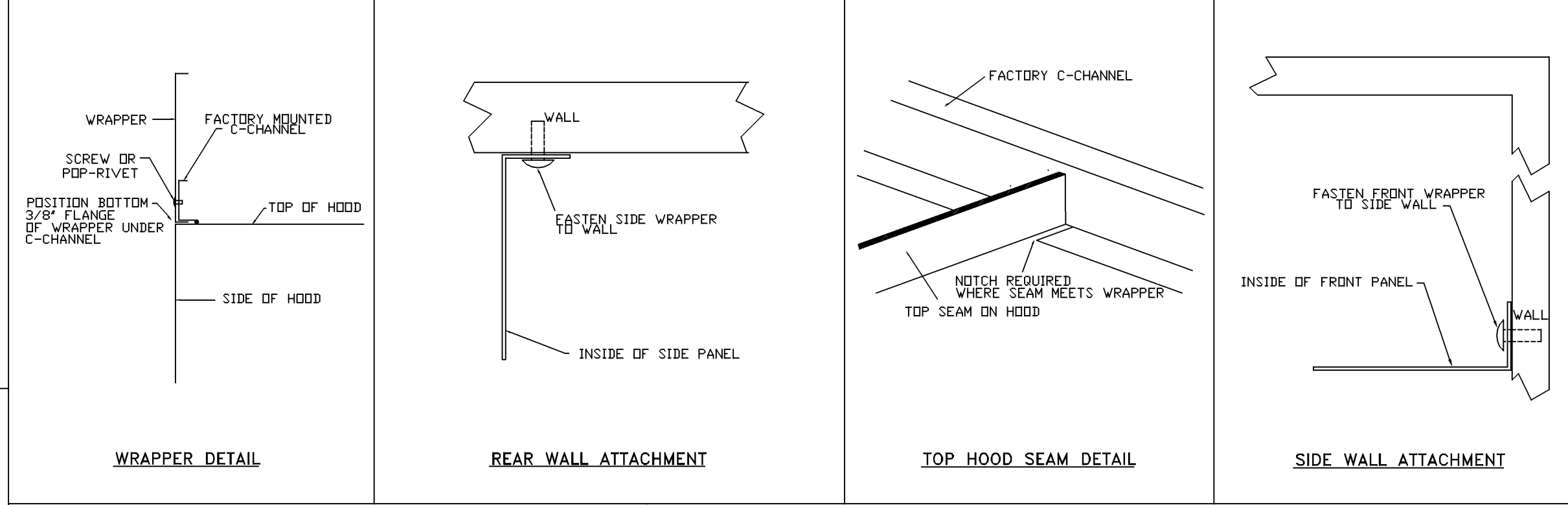
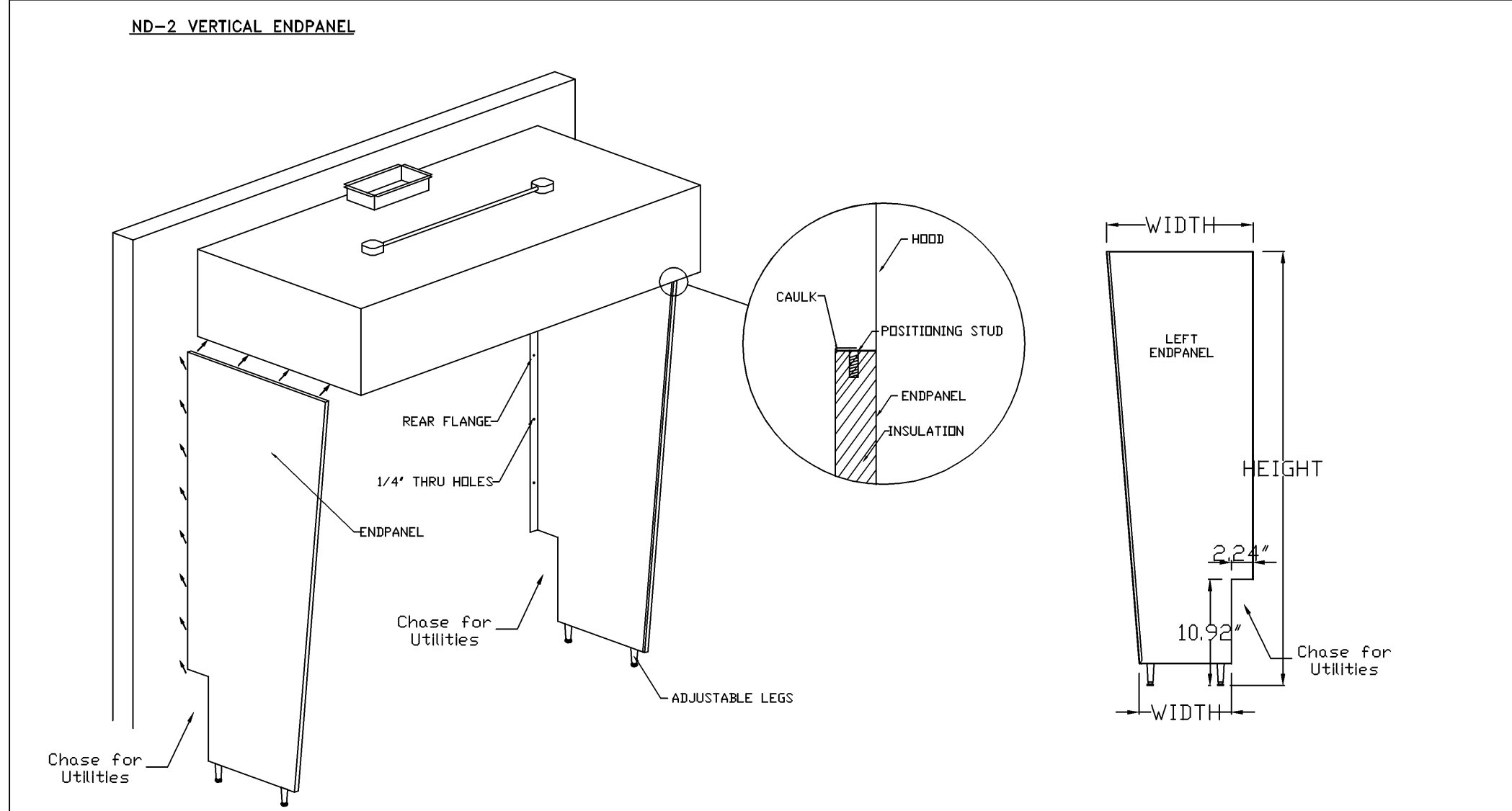
**HOOD OPTIONS**

HOOD NO	TAG	OPTION
1	Hood (Fryer)	FIELD WRAPPER 18.00" 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. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN.
2	Hood (Grill)	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN. GFCI DUPLEX OUTLET, 20A 125V - HOOD FRONT LEFT - HORIZONTAL - DIST FROM END: 3.50 DIST FROM BOTTOM: 4.00. LEFT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS. RIGHT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.

**CLEARANCE TO COMBUSTIBLES**

HOODS #	SURFACE	*CLEARANCE
1	TOP	18"
	FRONT	0"
	BACK	0"
	LEFT	18"
2	RIGHT	0"
	TOP	18"
	FRONT	0"
	BACK	0"
	LEFT	18"
	RIGHT	18"

- #0" CLEARANCE TO COMBUSTIBLES CONFORMS TO UL710 STANDARD.  
- HOOD MOUNTED UTILITY CABINETS REQUIRE 36" SERVICE CLEARANCE.



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-2W	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 CFM  
TOTAL DUCT AREA (sq. in.) = 144 X CFM<sup>2</sup>  
DUCT LENGTH = TOTAL DUCT AREA / DUCT WIDTH  
DUCT WIDTH

\* CAPTIVEAIRE HOODS LISTED SIZES ARE CALCULATED USING AN INSTANT VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 100 FPM.

**CALCULATIONS UTILIZED**

CAPTIVE-AIRE HOODS BUILT IN COMPLIANCE WITH:

ETL LISTED UNDER ETL FILE NUMBER 3054804-001/002

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
- ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
  - ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
  - HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
  - ALL CONNECTIONS FROM CAPTIVEAIRE HOOD PER MECHANICAL CONTRACTOR'S PLANS.
  - COOKING EQUIPMENT TO SHUT OFF IN EVENT OF FIRE.
  - EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
  - ALL LIGHT FIXTURES SHOWN INSTALLED BY CAPTIVEAIRE ARE FACTORY PROVIDED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES ARE BY ELECTRICAL CONTRACTOR.
  - LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
  - SEISMIC RESTRAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
  - INSTALLING CONTRACTORS ASSUME ALL RELATED RESPONSIBILITY 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.

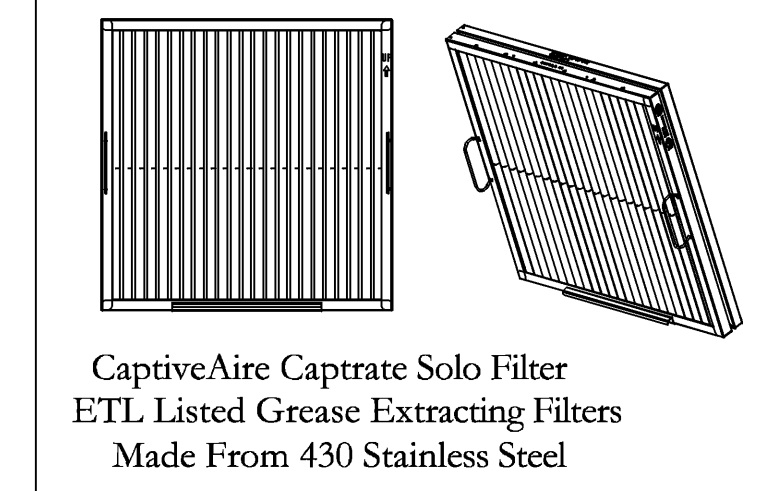
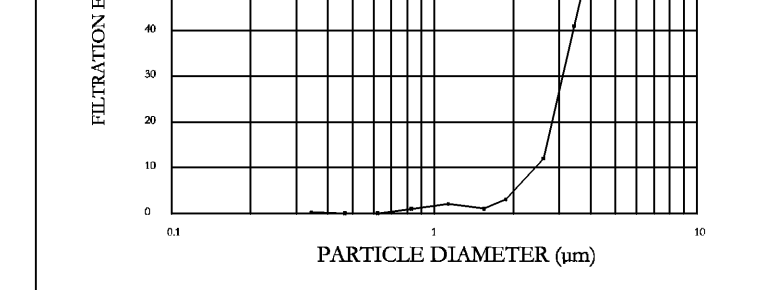
**BALANCE**

- KITCHEN HOODS MUST BE BALANCED WITH KITCHEN TO DRAIN AREA.
- RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

**ADDITIONAL**

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

**GENERAL NOTES**

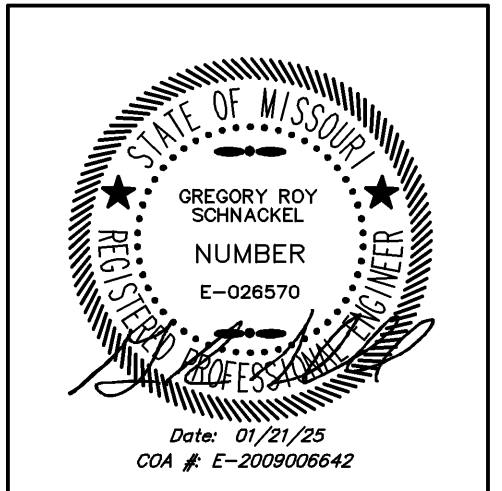


**FILTER DETAIL**

E  
D  
C  
B  
A

REVISIONS	
NO.	DESCRIPTION
A	10/15/24 REVISION A
B	10/25/24 REVISION B
D	12/12/24 REVISION D
1	01/22/25 REVISION 1

DATE: 9/27/2024  
DWG #: 7072639  
DRAWN BY: Joe.shilba  
SCALE: 3/4" = 1'-0"  
MASTER DRAWING



FIELD VERIFICATION:  
The Consultant shall verify all signed dimensions and conditions at the project site and notify Zebra Architecture, PLLC of any discrepancies, omissions or discrepancies before beginning or fabricating any work. Do not scale from drawings.

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SHEET NAME:  
**CAPTIVEAIRE DRAWINGS**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: RAS SCALE:

SHEET NO.:  
**M702**

REVISIONS

DESCRIPTION DATE

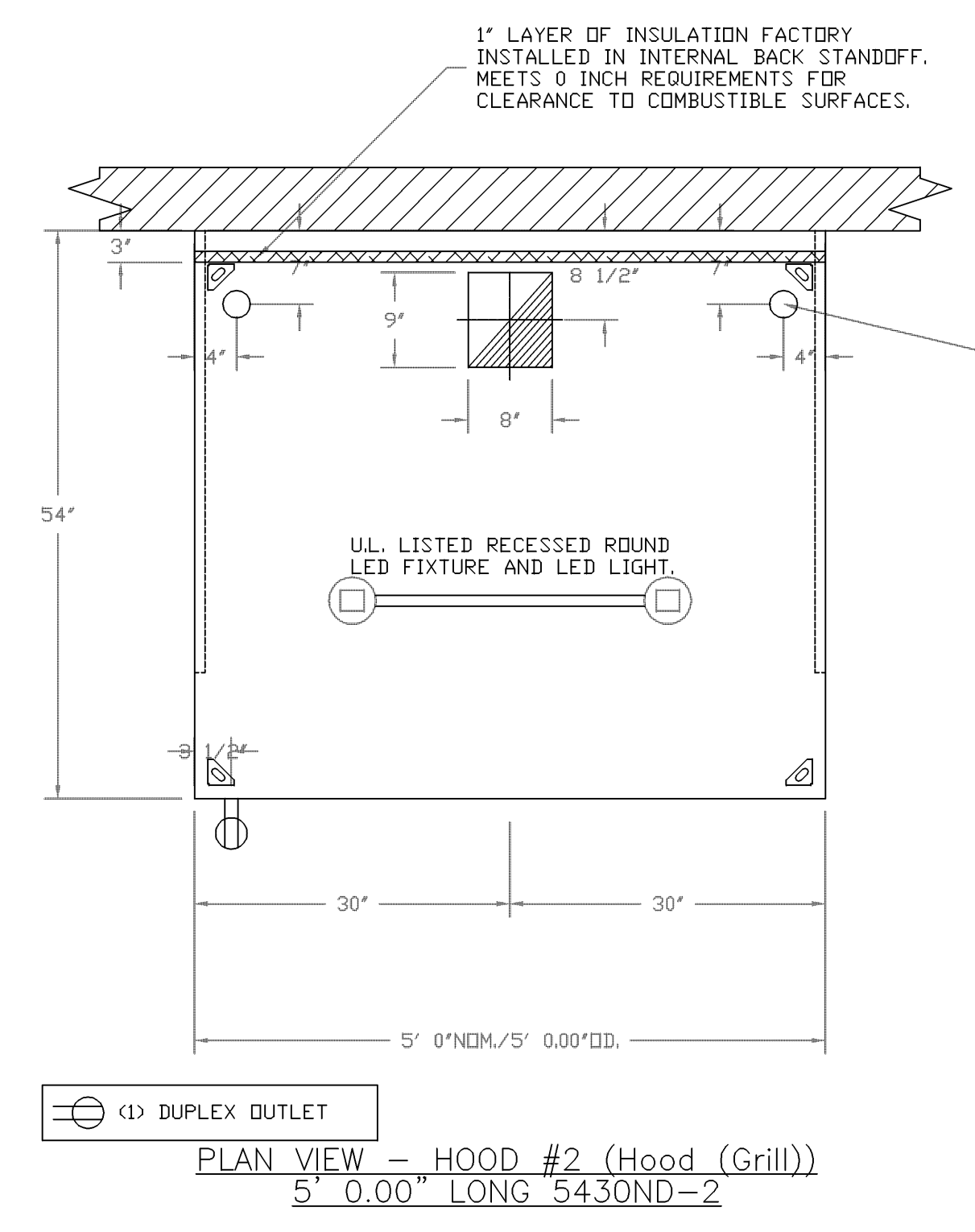
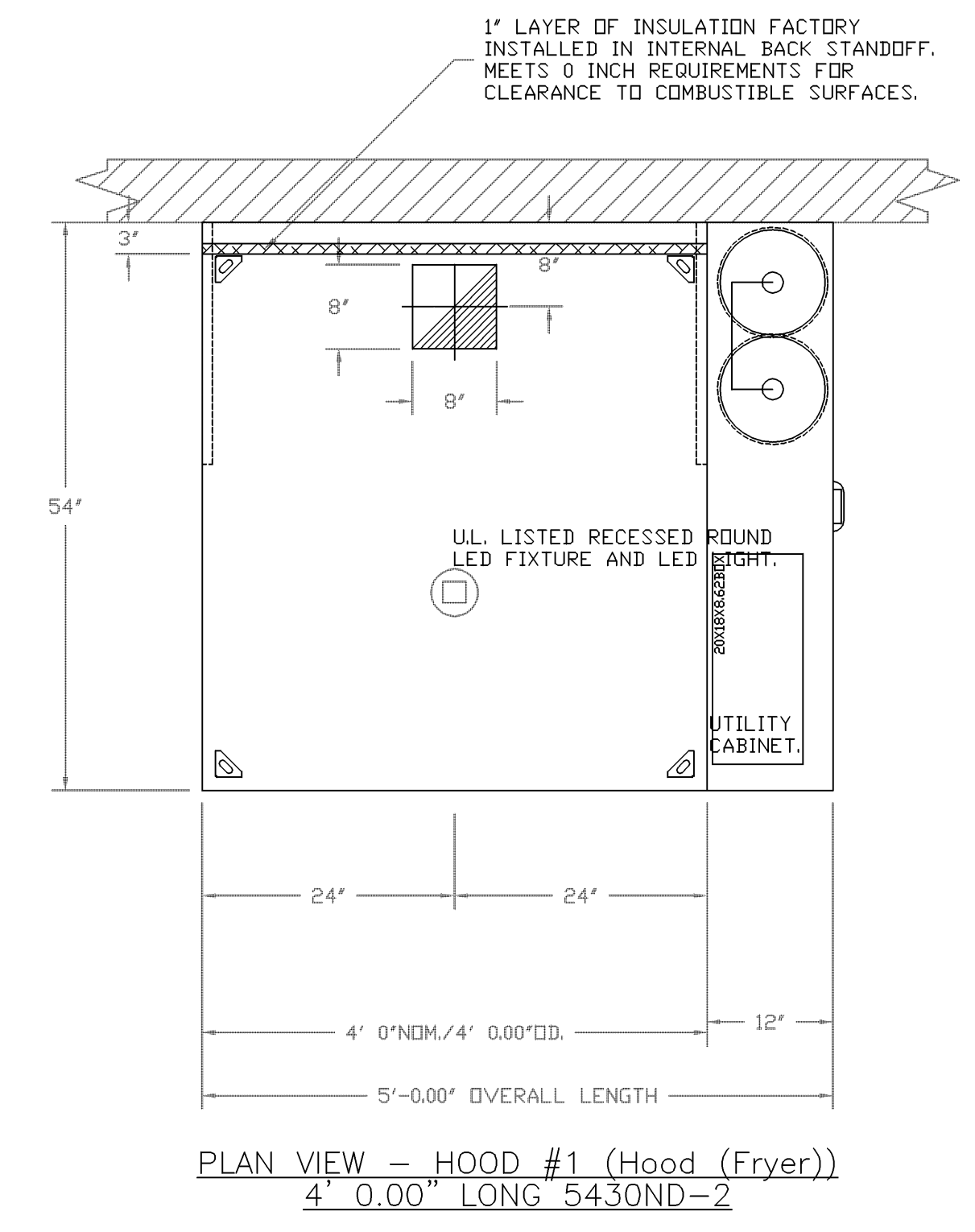
www.captiveaire.com

**CAPTIVEAIRE**

Eastern, P.A. Mechanical  
225 E. City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: mep103@captiveaire.com

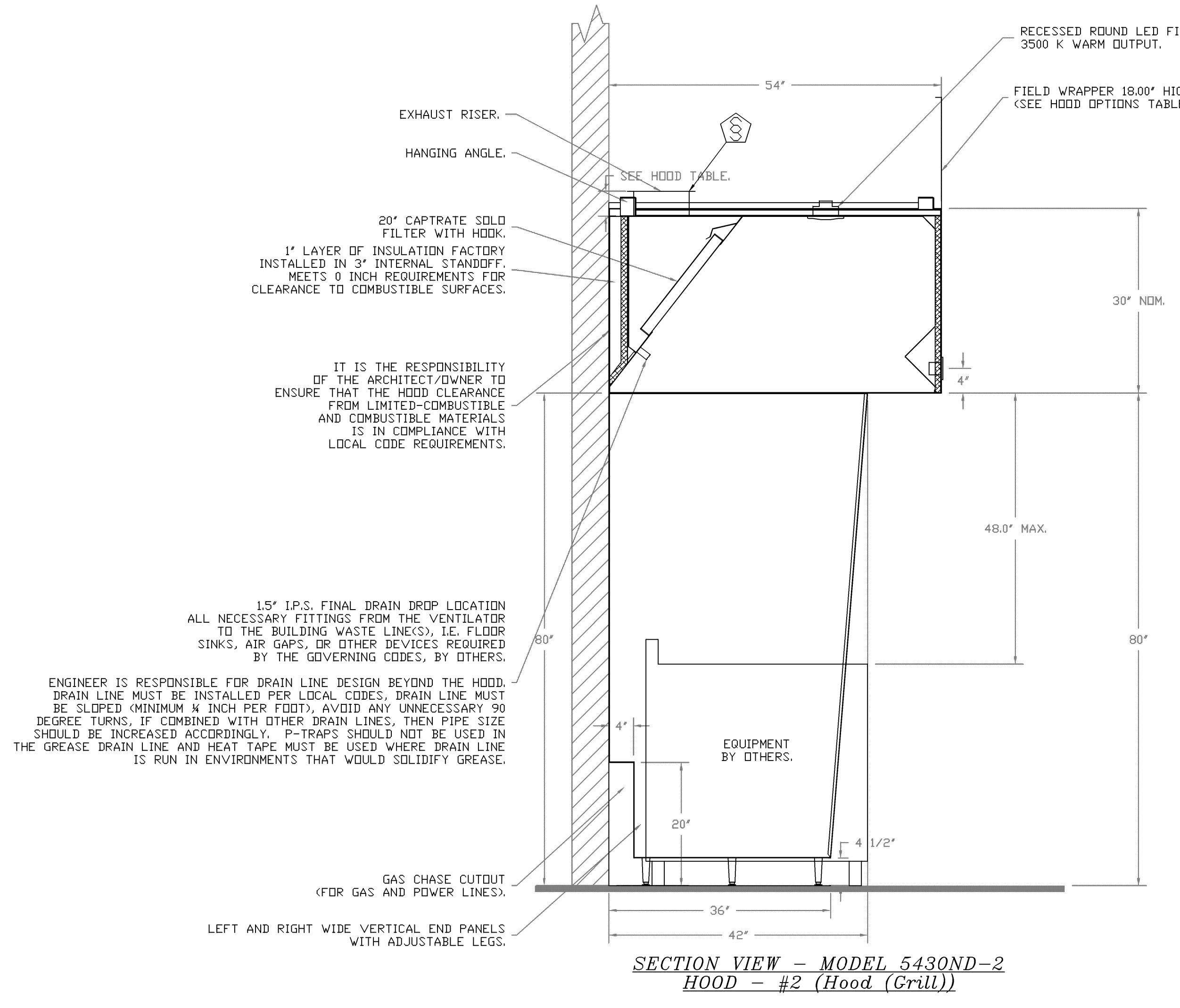
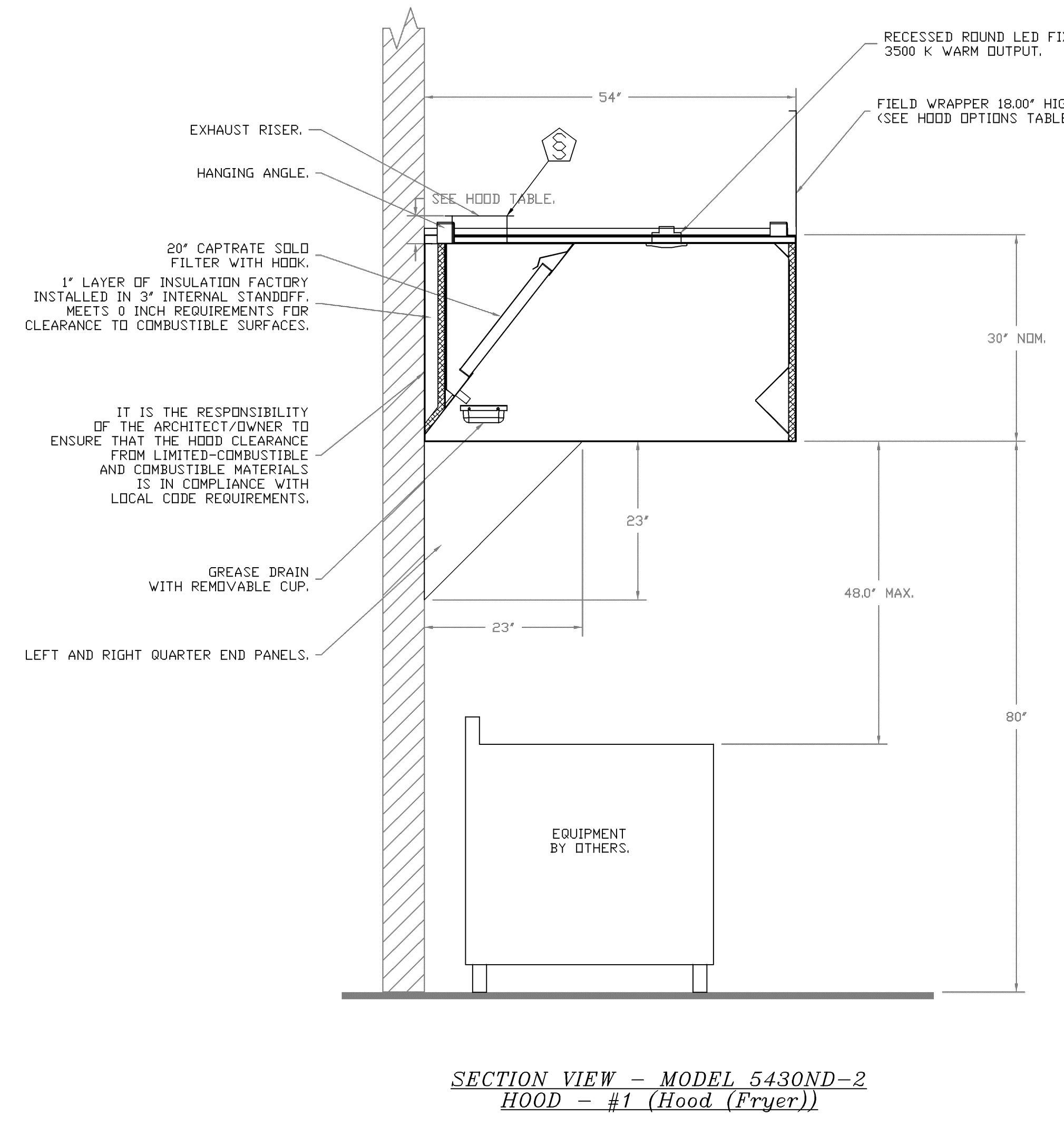
Shake Shack-1632-Sunset-Hills, M(Kitchen)-R1

SHEET NO. 2



1.5" I.P.S. DRAIN DROP ENGINEER IS RESPONSIBLE FOR DRAIN LINE DESIGN BEYOND THE HOOD. DRAIN LINE MUST BE INSTALLED PER LOCAL CODES. DRAIN LINE MUST BE SLOPED (MINIMUM 1/8 INCH PER FOOT), AVOID ANY UNNECESSARY 90 DEGREE TURNS. IF COMBINED WITH OTHER DRAIN LINES, THEN PIPE SIZE SHOULD BE INCREASED ACCORDINGLY. P-TRAPS SHOULD NOT BE USED IN THE GREASE DRAIN LINE AND HEAT TAPE MUST BE USED WHERE DRAIN LINE IS RUN IN ENVIRONMENTS THAT WOULD SOLIDIFY GREASE.

SIZE BUILDING GREASE INTERCEPTOR ACCORDINGLY. BOTH ENDS.



**FIRE SYSTEM INFORMATION - JOB#7072639**

FIRE SYSTEM NO	TAG	TYPE	SIZE	MAX FP	DESIGN FP	INSTALLATION	
						SYSTEM	LOCATION ON HOOD
1		TANK FS	4.0/4.0	40	36	FIRE CABINET RIGHT	RIGHT, HOOD 1

**CAS VALVE(S)**

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1		SC ELECTRICAL	L000	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.

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

JOB #: 7072639.

JOB NAME: SHAKE SHACK-1632-SUNSET HILLS, MO(KITCHEN)-R1.

SYSTEM SIZE: TANK-SP-2 DESIGN FP: 36. MAXIMUM FP: 40.

HOOD # 1 4' 0.00" LONG x 54" WIDE x 30" HIGH.

RISER # 1 SIZE: 8" x 8"

HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.

HOOD # 2 5' 0.00" LONG x 54" WIDE x 30" HIGH.

RISER # 1 SIZE: 9" x 8"

HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

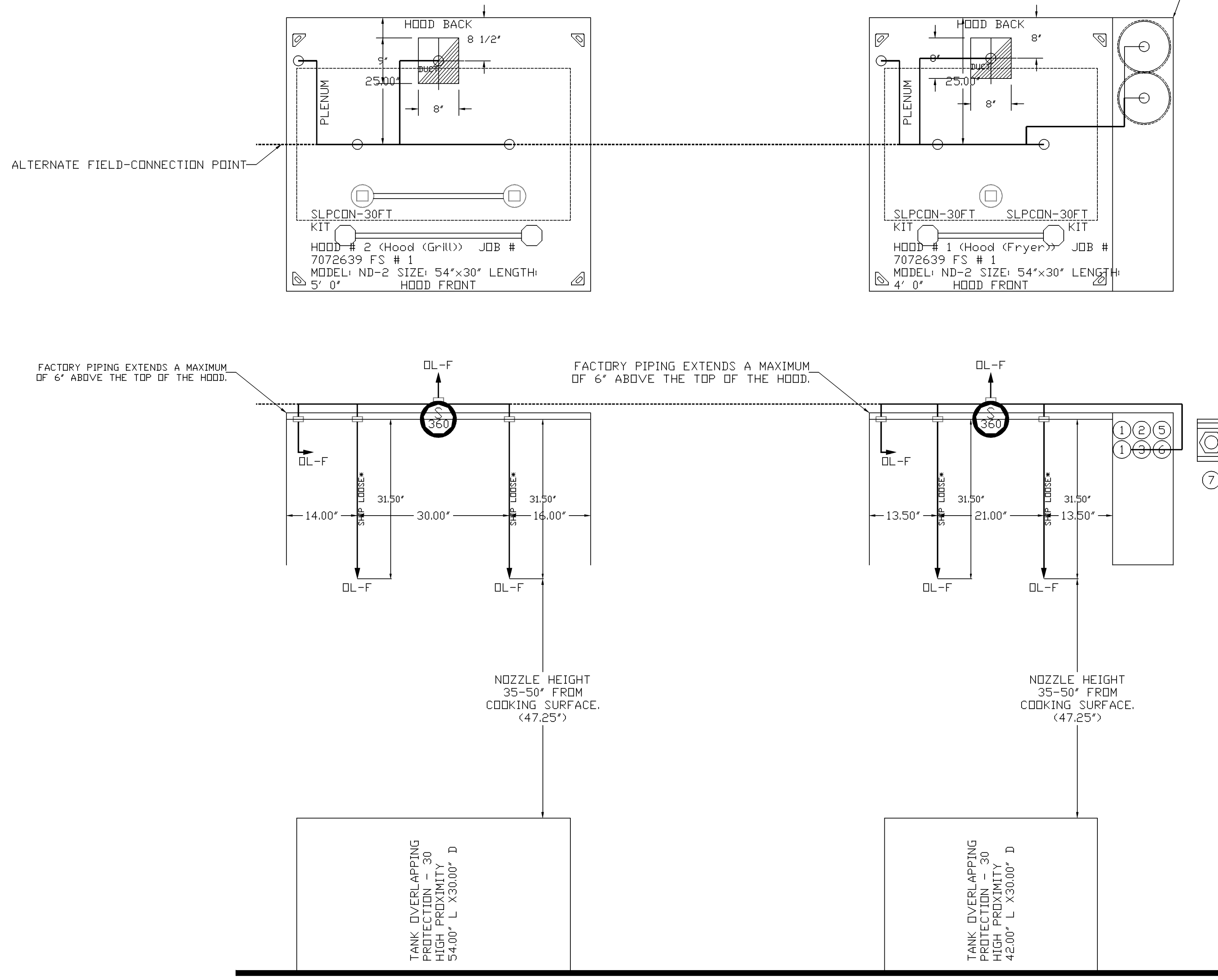
- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.

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

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.



- SYSTEM REQUIRES A MINIMUM OF 7 FT OF EQUIVALENT PIPE LENGTH BETWEEN TANK AND NEAREST APPLIANCE NOZZLE FOR MOST APPLIANCES. EACH 90 DEGREE ELBOW ADDS 1.3 FT OF EQUIVALENT LENGTH. SEE MANUAL FOR DETAILS

**REVISIONS**

NO.	DATE	DESCRIPTION

**CAPTIVEAIRE**

Eastern, P.A. Mechanical  
225 E City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: rgr108@captiveaire.com

Shake Shack-1632-Sunset Hills, MO(Kitchen)-R1

DATE: 9/27/2024  
DWG.#: 7072639  
DRAWN BY: Joe.shilba  
SCALE: 3/4" = 1'-0"  
MASTER DRAWING

SHEET NO. 3

**zebra**

ZEBRA ARCHITECTURE, PLLC  
1454 N KIERLAND BLVD, SUITE N300  
SCOTTSDALE, ARIZONA 85254  
PHONE: 480.912.1169 zbr-global

CONSULTANT LOGO:  
**Schnackel engineers**  
New York, New Jersey, California, Florida, Illinois, Michigan, Minnesota, Missouri, North Carolina, South Carolina, Texas, Virginia, Washington, D.C., Wisconsin  
800-881-0963 www.schnackel.com

STORE NO:  
**MO #1632**

**SHAKE SHACK**  
SUNSET HILLS  
10752 SUNSET HILLS PLAZA,  
ST. LOUIS, MO, 63127

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I

STATUS: IFC SET

STATE OF WISCONSIN  
GREGORY BOY SCHNACKEL  
NUMBER E-008570  
Date: 01/21/25  
CSA # E-200000642

**FIELD VERIFICATION:**  
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SHEET NAME:  
**CAPTIVEAIRE DRAWINGS**

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: RAS SCALE:

SHEET NO.: **M703**

**EXHAUST FAN INFORMATION - JOB#7072639**

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL.	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SDNES
1	KEF(FRYER)	1	DU50HFA	CAPTIVEAIRE	700	1.500	1675	TEAD-ECM	0.500	0.4850	1	208	3.8	266 FPM	79	19.7
2	KEF(GRILL)	1	DU50HFA	CAPTIVEAIRE	738	1.500	1685	TEAD-ECM	0.500	0.4940	1	208	3.8	281 FPM	79	19.9

**FAN OPTIONS**

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

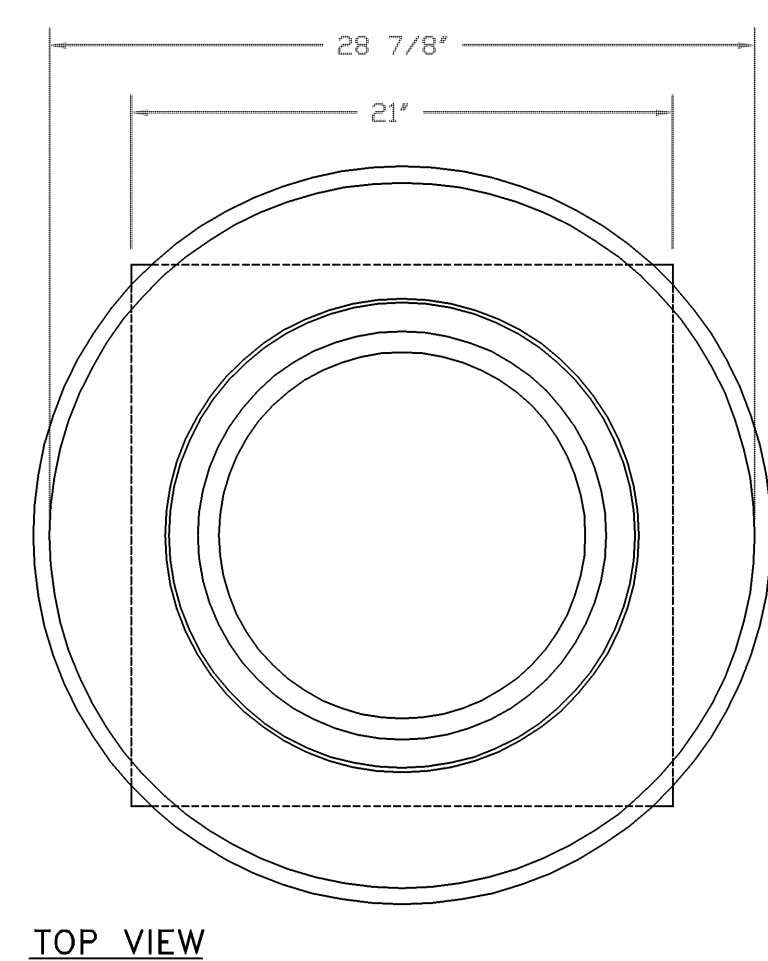
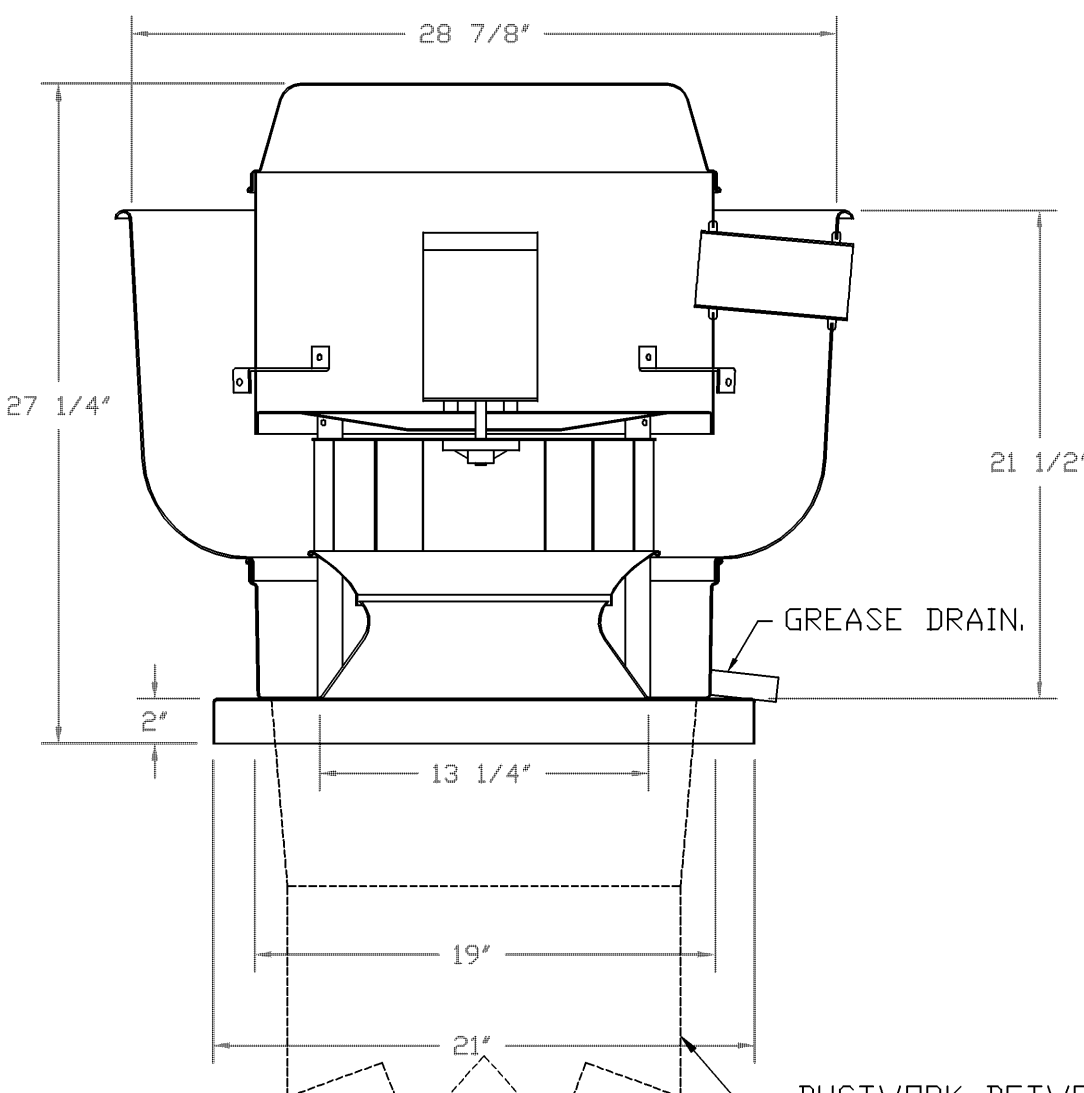
**FAN ACCESSORIES**

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

**CURB ASSEMBLIES**

NO	QTY	FAN TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF(FRYER)	31 LBS	CURB	19.500"W X 19.500"L X 20.000"H HINGED.
2	# 2	KEF(FRYER)	31 LBS	CURB	19.500"W X 19.500"L X 20.000"H HINGED.

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



TOP VIEW

**FEATURES:**

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 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**

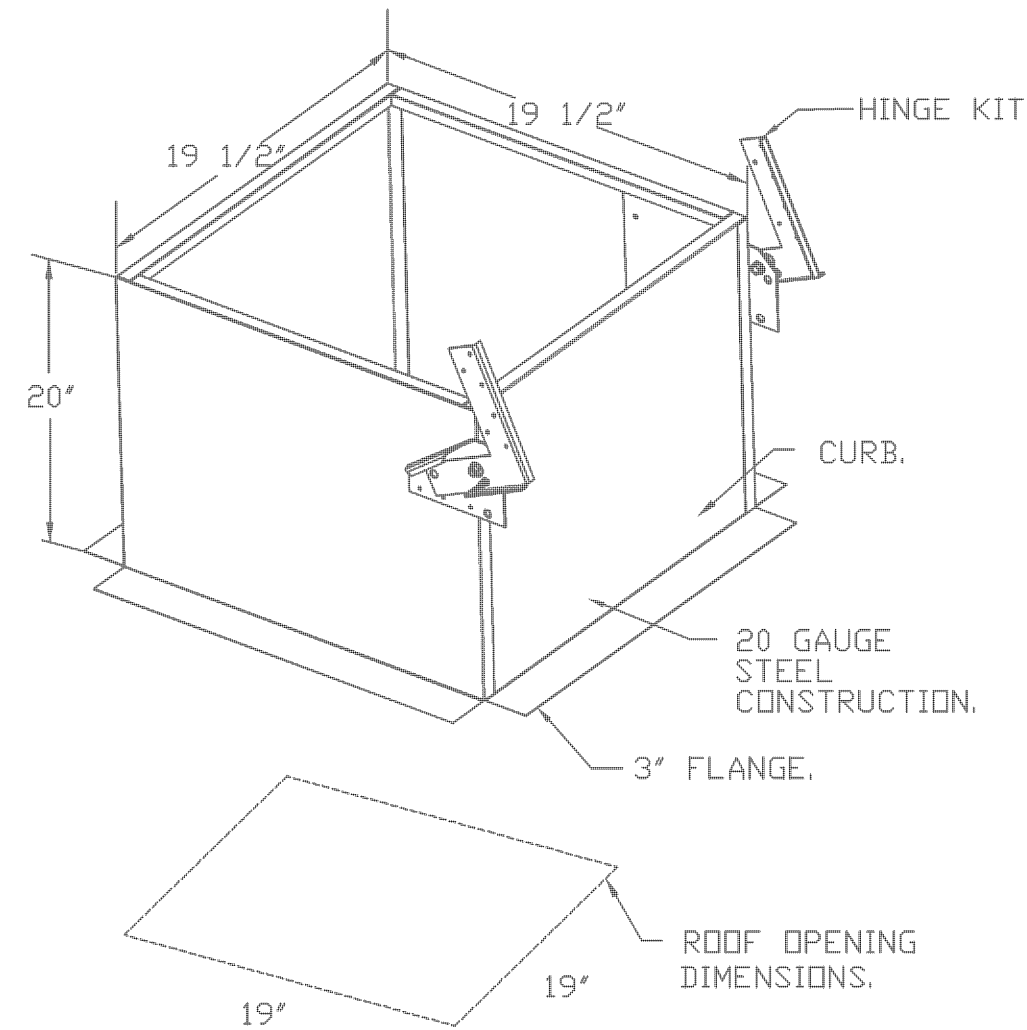
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

**ABNORMAL FLARE-UP TEST**

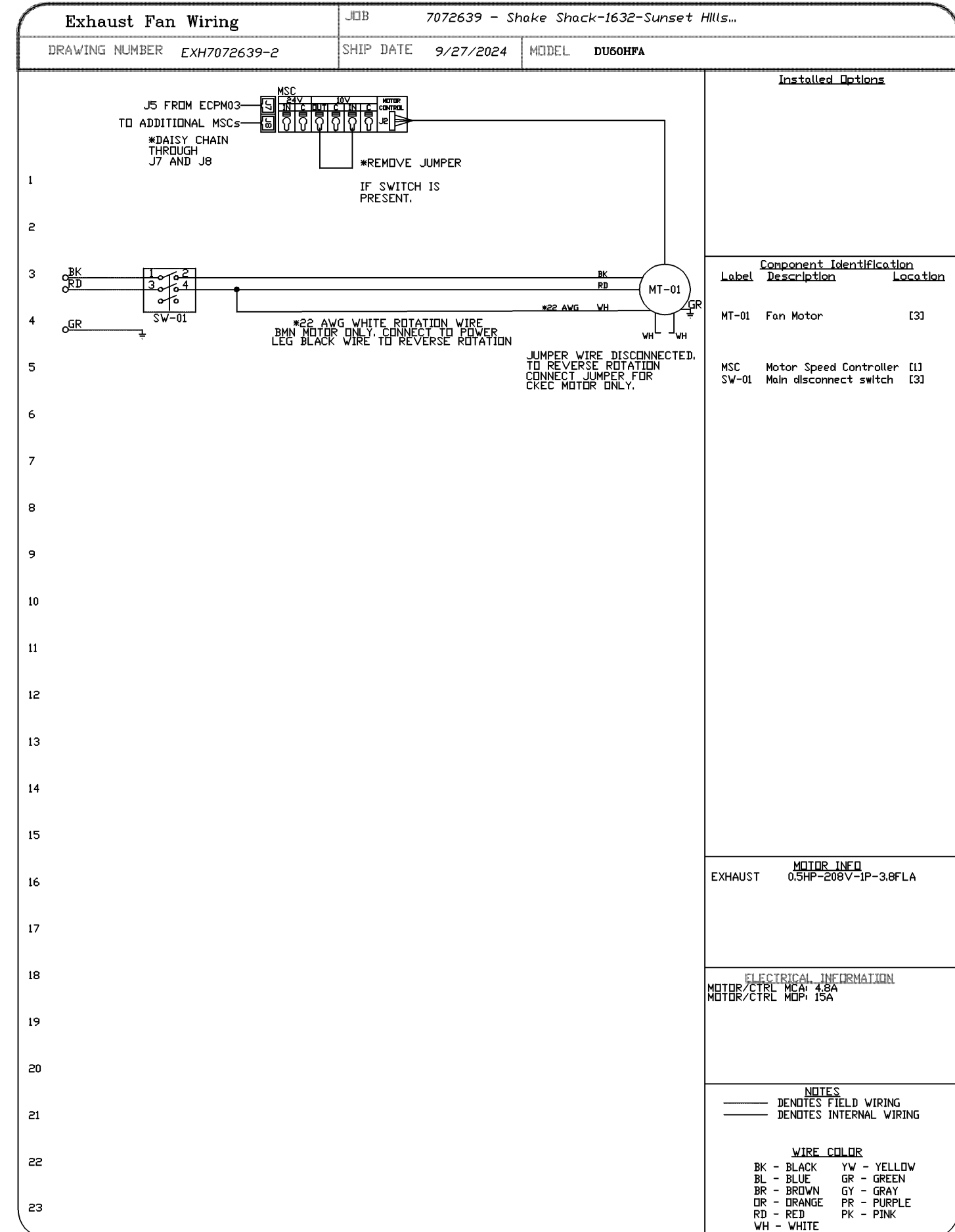
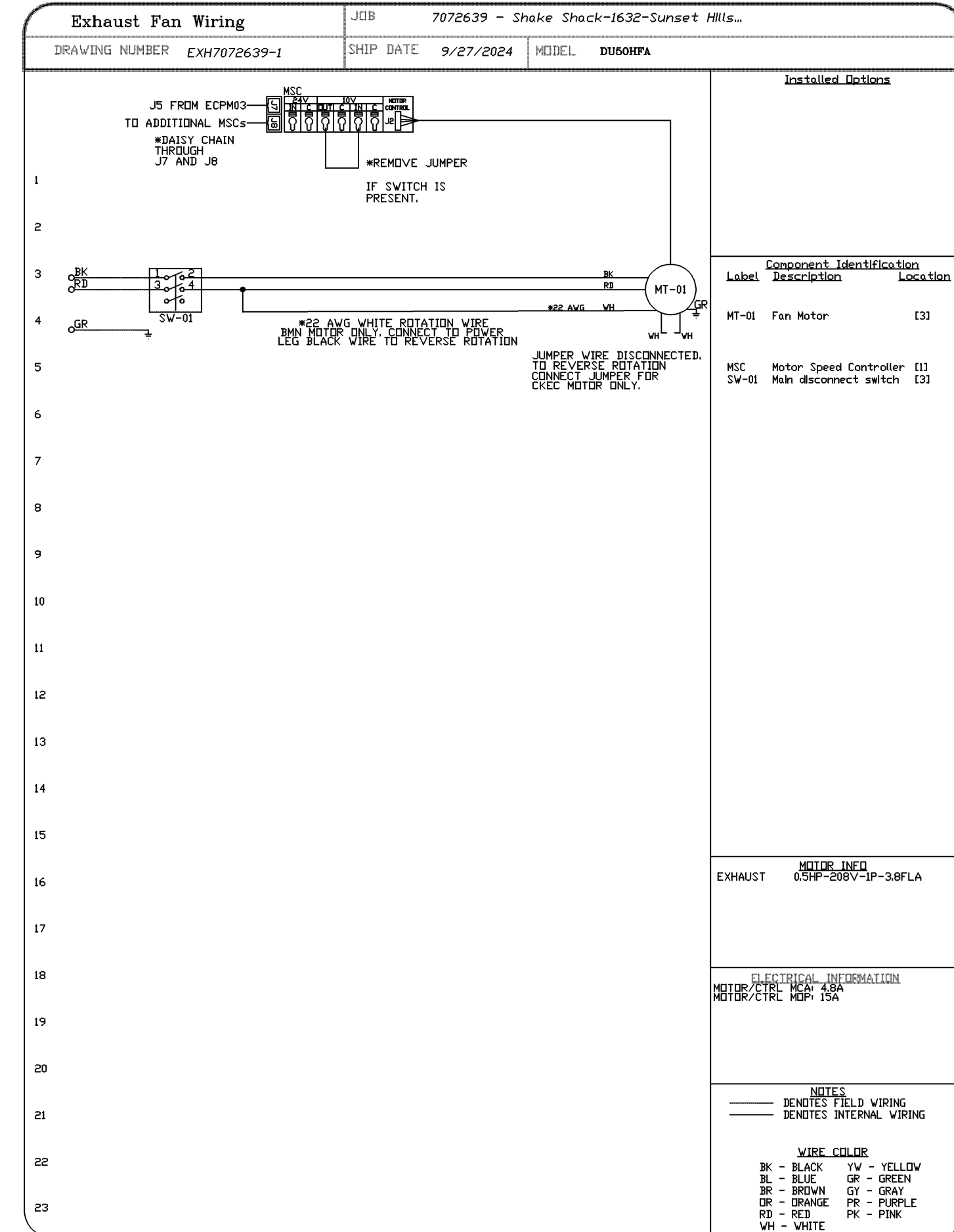
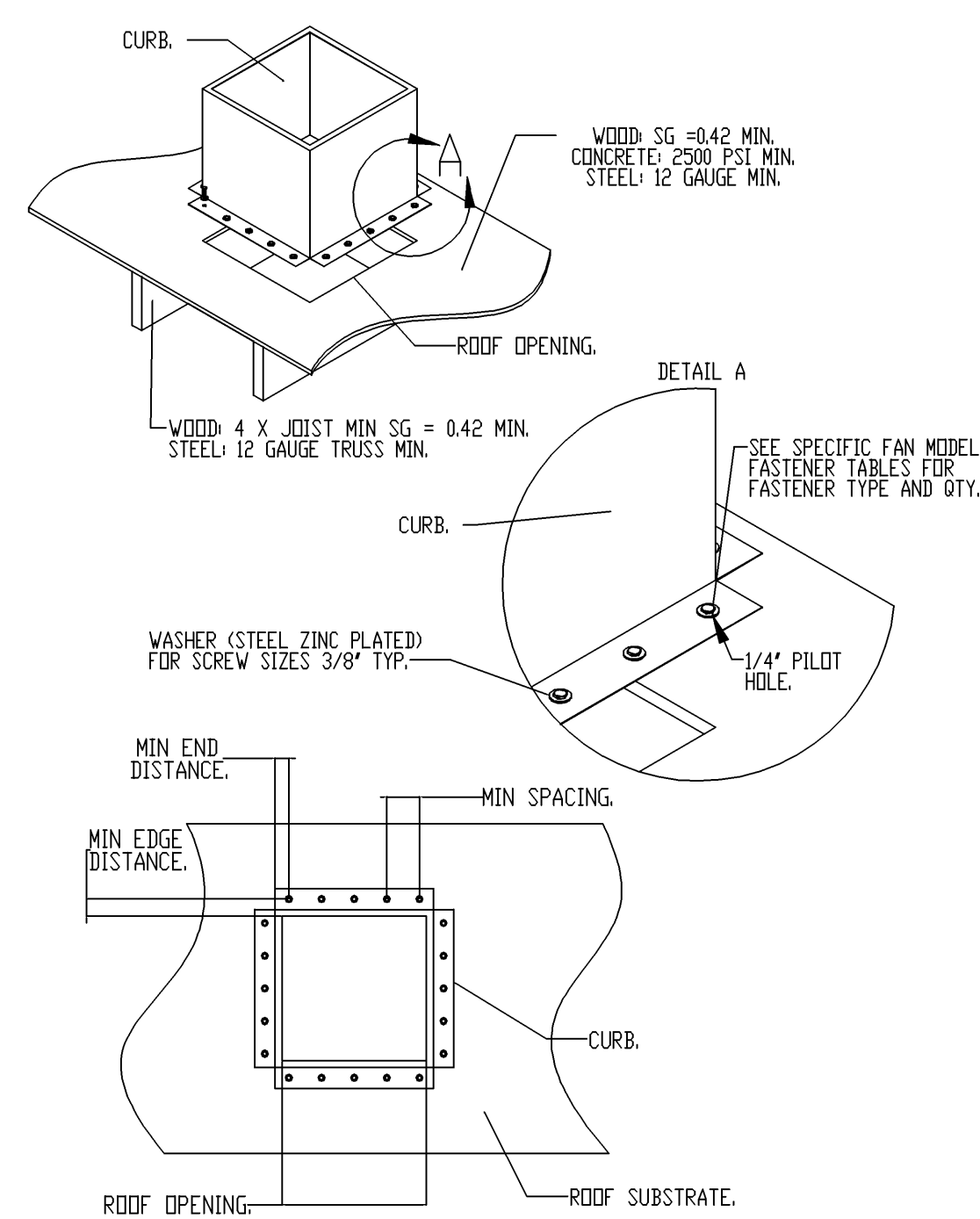
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

**OPTIONS**

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



**MIAMI-DADE COUNTY - CURB ROOF INSTALLATION GUIDE**



**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I

DATE: 9/27/2024  
DWG.#: 7072639  
DRAWN BY: Joe.shilba  
SCALE: 3/4" = 1'-0"  
MASTER DRAWING

SHEET NO. 4

Shake Shack-1632-Sunset Hills, ME(Kitchen)-R1

**zebra**

ZEBRA ARCHITECTURE, PLLC  
14614 N KIERLAND BLVD, SUITE 2000  
SCOTTSDALE, ARIZONA 85254  
PHONE: 480.912.1169 zbrglobal

CONSULTANT LOGO:

**Schnackel**  
engineers

800-881-0963 www.schnackel.com

STORE NO:  
**MO #1632**

**SHAKE SHACK**

SUNSET HILLS PLAZA  
10752 SUNSET HILLS PLAZA  
ST. LOUIS, MO, 63127

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I

STATUS: IFC SET

STATE OF MISSOURI

GREGORY RYD SCHNACKEL  
NUMBER E-008570  
Date: 01/21/25  
CSA # E-200000642

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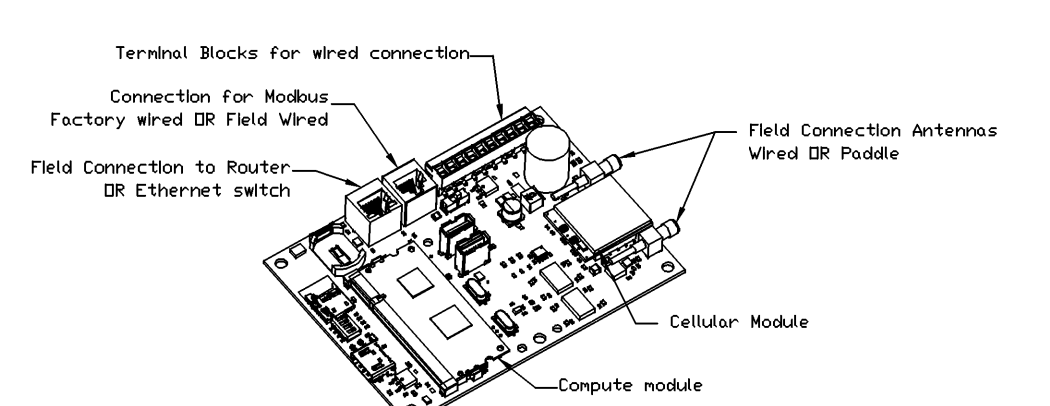
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SHEET NAME:  
**CAPTIVEAIRE DRAWINGS**

DATE: 09/24/2024 PROJECT NO: 39038  
DRAWN: RAS SCALE:

SHEET NO:  
**M704**

ELECTRICAL PACKAGE - JOB#7072639											
ND	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED				
				LOCATION	QUANTITY		FAN TAG	TYPE	HP	VOLTS	FLA
1		SC-320110MA	UTILITY CABINET RIGHT	RIGHT HOOD # 1	1 LIGHT 1 FAN	SMART CONTROLS THERMOSTATIC CONTROL V/ RELAY ON/OFF WITH SUPPLY	KEF(FRYER)	1	0.500	208	3.8
							KEF(GRILL)	1	0.500	208	3.8

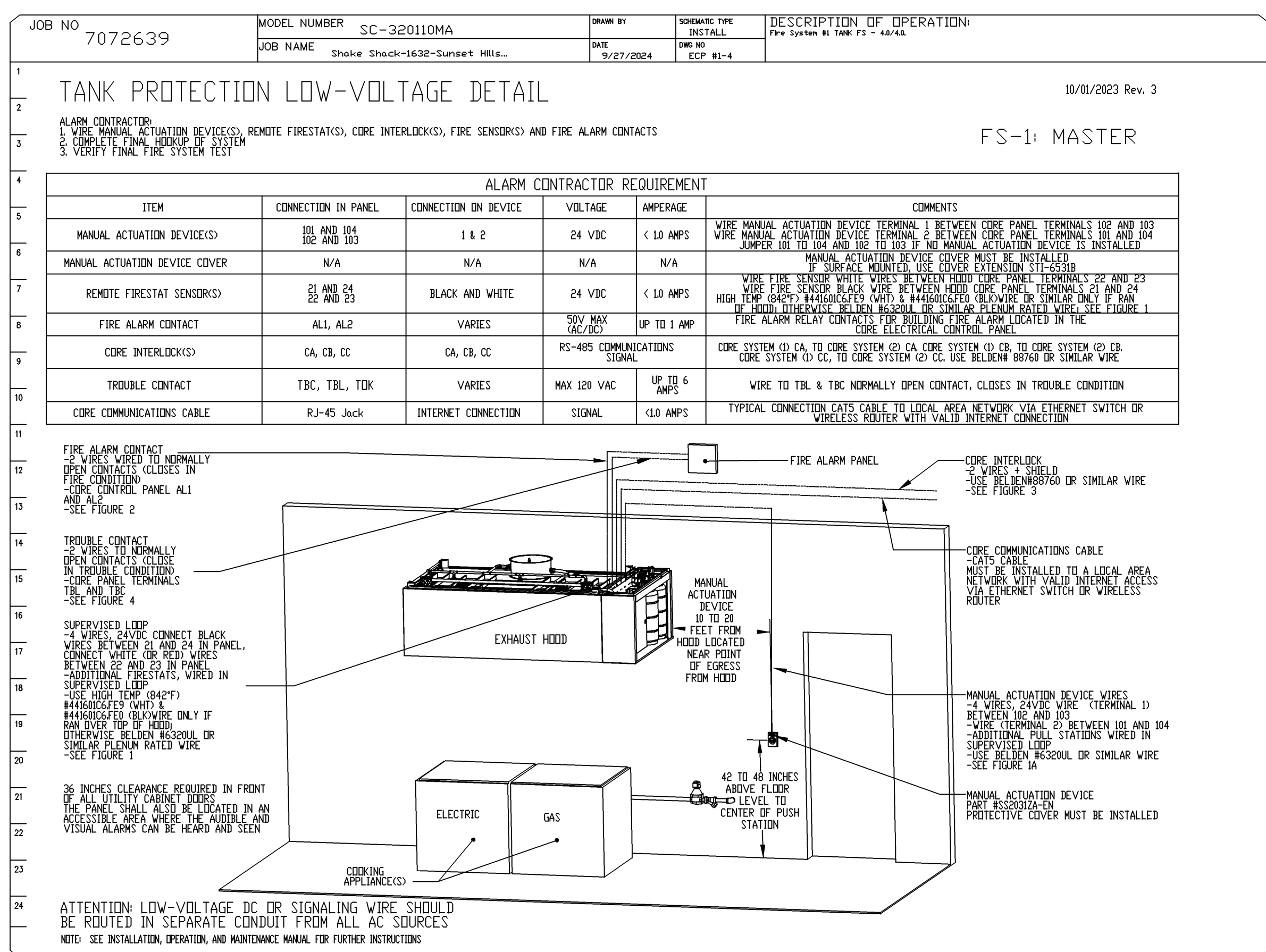
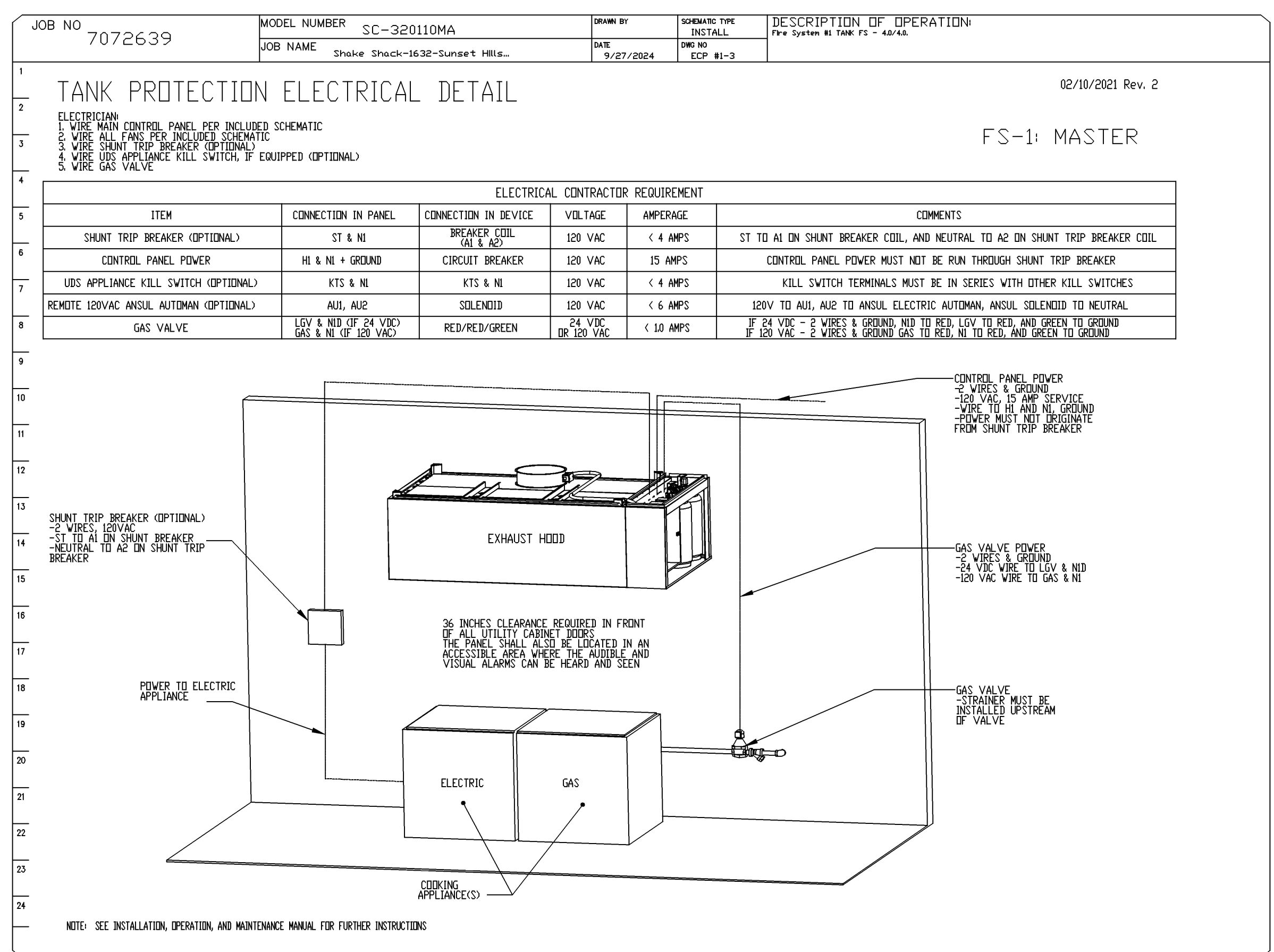
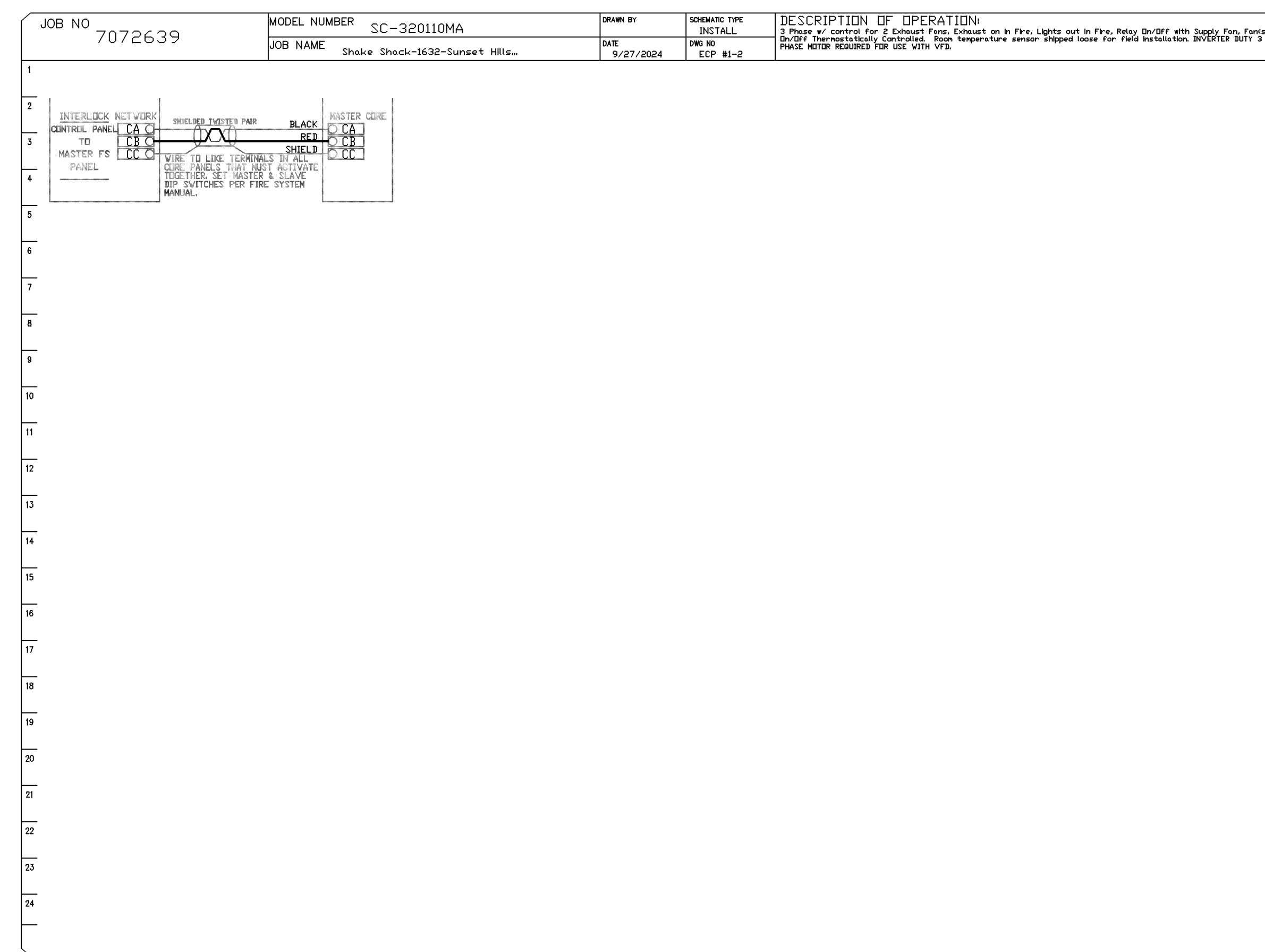
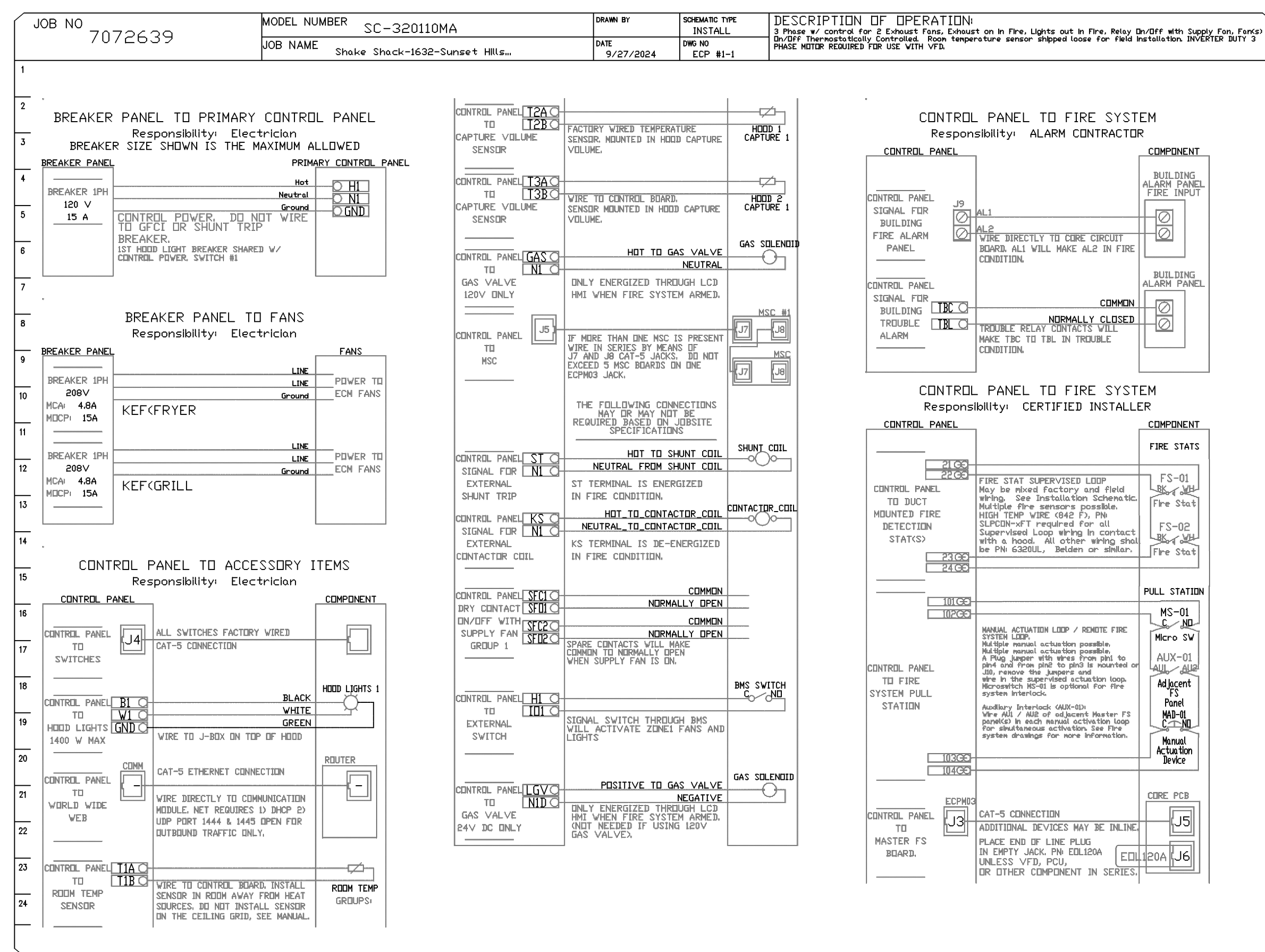


**CAslink Monitor and Control**

— 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	SC Packages	Function
Room Temperature	MONITOR	Room Temperature(s)	MONITOR
Area Discharge Temperature	MONITOR	Duct Temperature(s)	MONITOR
Minimum RTU Discharge Temperature	MONITOR	Minimum RTU Discharge Temperature	MONITOR
Fan Speed	MONITOR	Controller Faults	MONITOR
Fan Amperage	MONITOR	Fan Status	MONITOR
Fan Power	MONITOR	PCU Faults	MONITOR
YFP Faults	MONITOR	PCU Filter Clay Percentage	MONITOR
Controller Faults	MONITOR	Fire Condition	MONITOR
Fan Status	MONITOR	Control Fire System	MONITOR
PCU Faults	MONITOR	Building Pressure	MONITOR & CONTROL
PCU Filter Clay Percentage	MONITOR	Fans Status	MONITOR & CONTROL
Fire Condition	MONITOR	Light Button(s)	MONITOR & CONTROL
Control Fire System	MONITOR	Wash Button	MONITOR & CONTROL
Building Pressure	MONITOR & CONTROL		
Prep Time Status	MONITOR & CONTROL		
Fans Status	MONITOR & CONTROL		
Light Status	MONITOR & CONTROL		
Wash Button	MONITOR & CONTROL		



**REVISIONS**

NO.	DESCRIPTION	DATE
1		
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**CAPTIVE**

Eastern, P.A. Mechanical  
 225 E City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: rsg108@captiveaire.com

Shake Shack-1632-Sunset Hills, Milwaukee-R1

DATE: 9/27/2024  
 DWG.#: 7072639  
 DRAWN BY: Joe.Shilba  
 SCALE: 3/4" = 1'-0"  
 MASTER DRAWING

SHEET NO. 5

**zebra**

ZEBRA ARCHITECTURE, PLLC  
 14614 N KIERLAND BLVD., SUITE N300  
 SCOTTSDALE, ARIZONA 85254  
 PHONE: 480.912.1169 zbrglobal

CONSULTANT LOGO:  
**Schnackel** engineers  
 800-811-0963 www.schnackel.com

STORE NO:  
**MO #1632**

**SHAKE SHACK**  
 SUNSET HILLS PLAZA  
 10752 SUNSET HILLS PLAZA  
 ST. LOUIS, MO, 63127

**REVISIONS**

NO.	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
C	12/12/24	REVISION C
D	01/22/25	REVISION D
E		
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STATUS: IFC SET

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SHEET NAME:  
**CAPTIVE**  
**DRAWINGS**

DATE: 09/24/2024 PROJECT NO.: 38038  
 DRAWN: RAS SCALE:  
 SHEET NO.: **M705**

REVISIONS

DESCRIPTION DATE

**CAPTIVEAIRE**

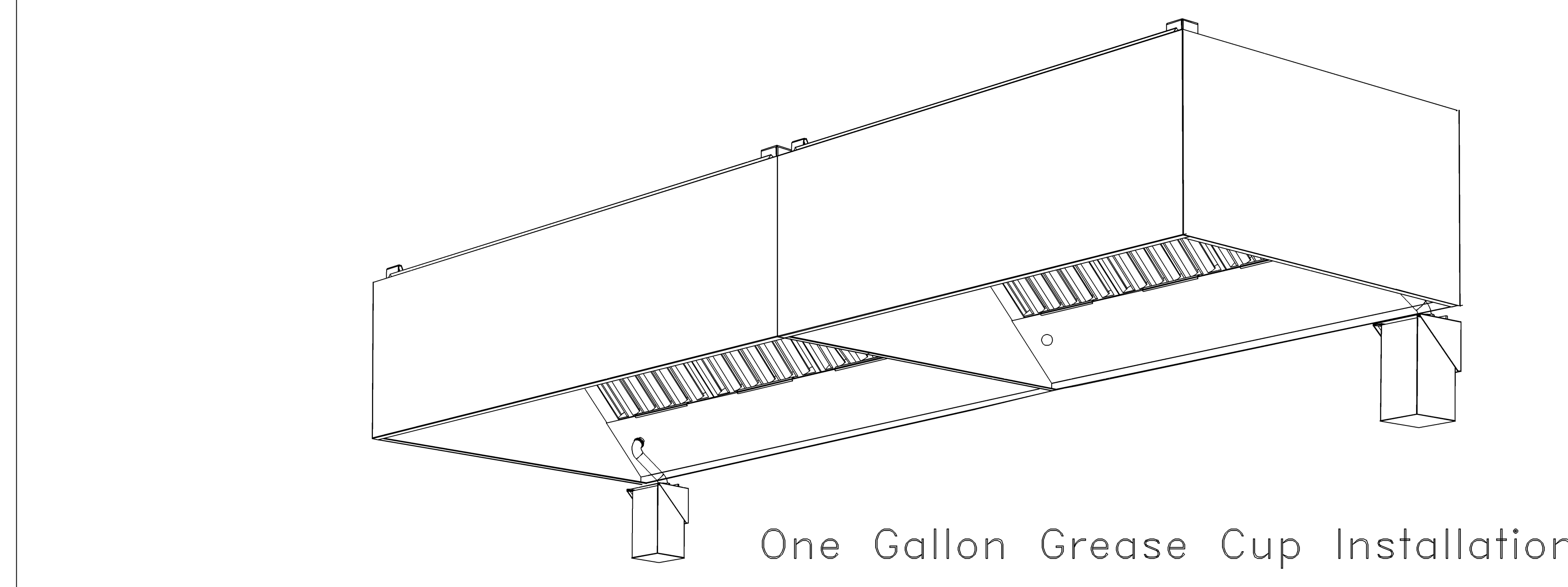
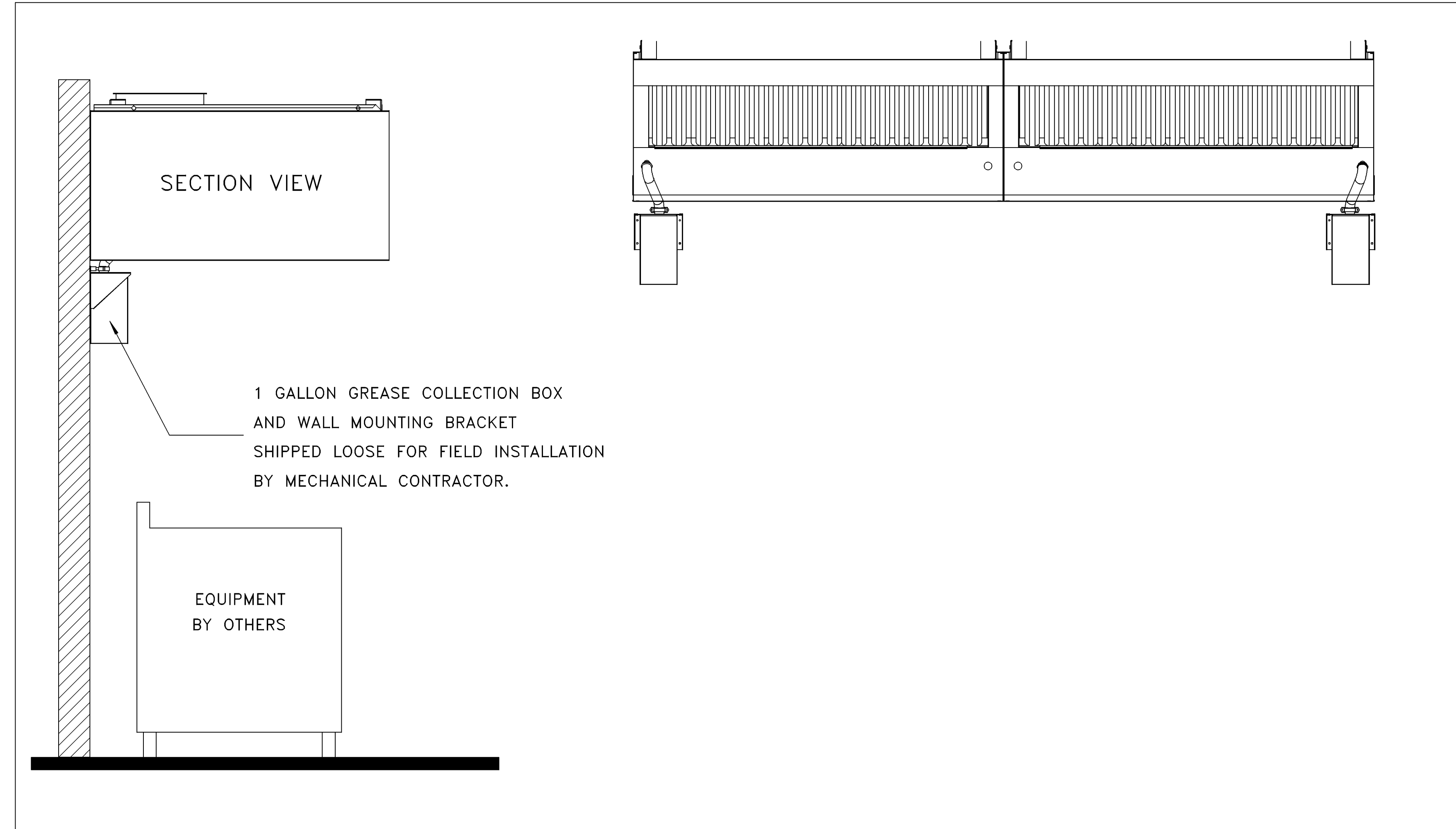
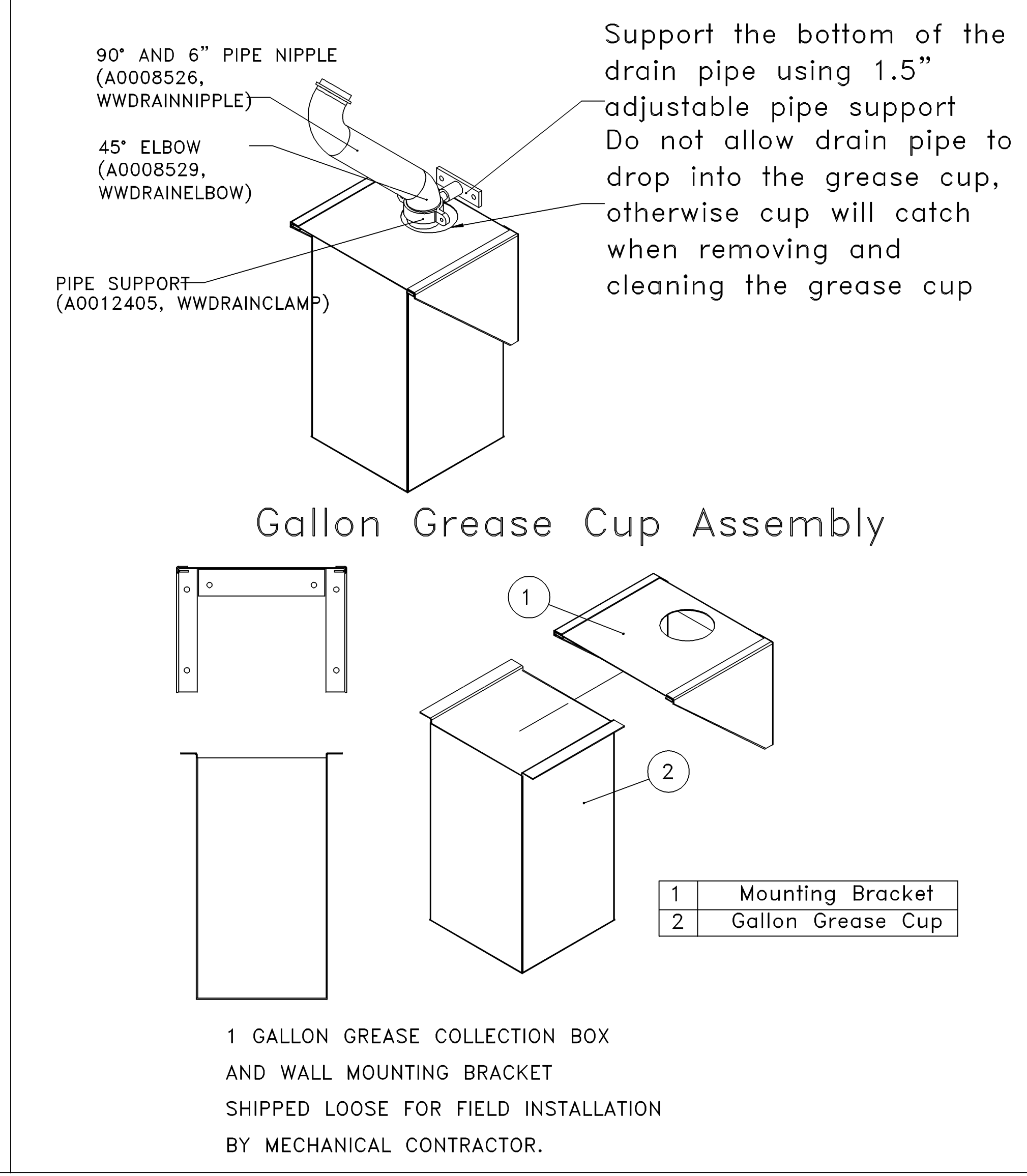
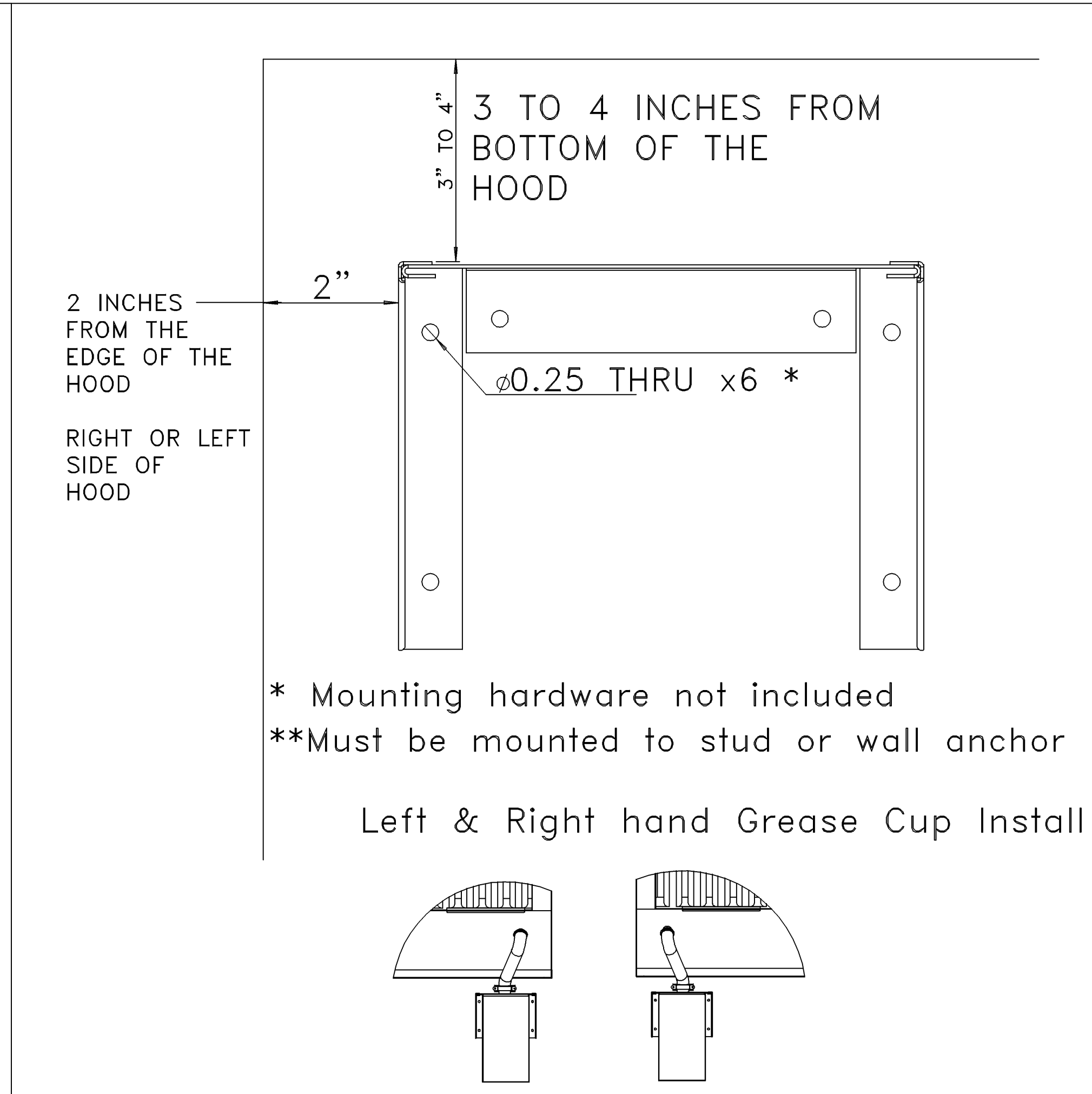
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Shake Shack-1632-Sunset Hills, MD(Kitchen)-R1

DATE: 9/27/2024  
DWG.#: 7072639  
DRAWN BY: Joe.shilba  
SCALE: 3/4" = 1'-0"  
MASTER DRAWING

SHEET NO. 6



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.

E  
D  
C  
B  
A

DOAS/RTU FAN SCHEDULE - JOB#7015973

FAN UNIT NO	TAG	QTY	FAN INFORMATION										ELECTRICAL INFORMATION										COOLING INFORMATION										REHEAT INFORMATION										GAS HEAT INFORMATION										NOTES
			DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL CFM	WEIGHT (LBS)	ESP	HP	PHASE	VOLT	MCA	MDCP	DB	WB	DB	WB	DB	WB	DP	TOTAL	SENS.	IEER	ISMRE	DISCHARGE DB	WB	DESIRED	MAX	CAPACITY	MOISTURE REMOVAL RATE	GAS TYPE	INPUT BTU/H	OUTPUT BTU/H	TEMP RISE	REQUIRED INPUT GAS PRESSURE																
1	RTU-1(DINING)	1	CAS-HVAC3-1200-24-1ST	CAPTIVEAIRE	24NF-3-RTU	2900	1100	4000	2588	1000	5.00	3	208	71.9A	80A	93.0°F	77.0°F	80.0°F	66.7°F	48.5°F	48.4°F	48.4°F	210.3 MBH	137.0 MBH	18.8	5.7	75.0°F	62.5°F	120.2 MBH	129.6 MBH	65.8 LBS/HR	NATURAL	181748	147216	33°F	7 IN. W.C. - 14 IN. W.C.	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18																
2	RTU-2 (KITCHEN)	1	CAS-HVAC3-1300-24-20T	CAPTIVEAIRE	24NF-3-RTU	4950	1050	6000	2794	1000	10.00	3	208	106.4A	125A	93.0°F	77.0°F	78.2°F	65.1°F	50.0°F	50.0°F	50.1°F	263.4 MBH	184.0 MBH	18.2	6.0	69.0°F	57.7°F	126.2 MBH	129.6 MBH	69.3 LBS/HR	NATURAL	215649	174676	27°F	7 IN. W.C. - 14 IN. W.C.	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18																

FOR QUESTIONS, CALL THE Eastern PA Mechanical REGION 109 PHONE: (267) 504 - 4126 EMAIL: reg109@captiveaire.com

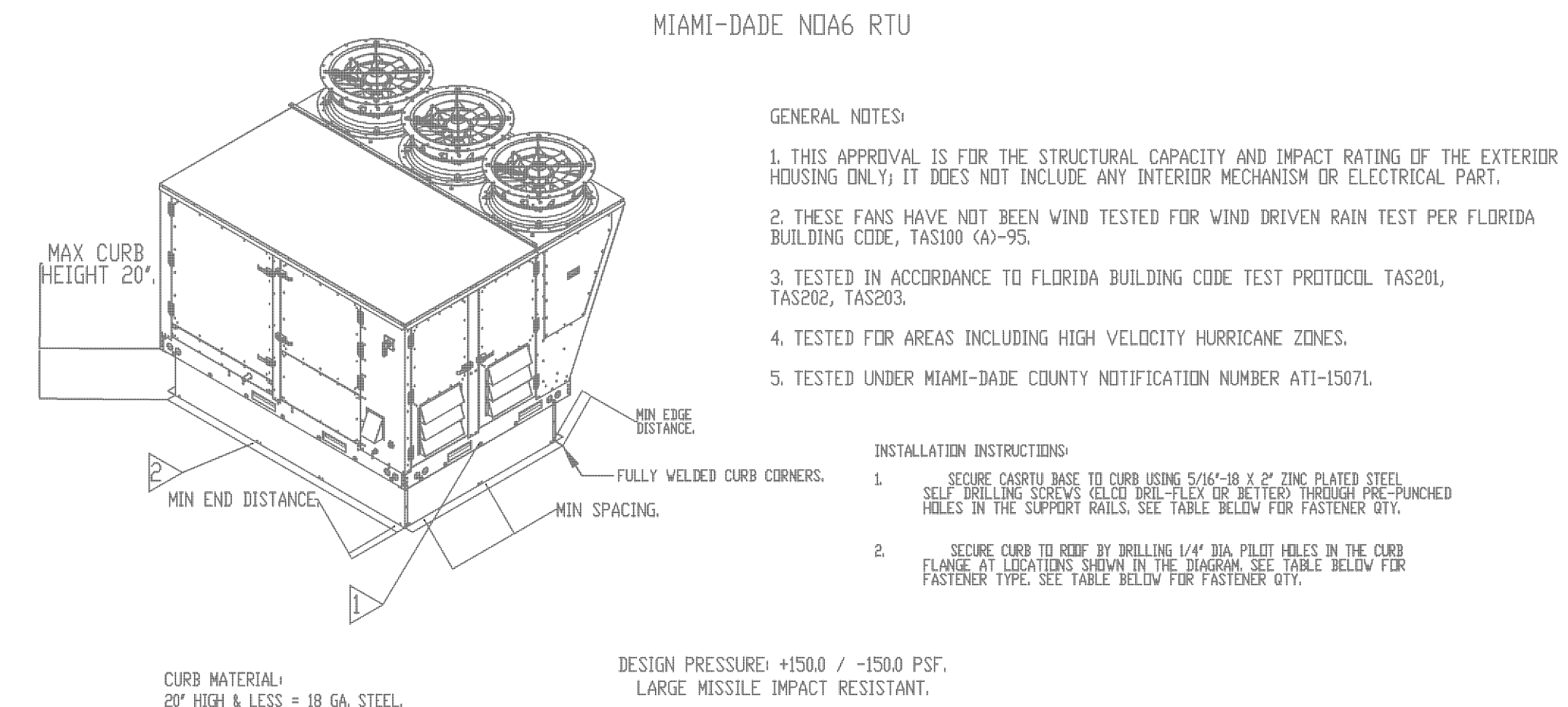
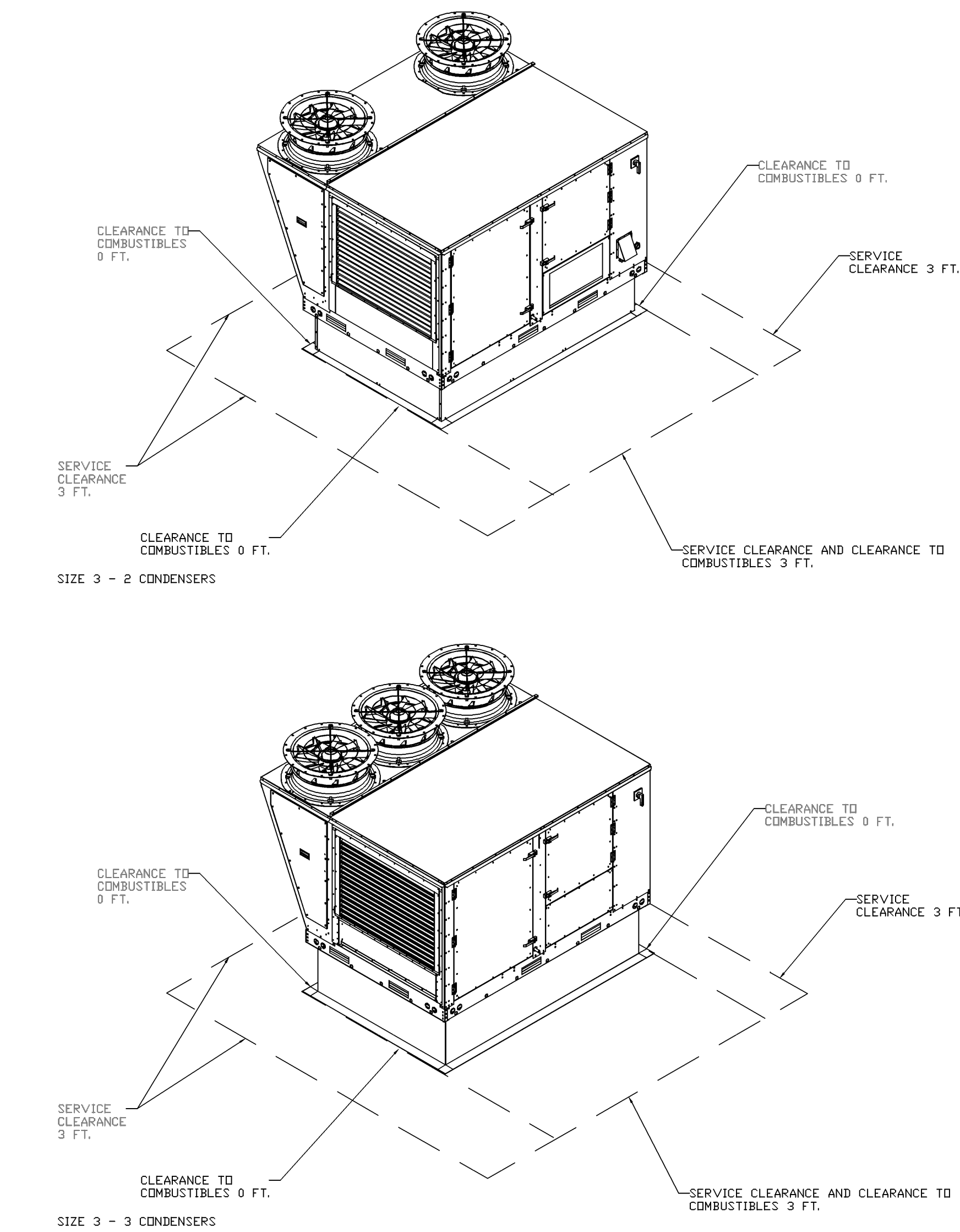
FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	RTU-1(DINING)	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE
		1	TOTAL CFM MONITORING
		1	INTAKE FIRESTAT SET TO 135°F
		1	FREEZE STAT
		1	DISCHARGE FIRESTAT SET TO 240°F
		1	SHIP LODGE 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, #A4, 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	RTU3 DOWN DISCHARGE
		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	RTU3 CURB DUCT HANGER
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	120V FIRE INPUT
		1	LOW AMBIENT COOLING OPERATION - DOWN TO OF AMBIENT
		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	15 TON MODULATING COOLING OPTION, 208/230V, R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	15 TON MODULATING REHEAT OPTION - SPACE DEWPOINT CONTROL - R410A
		1	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY CONTROL
		1	RTU3 ECONOMIZER BARMETRIC RELIEF
1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI		
1	RTU3 HAIL GUARD		
1	RTU3 DOWN RETURN		
1	VAV PACKAGE W/ MANUAL/DDC CONTROL (571 VFD INCLUDED)		
1	LOAD REACTOR MOUNTED IN FAN		
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)		
1	EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET		
2	RTU-2 (KITCHEN)	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE
		1	TOTAL CFM MONITORING
		1	INTAKE FIRESTAT SET TO 135°F
		1	FREEZE STAT
		1	DISCHARGE FIRESTAT SET TO 240°F
		1	SHIP LODGE GAS STRAINER 1"
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU, 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, #A4, 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	RTU3 DOWN DISCHARGE
		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	RTU3 CURB DUCT HANGER
		1	120V FIRE INPUT
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	RTU3 CURB DUCT HANGER
		1	120V FIRE INPUT
		1	LOW AMBIENT COOLING OPERATION - DOWN TO OF AMBIENT
		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, 208/230V, R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	20 TON MODULATING REHEAT OPTION - SPACE DEWPOINT CONTROL - R410A
1	VAV PACKAGE W/ MANUAL/DDC CONTROL (571 VFD INCLUDED)		
1	RTU3 DOWN RETURN		
1	ZIEHL POWERED EXHAUST FOR RTU3 - MANUAL CONTROL, 3000 CFM MAX AT 0"		
1	RTU3 ECONOMIZER BARMETRIC RELIEF		
1	RTU3 HAIL GUARD		
1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI		
1	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY 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)		
1	EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET		

CURB ASSEMBLIES

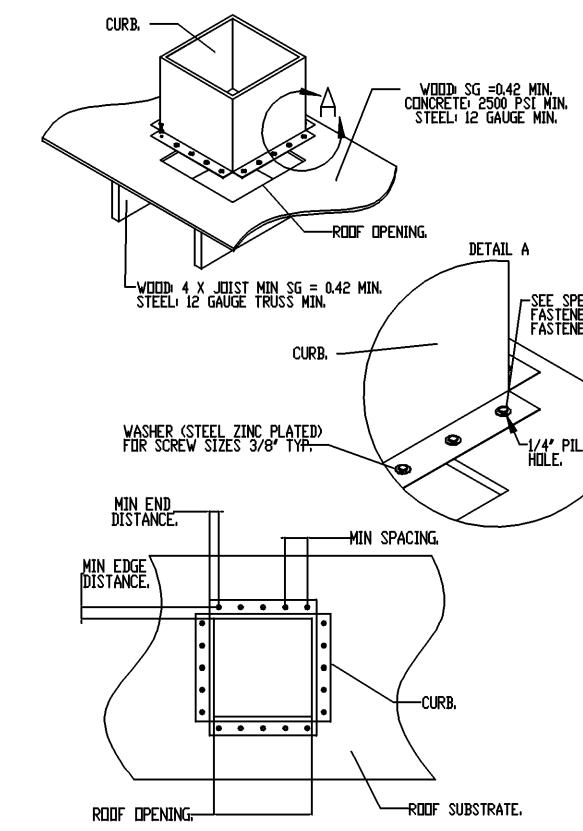
NO	DN FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	RTU-1(DINING)	104 LBS	CURB	59.500"W X 91.000"L X 14.000"H INSULATED.
2	# 2	RTU-2 (KITCHEN)	104 LBS	CURB	59.500"W X 91.000"L X 14.000"H INSULATED.

UNIT NUMBER	HMI #	HMI LOCATION	TEMP AVERAGING	MODBUS ADDRESS
FAN #1	HMI #1 - UNIT	IN UNIT	NOT AVERAGED	55
FAN #1	HMI #2 - SPACE	DINING ROOM	AVERAGED	56
FAN #1	HMI #3 - SPACE	MANAGERS OFFICE	NOT AVERAGED	57
FAN #2	HMI #1 - UNIT	IN UNIT	NOT AVERAGED	55
FAN #2	HMI #2 - SPACE	KITCHEN #1	AVERAGED	56
FAN #2	HMI #3 - SPACE	KITCHEN #2	AVERAGED	57
FAN #2	HMI #4 - SPACE	MANAGERS OFFICE	AVERAGED	58



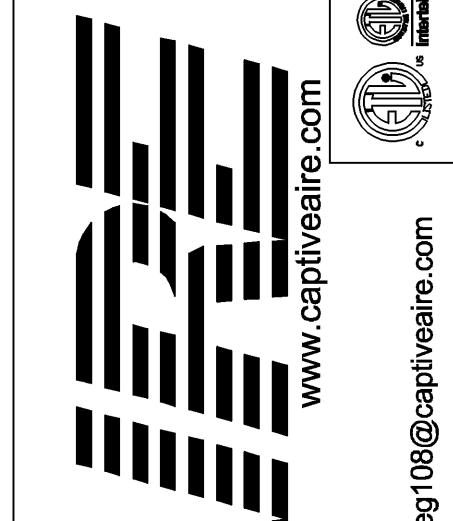
FASTENER	INSTALLATION FASTENER TYPES			
	WOOD (80 = 0.42 MIN)	STEEL (12 GAUGE MIN)	CONCRETE (2800 PSI MIN, CRACKED CONCRETE)	
MINIMUM THREAD PENETRATION	N/A	1-1/2"	3/8" DIA. SS HILTI KWIK BOLT 1/2" EXPANSION ANCHOR	2"
MINIMUM EDGE DISTANCE	N/A	1-1/2"	3/8"	3"
MINIMUM END DISTANCE	N/A	4-1/2"	4-1/2"	4-1/2"
MINIMUM SPACING	N/A	1-1/2"	6"	6"

MIAMI-DADE COUNTY - CURB REEF INSTALLATION GUIDE



REVISIONS

NO	DATE	DESCRIPTION



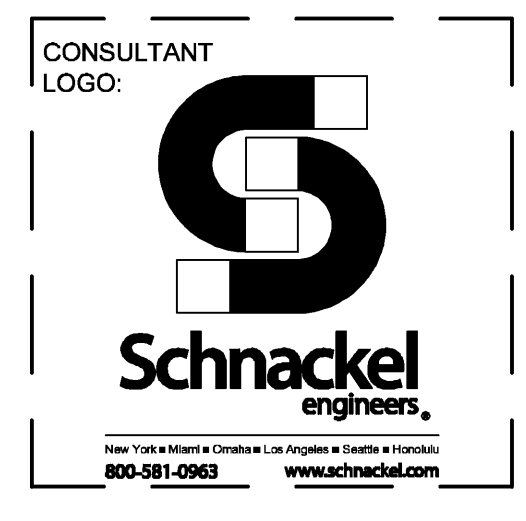
Eastern PA Mechanical  
225 E City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004 PHONE: (267) 504 - 4126 EMAIL: reg109@captiveaire.com

Shake Shack - 1632 - Sunset Hills, MD (HVAC)  
SAINT LOUIS, MO, 63127

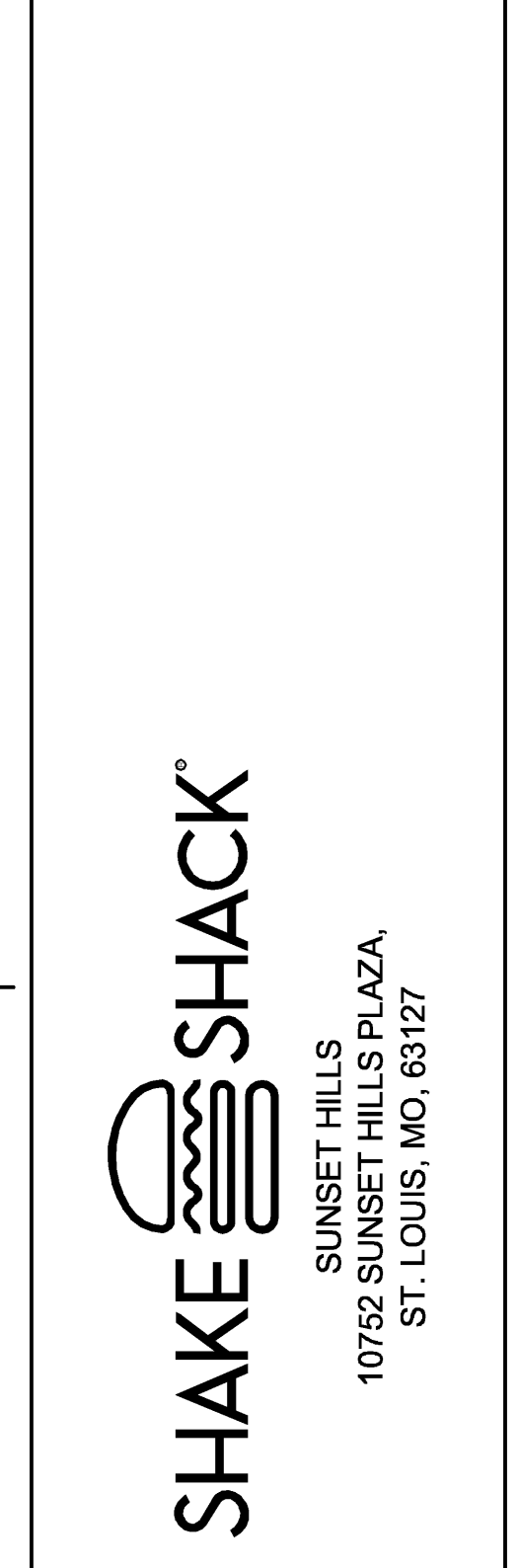
DATE: 9/12/2024  
DWG.#: 7015973

DRAWN By: Joe Shilba  
SCALE: 1/2" = 1'-0"  
MASTER DRAWING

SHEET NO. 1

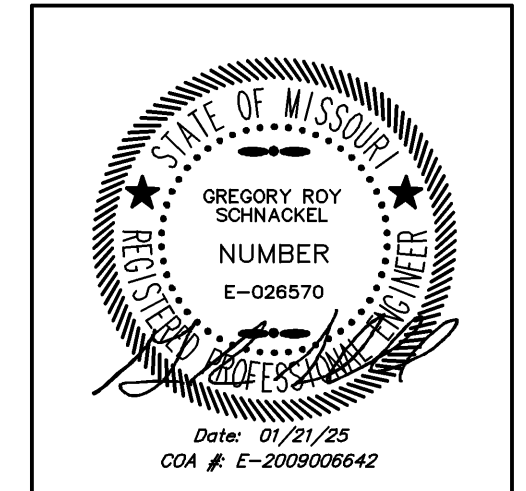


STORE NO: MO #1632



REVISIONS

NO	DATE	DESCRIPTION
A	10/15/24	REVISION A
B	10/25/24	REVISION B
D	12/12/24	REVISION D
I	01/22/25	REVISION I



FIELD VERIFICATION: The Contractor shall verify all signed dimensions and conditions at the project site and notify Zebra Architecture, Inc. of any discrepancies before beginning or fabricating any work. Do not make form change.

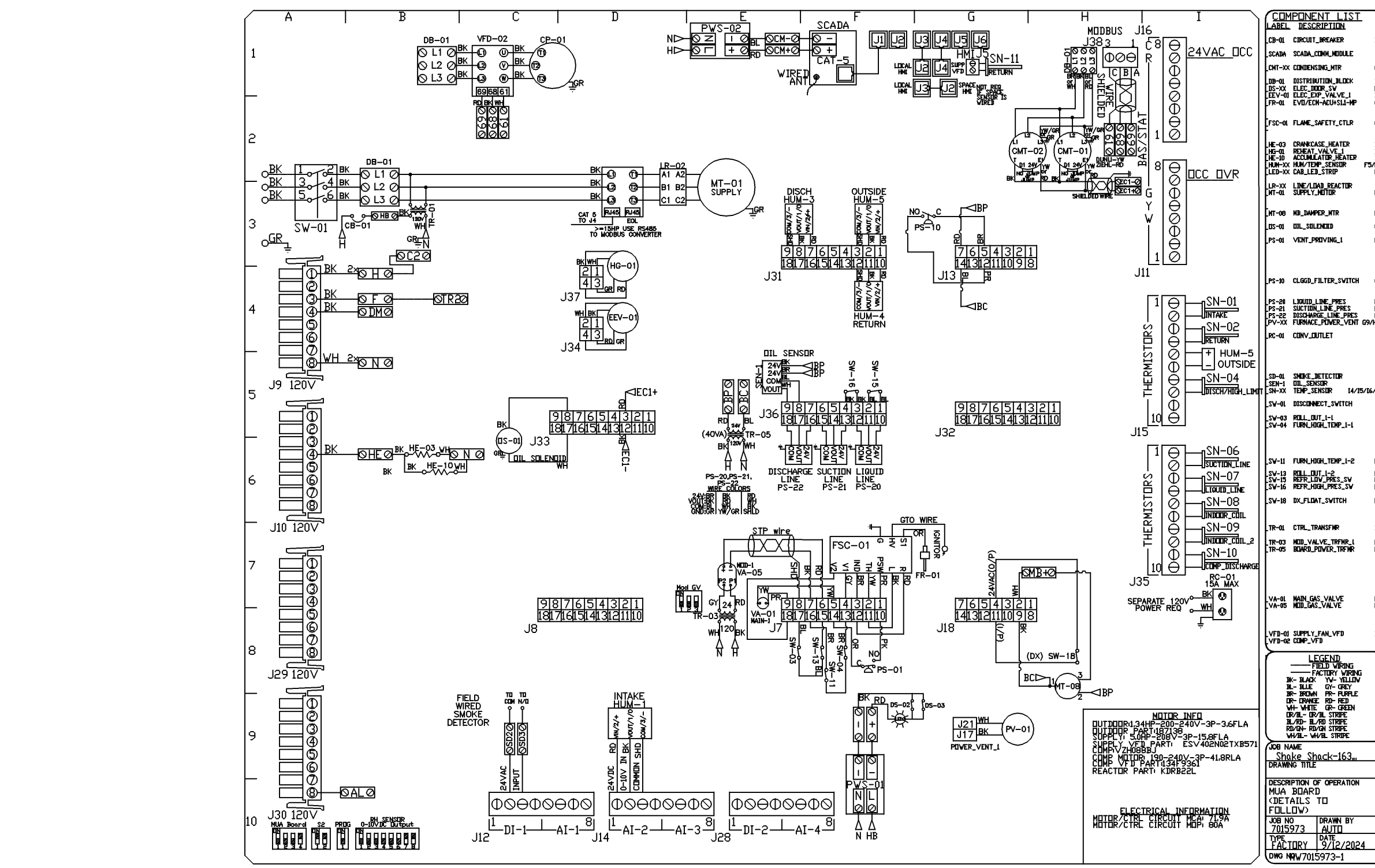
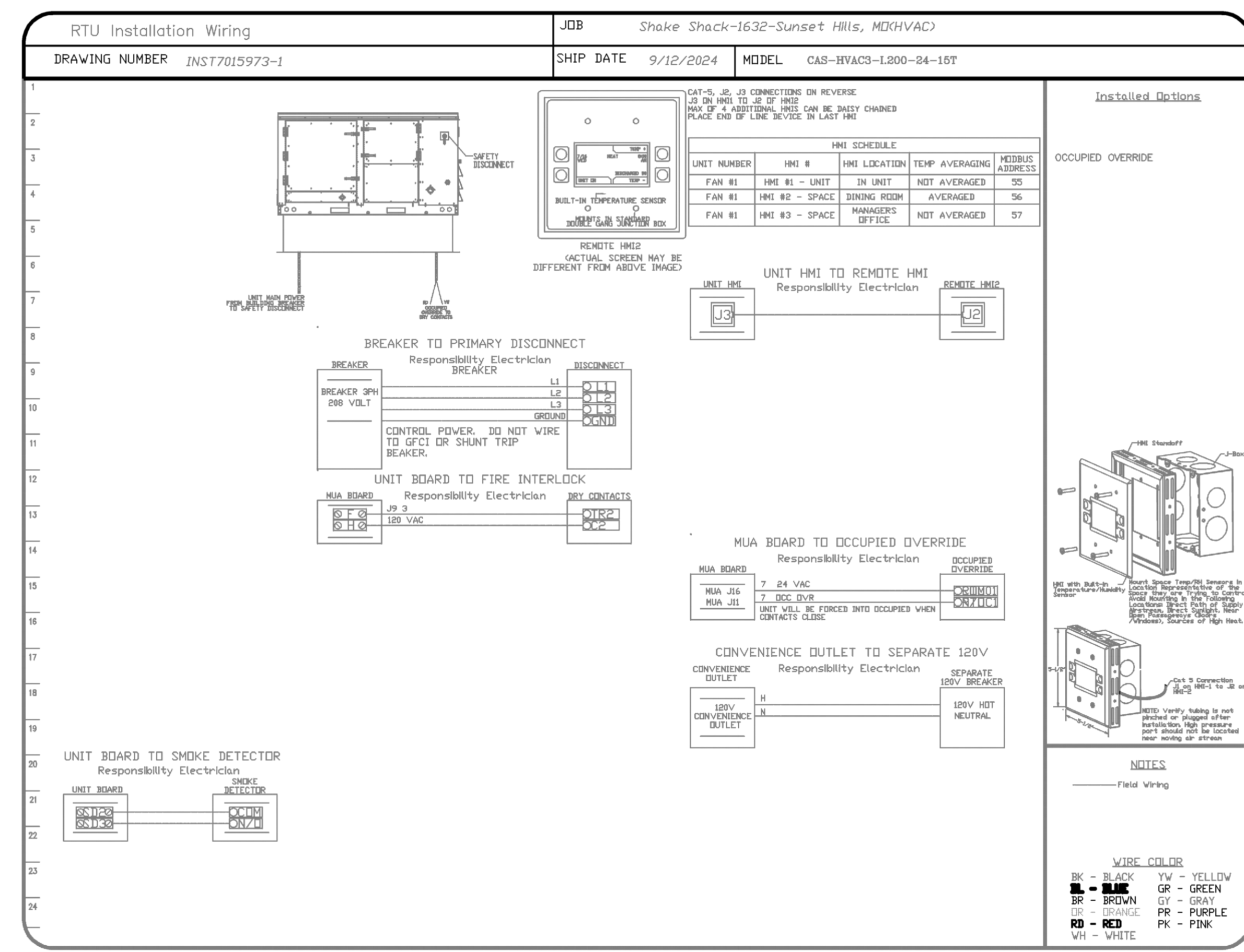
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SHEET NAME: CAPTIVEAIRE DRAWINGS

DATE: 09/24/2024 PROJECT NO.: 39038  
DRAWN: SCALE:

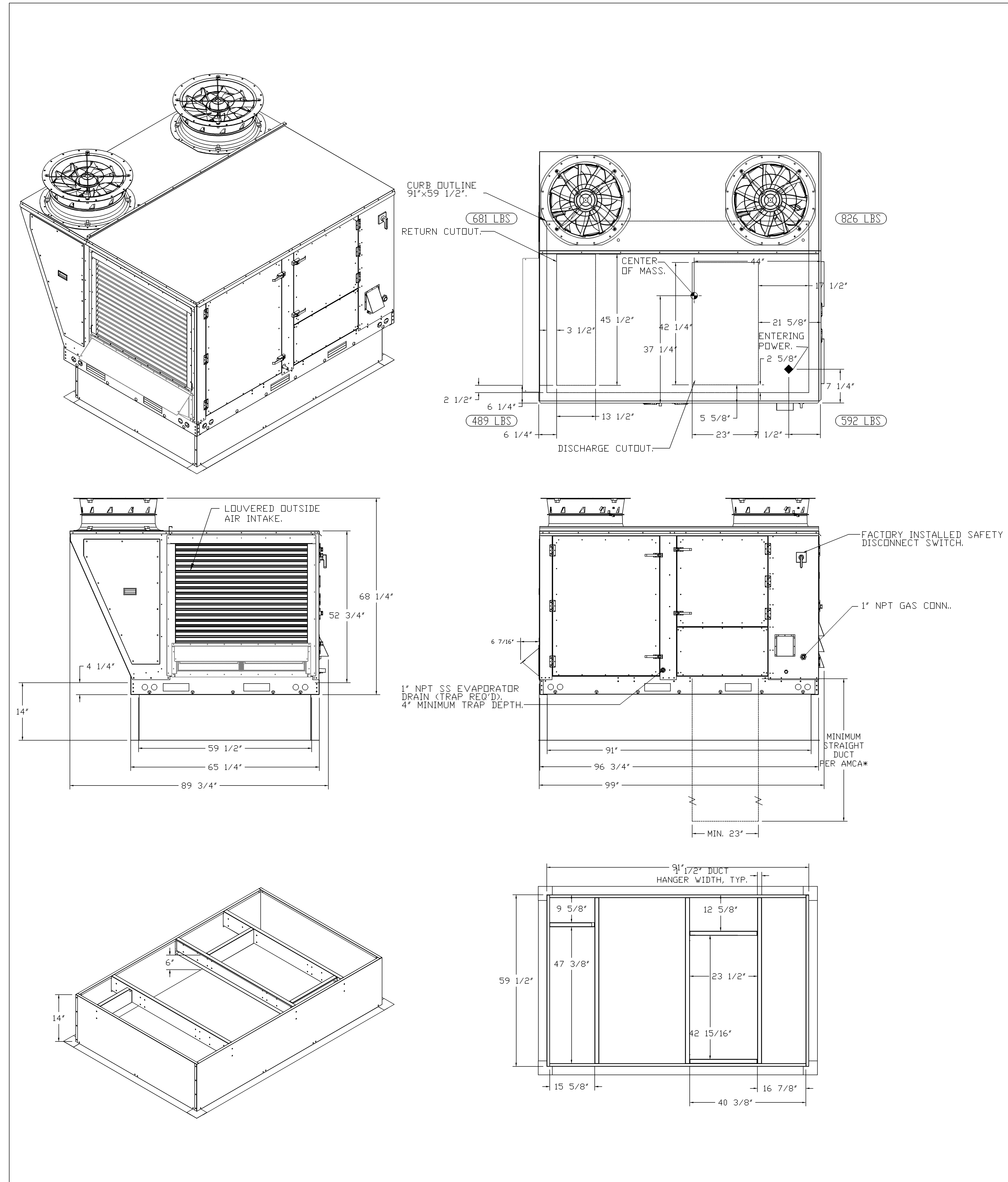
SHEET NO: M707

**CAPTIVEAIRE**  
www.captiveaire.com  
Eastern, PA, Mechanical  
225 E City Line Avenue, Suite #103, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg.08@captiveaire.com



FAN #1 CAS-HVAC3-1200-24MF-15T - HEATER (RTU-1(DINING))

- 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.



E  
D  
C  
B  
A

