

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

DESCRIPTION	FURNISHED			INSTALLED			REMARKS
	GENERAL CONTRACTOR	OWNER	LANDLORD	GENERAL CONTRACTOR	OWNER	LANDLORD	
DIVISION 23: HEATING, VENTILATING, AND AIR CONDITIONING							
23.1 HVAC DUCTWORK AND PIPING IDENTIFICATION							
23.1.1 HVAC DUCTWORK SYSTEM IDENTIFICATION	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			
23.2 ROOF CURBS							
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
23.3 HVAC DUCTWORK SYSTEM COMPONENTS							
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			
23.4 MECHANICAL PIPING SYSTEM COMPONENTS							
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			NA			NA	
23.4.4 CONDENSER WATER			NA			NA	
23.4.5 HEATING HOT WATER			NA			NA	
23.4.6 VALVES AND ACCESSORIES (E.G. AIR VENTS)	X			X			
23.5 HVAC EQUIPMENT							
23.5.1 SUPPLY FAN	X			X			GENERAL CONTRACTOR SCOPE OF WORK TO INCLUDE RIGGING FOR ALL ROOFTOP EQUIPMENT
23.5.2 TOILET EXHAUST FAN	X			X			
23.5.3 KITCHEN EXHAUST FAN	X	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
23.6 KITCHEN EXHAUST WITH FIRE SUPPRESSION SYSTEM							
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
23.7 COMMISSIONING ACTIVITIES							
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



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Seal

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Brian S. Thomas
Architect

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Project

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SYMBOLS			
HEATING - VENTILATING - AIR CONDITIONING			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	STEAM (LOW PRESSURE)		AUTOMATIC CONTROL VALVE
	STEAM (MEDIUM PRESSURE)		PRESSURE REGULATING VALVE (PRV)
	STEAM (HIGH PRESSURE)		SAFETY RELIEF VALVE
	CONDENSATE (LOW PRESSURE)		BLOW OFF VALVE
	CONDENSATE (MEDIUM PRESSURE)		P AND T TRAP (LWP, #/RR)
	CONDENSATE (HIGH PRESSURE)		THERMOSTATIC TRAP
	HOT WATER SUPPLY (HEATING)		STATIC PRESSURE
	HOT WATER RETURN (HEATING)		CIRCUIT SETTER FLOW CONTROL VALVE
	ETHYLENE GLYCOL SUPPLY		AIR REGISTER VALVE (RADIANT PANEL)
	ETHYLENE GLYCOL RETURN		AIR ELIMINATOR
	CHILLED WATER SUPPLY		AUTOMATIC BALANCING VALVE
	CHILLED WATER RETURN		SOLENOID VALVE (REFRIGERANT)
	CONDENSATE TO ROOM DRAIN DISCHARGE		THERMOSTATIC EXPANSION VALVE (TRV)
	HUMIDIFICATION LINE		BACK PRESSURE VALVE
	FUEL OIL SUPPLY		SIGHT GLASS
	FUEL OIL RETURN		ROUND DUCT REGISTER
	FUEL OIL VENT		FAN COIL UNIT AND MARK
	GAS LINE		UNIT HEATER-PROPELLER TYPE & MARK
	REFRIGERANT LIQUID LINE		CABINET UNIT HEATER & MARK
	REFRIGERANT SUCTION LINE		FIN TUBE, MARK, AND CAPACITY
	REFRIGERANT HOT GAS DISCHARGE LINE		CONNECTOR AND MARK
	CONDENSER WATER		UNIT VENTILATOR AND MARK
	CONDENSER WATER RETURN		RECTANGULAR DUCT
	BOILER BLOW OFF		FIRE AND SMOKE DAMPER
	EXHAUST STEAM		FIRE AND SMOKE DAMPER
	CONCENTRIC REDUCER		BASEBOARD RADIATOR
	ECCENTRIC REDUCER		BASEBOARD RADIATOR
	UNION		HEATING RISER NUMBER
	STRAINER		EXHAUST FAN RISER NUMBER
	EXPANSION JOINT		BASEBOARD RADIATION
	THERMOMETER		REMOTE SENSOR
	PRESSURE GAUGE		THERMOSTAT
	EXTRACTOR		

NOT ALL ITEMS SHOWN WITHIN THE SYMBOLS LEGENDS ARE USED WITHIN THE DRAWINGS.

SUBMITTAL MATRIX				
GENERAL CONTRACTORS TO ALSO REVIEW ARCHITECTURAL SPECIFICATIONS AS NOTED IN PLANS IN SECTION 700 OF THE ARCHITECTURAL PACKAGE FOR REQUIRED SUBMITTALS THAT MIGHT NOT BE LISTED BELOW.				
SUBMITTAL DESCRIPTION	Required Review Time (Business Days)	Product of Project (Business Days)	Physical Sample Required	Submitted for Submittal 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		
Diffusers, 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
M&P 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
Rolling 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		
Storefront - Shop Drawings	5	X		
Tile (if differs from spec)	5	X		X
Window Film	5	X		



SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number 25128
Drawn By SEI
Checked By GRS
Date 09 JUN 2025

Revisions
1 17 JUL 2025 ISSUED FOR CONSTRUCTION
3 09 SEP 2025 STRUCT. COORD.

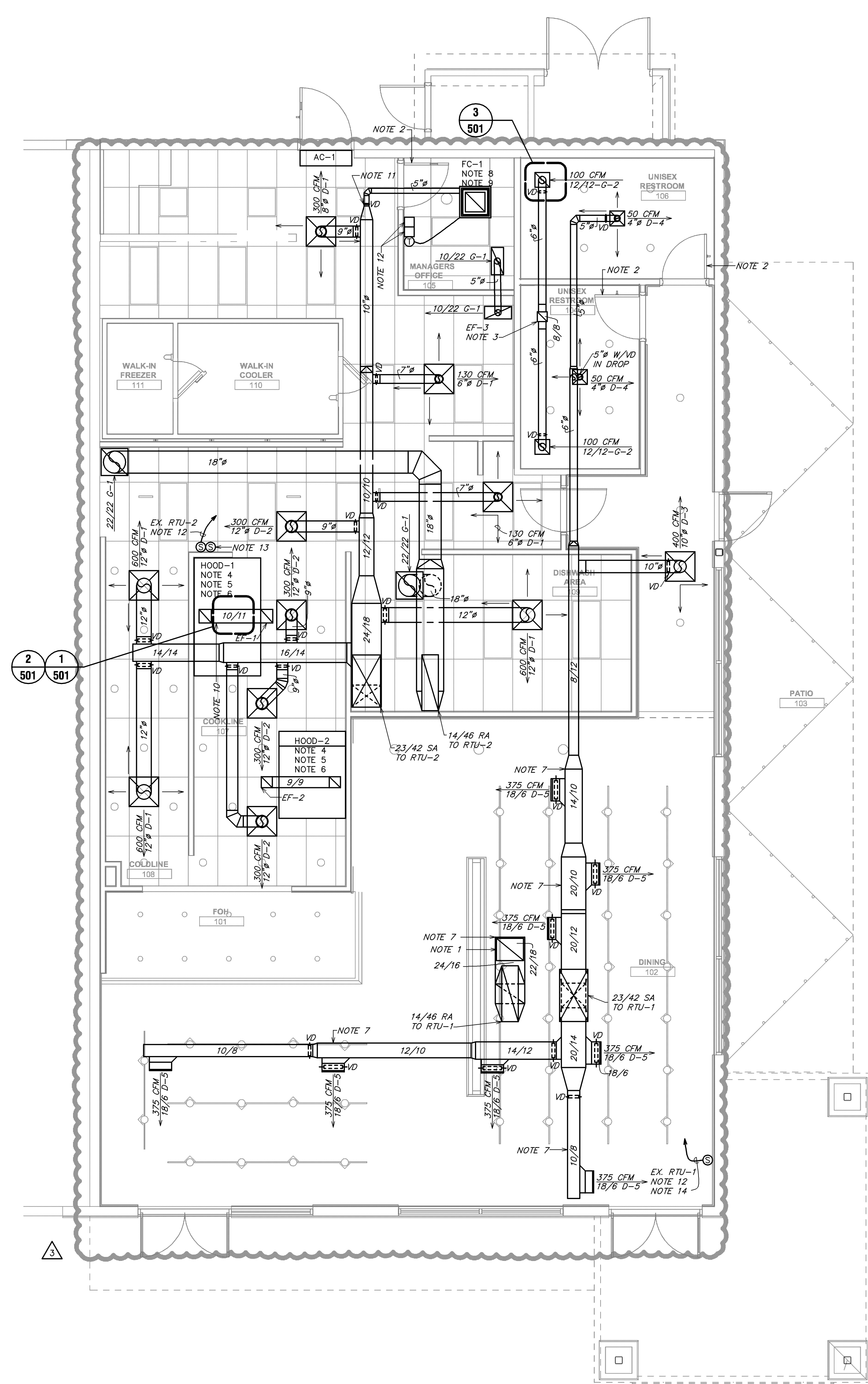
Drawing

MECHANICAL
ABBREVIATIONS &
SYMBOLS

M001

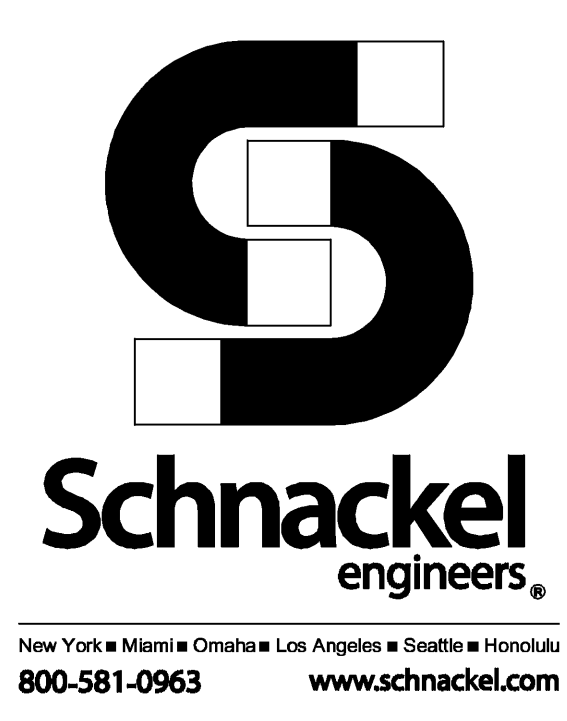
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1 MECHANICAL FLOOR PLAN
 SCALE: 1/4" = 1'-0"
 0 2'-0" 4'-0" 6'-0"

- 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 OF 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. WHEN 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 SPECIFICATIONS AND WITH ADEQUATE CLEARANCE. 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 IN ATTACHED WALLS. ALL CONNECTIONS SHALL BE MADE 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 SMOGA 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.
 - ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE, THRU JOIST SPACE.
 - PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED ENERTECH FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILING. 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.
 - TENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITY RUNS 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 RUNS AND/OR OTHER 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 DUCTWORK 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 HANDMADE AND/OR FIELD FABRICATED WORK INSTALLED. THE WARRANTY SHALL INCLUDE ALL LABOR, MATERIALS AND THREE (3) ROUTINE SERVICES INCLUDING FILTER CHANGES DURING A ONE (1) YEAR AT THE COMPLETION OF THE PROJECT. ALL WORK SHALL BE 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 TURNBOURGH AT WILL@NATIONTAB.COM OR 314-954-6244.
 - 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:**
- TOP OPEN RETURN AIR DUCT. PROVIDE OPENING WITH 1/4" MESH GALVANIZED SCREEN.
 - CONTRACTOR SHALL UNDERCUT DOOR 3/4"
 - PROVIDE 6/8 EXHAUST AIR DUCT UP TO EF-3 ON ROOF.
 - NEW CAPTIVEAIRE GREASE EXHAUST HOOD TO BE FURNISHED BY OWNER FOR INSTALLATION BY THE MECHANICAL CONTRACTOR. SEE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION. BALANCE HOOD EXHAUST AS NOTED ON CAPTIVEAIRE SHEETS. VERIFY ALL MANUFACTURER AND CODE REQUIRED CLEARANCES ARE MAINTAINED. NOTIFY ARCHITECT IF ANY CONFLICTS OCCUR.
 - TRANSITION FROM HOOD EXHAUST AND EXTEND KITCHEN HOOD GREASE EXHAUST DUCTWORK COLLAR AS INDICATED ON 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 CERAMICS FAST WRAP XL. 1 1/2" THICK WITH 3" PERIMETER AND LONGITUDINAL OVERLAPS OR EQUIVALENT U.L. LISTED GREASE DUCT WRAP FOR ZERO CLEARANCE TO COMBUSTIBLES. REFER TO SHEET M501, DETAIL 1, FOR ADDITIONAL INFORMATION. TYPICAL OF 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 RTV 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 MANUFACTURER DRAWINGS. REFERENCE SHEET M501, DETAIL 14, FOR ADDITIONAL INFORMATION.
 - DUCTWORK TO BE TO BE INSTALLED AS HIGH AS CONDITIONS ALLOW. COORDINATE ROUTING AND MOUNTING HEIGHT WITH LIGHTING FIXTURES. NOTIFY THE ARCHITECT OF ANY CONFLICTS AND COORDINATE WITH THE CONSTRUCTION MANAGER.
 - PROVIDE NEW FC UNIT AS NOTED ON PLANS AND AS SCHEDULED ON SHEET M601.
 - 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.
 - PROVIDE CLEANOUTS ON GREASE DUCTWORK AS REQUIRED BY CODE. REFERENCE SHEET M501, DETAIL 2 FOR ADDITIONAL INFORMATION. TYPICAL OF GREASE EXHAUST DUCTWORK.
 - BALANCE THE DAMPER TO 40 CFM.
 - COORDINATE WITH CAPTIVEAIRE ON REMOTE SENSORS AND COMFORT CONTROLS PACKAGE THAT IS TO BE INSTALLED IN THE OFFICE. VERIFY CONTROLS ARE A FULLY DIGITAL 7 DAY PROGRAMMABLE TYPE THERMOSTAT WITH REMOTE SENSING CAPABILITIES, AUTO CHANGE OVER AND AUTO SET BACK. MOUNT SENSOR AND CONTROLS AT 48" ABOVE FINISHED FLOOR, UNITS SERVING THE SAME TEMPERATURE ZONE SHALL BE INTERLOCKED TO PREVENT SIMULTANEOUS HEATING AND COOLING. LOCATE REMOTE TEMPERATURE SENSORS AS INDICATED ON PLAN. COORDINATE LOCATION WITH CONSTRUCTION MANAGER AND WALL GRAPHICS LAYOUT. REFERENCE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION.
 - MOUNT TEMPERATURE CAPTIVEAIRE ROOM TEMPERATURE SENSOR FURNISHED WITH KITCHEN HOODS ON WALL AS INDICATED ON THE PLANS AND AS SPECIFIED BY THE MANUFACTURER.
 - PROVIDE WITH INSULATED BACK PAN.



Seal

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 Architect

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Project

SHAKE SHACK
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 COLONIAL
 MARKETPLACE, FL

Project Number 25128
 Drawn By SEI
 Checked By GRS
 Date 09 JUN 2025

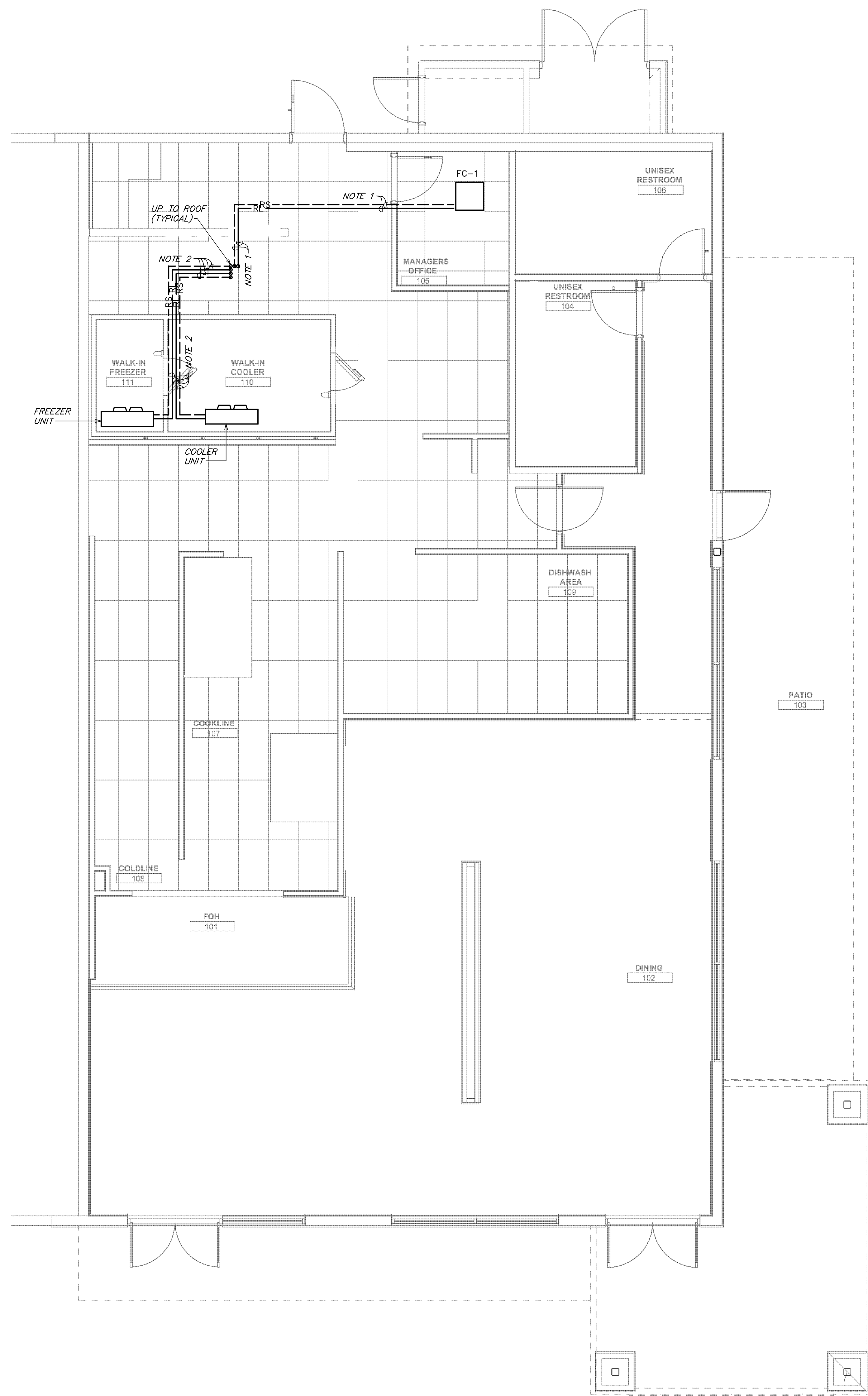
Revisions
 1 17 JUL 2025 ISSUED FOR CONSTRUCTION
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Drawing
MECHANICAL FLOOR PLAN

M101

08.2024

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1 MECHANICAL REFRIGERANT PIPING LAYOUT PLAN

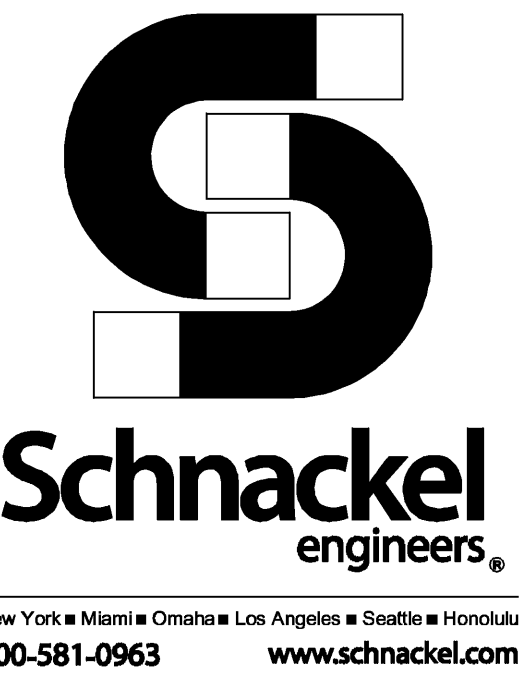
SCALE: 1/4" = 1'-0"

0 2'-0" 4'-0" 8'-0"

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 - 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) ONE (1) DUCT HANGERS 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 SMOGA AND MAJIMA. 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.
 - ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE, THRU JOIST SPACE.
 - PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED ENERTECH FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILING. 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.
 - TENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITY RUNS 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 RUNS 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 DUCTWORK 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 1/2 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 AECQ, ABC OR TABS 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 TURNBOURGH AT WILL@NATIONTAB.COM OR 314-954-6244.
 - 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.



Seal

CO# 28403

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Project

SHAKE SHACK
SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number 25128
Drawn By SEI
Checked By GRS
Date 09 JUN 2025

Revisions

1	17 JUL 2025	ISSUED FOR CONSTRUCTION
3	09 SEP 2025	STRUCT. COORD.

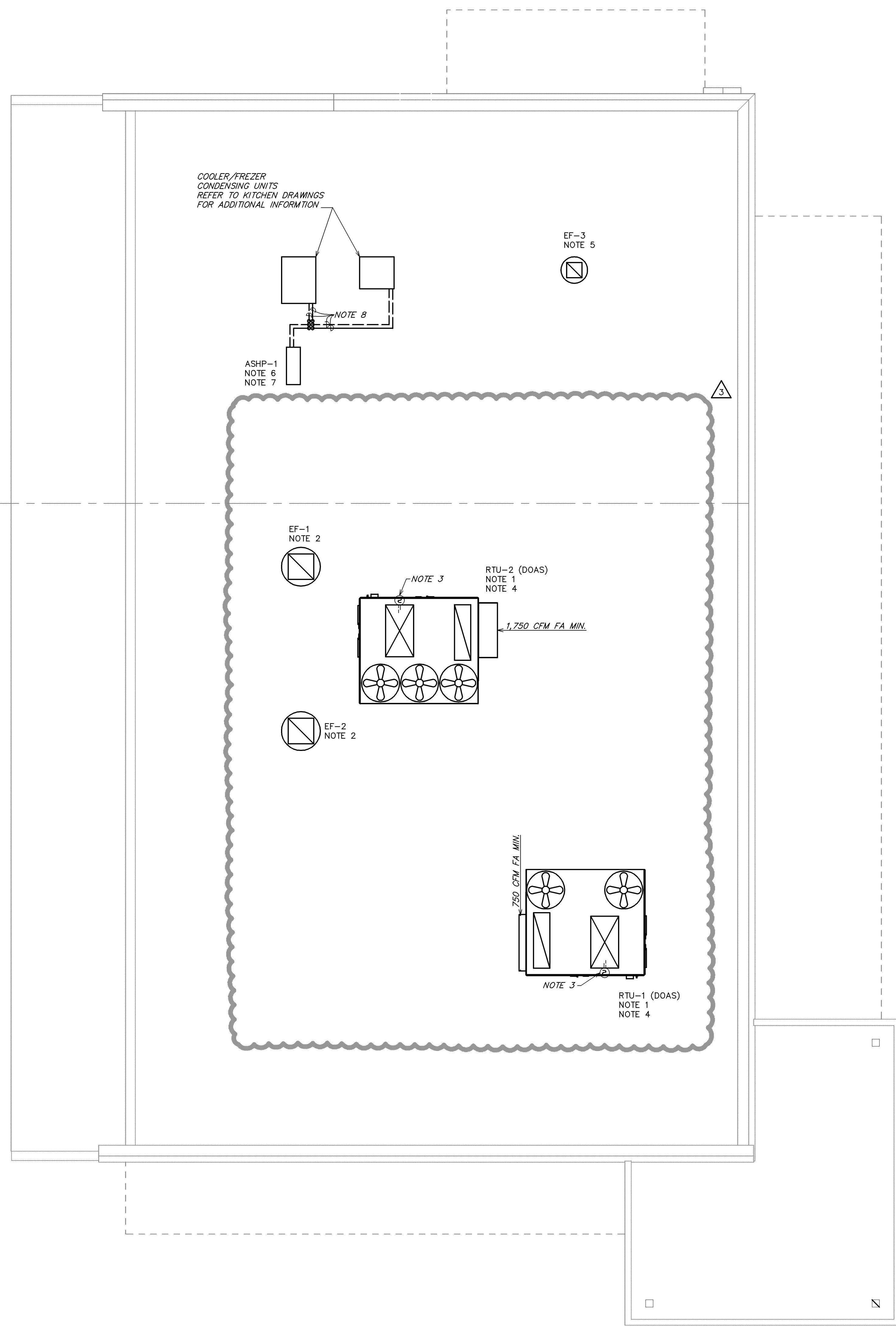
Drawing

MECHANICAL REFRIGERANT PIPING LAYOUT PLAN

M102

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

- 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 OF 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 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 AND 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) OR IN ADJACENT WALLS. ALL CONNECTIONS TO JOISTS SHALL BE MADE 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 SMOKE AND HEAT/RETURNS 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.
 - ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE, THRU JOIST SPACE.
 - PROVIDE FLEXIBLE VALVE DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED 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.
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 - 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. 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 SUPPLY 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 M001 FOR ADDITIONAL INFORMATION. SHEET M001 FOR SCHEDULE, AND SHEET M092 FOR SPECIFICATIONS.
 - PROVIDE NEW EXHAUST FAN AS NOTED ON PLANS AND SCHEDULED ON SHEET M001. THE CONTRACTOR SHALL FIELD VERIFY THAT THE LOCATION SHOWN IS A MINIMUM OF 10'-0" FROM ANY OUTDOOR AIR INTAKE.
 - MECHANICAL CONTRACTOR TO PROVIDE ASHP-1 AS NOTED ON PLANS AND SCHEDULED ON SHEET M001. PROVIDE WITH ALUMINUM HERRINGBONE RATED STAND FOR MOUNTING TO THE ROOF. PRECISION ALUMINUM PRODUCTS OR SIMILAR MANUFACTURER. STANDS SHOULD BE MIAMI-DADE COUNTY RATED. MOUNTING LOCATION OF UNIT SHALL COMPLY WITH FBC M-306.5 (EQUIPMENT AND APPLIANCES ON ROOFS OR ELEVATED STRUCTURES) AND ANY LOCAL BUILDING CODE REQUIREMENTS.
 - MECHANICAL CONTRACTOR TO 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. 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. PROVIDE WITH ALUMINUM HERRINGBONE RATED STAND FOR MOUNTING TO THE ROOF. PRECISION ALUMINUM PRODUCTS OR SIMILAR MANUFACTURER. STANDS SHOULD BE MIAMI-DADE COUNTY RATED. MOUNTING LOCATION OF UNITS SHALL COMPLY WITH FBC M-306.5 (EQUIPMENT AND APPLIANCES ON ROOFS OR ELEVATED STRUCTURES) AND ANY LOCAL BUILDING CODE REQUIREMENTS.



Seal

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Project

SHAKE SHACK
SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number 25128
 Drawn By SEI
 Checked By GRS
 Date 09 JUN 2025

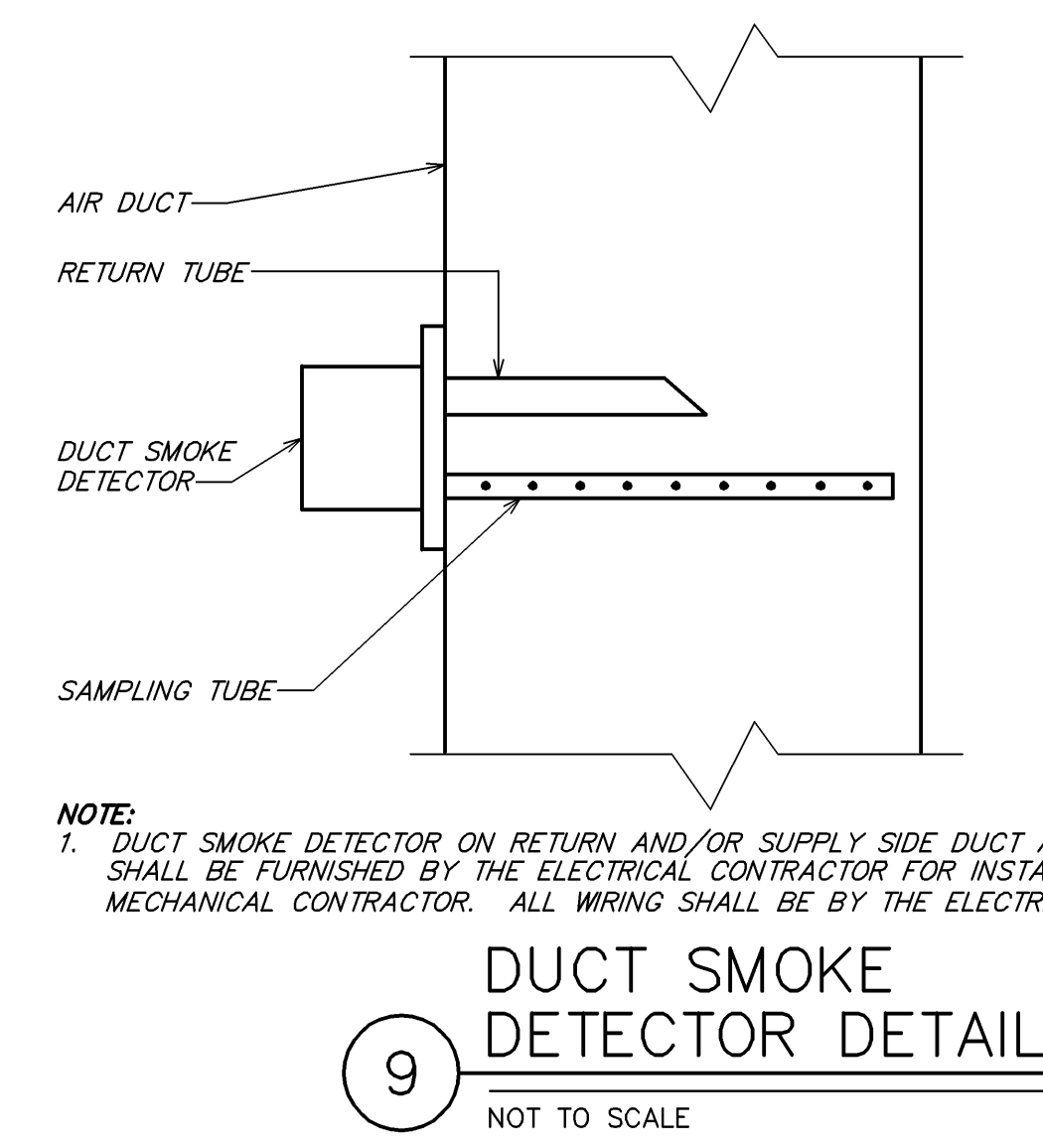
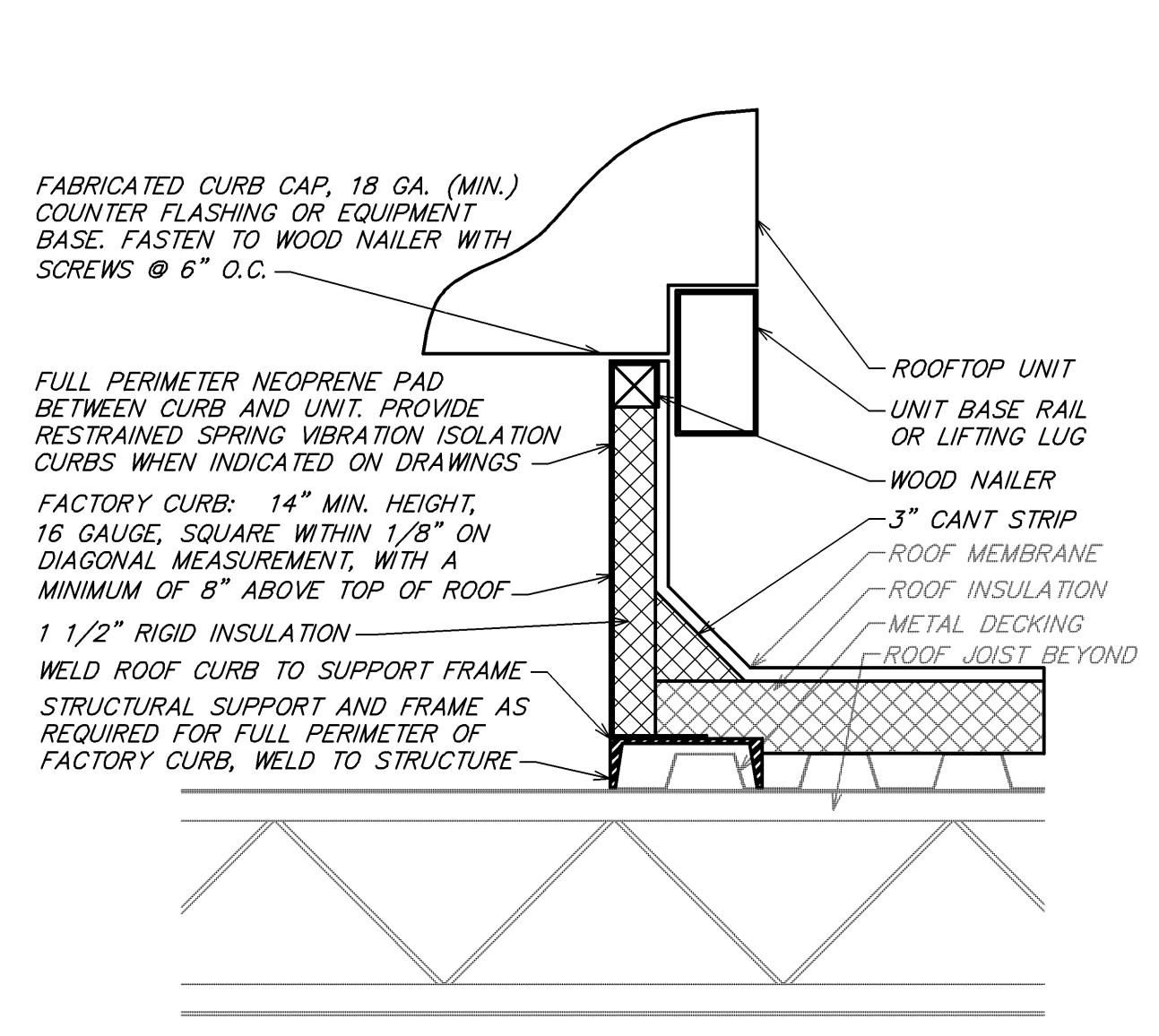
Revisions

1	17 JUL 2025	ISSUED FOR CONSTRUCTION
3	09 SEP 2025	STRUCT. COORD.

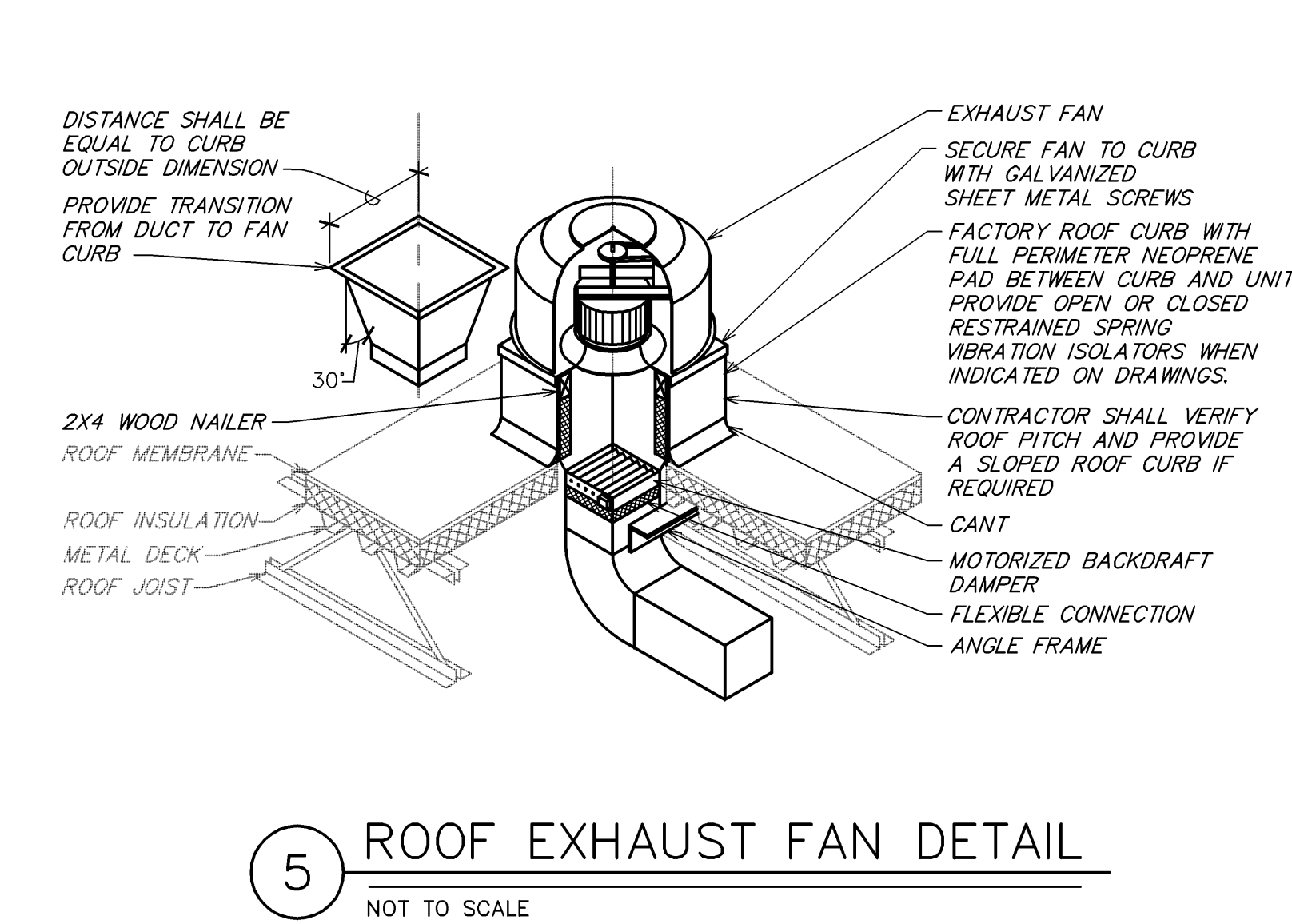
Drawing
MECHANICAL ROOF PLAN

M150

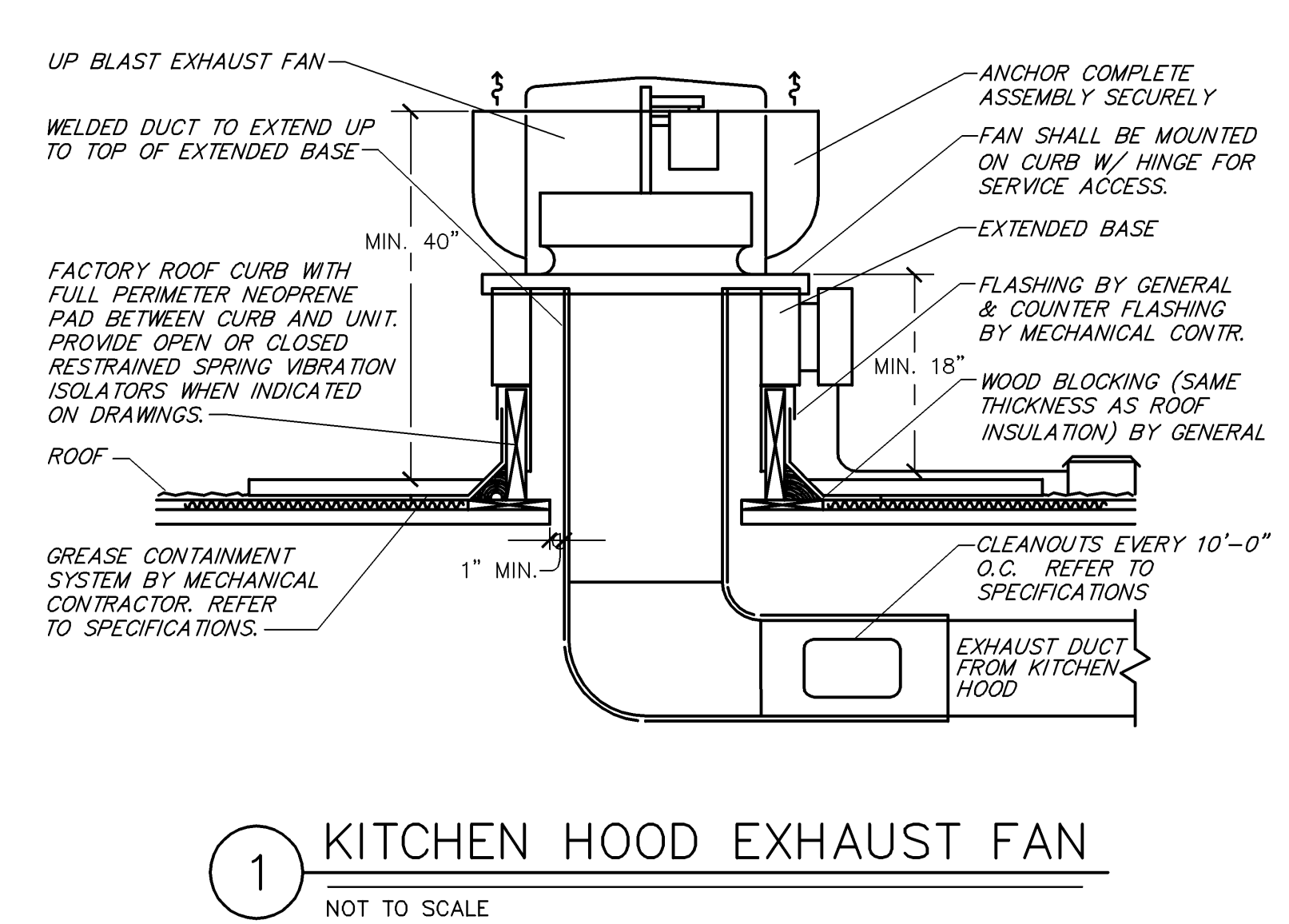
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9 DUCT SMOKE DETECTOR DETAIL
NOT TO SCALE

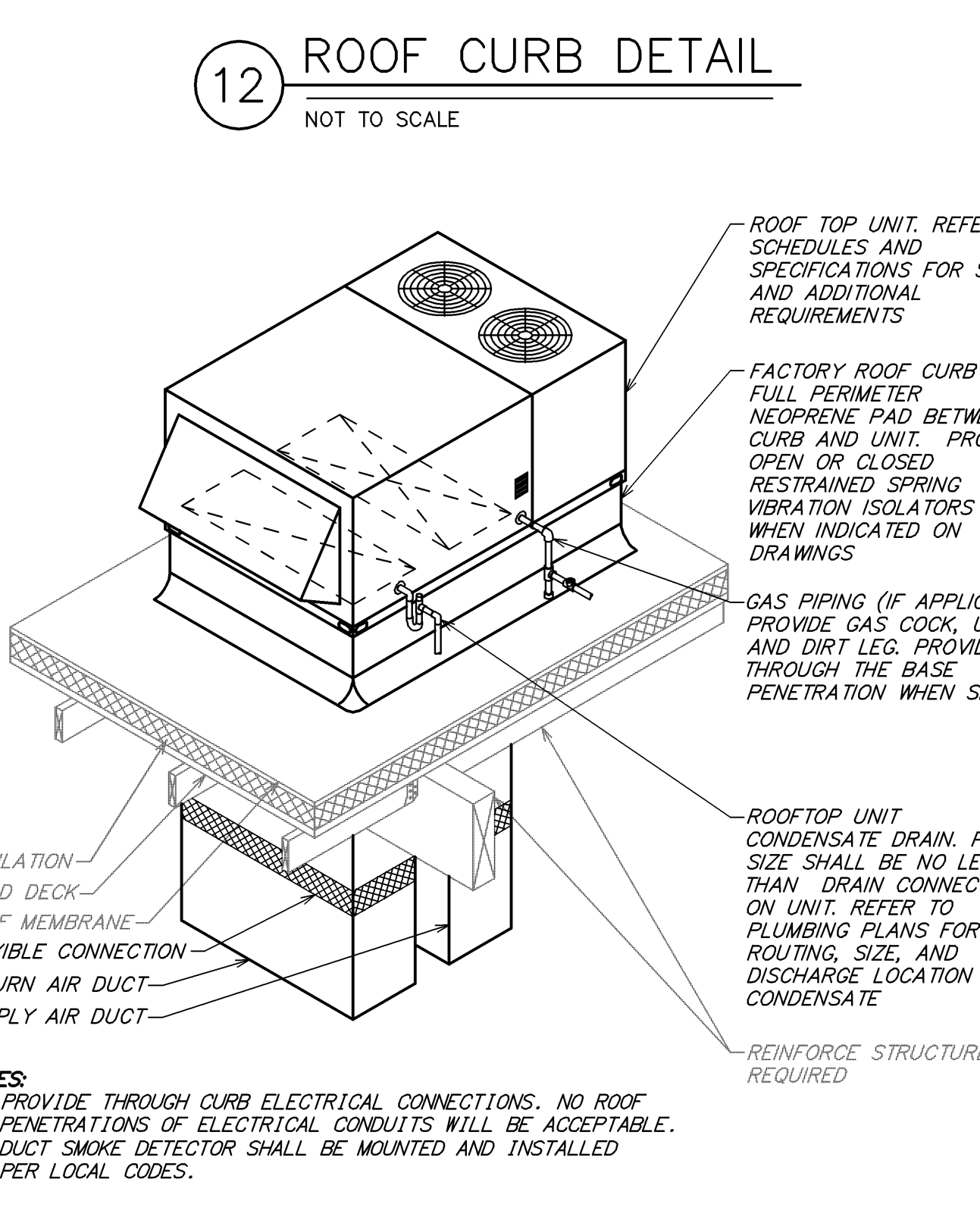


5 ROOF EXHAUST FAN DETAIL
NOT TO SCALE



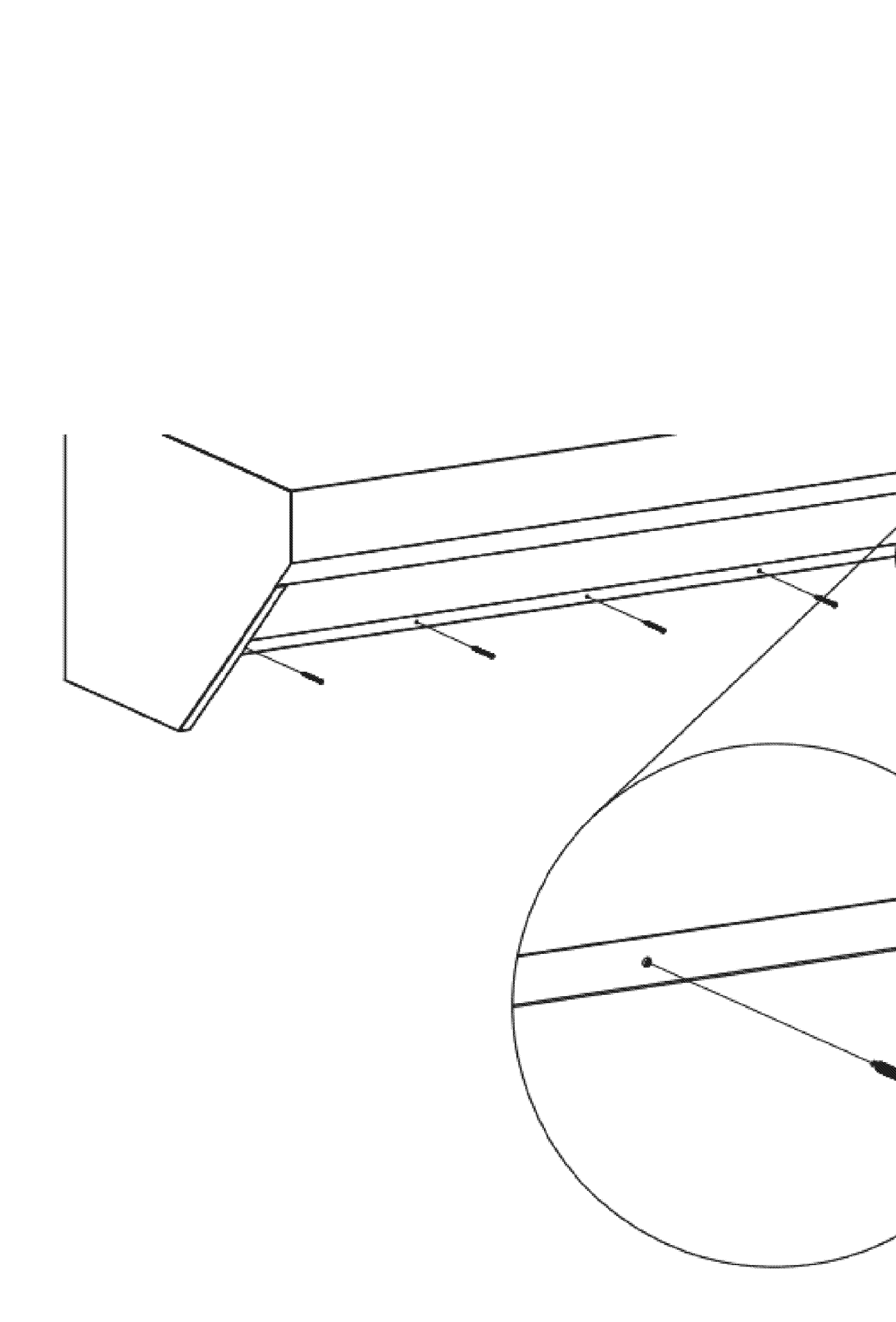
1 KITCHEN HOOD EXHAUST FAN
NOT TO SCALE

NOTES:
1. CUT AND PATCH EXISTING ROOFING AS REQUIRED FOR NEW CURB INSTALLATION.
2. CURB SHALL BE CHIMED LEVEL. PROVIDE TAPERED ROOF CURB IF REQUIRED.
3. SECURELY INSTALL CURB TO ROOF STRUCTURE. USE FASTENERS AS REQUIRED BY ROOF CONSTRUCTION.



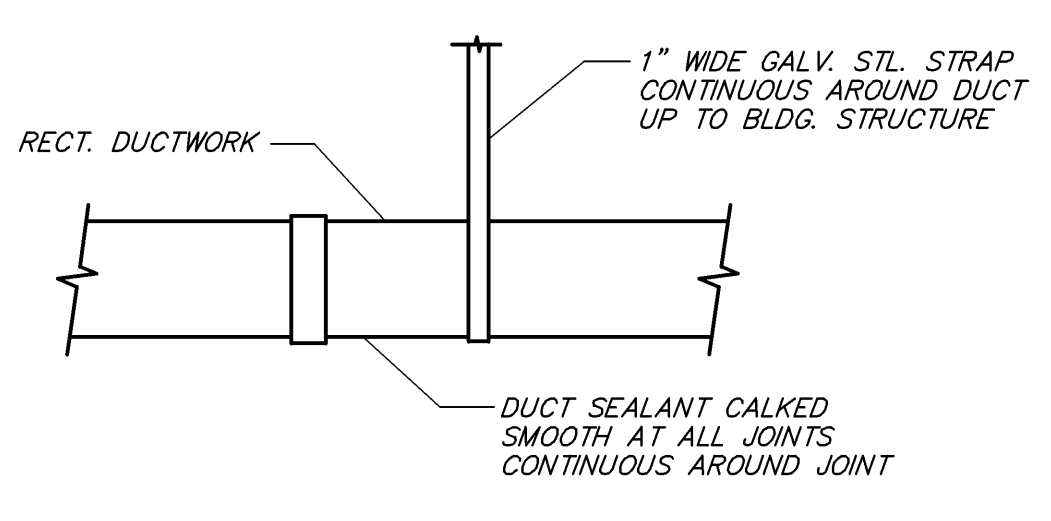
12 ROOF CURB DETAIL
NOT TO SCALE

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

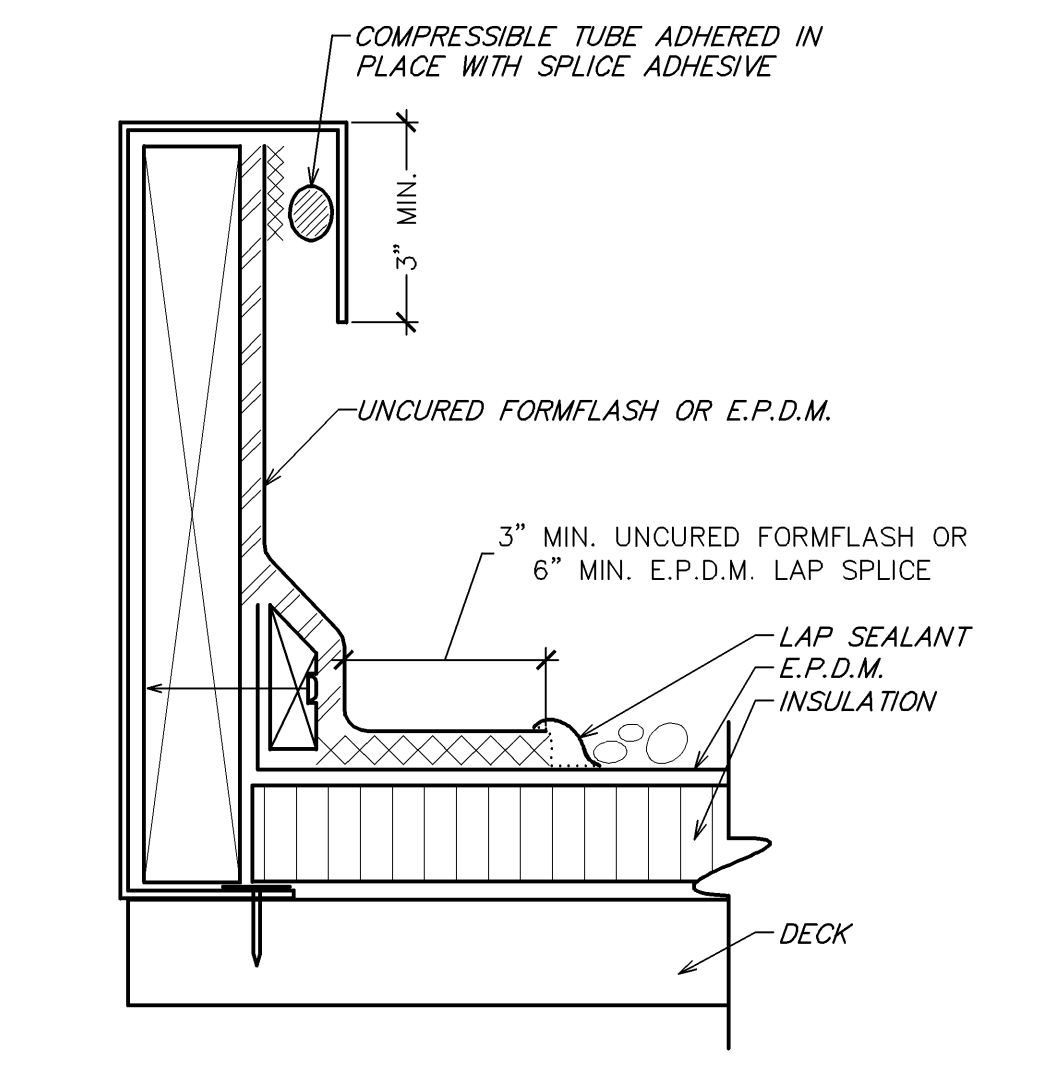


13 TYPICAL ROOF TOP UNIT DETAIL
NOT TO SCALE

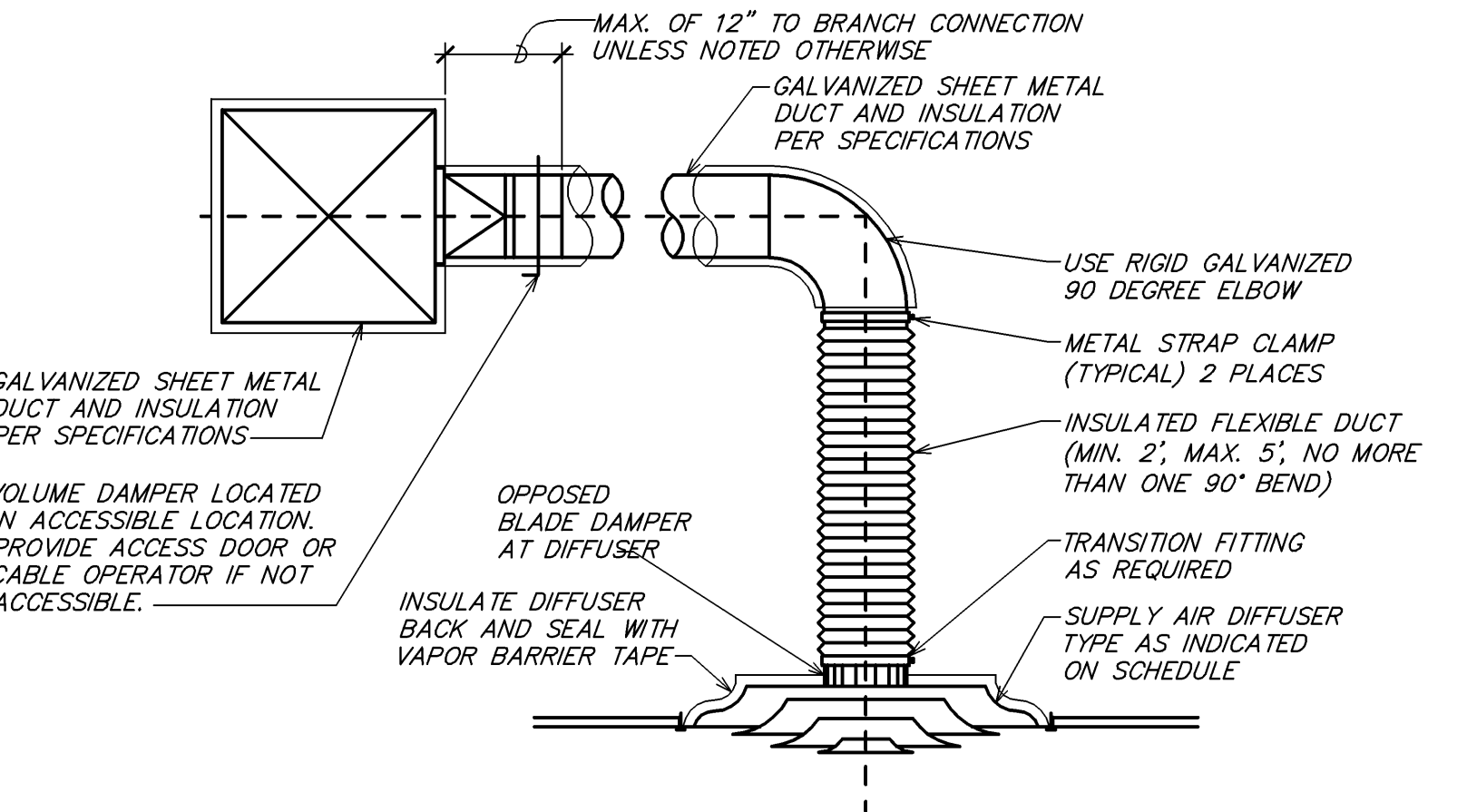
14 HOOD FASTENING DETAIL
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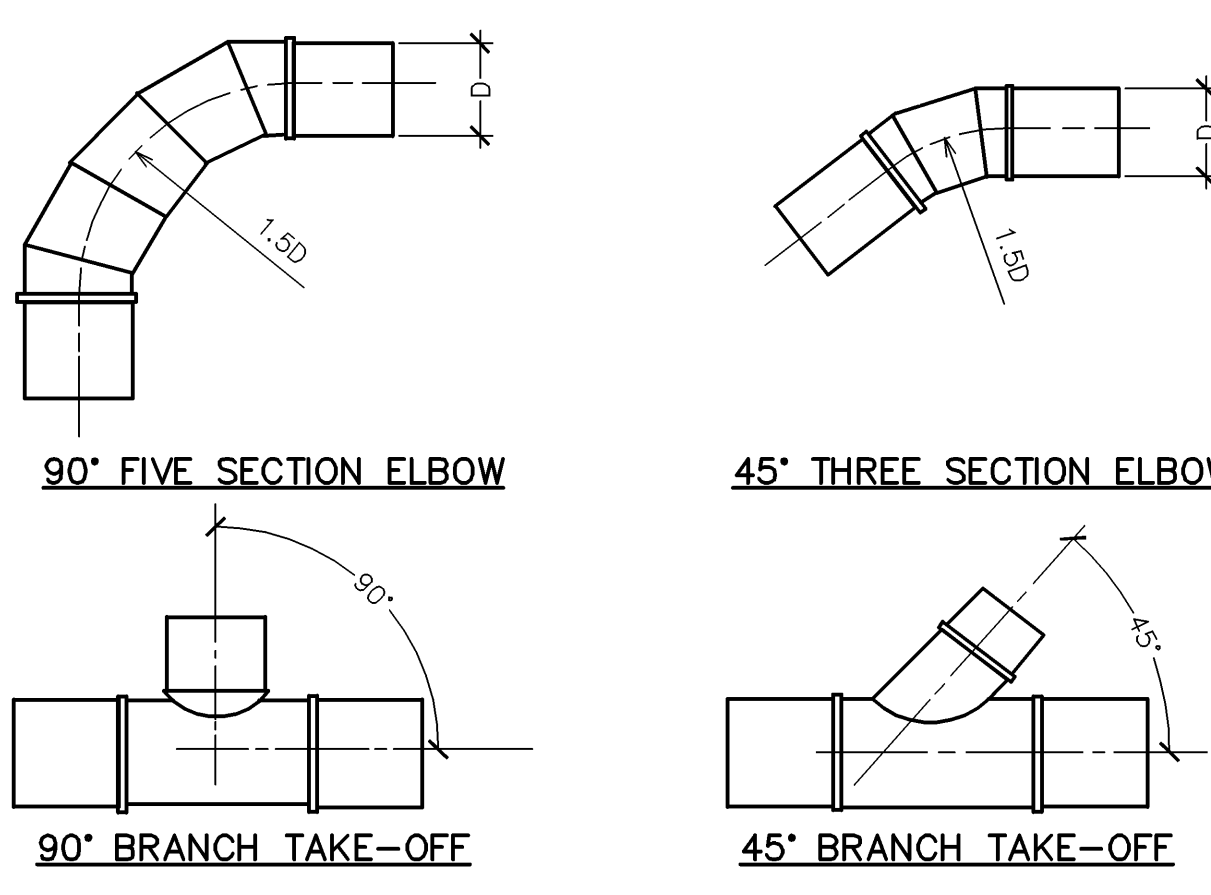
10 EXPOSED RECTANGULAR DUCT SUPPORT DETAIL
NOT TO SCALE



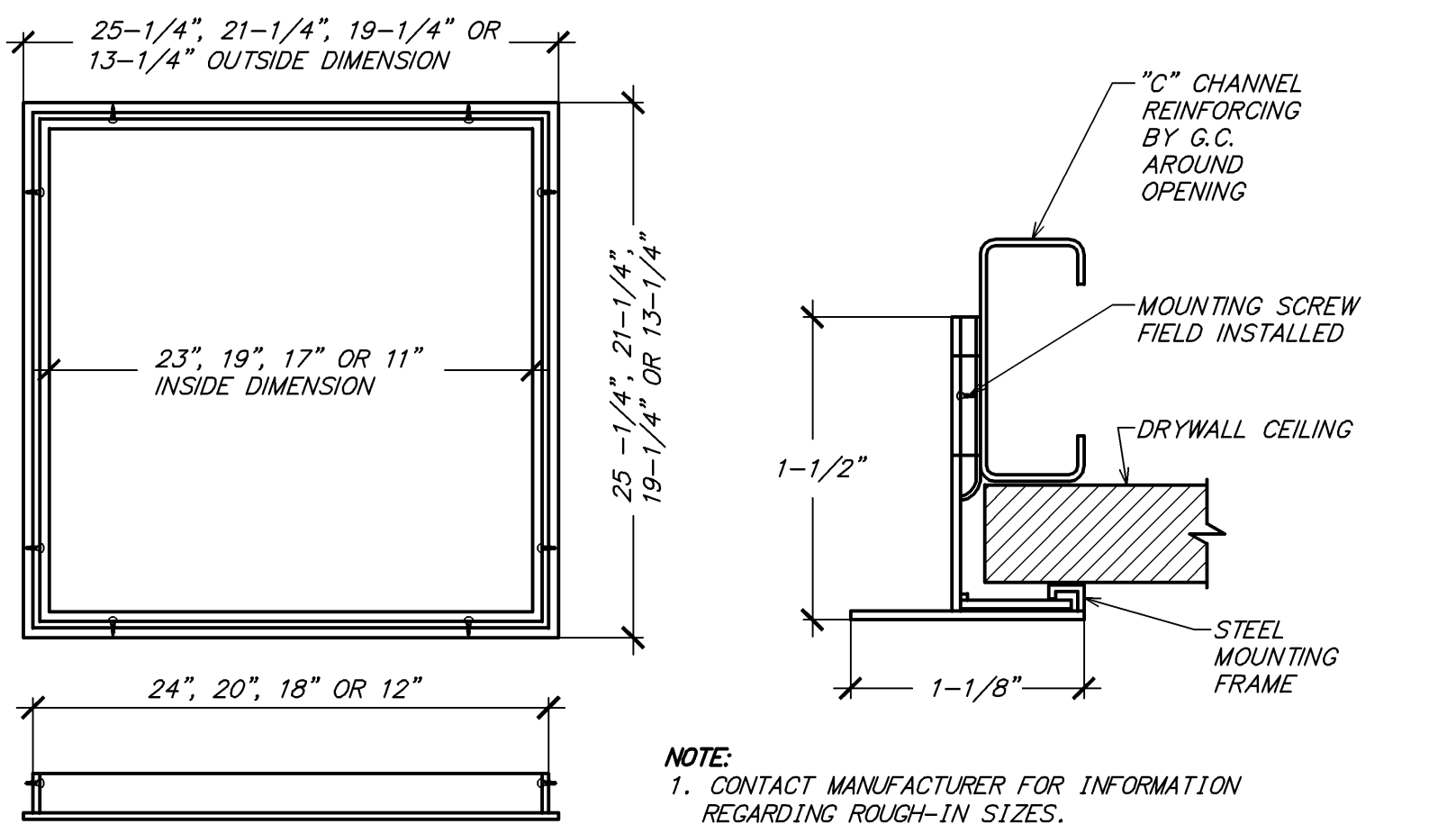
11 CURB FLASHING DETAIL
NOT TO SCALE



6 TYPICAL DIFFUSER CONNECTION
NOT TO SCALE

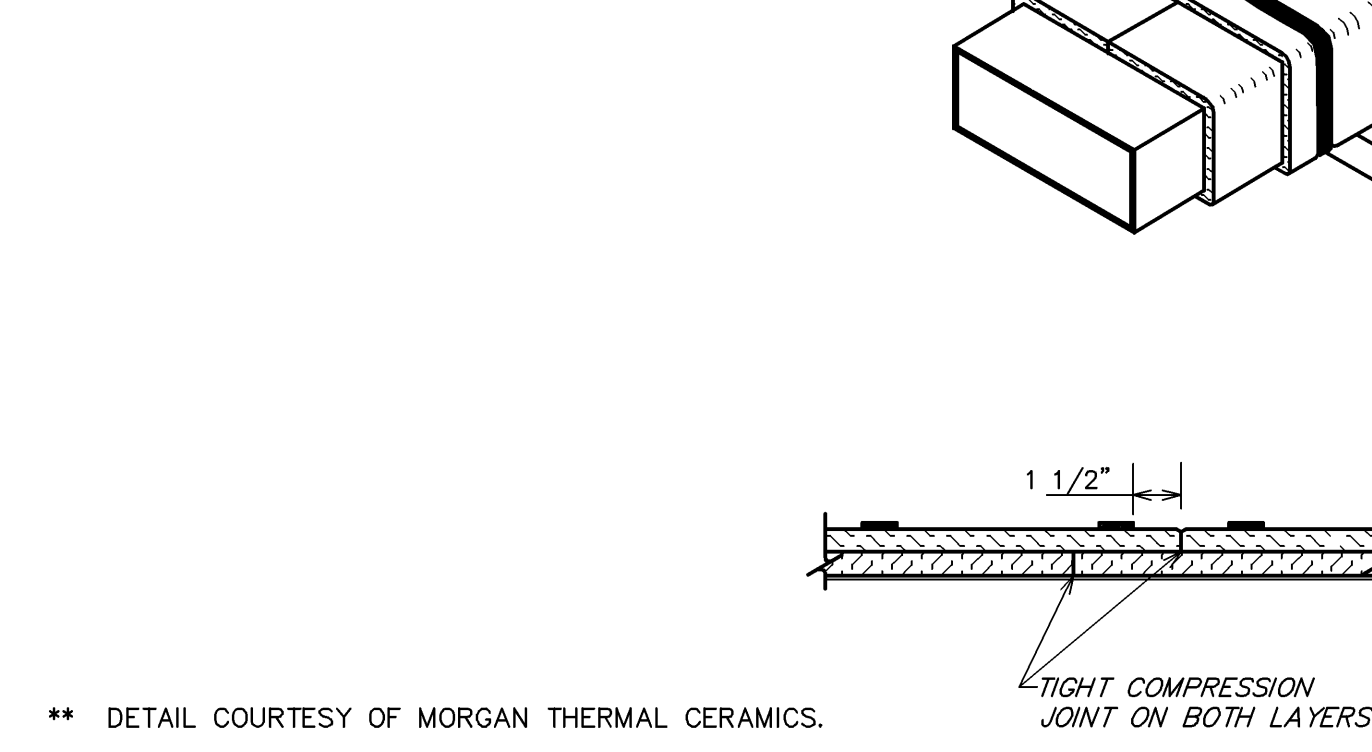


7 TYPICAL ROUND DUCT FITTINGS
NOT TO SCALE



8 TYPICAL DRYWALL MOUNTING FRAME DETAIL
NOT TO SCALE

NOTES:
1. THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2336 AND UL LISTED PER HNK.T.G18 TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1 OR 2 HOUR EXPOSURE THROUGH PENETRATIONS FIRESTOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E 914 (UL 1479). ICC-ES APPROVAL PER REPORT ESR 2213 OR EST 2832.
2. COMPLIANT TO THE FOLLOWING CODES:
NFPA 96
INTERNATIONAL MECHANICAL CODES
UNIFORM MECHANICAL CODE
CALIFORNIA MECHANICAL CODE
3. INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
4. MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAUGE STAINLESS STEEL) RECTANGULAR OR ROUND TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20 FT ON HORIZONTAL RUNS.
5. INSTALL UL LISTED AND LIQUID TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20 FT ON HORIZONTAL RUNS.
6. SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM OF 3/8\"/>

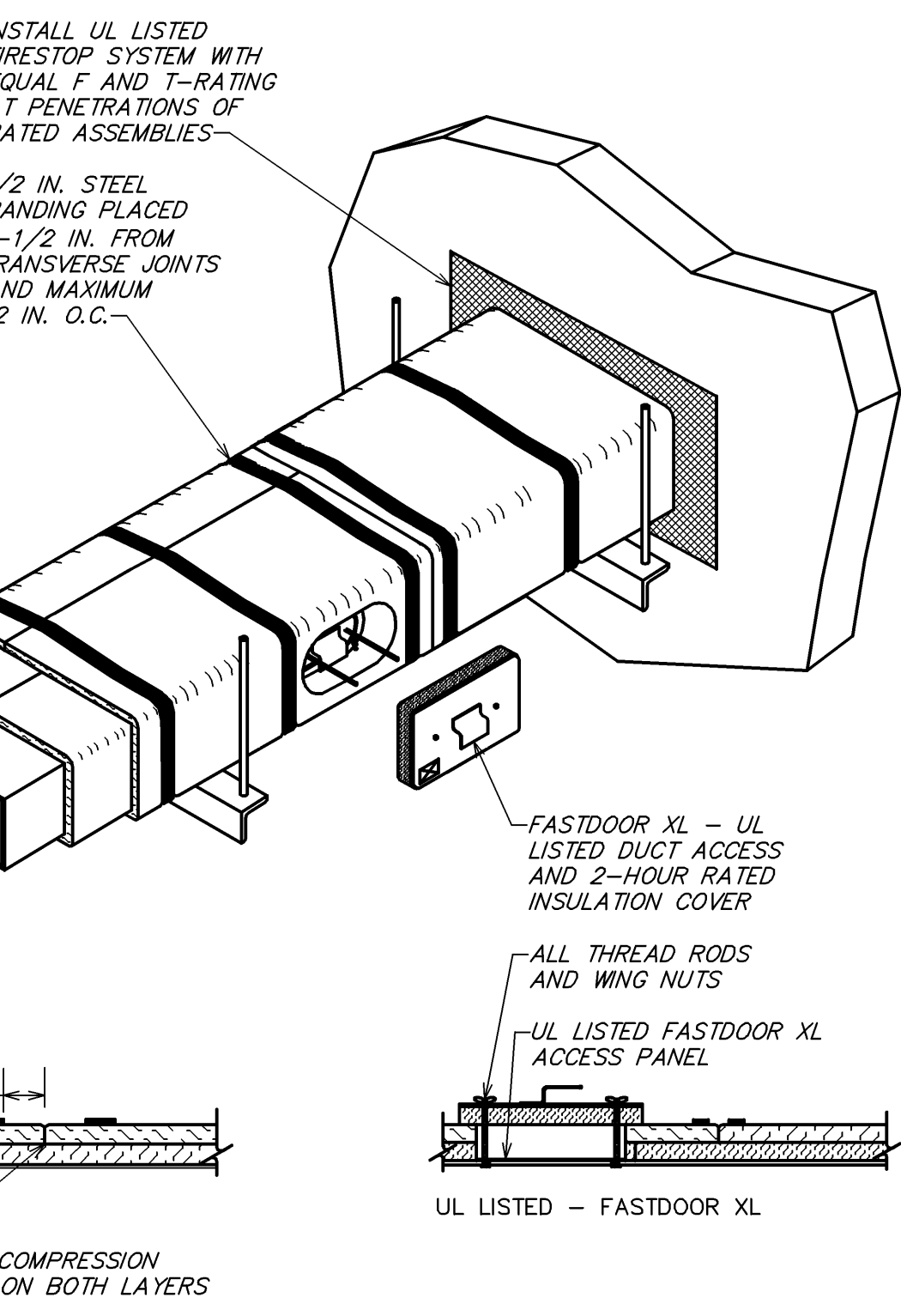


2 FIREMASTER FASTWRAP XL DETAIL
NOT TO SCALE

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/SF 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



3 REMOTE VOLUME DAMPER CONTROLLER
NOT TO SCALE

Seal

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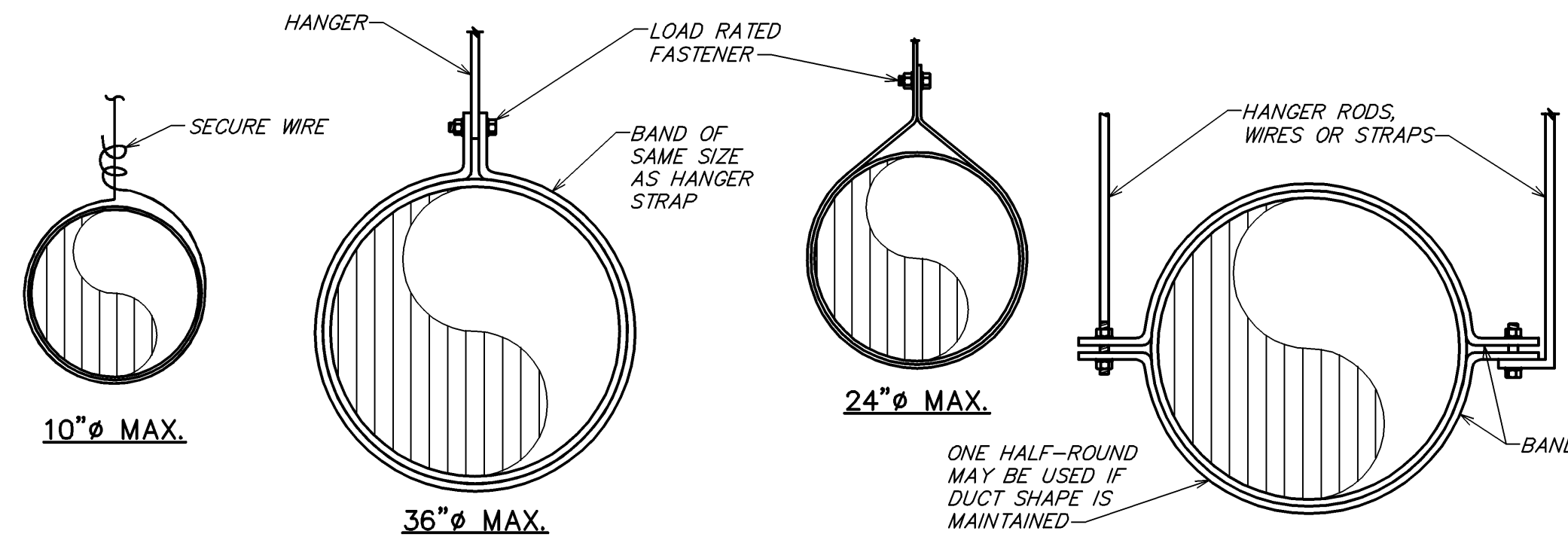
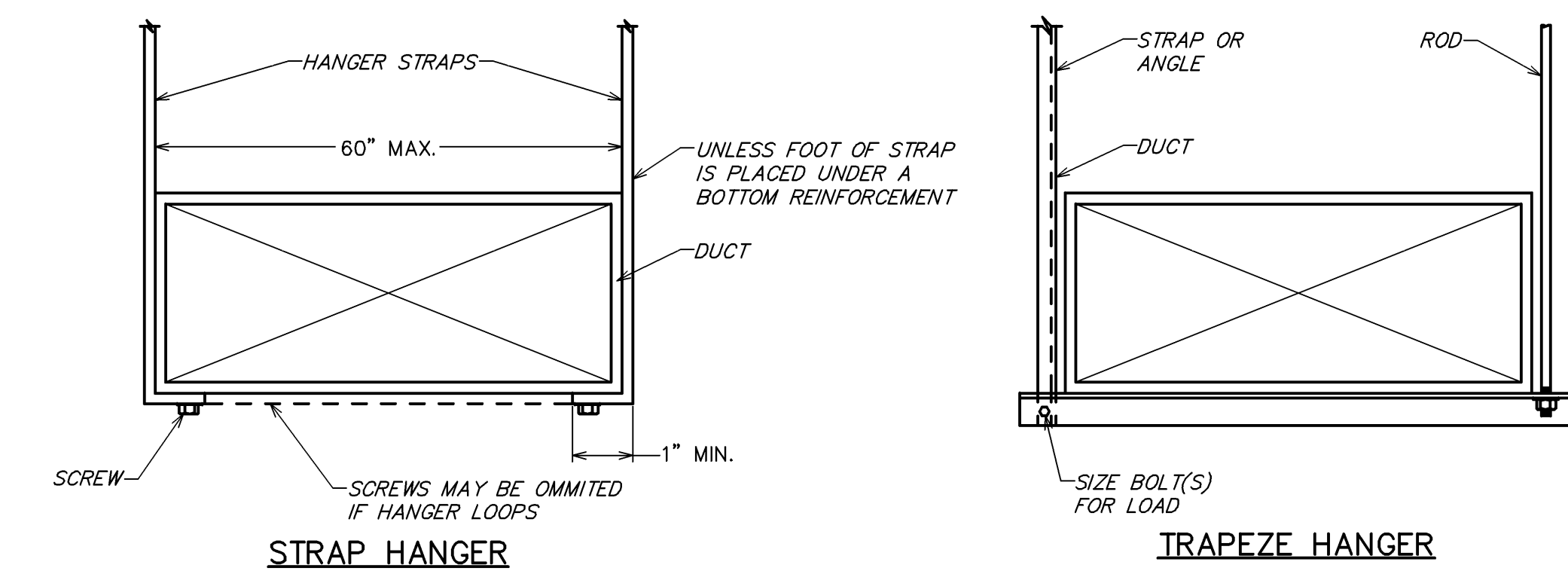
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MECHANICAL
DETAILS

M501

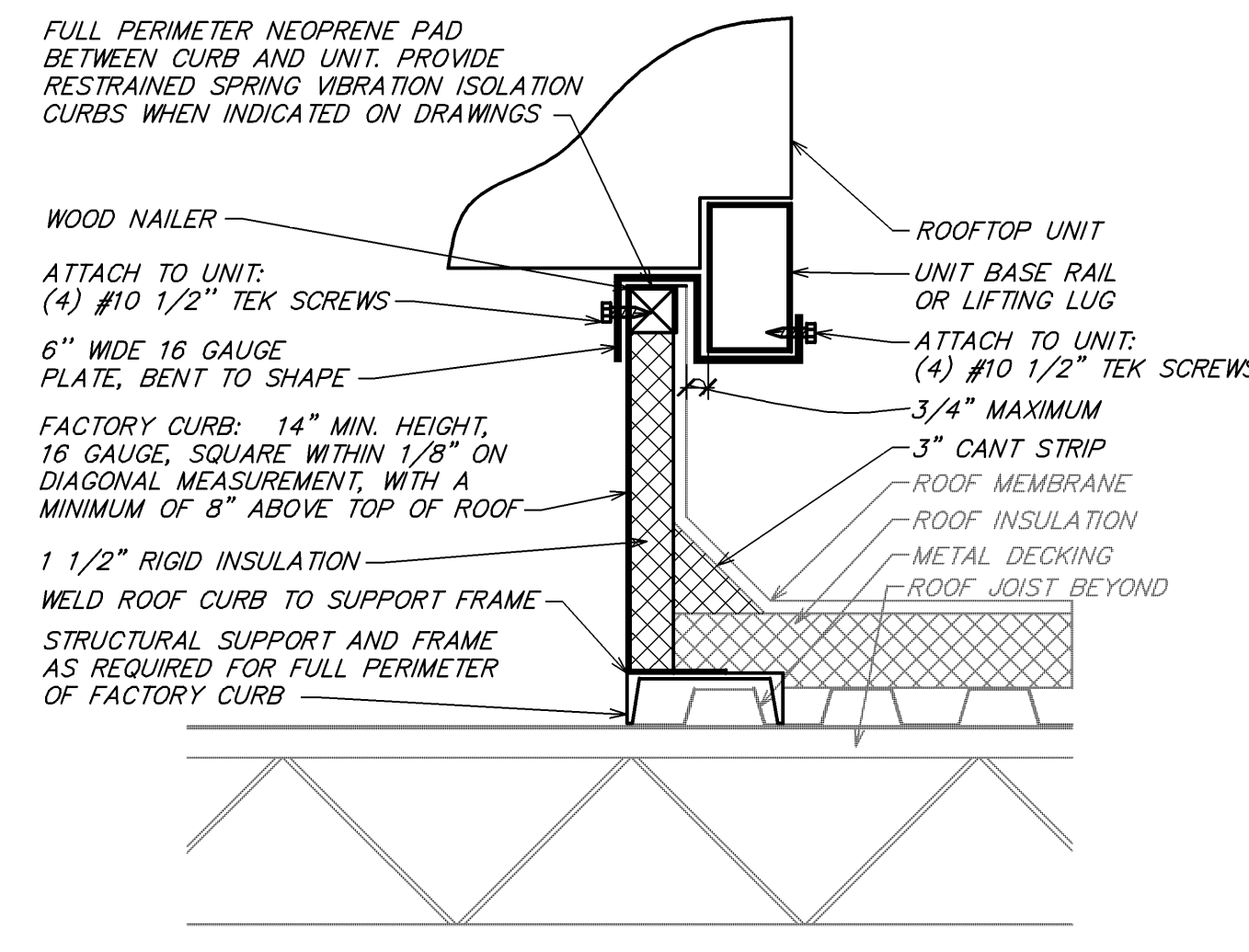
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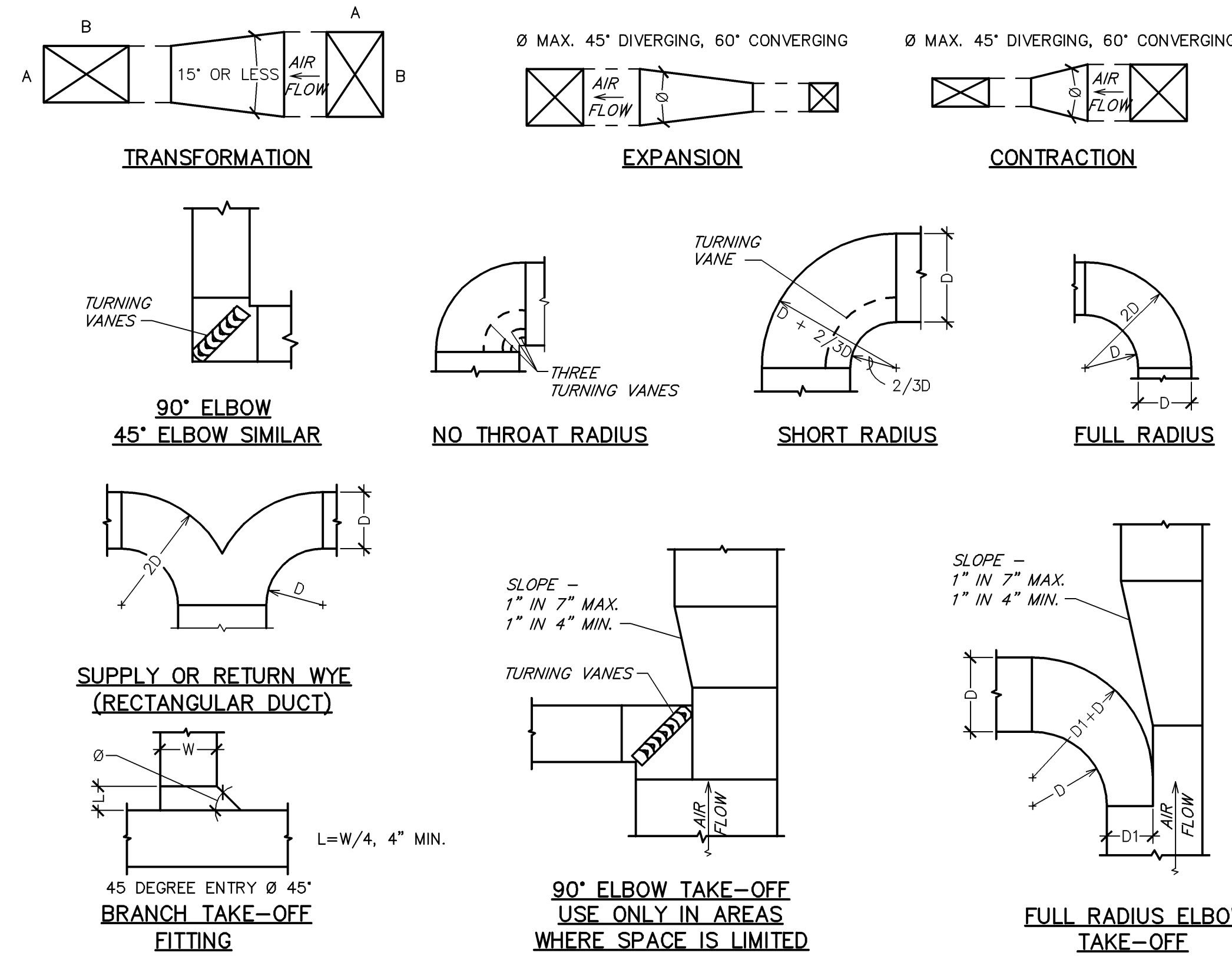
NOTE: HANGERS MUST NOT DEFORM DUCT SHAPE

6 DUCT HANGER DETAIL
 NOT TO SCALE

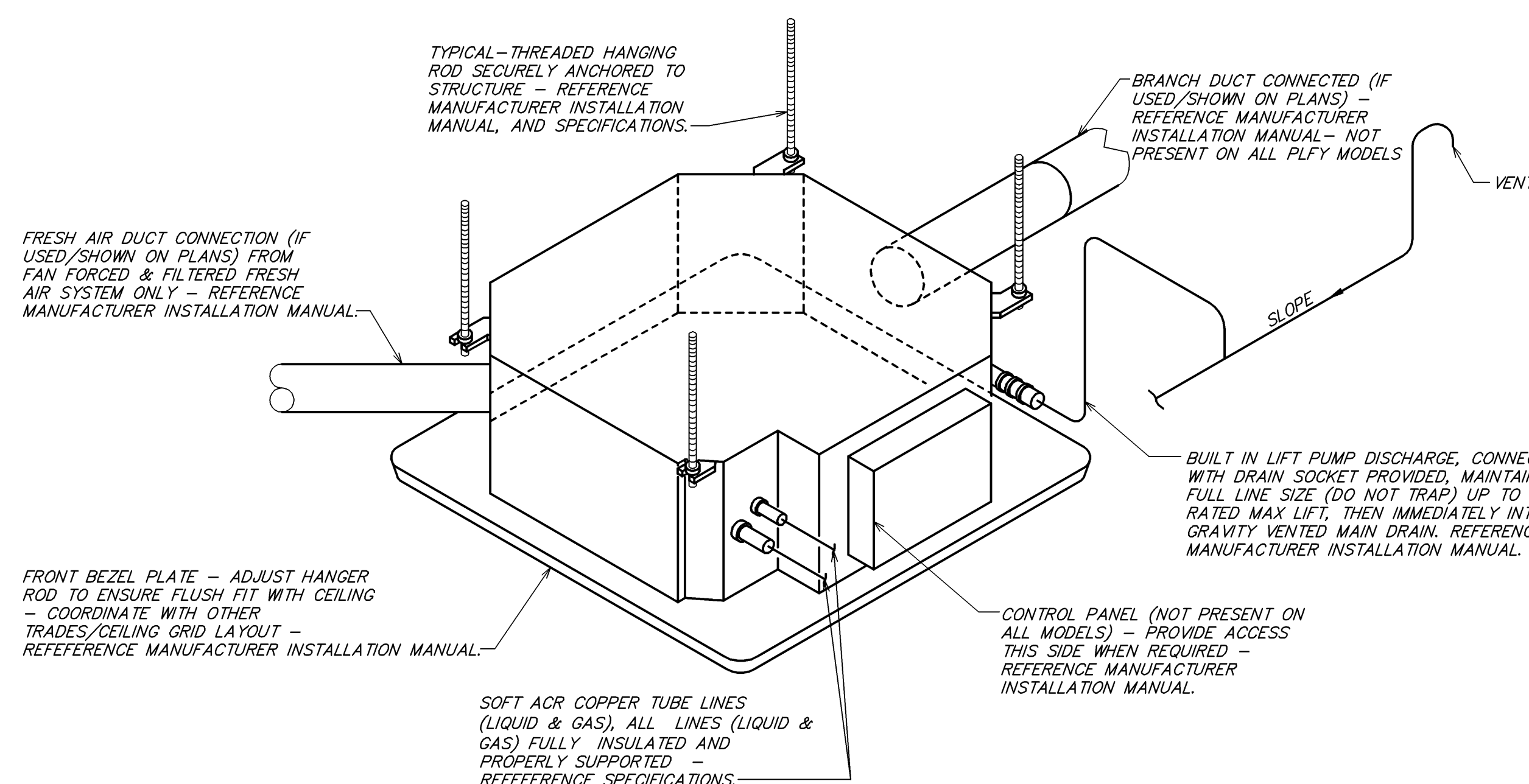


- NOTES:
 1. USE A MINIMUM OF (1) PLATE PER SIDE OF UNIT.
 2. PLATE MUST BE PAINTED WHERE IT CONTACTS RAIL.
 3. USE (9) SCREWS TO SECURE PLATE, NO SMALLER THAN #10x1/2"
 4. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF, AND COMPLIANCE WITH ALL LOCAL CODES

7 ROOF TOP UNIT HURRICANE TIE DOWN DETAIL
 NOT TO SCALE



4 DUCTWORK DETAILS
 NOT TO SCALE



5 CASSETTE UNIT
 NOT TO SCALE

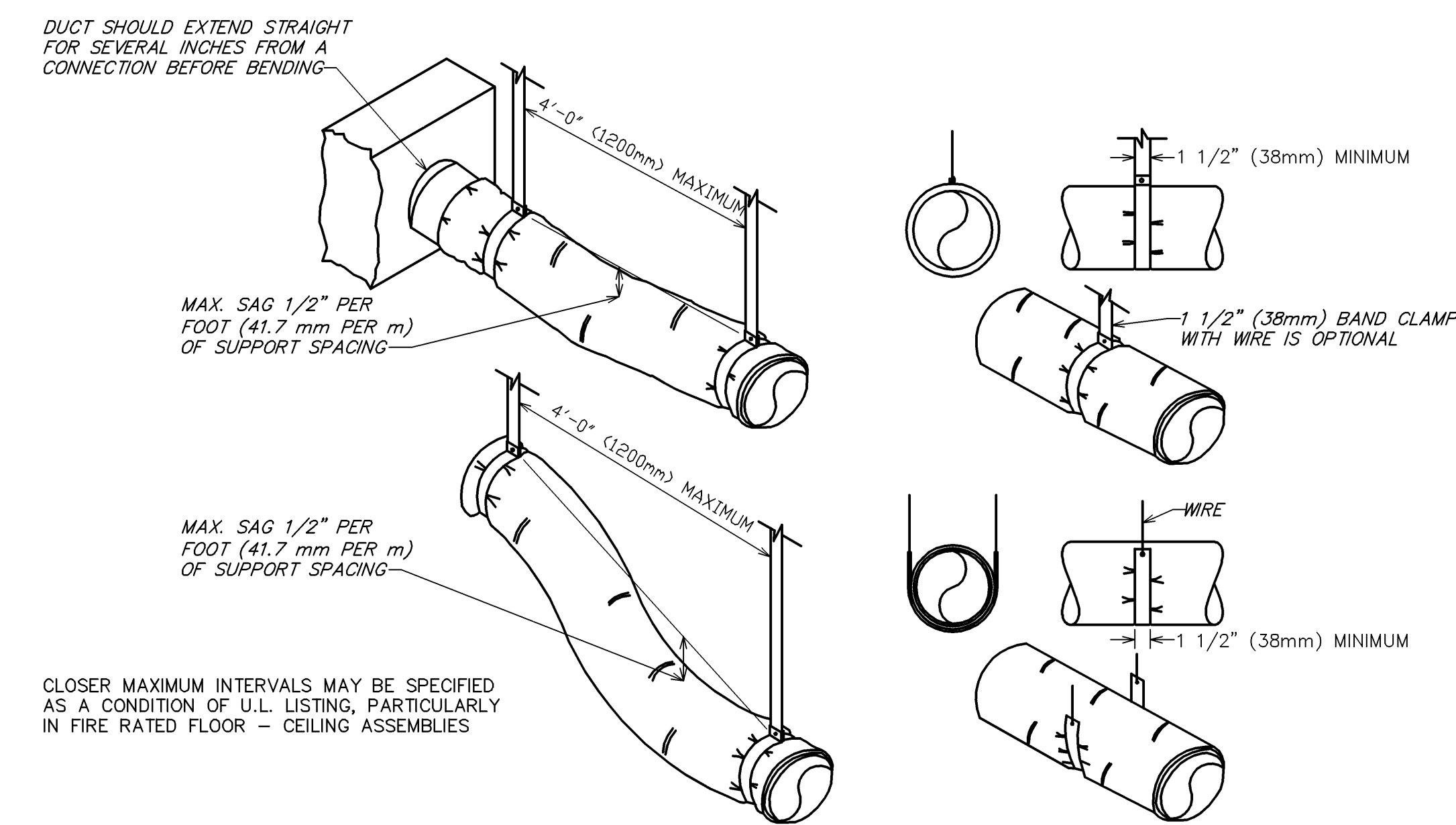
MAXIMUM HALF OF DUCT PERIMETER	PAIR AT 10 FT. SPACING		PAIR AT 8 FT. SPACING		PAIR AT 5 FT. SPACING		PAIR AT 4 FT. SPACING	
	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD
P/2 = 30"	1" x 22 GA.	10 GA. (.135")	1" x 22 GA.	10 GA. (.135")	1" x 22 GA.	12 GA. (.106")	1" x 22 GA.	12 GA. (.106")
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:

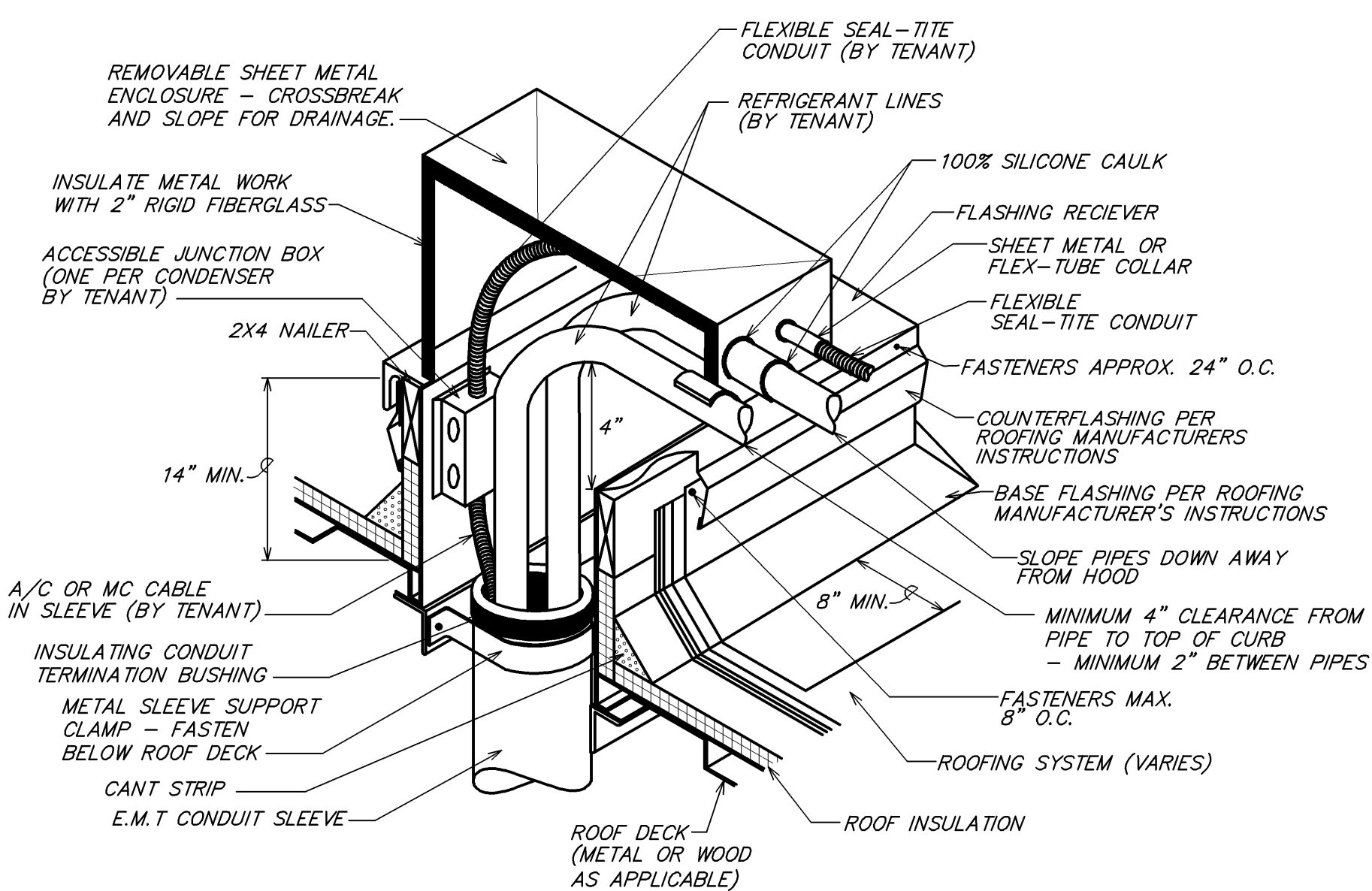
	SINGLE HANGER MAXIMUM ALLOWABLE LOAD	
	STRAP	WIRE OR ROD (DIA.)
1" x 18, 20, 22 GA. - TWO #10 OR ONE 1/4" BOLT	1" x 22 GA. - 260 LBS.	0.106" - 80 LBS.
1" x 16 GA. - TWO 1/4" DIA.	1" x 20 GA. - 320 LBS.	0.135" - 120 LBS.
1" x 16 GA. - TWO 3/8" DIA.	1" x 18 GA. - 420 LBS.	0.162" - 160 LBS.
1 1/2" x 16 GA. - 700 LBS.	1 1/2" x 16 GA. - 1100 LBS.	1/4" - 270 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 8 GA. WIRE IS STEEL OF BLACK ANNEALED, BRIGHT BASIC OR GALVANIZED TYPE.
 6. DUCTS SHALL BE SUPPORTED AT INTERVALS NOT EXCEEDING 10 FEET.

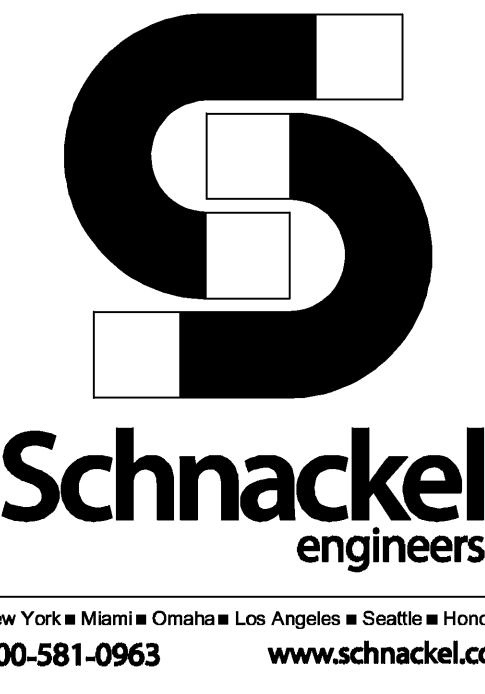
1 RECTANGULAR DUCT HANGER TABLE
 NOT TO SCALE



2 FLEXIBLE DUCT SUPPORTS
 NOT TO SCALE



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



Seal

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY GREGORY R. SCHNACKEL, PE ON THE DATE AND/OR TIME STAMP SHOWN USING A DIGITAL SIGNATURE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED BY A 3RD PARTY CERTIFICATE AUTHORITY ON ANY ELECTRONIC COPY. FAC 81G15-23.004

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Project

SHAKE SHACK

SHAKE SHACK #1731
 COLONIAL
 MARKETPLACE, FL

Project Number 25128
 Drawn By SEI
 Checked By GRS
 Date 09 JUN 2025

Revisions
 1 17 JUL 2025 ISSUED FOR CONSTRUCTION
 3 09 SEP 2025 STRUCT. COORD.

Drawing
MECHANICAL
 DETAILS

M502

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09.2025

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SECTION 230000 - HVAC GENERAL CONDITIONS

PART 1 GENERAL

- 1.01 APPLICABILITY
A. This section supplements all sections of the Specifications for Division 23 and shall apply to all phases of work hereinafter specified, shown on the Drawings, or required to provide a complete installation of approved HVAC systems.
1.02 DEFINITIONS
A. "Work" is hereby defined as, "The construction and services required by the Contract Documents whether completed or partially completed and includes all labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The work may constitute the whole or a part of the project."
B. "Furnish" is hereby defined as, "To supply and deliver, unload, and inspect for conformance with the Contract Documents."
C. "Install" is hereby defined as, "To unpack, assemble, erect, apply, place, finish, cure, protect, clean, connect, and place into operation into the work."
D. "Provide" is hereby defined as, "To furnish and install."
E. "Connect" is hereby defined as, "To connect, install, and make final attachment including necessary ductwork, piping, wiring, etc."
F. "Concealed" is hereby defined as, "Hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, or covered by other materials."
G. "Exposed" is hereby defined as, "Not installed underground nor concealed as defined by the Specifications."
H. "Drawings" is hereby defined as, "All plans, details, equipment schedules, diagrams, sketches, etc. issued for the construction of the work."
1.03 CODES AND STANDARDS
A. Perform work in accordance with the applicable Building Code, Electrical Code, Fire Code, Mechanical Code, Plumbing Code, Energy Code, and all other applicable codes, amendments, and ordinances. Also perform all work in accordance with the Americans with Disabilities Act (ADA) and the Authority Having Jurisdiction (AHJ) including Fire Marshal(s).
B. Perform work in accordance with Landlord requirements, including any Tenant Criteria Manuals and Lease Exhibits, where applicable.
C. Perform work in accordance with the applicable codes and standards serving the project. Make all arrangements with the utility companies for proper coordination of the work.
D. Recognized Standards: Design, manufacture, testing and method of installation of all apparatus and materials furnished under the requirements of these Specifications shall conform to the latest published standards and specifications of Underwriters Laboratories, Inc. (UL), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), National Fire Protection Association (NFPA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and the Sheet Metal and Air Conditioning Contractors National Association (SMACNA), and all other applicable codes, amendments, and ordinances. Also perform all work in accordance with the Americans with Disabilities Act (ADA) and the Authority Having Jurisdiction (AHJ) including Fire Marshal(s).
E. The Contractor shall take precedence where the Contract Documents exceed code, Landlord utility, or restricted jurisdiction requirements.
1.04 PERMITS AND FEES
A. Permits, licenses, fees, inspections and arrangements required for the work under this Contract shall be obtained by the Contractor at his expense, unless otherwise indicated.
1.05 CONTRACT DRAWINGS
A. The Contractor is responsible to obtain, fully understand, and coordinate the work with the complete set of Contract Documents, including all associated codes, arising from issues caused by the Contractor's failure to understand and/or coordinate the work with the complete set of Contract Documents are the Contractor's sole responsibility.
B. Work under these sections is diagrammatic unless indicated otherwise and is intended to convey the scope of work and indicate the general arrangement of ductwork, piping, equipment, and accessories. Follow these drawings in laying out the work and verify spaces for the installation of these materials and equipment. Wherever a question exists as to the exact intended location of ductwork, piping, or equipment, obtain instructions from the Architect before proceeding with the work.
C. Notify the Architect for resolution if a discrepancy is discovered within the Contract Documents. Failure of the Contractor to resolve the discrepancy of discrepancies shall result in the resolution becoming the Contractor's responsibility and subject to the latest published standards and specifications. Should the Architect reject a discrepancy resolution of which they were not notified, the Contractor is fully responsible for the correct installation, including all associated costs, until approval of the installation is given by the Architect.
1.06 EXISTING CONDITIONS
A. Verify all existing conditions prior to beginning work.
B. Any existing conditions indicated in the Contract Documents are based on information drawings provided by others and possibly limited field verification. The Contractor shall adjust for conditions not shown on the drawings and report to the Owner.
C. The Contractor shall visit the project site, review existing conditions against the Contract Documents, and familiarize himself with the work prior to bidding and start of the work. By signing the Contract, the Contractor acknowledges the site visit has been completed and the existing conditions are as shown on the drawings.
D. The Contractor shall notify the Architect of major discrepancies in writing so the appropriate modifications to the design drawings may be made prior to project start. The Contractor assumes full responsibility of adjusting for discrepancies of which the Architect is not informed.
1.07 SUBMITTALS
A. Shop Drawings:
1. Furnish the following submittals to the Architect for review by the Engineer:
a. Provide product data and shop drawings for vibration isolation.
b. Provide balancing firm qualifications and final test report for Testing, Adjusting, and Balancing.
c. Provide product data for duct insulation.
d. Provide product data for grease duct preproofing (if specified).
e. Provide product data for HVAC piping insulation.
f. Provide product data refrigerant piping.
g. Provide product data and shop drawings for HVAC ductwork.
h. Provide product data and shop drawings for air handling and fan coil units.
i. Provide product data and shop drawings for air conditioning units.
j. Provide product data and shop drawings for air conditioning units.
k. Provide product data and shop drawings for air conditioning units.
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v. Provide product data and shop drawings for air conditioning units.
w. Provide product data and shop drawings for air conditioning units.
x. Provide product data and shop drawings for air conditioning units.
y. Provide product data and shop drawings for air conditioning units.
z. Provide product data and shop drawings for air conditioning units.
2. Submittals other than those listed above will not be reviewed and will be returned stating as such.
3. Shop drawings shall be prepared by a manufacturer's representative, and shall contain names of the manufacturer and cut sheets of equipment to be used on the project. Use manufacturer's specification sheets identified by number indicated on drawings or schedules. Indicate catalog number on the cut sheets. As applicable, provide construction data, weight and dimensional data, voltage ratings, performance data, and other information. Provide cut sheets and sound data as part of the shop drawing submittal.
4. Submittals are reviewed only for compliance with the Contract Documents. Dimensions, quantities and details are not checked during submittal review. Review of the submittals does not relieve the Contractor of the responsibility for providing all materials and equipment in accordance with the project and the intent of the Contract Documents. The Contractor is responsible for a complete and operational system meeting the requirements of the project and the intent of the Contract Documents. The Contractor is responsible for coordination of substituted materials and equipment lists solely with the subcontracting Contractor.
5. Electrical Characteristics: Verify that proper power supply is available prior to ordering equipment. Verify proper voltage, phase and current rating of power supply and inform Engineer of any deviations prior to ordering. Connection of equipment or start-up. Responsibility for verification of proper power supply voltage and phase and current rating or damage resulting from incorrect connections shall rest with this Contractor.
B. Test Reports: Provide Testing, Adjusting, and Balancing (TAB) and Commissioning reports to the Architect for review by the Engineer. All other reports shall be provided to the Owner.
1.08 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with a minimum five year track record.
B. Installer Qualifications: Company specializing in performing the work of this section, with minimum five year track record.
C. Products:
1. Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
D. All equipment and components shall be free of oil/rust/corrosion or any visible damage. All items not complying with this requirement shall be replaced with any change in the Contract amount.
E. Equipment performance 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, including all required components referred to in the Contract Documents.
F. Code or utility company requirements shall supersede any conflicting requirements of this section.
1.09 DELIVERY, STORAGE, AND HANDLING
A. Rooftop Equipment: Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.
B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.
C. Protect dampers and accessories from damage by opening linkages, blades and finishes.
D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
E. Protect motors stored on site from weather and by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.
1.10 WARRANTY AND GUARANTEE
A. Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer's warranty department.
B. Provide one year manufacturer warranty for pumps.
C. Provide three year manufacturer warranty for solid state ignition modules.
D. Provide five year manufacturer warranty for compressors, heat exchangers, condensing units, and electronic air cleaners.
PART 2 PRODUCTS
2.01 SUBSTITUTIONS
A. The manufacturers listed are listed to set minimum standards for quality, design, and function. The products of other manufacturers may be substituted with the Contractor's option, during shop drawing review unless indicated otherwise. The products of that meet or exceed all requirements of the Contract Documents. The Contractor accepts all responsibility for costs and coordination issues arising out of the substitution of materials, equipment, and the coordination of such substitutions with all other contractors and subcontractors.
B. The Contractor may use any of the following ductwork, piping or insulation materials at his option, provided the selected material meets with the approval of all State, local authorities and any utility companies having jurisdiction. Verification of compliance of the selected material is the sole responsibility of the installing Contractor.
PART 3 EXECUTION
3.01 COORDINATION OF WORK
A. Examine the Contract Documents as a whole for the work of other trades. Coordinate

- all work accordingly.
B. Promptly report to the Architect any delay or difficulties encountered in the installation of the work, which might prevent prompt and proper installation, or make it unusable to connect with or receive the work of others. Failure to so report shall constitute an acceptance of the work of other trades as approved for the execution of this work.
C. Plan, lay out, and coordinate the work with all trades well enough in advance so that it proceeds with a minimum of interference to work that has not been completed and work that is in progress. Inform all trades of openings required for the work and specify all specifications, dimensions, and materials. The HVAC system layout may be altered to suit the conditions with engineer approval, prior to the installation of any work, without additional cost to the Owner.
D. Conflicts arising from lack of coordination shall be this Contractor's responsibility.
E. Perform all work in conformity with the Contract Documents and afford other trades reasonable opportunity for the execution of their work. Properly connect and coordinate this work with the work of other trades at such time and in such a manner as not to delay or interfere with their work.
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.
G. All temperature control wiring, thermostat wiring, damper interlock wiring, control panel interlock wiring and miscellaneous low voltage wiring associated with the equipment furnished or installed under this contract shall be furnished and installed by the mechanical contractor or his sub-contractor. All wiring installed under this contract shall be in full compliance with the National Electrical Code, all State and local codes and requirements of the Electrical Specifications for this project.
3.02 EXAMINATION
A. Verify field measurements are as indicated on the Drawings.
B. Verify all equipment locations prior to rough-in. Maintain adequate equipment service clearance per manufacturer and code.
C. Verify routing of all ductwork and piping in field prior to fabrication or installation. Verify adequate clearance with structure, light fixtures, and ceiling heights.
D. Verify that proper fuel and power supply is available for connection.
3.03 INTERFERE WITH OTHER PRODUCTS
A. Install all ductwork, pipe, equipment, and accessories to preserve fire resistance rating, partitions and other elements, using materials and methods specified in the Specifications.
B. Provide tests as necessary to establish the adequacy, quality, safety, completed status, and suitable operation of each system. Tests shall be conducted under the supervision of the Architect.
3.04 FIELD QUALITY CONTROL
A. Provide tests as necessary to establish the adequacy, quality, safety, completed status, and suitable operation of each system. Tests shall be conducted under the supervision of the Architect.
3.05 CLEANING AND REPAIR
A. Clean fire suppression parts to remove harmful materials.
B. Clean exposed ductwork, piping, equipment, and accessories of all dirt, debris, splatter, and other deleterious materials. Follow the manufacturer's recommendations for cleaning as applicable.
C. Repair and replace damaged ductwork, piping, equipment, and accessories, as directed by and to the satisfaction of the Architect, where marring or disfigurement has occurred. All pipe, equipment, and accessories shall be new.
3.06 PROJECT CLOSEOUT
A. Prepare and submit Contract Documents: At project closeout, provide one printed copy and one electronic copy of the project record documents to the Owner. Record documents will not be reviewed by the Engineer.
B. Record Drawings: Information contained on project record drawings shall include, as a minimum:
1. Actual locations of all equipment, ductwork, air inlets/outlets, accessories, etc.
2. Actual routing of ductwork with sizes and elevations.
3. Actual locations of control devices including valves and volume dampers.
C. Operation and Maintenance Data: Provide descriptive literature, maintenance and operation data for all hvac equipment, control systems, accessories, and materials used. Include maintenance procedures, intervals, and parts list of each item installed under this contract. Include all manufacturer's warranties and warranties.
D. Maintenance Materials: At project closeout, furnish to the Owner the following:
1. One set of replacement filters for all hvac equipment.
2. The maintenance contract for the hvac system, if applicable.
E. Test Reports: Submit to the Owner all testing reports.

END OF SECTION

SECTION 230448 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Vibration isolators.
B. Fans, axial and centrifugal
C. Condensing units and air source heat pumps
A. Product Data: Provide schedule of vibration isolator type with location and load on each.
PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Isolation Technology, Inc.; Kinetics Noise Control, Inc.; Mason Industries.
2.02 VIBRATION ISOLATORS
A. Spring Hanger:
1. Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection.
2. Color code springs for load carrying capacity.
3. Housing: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators or rubber with threaded insert.
4. Cores: Castable of 20 degree hangar rod misalignment.
4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene casted springs.
B. Neoprene Pad Isolators:
1. Rubber neoprene wedge pads.
a. Hardness: 30 durometer.
b. Thickness: Minimum 1/2" to 2" inch.
c. Maximum Loading: 50 lbs.
d. Rib Height: Maximum 0.7 times width.
2. Rubber Mount or Hanger: Molded rubber designed for 0.4 inch deflection with 100% elongation.
3. Glass Fiber pads: Neoprene jacketed pre-compressed molded glass fiber.
PART 3 EXECUTION
3.01 INSTALLATION
A. Installation in accordance with manufacturer's instructions.
B. Provide flexible connections on all piping and ductwork connections to equipment. Refer to sections of this Specification for the acceptable types of flexible connectors to be used.
C. Selection of type, thickness and deflection of vibration isolation shall be by the vibration control manufacturer based on the specific equipment type and size, as scheduled on the Drawings and indicated below.
3.02 SCHEDULES
A. Equipment Isolation Schedule: (Minimum deflection as sized by the isolation equipment manufacturer.)
1. Fans, axial and centrifugal.
a. Small fans up to 22" diameter wheel:
i. Base: Concrete Housing/Support Pad, Rubber Mount or Glass Fiber Pad.
ii. Minimum Noise Reduction Coefficient: 0.3.
b. Above grade floor or roof structures:
i. Base: Plastic or Fiber Cement Pad.
ii. Minimum Noise Reduction Coefficient: 0.3.
c. Furnaces and fan coil units.
i. Floor mounted (all locations):
1. Base: Concrete Housing/Support Pad.
2. Thickness: 0.70.
ii. Suspended:
1. Isolation: Rubber or Spring Hanger.
END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Testing, adjusting, and balancing of air systems.
1. Air handling units; Packaged heating and/or cooling equipment; Fans (Exhaust and supply); Coil; Terminal equipment; Air inlets and outlets; (Diffusers, grilles, louvers, etc.).
B. Measurement of final operating condition of HVAC systems.
C. Independent agency requirements.
1.02 SUBMITTALS
A. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract. Provide TAB Agency approval.
B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Submit to the Construction Manager within two weeks after completion of testing, adjusting, and balancing.
2. Provide reports in bound manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat and equipment locations.
3. Include actual instrument list with manufacturer name, serial number, and date of calibration.
4. Include construction and installation drawings.
5. Report format use that; otherwise, follow ASHRAE Std 111.
C. Data: The following on the title page of each report:
a. Name, address and telephone number of Testing, Adjusting, and Balancing firm.
b. Project Name; location; Engineer; Contractor, Report date.
1.03 WARRANTY
A. A Balancing Contractor shall be prepared to return to the site at no additional cost to re-adjust air quantities as required to provide uniform temperatures, eliminate drafts and objectionable noises during the first year of occupancy, including one full heating and one full cooling season, after the acceptance of the final balancing report.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION
3.01 GENERAL REQUIREMENTS
A. Perform final system balance in accordance with one of the following:
1. AABC MN-1, AABC National Standards for Total System Balancing.
2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
B. SMACNA HVAC Systems Testing, Adjusting, and Balancing.
C. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the Project.
D. Where HVAC systems and components interface with other systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
E. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this Section with a minimum of five years experience.
2. Certified by one of the following:
a. AABC, Associated Balance Council; upon completion submit AABC National Performance Guaranty.
b. NEBB, National Environmental Balancing Bureau.

- c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute.
3. The TAB Agency must be a completely independent, third party balancing contractor with no financial, common owners or other ties to the installing contractor.
E. TAB Supervisor and Technician Qualifications: Certified by some organization as TAB agency.
3.02 ADJUSTING TOLERANCES
A. Air Handling Systems; Air Outlets and Inlets; Hydronic Systems: Adjust to within plus or minus 15 percent of design.
3.03 RECORDING AND ADJUSTING
A. Permanently mark settings of valves, dampers, and other adjustment devices allowing markings to be restored. Set and lock memory stops.
B. Refer to the Drawings the locations where traverses and other critical measurements were taken and cross reference the location in the final report.
3.04 AIR SYSTEM PROCEDURE
A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
B. Verify total system air quantities by adjustment of fan speeds. Provide drive changes required at no additional expense to the Owner. Verify branch air quantities by damper regulation.
C. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
D. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions in all operating modes as indicated in the sequence of control.
E. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
F. Where modulating dampers are provided, take measurements and balance at extreme conditions and at all intermediate operating conditions specified in the sequence of control. Balance variable volume systems at maximum air flow rate, full cooling and minimum air flow rate, full heating.
3.05 SCOPE
A. Equipment Requiring Testing, Adjusting, and Balancing (if present on the project):
1. HVAC Pumps; Boilers; All Air Handling Equipment; All Packaged Heating and/or Cooling Equipment; All Coil; All Heat Exchangers; Terminal Heat Transfer Units; Air Terminal Units; Air Inlets and Outlets
B. Minimum DATA TO BE REPORTED:
A. Report (as applicable to the project):
1. Summary Comments
2. Design versus field performance
3. Notable characteristics of system
4. Summary of outdoor and exhaust air flows to indicate amount of building pressurization
5. Nonparametric used throughout report and test conditions.
B. Electric Motors and drives:
1. Manufacturer; Model/Frame; HP/BHP; Phase, voltage, ampere; nameplate, actual, no load, RPM, Service factor; Sheave Make/Size/Bore.
2. V-Belt Drives: Identification/location; Required driver RPM; Driven shaft, actual, no load, RPM; Belt; size and quantity.
C. Cooling and Heating Coils:
1. Identification/number; Manufacturer
2. Air flow design and actual
3. Air pressure drop, design and actual
4. Entering and leaving air DB and WB temperature, design and actual
5. Water flow, design and actual (if applicable)
6. Water pressure drop, design and actual (if applicable)
7. Entering and leaving water temperature, design and actual (if applicable)
D. Air Moving Equipment:
1. Manufacturer; Model number; Serial number; Arrangement/Class/Discharge
2. Air flow, specified and actual
3. Inlet, Discharge; Total static pressure (total external), specified and actual
E. Air Distribution Tests:
1. Air terminal number
2. Room number/location
3. Terminal type
4. Terminal size
5. Mass flow rate
6. Design velocity
7. Design static pressure
8. Test (final) velocity
9. Test (final) static pressure
10. Percent of design air flow
END OF SECTION

SECTION 230713 - DUCT INSULATION

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Duct insulation.
B. Duct liner.
C. Insulation jackets.
D. Supply, return or exhaust ducts in ceiling spaces.
E. Supply, return or exhaust ducts in interior unconditioned areas.
F. Supply, return or exhaust ducts in exposed locations.
1.02 FIELD QUALITY CONTROL
A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
B. Maintain temperature during and after installation for minimum period of 24 hours.
PART 2 PRODUCTS
2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION
A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.
B. Manufacturer: Knauf Fiber Glass; Johns Manville Corporation; Owens Corning Corp.; CertainTeed Corporation.
2.02 GLASS FIBER, FLEXIBLE
A. Insulation: ASTM C 563, flexible, noncombustible blanket.
1. K' value: 0.31 at 75 degrees F, when tested in accordance with ASTM C 518.
2. Maximum Service Temperature: 450 degrees F.
3. Minimum Water Vapor Sorption: 0.0 percent by weight.
B. Vapor Barrier Jacket:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminumized film, with pressure sensitive adhesive.
2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E 96/96M.
3. Secure with pressure sensitive tape.
C. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminumized film, with pressure sensitive rubber based adhesive.
D. Outdoor Vapor Barrier Membrane:
1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
E. Tie Wire: Annealed steel, 16 gauge.
2.03 DUCT LINER
A. Insulation: Incombustible glass fiber complying with ASTM C 1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM C 21.
B. Thermal Conductivity: Maximum of 0.31 at 250 degrees F.
C. Service Temperature: Up to 250 degrees F.
D. Noted Velocity on Coated Air Side for Air Flow: 5,000 fpm, minimum.
E. Minimum Noise Reduction Coefficient:
a. 1/2 inch Thickness: 0.30.
b. 1 inch Thickness: 0.45.
c. 1-1/2 inches Thickness: 0.60.
d. 2 inch Thickness: 0.70.
F. Adhesive: Waterproof, fire-retardant type.
G. Liner Fasteners: Galvanized steel, self-adhesive pad or impact applied with integral, or press-on head.
PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions and NAIMA National Insulation Standards.
B. Insulated ducts conveying air below ambient temperature:
1. Provide insulation with vapor barrier jacket.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
C. Insulated ducts conveying air above ambient temperature:
1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
D. External Duct Insulation Application:
1. Secure insulation with vapor barrier with wire and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5. Slop and joint insulation around access doors and damper operators to allow for thermal expansion and contraction.
E. Duct and Plenum Liner Application:
1. Form of Test Reports:
a. Provide insulation with mechanical liner fasteners. Refer to SMACNA HVAC Duct and Plenum Liner Installation.
2. Seal and smooth joints. Seal and coat transverse joints.
3. Seal surface penetrations with adhesive.
4. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.
3.02 SCHEDULES
A. The Contractor may use any of the following insulating materials, at his option, provided the selected material meets with the approval of all State, local authorities and any utility company requirements. Verification of compliance of the selected material is the sole responsibility of the installing Contractor.
B. Supply or exhaust air ducts in crawl spaces, attics or other unconditioned areas:
1. Flexible Glass Fiber Duct Insulation: 1 inches thick.
2. Flexible Glass Fiber Duct Liner Insulation: 1 inches thick.
C. Supply, return or exhaust air ducts in crawl spaces, attics or other unconditioned areas:
1. Flexible Glass Fiber Duct Insulation: 3 inches thick.
2. Supply or exhaust ducts exposed in finished areas: 1 inches thick.
END OF SECTION

SECTION 230715.13 - GREASE DUCT PREPROOFING

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Fire resistant duct wrap for kitchen hood exhaust ventilation ducts (grease ducts).
B. Fireproofing at duct penetrations through fire rated walls and floors.
PART 2 PRODUCTS
2.01 MANUFACTURERS

- 3. Acceptable Manufacturer: 3M Fire Protection Products, Inc.; Unifrax FireWap; Morgan Thermal Ceramics.
2.02 MATERIALS
A. Grease Duct Fireproofing: Material applied directly to metal ducts and achieving a minimum fire rating when tested in accordance with UL 2221 or ASTM E2338 by independent testing agency.
1. Surface Burning Characteristics: Flame spread index of 0 and smoke developed that is not greater than 10 when tested in accordance with ASTM E 84, both blanket and foil.
2. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
3. Integrity: Capable of withstanding fire for a minimum of 15 minutes.
4. Surface: Fail or other damage resistant surface; fiber not exposed after installation.
5. Accommodation For Duct Access Doors and Panels: Capable of being installed to achieve fire rating without impeding access.
6. Acceptable Products: 3M Fire Barrier Duct Wrap; Fire resistant inorganic blanket encapsulated with scrim-reinforced foil facing.
B. Fireproofing: Non-combustible; use one or both of the following to attach fireproofing to ducts:
1. Bonding: Stucco or stainless steel, 1/2 inch wide, minimum, and 0.015 inch thick, minimum; with steel bonding clips.
2. Insulation Pins: Copper-coated steel impudent pins, minimum 12 gage, for welded attachment with galvanized steel self-locking washers, 1-1/2 inch square or diameter, or equivalent steel cup-head pins.
C. Access Panel Hardware: Minimum threaded rods, sleeves, washers, and wing nuts as specified in manufacturer's instructions.
D. Tape: Aluminum foil tape for sealing exposed fiber edges and repairing tears in facing.
E. Fireproofing Material: Material tested in conjunction with fireproofing, in accordance with ASTM E 814, to achieve fire rated penetration of duct penetrations through fire rated assemblies.
F. Fire Rating: Same or greater than rating of penetrated assembly.
2. Acceptable Products: 3M Fire Barrier 1000 N/S, 1003 S/L, and 2000+ Silicone Sealants, as required by tested assembly.

PART 3 EXECUTION

- 3.01 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify the subcontractor with other products of the installation and proceed.
3.02 PREPARATION
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using steel methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
3.03 INSTALLATION
A. Install in strict accordance with manufacturer's instructions and as indicated on the Drawings.
B. Perform all required regulatory duct leakage and weld tests in the presence of the code official, including but not limited to, smoke tests, and smoke tests, to demonstrate the integrity of the duct construction to the satisfaction of any authority having jurisdiction.
C. Insulation that prevents visual inspection of the ductwork on all sides.
D. Install fireproofing on exposed ducts including, but not limited to, duct penetrations through documents explicitly indicate 3-sided or 2-sided insulation, floors, roofs, and exterior walls.
E. Seal all duct edges and ends and repair tears in facing using aluminum foil tape.
END OF SECTION

SECTION 230719 - HVAC PIPING INSULATION

- PART 1 GENERAL
1.01 SECTION INCLUDES
A. Cooling condensate drain piping insulation.
B. Refrigerant piping insulation.
PART 2 PRODUCTS
2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION
A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.
B. The Contractor may use any of the following insulating/jacketing materials, at his option, provided the selected material meets with the approval of all State, local authorities and any utility company requirements. Verification of compliance of the selected insulating/jacketing material is the sole responsibility of the installing Contractor.
2.02 GLASS FIBER
A. Manufacturers: Knauf Insulation; Johns Manville Corporation; Owens Corning Corp.; CertainTeed Corporation.
B. Insulation:
1. K' value: ASTM C 177, 0.24 at 75 degrees F.
2. Maximum service temperature: 850 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.
C. Insulation: ASTM C 547 and ASTM C 795; semi-rigid, noncombustible, and grain coated to jacket.
1. K' value: ASTM C 177, 0.24 at 75 degrees F.
2. Maximum service temperature: 850 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.
D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminumized film, with pressure sensitive adhesive.
E. Vapor Barrier Tape: Moisture vapor permeability 0.029 ng/Pa s m (0.02 perm inch).
F. Insulating Cement/Mastic: ASTM C 195; hydraulic setting on mineral wool.
G. Fibrous Glass Fabric:
1. Cloth: Unretired; 9 oz/sq yd weight.
2. Blanket: 1.0 lb/cu ft density.
3. Weave: 5/2.
H. Indoor Vapor Barrier Finish:
1. Vinyl emulsion type acrylic, compatible with insulation, black color.
2. Insulation: ASTM C 177, 0.24 at 75 degrees F.
2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION
A. Manufacturers: Knauf Insulation; Johns Manville Corporation; Owens Corning Corp.; CertainTeed Corporation.
B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Grade 3; use molded tubular material wherever possible.
1. Minimum Service Temperature: 0 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Connections: Brush on welding adhesive.
C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
2.04 JACKETS
A. PVC Plastic:
1. Manufacturers: Knauf Fiber Glass; Johns Manville Corporation; Owens Corning Corp.; CertainTeed Corporation.
2. Connections: Brush on welding adhesive.
B. ABS Plastic:
1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
a. Minimum Service Temperature: 0 degrees F.
b. Maximum Service Temperature: 150 degrees F.
c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E 96/96M.
d. Thickness: 10 mil.
e. Connections: Brush on welding adhesive.
2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
a. Minimum Service Temperature: -40 degrees F.
b. Maximum Service Temperature: 180 degrees F.
c. Moisture Vapor Permeability: 0.002 perm inch, when tested in accordance with ASTM E 96/96M.
d. Thickness: 30 mil.
e. Connections: Brush on welding adhesive.

PART 3 EXECUTION

- 3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Install in accordance with National Insulation Standards.
C. Inserts and Shields:
1. Application: Piping 2 inches diameter or larger.
2. Shields: Galvanized steel between piping or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Shield configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
D. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruption.
E. Exposed Piping: Locate insulation and cover seams in least visible locations.
3.02 SCHEDULE
A. Cooling Systems:
1. Cold Condensate Drain:
a. Pipe Size Range: All Sizes.
b. Flexible Elastomeric Cellular Foam Insulation:
i. Pipe Size Range: All Sizes.
ii. Thickness: 1/2 inch.
B. Refrigerant Section:
1. Glass Fiber Insulation:
a. Pipe Size Range: All Sizes.
b. Flexible Elastomeric Cellular Foam Insulation:
i. Pipe Size Range: All Sizes.
ii. Thickness: 3/4 inch.
C. Refrigerant Hot Gas Piping:
1. Glass Fiber Insulation:
a. Pipe Size Range: All Sizes.
b. Flexible Elastomeric Cellular Foam Insulation:
i. Pipe Size Range: All Sizes.
ii. Thickness: 1/2 inch.
END OF SECTION

SECTION 230800 - COMMISSIONING OF HVAC

- PART 1 GENERAL
1.01 SUMMARY
A. See Section 01 9113 - General Commissioning Requirements for overall objectives; and Section 01 9114 - General Commissioning Requirements for specific objectives.
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.
C. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Pre-functional Checklists and Functional Test Procedures for Contractor's use.
D. The entire HVAC system is to be commissioned, including commissioning activities and testing.
1. Control system.
2. Control and/or equipment items.
3. Piping systems and equipment.
4. Ductwork and accessories.
5. Terminal units.
6. Sound control devices.
7. Vibration control devices.

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Project

SHAKE SHACK #1731 COLONIAL MARKETPLACE, FL

Project Number 25128 Drawn By SEI Checked By GRS Date 09 JUN 2025

Revisions 1 17 JUL 2025 ISSUED FOR CONSTRUCTION 3 09 SEP 2025 STRUCT. COORD.

Drawing

MECHANICAL SPECIFICATIONS

M590

- 8. Variable frequency drives.
- 9. Special Ventilations: Hood, pressurization, exhaust, etc.
- 10. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- 11. Indoor Air Quality Procedure: The Commissioning Authority will coordinate Contractor with respect to Section 01 5719.
- E. The Pre-functional Checklists and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

- 1.02 RELATED REQUIREMENTS
 - A. Section 23 0993 - Sequence of Operations for HVAC Controls.
 - B. Section 23 0993 - Testing, Adjusting, and Balancing for HVAC.
- 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.
 - B. DRAFT Pre-functional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, check-out and adjust the control system prior to full system functional testing; include at least the following for each type of equipment/control:
 - 1. System name.
 - 2. List of devices.
 - 3. Step-by-step procedures for testing each controller after installation, including:
 - a. Process of verifying proper hardware and wiring installation.
 - b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
 - c. Process of performing operational checks of each controlled component.
 - d. Plan and process for calibrating valve and damper actuators and all sensors.
 - e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected tolerances.
 - 4. Copy of proposed log and field check-out sheets to be used to document the process; include space for initial system test, final record on the air-built field of each point and space to specifically indicate when a sensor or controller has "passed" or is operating within tolerances.
 - 5. Description of the instrumentation required for testing.
 - 6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.
 - C. Startup Reports, Pre-functional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.
 - D. HVAC Control System O&M Manual Requirements: In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
 - 1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of the control system. Provide index and clear table of contents. Include the detailed technical manual for programming and customizing control system.
 - 2. Full as-built set of control drawings.
 - 3. Full as-built sequence of operations for each piece of equipment.
 - 4. Full points list, in addition to the information in the original points list submitted, include a listing of all rooms with the following information for each:
 - a. Floor.
 - b. Room number.
 - c. Room name.
 - d. Air handler unit ID.
 - e. Reference drawing number.
 - f. Air terminal unit tag ID.
 - g. Heating and/or cooling valve tag ID.
 - h. Minimum air flow rate.
 - i. Maximum air flow rate.
 - 5. Full print out of all schedules and set points after testing and acceptance of the system.
 - 6. Full as-built print out of software program.
 - 7. Electronic copy on disk of the entire program for this facility.
 - 8. Marking of all system sensors and their location on the air-built floor plan and HVAC drawings with their control system designations.
 - 9. Maintenance instructions including maintenance requirements and methods by sensor type, etc.
 - 10. Control equipment component submittals, parts lists, etc.
 - 11. Warranty requirements.
 - 12. Copies of all checkout tests and calibrations performed by the Contractor during commissioning tests.
 - 13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
 - a. Sequences of operation.
 - b. Control drawings.
 - c. Points lists.
 - d. Controller and/or module data.
 - e. Schedules and times.
 - f. Sensors and DP switches.
 - g. Valves and valve actuators.
 - h. Dampers and damper actuators.

- E. Project Record Documents:
 - 1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
 - 2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.
- F. Draft Training Plan:
 - 1. Follow the recommendations of ASHRAE Guideline 1.1.
 - 2. Control system manufacturer's recommended training.
- G. Training Manuals:
 - 1. Demonstration and instruction on function and operation of any local packaged controls not controlled by the HVAC control system.
- H. Submittals are reviewed only for general compliance with the Contract Documents. Dimensions, quantities and details are not checked during submittal review. Review of the submittals does not relieve the Contractor of the responsibility for providing all materials, equipment and accessories necessary for a complete and operational system meeting the requirements of the Contract Documents. The responsibility for coordination of substituted materials and equipment lies solely with the substituting Contractor.

- 2.01 TEST EQUIPMENT
 - A. Provide all standard testing equipment required to perform startup and initial check-out and required functional performance testing, unless otherwise noted such testing equipment will NOT become the property of the Contractor.
 - B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or functional testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

- 3.01 PREPARATION
 - A. Cooperate with the Commissioning Authority in development of the Pre-functional Checklists and Functional Test Procedures.
 - B. Furnish additional information requested by the Commissioning Authority.
 - C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, and commissioning, and coordinate and completion for use by the Commissioning Authority; update the schedule as appropriate.
 - D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing the system are completed. Do not commence activities not yet scheduled, unless the Commissioning Authority has approved in writing that the specified activities will not impact the project schedule.

- 3.02 INSPECTING AND TESTING - GENERAL
 - A. Submit startup plans, startup reports, and Pre-functional Checklists for each item of equipment or other assembly to be commissioned by the Commissioning Authority.
 - B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.
 - C. Provide two-way radios for use during the testing.
 - D. Valve/Damper Stroke Setup and Check:
 - 1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 - 2. Set pump fan to normal operating mode.
 - 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 - 4. Command valve/damper open; verify position is full open and adjust output signal as required.
 - 5. Command valve/damper to a few intermediate positions.
 - 6. Verify proper operation of Normally Open or Normally closed positions of all valves/dampers by means of normal operating mode tests plus removal of power to confirm proper closure or opening upon failure of power or control signal as required.
 - E. If actual valve/damper position does not reasonably correspond, replace actuator.
 - F. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

- 3.03 TAB COORDINATION
 - A. TAB: Testing, adjusting, and balancing of HVAC.
 - B. Coordinate commissioning and TAB schedule.
 - C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
 - D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control units for setting terminal unit boxes, etc.
 - E. Hold all required Pre-functional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.
 - F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

- 3.04 CONTROL SYSTEM FUNCTIONAL TESTING
 - A. Pre-functional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of operation documentation submitted.
 - B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested and approved by the Commissioning Authority. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.
 - C. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
 - D. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified in the Contract Documents.
 - E. Perform all trend logging specified in Pre-functional Checklists and Functional Test procedures.
 - F. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Tests is not required unless specifically indicated below.
 - G. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
 - 1. Setpoint changing features and functions.
 - 2. Sensor calibrations: Hood, pressurization, exhaust, etc.
 - 3. Demonstrate to the Commissioning Authority:
 - 1. That specified functions and features are set up, debugged and fully operational.
 - 2. That scheduling features are fully functional and setup, including holidays.
 - 3. That all graphic screens and value readouts are completed.
 - 4. Correct date and time setting in control computer.
 - 5. That field panels read the same time as the control computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent.
 - 6. Functionality of field panels using local operator keyboards and local ports (plug-ins) using portable computer/keyboard; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units of no extra cost to Owner.
 - 7. Power failure and battery backup and power-up restart functions.
 - 8. Global commands features.
 - 9. Security and access codes.
 - 10. Occupant override (manual, telephone, key, keypad, etc.).
 - 11. O&M schedules and alarms.
 - 12. Occupancy sensors and controls.
 - 13. "After hours" use tracking and billing.
 - 14. System name and address.
 - 15. Fire alarm interlocks and response.
 - 16. Fire protection and response systems interlocks.
 - 17. Security system interlocks.
 - 18. That points that are monitored only, having no control function, are recording properly to the control system.
 - 19. All control strategies and sequences not tested during controlled equipment testing.
 - 20. Trend logging and graphing features that are specified.
 - 21. Other integrated tests specified in the Contract Documents.
 - 22. That control system features that are included but not specified to be setup are actually installed.

- H. Perform and submit trend logging on the following using the control system, for minimum period of 90 days including one weekend, if the control points are monitored by the control system (Yes / No); i.e. a point whose value is used to make a calculation which in turn is a virtual point to control itself.
 - 1. Duty cycling, if specified.
 - 2. Demand limiting, including override of limiting.
 - 3. Scheduled staging ON of equipment, optionally demonstrated manually.
 - 4. Optimum start-stop functions.
 - 5. Demand Limiting: Record actual locations of components and setpoints of controls, including changes to sequences made after submission of shop drawings.

- 1.05 QUALITY ASSURANCE
 - A. Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the State in which the Project is located.
 - B. Code or utility company requirements shall supersede any conflicting requirements of this Specification.
- 2.01 PRODUCTS - NOT USED
- 3.01 EXECUTION
 - A. Time Schedule: Control fan coil units based on the programmed time schedule as determined by the Owner's operating personnel. Provide occupied/unoccupied mode control with night setback of temperatures, where applicable.
 - B. Supply fan shall run continuously during the occupied period and cycle during the unoccupied period based on a demand for heating or cooling.
 - C. Dual temperature thermostat or EMS sensor/controller set at 75 degrees F (24 degrees C) maintain constant space temperature during the occupied mode and 10 degrees F (6 degrees C) warmer during the unoccupied mode by cycling refrigerant compressor.
 - D. Provide automatic change over from heating to cooling based on room demand.
 - E. Automatic Start Capabilities: Controls shall be capable of automatically adjusting the daily start time of the HVAC system in order to bring each space to the desired occupancy temperature immediately prior to scheduled occupancy.
 - F. Outside and Relief Dampers:
 - 1. When supply fan is not running, outside and relief dampers are closed and return damper is open.
 - 2. When supply fan is running, dampers are control damper and operate with outside return damper closed.
 - 3. For cooling, outside air damper to minimum, close relief damper (12 degrees C), modulate dampers to maintain mixed air temperature of 55 degrees F (12 degrees C) warmer than minimum outdoor air temperature.
 - 4. For heating and outside air temperatures above 55 degrees F (12 degrees C) compare return and outside air enthalpies. If return air enthalpy is lower, drive outside damper to minimum, close relief damper, and open return damper.
 - 5. Control equipment shall monitor and indicate at the operators console the status of the unit including:
 - a. system on/off status.
 - b. system on/off command status.
 - c. Minimum R-Value: 4.2 or greater as required by the applicable energy code.
 - d. Return fan status (if present).
 - e. Exhaust fan status (if present).
 - f. System operating mode (heating/cooling/ventilation).
 - g. Discharge air temperature.
 - h. Discharge air temperature setpoint (where applicable).
 - i. Mixed air temperature.
 - j. Outdoor air temperature and humidity.
 - k. Return air temperature and humidity.
 - l. Space temperature (where applicable).
 - m. Space temperature setpoint (where applicable).
 - n. Compressor status, individually by compressor.

- 3.02 EXHAUST FANS
 - A. General building exhaust fans:
 - 1. Time Schedule: Start and stop exhaust fan based on the programmed time schedule as determined by the Owner's operating personnel.
 - 2. Specific duty exhaust fans:
 - a. Specific duty exhaust fans shall be interfaced with the respective equipment as indicated on the Drawings. Provide necessary sensors and relays to allow control system to accurately sense equipment operation and activate fan systems accordingly. Interlock make up air units/fans and air handling systems providing make up air to exhaust systems as required to provide 100% make up air to all operating exhaust fans.
 - B. Packaged HVAC equipment based on the programmed time schedule as determined by the Owner's operating personnel. Provide occupied/unoccupied mode control with adjustable night setback of temperatures, where applicable.
 - 1. Time Schedule: Control HVAC equipment based on the programmed time schedule as determined by the Owner's operating personnel. Provide occupied/unoccupied mode control with adjustable night setback of temperatures, where applicable.
 - 2. Maintain the integrity of the packaged control equipment and sequences. The packaged unit controls shall operate such functions as the economizer operations, burner modulation, high limit and low limit safeties, etc. All set point, occupancy, staging and shut-down capabilities shall be controlled by the temperature control system.
 - 3. The control system shall monitor and indicate at the operators console the status of the unit including:
 - a. system on/off status.
 - b. system on/off command status.
 - c. Minimum R-Value: 4.2 or greater as required by the applicable energy code.
 - d. Return fan status (if present).
 - e. Exhaust fan status (if present).
 - f. System operating mode (heating/cooling/ventilation).
 - g. Discharge air temperature.
 - h. Discharge air temperature setpoint (where applicable).
 - i. Mixed air temperature.
 - j. Outdoor air temperature and humidity.
 - k. Return air temperature and humidity.
 - l. Space temperature (where applicable).
 - m. Space temperature setpoint (where applicable).
 - n. Compressor status, individually by compressor.

- 3.03 CONTROL OF PACKAGED HVAC EQUIPMENT CONTAINING FACTORY MOUNTED CONTROLS
 - A. Heat Pump Unit Controls: Control system for the individual heat pump units shall be furnished by the equipment manufacturer. The program clock or energy management functions listed below must be interfaced with the packaged controls furnished by the heat pump manufacturer. During the occupied mode as indicated by the program clock or EMS controller, the unit shall provide heating and cooling functions as specified in the Contract Documents. During the unoccupied mode, the unit shall provide heating only at the night setback temperature as set by the room set/back temperature or EMS sensor/controller. Heat pump control (heat, cool, occupied, unoccupied) shall be individually addressable for each heat pump unit. Heat pump supply fans shall run continuously during the occupied mode. This feature shall be individually addressable for each heat pump unit.
 - B. Automatic Start Capabilities: Controls shall be capable of automatically adjusting the daily start time of the HVAC system in order to bring each space to the desired occupancy temperature immediately prior to scheduled occupancy.

- 3.04 HEAT PUMP SYSTEMS
 - A. Heat Pump Unit Controls: Control system for the individual heat pump units shall be furnished by the equipment manufacturer. The program clock or energy management functions listed below must be interfaced with the packaged controls furnished by the heat pump manufacturer. During the occupied mode as indicated by the program clock or EMS controller, the unit shall provide heating and cooling functions as specified in the Contract Documents. During the unoccupied mode, the unit shall provide heating only at the night setback temperature as set by the room set/back temperature or EMS sensor/controller. Heat pump control (heat, cool, occupied, unoccupied) shall be individually addressable for each heat pump unit. Heat pump supply fans shall run continuously during the occupied mode. This feature shall be individually addressable for each heat pump unit.

SECTION 230993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

- 1.01 GENERAL
 - A. This Section defines the manner and method by which controls function.
 - B. Requirements for each type of control system are specified in Equipment, devices, and system components required for control systems are specified in other sections.
 - C. This Section provides the intended sequence of operation for each piece of controlled equipment. Other Sections of this Specification indicate the requirements for direct digital control systems and energy management systems, packaged factory controls or conventional analog control systems. Equipment, devices, and system components required for control systems are specified in other sections. Wherever the sequences contained herein indicate control by a thermostat or EMS sensor/controller, the Manufacturer Control Contractor shall furnish EMS sensor/controllers for digital control systems or a thermostat for conventional analog control systems as specified in other sections of this Specification.

- 1.02 SYSTEM DESCRIPTION
 - A. Fan coil units.
 - 1. Fan coil units.
 - 2. Heat pump heating/cooling.
 - 3. Automatic chiller/heater.
 - 4. Variable speed supply fan.
 - B. Exhaust fans.
 - a. General duty building exhaust fans.
 - b. Specific duty exhaust fans.
 - C. Control of packaged HVAC equipment containing factory mounted controls.
 - 1. Single Zone Systems.
 - 2. Heat pump systems.
 - 3. Heat pump unit controls.

- 1.03 RELATED REQUIREMENTS
 - A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- 1.04 SYSTEM DESCRIPTION
 - A. Equipment performance, controls and accessories shall be as scheduled on the Drawings and specified in the Contract Documents. Equipment and accessories specified in this Section shall be included in the Contract Documents. Provide all necessary controls, accessories and connections as required for a complete, functional system for all systems indicated on the Drawings.
 - 1. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 2. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 3. Provide a complete and functional system.
 - 4. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 5. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 6. Provide a complete and functional system.

- 1.05 REGULATORY REQUIREMENTS
 - A. Conform to ASME B31.9 for installation of piping system.
 - B. Welding Materials and Welding Procedures: Conform to ASME (BPV IX) and applicable state and local regulations.
 - C. Welders Certification: In accordance with ASME (BPV IX).

- 2.01 PIPING
 - A. Product: Tube: ASTM B 280, H58 hard drawn or 960 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Brazed, AWS B3.1 BCP alloy (phosphorus)/copper alloy.
 - B. Copper: Tube to 1/2 inch OD, ASTM B 88 (ASTM B 88M), Type K (A), annealed.
 - 1. Fittings: ASME B16.26 cast copper.
 - 2. Joints: Flared.
 - C. Pipe Supports and Anchors:
 - 1. Capacity: ASME B31.5, ASTM F 708, MSS SP-58, MSS SP-69, and MSS SP-69.

- 2.02 REFRIGERANT
 - A. Provide refrigerant as specified by the manufacturer of the refrigeration equipment.
- 2.03 MOISTURE AND LEAK INDICATORS
 - A. Liquid Indicators: Parker Hannifin/Refrigeration and Air Conditioning;
 - 1. Heavy Technolox; Sparlan Valve Company.
 - B. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

- 2.04 FILTER-DRIERS
 - A. Manufacturer:
 - 1. Air Conditioning: Sparlan Valve Company.

- 2. Flow Capacity - Liquid Line: As required by capacities indicated on the Drawings, minimum, rated in accordance with ARI 710.
- 3. Flow Capacity - Suction Line: As required by capacities indicated on the Drawings, minimum, rated in accordance with ARI 730.
- 4. Pressure Drop: 2 psi, maximum, when operating at full connected evaporator capacity.
- 5. Design Working Pressure: 350 psi, minimum.
- 6. Refrigerant: R-410A, or other refrigerant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass any refrigerant lines.
- 7. Construction: UL listed.
- 8. Replicable Core Type: Steel that will remove cap.
- 9. Sealed Type: Copper shell.
- 10. Connections: As specified for applicable pipe type.

- 2.05 EXPANSION VALVES
 - A. Manufacturer:
 - 1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sparlan Valve Company.
 - B. Angle of full throat Through Type: ARI 730, design suitable for refrigerant, brass body, internal or external expansion, bleed hole, adjustable superheat setting bulb.
 - C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degree F superheat. Select to avoid being oversized at full load and excessively oversized at part load.

- 3.01 INSTALLATION
 - A. Install refrigeration specialties in accordance with manufacturer's instructions.
 - B. All fan penetrations shall be flashed and weather sealed by the roofing manufacturer's authorized roofing contractor at this Contractor's expense. This Contractor shall provide the factory authorized roofing contractor for this specific roofing system applicable to this Project. The use of an unauthorized contractor may result in voiding of the manufacturer's warranty of the product at this Contractor's expense.
 - C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degree F superheat. Select to avoid being oversized at full load and excessively oversized at part load.

- 3.02 FIELD QUALITY ASSURANCE
 - A. Test refrigeration system in accordance with ASME B31.5.

- 3.03 EXECUTION
 - A. Manufacturer:
 - 1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sparlan Valve Company.

- 3.04 HEAT PUMP SYSTEMS
 - A. Heat Pump Unit Controls: Control system for the individual heat pump units shall be furnished by the equipment manufacturer. The program clock or energy management functions listed below must be interfaced with the packaged controls furnished by the heat pump manufacturer. During the occupied mode as indicated by the program clock or EMS controller, the unit shall provide heating and cooling functions as specified in the Contract Documents. During the unoccupied mode, the unit shall provide heating only at the night setback temperature as set by the room set/back temperature or EMS sensor/controller. Heat pump control (heat, cool, occupied, unoccupied) shall be individually addressable for each heat pump unit. Heat pump supply fans shall run continuously during the occupied mode. This feature shall be individually addressable for each heat pump unit.

SECTION 233200 - REFRIGERANT PIPING

- 1.01 GENERAL
 - A. This Section defines the manner and method by which controls function.
 - B. Requirements for each type of control system are specified in Equipment, devices, and system components required for control systems are specified in other sections.
 - C. This Section provides the intended sequence of operation for each piece of controlled equipment. Other Sections of this Specification indicate the requirements for direct digital control systems and energy management systems, packaged factory controls or conventional analog control systems. Equipment, devices, and system components required for control systems are specified in other sections. Wherever the sequences contained herein indicate control by a thermostat or EMS sensor/controller, the Manufacturer Control Contractor shall furnish EMS sensor/controllers for digital control systems or a thermostat for conventional analog control systems as specified in other sections of this Specification.

- 1.02 SYSTEM DESCRIPTION
 - A. Fan coil units.
 - 1. Fan coil units.
 - 2. Heat pump heating/cooling.
 - 3. Automatic chiller/heater.
 - 4. Variable speed supply fan.
 - B. Exhaust fans.
 - a. General duty building exhaust fans.
 - b. Specific duty exhaust fans.
 - C. Control of packaged HVAC equipment containing factory mounted controls.
 - 1. Single Zone Systems.
 - 2. Heat pump systems.
 - 3. Heat pump unit controls.

- 1.03 RELATED REQUIREMENTS
 - A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- 1.04 SYSTEM DESCRIPTION
 - A. Equipment performance, controls and accessories shall be as scheduled on the Drawings and specified in the Contract Documents. Equipment and accessories specified in this Section shall be included in the Contract Documents. Provide all necessary controls, accessories and connections as required for a complete, functional system for all systems indicated on the Drawings.
 - 1. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 2. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 3. Provide a complete and functional system.
 - 4. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 5. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 6. Provide a complete and functional system.

- 1.05 REGULATORY REQUIREMENTS
 - A. Conform to ASME B31.9 for installation of piping system.
 - B. Welding Materials and Welding Procedures: Conform to ASME (BPV IX) and applicable state and local regulations.
 - C. Welders Certification: In accordance with ASME (BPV IX).

- 2.01 PIPING
 - A. Product: Tube: ASTM B 280, H58 hard drawn or 960 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Brazed, AWS B3.1 BCP alloy (phosphorus)/copper alloy.
 - B. Copper: Tube to 1/2 inch OD, ASTM B 88 (ASTM B 88M), Type K (A), annealed.
 - 1. Fittings: ASME B16.26 cast copper.
 - 2. Joints: Flared.
 - C. Pipe Supports and Anchors:
 - 1. Capacity: ASME B31.5, ASTM F 708, MSS SP-58, MSS SP-69, and MSS SP-69.

- 2.02 REFRIGERANT
 - A. Provide refrigerant as specified by the manufacturer of the refrigeration equipment.
- 2.03 MOISTURE AND LEAK INDICATORS
 - A. Liquid Indicators: Parker Hannifin/Refrigeration and Air Conditioning;
 - 1. Heavy Technolox; Sparlan Valve Company.
 - B. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

- 2.04 FILTER-DRIERS
 - A. Manufacturer:
 - 1. Air Conditioning: Sparlan Valve Company.

- 2. Flow Capacity - Liquid Line: As required by capacities indicated on the Drawings, minimum, rated in accordance with ARI 710.
- 3. Flow Capacity - Suction Line: As required by capacities indicated on the Drawings, minimum, rated in accordance with ARI 730.
- 4. Pressure Drop: 2 psi, maximum, when operating at full connected evaporator capacity.
- 5. Design Working Pressure: 350 psi, minimum.
- 6. Refrigerant: R-410A, or other refrigerant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass any refrigerant lines.
- 7. Construction: UL listed.
- 8. Replicable Core Type: Steel that will remove cap.
- 9. Sealed Type: Copper shell.
- 10. Connections: As specified for applicable pipe type.

- 2.05 EXPANSION VALVES
 - A. Manufacturer:
 - 1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sparlan Valve Company.
 - B. Angle of full throat Through Type: ARI 730, design suitable for refrigerant, brass body, internal or external expansion, bleed hole, adjustable superheat setting bulb.
 - C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degree F superheat. Select to avoid being oversized at full load and excessively oversized at part load.

- 3.01 INSTALLATION
 - A. Install refrigeration specialties in accordance with manufacturer's instructions.
 - B. All fan penetrations shall be flashed and weather sealed by the roofing manufacturer's authorized roofing contractor at this Contractor's expense. This Contractor shall provide the factory authorized roofing contractor for this specific roofing system applicable to this Project. The use of an unauthorized contractor may result in voiding of the manufacturer's warranty of the product at this Contractor's expense.
 - C. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degree F superheat. Select to avoid being oversized at full load and excessively oversized at part load.

- 3.02 FIELD QUALITY ASSURANCE
 - A. Test refrigeration system in accordance with ASME B31.5.

- 3.03 EXECUTION
 - A. Manufacturer:
 - 1. Flow Controls Division of Emerson Electric; Parker Hannifin/Refrigeration and Air Conditioning; Sparlan Valve Company.

- 3.04 HEAT PUMP SYSTEMS
 - A. Heat Pump Unit Controls: Control system for the individual heat pump units shall be furnished by the equipment manufacturer. The program clock or energy management functions listed below must be interfaced with the packaged controls furnished by the heat pump manufacturer. During the occupied mode as indicated by the program clock or EMS controller, the unit shall provide heating and cooling functions as specified in the Contract Documents. During the unoccupied mode, the unit shall provide heating only at the night setback temperature as set by the room set/back temperature or EMS sensor/controller. Heat pump control (heat, cool, occupied, unoccupied) shall be individually addressable for each heat pump unit. Heat pump supply fans shall run continuously during the occupied mode. This feature shall be individually addressable for each heat pump unit.

SECTION 233100 - HVAC DUCTS AND CASINGS

- 1.01 GENERAL
 - A. This Section defines the manner and method by which controls function.
 - B. Requirements for each type of control system are specified in Equipment, devices, and system components required for control systems are specified in other sections.
 - C. This Section provides the intended sequence of operation for each piece of controlled equipment. Other Sections of this Specification indicate the requirements for direct digital control systems and energy management systems, packaged factory controls or conventional analog control systems. Equipment, devices, and system components required for control systems are specified in other sections. Wherever the sequences contained herein indicate control by a thermostat or EMS sensor/controller, the Manufacturer Control Contractor shall furnish EMS sensor/controllers for digital control systems or a thermostat for conventional analog control systems as specified in other sections of this Specification.

- 1.02 SYSTEM DESCRIPTION
 - A. Fan coil units.
 - 1. Fan coil units.
 - 2. Heat pump heating/cooling.
 - 3. Automatic chiller/heater.
 - 4. Variable speed supply fan.
 - B. Exhaust fans.
 - a. General duty building exhaust fans.
 - b. Specific duty exhaust fans.
 - C. Control of packaged HVAC equipment containing factory mounted controls.
 - 1. Single Zone Systems.
 - 2. Heat pump systems.
 - 3. Heat pump unit controls.

- 1.03 RELATED REQUIREMENTS
 - A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- 1.04 SYSTEM DESCRIPTION
 - A. Equipment performance, controls and accessories shall be as scheduled on the Drawings and specified in the Contract Documents. Equipment and accessories specified in this Section shall be included in the Contract Documents. Provide all necessary controls, accessories and connections as required for a complete, functional system for all systems indicated on the Drawings.
 - 1. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 2. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 3. Provide a complete and functional system.
 - 4. All wiring of control systems including connections to controlled devices external to the control system shall be included in the temperature controls contract as a part of the Mechanical Contract. The Electrical Contractor will only furnish power connections to devices at the locations indicated on the Electrical Drawings.
 - 5. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
 - 6. Provide a complete and functional system.

- 1.05 REGULATORY REQUIREMENTS
 - A. Conform to ASME B31.9 for installation of piping system.
 - B. Welding Materials and Welding Procedures: Conform to ASME (BPV IX) and applicable state and local regulations.
 - C. Welders Certification: In accordance with ASME (BPV IX).
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- 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 can 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 beads 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 drive bands.
- I. Support flexible duct runs every five feet in the horizontal direction to avoid dips and sags.
- J. Connect terminal units to supply ducts with one foot maximum length of flexible duct. Do not use flexible duct to change direction.
- K. Connect diffusers to low pressure ducts directly or through a 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. A maximum of one 90 degree bend, or equivalent, will be allowed in flexible duct runs.
- L. During 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 accepted in exposed finished areas. Live all 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 in accordance with AMCA 500-1, clean half the system at a time. Protect equipment which may be harmed by excessive dust with temporary filters, or bypass during cleaning.

3.04 SCHEDULES

- A. Ductwork Material:
 - B. 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 codes applicable to this Contractor's expense. The responsibility of compliance 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 (Systems with Cooling): 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. Duct connections.
- D. Duct access doors.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers: Ruskin Company, Titus.

2.02 VOLUME CONTROL DAMPERS

- A. Manufacturers: Louvers & Dampers, Inc.; Nalor Industries Inc.; Ruskin Company; Prefco Inc.

2.03 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

2.04 DUCT ACCESS DOORS

- A. Manufacturers: Acador Products Inc.; Nalor Industries Inc.; Ruskin Company; SEMCO Corporation.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 96A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Duct construction and pressure class.

3.02 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. 2500:2008.

3.03 WARRANTY

- A. All units shall be provided with the following standard warranties:
 - 1. 2-year or 18,000 hours from initial start-up. National TAB provided service plan. The phi cell & UV light replacement 18,000 hour replacements are provided/installed at no cost if National TAB is providing Renew-Cx Service after initial installation.

AIR PURIFICATION DEVICES

Model: PHI-PKG14-24V Specifications

FACTORY UV PHU CELL

INSTALLATION: RTU PACKAGED UNIT / BLOWER CABINET

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes Hydro-peroxide, Super-Oxide Ions, & Hydroxide Ion delivered via PHI technology through packaged heating and cooling units capable of supplying 3,000 to 8,000 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. 2500:2008.

1.03 WARRANTY

- A. All units shall be provided with the following standard warranties:
 - 1. 2-year or 18,000 hours from initial start-up. National TAB provided service plan. The phi cell & UV light replacement 18,000 hour replacements are provided/installed at no cost if National TAB is providing Renew-Cx Service after initial installation.

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.

2.03 ELECTRICAL

- 1. UV-C bulb
- 2. Electronic Enclosure (24VAC input Power Jack)
- 3. Magnetic mounting feet for easy placement and installation in the Blower Cabinet.

END OF SECTION

SECTION 233423 -- HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof exhausters.
- B. Kitchen range hood exhausters.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Greenheck; Loren Cook Company; PemBarry; CaptivAir.

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: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2" inch mesh, 0.02 inch thick aluminum wire bracket; square base to suit roof curb with continuous curb gaskets.

2.04 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.

2.05 EVAPORATOR COIL

- A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.

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.

2.07 CONDENSER COIL

- A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.

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 fail to closed position. Relief dampers may be gravity balanced.

2.09 INTEGRATED ECONOMIZER

- A. Economizer shall be furnished and installed complete with outside air and relief dampers and controls.

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. A water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the equipment serving 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).

2.13 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

2.14 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

2.15 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.

2.16 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

2.17 QUALIFICATION

- 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. Titus; Krueger; Price Industries; Nalor Industries Inc.; Hart & Cooley; Ruskin, Greenheck.

2.02 RECTANGULAR CEILING DIFFUSERS

- A. Type: Square, adjustable pattern, stamped, multi-core, or architectural pique diffuser to discharge air in 360 degree pattern with sectoring baffles where indicated.

2.03 PERFORATED FACE CEILING DIFFUSERS

- A. Type: Perforated face with removable face.

2.04 GRID CORE EXHAUST AND RETURN GRILLES

- A. Type: Fixed grilles of 1/2" x 1/2" x 1 inch louvers.

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.

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SYSTEM 1 Block Load																
ROOM #	NAME	Az AREA (FT2)	TABLE 403.3.1.1 OCCUPANCY CATEGORY	TABLE 403.3.1.1 R _p PEOPLE/GA (CFM/PER)	TABLE 403.3.1.1 R _a AREA/GA (CFM/FT2)	TABLE 403.3.1.1 OCCUPANT DENSITY (#/1000 FT2)	P ₂ (ft)	R ₁ /P ₂	R ₂ /A ₂	V ₂ (CFM)	TABLE 403.3.1.1.2 V ₂ (CFM)	V ₂ MAX SUPPLY (CFM)	V ₂ MIN SUPPLY (CFM)	TABLE 403.3.1.1.2.3.2 CALCULATED Z ₀ Ev		
101	DINING	1,168	DINING ROOMS	7.5	0.18	70	82	615	210	828	0.80	1052	3000	3000	0.344	0.81
102	HALLWAY	162	CORRIDORS	0.0	0.09	0	0	0	10	10	0.80	12	400	400	0.030	1.00
103	UNISEX RESTROOM	105	NO LISTING	0.0	0.00	0	0	0	0	0	0.80	0	50	50	0.000	1.00
104	UNISEX RESTROOM	105	NO LISTING	0.0	0.00	0	0	0	0	0	0.80	0	50	50	0.000	1.00
105	COOKLINE	231	KITCHEN (COOKING)	7.5	0.12	20	9	38	28	85	0.80	82	1200	1200	0.088	1.00
106	COLDLINE	240	KITCHEN (COOKING)	7.5	0.12	20	9	38	20	66	0.80	83	1200	1200	0.089	1.00
107	DISHWASH AREA	205	KITCHEN (COOKING)	7.5	0.12	20	9	38	29	82	0.80	79	1000	1000	0.078	1.00
108	BOH	872	KITCHEN (COOKING)	7.5	0.12	20	12	30	89	159	0.80	198	600	600	0.311	0.82
109	MANAGERS	66	OFFICE SPACES	5.0	0.09	5	2	10	4	14	0.80	18	350	350	0.050	1.00
		2,856					111	828	374	1201		1502	7850	7850	0.344	0.81

OUTDOOR AIR CALCULATIONS PER EQUATION 4-1:		
SYMBOL	VALUE	DESCRIPTION
P ₂	111	SYSTEM POPULATION
SP ₂	111	ZONE POPULATION
D	1,000	OCCUPANT DIVERSITY
V ₂	1201	UNCORRECTED OUTDOOR AIR INTAKE
Z _p (max)	0.344	ZONE PRIMARY OUTDOOR AIR FRACTION (MAXIMUM)
E _v	0.81	SYSTEM VENTILATION EFFICIENCY
S ₁ (p ₂)	7850	ZONE PRIMARY AIRFLOW
V ₂	1,490	CODE REQUIRED OUTDOOR AIRFLOW RATE, CFM
V ₂	2,800	DESIGN OUTDOOR AIRFLOW RATE, CFM

1 OUTSIDE AIR 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	NO
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
SUPPLY FAN			
ON DURING OCCUPIED MODE	YES	YES	YES
VARIABLE VOLUME - MODULATE FAN SPEED	YES	YES	YES
SAFETIES AND INTERLOCKS			
SUPPLY 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	3,500	1,050	2,450		30%	FOH
RTU-2	4,000	1,550	2,450		39%	DINING
FC-1	350	0	350		0%	OFFICE
EF-1				1,200		HOOD-1
EF-2				860		HOOD-2
EF-3				200		RESTROOMS
TOTAL =	7,850	2,600	5,250	2,260		
RESULTING BUILDING PRESSURIZATION = 340 CFM						
PRESSURIZATION PERCENTAGE = 4.3 %						

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 (IN)	AIRFLOW (CFM)	HEATER			FANS			ELECTRICAL			MANUFACTURER	MODEL NUMBER	REMARKS
			IN (KW)	OUT (MBH)	TEMP RISE (F)	QTY	HP	CIRCUIT (QTY)	VOLT	PH				
AC-1	42.0	1,418	NA	NA	NA	1	1/2	1	115	1	MARS	STD42	[1-4]	

REMARKS:
 1. PROVIDE AUTOMATIC DOOR SWITCH.
 2. PROVIDE UNIT MOUNTED CONTROL PANEL.
 3. VERIFY FINAL COLOR/FINISH WITH ARCHITECT.
 4. FIELD VERIFY AND PROVIDE MOUNTING BRACKETS AS REQUIRED.

AIR SOURCE HEAT PUMPS													
MARK	LOCATION	SERVES	NOMINAL COOL (TONS)	HEATING AT 47°F (MBH)	ELECTRICAL			SEER2	HSPF2	MANUFACTURER	MODEL NUMBER	REMARKS	
					VOLT	PH	MCA						
ASHP-1	ROOF	FC-1	3/4	9.8	208	1	15.0	15	20.5	10.3	CARRIER	38MARB009	[1,2]

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. PROVIDE WITH LOW AMBIENT CONTROL.

DUCTLESS SPLIT SYSTEMS													
MARK	NOMINAL (TONS)	TOT (MBH)	SEN (MBH)	HEATING AT 47°F (MBH)	SUPPLY AIR (CFM)	FAN (WATT)	ELECTRICAL			SEER2	CARRIER MODEL NUMBER	REMARKS	
							VOLT	PH	MCA				
FC-1	3/4	11.73	8.79	9.80	350	45	208	1	0.2	N/A	20.5	40MBC009	[1,2]

REMARKS:
 1. INDOOR UNIT POWER PROVIDED FROM OUTDOOR UNIT.
 2. 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	300RL X X 1 26	[1,5,6]
G-1	VARIABLE	CEILING	AC TILE	LAY-IN	TITUS	50F X X 3 26	[1,3,5,6]
G-2	EXHAUST	CEILING	GYP. BOARD	LAY-IN	TITUS	50F X X 1 26	[1,3-6]

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 TRIM 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 EXPOSED MOUNTING SCREWS.

EXHAUST FANS													
MARK	LOCATION	SERVICE	AIRFLOW (CFM)	EXTERNAL STATIC (IN H2O)	SONES	MOTOR DATA			RPM	FEI	MANUFACTURER	MODEL NUMBER	REMARKS
						FAN (HP)	VOLT	PH					
EF-1	ROOF	HOOD-1	-	-	-	-	-	-	-	-	CAPTIVEAIRE	-	5
EF-2	ROOF	HOOD-2	-	-	-	-	-	-	-	-	CAPTIVEAIRE	-	5
EF-3	ROOF	RESTROOMS	200	0.50	6.9	1/8	115	1	1,550	NA	GREENHECK	G-095-D	1-4

REMARKS:
 1. PROVIDE SOLID STATE SPEED CONTROL.
 2. PROVIDE BACKDRAFT DAMPER.
 3. PROVIDE MINIMUM 18 INCH HEIGHT ROOF CURB.
 4. DEVICE ASSEMBLY SHALL MEET FLORIDA PRODUCT APPROVAL #FL13225.1 RATING OR EQUAL.
 5. 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.

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Seal

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Brian S. Thomas
 Architect

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 Greenville, SC 29601
 864.232.8200
 www.DP3architects.com

Project

SHAKE SHACK #1731
 COLONIAL
 MARKETPLACE, FL

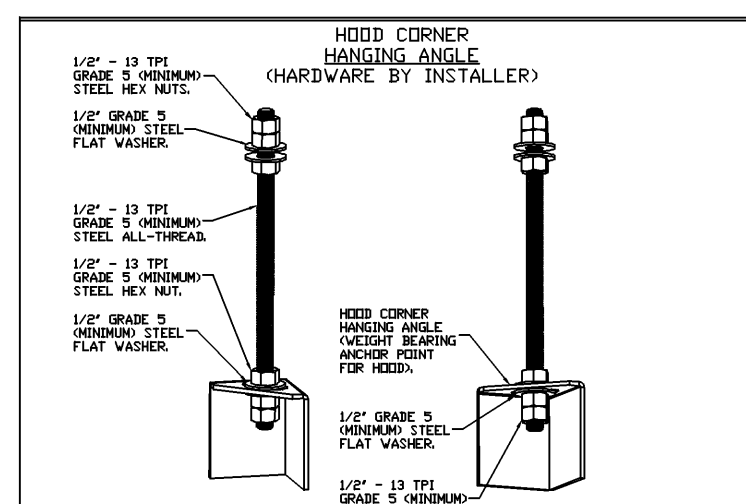
Project Number 25128
 Drawn By SEI
 Checked By GRS
 Date 09 JUN 2025

Revisions
 1 17 JUL 2025 ISSUED FOR CONSTRUCTION
 3 09 SEP 2025 STRUCT. COORD.

Drawing
 MECHANICAL
 SCHEDULES

M601

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

ETL HOOD LISTING DETAIL			
EXHAUST CFM = LENGTH OF HOOD X CFM/INFT. (LOAD)			
SUPPLY CFM = EXHAUST CFM X PERCENTAGE REQUIRED			
TOTAL DUCT AREA (sq. in.) = 144 X _____			
DUCT LENGTH = _____			
DUCT WIDTH = _____			

CALCULATIONS UTILIZED

CAPTIVE-AIRE HOODS BUILT IN COMPLIANCE WITH:

ETL LISTED UNDER ETL FILE NUMBER 3054804-001/002

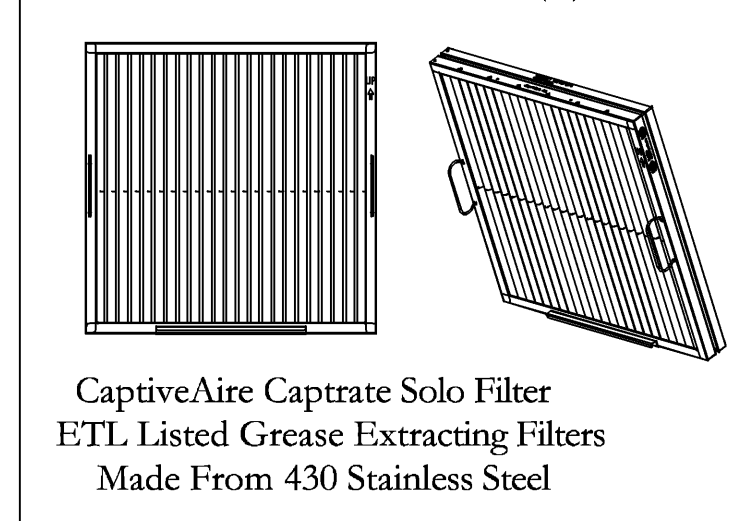
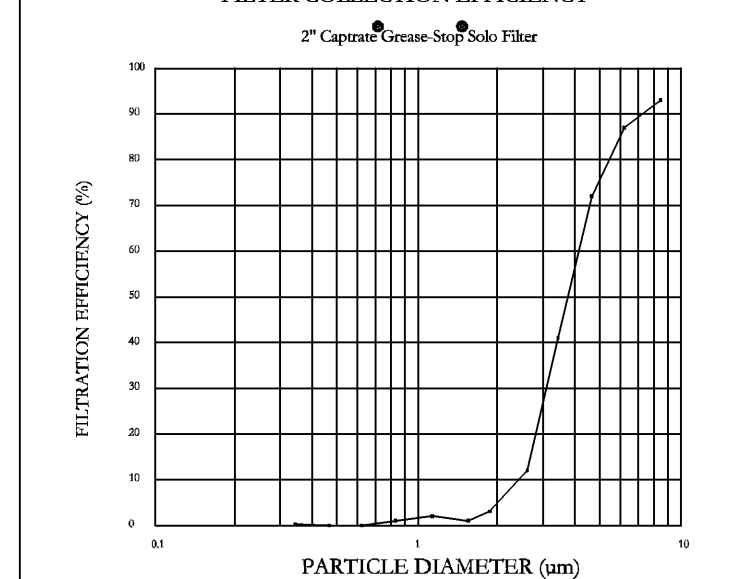
BUILDING CODES	
CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:	
MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" INSULATED STANDOFF

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 LOCKED 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. INTERCONNECTING 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.
 - KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DRIVING 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

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

HOOD INFORMATION - JOB#7488296

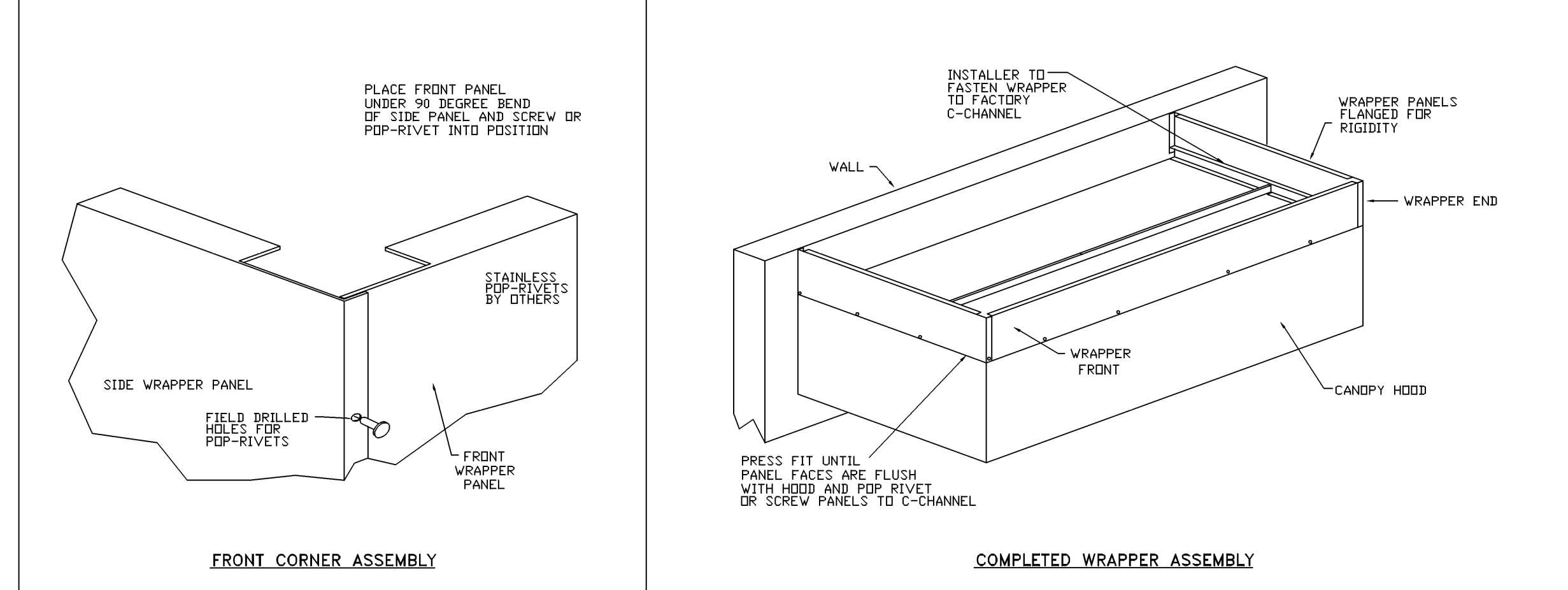
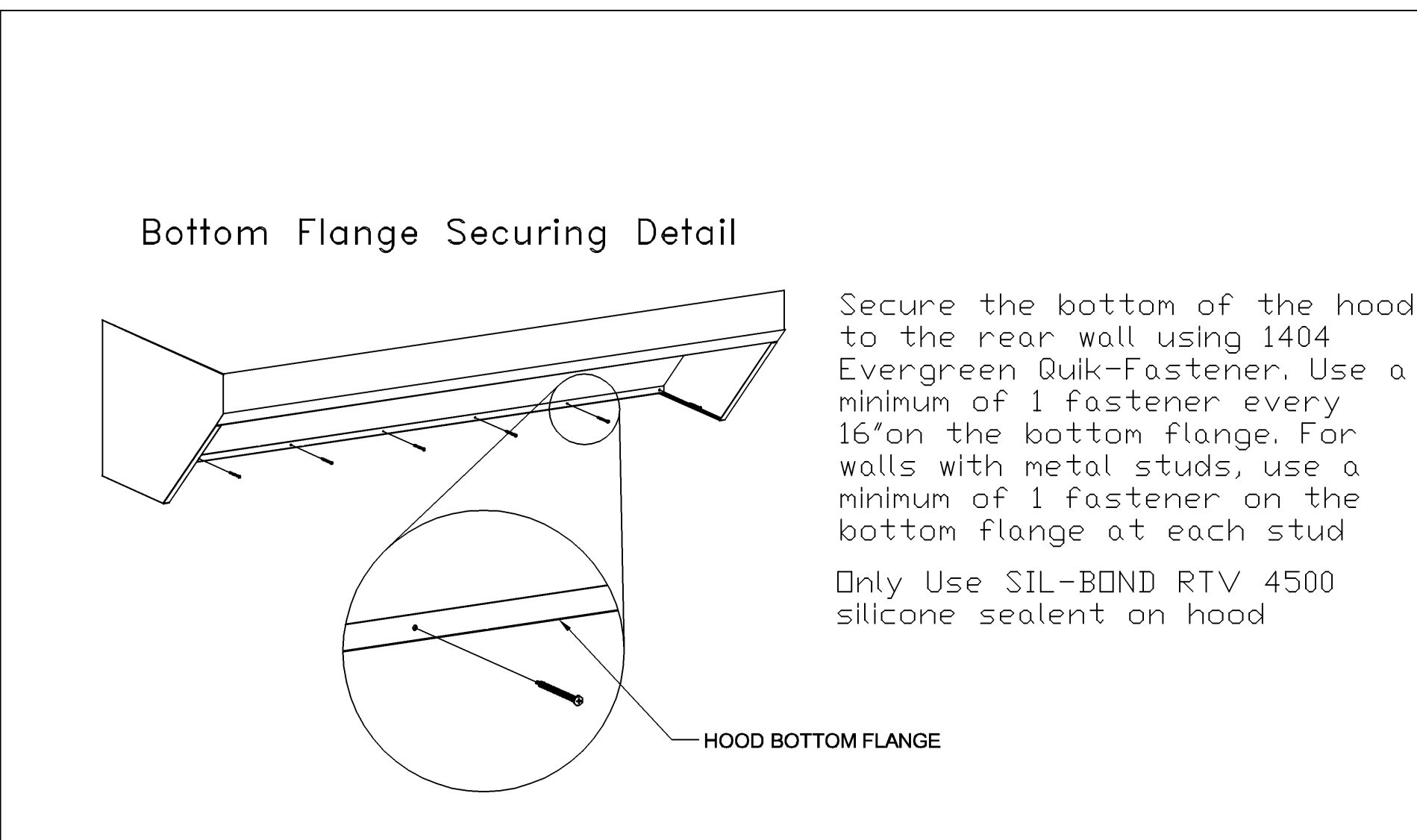
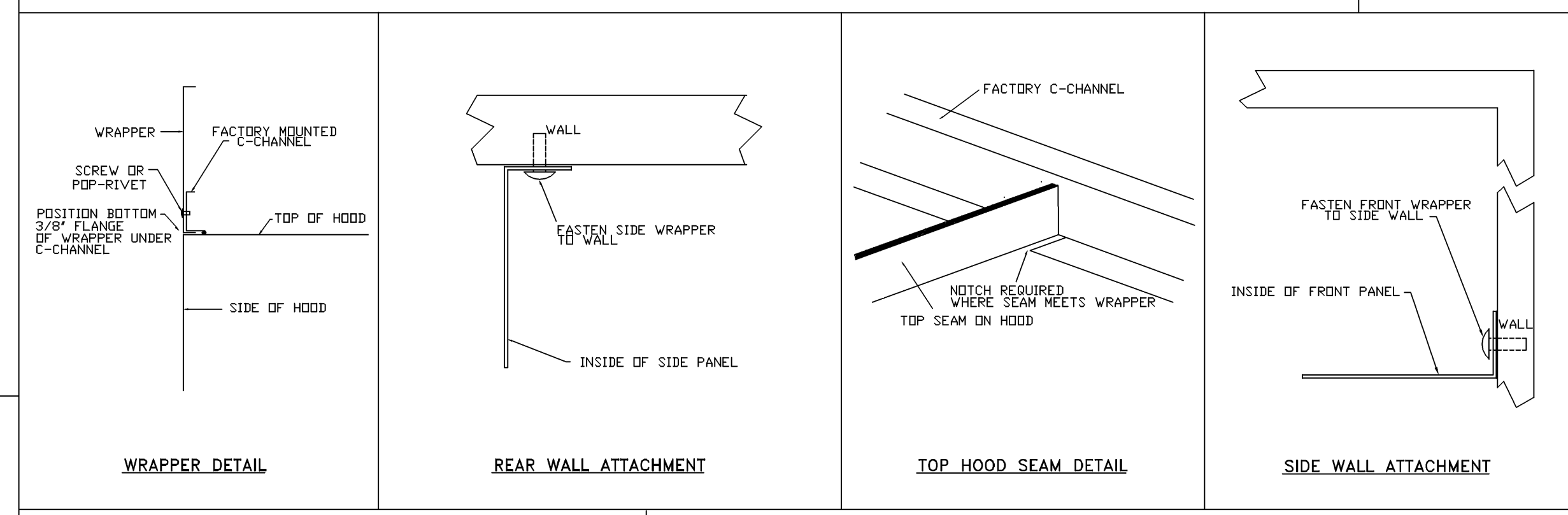
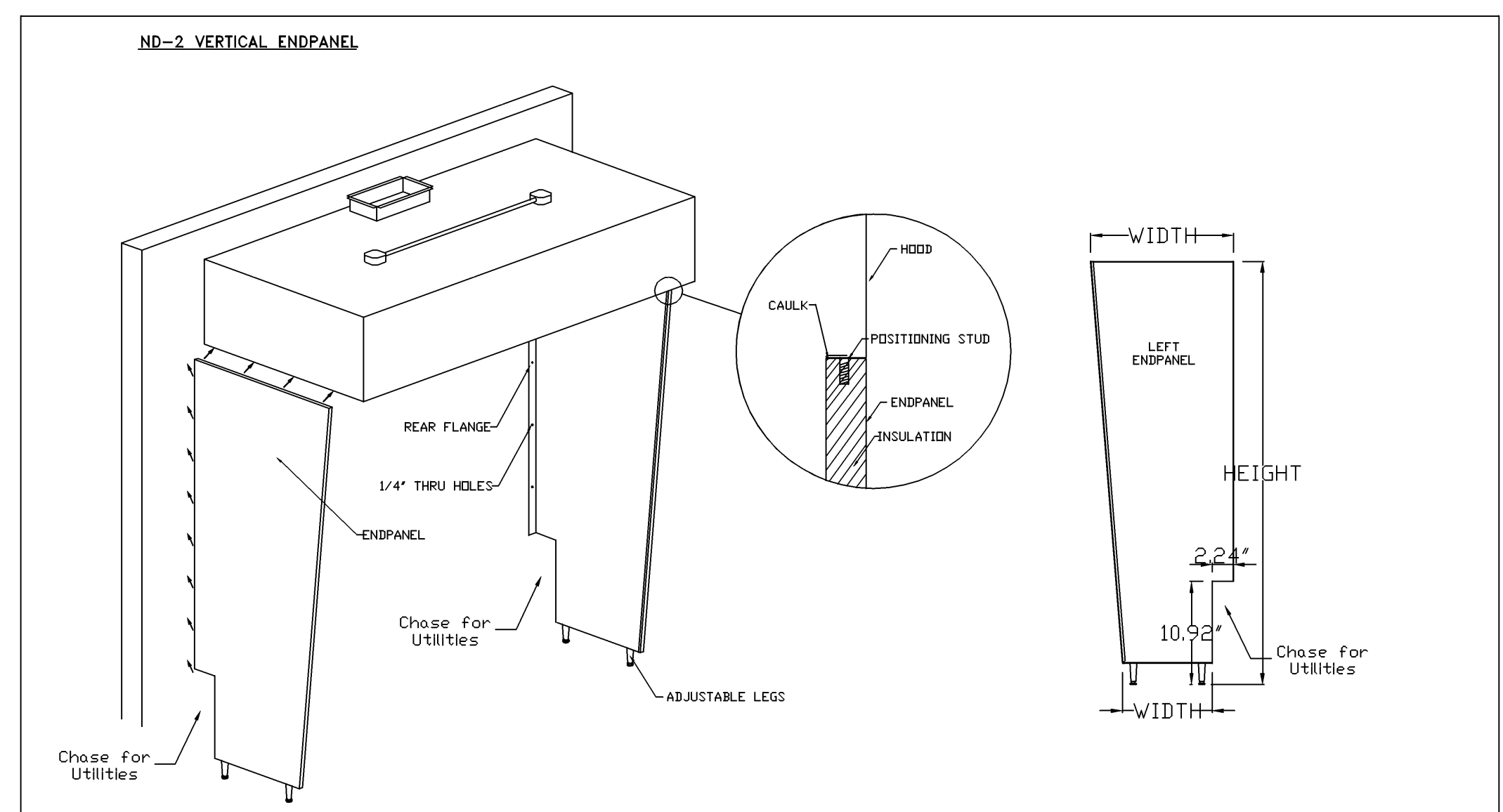
HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)				HOOD CONSTRUCTION	HOOD CONFIG			
										WIDTH	LENG	HEIGHT	DIA		CFM	VEL	SP	END TO END
1	Hood (Grill)	5430 ND-2	CAPTIVEAIRE	7' 11"	450 DEG	I	MEDIUM	150	1188	10'	11'	4'	1188	1555	-0.462'	430 SS WHERE EXPOSED	ALONE	ALONE
2	Hood (Fryer)	5430 ND-2	CAPTIVEAIRE	4' 11"	600 DEG	I	HEAVY	175	860	9'	9'	4'	860	1529	-0.494'	430 SS WHERE EXPOSED	ALONE	ALONE

HOOD INFORMATION

HOOD NO	TAG	TYPE	FILTER(S)			LIGHT(S)			UTILITY CABINET(S)			FIRE SYSTEM PIPING	HOOD HANGING WEIGHT				
			QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	LOCATION	SIZE			FIRE SYSTEM	SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY
1	Hood (Grill)	CAPTRATE SOLD FILTER	5	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	ND				YES	484 LBS			
2	Hood (Fryer)	CAPTRATE SOLD FILTER	3	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	ND	LEFT	12"x54"x30"	TANK FS	4.0/4.0/4.0	SC-320110MA	1 LIGHT 1 FAN	YES	748 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	Hood (Grill)	FIELD WRAPPER 18.00' HIGH FRONT, LEFT, RIGHT. RIGHT END STANDOFF (FINISHED) 1' WIDE 54" LONG INSULATED. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN. LEFT VERTICAL END PANEL 27" TOP WIDTH, 21" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS. GFCI DUPLEX OUTLET, 20A 125V - HOOD FRONT LEFT - HORIZONTAL - DIST FROM END: 3.50 DIST FROM BOTTOM: 4.00. RIGHT WALL AS END PANEL.
2	Hood (Fryer)	FIELD WRAPPER 12.00' HIGH FRONT, LEFT, RIGHT. RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN.



REVISIONS

NO.	DESCRIPTION	DATE

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Shake Shack-1731-Colonial, FL(Kitchen)
ORLANDO, FL, 32803

DATE: 4/23/2025
DWG.#: 7488296
DRAWN BY: Joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 1

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Seal

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SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number 25128
Drawn By SEI
Checked By GRS
Date 09 JUN 2025

Revisions
1 17 JUL 2025 ISSUED FOR CONSTRUCTION
3 09 SEP 2025 STRUCT. COORD.

Drawing
CAPTIVEAIRE DRAWINGS

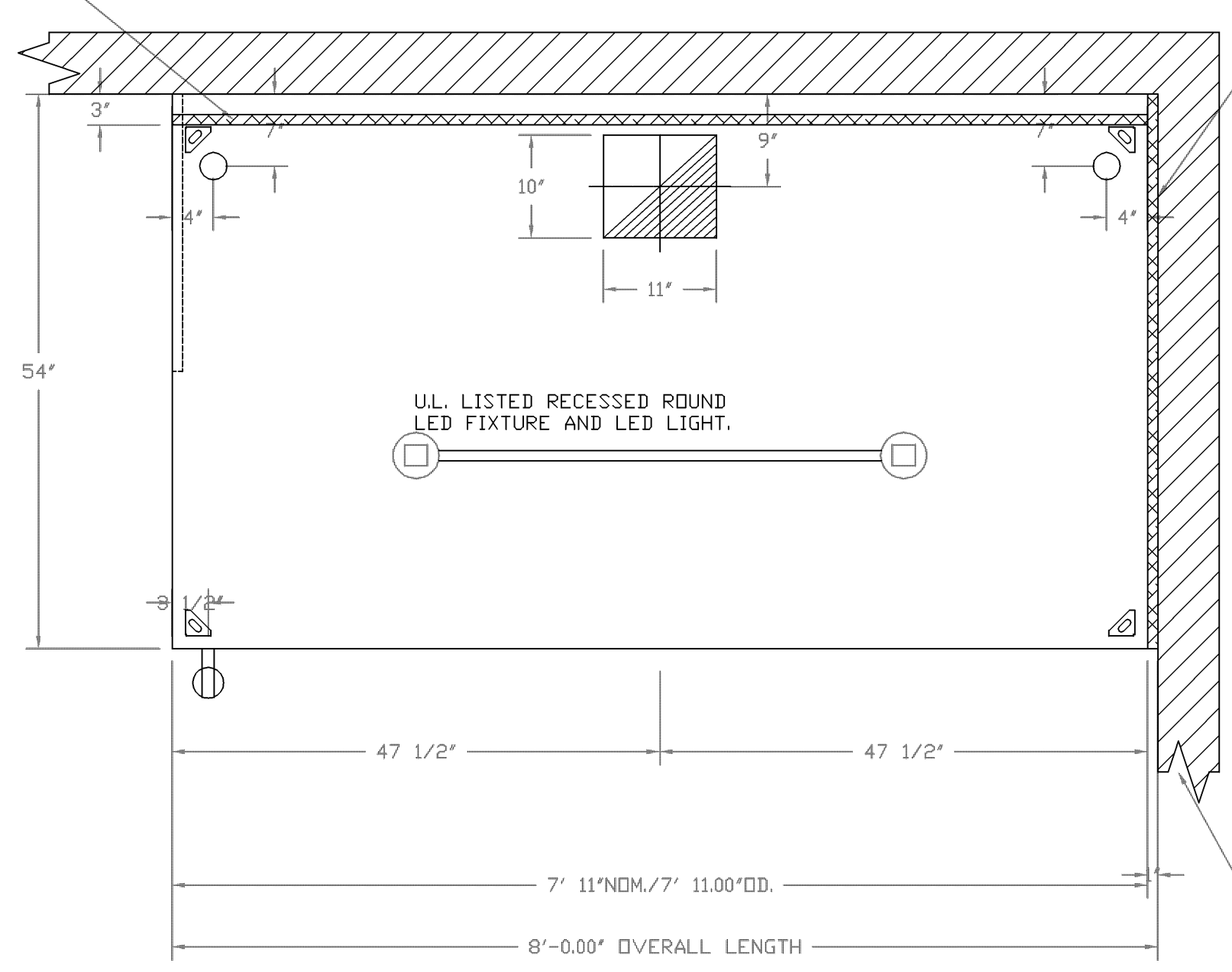
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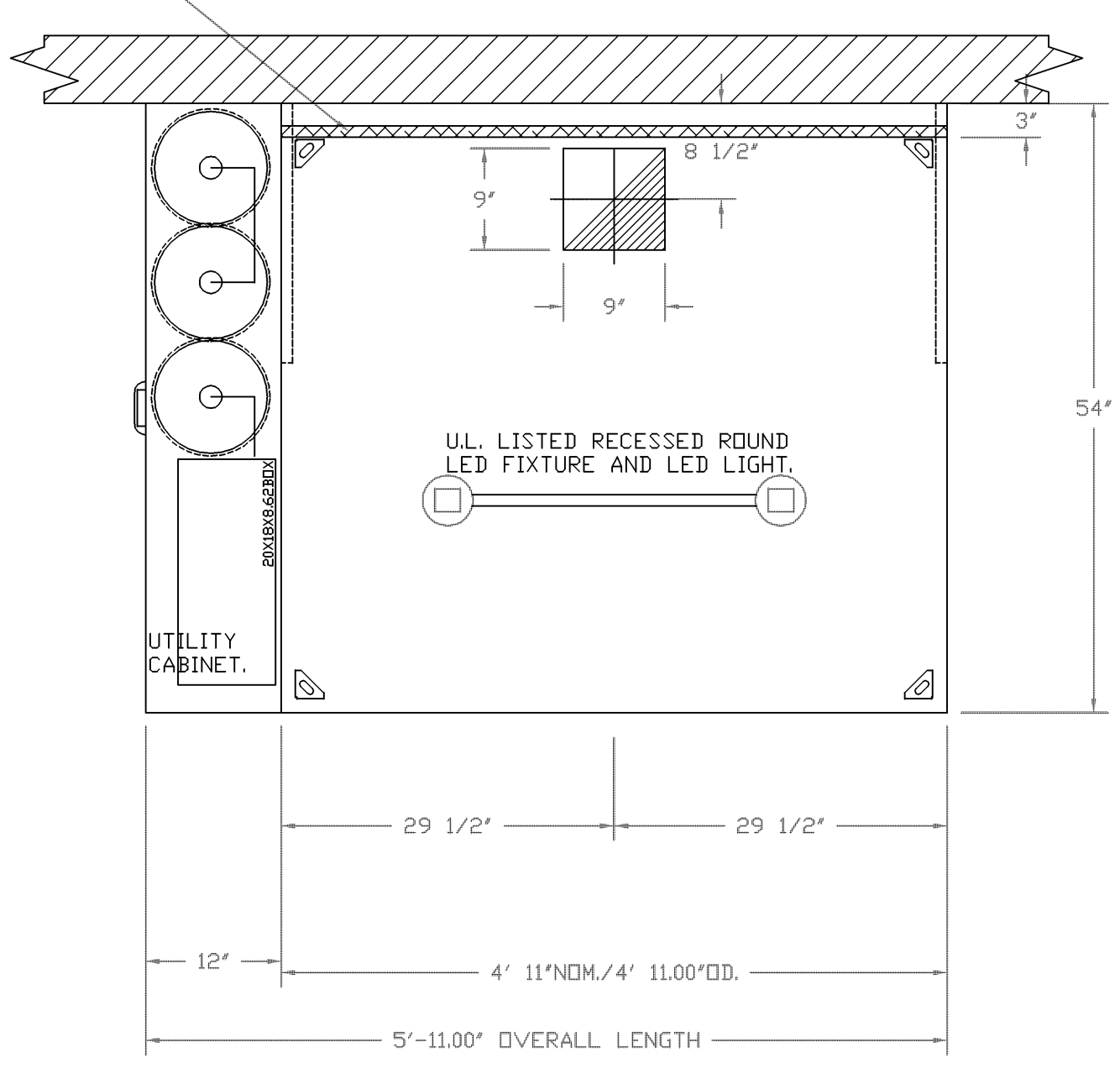
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1" LAYER OF INSULATION FACTORY INSTALLED IN INTERNAL BACK STANDOFF. MEETS 0 INCH REQUIREMENTS FOR CLEARANCE TO COMBUSTIBLE SURFACES.



PLAN VIEW - HOOD #1 (Hood (Grill))
7' 11.00" LONG 5430ND-2

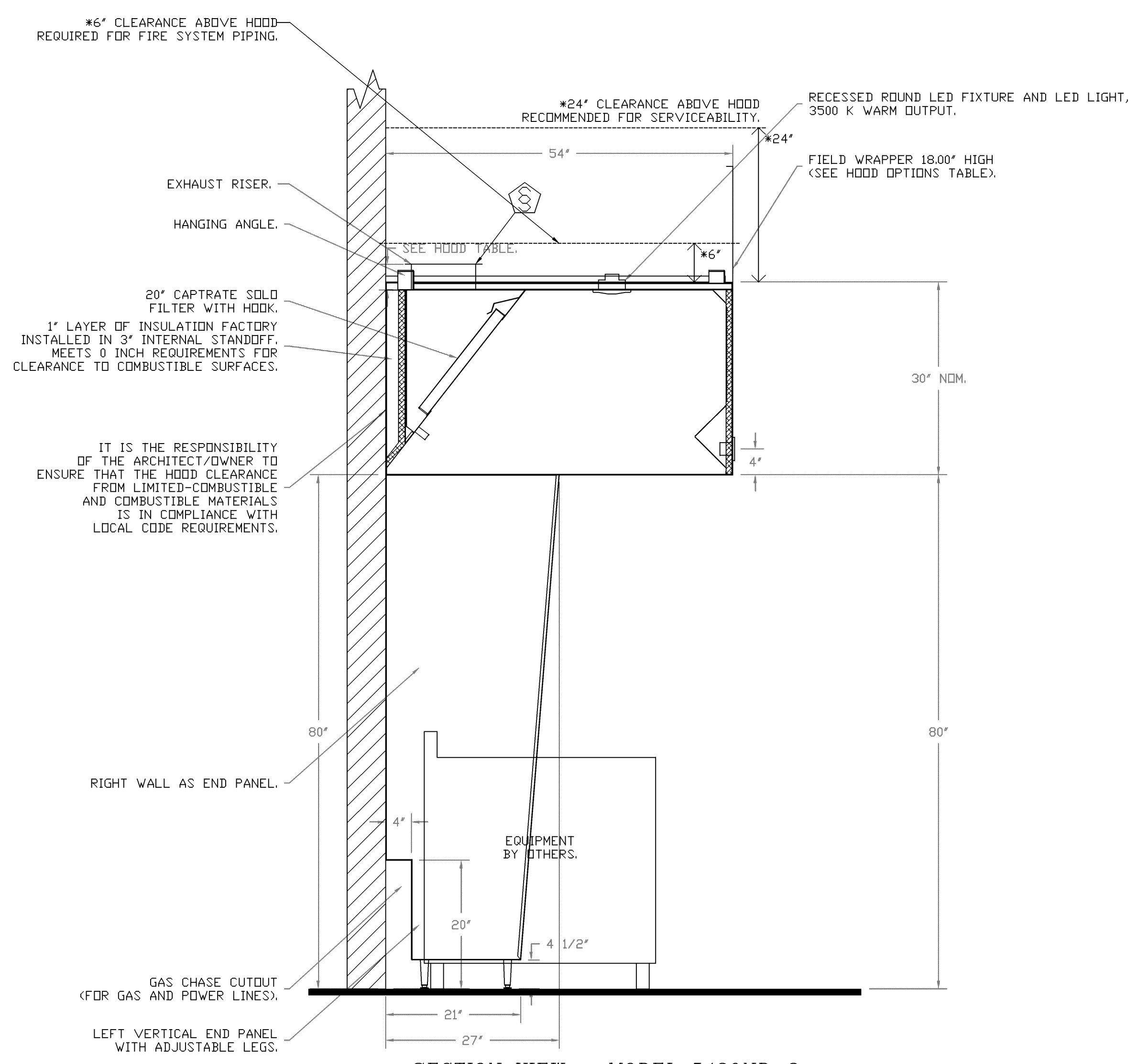
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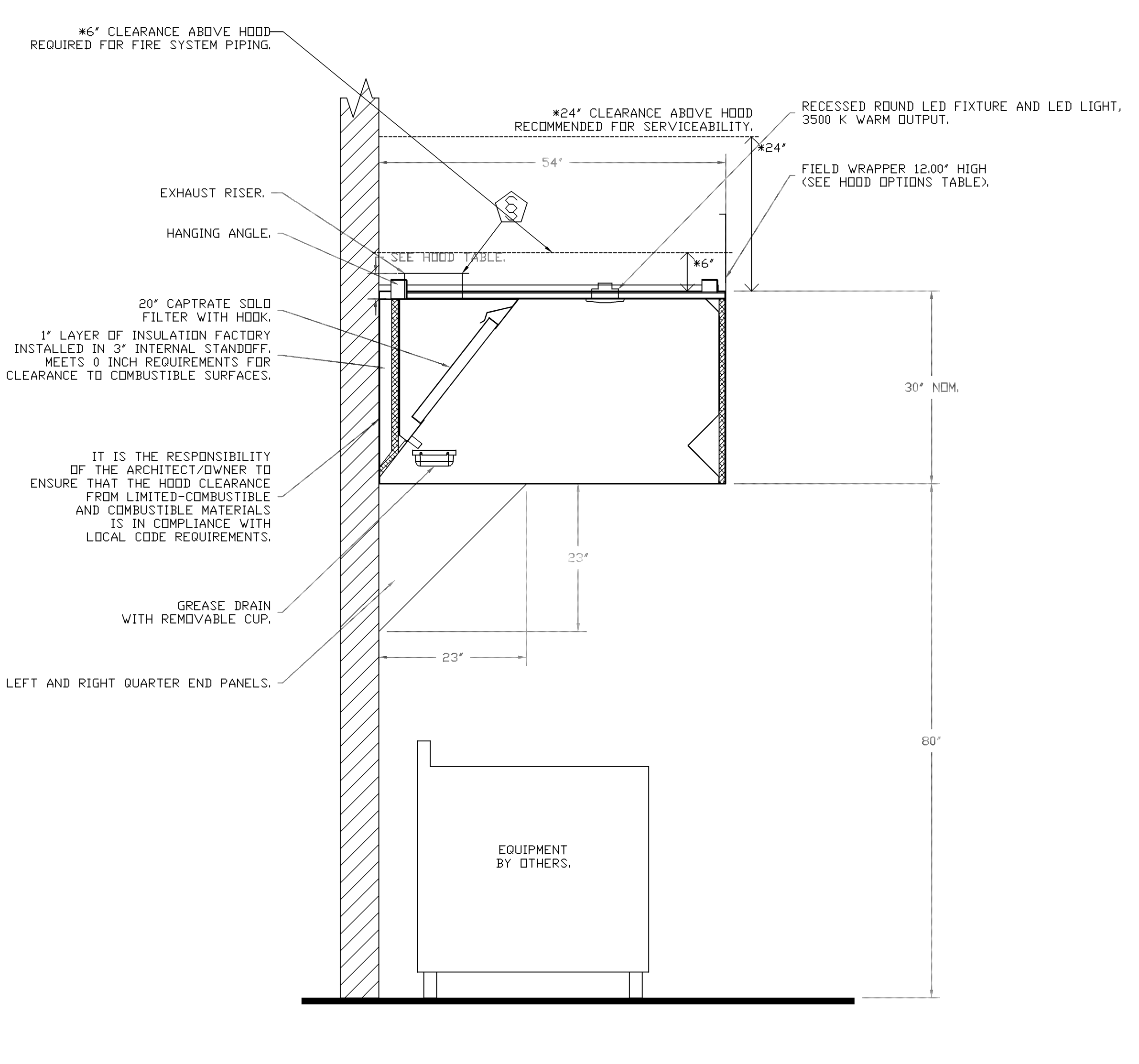
PLAN VIEW - HOOD #2 (Hood (Fryer))
4' 11.00" LONG 5430ND-2

INSTALLER MUST CONFIRM HOOD IS INSTALLED SUCH THAT THE SPECIFIED WALL, ACTING AS AN END PANEL, IS MATED TIGHT TO THE CORRECT END OF HOOD TO ACHIEVE A REDUCED MINIMUM EXHAUST CFM LISTING. NON-COMPLIANCE WILL NULLIFY THE ETL LISTING, VOID THE MANUFACTURER'S WARRANTY, AND HOLD THE CONTRACTOR LIABLE FOR ANY AND ALL LOSSES, COSTS, AND EXPENSES RELATED TO THE NON-COMFORMANCE OF THE MANUFACTURER'S SPECIFIED INSTRUCTION. THE WALL ACTING AS AN END PANEL MUST EXTEND NO LESS THAN 20" FROM THE INTERSECTING WALL ON WHICH HOOD IS MOUNTED AND MUST EXTEND NO LESS THAN 20" UNDER BOTTOM OF HOOD TO BE ELIGIBLE FOR REDUCED MINIMUM EXHAUST CFM LISTING.

(1) DUPLEX OUTLET



SECTION VIEW - MODEL 5430ND-2
HOOD - #1 (Hood (Grill))



SECTION VIEW - MODEL 5430ND-2
HOOD - #2 (Hood (Fryer))

IT IS THE RESPONSIBILITY OF THE ARCHITECT/DOWNER TO ENSURE THAT THE HOOD CLEARANCE FROM LIMITED-COMBUSTIBLE AND COMBUSTIBLE MATERIALS IS IN COMPLIANCE WITH LOCAL CODE REQUIREMENTS.

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Shake Shack-1731-Colonial, FL (Kitchen)
ORLANDO, FL, 32803

SHAKE SHACK

SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number: 25128
Drawn By: SEI
Checked By: GRS
Date: 09 JUN 2025

DATE: 4/23/2025
DWG.#: 7488296
DRAWN BY: joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 2

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FIRE SYSTEM INFORMATION - JOB#7488296

FIRE SYSTEM NO	TAG	TYPE	SIZE	MAX FP	DESIGN FP	INSTALLATION	
						SYSTEM	LOCATION ON HOOD
1		TANK FS	4.0/4.0/4.0	60	46	FIRE CABINET LEFT	LEFT, HOOD 2

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 PRE-ENGINEERED FIRE SYSTEM COMPLIES WITH UL 300 REQUIREMENTS.

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

JOB #: 7488296
JOB NAME: SHAKE SHACK-1731-COLONIAL, FL(KITCHEN).

SYSTEM SIZE: TANK-SP-3 DESIGN FP: 46, MAXIMUM FP: 60.
HOOD # 1 7' 11.00" LONG x 54" WIDE x 30" HIGH.
RISE # 1 SIZE: 10" x 11"
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 2 4' 11.00" LONG x 54" WIDE x 30" HIGH.
RISE # 1 SIZE: 9" x 9"
HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

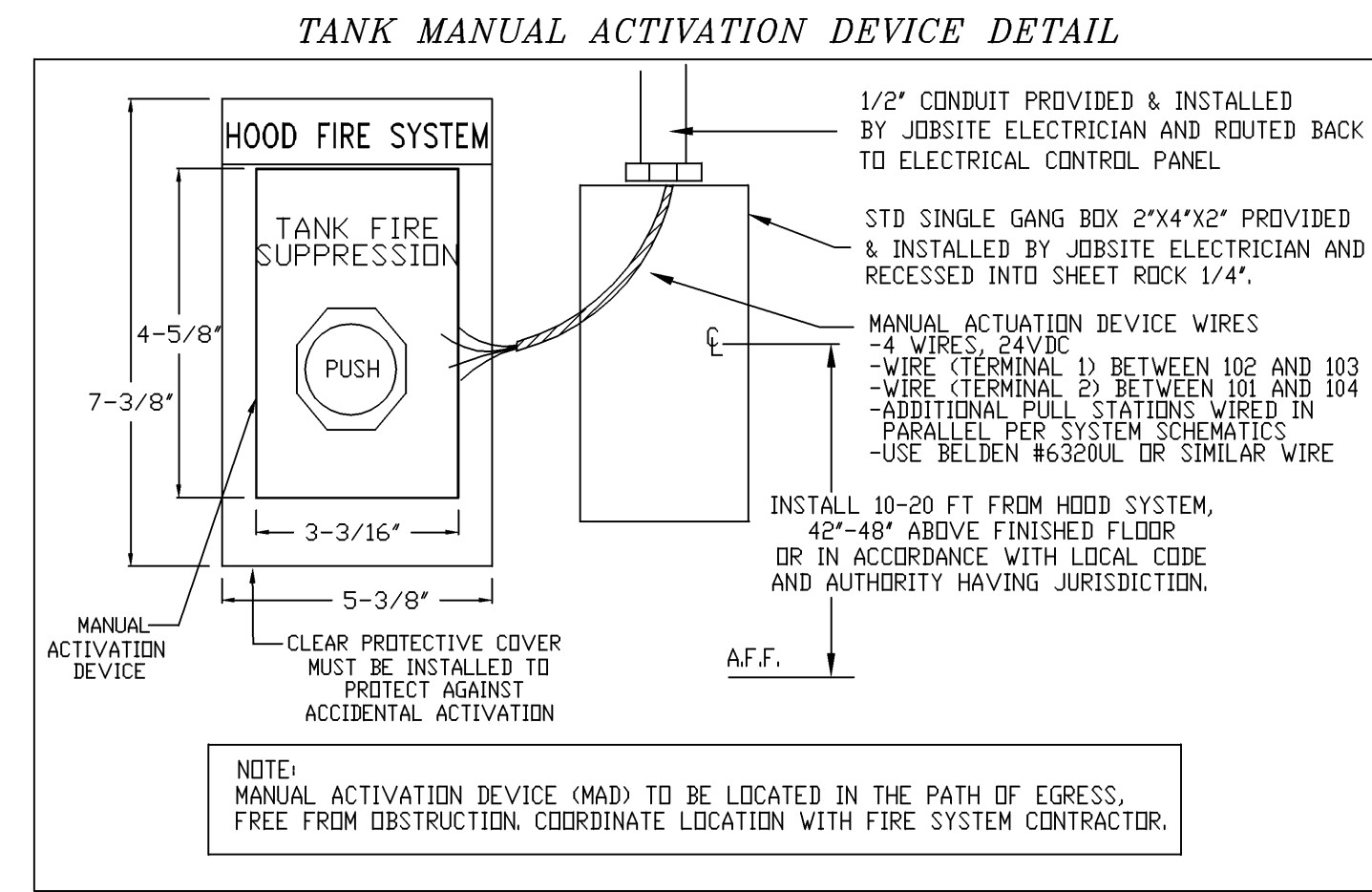
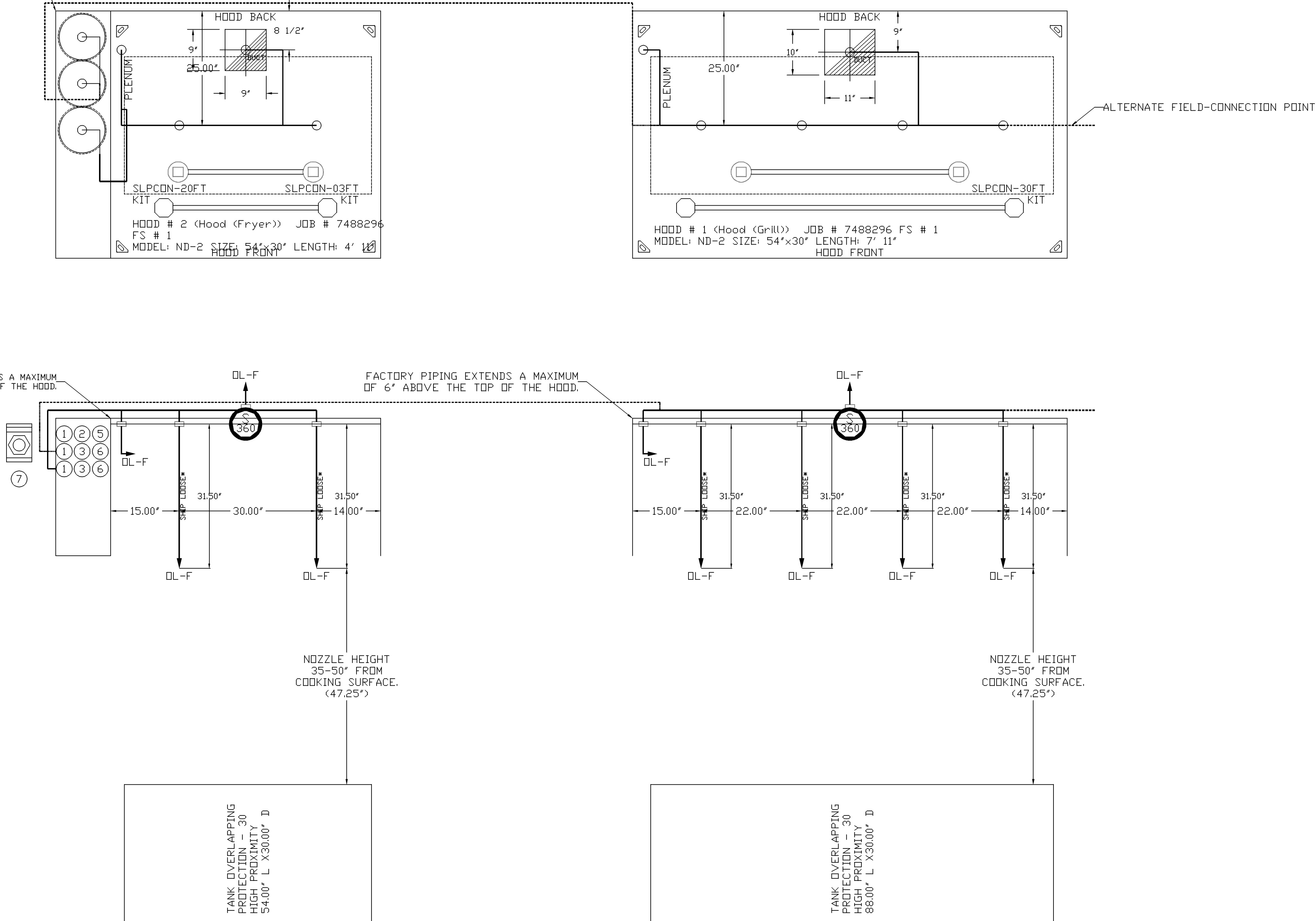
- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

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

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SHAKE SHACK®

SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number: 25128
Drawn By: SEI
Checked By: GRS
Date: 09 JUN 2025

Revisions
1 17 JUL 2025 ISSUED FOR CONSTRUCTION
3 09 SEP 2025 STRUCT. COORD.

Shake Shack-1731-Colonial, FL(Kitchen)
ORLANDO, FL, 32803

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DRAWN BY: Joe.shilba
SCALE: 3/4" = 1'-0"
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EXHAUST FAN INFORMATION - JOB#7488296

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(GRILL)	1	DU85HFA	CAPTIVEAIRE	1188	1.000	1213	TEAD-ECM	0.750	0.3070	1	208	5.2	376 FPM	90	9.1
2	KEF(FRYER)	1	DU85HFA	CAPTIVEAIRE	860	1.000	1141	TEAD-ECM	0.750	0.2550	1	208	5.2	272 FPM	90	8.1

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	KEF(GRILL)	1	GREASE BOX
		1	FAN BASE CERAMIC SEAL - DU/DR85HFA - INSTALLED AT PLANT - FOR GREASE DUCTS
		1	ECM WIRING PACKAGE - EXHAUST - MDDBUS CONTROL -MSC- (TELCD), CCW ROTATION
		1	2 YEAR PARTS WARRANTY
2	KEF(FRYER)	1	GREASE BOX
		1	FAN BASE CERAMIC SEAL - DU/DR85HFA - INSTALLED AT PLANT - FOR GREASE DUCTS
		1	ECM WIRING PACKAGE - EXHAUST - MDDBUS CONTROL -MSC- (TELCD), CCW ROTATION
		1	2 YEAR PARTS WARRANTY

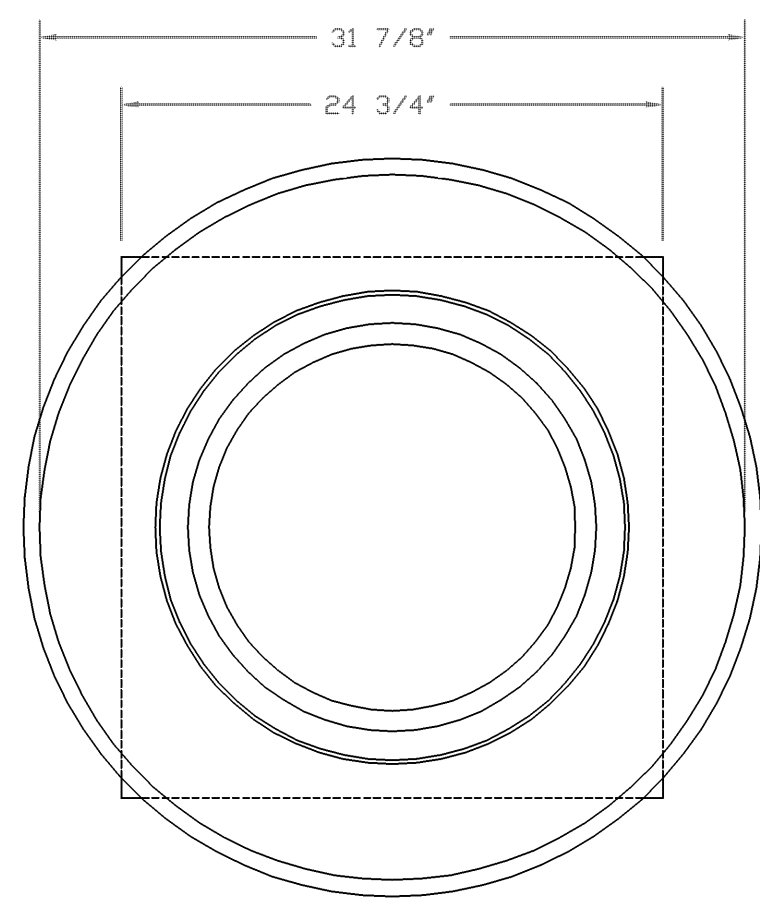
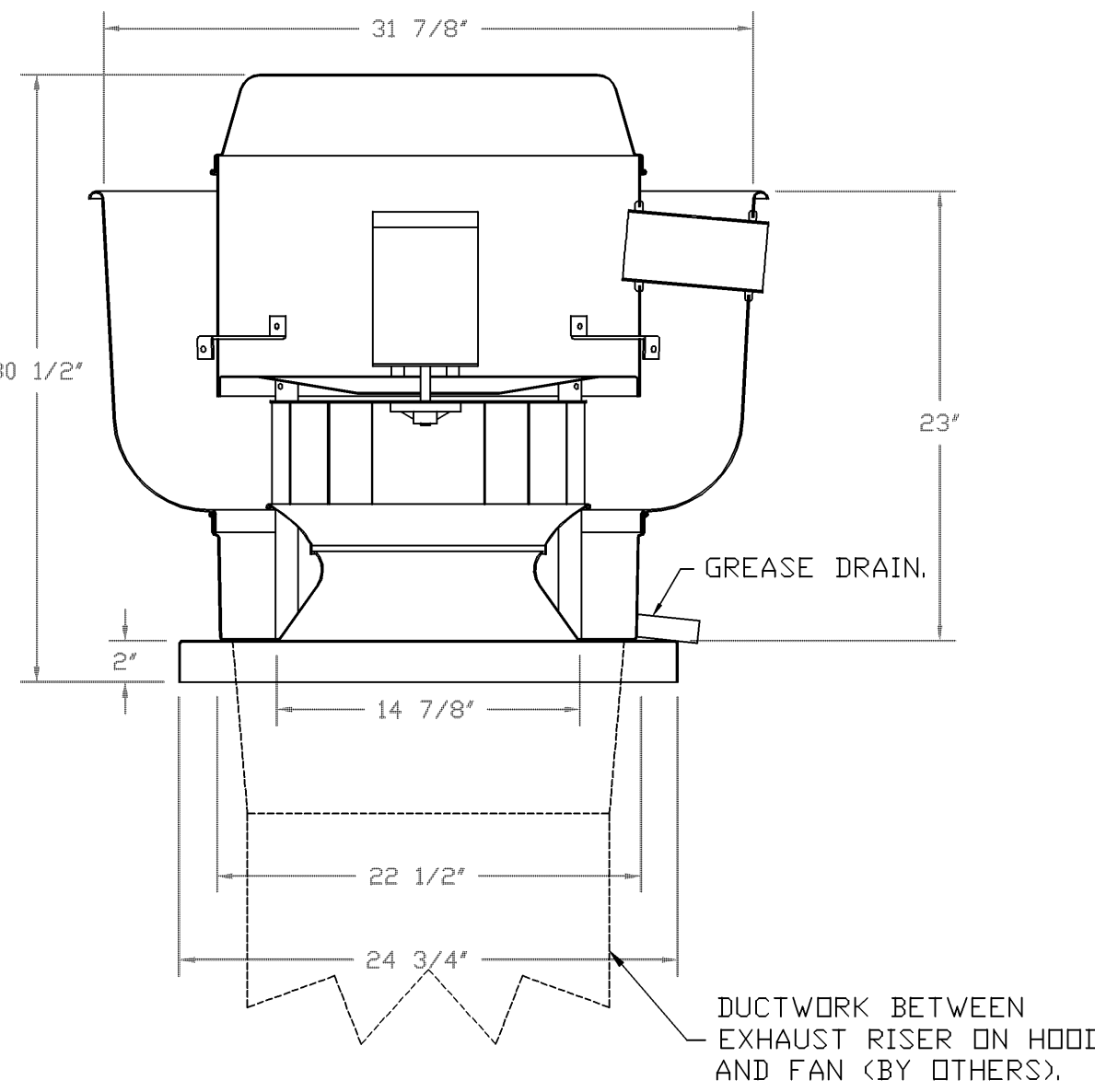
FAN ACCESSORIES

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

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF-1	36 LBS	CURB	23,000"W X 23,000"L X 20,000"H HINGED.
2	# 2	KEF(FRYER)	36 LBS	CURB	23,000"W X 23,000"L X 20,000"H HINGED.

FANS #1 (KEF(GRILL)), #2 (KEF(FRYER)) - DU85HFA EXHAUST FAN



TOP VIEW

FEATURES:

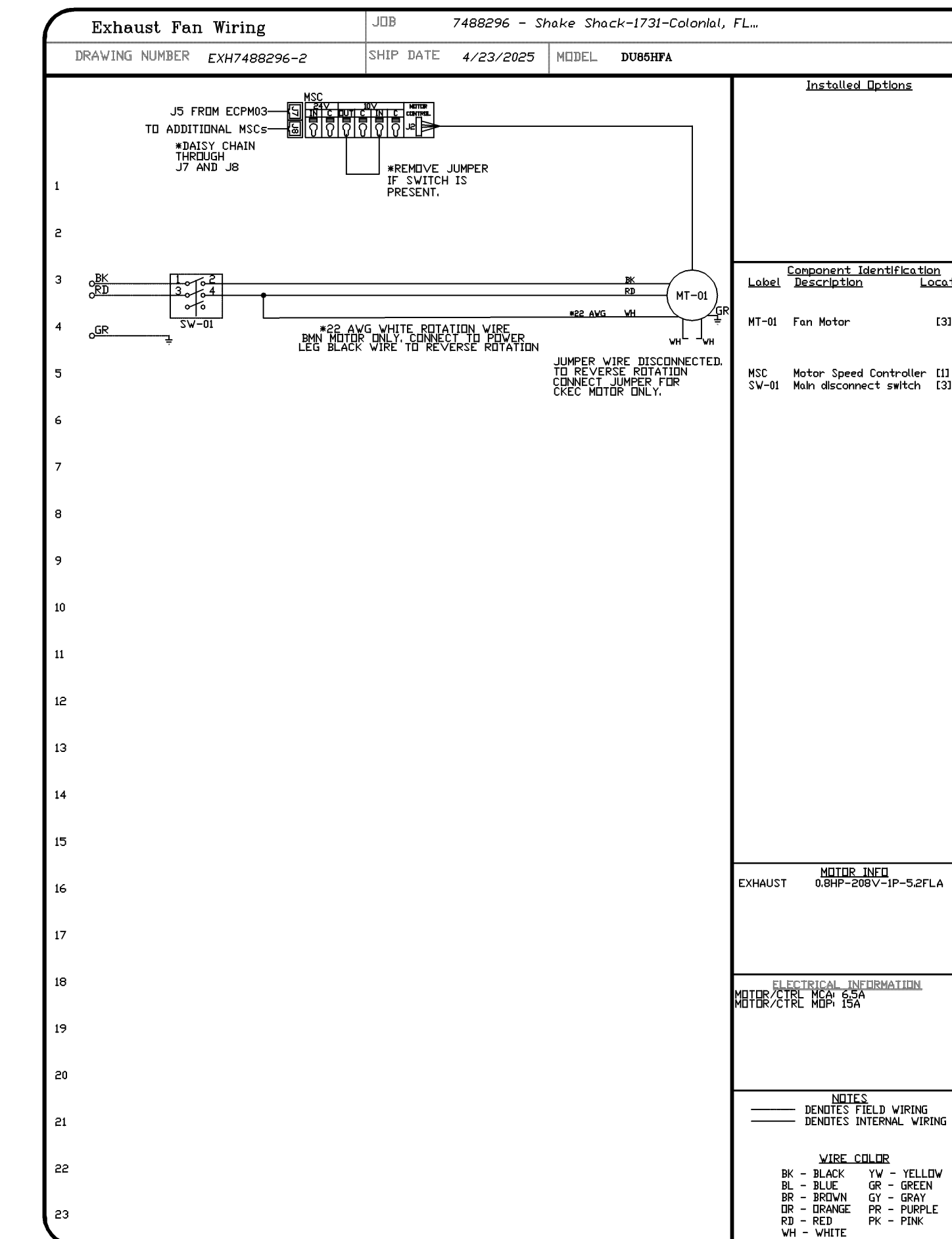
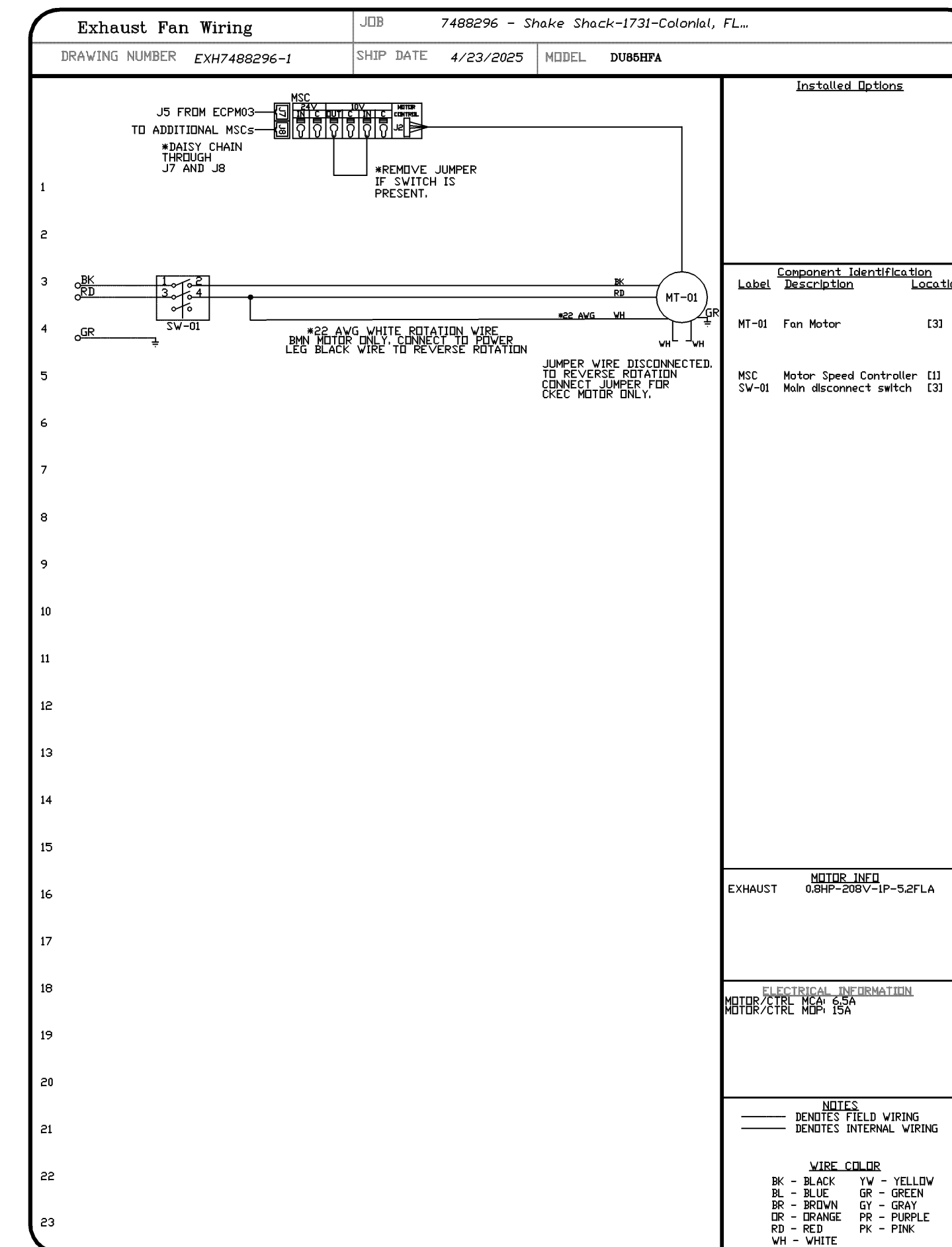
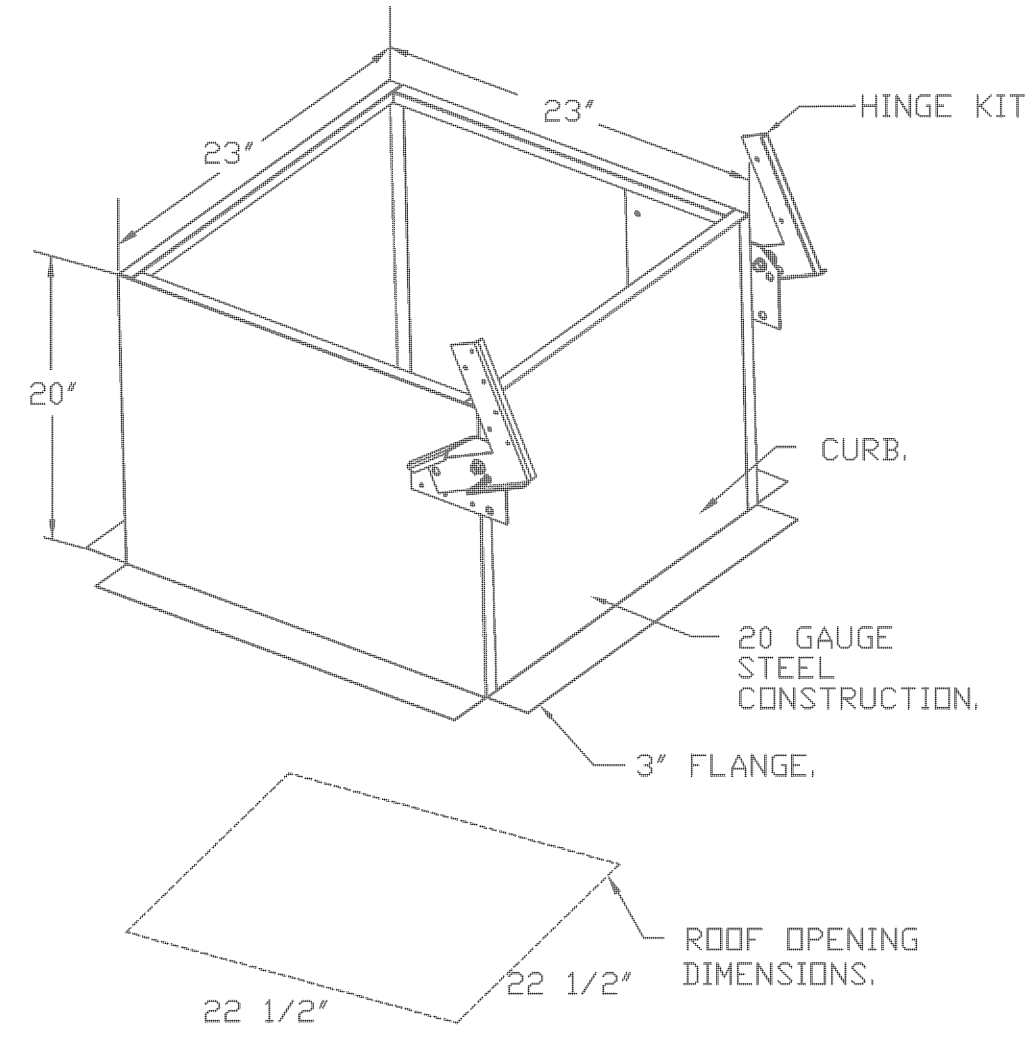
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT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

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

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

OPTIONS

- GREASE BOX.
- FAN BASE CERAMIC SEAL - DU/DR85HFA - INSTALLED AT PLANT - FOR GREASE DUCTS.
- ECM WIRING PACKAGE - EXHAUST - MDDBUS CONTROL -MSC- (TELCD), CCW ROTATION.
- 2 YEAR PARTS WARRANTY.



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Project



SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number: 25128
Drawn By: SEI
Checked By: GRS
Date: 09 JUN 2025

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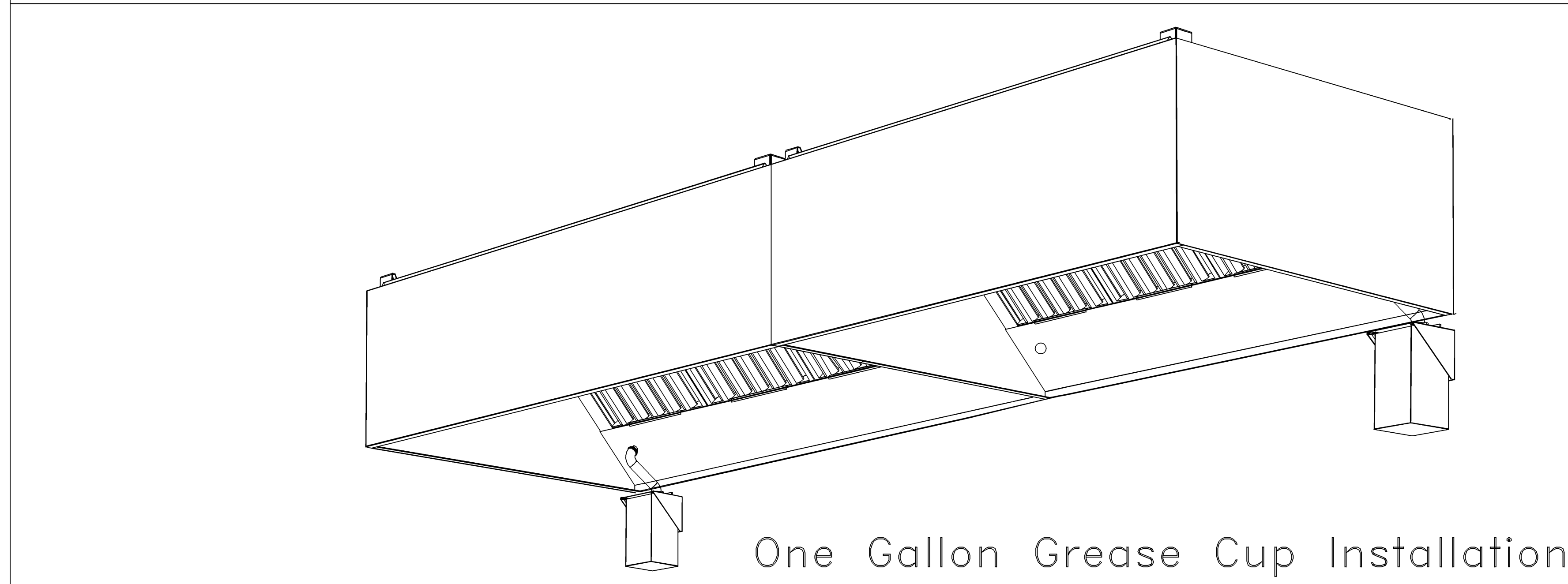
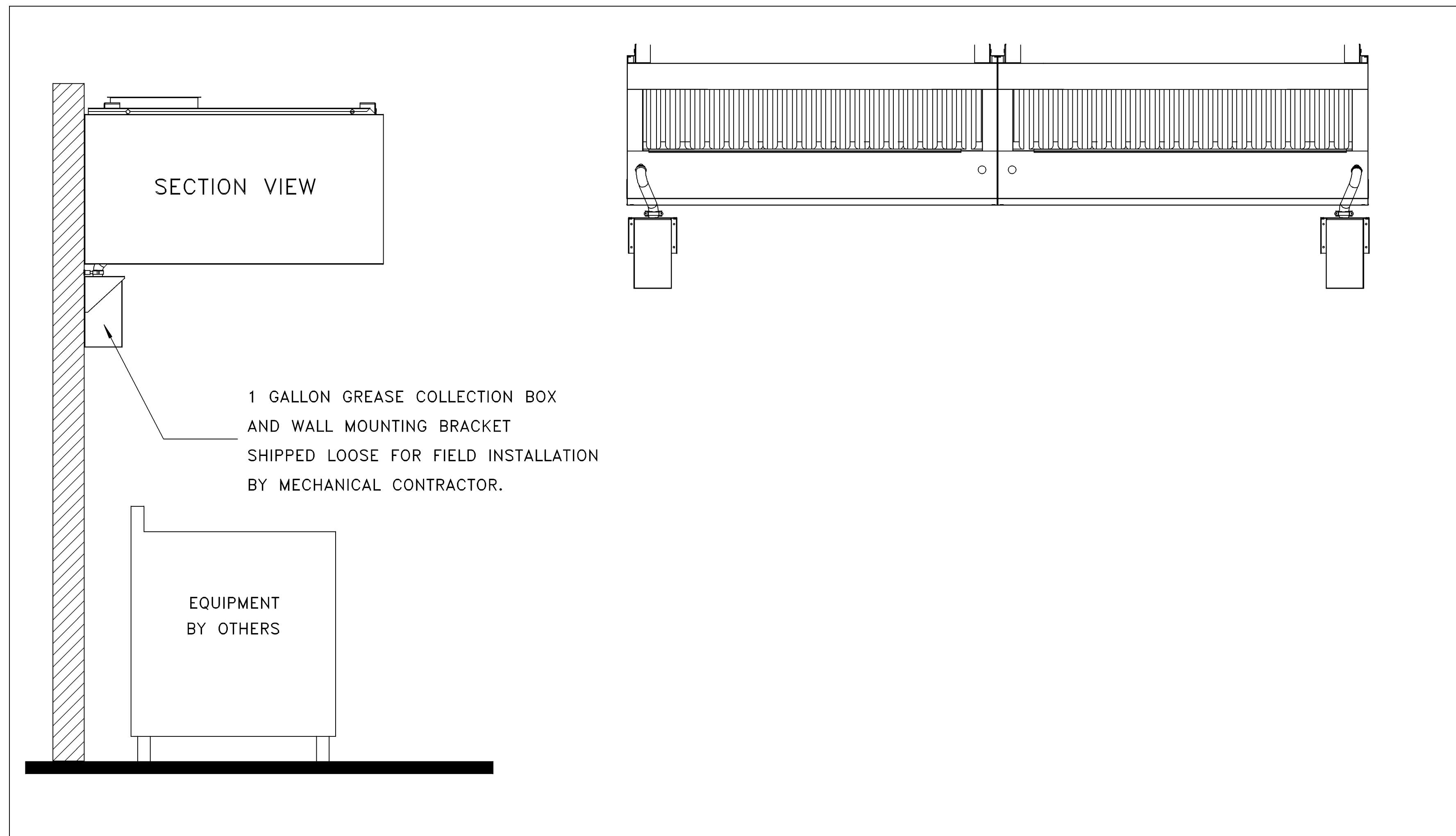
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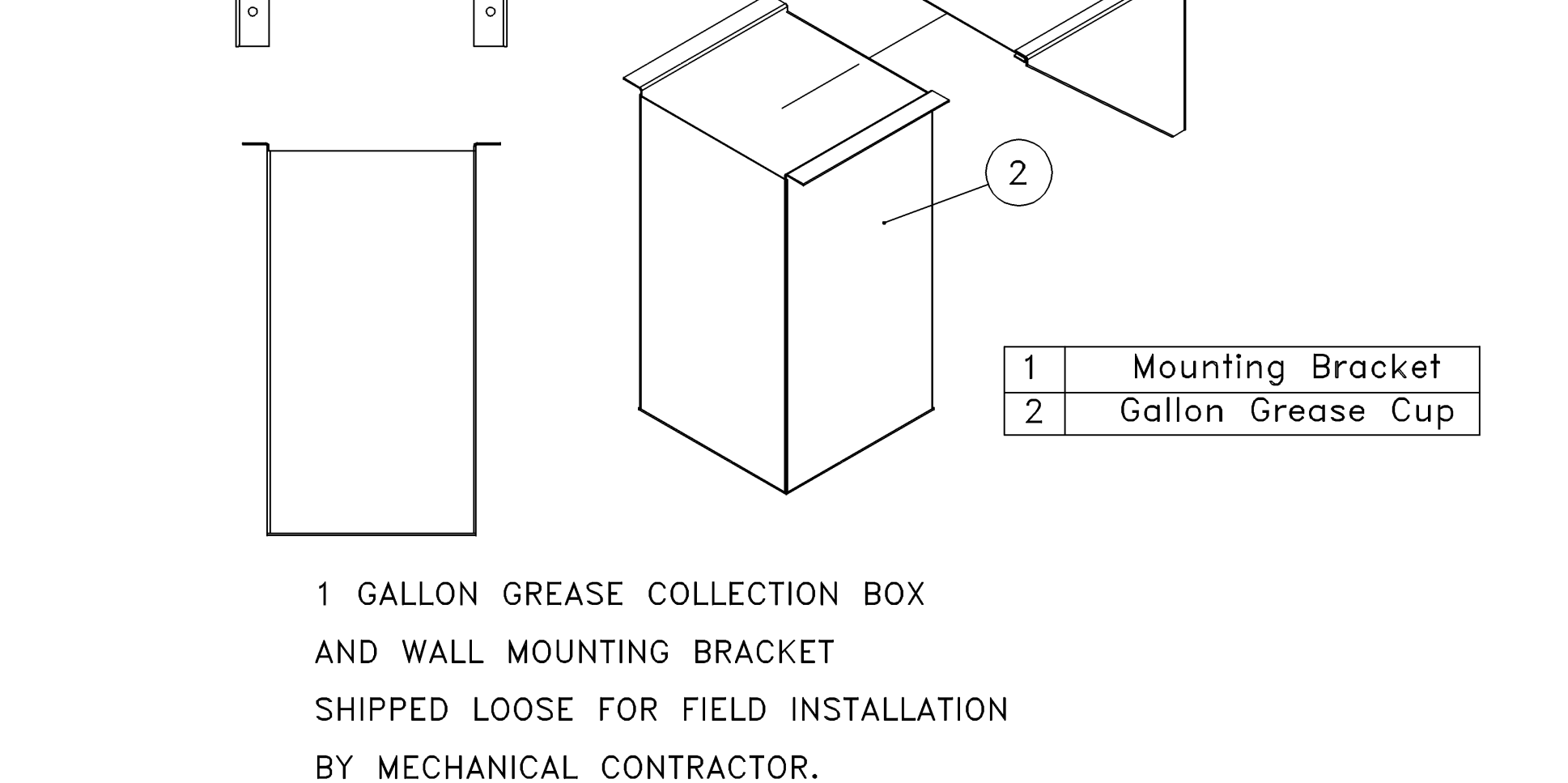
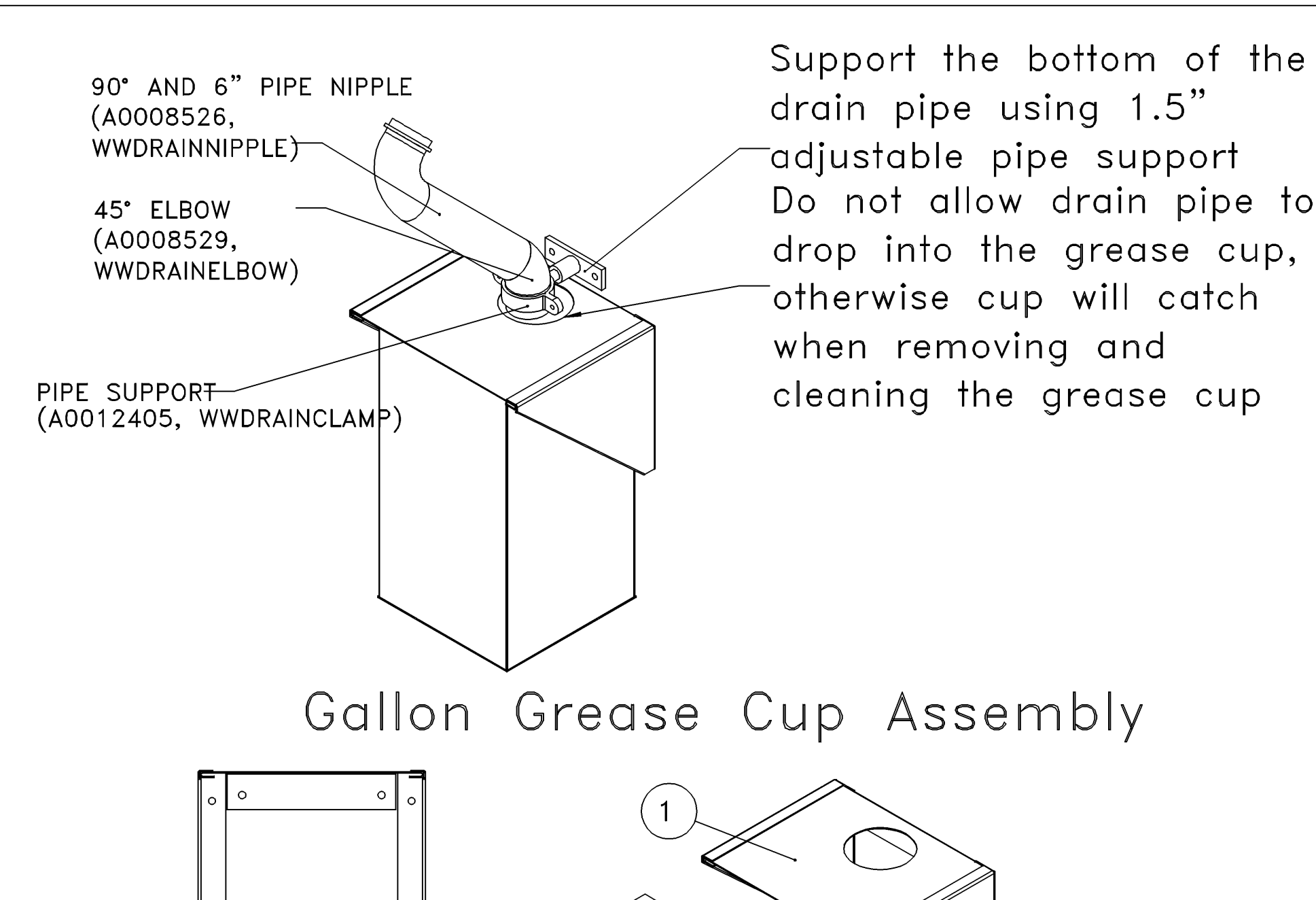
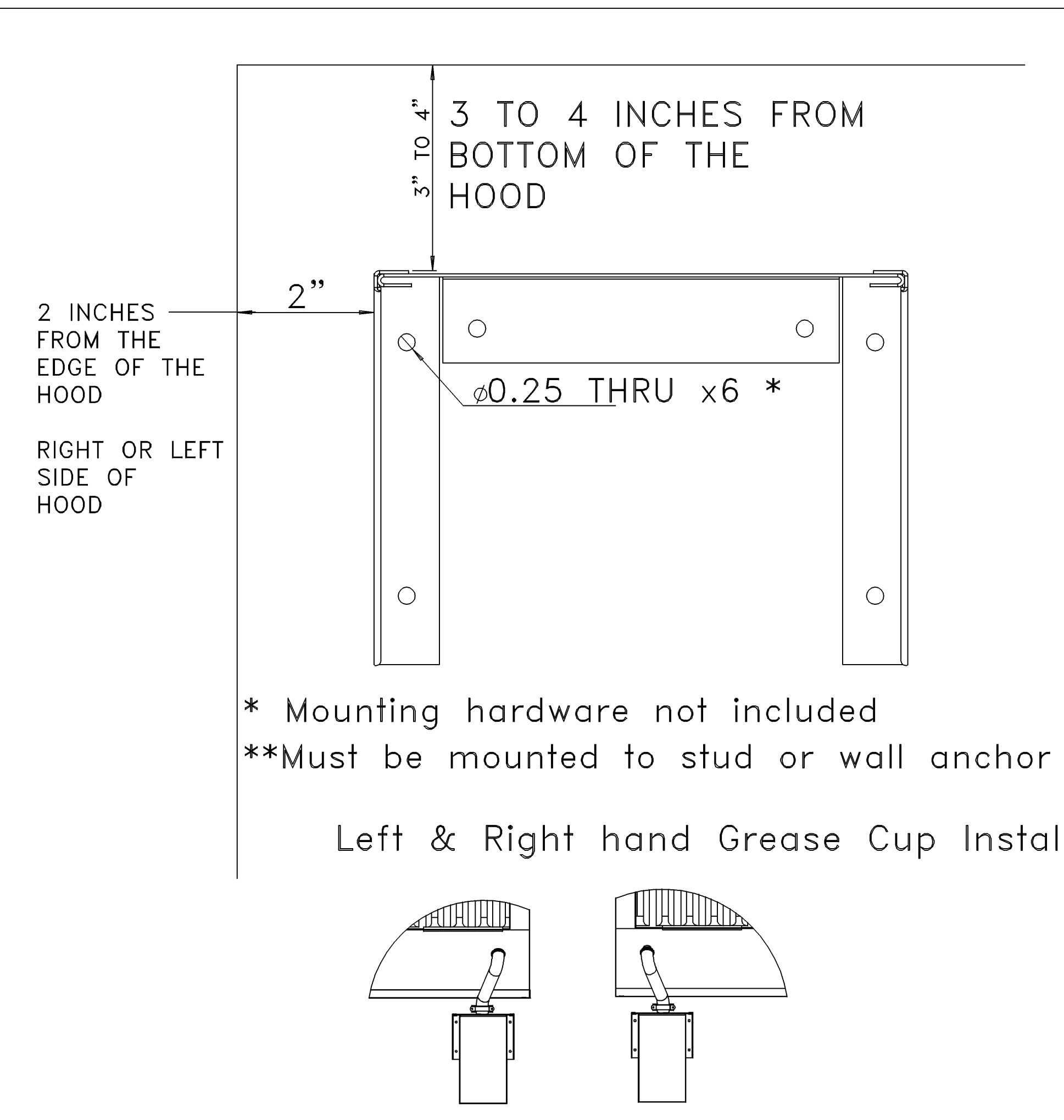
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Instructions below outline single, or dual, one gallon grease cup installation for ND-2 hood models.

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.



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DRAWN BY: Joe.shilba

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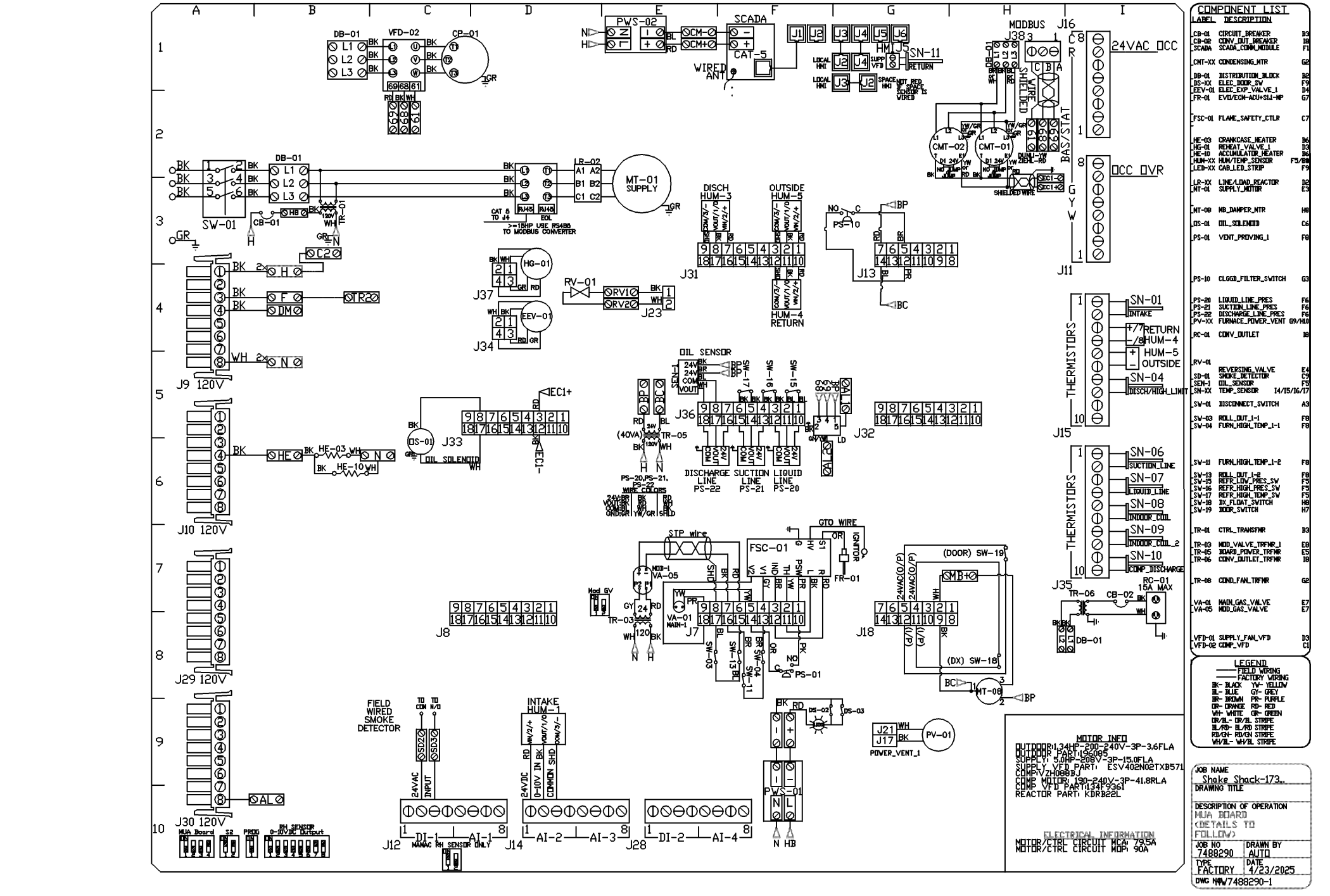
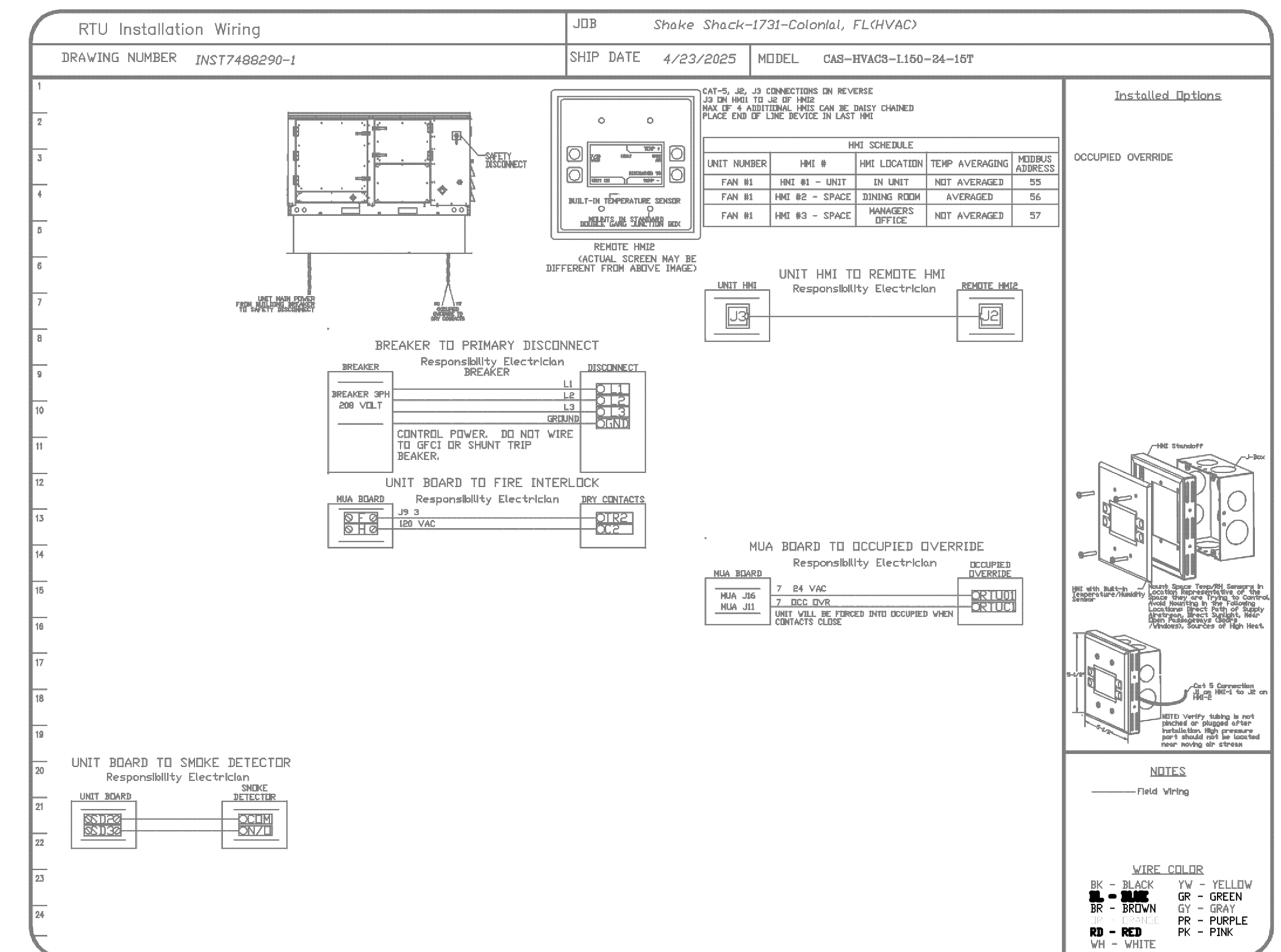
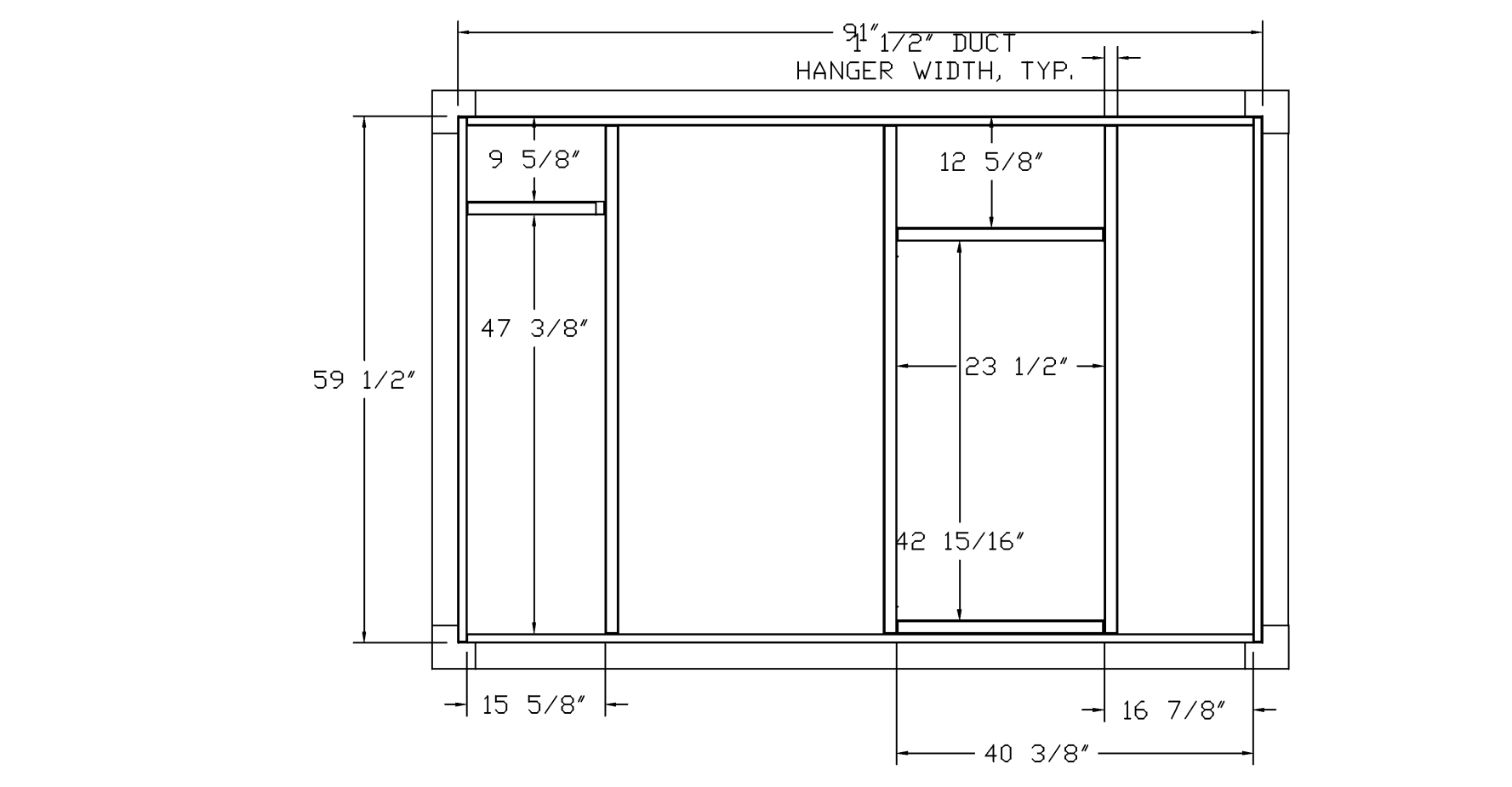
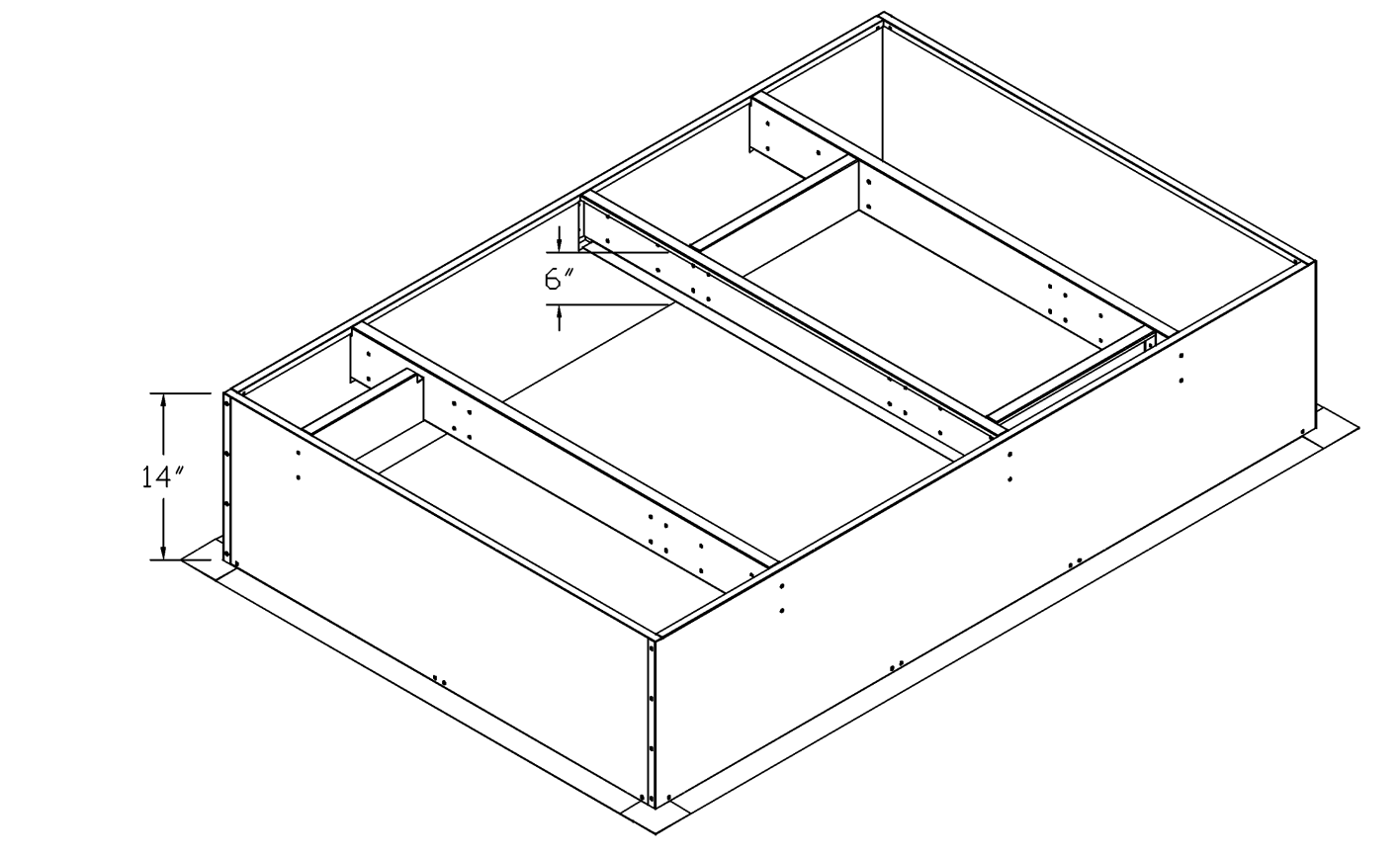
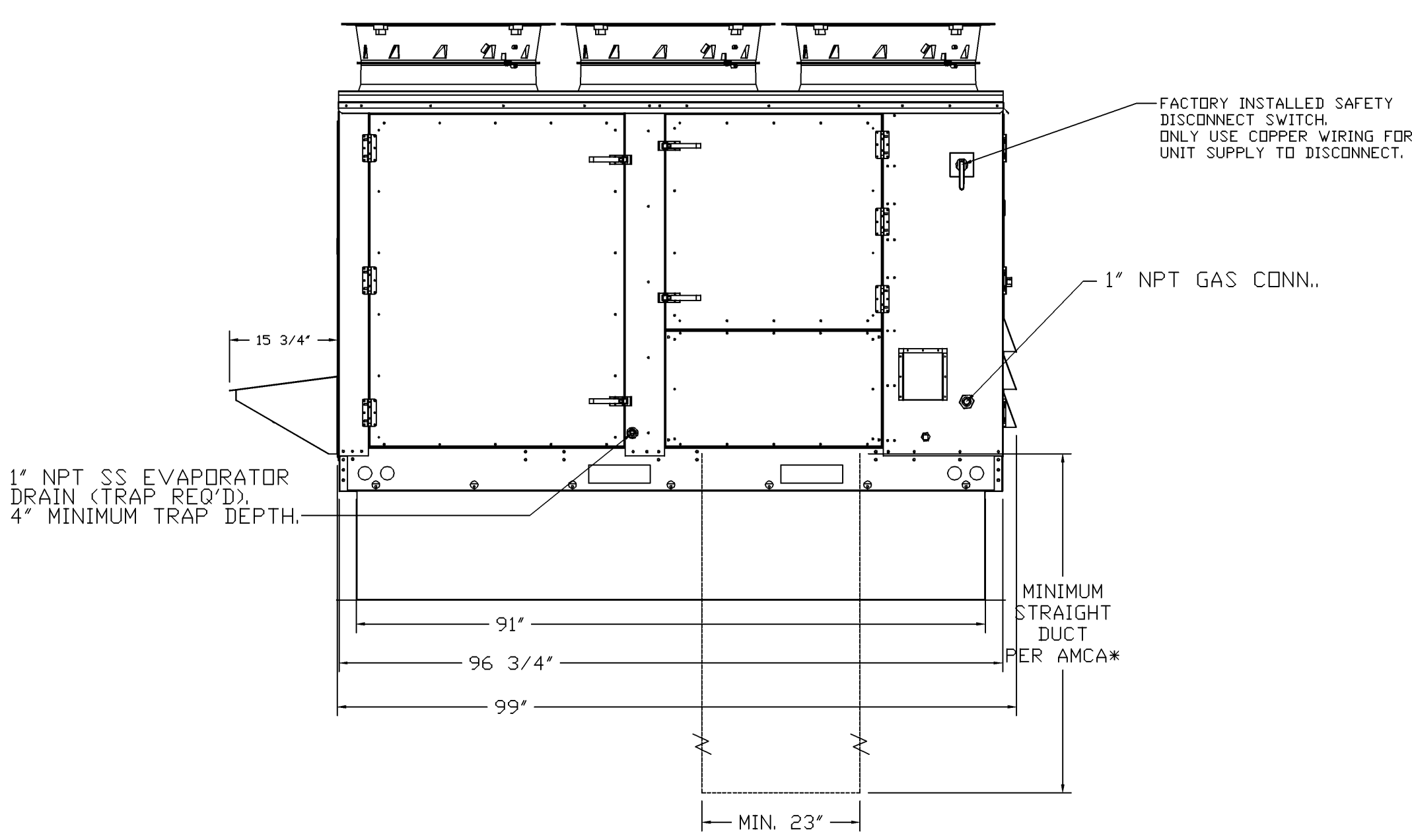
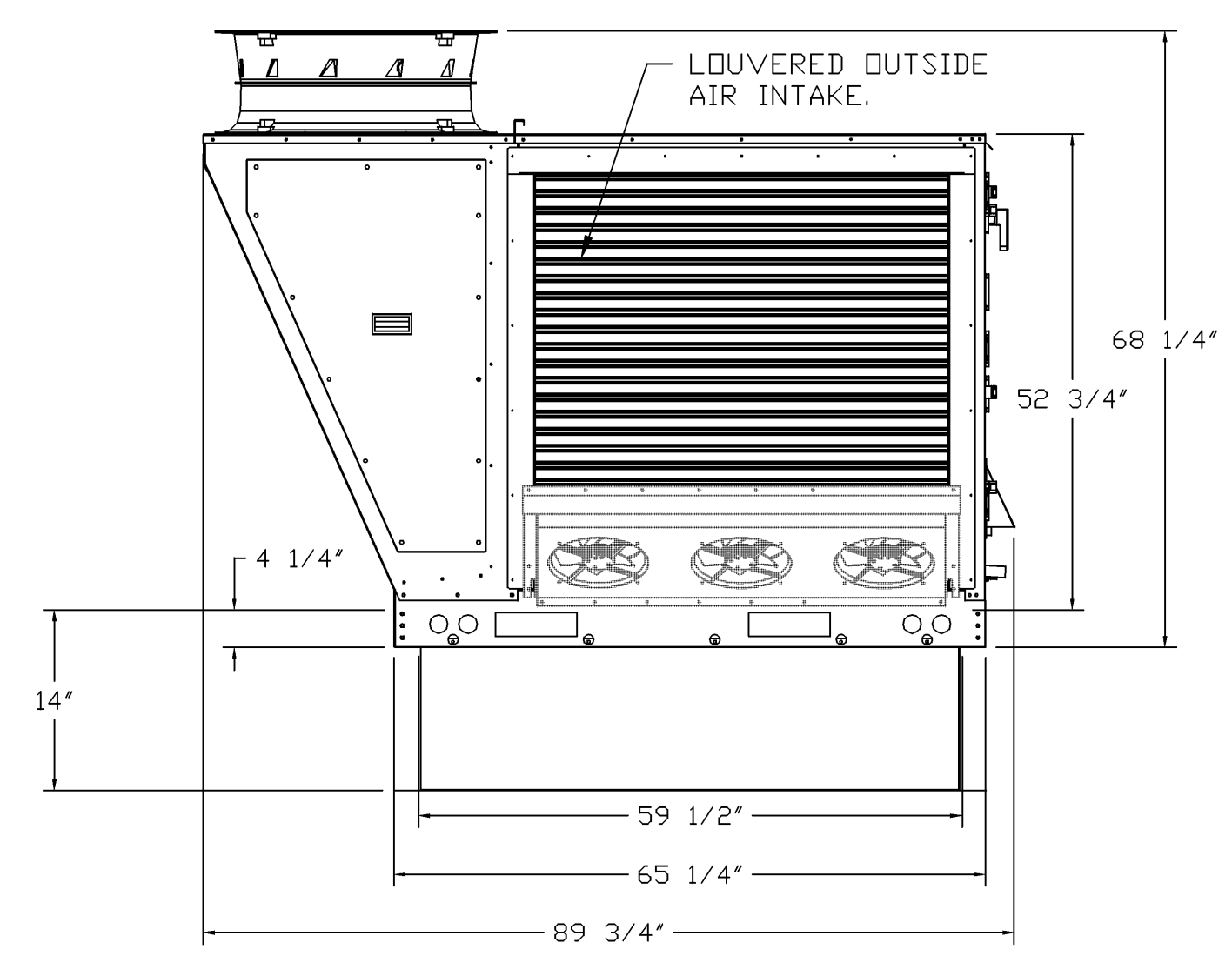
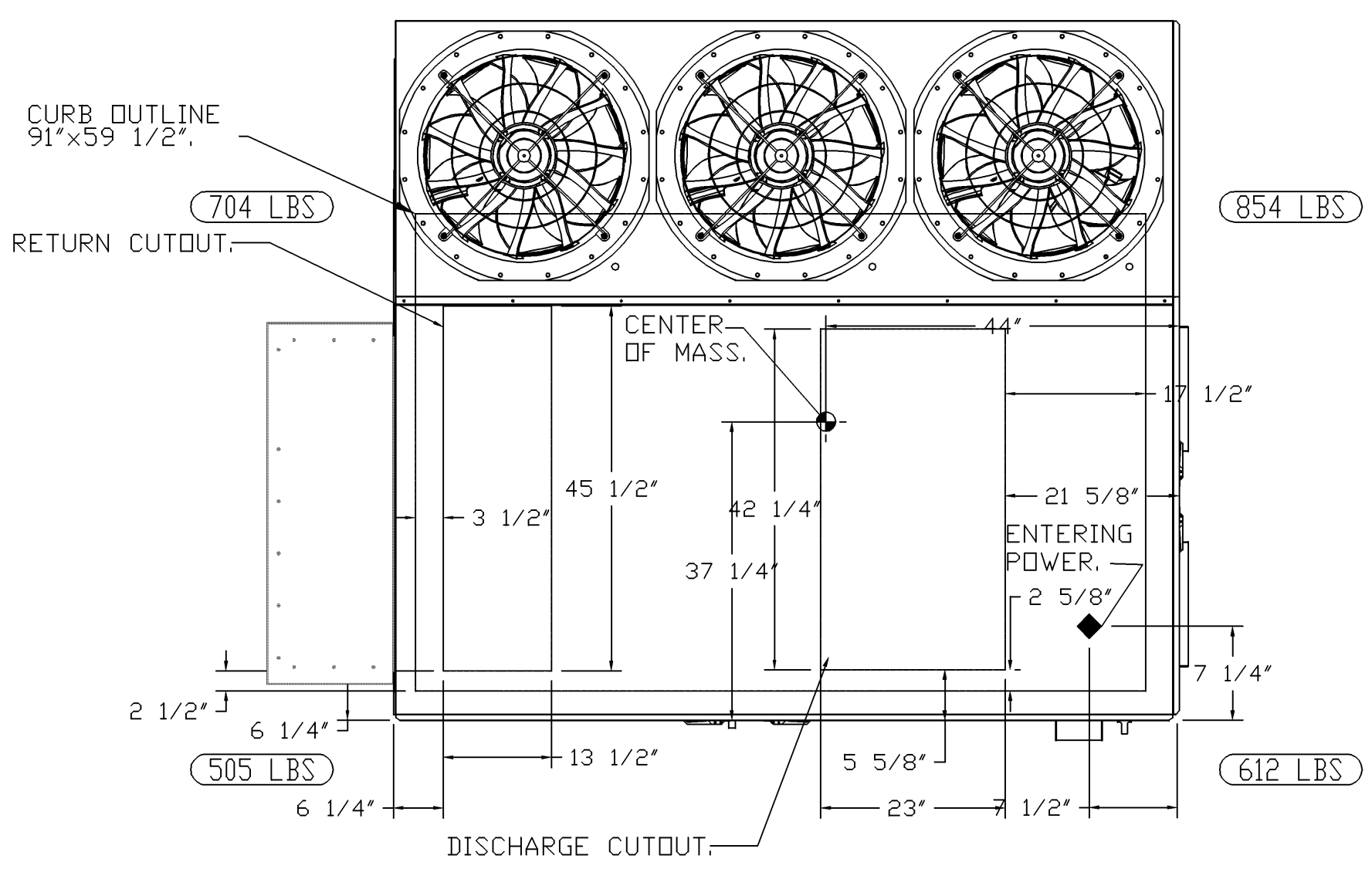
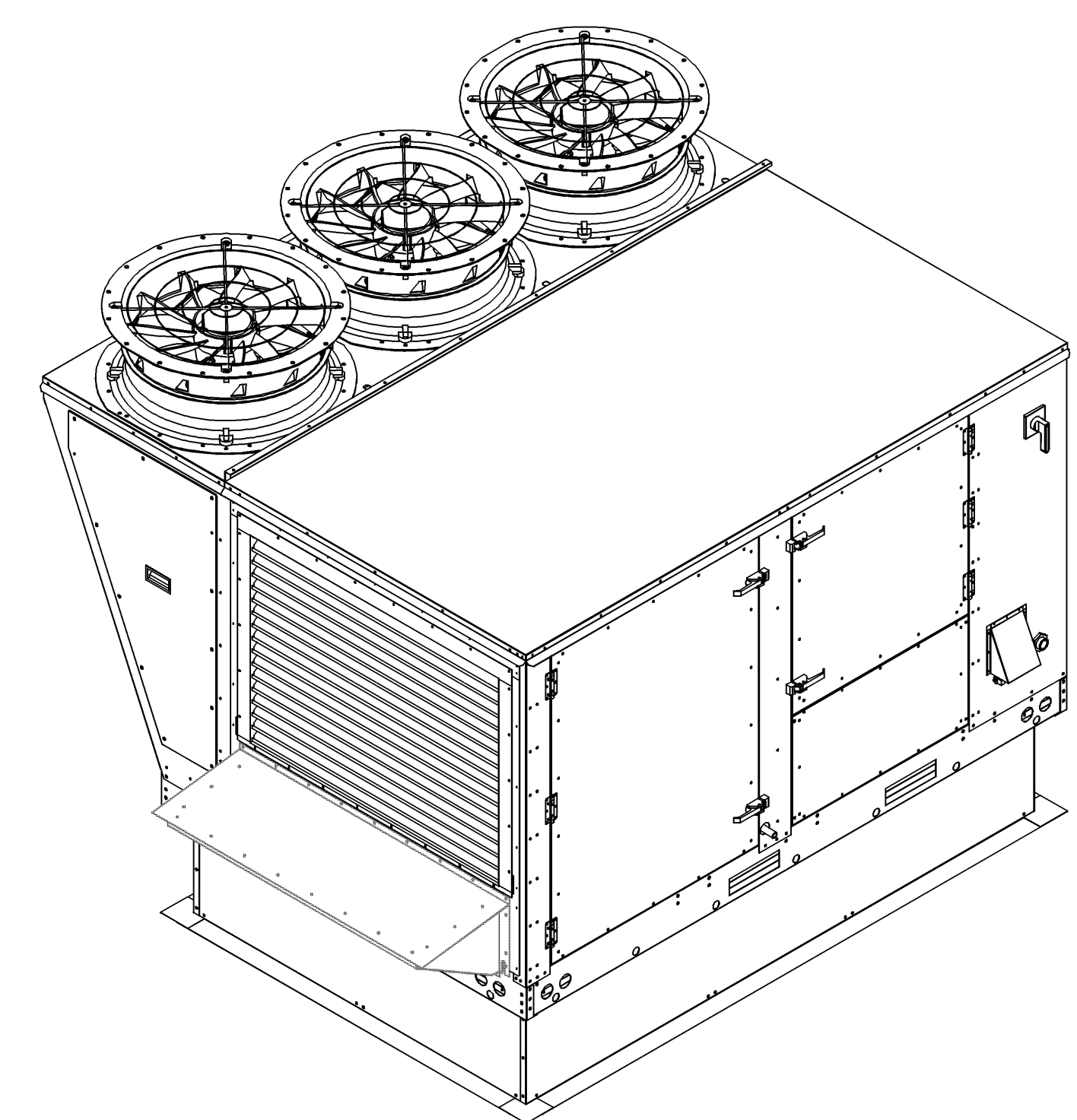
Drawing

CAPTIVEAIRE DRAWINGS

M706

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REVISIONS	
DESCRIPTION	DATE

CAPTIVEAIRE

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

Shake Shack-1731-Colonial, FL (HVAC)
ORLANDO, FL, 32803

DATE: 4/23/2025
DWG.#: 7488290
DRAWN BY: Joe.shilba
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO. 3

Schnackel engineers
New York • Miami • Omaha • Los Angeles • Seattle • Honolulu
800-581-0963 www.schnackel.com

Seal

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SHAKE SHACK®
SHAKE SHACK #1731
COLONIAL
MARKETPLACE, FL

Project Number 25128
Drawn By SEI
Checked By GRS
Date 09 JUN 2025

Revisions
1 17 JUL 2025 ISSUED FOR CONSTRUCTION
3 09 SEP 2025 STRUCT. COORD.

FAN #2 CAS-HVAC3-1.150-24MF-20T - HEATER (RTU-2 (KITCHEN))

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

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

Drawing
CAPTIVEAIRE
DRAWINGS

M709

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