

MECHANICAL GENERAL NOTES:

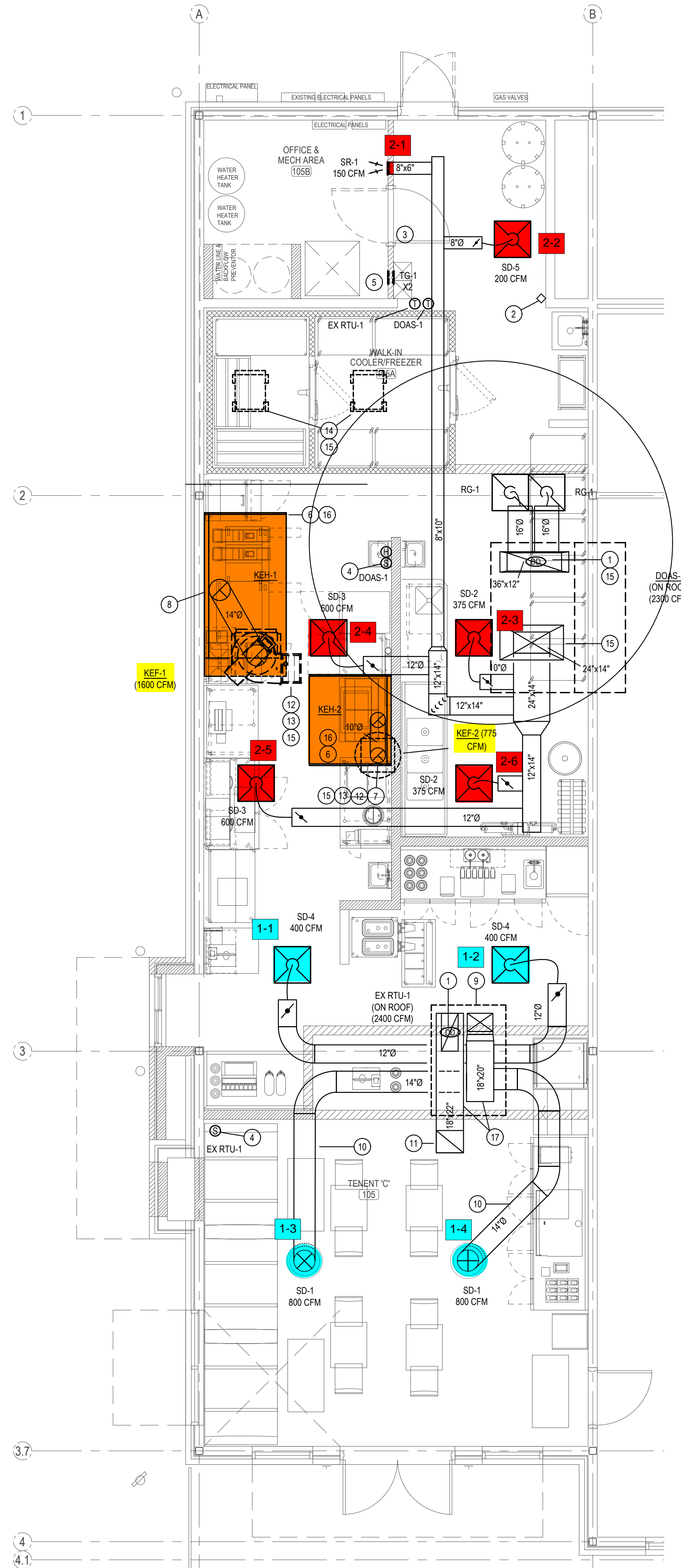
- COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS AS REQUIRED TO PROPERLY INSTALL ALL SYSTEMS AS INTENDED, WITHIN THE CONFINES OF THE SPACES AVAILABLE, AND WITHOUT INTERFERENCES.
- THIS CONTRACTOR SHALL PERFORM ALL WORK INDICATED AND/OR AS REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE MECHANICAL SYSTEMS.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF DIFFUSERS.
- INSTALL ALL DUCT, PIPE, ETC. AS HIGH AS POSSIBLE.
- DUCT SIZES SHOWN ARE ACTUAL SHEET METAL SIZES AND INCLUDE AN ALLOWANCE FOR DUCT LINER WHERE APPLICABLE.
- PROVIDE FLEXIBLE CONNECTION BETWEEN DUCTWORK AND ROOFTOP UNITS, EXHAUST FANS, AND OTHER MOTORIZED EQUIPMENT.
- NO DUCT SHALL BE ROUTED OVER THE TOP OF ELECTRICAL PANELS.
- ALL MECHANICAL SYSTEMS SHALL BE BALANCED BY A CERTIFIED BALANCING CONTRACTOR. REFER TO SPECIFICATIONS FOR DETAILS.

MECHANICAL PLAN NOTES:

- LOCATION OF DUCT MOUNTED SMOKE DETECTOR. PROVIDE REMOTE ENUNCIATOR AUDIOVISUAL. VERIFY LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION. REFER TO SPEC SHEET MP0 FOR ADDITIONAL INFORMATION.
- LOCATION OF MANUAL PULL STATION. INSTALL PER THE MANUFACTURERS REQUIREMENTS. COORDINATE WITH FIRE MARSHAL/AHU PRIOR TO INSTALLATION.
- LOCATION OF RTU AND DOAS THERMOSTATS. GC TO LABEL EACH THERMOSTAT.
- LOCATION OF RTU/DOAS TEMPERATURE/HUMIDITY SENSORS MOUNTED 7'-0" AFF.
- INSTALL (2) INLINE TRANSFER GRILLES AT 8' A.F.F. FOR RETURN AIR PATH FROM MECH. ROOM.
- EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTURERS INSTRUCTIONS.
- TRANSITION AND CONNECT 10" GREASE DUCT TO EXHAUST HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. DUCT TO BE SLOPED AT A MINIMUM OF 2% BACK TOWARDS HOOD. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
- TRANSITION AND CONNECT 14" GREASE DUCT TO COLLAR ON EXHAUST HOOD. ROUTE DUCT UP BETWEEN TRUSSES AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. REFER TO DETAIL ON SHEET M2. DUCT TO BE SLOPED AT A MINIMUM OF 2% BACK TOWARDS HOOD. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AND ACCESS DOORS AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
- BALANCE OUTDOOR AIR INTAKE FOR EXISTING RTU-1 TO NEW MINIMUM CFM AS SHOWN ON EXISTING ROOFTOP UNIT SCHEDULE (REFER TO SHEET M3).
- EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT (TYPICAL).
- RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM 6" CLEARANCE TO DECK.
- MAINTAIN 10' CLEARANCE FROM ALL OUTDOOR AIR INTAKES. SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
- GC TO INSTALL CAPTIVE AIR WBE WINDBAND EXTENSION FOR KEF-1 AND KEF-2 PROVIDED BY KITCHEN EQUIPMENT SUPPLIER.
- MOUNT CONDENSING UNIT ON ROOF AS DETAILED AND AS REQUIRED BY THE MANUFACTURER. CONNECT REFRIGERANT PIPING AS REQUIRED BY THE MANUFACTURER. SEE REFER TO SHEET M2 FOR MOUNTING DETAIL.
- CUT EXISTING ROOF AND FLASH INTO ROOF AS REQUIRED TO SEAL PENETRATION WEATHERTIGHT. ALL ROOFING WORK SHALL BE PERFORMED BY BUILDING OWNER'S ROOFING CONTRACTOR (AT THIS CONTRACTOR'S EXPENSE) TO MAINTAIN EXISTING ROOF WARRANTY. VERIFY APPROVED ROOFING CONTRACTOR WITH BUILDING OWNER PRIOR TO PERFORMING WORK.
- HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERED UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.
- COORDINATE WITH ARCHITECTURE AND STRUCTURAL PLANS AND CONFIRM CLEARANCES FOR DUCT CONNECTIONS ROUTING.

MECHANICAL SYMBOLS

- NEW SUPPLY DIFFUSER
- NEW RETURN AIR GRILLE
- EXHAUST GRILLE/FAN
- REMOTE TEMPERATURE SENSOR
- THERMOSTAT, MOUNTED AT 48" AFF
- HUMIDITY SENSOR, MOUNTED AT 48" AFF
- DUCT-MOUNTED SMOKE DETECTOR
- MOTORIZED DAMPER/LOUVER
- NEW DUCTWORK
- 32"x14" SIZE OF RECTANGULAR DUCT
- 6"0 SIZE OF ROUND DUCT
- FLEXIBLE DUCTWORK
- FLEXIBLE CONNECTION TO FAN
- FLOOR PLAN NOTE DESIGNATION
- S.A. SUPPLY AIR
- R.A. RETURN AIR
- EXH. EXHAUST AIR
- TRANSITION IN DUCT SIZE
- ELBOW WITH TURNING VANES
- MANUAL VOLUME DAMPER
- MOTORIZED CONTROL DAMPER
- FIRE DAMPER
- SPLITTER DAMPER WITH HORIZONTAL REGULATOR
- SUPPLY AIR DUCT UP/DOWN
- RETURN AIR DUCT UP/DOWN
- EXHAUST AIR DUCT UP/DOWN
- CHANGE IN ELEVATION UP (UP) DOWN (DN) IN DIRECTION OF FLOW
- RTU-1 SCHEDULED MECHANICAL EQUIPMENT
- EXIST'G DUCT TO REMAIN
- EXIST'G DUCT TO BE REMOVED
- EXISTING FLEXIBLE DUCT
- 32"x14"E SIZE OF EXISTING DUCT
- EXISTING SUPPLY DIFFUSER



AIR BALANCE SCHEDULE

SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA (%)	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)
EX RTU-1	440	1,960	2,400	18.3%	KEF-1	1,600
DOAS-1	2300	0	2,300	100.0%	KEF-2	775
TOTAL	2740	1,960	4,700	58.3%	TOTAL	2,375
RESULTING BUILDING PRESSURIZATION (CFM)						365

THE BUILDING HVAC SYSTEM SHALL BE BALANCED BY NATIONAL TAB HIRED BY THE OWNER. CONTACT Dan Hertenstein - National TAB at: 816-215-1593 - DAN@NATIONALTAB.COM

THE RTU SUPPLY FANS SHALL OPERATE IN SINGLE ZONE VAV MODE WITH 2 STAGES OF FAN CONTROL. LOW SPEED SHALL BE USED DURING PERIODS OF LOW COOLING LOAD AND VENTILATION ONLY OPERATION PER 2018 IECC REQUIREMENTS.

THE ECONOMIZER DAMPERS SHALL HAVE TWO POSITIONS DEPENDENT ON THE FAN SPEED TO MAINTAIN CONSTANT OUTDOOR AIR VOLUME AND BUILDING PRESSURE.

THE UNIT SHALL HAVE ITS FRESH AIR HEATING OPTION ENABLED TO HEAT VENTILATION AIR TO A NEUTRAL VALUE DURING COLD WEATHER OPERATION. REFER TO THE MANUFACTURER'S PROGRAMMING DOCUMENTATION FOR SETUP INSTRUCTIONS.

OUTDOOR AIR CALCULATIONS

UNIT	Area (sqft)	OCCUPANCY CLASSIFICATION	Occupant Density #/1000 sqft	People outdoor airflow rate in breathing zone, (Rp) cfm/person	Area outdoor airflow rate in breathing zone, (Ra) cfm/sqft	Breathing zone outdoor airflow (Vbz)	Zone air distribution effectiveness (Ez)	Zone outdoor airflow (cfm)
EX RTU-1	385	Dining rooms	70	7.5	0.18	271	0.8	339
	300	Service Counter	20	7.5	0.12	81	0.8	101
Total								440

BC PROJECT #: 25483
KENTUCKY PE COA #1723

This drawing has been prepared by the Engineer, or under his supervision. This drawing is provided as an instrument of service by the Design Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, notes and design, including the overall form, arrangement and composition of letters and elements appearing herein, constitute the original, copyrighted work of the Design Engineer. Any reproduction, use, or disclosure of information contained herein without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, KS 66203 (913)262-1772



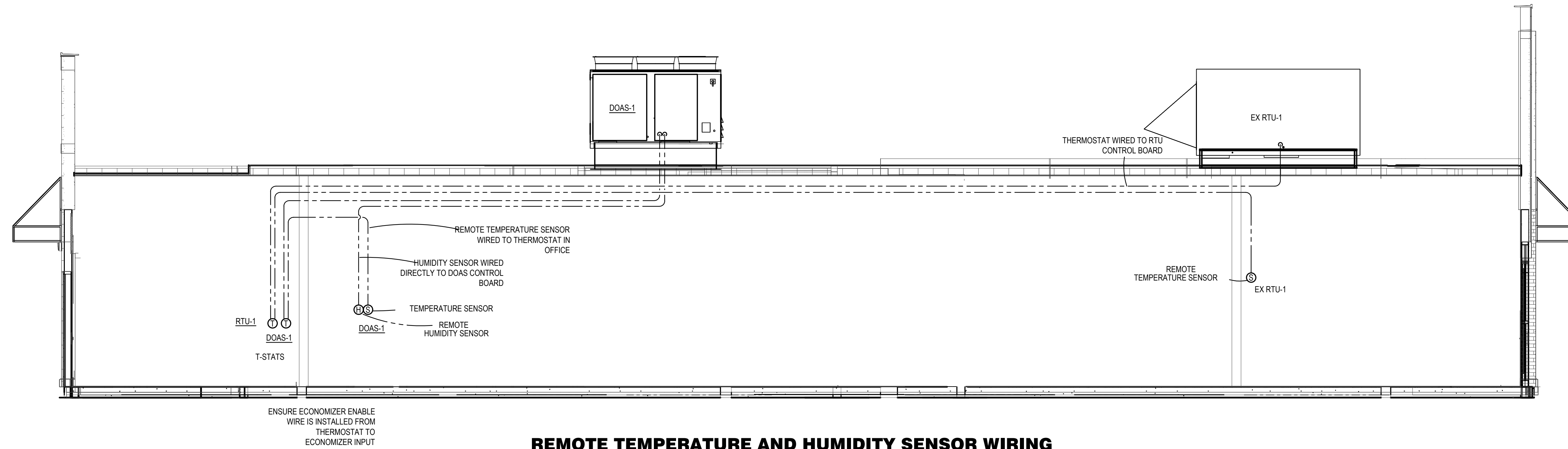
FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net



MECHANICAL FLOOR PLAN
DATE: 07/17/2025
DRAWN BY: FOAK
CHECKED: EKCS
REVISIONS:
M1

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



REMOTE TEMPERATURE AND HUMIDITY SENSOR WIRING

ALL LOW VOLTAGE WIRING FOR THE HVAC SYSTEM IS TO BE PROVIDED AND INSTALLED BY THE HVAC CONTRACTOR.

- A. **KITCHEN HOOD EXHAUST FAN (KEF-1, AND KEF-2)**
 1. THE KITCHEN HOOD EXHAUST FAN SHALL BE ENABLED WHEN ANY COOKING APPLIANCE LOCATED UNDER ITS RESPECTIVE HOOD, IS IN USE.
- B. **EF-1, EF-2**
 1. EXHAUST FAN SHALL RUN WHEN THE RESTROOM IS OCCUPIED.
- C. **DOAS-1**
 1. THE MAKE UP AIR UNIT SHALL BE ENABLED WHEN THE KITCHEN HOOD EXHAUST FANS (KEF-1 AND KEF-2) ARE ENERGIZED.
 2. OCCUPIED MODE: BASED ON THE DOAS UNITS HOURS OF OCCUPANCY, START THE UNIT AT THE BEGINNING OF OCCUPANCY AND SHUT DOWN THE UNIT AT THE END OF OCCUPANCY (NOTE: OUTSIDE AIR DAMPER WITHIN THE UNIT SHALL OPEN 100% AND THEN THE FAN SHALL START). THE UNIT SHALL START EARLIER AS DETERMINED BY THE PROGRAM FOR EARLY WARM-UP OR COOL DOWN. ON A SYSTEM STARTUP, THE FAN SHALL START AND RUN CONTINUOUSLY. BASED ON THE SPACE TEMPERATURE SENSOR, THE UNIT SHALL MODULATE THE HEATING/COOLING TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
 - 2.1. HUMIDITY CONTROL: UPON DETECTION OF RELATIVE HUMIDITY ABOVE 55%, THE UNIT SHALL CYCLE INTO DEHUMIDIFICATION MODE IF NOT ALREADY IN COOLING AND MODULATE THE COMPRESSORS AND HOT GAS REHEAT VALVE TO SUPPLY SPACE NEUTRAL DEHUMIDIFIED AIR UNTIL THE RELATIVE HUMIDITY DROPS BELOW 55% RH.
 3. UNOCCUPIED MODE: THE DOAS INTERNAL OA DAMPERS SHALL REMAIN CLOSED WHEN THE BUILDING IS NOT OCCUPIED AND THE UNIT SHALL OPERATE IN RECIRCULATION MODE. THE UNIT SHALL STOP HEATING/COOLING AND THE FAN SHALL STOP. BASED ON THE SPACE TEMPERATURE SENSOR, THE UNIT SHALL CYCLE THE HEATING/COOLING TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
 4. UPON DETECTION OF SMOKE BY UNIT SMOKE DETECTOR ALL RTUS SHALL SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FIRE ALARM CONTROL PANEL. (WHERE APPLICABLE). LOCAL REMOTE ANNUNCIATORS SHALL ALSO BE ACTIVATED.
- D. **ANSUL SYSTEM ACTIVATION**
 1. UPON ACTIVATION OF ANSUL SYSTEM, SHUT DOWN RTU-1. PROVIDE RELAYS CONTACTS, INTERLOCKS, TRANSFORMERS AND ALL ASSOCIATED WIRING TO ACCOMPLISH SEQUENCE. DOAS-1 IS ALREADY PREWIRED TO SHUT DOWN IN HOOD CONTROL PANEL. MECHANICAL CONTRACTOR SHALL INTERLOCK RTU-1 TO ALSO SHUT DOWN.

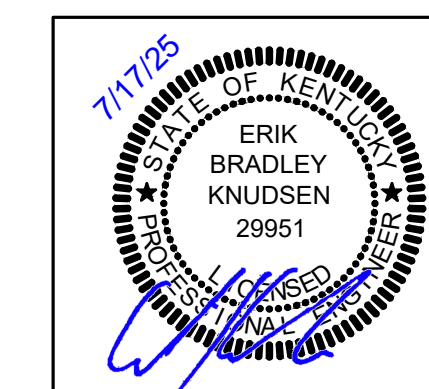
- E. **RTU-1 WIRING AND CONTROL**
 1. WIRE THE REMOTE TEMPERATURE SENSOR FOR RTU-1 TO THE THERMOSTAT LOCATED IN THE OFFICE. SET THERMOSTAT FOR REMOTE SENSOR OPERATION.
 2. REFER TO THE RTU SEQUENCE OF OPERATIONS FOR UNIT OPERATION.
- F. **DOAS-1 WIRING AND CONTROL**
 1. WIRE THE REMOTE TEMPERATURE SENSOR FOR DOAS-1 TO THE DOAS UNIT CONTROL PANEL. SET HMI FOR REMOTE SENSOR OPERATION.
 2. WIRE THE REMOTE HUMIDITY SENSOR DIRECTLY TO THE HUMIDITY TERMINALS ON THE DOAS UNIT CONTROL PANEL PER THE MANUFACTURERS REQUIREMENTS.
 3. PROGRAM THE DOAS UNIT TO OPERATE THE HOT GAS REHEAT CONTROLS BASED ON THE REMOTE SENSOR TO CONTROL HUMIDITY IN THE SPACE.
 4. REFER TO THE DOAS-1 SEQUENCE OF OPERATIONS FOR UNIT OPERATION.

BC PROJECT #: 25483
KENTUCKY PE COA #1723

This drawing has been prepared by the Engineer, or under his supervision. This drawing is provided as an instrument of service by the Designer/Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, notes and designs, including the overall form, arrangement and composition of letters and elements appearing herein, constitute the original, copyrighted work of the Designer/Engineer. Any reproduction, use, or disclosure of information contained herein without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS
INCORPORATED

5720 Reeder Shawnee, KS 66203 (913)262-1772



FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

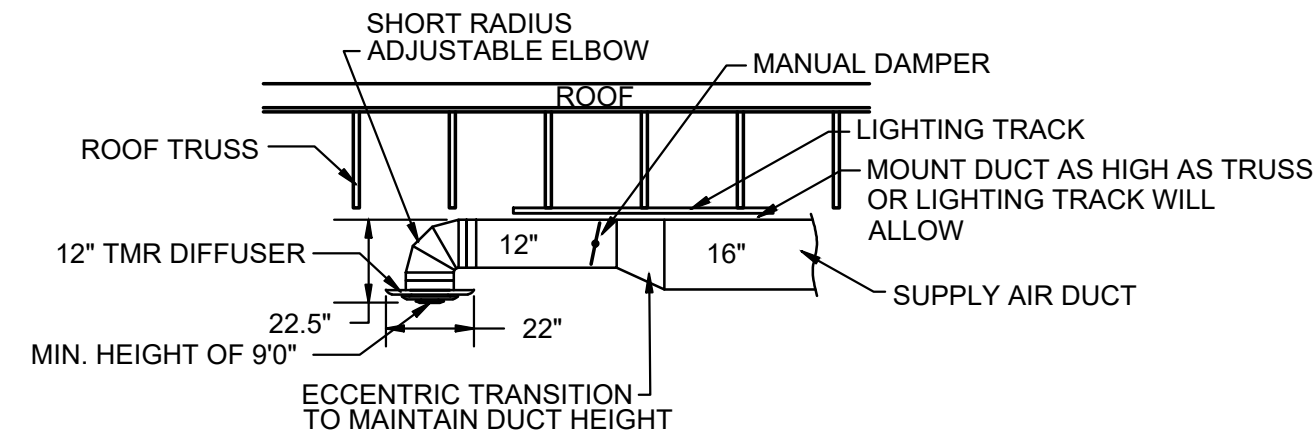


TEMPERATURE AND HUMIDITY SENSOR WIRING
DATE: 07/17/2025 DRAWN BY: FOAK CHECKED: EKCS REVISIONS: M2

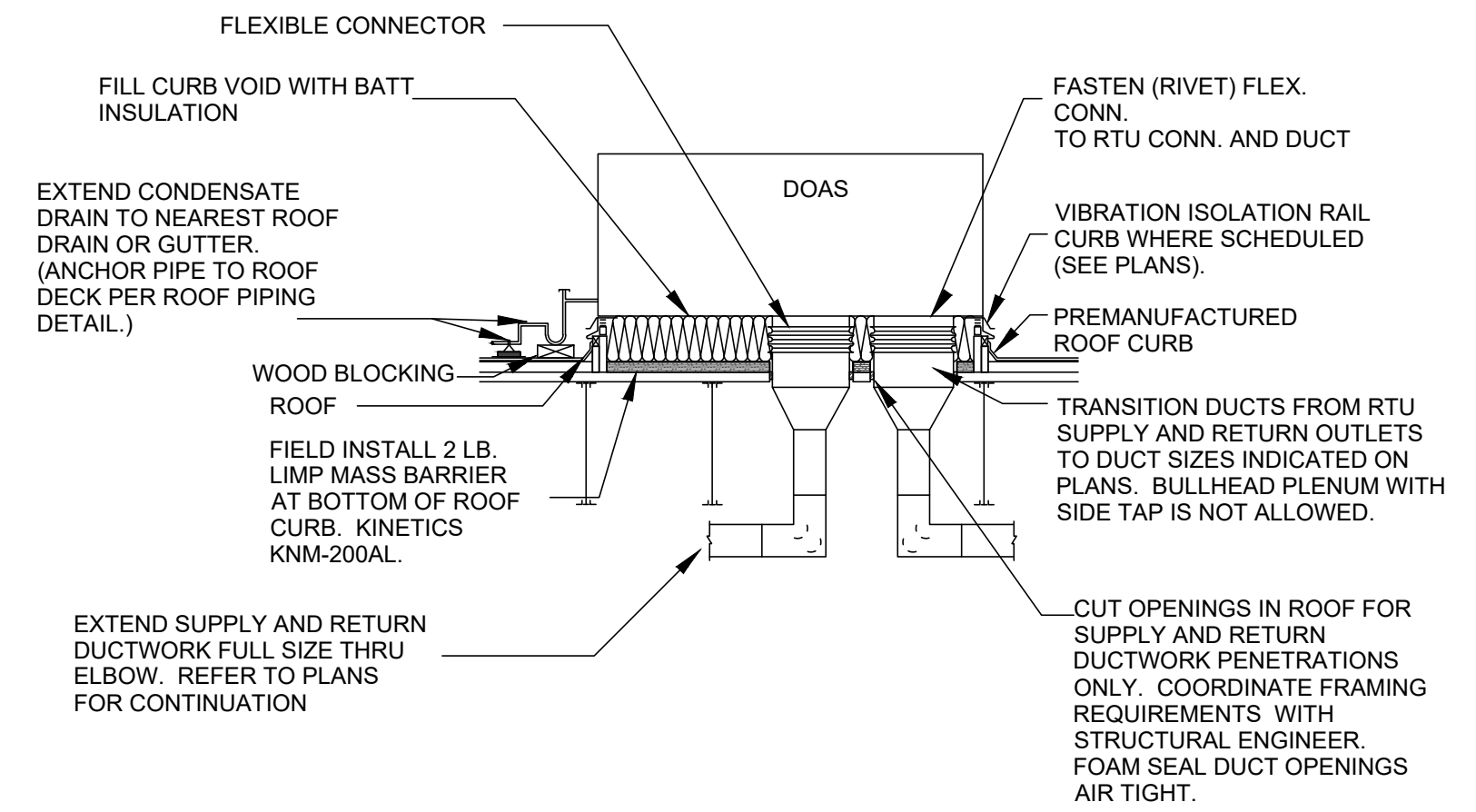
EXISTING ROOFTOP UNIT SCHEDULE													
MARK	MFR.	MODEL NO.	NOM. TONS	EVAP. CFM	COOLING				HEATING (GAS)		ELECTRICAL		MINIMUM OUTDOOR AIR (CFM)
					TOTAL BTUH	SENS. BTUH	AMB.	EVAP. EAT DB/WB	BTUH INPUT	BTUH OUTPUT	VOLT/PHZ	BLOWER MOTOR	
RTU-1	DAIKIN	DFG0723	6	2400	71,326	53,901	95	80/67	140,000	112,000	208/3/60	2.3	440

DIFFUSER SCHEDULE									
MARK	MFR.	MODEL	BORDER TYPE	NECK SIZE	FACE SIZE	FINISH	DAMPER	ACCESSORIES	NOTES
SD-1	TITUS	TMR	-	14"Ø	22"Ø	WHITE			1
SD-2		TMS-AA	3	10"Ø	24"x24"				-
SD-3		PAR-AA		12"Ø					-
SD-4		TMS-AA		8"Ø					-
SD-5		TMS		8"Ø					-
SR-1		300RL	1	8"x6"					-
TG-1		350RL	1	8"x6"					-
RG-1	AMER. LOUVER CO.	STRATUS	-	16"Ø	24"x24"		OPPOSED BLADE		2

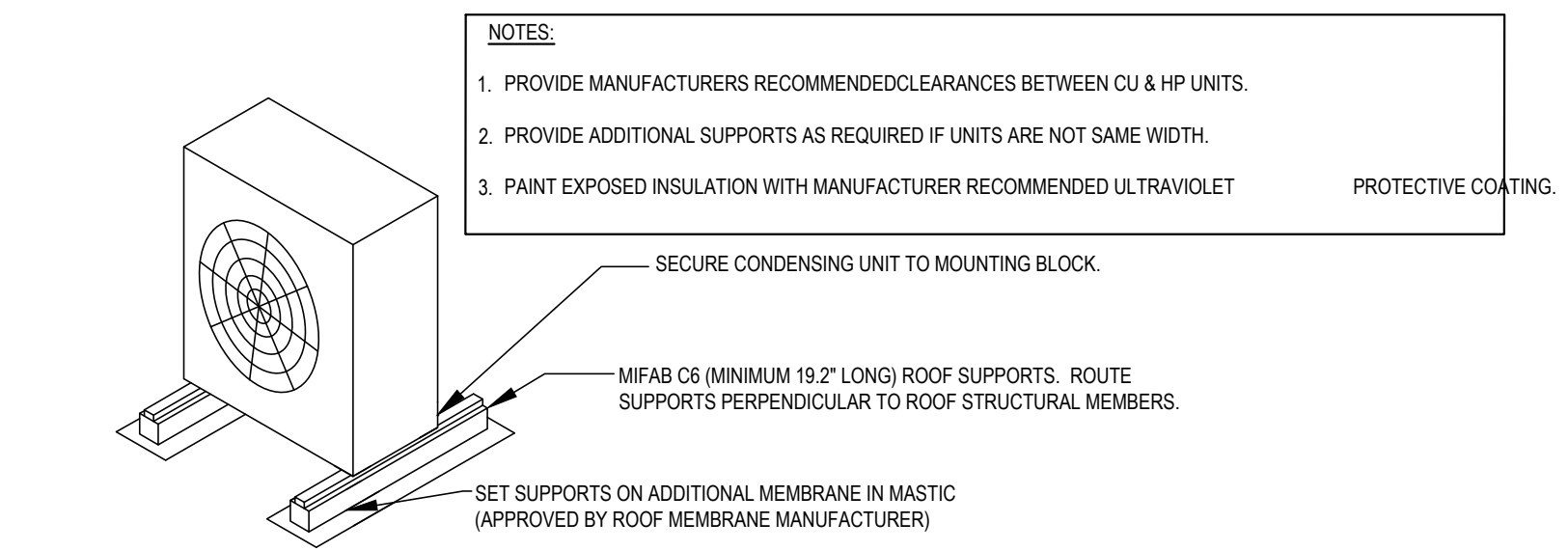
- NOTES:
- FIELD PREP FOR PAINTING.
 - RETURN GRILL TO BE PLASTIC FILTER RETURN, FILTER TO BE AMERICAN AIR FILTER (AAF) FRONTLINE GREEN 1", WITH AAF AMERIFRAME SIZE 20x20x1.



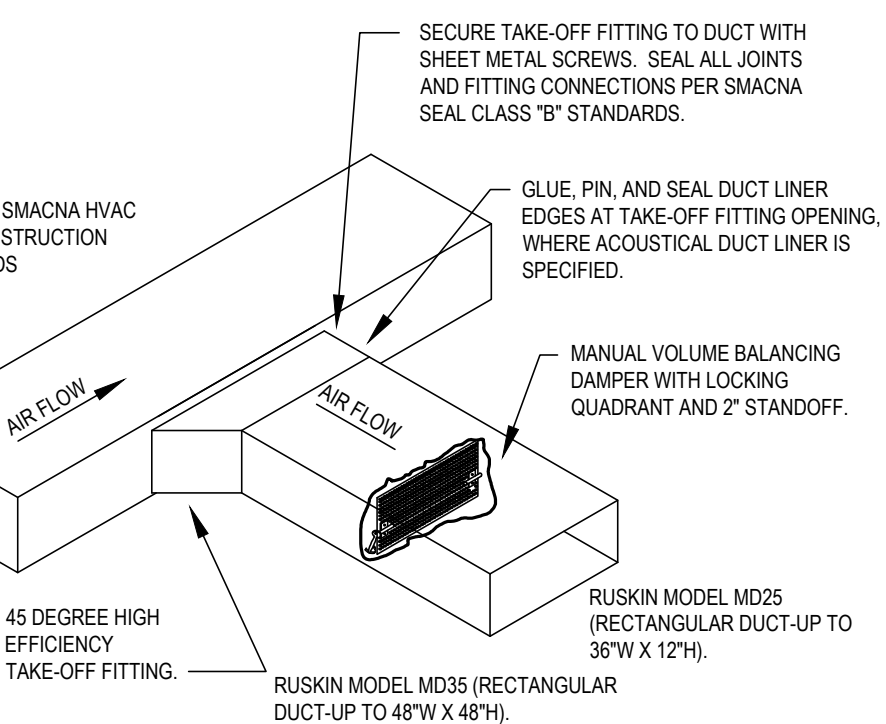
DINING ROOM DIFFUSER DETAIL
SCALE: NONE



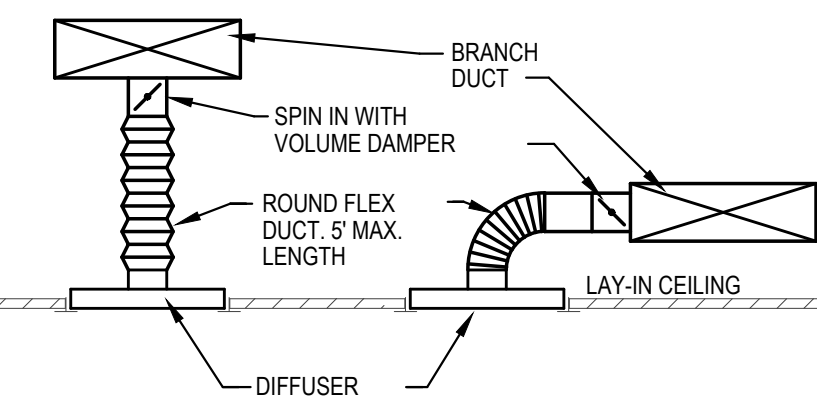
DOAS DROPPDOWN DETAIL
SCALE: NONE



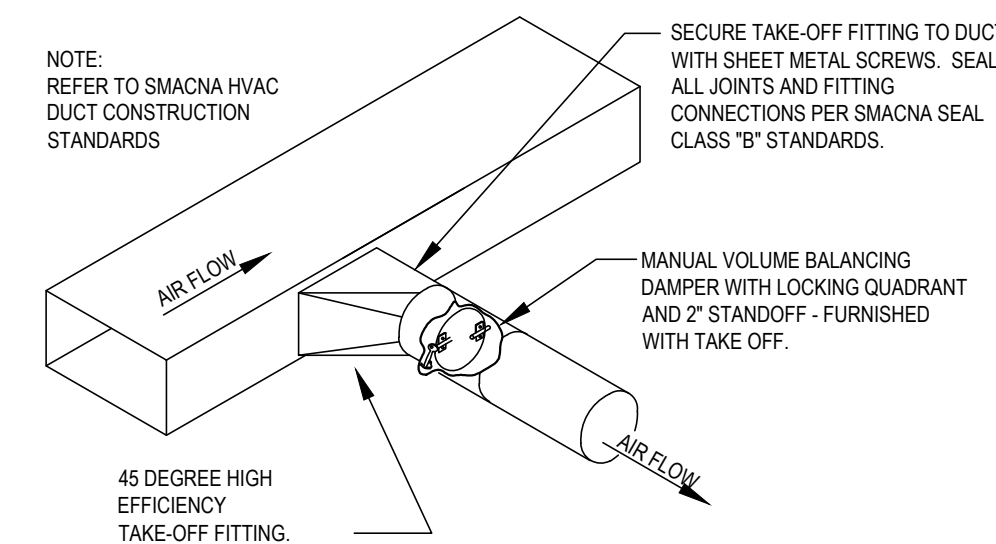
ROOF CONDENSING UNIT MOUNTING DETAIL
SCALE: NONE



RECTANGULAR DUCT TAKE OFF DETAIL
SCALE: NONE



DIFFUSER DETAIL
SCALE: NONE



ROUND DUCT TAKE OFF DETAIL
SCALE: NONE

FIRE RATED ENCLOSURE - GREASE DUCTS

- THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2936 AND UL LISTED PER HNK7.G18 TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1- OR 2- HOUR ENCLOSURE. THROUGH PENETRATIONS FIRESTOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E 814 (UL 1479). ICC-ES APPROVAL PER REPORT ESR 2213 DR ESR 2832.
- COMPLIANT TO THE FOLLOWING CODES:
NFPA 96
INTERNATIONAL MECHANICAL CODES
UNIFORM MECHANICAL CODE
CALIFORNIA MECHANICAL CODE
- INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
- MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAGE STAINLESS STEEL) RECTANGULAR OR ROUND GREASE EXHAUST DUCT
- 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.
- SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM 3/8 IN. DIAMETER AND SUPPORTS ARE MINIMUM 2 X 2 X 1/8 IN. STEEL ANGLE OR SMACNA EQUIVALENT SUPPORT SYSTEM.
- THERMAL CERAMICS DUCT WRAP SHALL BE INSTALLED DIRECTLY ONTO THE DUCT AND APPLIED FROM THE HOOD CONNECTION TO THE CONNECTION TO THE FAN.
- THERMAL CERAMICS DUCT ENCLOSURE SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND UL LISTINGS.

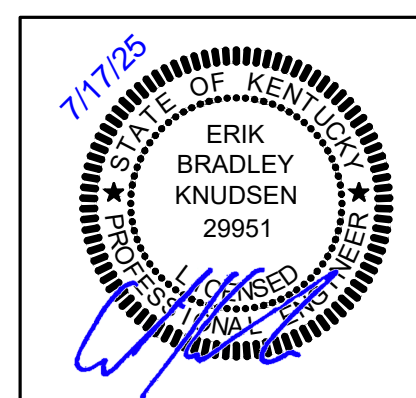
P.O. Box 923
Augusta, Georgia 30903-0923
Phone: (706) 560-4038

BC PROJECT #: 25483
KENTUCKY PE COA #1723

This drawing has been prepared by the Engineer or under his supervision. This drawing is provided as an instrument of service by the Designer/Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, lists and designs, including the overall form, arrangement and composition of letters and elements appearing herein, constitute the original, copyrighted work of the Designer/Engineer. Any reproduction, use, or disclosure of information contained herein without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS INCORPORATED
5720 Reeder Shawnee, KS 66203 (913)262-1772

Freddy's
FROZEN CUSTARD & STEAKBURGERS®



FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383

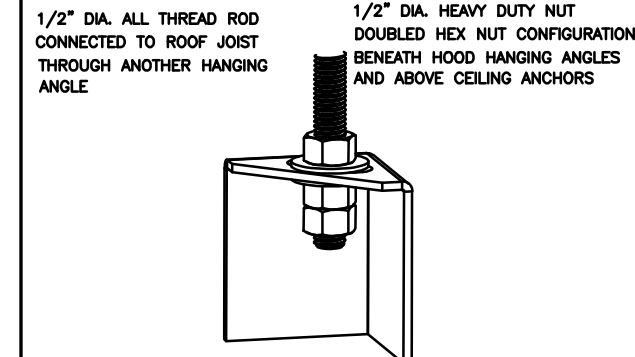
johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

MECHANICAL SCHEDULES

DATE 07/17/2025	DRAWN BY FOAK	CHECKED EKDS	REVISIONS
--------------------	------------------	-----------------	-----------

M3

ND-2 HANGING ANGLE DETAIL



ROOF AND NUTS TO BE SUPPLIED BY INSTALLING CONTRACTOR. HANGING ANGLE IS PRE-ANCHORED AT FACTORY.

HANGING ANGLE LOCATIONS

HOOD STYLE	DIM FROM REAR	DIM FROM FRONT (24" H)	DIM FROM FRONT (30" H)
CANOPY ND2	4.166"	2.246"	2.246"
ND2-PSP-F	4.166"	2.246"	2.246"
BACKSHELF BD-2	4.166"	2.246"	-
VHB/VHB-G	36"x36"	42"x42"	48"x48"
FRONT/BACK DIMS BY SIZE	2.246"	2.246"	2.246"

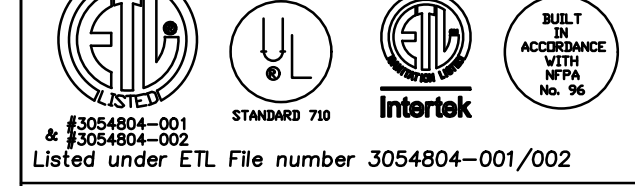
CALCULATIONS UTILIZED

EXHAUST CFM=LENGTH OF HOOD X CFM/IN.FT. (LOAD)
 SUPPLY CFM=EXHAUST CFM X PERCENTAGE REQUIRED
 TOTAL DUCT AREA=144 X CFM (FPM)
 DUCT LENGTH= TOTAL DUCT AREA / DUCT WIDTH

*CAPTIVE-AIRE DUCT CONNECTION SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 300-400 FPM.

BUILDING CODES

CAPTIVE-AIRE HOODS ARE BUILT IN COMPLIANCE WITH:



Listed under ETL File number 3054804-001/002

CLEARANCE TO COMBUSTIBLES

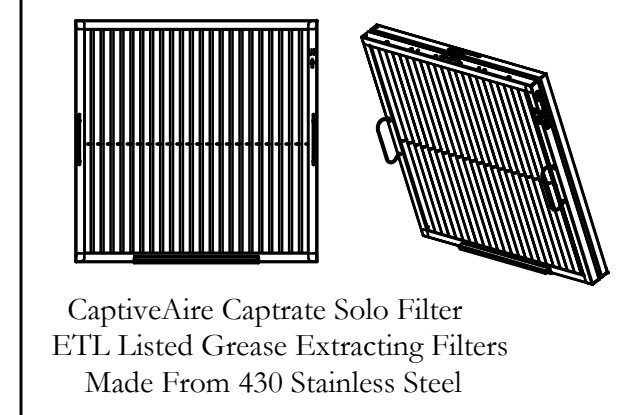
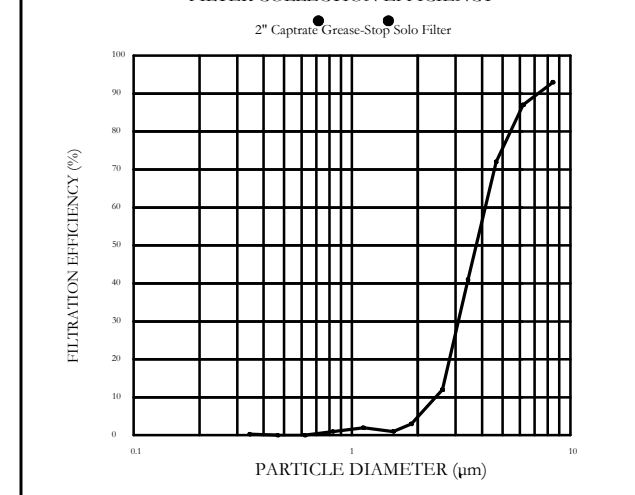
CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

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

GENERAL NOTES

- ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
- ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
- HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
- ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTORS TO BE MADE.
- COOKING EQUIPMENT TO SHUTOFF IN EVENT OF FIRE.
- EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
- ALL LIGHTS TO BE INSTALLED BY CAPTIVE-AIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
- 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 DINING 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 PROVIDED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

FILTER DETAIL



Captive-Aire Captrate Solo Filter
 ETL Listed Grease Extracting Filters
 Made From 430 Stainless Steel

HOOD INFORMATION - JOB#7576108

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX CODING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST FLENUM	HOOD CONSTRUCTION	HOOD CONFIG	PATENT NUMBERS
1	ITEM 33A	5424 ND-2	CAPTIVEAIRE	8' 0"	450 DEG	I	MEDIUM	200	1600	4" 14" 1600 1497 -0.734"	430 SS WHERE EXPOSED	ALONE FRONT	EXHAUST HOODS ND-2/BD-2/SND-2 (CANADA) - CA PATENT 2520435 C.
2	ITEM 33B	5424 ND-2	CAPTIVEAIRE	5' 0"	450 DEG	I	MEDIUM	155	775	4" 10" 775 1481 -0.436"	430 SS WHERE EXPOSED	ALONE ALONE	

HOOD INFORMATION

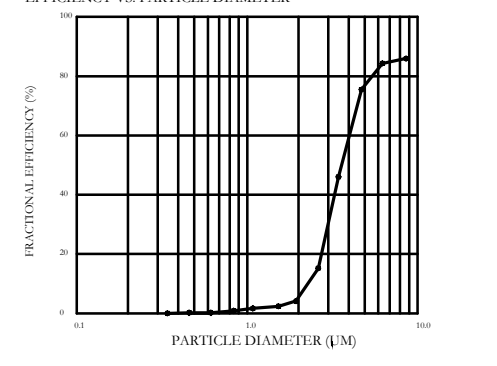
HOOD NO	TAG	TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	LOCATION	SIZE	TYPE	FIRE SYSTEM	SIZE	TYPE	ELECTRICAL MODEL #	QUANTITY	SWITCHES	FIRE SYSTEM PIPING WEIGHT	HOOD WEIGHT
1	ITEM 33A	CAPTIVATE SLD FILTER	5	16"	16'	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"x54"x24"	TANK FS	4.0/4.0/4.0	DCV-2111	1 LIGHT	1 FAN			YES	918 LBS
2	ITEM 33B	CAPTIVATE SLD FILTER	3	16"	16'	85% SEE FILTER SPEC	2	RECESSED ROUND	NO										YES	355 LBS

HOOD OPTIONS

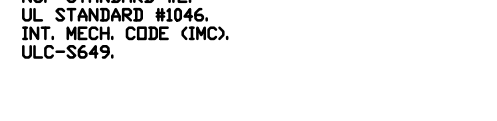
HOOD NO	TAG	OPTION
1	ITEM 33A	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT. LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. INSULATION FOR TOP OF HOOD. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN.
2	ITEM 33B	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT. LEFT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. RIGHT QUARTER END PANEL 23" TOP WIDTH, 0" BOTTOM WIDTH, 23" HIGH 430 SS. INSULATION FOR TOP OF HOOD. INSULATION FOR BACK OF HOOD. RISER SENSOR INSTALL 6IN PLEN.

SPECIFICATION: CAPTIVATE GREASE-STOP SLD FILTER

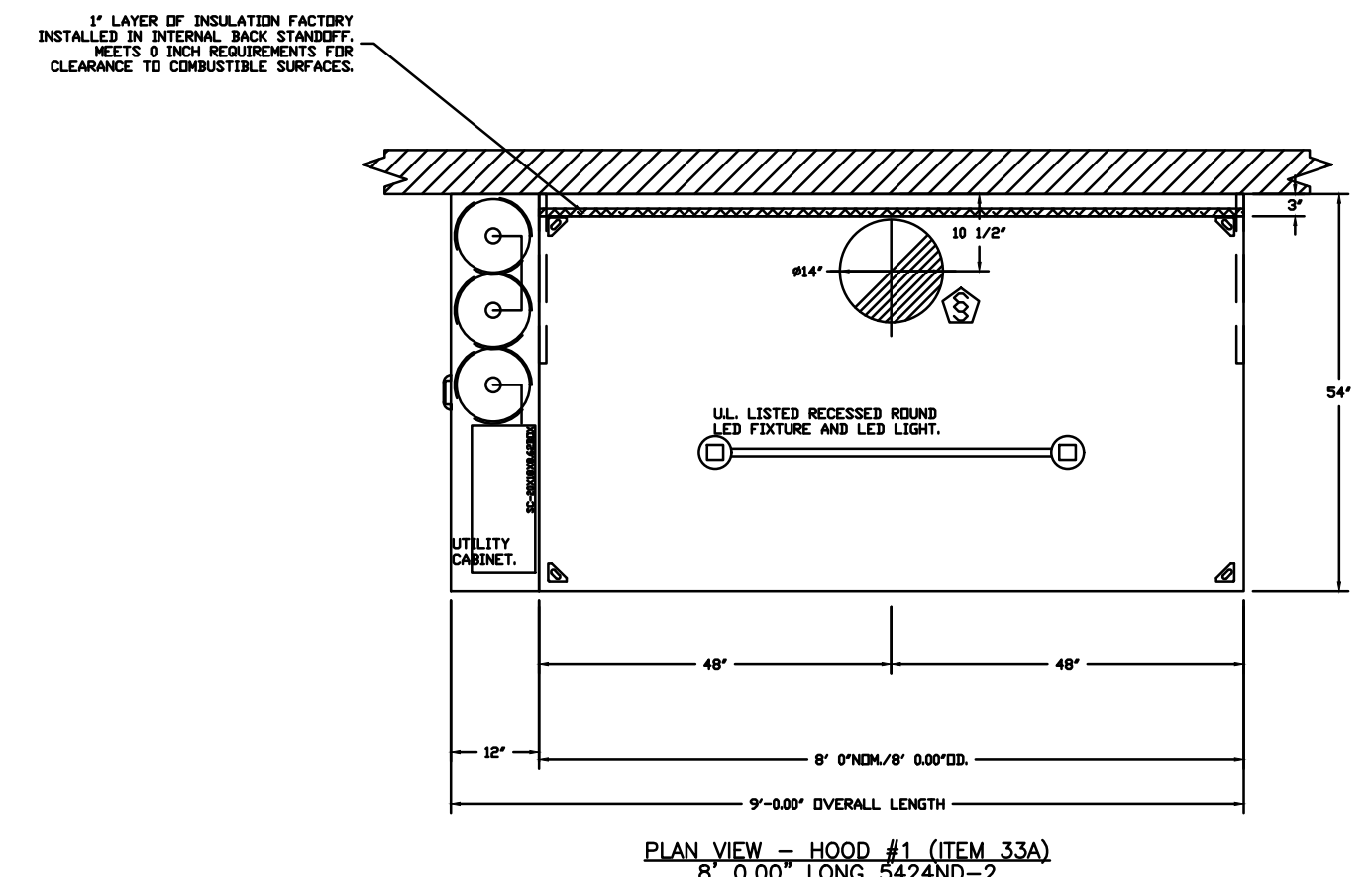
THE CAPTIVATE GREASE-STOP SLD FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-SHAFFLE DESIGN IN CONJUNCTION WITH A SLOTTED REAR BAFFLE DESIGN TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY. FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 6-INCH DEEP HOOD CHANNELS.



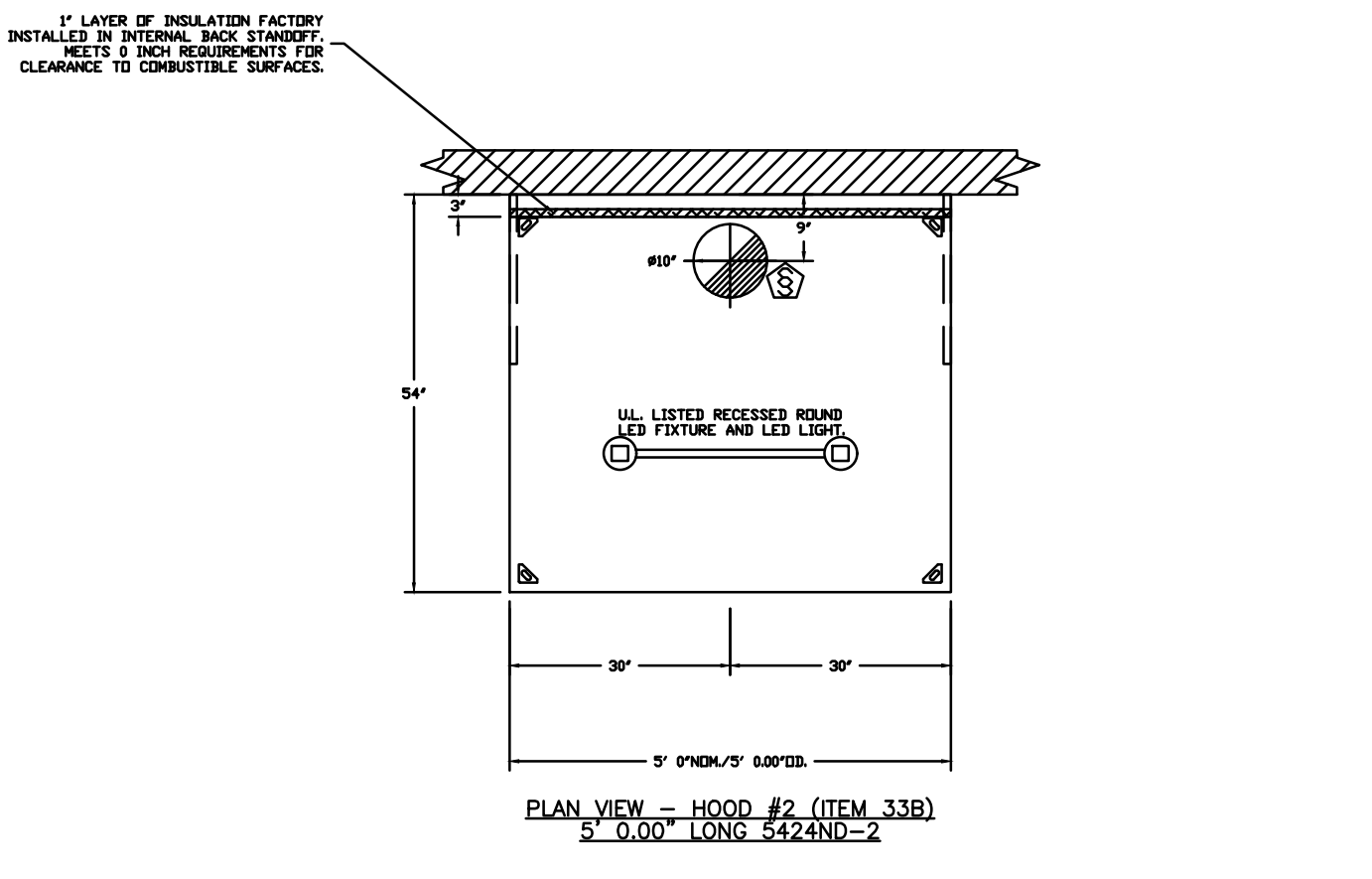
CAPTIVATE FILTERS ARE BUILT IN COMPLIANCE WITH:



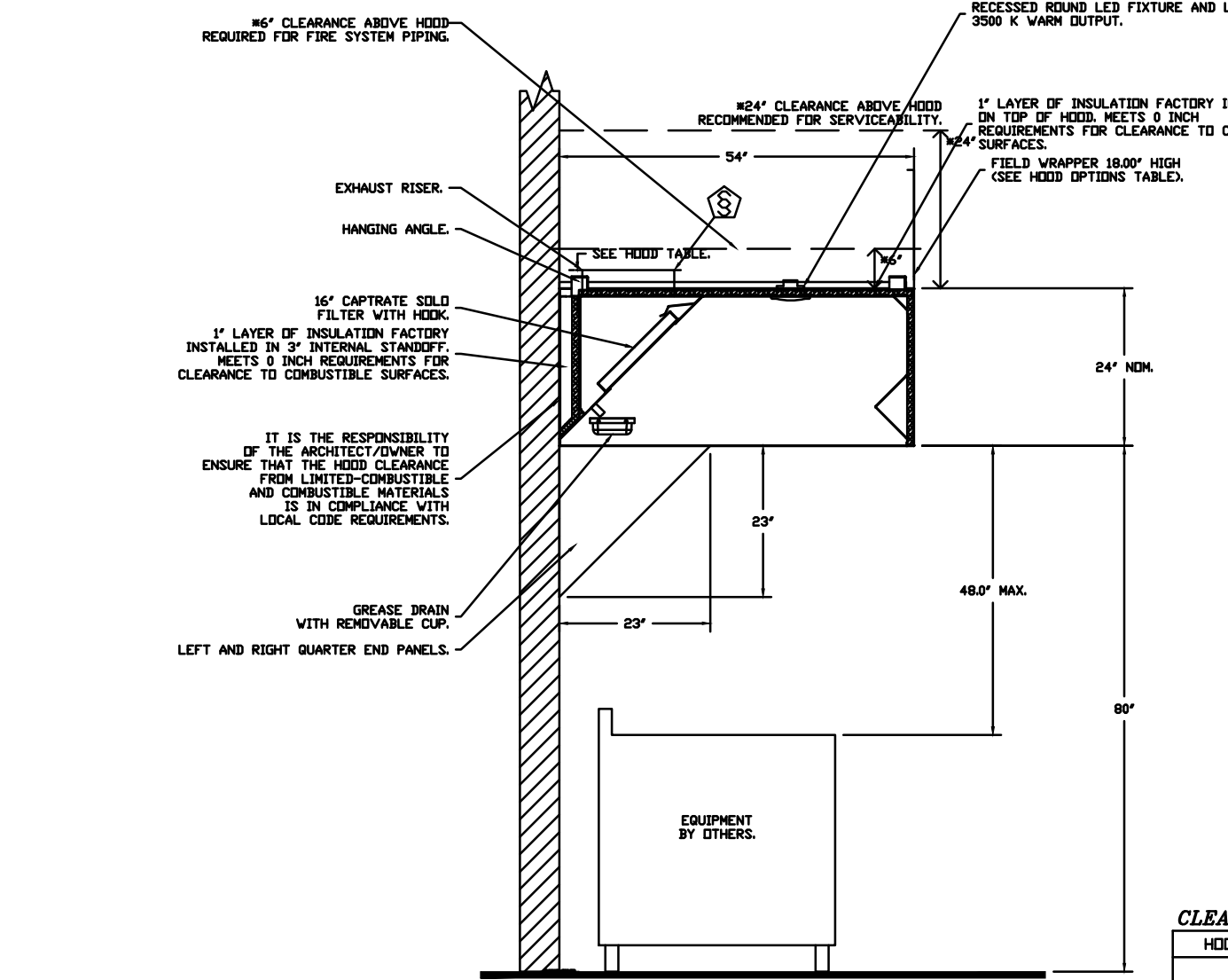
NSF 99E
 NSF STANDARD 82
 UL STANDARD 784G
 INT. MECH. CODE (MCC)
 ULC-5649.



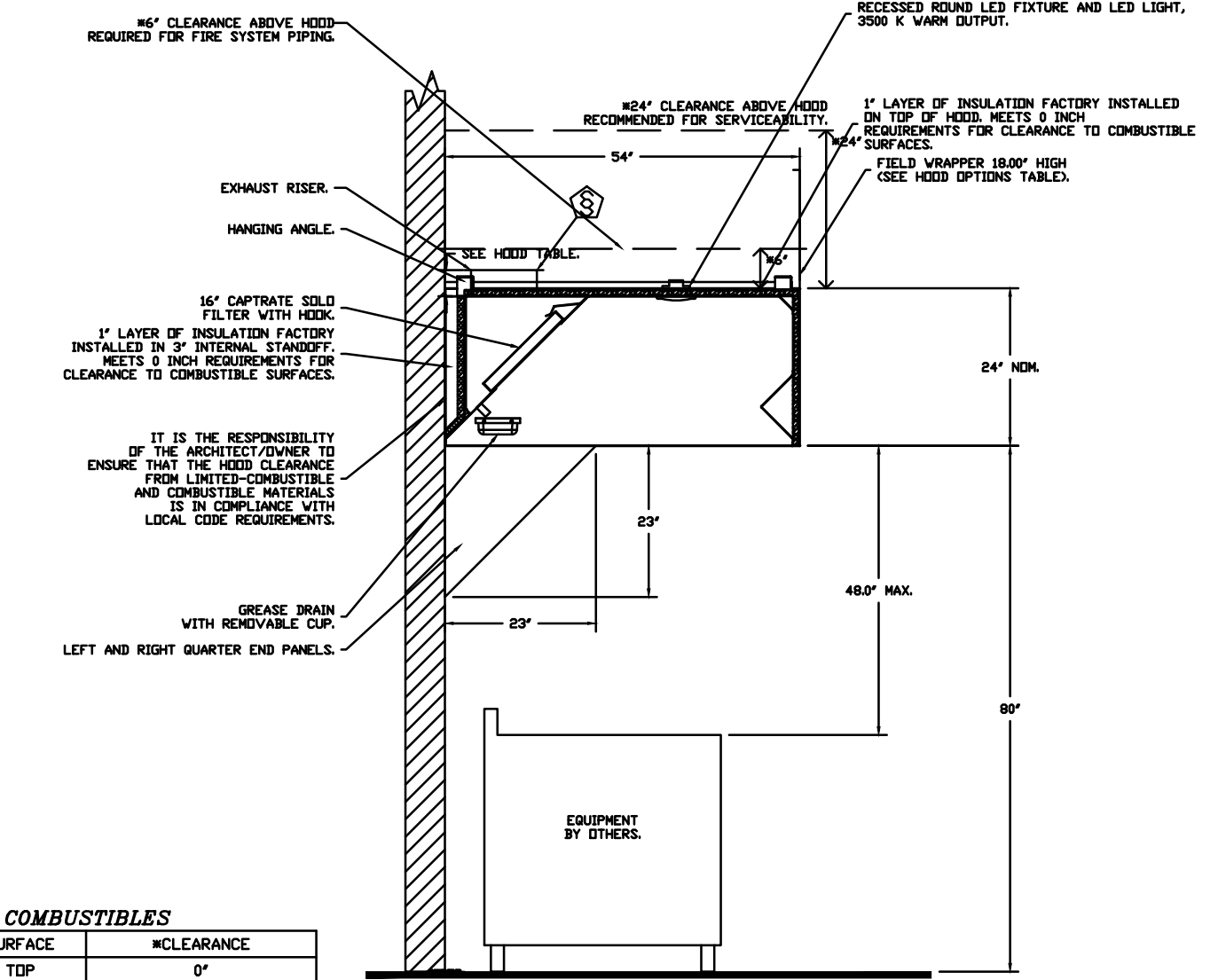
PLAN VIEW - HOOD #1 (ITEM 33A)
 9' 0.00" LONG 5424ND-2



PLAN VIEW - HOOD #2 (ITEM 33B)
 5' 0.00" LONG 5424ND-2



SECTION VIEW - MODEL 5424ND-2
 HOOD - #1 (ITEM 33A)



SECTION VIEW - MODEL 5424ND-2
 HOOD - #2 (ITEM 33B)

CLEARANCE TO COMBUSTIBLES

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

* 40" CLEARANCE TO COMBUSTIBLES CONFORMS TO UL710 STANDARD.
 * HOOD MOUNTED UTILITY CABINETS REQUIRE 36" SERVICE CLEARANCE.

***** NOTE *****
 ALL WALLS AND STRUCTURES THAT COME WITHIN 18" OF HOOD MUST BE METAL STUDS AND SHEETROCK. WOOD STUDS OR ANY OTHER COMBUSTIBLE MATERIAL WITHIN 18" OF HOOD NOT ALLOWED.

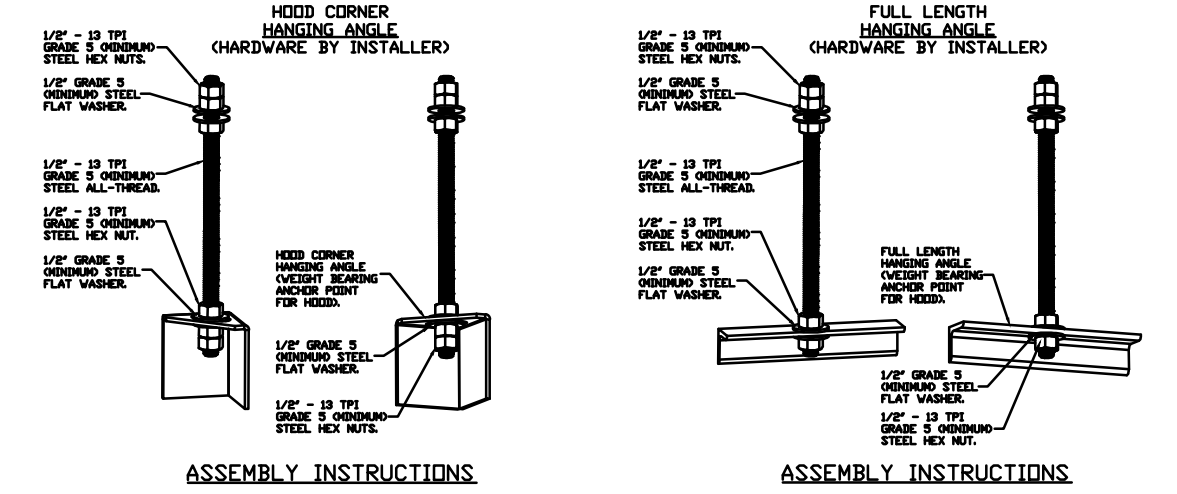
***** NOTE *****
 HOOD MANUFACTURER RECOMMENDS NO RETURNS OR 4-WAY DIFFUSERS WITHIN 10 FEET OF HOOD IN ALL DIRECTION.

***** NOTE *****
 MAKEUP AIR SHALL BE DELIVERED INTO SPACE IN MANNER THAT WILL NOT DISRUPT HOODS ABILITY TO CAPTURE AND CONTAIN.

FOR QUESTIONS, CALL THE:
 KANSAS CITY REGIONAL OFFICE
 1128 SWIFT STREET, KANSAS CITY, MO 64116
 PHONE: (816) 221-8575
 FAX: (816) 221-8311

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted
 Approved with ND Exception Taken
 Revise and Resubmit
 SIGNATURE _____ DATE _____
 Your Title _____

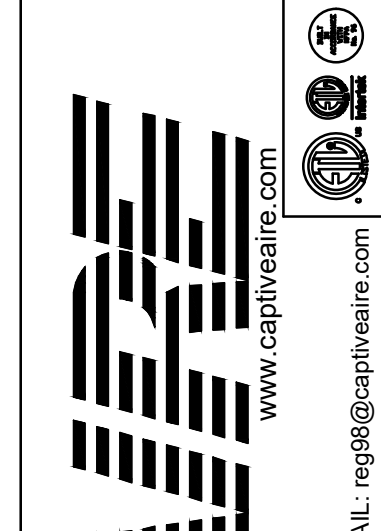


ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD, SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

REVISIONS

NO.	DESCRIPTION	DATE



Freddy's - Versailles, KY
Versailles, KY, 40383

DATE: 6/10/2025
 DWG.#: 7576108
 DRAWN BY: michael.co
 SCALE: 1/2" = 1'-0"
 MASTER DRAWING

SHEET NO. 1

BC PROJECT #: 25483
 KENTUCKY PE COA #1723

ERIK BRADLEY KNUDSEN 29951

5720 Reeder Shawnee, KS 66203 (913)262-1772

BC ENGINEERS INCORPORATED

5720 Reeder Shawnee, KS 66203 (913)262-1772

Freddy's FROZEN CUSTARD & STEAKBURGERS®
 1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
 546 East Main Street, Suite 101 · Lexington, KY 40508
 phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

MECHANICAL HOOD PLANS

DATE: 07/17/2025
 DRAWN BY: FOAK
 CHECKED: EKCS
 REVISIONS

M4

BC PROJECT #: 25483
 KENTUCKY PE COA #1723

ERIK BRADLEY KNUDSEN 29951

5720 Reeder Shawnee, KS 66203 (913)262-1772

Freddy's FROZEN CUSTARD & STEAKBURGERS®
 1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
 546 East Main Street, Suite 101 · Lexington, KY 40508
 phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

MECHANICAL HOOD PLANS

DATE: 07/17/2025
 DRAWN BY: FOAK
 CHECKED: EKCS
 REVISIONS

M4

FAN #3 CAS-HVAC3-I.250-15-15T - HEATER (ITEM 74.3)

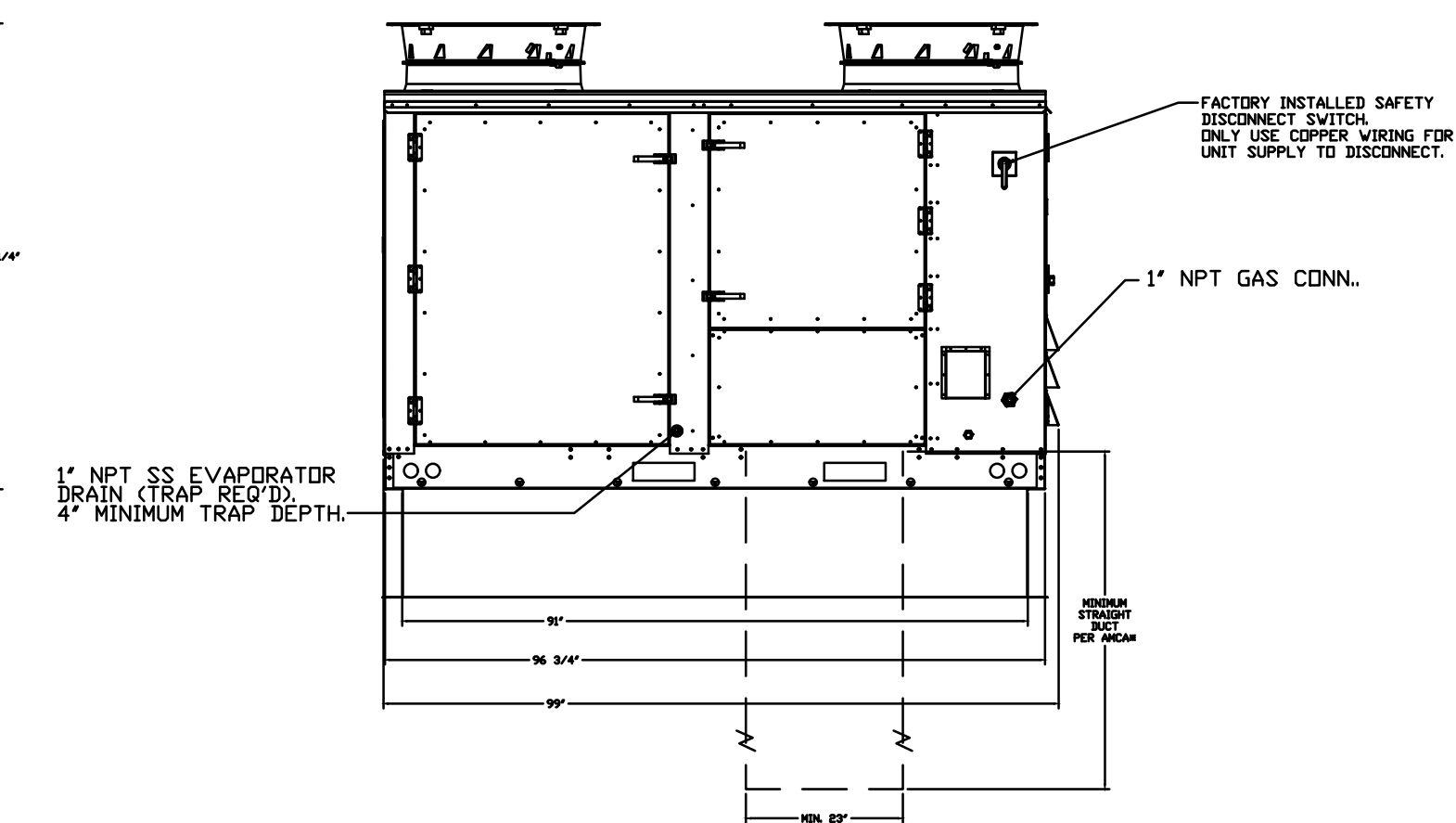
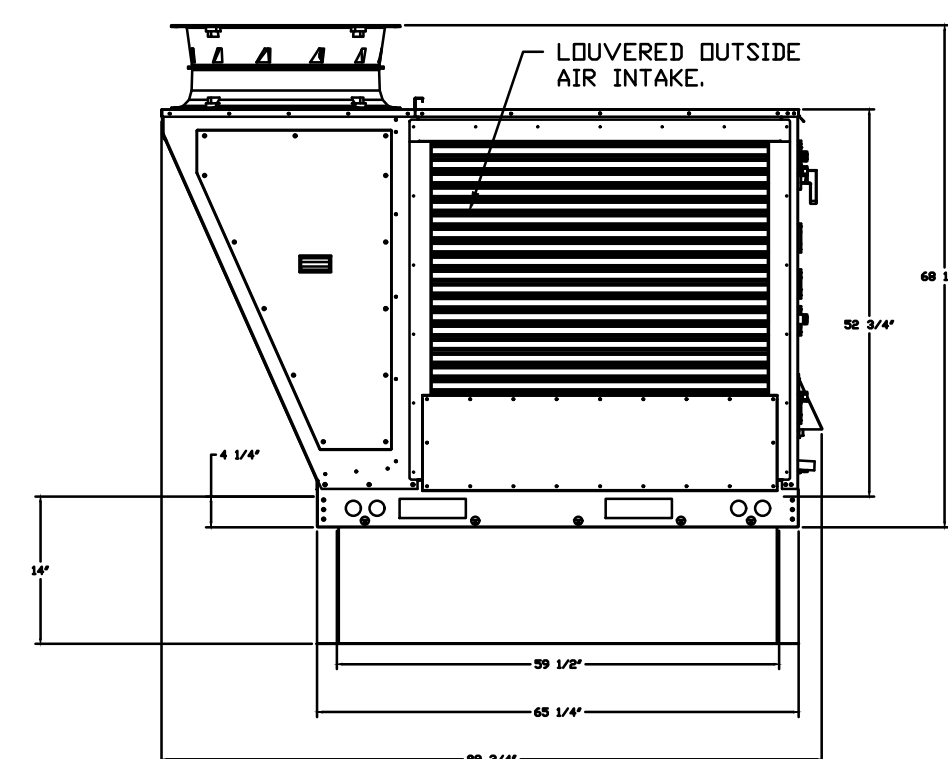
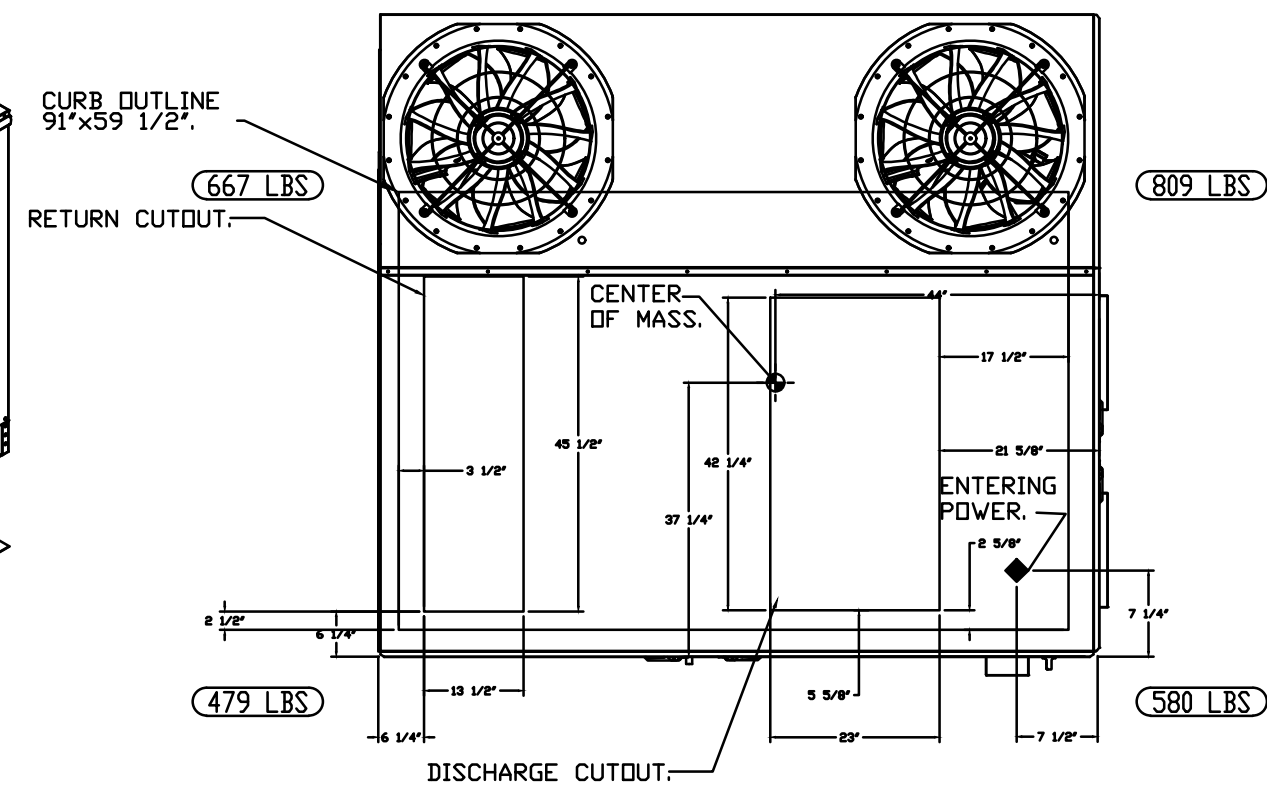
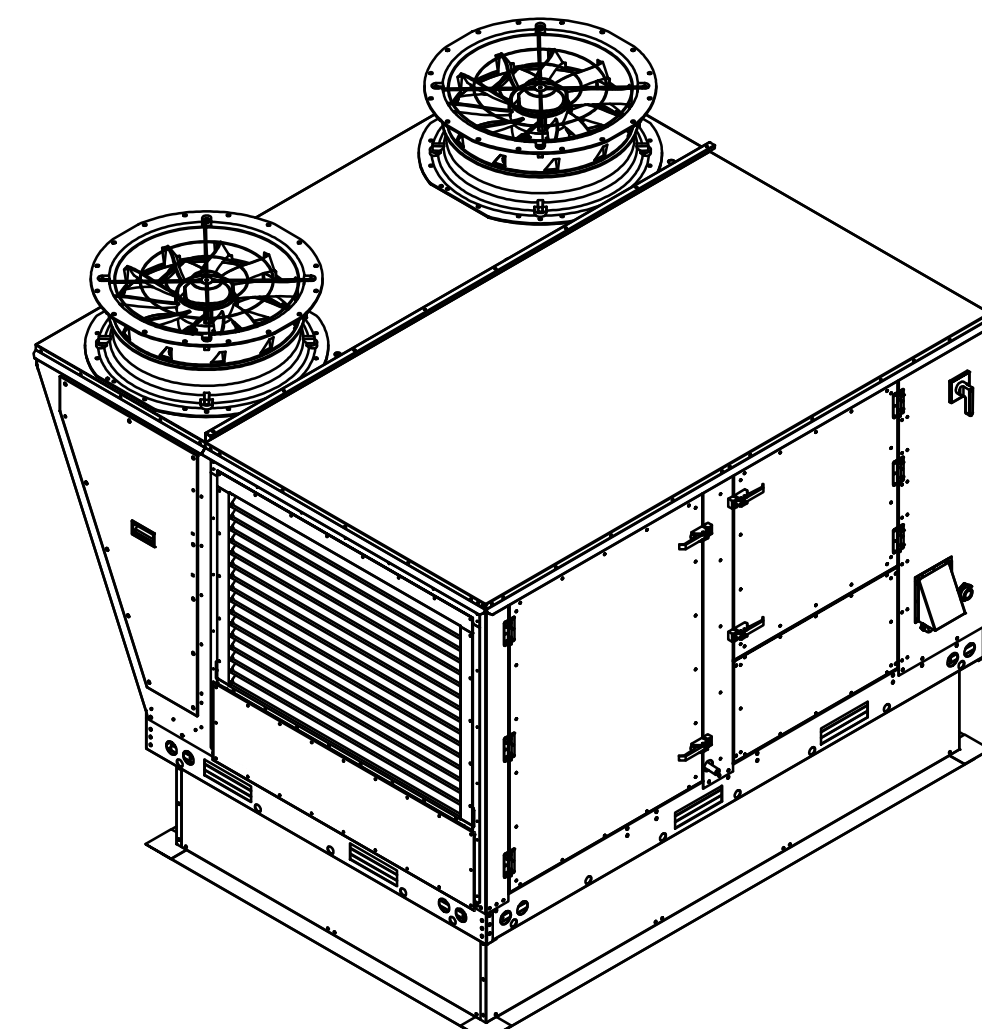
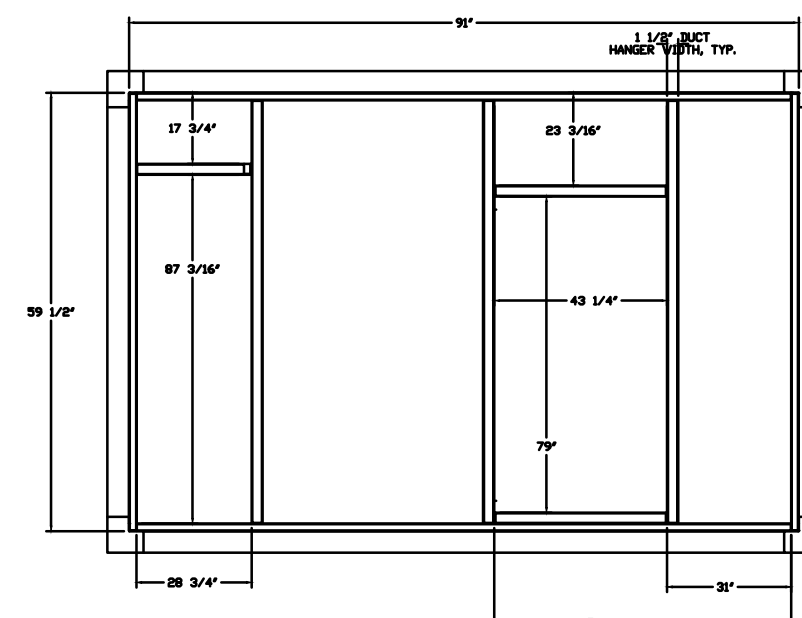
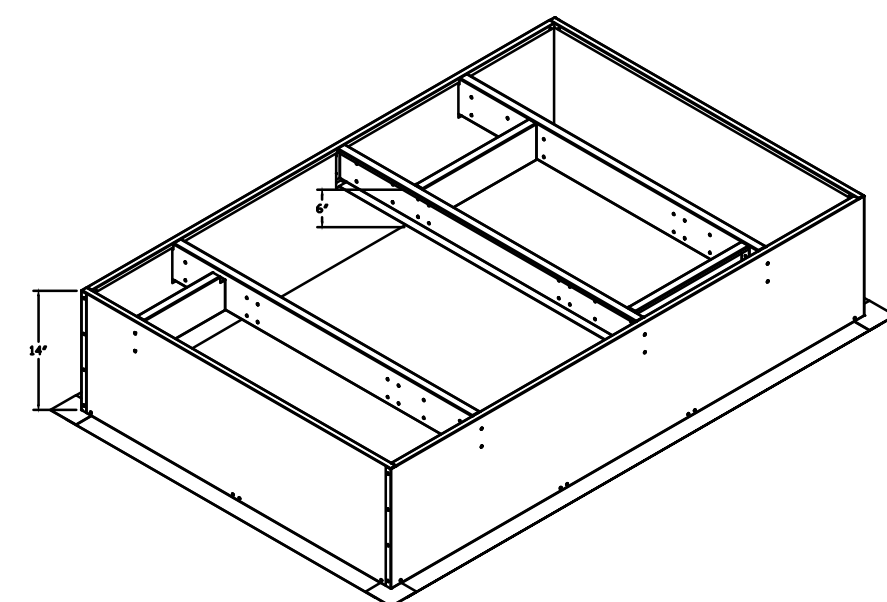
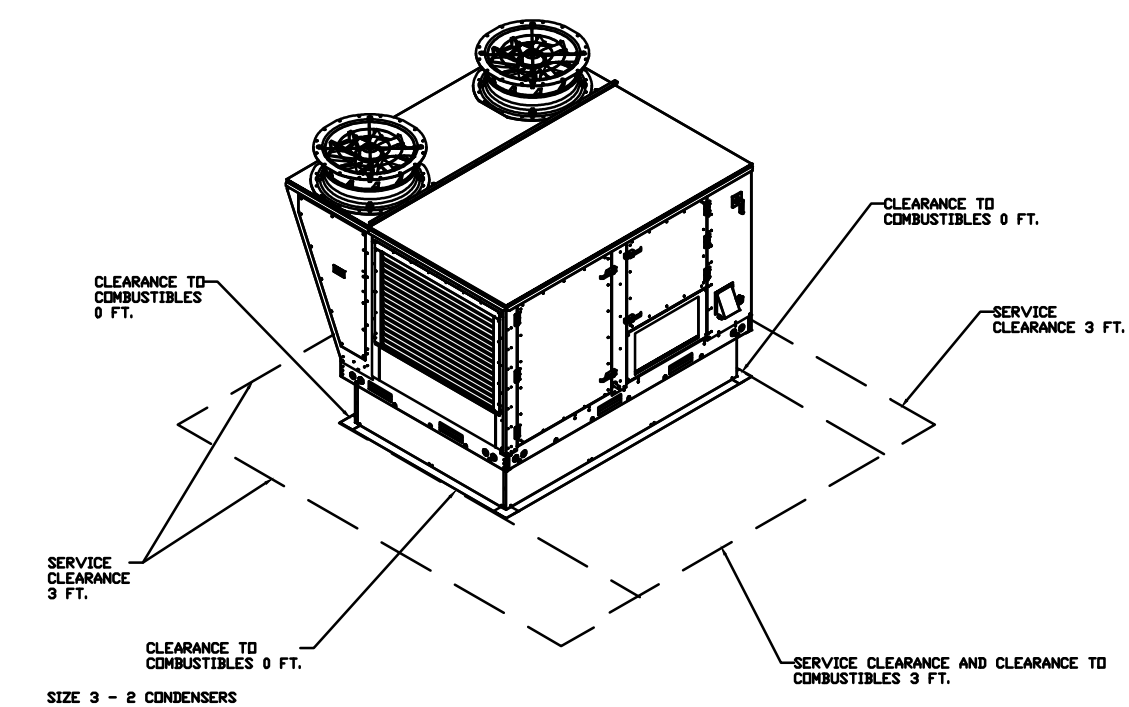
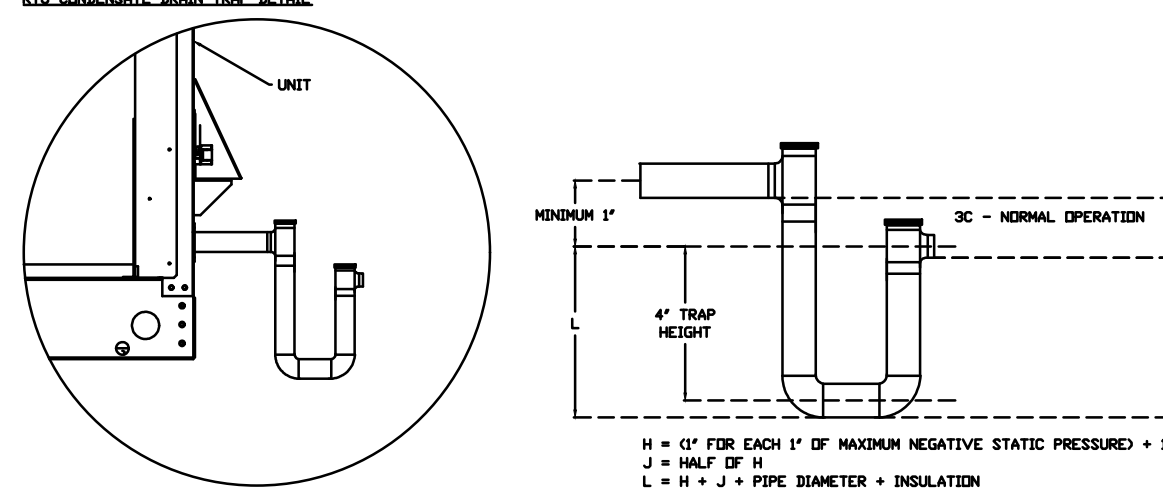
- NOTES:
- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
 - DENOTES CORNER WEIGHT.
 - ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.
 - CONNECTION FROM BREAKER TO UNITS SAFETY DISCONNECT SWITCH TO BE COPPER WIRE ONLY.
 - EXTERIOR GAS CONNECTION PROVIDED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

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

*NOTE: THIS UNIT IS INTENDED TO SERVE IN PLACE OF THE KITCHEN HVAC ROOF TOP UNIT (RTU) IN ADDITION TO PROVIDING APPROPRIATE MAKE-UP AIR FOR THE KITCHEN HOOD(S). RTU AND ASSOCIATED DUCTWORK SHALL BE REMOVED FROM SCOPE UNLESS REQUIRED FOR INTERNAL LOAD ESTIMATES. FINAL DESIGN SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT.
SUGGESTED STRAIGHT DUCT SIZE IS 23" x 39".

RTU CONDENSATE DRAIN TRAP DETAIL



REVISIONS	
DESCRIPTION	DATE

CAPTIVE
HBT Foodservice
104 W 9th St Suite 204, Kansas City, MO, 64105 PHONE: (816) 221-4575 FAX: (816) 221-4311 EMAIL: reg@captiveware.com www.captiveware.com

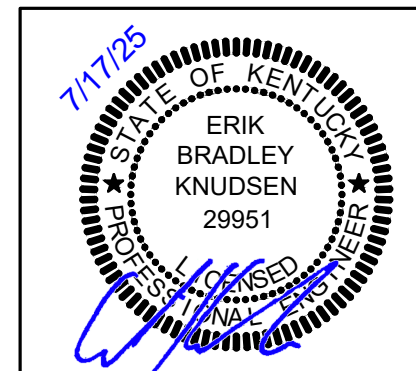
Freddy's - Versailles, KY
Versailles, KY, 40383

DATE: 6/10/2025
DWG.#: 7576108
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING
SHEET NO. 4

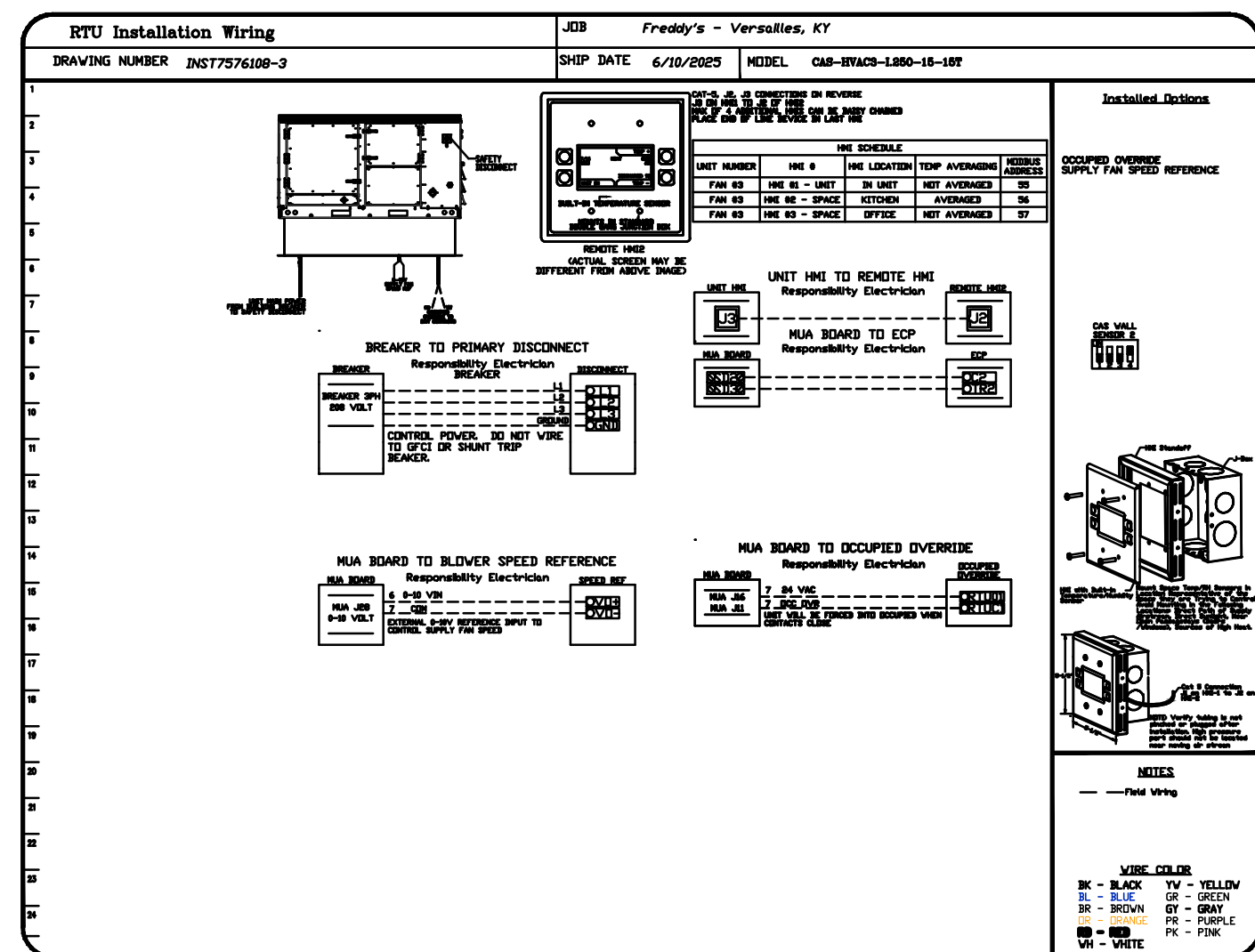
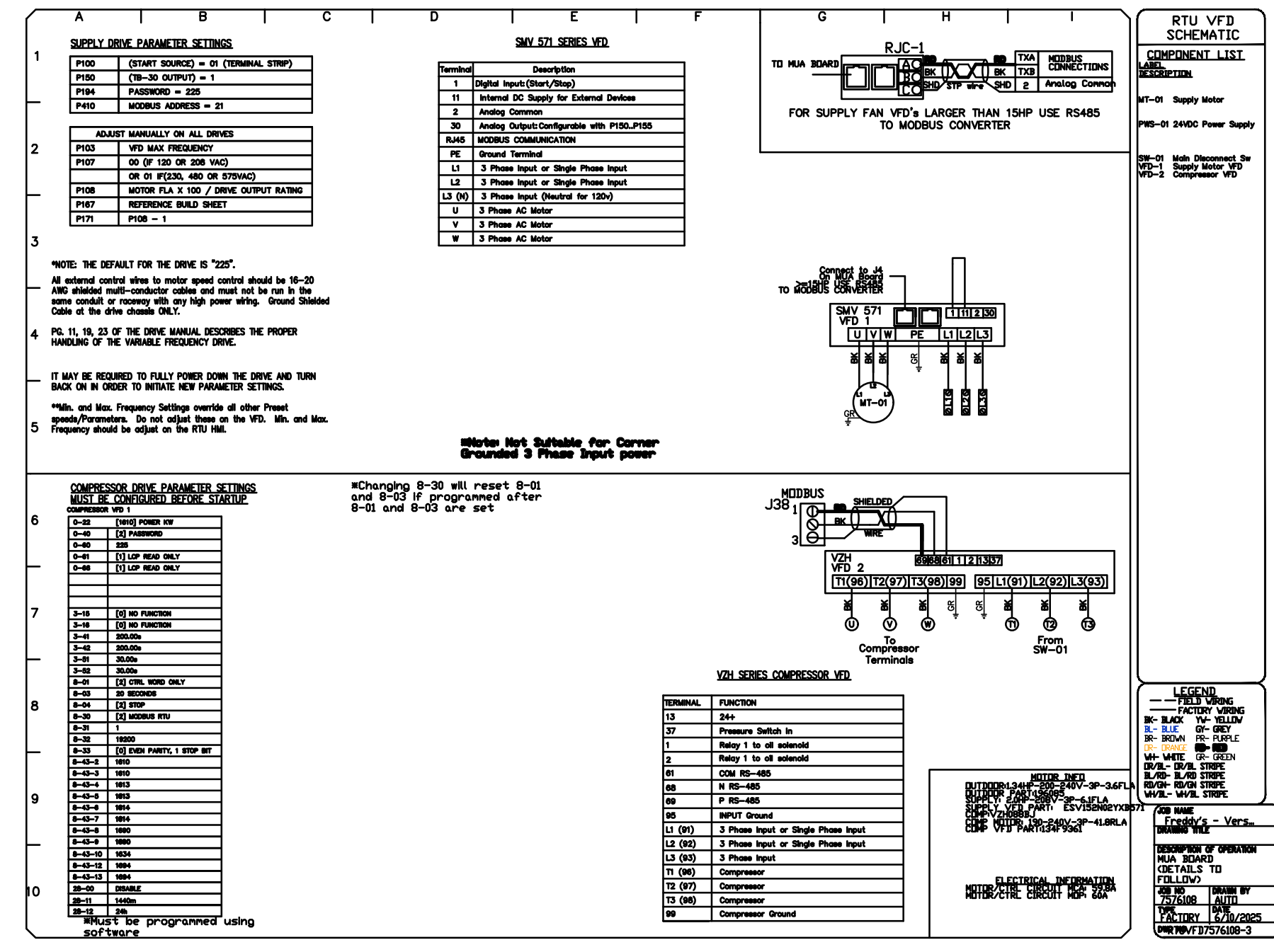
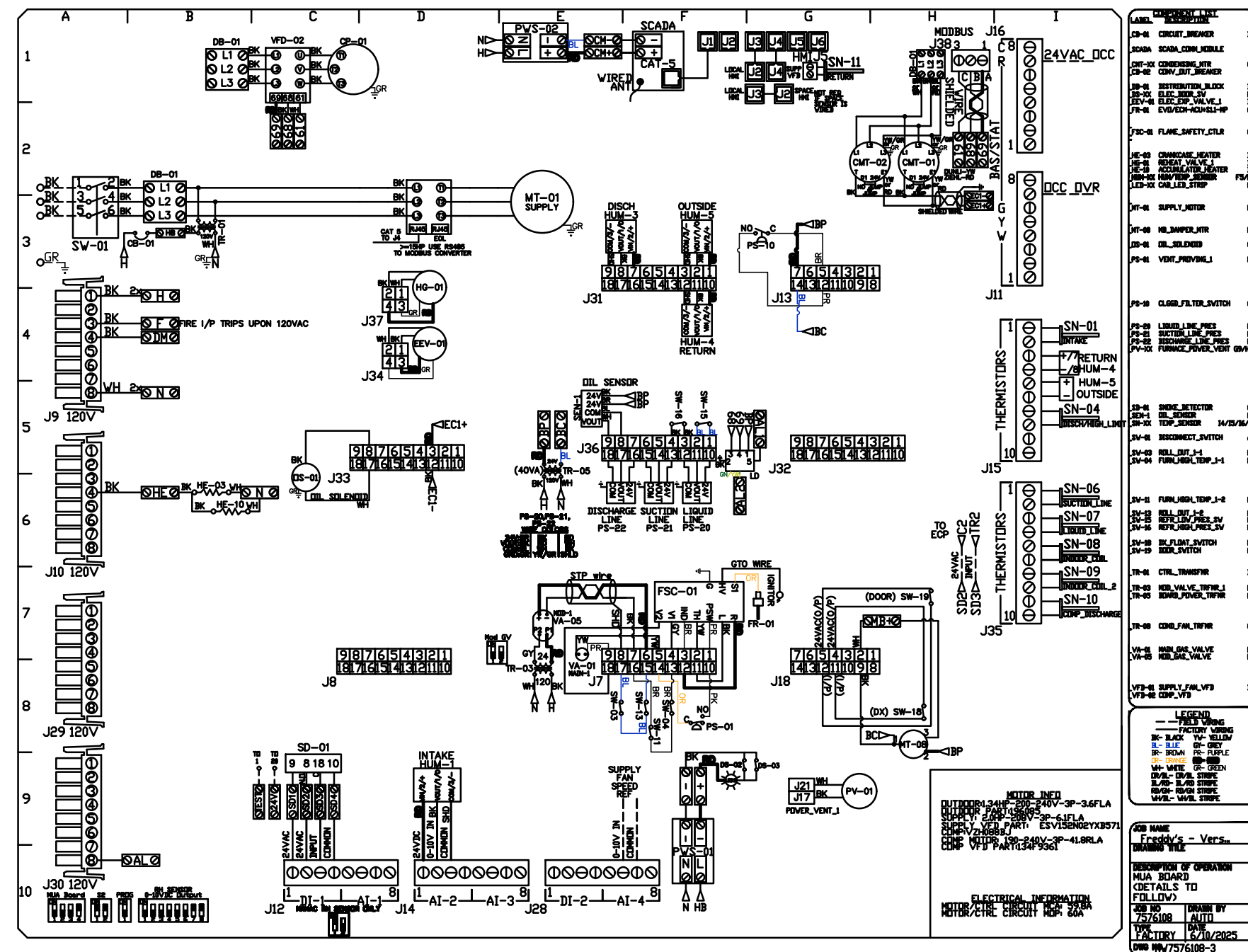
BC PROJECT #: 25483
KENTUCKY PE COA #1723
This drawing has been prepared by the Engineer, or under his supervision. This drawing is provided as an instrument of service by the Design Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, notes and designs, including the overall form, arrangement and composition of letters and elements appearing herein, constitute the original, copyrighted work of the Design Engineer. Any reproduction, use, or disclosure of information contained herein without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS
INCORPORATED
5720 Reeder Shawnee, KS 66203 (913)262-1772

Freddy's
FROZEN CUSTARD &
STEAKBURGERS®



FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383
johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net
MECHANICAL HOOD PLANS
DATE: 07/17/2025 DRAWN BY: FOAK CHECKED: EKCS REVISIONS: SHEET NO. M7



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVE

HBT Foodservice

www.captiveaire.com
www.hbtfoodservice.com

104 W 9th St Suite 204, Kansas City, MO 64105 PHONE: (816) 221-4575 FAX: (816) 221-8511 EMAIL: regis@hbtfoodservice.com

Freddy's - Versailles, KY
Versailles, KY, 40383

DATE: 6/10/2025
DWG.#: 7576108
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING

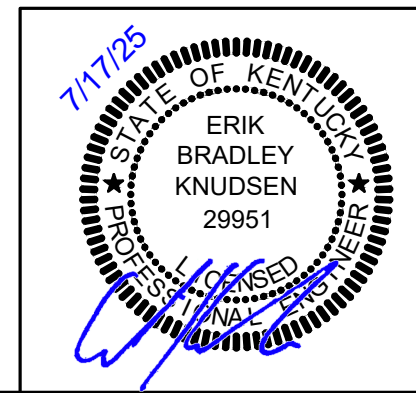
SHEET NO.
5

BC PROJECT #: 25483
KENTUCKY PE COA #1723

This drawing has been prepared by the Engineer or under his supervision. This drawing is provided as an instrument of service by the Design Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, lists and designs, including the overall form, arrangement and composition of letters and elements appearing herein, constitute the original, copyrighted work of the Design Engineer. Any reproduction, use, or disclosure of information contained herein without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS
INCORPORATED

5720 Reeder Shawnee, KS 66203 (913)262-1772



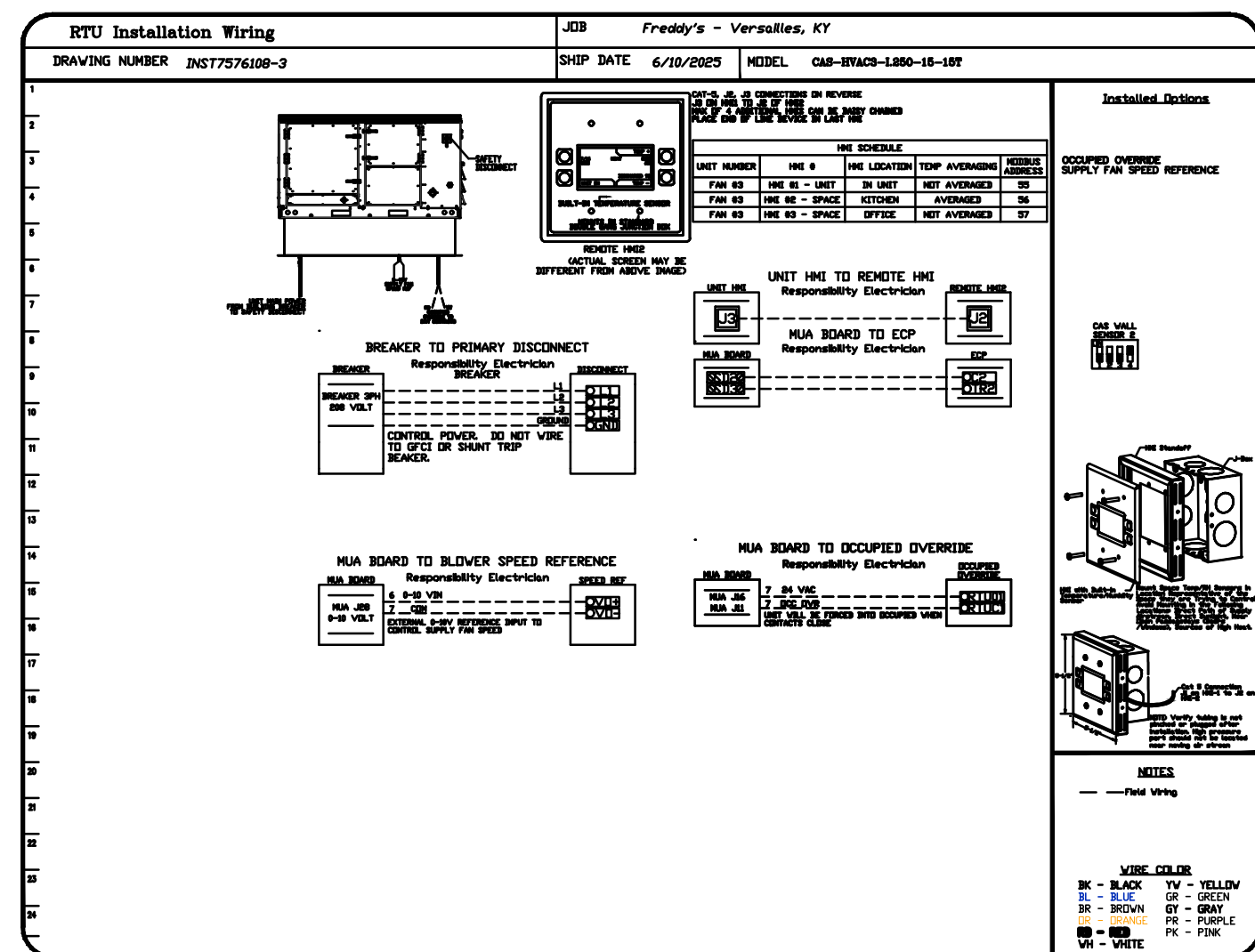
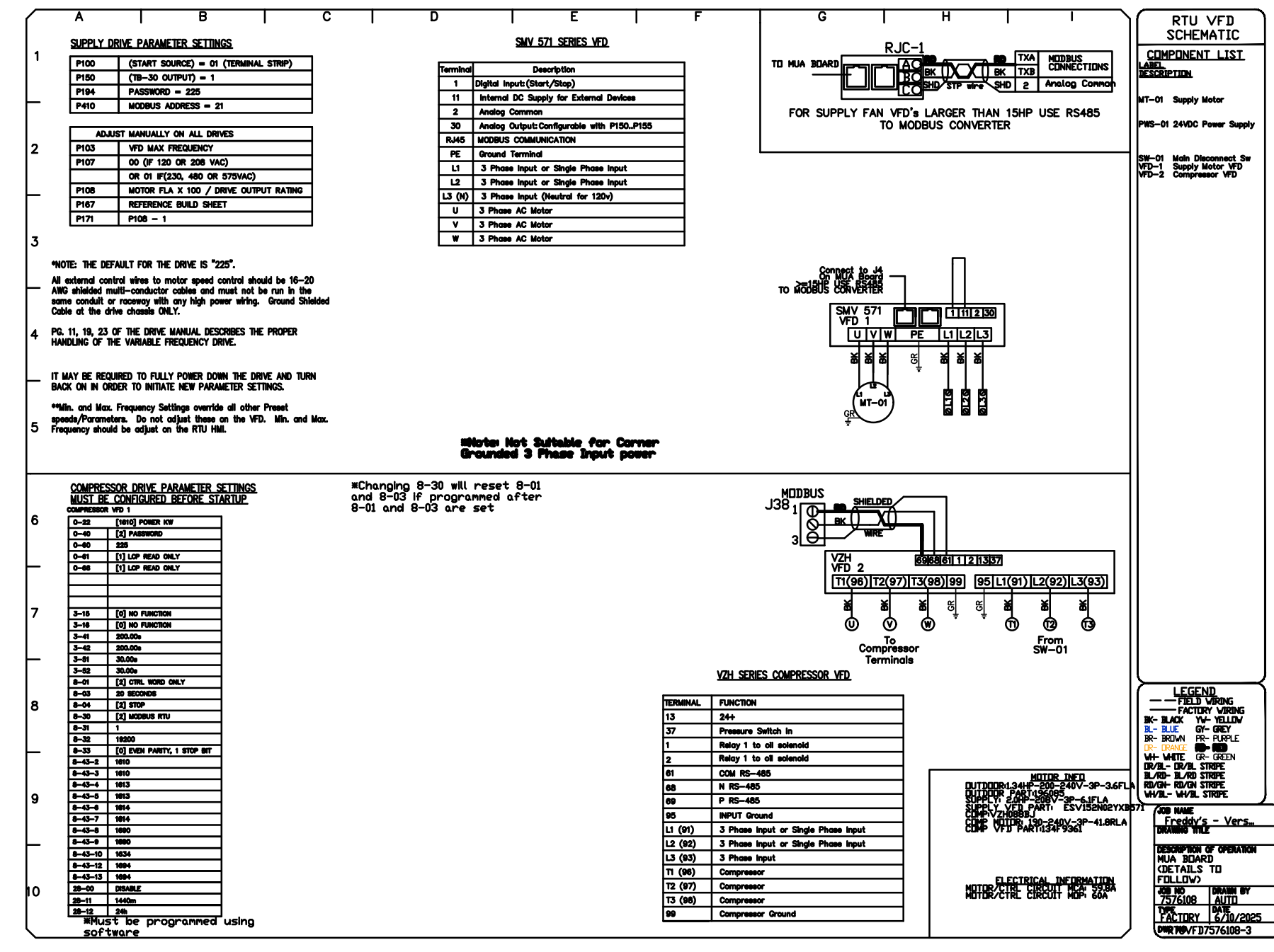
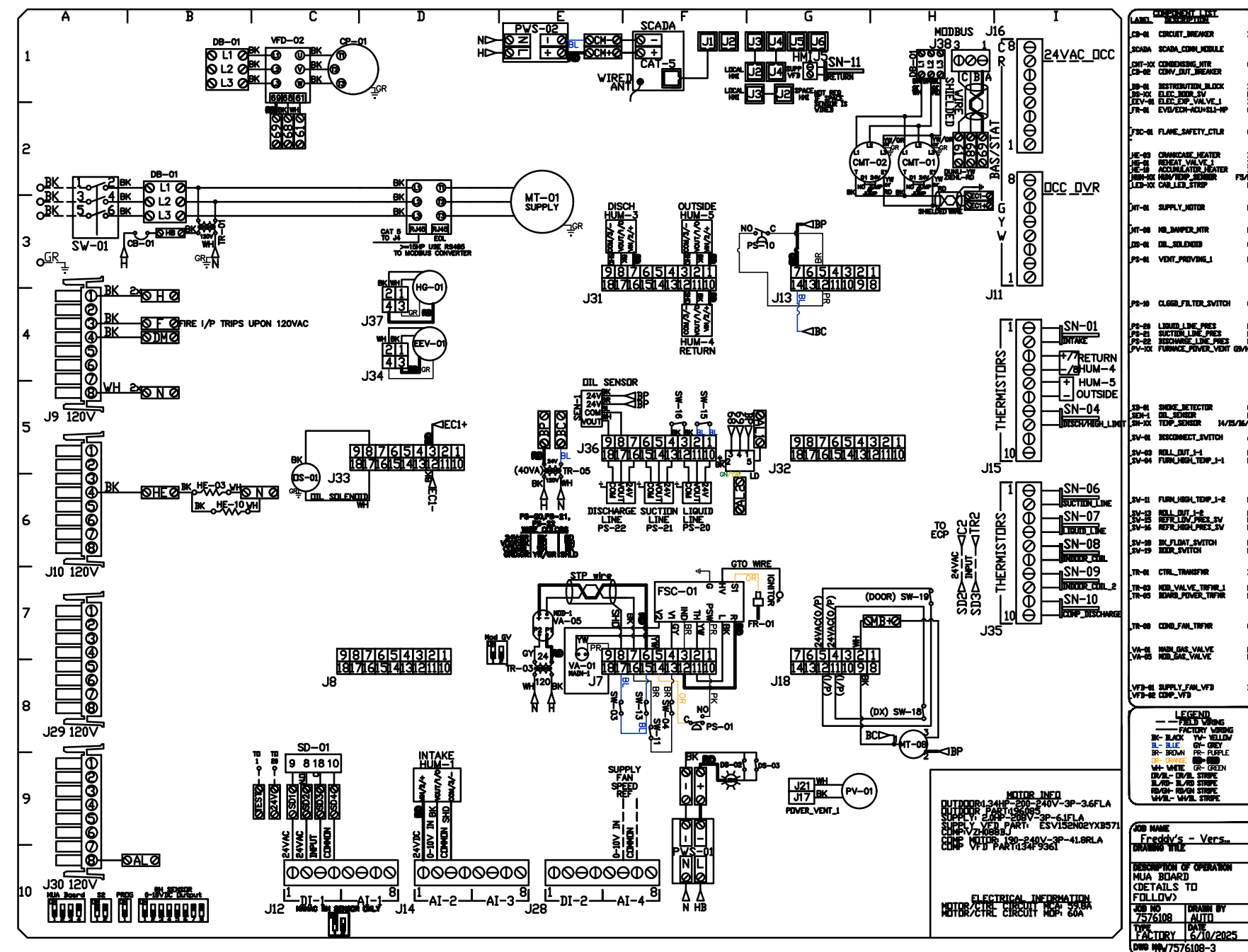
FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

MECHANICAL HOOD PLANS

DATE	DRAWN BY	CHECKED	REVISIONS
07/17/2025	FOAK	EKCS	

M8



REVISIONS	
DESCRIPTION	DATE

CAPTIVE

HBT Foodservice

www.captiveaire.com
www.hbtfoodservice.com

104 W 9th St Suite 204, Kansas City, MO 64105 PHONE: (816) 221-4575 FAX: (816) 221-8511 EMAIL: regis@hbtfoodservice.com

FREDDY'S - Versailles, KY
Versailles, KY, 40383

DATE: 6/10/2025
DWG.#: 7576108
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING

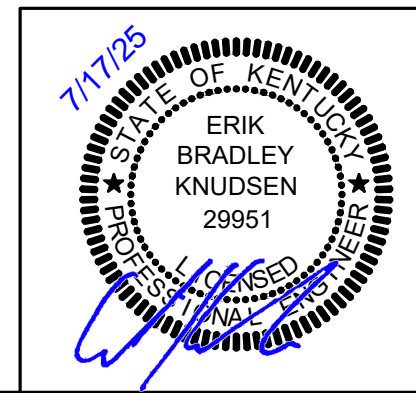
SHEET NO.
5

BC PROJECT #: 25483
KENTUCKY PE COA #1723

This drawing has been prepared by the Engineer or under his supervision. This drawing is provided as an instrument of service by the Design Engineer and is intended for use on this project only. Pursuant to the Architectural Works Copyright Protection Act of 1990, all drawings, specifications, notes and designs, including the overall form, arrangement and composition of letters and elements appearing hereon, constitute the original, copyrighted work of the Design Engineer. Any reproduction, use, or disclosure of information contained hereon without prior written consent of the Engineer is strictly prohibited. © 2025 BC Engineers, Inc.

BC ENGINEERS
INCORPORATED

5720 Reeder Shawnee, KS 66203 (913)262-1772



FREDDY'S FROZEN CUSTARD & STEAKBURGERS®
1031 TYRONE PIKE, VERSAILLES, KY 40383

johnson · early · architects
546 East Main Street, Suite 101 · Lexington, KY 40508
phone: 859-259-1515 · fax: 859-231-5060 · email: earlyjb@jeaarchitects.net

MECHANICAL HOOD PLANS

DATE	DRAWN BY	CHECKED	REVISIONS
07/17/2025	FOAK	EKCS	

M9

MECHANICAL/PLUMBING SPECIFICATIONS

1. GENERAL PROVISIONS
 - A. PROVIDE LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF THE PLUMBING AND MECHANICAL SYSTEMS OUTLINED.
 - B. OBTAIN ALL PERMITS, FEES, LICENSES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.
 - C. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE SITE.
 - D. ALL TESTING REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.
 - E. DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, PUMP, DUCT, ETC. SHALL BE COVERED, PLUGGED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNIMPAIRED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERINGS SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.
 - F. PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILING, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.
 - G. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.
2. OPERATION AND MAINTENANCE MANUALS
 - A. DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS, PARTS LISTS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.
 - B. ALL TEST RECORDS AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.
 - C. ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE BOUND IN A 3-RING BINDER AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC.
3. MANUFACTURERS
 - A. MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSIDERED AS LIMITING COMPETITION. ARTICLES, PATTERNS, ETC. OF EQUAL OR EQUAL QUALITY BY MANUFACTURERS SHALL BE ACCEPTABLE, SUBJECT TO STRUCTURAL AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.
4. MOTORS
 - A. PROVIDE THERMAL OVERLOAD PROTECTION FOR EACH MOTOR PROVIDED BY THIS WORK.
5. TESTING, BALANCING, AND CLEANING
 - A. ALL PIPING SHALL BE TESTED FOR LEAKS BEFORE BEING CONCEALED IN WALL CONSTRUCTION OR COVERED WITH INSULATION.
 - B. SEWER AND VENT PIPING SHALL BE HYDROSTATICALLY TESTED WITH NO LESS THAN 10 FEET OF HEAD FOR 4 HOURS AND NOT LESS THAN 15 MINUTES, PER THE LOCAL PLUMBING CODE, WITH NO LEAKS.
 - C. DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
 - D. NATURAL GAS PIPING SHALL BE PNEUMATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS, WITH NO LEAKS.
6. DUCTWORK AND PIPING SHALL BE BALANCED BY QUALIFIED INDEPENDENT BALANCING PERSONNEL WHO HAVE COMING EXPERIENCE AND ARE CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (IABCO) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).
 - A. BALANCING SHALL INCLUDE THE BALANCING AND AIR DISTRIBUTION SYSTEMS TO PROVIDE DESIGN QUANTITIES INDICATED AND VERIFICATION OF PERFORMANCE OF ALL EQUIPMENT AND AUTOMATIC CONTROLS.
 - B. WITHIN 30 DAYS OF THE COMPLETION OF THE TESTING AND BALANCING WORK, SUBMIT THE TEST AND BALANCING REPORT BEARING THE SIGNATURE OF THE TEST AND BALANCE ENGINEER. THE REPORT SHALL BE CERTIFIED PROOF THAT THE SYSTEMS HAVE BEEN TESTED, ADJUSTED, AND BALANCED IN ACCORDANCE WITH THE REFERENCED STANDARDS, AND AN ACCURATE REPRESENTATION OF HOW THE SYSTEMS HAVE BEEN INSTALLED AND ARE OPERATING. REPORTS SHALL BE BOUND IN A VOLUME AND THE BINDER LABELED OR MAY BE ELECTRONIC PDF SUBMITTAL.
 - C. GREASE DUCT SHALL BE TESTED PRIOR TO USE OR CONCEALMENT OF ANY PORTION OF THE GREASE DUCT SYSTEM. DUCTS SHALL BE CONSIDERED TO BE CONCEALED WHEN INSTALLED IN SHAFTS OR COVERED BY DUCT WRAP INSULATION THAT PREVENTS THE DUCTWORK FROM BEING VISUALLY INSPECTED FROM ALL SIDES. THE PERMIT HOLDER SHALL BE RESPONSIBLE TO PROVIDE THE NECESSARY EQUIPMENT AND PERFORM THE GREASE DUCT LEAKAGE TEST PER NFPA 96 AND ALL LOCAL CODES.
 - D. BEFORE DOMESTIC WATER PIPING IS PLACED IN SERVICE, ALL DOMESTIC WATER DISTRIBUTION SYSTEMS, INCLUDING THOSE FOR COLD WATER AND HOT WATER SYSTEMS, SHALL BE FLUSHED, STERILIZED AND CHLORINATED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS. THE SYSTEMS SHALL BE FLUSHED AND CHLORINATED FOR ALL DRIED AND FOREIGN MATTER. THEN FLUSH WITH WATER TREATED WITH 50 PPM OF CHLORINE. DURING THE FILLING PROCESS, VALVES AND FAUCETS SHALL BE OPENED SEVERAL TIMES TO ASSURE TREATMENT OF THE ENTIRE SYSTEM. THE TREATED WATER SHALL BE LEFT IN THE SYSTEM FOR 24 HOURS AFTER WHICH THE SYSTEM SHALL BE FLUSHED IF THE RESIDUAL CHLORINE IS NOT LESS THAN 10 PPM. THE FLUSHING SHALL BE REPEATED. AFTER STERILIZATION, SAMPLES OF WATER IN THE SYSTEM SHALL BE APPROVED BY THE BOARD OF HEALTH.
7. PLUMBING
 - A. PROVIDE APPROVED WATER HAMMER ARRESTOR FOR EACH PLUMBING FIXTURE SUPPLY AS REQUIRED BY FIXTURE MANUFACTURER.
 - B. ALL EXPOSED WASTE PIPE SHALL BE CHROME PLATED BRASS PIPE, NO FERROUS PIPE.
 - C. PROVIDE CLEANOUTS AT EACH CHANGE OF DIRECTION AND AT 100' FOOT INTERVALS IN STRAIGHT RUNS.
 - D. PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES AND TAPS.
 - E. CLEANOUTS
 - 1) VENT, THE FLOOR, JR. SMITH #4140, OR EQUAL.
 - 2) QUARRY TILE FLOOR, JR. SMITH #4000, OR EQUAL.
 - 3) UNFINISHED FLOOR, JR. SMITH #4020, OR EQUAL.
 - F. PROVIDE DIELECTRIC UNIONS WITH APPROPRIATE END CONNECTIONS TO MATCH THE PIPE SYSTEM WHICH IS INSTALLED (SCREWED, SOLDERED, OR FLANGED). PROVIDE DIELECTRIC UNIONS ON ALL PIPING CONNECTIONS TO HOT WATER HEATERS AND EXPANSION TANKS.
 - G. WATER HEATERS
 - 1) EVERY WATER HEATER SHALL HAVE AN APPROVED MEANS INSTALLED ON THE COLD WATER SUPPLY LINE ABOVE THE EQUIPMENT TO PREVENT SPRINKLING OF A STORAGE WATER HEATER OR TANK.
 - 2) BOTTOM FED WATER HEATERS AND TANKS CONNECT TO WATER HEATERS SHALL HAVE A VACUUM RELIEF VALVE INSTALLED, ANSI Z22.122.
 - 3) STORAGE HEATERS OPERATING ABOVE ATMOSPHERIC PRESSURE SHALL HAVE AN APPROVED PRESSURE RELIEF VALVE AND/OR TEMPERATURE RELIEF VALVE.
 - H. ALL SEWER PIPING LOCATED INSIDE THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES.
 - 1) INSTALL 1/4" AND SMALLER PIPE AT 1/4" PER FOOT FALL.
 - 2) INSTALL 1" AND LARGER PIPE AT 1/8" PER FOOT FALL.
 - 3) INSTALL ALL GREASE WASTE PIPING AT 1/4" PER FOOT FALL.
8. PIPING
 - A. DOMESTIC COLD, HOT, AND HOT WATER RECIRCULATING (ABOVEGROUND).
 - 1) TYPE L HARD DRAWN COPPER TUBING, ASTM A88.
 - a) WROUGHT COPPER SOLDERED FITTINGS, ASTM B75 ALLOY C12200, ANSI B16.22, MSS SP-104.
 - b) MECHANICAL PRESS COPPER FITTINGS FOR USE IN PLUMBING OR MECHANICAL APPLICATIONS, ANSI P5-112, ASME B16.51, OR ASME B16.18. MECHANICAL PRESS COPPER FITTINGS SHALL CONFORM TO ASME P5-112 OR ASME B16.51.
 - 2) PEK HIGH-DENSITY CROSS-LINKED POLYETHYLENE TUBING SHALL BE MANUFACTURED TO THE REQUIREMENTS OF ASTM F876 AND MEET THE STANDARD GRADE HYDROSTATIC PRESSURE RATINGS FROM PLASTIC PIPE INSTITUTE IN ACCORDANCE WITH FH-403.
 - a) PEK-A AND PEK-B MEETING ANSISF61 AND ANSISF72 STANDARDS FOR POTABLE WATER SAFETY AND LEAD-FREE STANDARDS AND MUST BE MARKED WITH "PWL", "NSF-61-G" OR OTHER NSF-APPROVED MARKING, ASTM F2233 FOR USE WITH CHLORINATED WATER.
 - 3) PEK MECHANICAL, COMPRESSIBERT OR EXPANSION FITTINGS INSTALLED IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS. PIPE SIZES GIVEN ON THE DRAWINGS ARE NOMINAL COPPER PIPE SIZE, INCREASE PEK PIPING SIZE TO EQUAL OR EXCEED COPPER PIPE INSIDE DIAMETER FOR SUPPLY MAINS.
 - B. VALVES
 - 1) TO BE INSTALLED ON THE FIXTURE SUPPLY TO EACH PLUMBING FIXTURE.
 - 2) TO BE INSTALLED ON THE WATER SUPPLY SIDE TO EACH APPLIANCE OR MECHANICAL EQUIPMENT.
 - 1) GATE VALVE, JOMAR T8-3016 OR EQUAL, LEAD-FREE NSF 61, ANSI B1.20.1.
 - 2) GLOBE VALVE, JOMAR T600 OR EQUAL.
 - 3) BALL VALVE, JOMAR JF100P/P OR EQUAL CONTACT LEAD-FREE BRASS BALL VALVE, UL842, CSA 337-12 & 3371-92, FM, CALIFORNIA CODE AB1953, NSF61 ANNEX A APPROVED.
 - 4) BALL VALVE, JOMAR T-100E OR EQUAL, UL842, FM, CSA, NSF 61-8, MSS SP-110.
 - C. LEAD CONTENT OF WATER SUPPLY PIPE AND FITTINGS
 - 1) PIPE AND PIPE FITTINGS, INCLUDING VALVES AND FAUCETS, UTILIZED IN THE WATER SUPPLY SYSTEM SHALL NOT HAVE MORE THAN 8% LEAD CONTENT.
 - 2) PIPE, PIPE FITTINGS, JOINTS, VALVES, FAUCETS, AND FIXTURE FITTINGS UTILIZED TO SUPPLY WATER FOR DRINKING OR COOKING PURPOSES SHALL COMPLY WITH NSF 372 AND SHALL HAVE A WEIGHTED AVERAGE LEAD CONTENT OF 0.25% OR LESS.
 - D. SANITARY SEWER, GREASE, WASTE AND VENTS (UNDERGROUND, INTERIOR TO THE BUILDING).
 - 1) ABS PIPE AND FITTINGS, ABS PIPE AND FITTINGS SHALL COMPLY WITH NSF 14, "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS" FOR PLASTIC PIPING COMPONENTS, INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING AND "NSF-SEWER" FOR PLASTIC SEWER PIPING. SOILD-WALL, PVC PIPE, ASTM D 2661, SCHEDULE 40; CELLULAR-CORE ABS PIPE, ASTM F 683, SCHEDULE 40; ABS SOCKET FITTINGS, ASTM D 2661, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS. SOLVENT CEMENT, ASTM D 2325.
 - 2) PVC PIPE AND FITTINGS, PVC PIPE AND FITTINGS SHALL COMPLY WITH NSF 14, "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS" FOR PLASTIC PIPING COMPONENTS, INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING AND "NSF-SEWER" FOR PLASTIC SEWER PIPING. SOILD-WALL, PVC PIPE, ASTM D 2661, DRAIN, WASTE, AND VENT, PVC SOCKET FITTINGS, ASTM D 2666, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE. ADHESIVE PRIMER, ASTM F 656, SOLVENT CEMENT, ASTM D 2564. HUBLESS CAST IRON SOIL PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 888 AND CSPI STANDARD 301. HUBLESS COUPLINGS SHALL CONFORM TO CSPI STANDARD 310 AND BE CERTIFIED BY NSF INTERNATIONAL.
 - 3) HUB AND SPOGOT CAST IRON SOIL PIPE AND FITTINGS: HUB AND SPOGOT CAST IRON PIPE AND FITTINGS SHALL BE MANUFACTURED FROM GRAY CAST IRON AND SHALL CONFORM TO ASTM A 14.

MECHANICAL/PLUMBING SPECIFICATIONS (CONTINUED)

- G. SANITARY SEWER, GREASE, WASTE AND VENTS (ABOVE GROUND, INTERIOR TO THE BUILDING).
 - 1) DWV, WROUGHT COPPER, ANSI B16.22, STREAMLINED PATTERN, FITTINGS, BRAZED JOINTS, ANSI A 5.8.
 - a) DWV, WROUGHT COPPER, ANSI B16.22 (WATER HEATER TAP, INDIRECT WASTE FROM DISHWASHERSINKS).
 - 2) CONDENSATE DRAINS & INDIRECT WASTE (ABOVEGROUND).
 - 1) DWV, WROUGHT COPPER, ANSI B16.22 (CONCENTRIC INSIDE BUILDING).
 - 2) POLYVINYLCHLORIDE (PVC) DWV PIPE, SCHEDULE 40, SOLVENT JOINT (CONDENSATE ON ROOF).
 - 3) POLYVINYLCHLORIDE (PVC) DWV PIPE, SCHEDULE 40, SOLVENT JOINT (INDIRECT WASTE).
 - a) DWV, WROUGHT COPPER, ANSI B16.22 (WATER HEATER TAP, INDIRECT WASTE FROM DISHWASHERSINKS).
- K. REFRIGERANT
 - 1) ASTM B 280, TYPE ACR, HARD-DRAWN STRAIGHT LENGTHS, AND SOFT-ANNEALED COILS, SEAMLESS COPPER TUBING.
 - 2) WROUGHT COPPER, ANSI B16.22, STREAMLINED PATTERN, FITTINGS, BRAZED JOINTS, ANSI A 5.8.
 - 3) TUBING SHALL BE FACTORY CLEANED, READY FOR INSTALLATION, AND HAVE ENDS CAPPED TO PROTECT CLEANLINESS OF PIPE INTERIORS PRIOR TO SHIPPING.
 - 4) SIZE AND INSTALLATION OF PIPE SHALL BE IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.
- L. NATURAL GAS
 - 1) BLACK STEEL PIPE, SCHEDULE 40, ASTM A33.
 - a) PIPE 2" AND SMALLER, 160 LB. MALLEABLE IRON, THREADED FITTINGS.
 - b) PIPE 4" AND SMALLER, WEGA MEGAPRESS FOR WATER AND GAS, CSA C44, TSSAASME 831.
 - c) USE FOR ACTIVATION SCHEDULE 40 BLACK IRON PIPE.
 - 1) PIPE 2-1/2" AND LARGER, WELDED.
 - 2) FLUG VALVE, ROCKWELL NORDSTRUM FIGURE NO. 142 OR 143.
 - 3) BALL VALVE, JOMAR T-100E APPROVALS-UL842, FM, CSA, NSF 61-8, MSS SP-110.
 - 4) CORRUGATED STAINLESS STEEL TUBING (CSST) MADE OF TYPE 304 ALLOY, ASTM A400 WITH POLYETHYLENE JACKET, RATED FOR USE WITH ALL RECOGNIZED FUEL GASES ANSI LCGT-2005, GASSTIC OR EQUAL.
 - a) CORROSION RESISTANT BRASS FITTINGS WITH STANDARD NP1 THREADS FOR USE WITH CORRUGATED STAINLESS STEEL TUBING.
 - b) ALL APPROVED FUEL GAS FITTINGS AND MATERIALS WITH STANDARD NP1 THREADS.
 - c) FLUG VALVE, ROCKWELL NORDSTRUM FIGURE NO. 142 OR 143.
 - 4) BALL VALVE, JOMAR T-100E APPROVALS-UL842, FM, CSA, NSF 61-8, MSS SP-110.
 - 5) RIGID TERMINATION OF THE TUBE ENDS PER THE MANUFACTURERS REQUIREMENTS.
 - 2) GAS PIPING LABELING.
 - a) ALL ELEVATED PRESSURE GAS PIPING SHALL BE LABELED EVERY 40 FEET WITH SIGNS INDICATING "ELEVATED PRESSURE".
 - b) GAS PIPING PAINTING.
 - a) ALL BLACK STEEL GAS PIPING LOCATED EXTERIOR TO THE BUILDING SHALL BE PRIMED AND PAINTED TO EITHER MATCH ADJACENT EXTERIOR WHERE LOCATED OR IN NEAR EXTERIOR WALL AND PAINTED SAFETY YELLOW WHERE LOCATED OTHERWISE.
- M. ALL PIPE HANGERS AND SUPPORTS SHALL BE STANDARD PRODUCTS OF GRINNELL, FEE AND MASON, OR ELLEN. HANGER SPACING SHALL BE IN ACCORDANCE WITH MSS SP-69.
- N. SLEEVES
 - 1) PROTECT, SET, AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK. ALL SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DUE TO EXPANSION AND CONTRACTION.
 - 2) INTERIOR PARTITIONS: 1/2" GAGE GALVANIZED STEEL, PACK BETWEEN PIPE AND SLEEVE WITH FIRE SANDING AND CALK AT EACH END WITH FIRE RESISTANT SEALANT.
 - 3) ROOF, PROTECT OR EQUAL, MANUFACTURED PVC, SCHEDULE 40 PIPE SLEEVE WITH WATERPROOF SEAL COORDINATING WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.
 - 4) PROTECTIVE FRAMING CONTACT: METALLIC PIPING: CONTACT FOR CAST IRON DUCTILE IRON AND GALVANIZED STEEL SHALL NOT BE PLACED IN DIRECT CONTACT WITH STEEL FRAMING MEMBERS, CONCRETE, OR CINDER WALLS OR FLOORS OR OTHER MASONRY. METALLIC PIPING SHALL NOT BE PLACED IN DIRECT CONTACT WITH CORROSIVE SOIL. SHALL BE TWO TIMES GREATER THAN THE PIPE PASSING THOUGH THE WALL OR FOOTING. THE SHEATHING SHALL BE MADE OF PLASTIC, ANY PIPE THAT PASSES THROUGH A FOUNDATION WALL OR FOOTING SHALL BE PROVIDED WITH A RELIEVING ARCH OR A PIPE SLEEVE SHALL BE BUILT INTO THE FOUNDATION WALL. THE SLEEVE SHALL BE TWO TIMES GREATER THAN THE PIPE PASSING THOUGH THE WALL OR FOOTING.
 - 5) PLUMBING VENTS, FLASH ROOF VENT INTO ROOFSYSTEM AS REQUIRED BY THE WHICHEVER IS APPLICABLE. ALL DRIED AND FOREIGN MATTER, ALL PLUMBING VENT TERMINALS SHALL TERMINATE A MINIMUM OF 12" ABOVE ROOF OR EQUAL TO HEIGHT OF PARAPET, WHICHEVER IS GREATER.
 - 6) PROVIDE CHROME PLATED ESCUTCHEONS ON ALL PIPE ENTERING FINISHED AREAS.
- O. WATER HEATERS
 - A. GAS-FIRED, TANKLESS, DOMESTIC-WATER HEATERS
 - 1) STANDARD, ANSI Z21.10.3C24.4 FOR GAS-FIRED, INSTANTANEOUS, DOMESTIC-WATER HEATERS FOR INDOOR APPLICATION.
 - 2) CONSTRUCTION: COPPER PIPING OR TUBING COMPLYING WITH NSF 61 AND NSF 372 BARRIER MATERIAL FOR POTABLE WATER, WITHOUT STORAGE CAPACITY.
 - a) PRESSURE RATING: 150 PSIG.
 - b) HEAT EXCHANGER, STAINLESS STEEL.
 - c) INSULATION: COMPLY WITH ASHRAE 90.2. SHALL HAVE A THERMAL CONDUCTIVITY OF 0.27 Btu PER INH-FT-HR² OR LESS.
 - d) JACKET: METAL, WITH ENAMELED FINISH, OR PLASTIC.
 - e) BURNER: FOR USE WITH TANKLESS, DOMESTIC-WATER HEATERS AND NATURAL-GAS FUEL.
 - f) AUTOMATIC IGNITION: MANUFACTURERS PROPRIETARY SYSTEM FOR AUTOMATIC, GAS IGNITION.
 - g) TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT.
 - 3) SUPPORT: BRACKET FOR WALL MOUNTING.
 - B. DOMESTIC-WATER EXPANSION TANKS
 - 1) DESCRIPTION: STEEL, PRESSURE-RATED TANK CONSTRUCTED WITH WELDED JOINTS AND FACTORY INSTALLED BUTYL-RUBBER DIAPHRAGM. INCLUDE AIR PRECHARGE TO MINIMUM SYSTEM OPERATING PRESSURE AT TANK.
 - 2) CONSTRUCTION:
 - a) TANK: FABRICATED FACTORY-FABRICATED STEEL, WELDED TO TANK BEFORE TESTING AND LABELING, INCLUDE ASME B 31.20.1 PIPE THREAD.
 - b) INTERIOR FINISH: COMPLY WITH NSF 61 AND NSF 372 BARRIER MATERIALS FOR POTABLE WATER. TANK LININGS, INCLUDING EXTENDING FINISH INTO AND THROUGH TANK FITTINGS AND OUTLETS.
 - c) AIR-CHARGING VALVE: FACTORY INSTALLED.
 - 3) CAPACITY AND CHARACTERISTICS
 - a) WORKING-PRESSURE RATING: 150 PSIG.
9. INSULATION AND DUCT LINING:
 - A. ALL INSULATIONS AND ACCESSORIES SHALL HAVE A FIRE HAZARD CLASSIFICATION WITH A FLAME SPREAD RATING OF NOT OVER 25, A FUEL CONTRIBUTION RATING OF NOT OVER 50, AND A SMOKE DEVELOPED RATING OF NOT OVER 50, IN ACCORDANCE WITH NFPA.
 - B. PIPE INSULATION - ABOVE GRADE
 - 1) THE PIPING INSULATION USED SHALL HAVE A THERMAL CONDUCTIVITY OF 0.27 Btu PER INH-FT-HR² OR LESS.
 - 2) FIBERGLASS INSULATION WITH FACTORY APPLIED VAPOR BARRIER, ASJ JACKET, FACTORY APPLIED PRESSURE SEALING LONGITUDINE LAP JOINT, NO STRAPLES, ZESTON PREMIXED PVC FITTING COVERS. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.
 - 3) FLEXIBLE CLOSED CELL ELASTOMERIC THERMAL INSULATION, UNSUIT OR PRESUIT WITH PRESSURE SENSITIVE ADHESIVE SYSTEM FOR CLOSURE AND VAPOR SEALING, EQUAL TO ARMOFLEX OR ARMAFLEX 2000.
 - 4) FOR NON-CIRCULATING SYSTEMS, THE FIRST 3 FEET OF INLET AND OUTLET PIPING BETWEEN THE TANK AND THE HEAT TRAP INCLUDING THE HEAT TRAP MUST BE INSULATED.
 - C. FOR CIRCULATING SYSTEMS, ALL HOT WATER PIPING IN THE CIRCULATION LOOP MUST BE INSULATED AS SPECIFIED BELOW.
 - 1) INSULATION SCHEDULE

a) INSULATION COLD WATER	1"
b) DOMESTIC HOT WATER	1"
c) HOT WATER RECIRCULATING	1"
d) CONDENSATE DRAINS INSIDE BUILDING	1"
 - 2) EQUIPMENT INSULATION
 - 1) FIBERGLASS FIBERGLASS CLASS FIBER INSULATION ASTM C 563, TYPE 1, CLASS B-4, SEMI-RIGID BOARD, WITH FACTORY LAMINATED KRAFT ALUMINUM FOIL (ALL SERVICE JACKETS), VAPOR BARRIER, OLEFINCORING PIPE AND TANK INSULATION.
 - D. DUCTWORK: ACoustICAL INSULATION
 - 1) DUCT LINING: 2 LB/FT, THICKNESS AS SCHEDULED, AIR STREAM SIDE COATED, INSTALL PER SMACNA STANDARDS.
 - 2) DUCT LINING SCHEDULE

a) RECTANGULAR SUPPLY DUCT	1/2"	THROUGHOUT THE FIRST 10 FEET OF DUCT.
b) RETURN AIR DUCT	1/2"	THROUGHOUT THE FIRST 10 FEET OF DUCT.
- E. DUCTWORK: THERMAL INSULATION, (WHERE CONCEALED ABOVE THE CEILING)
 - 1) DUCT COVERING: 3/4 LB/FT, FIBERGLASS BLANKET WITH FACTORY APPLIED VAPOR BARRIER AND OLEFINCORING PIPE AND TANK INSULATION.
 - 2) THICKNESS AS SCHEDULED, INSTALL IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.
 - 3) DUCT COVERING SCHEDULE: MINIMUM R-6

a) ROUND SUPPLY DUCT	2"
b) RECTANGULAR SUPPLY DUCT	2"
c) RETURN AIR DUCT	2"
- F. EXPOSED SPIRAL DUCT
 - 1) DOUBLE WALL SPIRAL, DOUBLE WALL INSULATED SPIRAL DUCT AND FITTINGS WITH PERFORATED 1/2" INCH WITH A VALUE OF 0.27.
- G. SPIRAL DUCT LINING: JOHNS MANVILLE SPACROUSTIC PLUS ROUND DUCT LINER SYSTEM, VSD, SD, AND DS, SIZES: F19 AND I/P, MEETS ASTM E 84 25/50 FLAME AND SMOKE, ASHRAE 62, MEAF37-84M, SMACNA APPLICATION STANDARDS FOR DUCT LINERS, NAMA FIBERGLASS DUCT LINER STANDARD, 1" THICKNESS, AIR STREAM SIDE COATED, INSTALL PER SMACNA STANDARDS.

MECHANICAL/PLUMBING SPECIFICATIONS (CONTINUED)

10. DUCTWORK:
 - A. ALL DUCTWORK, UNLESS OTHERWISE INDICATED, SHALL BE FABRICATED FROM GALVANIZED SHEET STEEL CONFORMING WITH ASTM A 653 COATING QUALITY, WITH G-90 ZINC COATING IN ACCORDANCE WITH ASTM A 924 AND MILL PHOSPHATIZED FOR EXPOSED LOCATIONS.
 - B. WHERE DUCTWORK IS INDICATED TO BE EXPOSED TO VIEW IN OCCUPIED SPACES, PROVIDE MATERIALS WHICH ARE FREE FROM VISUAL IMPERFECTIONS INCLUDING FITTINGS, SEAM MARKS, ROLLER MARKS, STAINS AND DISCOLORATIONS, AND OTHER IMPERFECTIONS, INCLUDING THOSE WHICH WOULD IMPAIR PAINTING.
 - C. DUCTWORK, METAL, GAUGES, REINFORCING, ETC. SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA "HAC" DUCT CONSTRUCTION STANDARDS, LATEST EDITION FOR A 2 INCH WATER GAUGE STATIC PRESSURE.
 - 1) RECTANGULAR DUCT:
 - a) ELBOWS: UNLESS INDICATED OTHERWISE SHALL BE CONSTRUCTED WITH CENTERLINE RADII OF NOT LESS THAN 1.5 DUCT WIDTH OR SQUARE ELBOW WITH DOUBLE WALL STREAMLINE VANES.
 - b) RETURN AIR ACoustICAL ELBOWS AND SOUND BOOTS SHALL BE A SQUARE ELBOW WITH TURNING VANES.
 - c) SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.
 - d) RIGID AND OVERLAP SPIRAL, SHALL BE CONSTRUCTED INSIDE BUILDING.
 - e) PROVIDE RADIUS TYPE FITTINGS FABRICATED OF MULTIPLE SECTIONS WITH MAXIMUM 15 DEGREE CHANGE OF DIRECTION PER SECTION, UNLESS SPECIALLY DETAIL OTHERWISE. USE 45 DEGREE LATERALS FOR BRANCH TAKEOFF CONNECTIONS, WHERE 90 DEGREE BRANCHES ARE INDICATED PROVIDE CONICAL TYPE TEES.
 - f) SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3. AS AN OPTION, PROVIDE FACTORY FABRICATED DUCT AND FITTINGS, UNLESS INDICATED OTHERWISE.
 - g) PROVIDE MULTIPLE GORE CONSTRUCTION FOR LARGER DIAMETERS WITH STANDING SEAM CIRCUMFERENTIAL JOINT.
 - h) DIVIDED FLOW FITTINGS: 90 DEGREE TEES, CONSTRUCTED WITH SADDLE TAP SPOT WELDED AND BONDED TO DUCT FITTING BODY.
 - i) ROUND LONGITUDINAL SEAM DUCT, USE FOR RIGID METAL DUCT ON LEAVING SIDE OF DUCT IN CONCEALED LOCATIONS FOR EXTENSION TO FLEX FOR DIFFUSERS, UNLESS OTHERWISE INDICATED.
 - 2) DUCT SIZES SHOWN ON THE DRAWINGS ARE SHEETMETAL SIZES, ALLOWANCE FOR DUCT LOSS BE MADE WHERE APPLICABLE.
 - E. INSTALLATION OF METAL DUCTWORK:
 - 1) GENERAL: ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR-TIGHT SYSTEMS (MAXIMUM 5% LEAKAGE), WITH NO OBSTRUCTIBLE AREAS, AND CAPABLE OF PERFORMING DUCTWORK. INSTALL EACH RUN WITH MINIMUM NUMBER OF JOINTS. ALIGN DUCTWORK ACCURATELY WITH INTERNAL SURFACES SMOOTH. SUPPORT DUCTS HORIZ. WITH SUITABLE STRIPS, BRACES, HANGERS AND ANCHORS IN ACCORDANCE WITH SMACNA "HAC" DUCT CONSTRUCTION STANDARDS' LATEST EDITION. DUCT HANGERS SHALL BE OF THE TYPE WHICH WILL HOLD DUCTS TRUE TO SHAPE AND TO PREVENT BUCKLING. SUPPORT HORIZONTAL DUCTS AT EVERY FLOOR.
 - 2) AUXILIARY STEEL: PROVIDE AUXILIARY STEEL AS REQUIRED TO ADEQUATELY SUPPORT DUCTWORK.
 - 3) ROUTING: LOCATE DUCTWORK RUNS, EXCEPT AS OTHERWISE INDICATED, VERTICALLY AND HORIZONTALLY AND AVOID DIAGONAL RUNS WHERE POSSIBLE. LOCATE RUNS AS INDICATED BY DIAGRAMS, DETAILS AND NOTATIONS OR, IF NOT OTHERWISE INDICATED, RUN DUCTWORK IN SHORTEST ROUTE WHICH DOES NOT OBSTRUCT FLOOR SPACE OR BLOCK ACCESS FOR SERVICING BUILDING AND ITS EQUIPMENT. HOLD DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER STRUCTURAL AND PERMANENT ENCLOSURE ELEMENTS OF BUILDING, WHEREVER POSSIBLE. FINISH AND COVERED SPACES, CONCEAL DUCTWORK FROM VIEW BY LOCATING IN MECHANICAL SHAFTS, HOLLOW WALL CONSTRUCTION OR ABOVE SUSPENDED CEILING, COORDINATE LAYOUT WITH SUSPENDED CEILING AND LIGHTING LAYOUTS AND SIMILAR FINISHED WORK.
 - 4) DO NOT ROUTE DUCTWORK THROUGH ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES, UNLESS INDICATED OTHERWISE.
 - 5) PENETRATIONS:
 - a) WHERE DUCTS PASS THROUGH INTERIOR PARTITIONS OR EXTERIOR WALLS, AND ARE EXPOSED TO VIEW, CONCEAL SPACE BETWEEN DUCTWORK AND DUCT OR DUCT INSULATION WITH SHEET METAL FLANGES OF SAME GAGE AS DUCT, OVER LAP OPENING ON 4 SIDES BY AT LEAST 1-1/2". FASTEN TO DUCT AND WALL.
 - b) WHERE DUCTS PASS THROUGH FLOOR FLOORS, WALLS, OR PARTITIONS, PROVIDE FIRE-STOPPING BETWEEN DUCT AND WALL.
 - 6) COORDINATION: COORDINATE DUCTWORK WITH INSTALLATION OF ACCESSORIES, DAMPERS, COIL FRAMES, EQUIPMENT, CONTROLS, AND OTHER ASSOCIATED WORK OF THE DUCTWORK SYSTEM.
 - 7) INSTALLATION: INSTALL METAL DUCTWORK IN ACCORDANCE WITH SMACNA "HAC" DUCT CONSTRUCTION STANDARDS' LATEST EDITION.
 - F. EQUIPMENT CONNECTIONS
 - 1) CONNECT METAL DUCTWORK TO EQUIPMENT AS INDICATED, PROVIDE FLEXIBLE CONNECTION FOR EACH DUCTWORK CONNECTION TO EQUIPMENT MOUNTED ON VIBRATION ISOLATORS, AND EQUIPMENT CONTAINING ROTATING MACHINERY. PROVIDE ACCESS DOORS AS REQUIRED.
 - 2) SEAL ALL CONCEALED DUCTWORK JOINTS WITH NON-HARDENING, NON-FLAMING DUCTIC MASTIC SEALANT COMPRISED FOR SEALING SEAMS AND JOINTS IN DUCTWORK, OIL BASE CALKING AND GLAZING COMPOUNDS SHALL NOT BE APPLICABLE. ALL JOINTS SHALL BE SEALED TO THE CLASS LEVEL LISTED BELOW.

1) UNCONDITIONED SPACES (PLENUM)	CLASS C	CLASS B	CLASS C
2) CONDITIONED SPACES (PLENUM)	CLASS C	CLASS B	CLASS C
- G. SEAL ALL CONCEALED DUCTWORK JOINTS WITH NON-HARDENING, NON-FLAMING DUCTIC MASTIC SEALANT COMPRISED FOR SEALING SEAMS AND JOINTS IN DUCTWORK, OIL BASE CALKING AND GLAZING COMPOUNDS SHALL NOT BE APPLICABLE. ALL JOINTS SHALL BE SEALED TO THE CLASS LEVEL LISTED BELOW.

1) UNCONDITIONED SPACES (PLENUM)	CLASS C	CLASS B	CLASS C
2) CONDITIONED SPACES (PLENUM)	CLASS C	CLASS B	CLASS C
11. GREASE HOOD AND EXHAUST DUCT:
 - A. HOOD SHALL BE CONSTRUCTED OF 18 GAUGE STEEL OR 20 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA 96 AND LOCAL CODES.
 - 1) GREASE FILTERS SHALL BE UL LISTED ALUMINUM GREASE EXTRACTORS.
 - 2) PROVIDE A COMPLETE AUTOMATIC WET CHEMICAL FIRE EXTINGUISHING SYSTEM FOR THE HOOD AND DUCT AS REQUIRED BY NFPA AND LOCAL CODES. ALL COOKING EQUIPMENT UNDER THE HOOD SHALL BE INTERLOCKED WITH THE SYSTEM, TO SHUTDOWN IN AN ALARM CONDITION.
 - 3) THE GREASE HOOD FIRE SUPPRESSION SYSTEM SHALL BE EQUAL TO AMESKEY W/ SERIES PRE-ENGINEERED, WET CHEMICAL, STORED-PRESSURE TYPE WITH A FIXED NOZZLE ASBEST. DISTRIBUTION SYSTEM. THE SYSTEM SHALL BE UL LISTED AND TESTED TO UL STANDARD 300.
 - 4) THE SYSTEM SHALL UTILIZE AN ASBEST. MEDIUM OR HEAVY LIQUID FIRE SUPPRESSANT, A POTASSIUM ACETATE BASED SOLUTION THAT SUPPRESSES COOKING GREASE FIRES, SHALL HAVE A PH OF 0 OR LESS, AND SHALL NOT HARM STAINLESS STEEL SURFACES.
 - 5) THE SYSTEM SHALL BE PROVIDED WITH A MANUAL, TUAL ACTION TYPE FULL STATION, FULL STATION SHALL BE LOCATED NOT LESS THAN 10 FEET AND A MAXIMUM OF 20 FEET FROM THE GREASE HOOD AND IN THE PATH OF ESCAPE. THE MANUAL ACTION SHALL REQUIRE A MAXIMUM FORCE OF 40 POUNDS AND A MAXIMUM MOVEMENT OF 14 INCHES TO ACTUATE THE FIRE SUPPRESSION SYSTEM.
 - 6) PROVIDE A GAS SHUT OFF VALVE FOR MOUNTING IN THE GAS PIPE THAT WILL SHUT OFF GAS FLOW TO EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION. PROVIDE AN ELECTRICAL SWITCH WHICH SHALL BE CAPABLE OF DE-ENERGIZING ALL ELECTRICAL DEVICES AND EQUIPMENT UNDER THE HOOD IN AN ALARM CONDITION.
 - B. GREASE DUCT SHALL BE CONSTRUCTED OF 18 GAUGE CARBON STEEL OR 18 GAUGE STAINLESS STEEL IN ACCORDANCE WITH NFPA 96 AND LOCAL CODES.
 - a) JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE ON THE EXTERNAL SURFACE OF THE DUCT SYSTEM.
 - b) THE SYSTEM SHALL BE BUTT JOINTS, WELDED TO A MAXIMUM FLANGE DEPTH OF 12" OR OVERLAPPING DUCT JOINTS OF EITHER THE TELESCOPING OR BELL TYPE. OVERLAPPING JOINTS SHALL BE INSTALLED TO PREVENT LEAKS AND OBSTRUCTIONS FROM COLLECTING GREASE OR INTERFERING WITH GRAVITY DRAINAGE TO THE INTENDED COLLECTION POINT.
 - c) DUCT TO HOOD CONNECTIONS SHALL BE MADE WITH LISTED AND LABELED DUCT TO HOOD COLLAR CONNECTIONS THAT ARE INSTALLED PER THE TERMS OF THEIR APPROVAL AND PER THE MANUFACTURERS' INSTALLATION INSTRUCTIONS.
 - d) DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED AND GASKETED AT THE BASE OF THE FAN FOR VERTICAL DISCHARGE FANS, OR SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET OF THE FAN FOR SIDE INLET UTILITY FANS. GASKET SEALING MATERIALS SHALL BE RATED FOR A MINIMUM CONTINUOUS DUCT TEMPERATURE OF 1,500°F.
- C. SINGLE WALL ROUND GREASE DUCT:
 - 1) FURNISH SINGLE-WALL, FACTORY BUILT, GREASE DUCT FOR USE WITH TYPE KITCHEN HOODS, WHICH CONFORMS TO THE REQUIREMENTS OF NFPA 96, PRODUCTS SHALL BE ETL LISTED TO UL-1939 AND CANULC-5642 FOR VENTING AIR AND GREASE VAPORS FROM COMMERCIAL COOKING OPERATIONS AS DESCRIBED IN NFPA 96.
 - 2) THE DUCT WALL SHALL BE CONSTRUCTED OF 26B AND .047 THICK STAINLESS STEEL AND BE AVAILABLE IN DIAMETERS 8" THROUGH 24".
 - 3) ALL SUPPORTS, FAN ADAPTERS, HOOD CONNECTIONS, FITTINGS AND EXPANSION JOINTS REQUIRED TO INSTALL GREASE DUCT SHALL BE INCLUDED.
 - 4) ROOF PENETRATIONS SHALL COMPLY WITH LISTED CLEARANCE TO COMBUSTIBLES, SEE "CLEARANCE TO COMBUSTIBLES" GUIDE FOR DETAILS. THE GREASE DUCT WILL TERMINATE AT THE FAN ADAPTER PLATE AND THE FAN ADAPTER PLATE WILL BE FASTENED TO THE CURB USING A SUITABLY SIZED FASTENER PROVIDED BY OTHERS, SEE PAGE 12 OF THE "INSTALLATION, OPERATION AND MAINTENANCE MANUAL" FOR DETAILS.
 - 5) GREASE DUCT JOINTS SHALL BE HELD TOGETHER BY MEANS OF FORMED WEE CLAMPS AND SEALED WITH 3M FIRE BARRIER 2000+. SCREWS USED TO SECURE THE WEE CLAMPS SHALL BE OF THE HEX-HEAD TYPE WITH FLANGED STOPS AND TAPERED 1/4" IN THREADS FOR EASY STRAPPING. NUTS SHALL BE RETAINED BY MEANS OF A FREE FLOATING GASKET TO ALLOW EASY ALIGNMENT.
 - 6) SINGLE WALL GREASE DUCT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS' "INSTALLATION, OPERATION AND MAINTENANCE MANUAL", ETL LISTING AND STATE AND LOCAL CODES.
 - 7) GREASE DUCT INSTALLED OUTSIDE OF THE BUILDING SHALL BE PROTECTED AGAINST ACCIDENTAL DAMAGE OR VANDALISM.
 - 8) SUPPORT VERTICALLY INSTALLED GREASE DUCT FROM THE BUILDING STRUCTURE USING RIGID STRUCTURAL SUPPORTS, ANCHOR SUPPORTS TO THE STRUCTURE BY WELDING OR BOLTING STEEL EXPANSION ANCHORS OR CONCRETE INSERTS. SUPPORT HORIZONTALLY INSTALLED GREASE DUCT FROM THE BUILDING STRUCTURE USING ABOVE METHOD. 1/2" THROUGHOUT THE FIRST 10 FEET OF DUCT.
 - 9) FANS SHALL BE SUPPORTED INDEPENDENTLY FROM THE GREASE DUCT SECTIONS. PROTECT GREASE DUCT FROM TWISTING OR MOVEMENT CAUSED BY FAN TORQUE OR VIBRATION.
- D. FLEXIBLE DUCT
 - A. ATCO #86 (R-6), OR EQUAL.
 - B. FACTORY APPLIED INSULATION AND VAPOR BARRIER.
 - C. MAXIMUM LENGTH OF 5'-0".
13. FLUES AND ACCESSORIES
 - A. FLUE FOR GAS FIRED CONDENSING WATER HEATER OR FURNACE SHALL BE AS RECOMMENDED BY THE GAS APPLIANCE MANUFACTURER. FLUES SHALL BE SCHEDULE 40, PVC OR CPVC PIPE PER THE MANUFACTURERS' INSTALLATION REQUIREMENTS.
 - B. PROVIDE MANUFACTURERS STANDARD ACCESSORY ITEMS INCLUDING BIRD PROOF TOP, STORM COLLAR, ROOF THIMBLE, ETC. AS REQUIRED FOR A COMPLETE INSTALLATION. ROOF THIMBLES THROUGH THE BUILDING ROOF SHALL BE SUITABLE FOR USE WITH THE ROOF PROVIDED.

MECHANICAL/PLUMBING SPECIFICATIONS (CONTINUED)

15. SMOKE DETECTORS
 - A. UNITS MOUNTED IN THE DUCTWORK SHALL BE A DUCT MOUNTED UL LISTED PHOTO-ELECTRIC SELF-CONTAINED SMOKE DETECTOR WITH HOUSING. FITTINGS SHALL BE EQUAL TO SIMPLEX #4089-9667. THE SAMPLING TUBE SHALL BE #4089-9667 AS REQUIRED FOR DUCT.
 - B. DUCT DETECTOR REMOTE TEST STATION SHALL BE SIMPLEX #4089-9667 WITH REMOTE ALARM INDICATOR. POWER ON INDICATOR, TONE ALBERT, TONE ALBERT, AND TEST STATION.
 - 1) DEVICES SHALL BE MOUNTED IN APPROVED LOCATION AS INDICATED ON THE FLOOR PLANS AND AS DIRECTED BY LOCAL AUTHORITY HAVING JURISDICTION.
 - C. PROVIDE AND INSTALL A PHOTO-ELECTRIC SMOKE DETECTOR IN THE RETURN AIR DUCT FOR EACH HVAC UNIT AS INDICATED ON THE FLOOR PLANS. DETECTORS ARE TO BE PROVIDED WITH A SUB-BASE CONTAINING AUXILIARY RELAY CONTACTS. RELAY CONTACTS SHALL BE WIRED INTO CONTROL WIRING, SO AS TO SHUT UNIT DOWN IN THE CASE OF SMOKE DETECTION. PROVIDE ALL CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL PROVIDE 120 VOLT POWER TO EACH DETECTOR.
 - D. SMOKE DETECTORS SHALL BE INTERLOCKED. IN A NORMAL CONDITION OF A SINGLE DETECTOR, ALL UNITS SHALL SHUT DOWN.
16. FLAMMABLE REFRIGERANTS
 - A. EQUIPMENT WITH REFRIGERATION SYSTEMS USING GROUP A2L REFRIGERANTS SHALL MEET ALL REQUIREMENTS OF ASHRAE 62D 15 AND THIS SECTION.
 - B. LISTING AND INSTALLATION REQUIREMENTS.
 - C. LISTED IN ACCORDANCE WITH UL 494