

































MECHANICAL LEGEND

	SUPPLY DUCT UP		PIPING DOWN
	SUPPLY DUCT DOWN		PIPING UP
	RETURN DUCT UP		TURNING VANES
	RETURN DUCT DOWN		VOLUME DAMPER
	FIRE DAMPER		CONDENSATE DRAIN
	SMOKE DAMPER		MOTORIZED DAMPER
	COMB. FIRE/SMOKE DAMPER		BACKDRAFT DAMPER
	BACKDRAFT DAMPER		REMOTE ANNUNCIATOR
	SMOKE DETECTOR		REMOTE TEMP. SENSOR
	SPIN-IN WITH VOLUME DAMPER		THERMOSTAT
	45° RETURN DUCT TAP WITH VOL. DAMPER		FLEX DUCT
	DIFFUSER		LINEAR DIFFUSER WITH FLEX CONNECTION
	DIFFUSER WITH FLEX CONNECTION		ROUND DUCT UP
	GRILLE/REGISTER		ROUND DUCT DOWN
	SIDEWALL GRILLE/ REGISTER/ DIFFUSER		REDUCER
	CONNECT TO EXISTING		EXTENT OF DEMOLITION

SEQUENCE OF OPERATION

- A. PROVIDE STAND ALONE OR APPLICATION SPECIFIC CONTROLLERS AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCES OF OPERATIONS.
- B. PACKAGED ROOFTOP UNITS
1. UNIT SHALL CONSIST OF SUPPLY AIR FAN, FILTERS, DX COOLING COIL, GAS-FIRED HEAT SECTION, AND A 7-DAY PROGRAMMABLE THERMOSTAT.
2. PROVIDE AN OVERRIDE SWITCH TO OPERATE THE UNIT DURING UNOCCUPIED HOURS. THIS SWITCH SHALL BE PART OF THE PROGRAMMABLE THERMOSTAT. OVERRIDE SWITCH ALLOWS THE UNIT TO OPERATE FOR TWO HOURS (ADJUSTABLE).
3. OCCUPIED MODE: BASED ON THE ROOFTOP 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 RTU SHALL OPEN AND THEN THE RTU SHALL START). THE UNIT SHALL START EARLIER AS DETERMINED BY THE PROGRAM FOR EARLY WARM-UP OR COOL DOWN. ON A SYSTEM STARTUP, THE RTU FAN SHALL START AND RUN CONTINUOUSLY AND THE INTERNAL FACTORY CONTROLS SHALL BE ENABLED. BASED ON THE SPACE TEMPERATURE SENSOR, THE UNIT SHALL CYCLE THE HEATING/COOLING TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
- 3.1. ECONOMIZER MODE: WHEN ENTHALPY OF OA IS BELOW 28 BTU/LB, ECONOMIZER MODE SHALL BE ENABLED. ECONOMIZER MODE SHALL LINEARLY MODULATE OUTDOOR AIR CFM FROM MINIMUM OA CFM TO 100% BASED ON ENTHALPY READINGS.
4. UNOCCUPIED MODE: THE RTU INTERNAL OA DAMPERS SHALL REMAINED CLOSED WHEN THE BUILDING IS NOT OCCUPIED. THE RTU SHALL STOP HEATING/COOLING AND THE FAN SHALL STOP. IF THE SPACE TEMPERATURE FALLS BELOW 60 DEGREE F (ADJUSTABLE), THE UNIT SHALL START AND HEAT UNTIL THE SPACE TEMPERATURE IS 64 DEGREE F (ADJUSTABLE) AND THEN SHUTDOWN. IF THE SPACE TEMPERATURE RISES ABOVE 85 DEGREE F (ADJUSTABLE), THE UNIT SHALL START AND COOL UNTIL THE SPACE TEMPERATURE IS 80 DEGREE F (ADJUSTABLE) AND THEN SHUTDOWN.
5. UPON DETECTION OF SMOKE BY UNIT SMOKE DETECTOR THE RTU SHALL SHUT DOWN AND AN ALARM SHALL BE SENT TO THE RESPECTIVE LOCAL REMOTE ANNUNCIATORS.
- C. KITCHEN HOOD EXHAUST FAN (EF-1)
1. THE KITCHEN HOOD EXHAUST FAN SHALL BE ENABLED WHEN ANY COOKING APPLIANCE LOCATED UNDER THE HOOD IS IN USE.
- D. EF-2
1. EXHAUST FAN SHALL RUN WHEN THE BUILDING IS OCCUPIED. EC TO WIRE THROUGH KITCHEN LIGHT SWITCH.
- E. ANSUL SYSTEM ACTIVATION
1. UPON ACTIVATION OF ANSUL SYSTEM, SHUT DOWN RTU-1 AND RTU-2. PROVIDE RELAYS CONTACTS, INTERLOCKS, TRANSFORMERS AND ALL ASSOCIATED WIRING TO ACCOMPLISH SEQUENCE. MECHANICAL CONTRACTOR SHALL INTERLOCK RTU-1 AND RTU-2 TO ALSO SHUT DOWN.

GENERAL NOTES:

- A. ALL WORK TO BE PERFORMED TO MEET ALL STATE, CITY & LOCAL CODE REQUIREMENTS.
- B. ALL DUCTWORK TO BE CONSTRUCTED OF GALVANIZED METAL ACCORDING TO SMACMNA STANDARDS.
- C. ALL WALL PATCHING TO BE BY THE GENERAL CONTRACTOR.
- D. **HVAC CONTRACTOR IS TO COORDINATE WITH OTHER TRADES BEFORE INSTALLING DUCTWORK. IF THE HVAC CONTRACTOR FAILS TO COORDINATE WITH OTHER TRADES AND THE WORK MUST BE ALTERED THE HVAC CONTRACTOR WILL CHANGE IT AT HIS OWN EXPENSE.**
- E. ONCE THE SYSTEM IS COMPLETE AND ALL CEILING TILES ARE INSTALLED THE SYSTEM FILTER SHALL BE CHANGED AND THE AIR SIDE SHALL BE BALANCED. SUBMIT ELECTRONIC COPY OF BALANCE REPORT TO ENGINEER FOR REVIEW.
- F. COORDINATE THE EXACT LOCATION OF ALL GRILLES, REGISTERS & DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLAN, ALSO COORDINATE MOUNTING HEIGHTS OF FIXTURES.
- G. HVAC CONTRACTOR IS TO VISIT THE SITE PRIOR TO SUBMITTING A BID & INCLUDE IN THE BID ANY ITEMS NECESSARY FOR A COMPLETE & OPERATIONAL SYSTEM.
- H. PROVIDE TURNING VANES AT ALL 90° CHANGE IN DIRECTION.
- I. DRAWINGS ARE SCHEMATIC IN NATURE & HVAC CONTRACTOR IS TO INCLUDE ANY ITEMS REQUIRED FOR A COMPLETE & OPERATIONAL SYSTEM WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.
- J. HVAC CONTRACTOR TO FURNISH ALL PERMITS REQUIRED FOR HIS PORTION OF THE WORK.
- K. HVAC CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR CONCERNING ELECTRICAL REQUIREMENTS BEFORE ORDERING ANY EQUIPMENT.
- L. FLEXIBLE DUCTS SHALL BE WIREMOLD TYPE WGC, 1-1/2" INSULATION & RATED AT 10" W.C WITH A MAXIMUM LENGTH OF 5'-0".

ABBREVIATIONS

(D)	DEMOLITION	FPI	FINS PER INCH
(E)	EXISTING	GTC	GENERAL TRADES CONTRACTOR
(F)	FUTURE	ID	INNER DIAMETER
(R)	(RELOCATE)	LAT	LEAVING AIR TEMPERATURE
AAV	AUTOMATIC AIR VENT	LWT	LEAVING WATER TEMPERATURE
AFF	ABOVE FINISHED FLOOR	MFR	MANUFACTURER
AMB	AMBIENT	N/A	NOT APPLICABLE
APD	AIR PRESSURE DROP	NC	NORMALLY CLOSED
BAS	BUILDING AUTOMATIC SYSTEM	NO	NORMALLY OPEN
BDD	BACKDRAFT DAMPER	NTS	NOT TO SCALE
BFP	BACKFLOW PREVENTER	OA	OUTSIDE AIR
BLDG	BUILDING	OD	OUTSIDE DIAMETER
BOB	BOTTOM OF BEAM	PD	PRESSURE DROP
BOD	BOTTOM OF DUCT	PRV	PRESSURE REDUCING VALVE
BOP	BOTTOM OF PIPE	RA	RETURN AIR
BOS	BOTTOM OF STRUCTURE	REL	RELIEF AIR
CL	CENTER LINE	SA	SUPPLY AIR
CO	CLEAN OUT	SCC	SENSIBLE COOLING CAPACITY
DB	DRY BULB	SP	STATIC PRESSURE
DIA	DIAMETER	TCP	TEMPERATURE CONTROL PANEL
DN	DOWN	TSP	TOTAL STATIC PRESSURE
EA	EXHAUST AIR	TYP	TYPICAL
EAT	ENTERING AIR TEMPERATURE	UNO	UNLESS NOTED OTHERWISE
EFF	EFFICIENCY	VFD	VARIABLE FREQUENCY DRIVE
EG	ETHYLENE GLYCOL	WB	WET BULB
ESP	EXTERNAL STATIC PRESSURE	WG	WATER GAUGE
EWT	ENTERING WATER TEMPERATURE	WPD	WATER PRESSURE DROP
EXH	EXHAUST		

DRAWING INDEX

M0.0	HVAC GENERAL INOTES
M1.1	HVAC FLOOR PLAN
M3.1	HVAC ROOF PLAN
M5.1	HVAC SCHEDULES
M7.1	MECHANICAL SPECIFICATIONS
M7.2	MECHANICAL SPECIFICATIONS
H1.1	CAPTIVEAIRE DRAWING
H1.2	CAPTIVEAIRE DRAWING
H1.3	CAPTIVEAIRE DRAWING



CONSULTANTS



MPW ENGINEERING, LLC
110 W. 7TH STREET • SUITE 600 • TULSA, OK 74119
(918) 582-4088 • (918) 582-4087 FAX



New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

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HVAC GENERAL NOTES

SHEET:

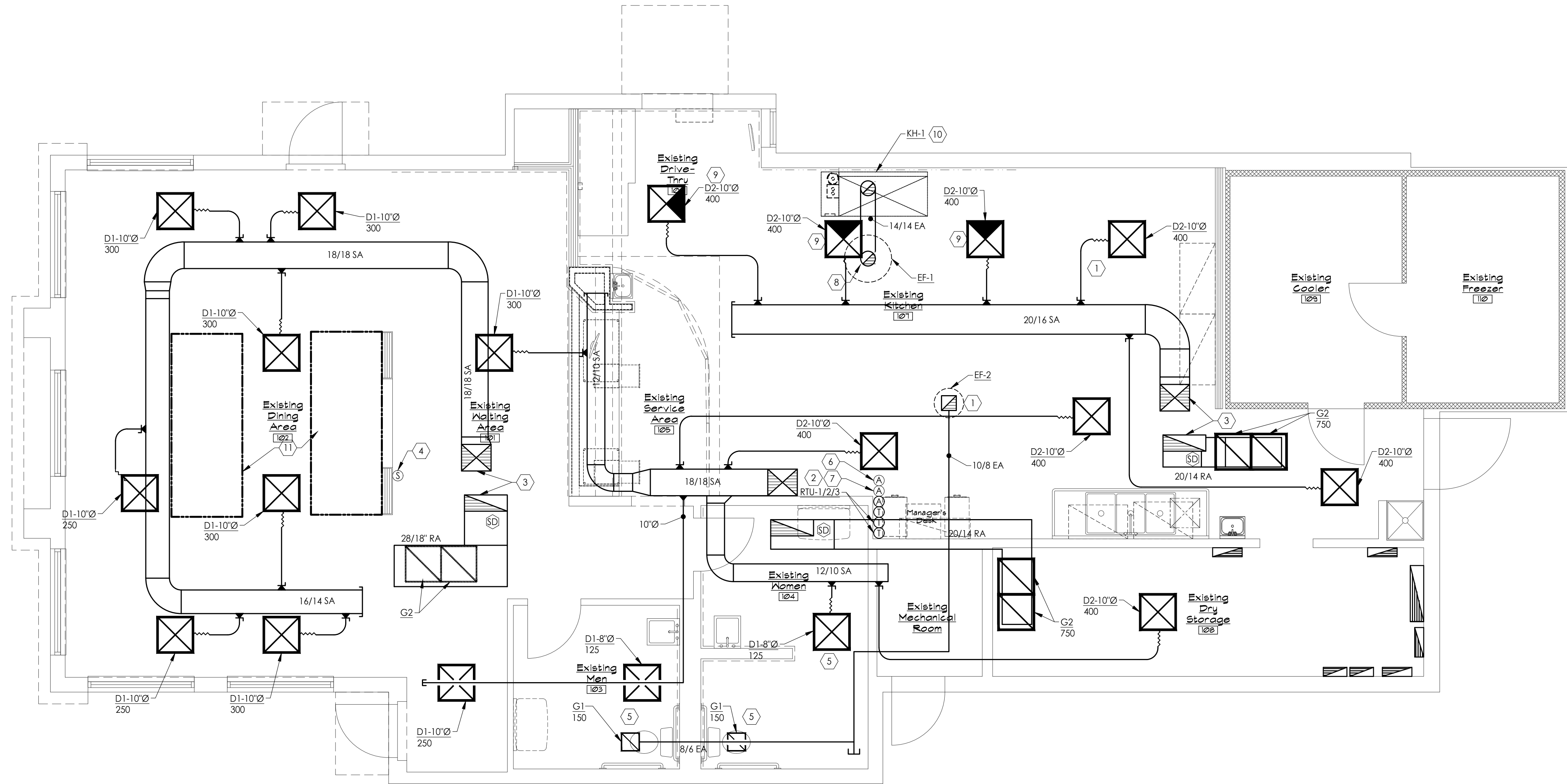
M0.0

GENERAL NOTES:

- A. MOUNT ALL DUCTWORK TIGHT TO STRUCTURE EXCEPT WHERE NOTED.
- B. DO NOT PENETRATE KITCHEN EXHAUST HOODS OR DUCTWORK WITH ANY TYPE OF FASTENING ASSEMBLY (I.E. SCREWS, RIVETS).
- C. REFER TO SCHEDULES ON SHEET M5.1 FOR FURTHER INFORMATION ON MECHANICAL EQUIPMENT AND AIR DEVICES.
- D. ALL PROVIDED DUCT DIMENSIONS ARE METAL-TO-METAL LENGTHS. CONTRACTOR TO PROVIDE INSULATION WRAP ON DUCT EXTERIOR FOR ALL CONCEALED DUCT.
- E. **THE AIR BALANCE WILL BE PERFORMED BY THE OWNER. COORDINATE EXACT TIME WITH THE CONSTRUCTION MANAGER.**
- F. **CONTRACTOR TO ROUTE ALL INDIVIDUAL ROUND DUCT BRANCHES THROUGH JOISTS. TYP.**

CODED NOTES: ⬢

1. UP TO EF ON ROOF. SEE SHEET M3.1 FOR CONTINUATION.
2. INSTALL LED TOUCHSCREEN (WITH CONTROLS LOCKED BY CODE) 24/7 PROGRAMMABLE THERMOSTAT MOUNTED AT 48" AFF. COORDINATE EXACT LOCATION WITH OWNER.
3. UP TO RTU ON ROOF. SEE SHEET M3.1 FOR CONTINUATION.
4. PROVIDE REMOTE TEMPERATURE SENSOR MOUNTED MOUNTED AT 72" A.F.F. FOR RTU-1. WIRE BACK TO THERMOSTAT IN MANAGER'S AREA.
5. PROVIDE BALANCE DAMPER ACCESSIBLE THROUGH FACE OF AIR DEVICE ON DEVICES LOCATED ON INACCESSIBLE CEILING(TYP.).
6. PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET FOR RTU-1 SMOKE DETECTOR MOUNTED AT 48" AFF.
7. PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET FOR RTU-2, RTU-3 SMOKE DETECTOR MOUNTED AT 48" AFF.
8. PROVIDE TYPE 1 KITCHEN EXHAUST DUCTWORK FROM KITCHEN EXHAUST HOOD TO EF-1 ON ROOF. DUCTWORK TO BE A MINIMUM 16 GAGE CARBON STEEL WITH CONTINUOUSLY WELDED LIQUID TIGHT SEAMS. PROVIDE GREASE RESERVOIR AS REQUIRED BY IMC 506.3.7 AND DUCT CLEANOUTS AS REQUIRED BY IMC 506.3.8. DUCTWORK SHALL BE INSULATED WITH 2-HOUR FLEXIBLE BLANKET TYPE FIRE WRAP WITH A FLAME SPREAD INDEX AT NOT MORE THAN 5 AND A SMOKE DEVELOPED INDEX NOT EXCEEDING 5. WHEN TESTED PER ASTM E-84 METHOD. WRAP SHALL COMPLY WITH ALL 5 FIRE TESTS OF STANDARD ASTM E-2236. GREASE DUCT ENCLOSURE SYSTEM, AND DUCT FIRESTOP SYSTEM BE ASTM E-814 CLASSIFIED. FABRICATED DUCT WRAP ENCLOSURE WRAP TO PROVIDE 2-HOUR FIRE RATING. ALL DUCT ELBOWS ARE TO BE RADIUS ELBOWS. COORDINATE ROUTING WITH P.C. AND STORM DRAINAGE.
9. PROVIDE CLEAR PLASTIC INSERT TO BLANK OFF DIFFUSER THROW AT THE EXHAUST HOOD AS SHOWN.
10. INSTALL HOOD AT LOCATION SHOWN. PROVIDE ALL REQUIRED SUPPORTS AND ACCESSORIES FOR A COMPLETE INSTALLATION.
11. AVOID ROUTING DUCTWORK ABOVE MARKED DINING ROOM SOFFIT AREA.



1 HVAC PLAN
1/16" = 1'-0"



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HVAC FLOOR PLAN

SHEET:

M1.1


$$1/4'' = 1'-0''$$

- A. MOUNT ALL HVAC EQUIPMENT ON ROOF PER DETAILS ON SHEET M5.1.
- B. CONTRACTOR TO MAINTAIN MINIMUM MANUFACTURER RECOMMENDED SERVICE CLEARANCE AROUND EACH PIECE OF EQUIPMENT.
- C. CONTRACTOR TO ENSURE A MINIMUM OF 10' CLEARANCE BETWEEN ALL OA INTAKES AND ANY EXHAUST FANS, VENTS, FLUES, ETC.
- D. CONTRACTOR TO ENSURE ALL MECHANICAL EQUIPMENT IS INSTALLED A MINIMUM OF 10' FROM THE ROOF EDGE WHERE PARAPET IS 36" HIGH OR LESS.
- E. COORDINATE EXHAUST LOCATION OF RTUS WITH STRUCTURE TO ENSURE DUCT DROPS ARE LOCATED WITHIN TRUSS.

1. NOT USED.
2. PLUMBING VENT/ FLUE PIPING SHOWN FOR REFERENCE. MAINTAIN A MINIMUM OF 10'-0" CLEARANCE TO ANY OA INTAKE.
3. RTU'S MOUNTED ON CURB ON ROOF. REFER TO DETAIL ON SHEET M5.1 FOR FURTHER INFORMATION.
4. NOT USED.
5. WATER HEATER FLUE PENETRATIONS SHOWN FOR REFERENCE.
6. NOT USED.
7. REMOVE EXISTING RTU AND MOUNT NEW RTU ON EXISTING ROOF CURB. PROVIDE ROOF CURB ADAPTER AS NECESSARY TO FACILITATE NEW INSTALLATION.
8. REMOVE EXISTING EF AND MOUNT NEW EF ON EXISTING ROOF CURB. PROVIDE ROOF CURB ADAPTER AS NECESSARY TO FACILITATE NEW INSTALLATION.



ROOFTOP UNIT SCHEDULE																		
MARK	MANUFACTURER & MODEL NO.	AREA SERVED	NOM. TONS	CFM	CFM O/A	HEATING (MBH)		COOLING CAP. (MBH)		E.S.P. "in.WC"	EER	FAN HP	UNIT WT. LBS.	ELECTRICAL				ACCESORIES
						TYPE	INPUT OUTPUT	GROSS CAPACITY	NET CAPACITY					VOLTS	PH.	MCA	MOCP	
RTU1	LENNOX LGH060H4E	DINING	5	2000	500	GAS	108 81	61.6	60	0.5	12.7	1	750	208	3	33	45	ALL
RTU2	LENNOX LGH060H4E	STORAGE/KITCHEN RESTROOM/ WAITING	5	2000	500	GAS	108 81	61.6	60	0.5	12.7	1	750	208	3	33	45	ALL
RTU3	LENNOX LGH060H4E	KITCHEN	5	2000	500	GAS	108 81	61.6	60	0.5	12.7	1	750	208	3	33	45	ALL
GENERAL NOTES: 1. HAILGUARD 2. 14" ROOF CURB 3. FACTORY PROVIDED DISCONNECT 4. FACTORY PROVIDED ENTHALPY ECONOMIZER WITH POWERED EXHAUST 5. RETURN AIR SMOKE DETECTOR FOR UNITS 5-TON OR MORE																		

GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE									
UNIT DATA				PERFORMANCE DATA					COMMENTS
TAG	FUNCTION	MODEL	FACE SIZE	FRAME TYPE	MATERIAL	FINISH	BALANCE DAMPER	MAX N.C.	
D1	SUPPLY	TMS	24"x24"	LAY-IN	STEEL	BEIGE	—	25	
D2	SUPPLY	TMS	24"x24"	LAY-IN	STEEL	WHITE	—	25	
G1	RETURN	35ORL	12"x12"	LAY-IN	STEEL	BEIGE	—	25	
G2	RETURN	50F	24"x24"	LAY-IN	STEEL	WHITE	—	25	
G3	RETURN	50F	24"x24"	LAY-IN	STEEL	BEIGE	—	25	

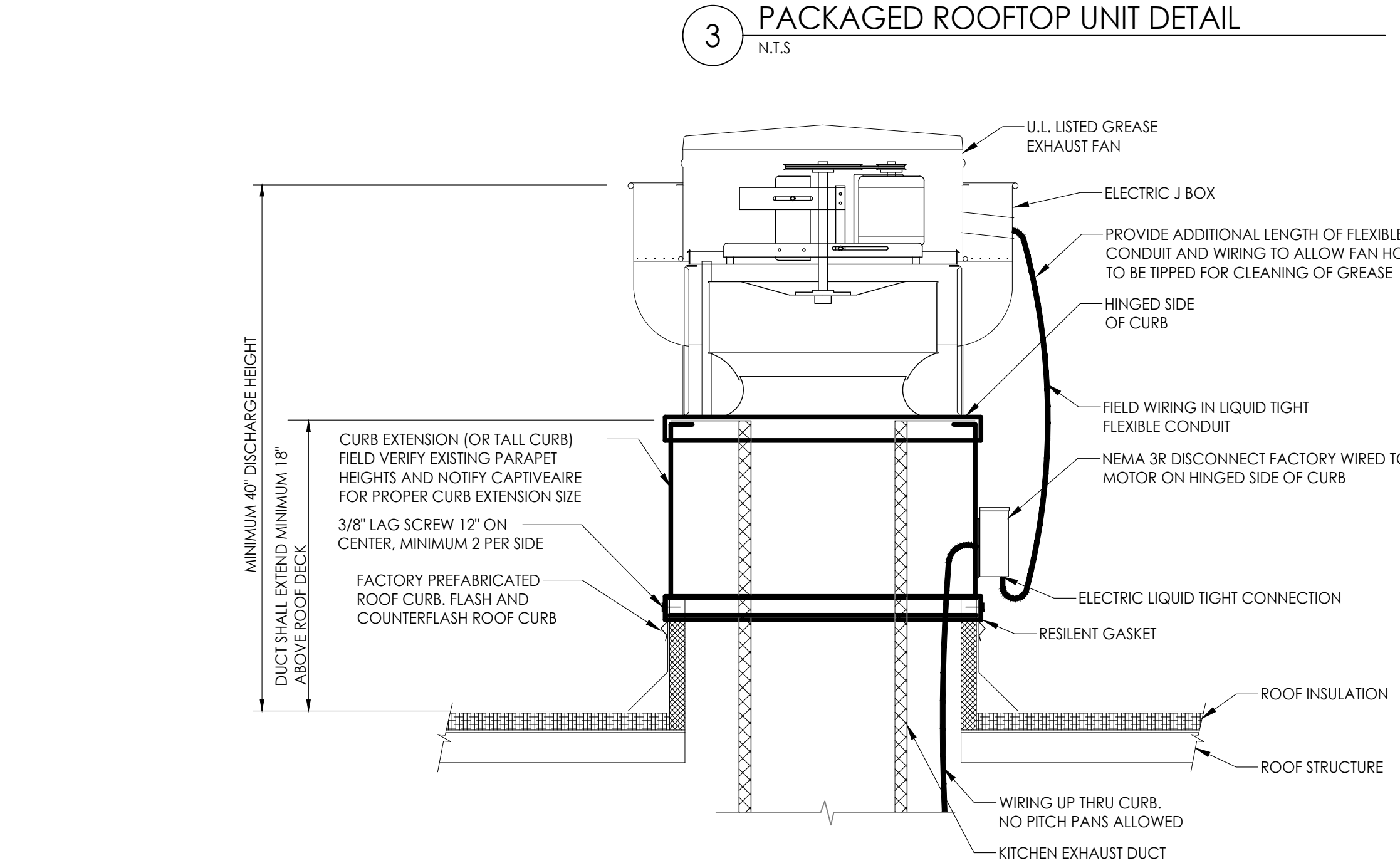
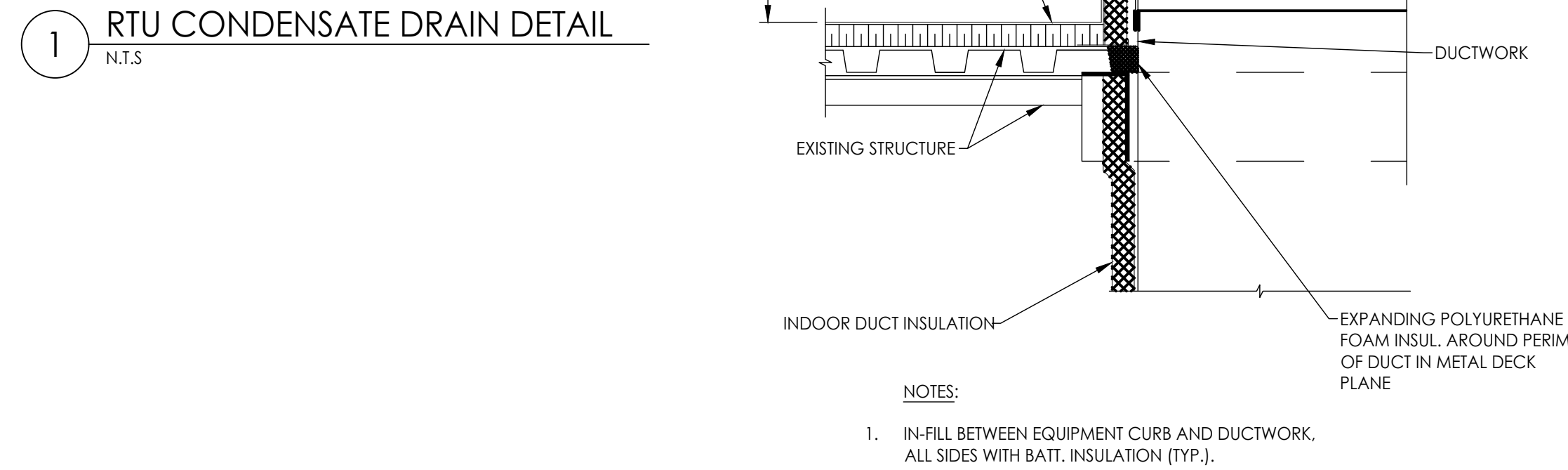
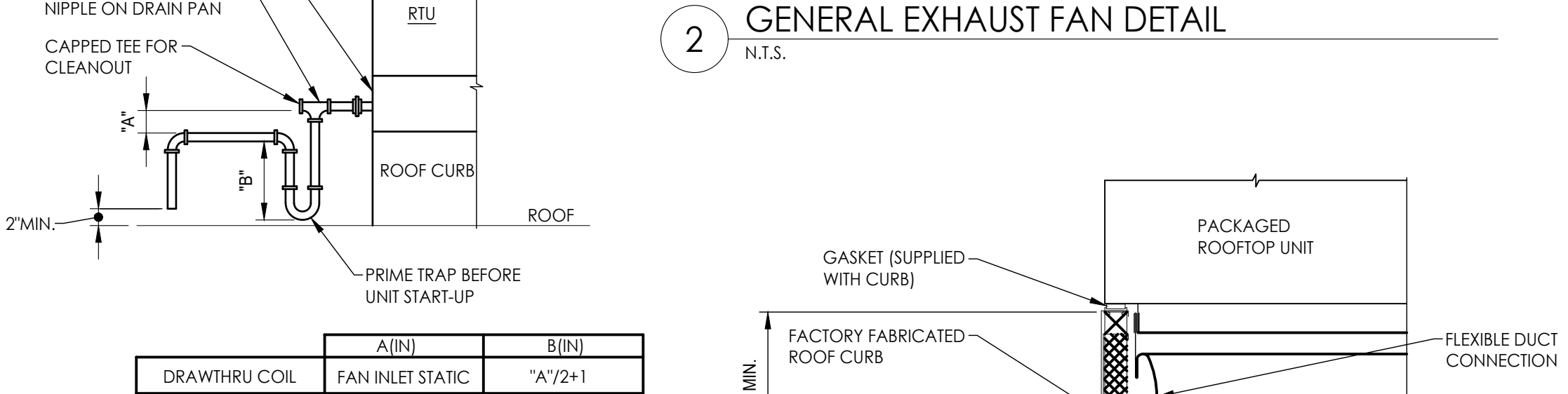
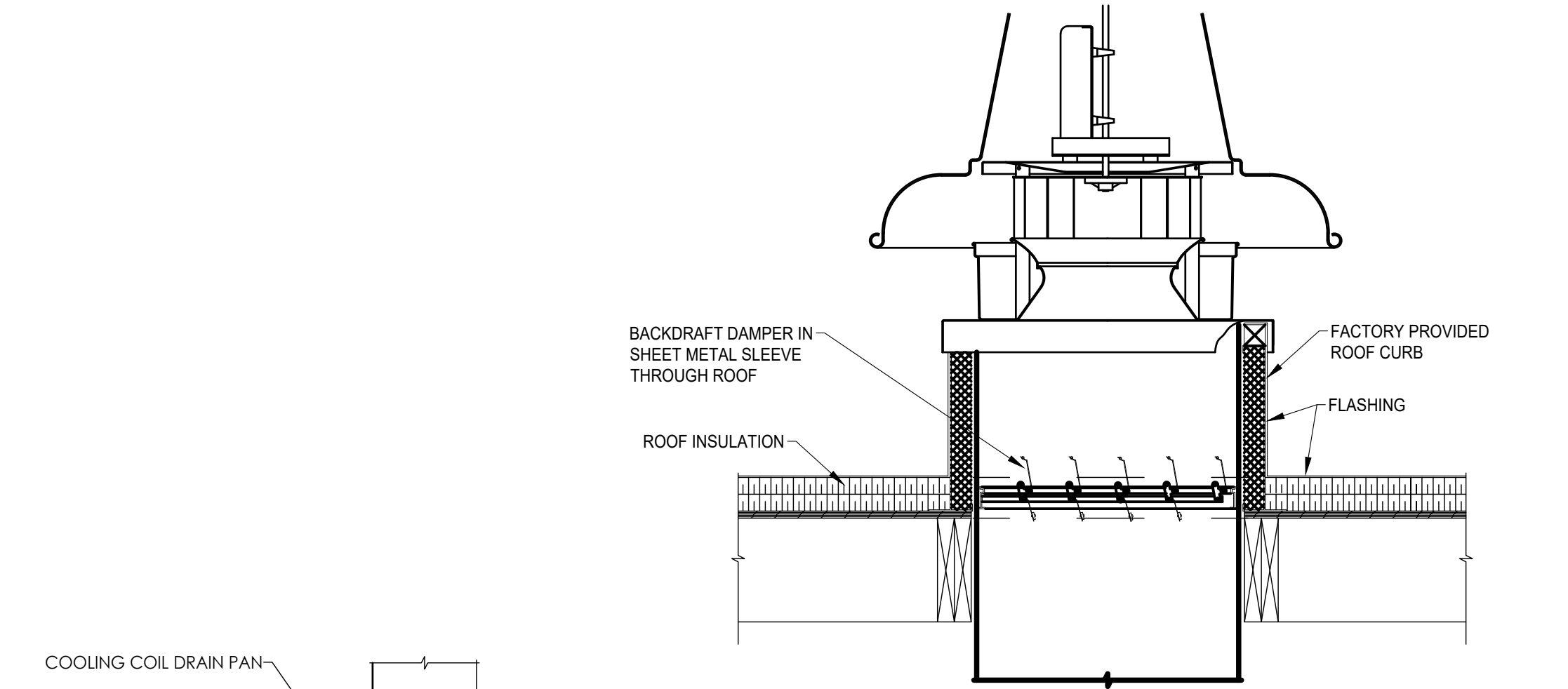
KITCHEN HOOD SCHEDULE											
BASED ON CAPTIVEAIRE U.N.O.											
UNIT DATA							LIGHTS		MISC		
TAG	MODEL	HOOD LENGTH	MAX. COOLING TEMP.	TOTAL EXHAUST CFM	RISER (H" x DIA*)	S.P. (IN.W.G.)	QTY.	TYPE	FIRE SUPP. SYSTEM	HANGING WEIGHT (LBS.)	COMMENTS
KH-1	5424-ND-2	5'-0"	450F	1000	4x10	-0.363	3	RECESSED ROUND	YES	511	

EXHAUST FAN SCHEDULE												
BASED ON CAPTIVEAIRE U.N.O.												
UNIT DATA				PERFORMANCE DATA					MOTOR DATA			
TAG	MODEL	FUNCTION	FAN TYPE	CFM	ESP	RPM	DAMPER	BELT OR DIRECT	HP	VOLT	PH	COMMENTS
EF-1	DU50HFA	KH-1 HOOD EHAUST	ROOF MOUNTED UPBLAST	1000	0.75	1370	—	BELT	0.5	120	1	1,2
EF-2	DR12HFA	RESTROOM EXHAUST	ROOF MOUNTED DOWNBLAST	300	0.25	1003	GRAVITY BD	BELT	0.25	120	1	1,2
NOTE: 1. FACTORY PROVIDED DISCONNECT SWITCH 2. REFER TO CAPTIVEAIRE DRAWINGS FOR ROOF CURB												

VENTILATION SCHEDULE													
SPACE DATA				PEOPLE VENTILATION			AREA VENTILATION			TOTAL			
SPACE NAME	ROOM NUMBER	CATEGORY	RTU SERVED BY	OCC.	CFM PER PERSON	CFM TOTAL (PEOPLE)	AREA (SF)	CFM REQUIRED PER SF	CFM TOTAL (AREA)	TOTAL VENTILATION	ROOFTOP UNIT VENTILATION SUMMATION		
DINING	102	FOOD & BEVERAGE/DINING	RTU-1	40	7.5	300	1000	0.18	180	480			
VESTIBULE (S)	100	CORRIDORS	RTU-2	—	—	0	38	0.18	7	7			
VESTIBULE (N)	101	CORRIDORS	RTU-2	—	—	0	50	0.18	9	9			
WOMENS	103	RESTROOMS	RTU-2	—	—	—	—	—	—	—	SYSTEM EFFICIENCY	CORRECTED OA	OA PROVIDED
MENS	104	RESTROOMS	RTU-2	—	—	—	—	—	—	—			
UNLISTED ROOMS ARE LUMPED INTO LISTED ROOMS										496	0.8	620	800

VENTILATION SCHEDULE													
SPACE DATA				PEOPLE VENTILATION			AREA VENTILATION			TOTAL			
SPACE NAME	ROOM NUMBER	CATEGORY	RTU SERVED BY	OCC.	CFM PER PERSON	CFM TOTAL (PEOPLE)	AREA (SF)	CFM REQUIRED PER SF	CFM TOTAL (AREA)	TOTAL VENTILATION	ROOFTOP UNIT VENTILATION SUMMATION		
SERVICE AREA	104	FOOD & BEVERAGE/KITCHEN	RTU-2&3	10	7.5	75	350	0.18	63	138			
KITCHEN	106	FOOD & BEVERAGE/KITCHEN	RTU-2 & RTU-3	2	7.5	15	500	0.18	90	90	SYSTEM EFFICIENCY	CORRECTED OA	OA PROVIDED
UNLISTED ROOMS ARE LUMPED INTO LISTED ROOMS										228	0.8	285	700

AIR BALANCE SCHEDULE						BUILDING PRESSURE
COMPONENT	SUPPLY CFM	RETURN CFM	SUPPLY AIR CFM TO HOOD	OUTDOOR AIR CFM	EXHAUST CFM	
RTU-1	2000	1500	—	500	—	
RTU-2	2000	1500	—	500	—	
RTU-3	2000	1500	—	500	—	
EF-1	—	—	—	—	1000	
EF-2	—	—	—	—	300	
TOTAL	6000	4500	0	1500	1300	+200 CFM



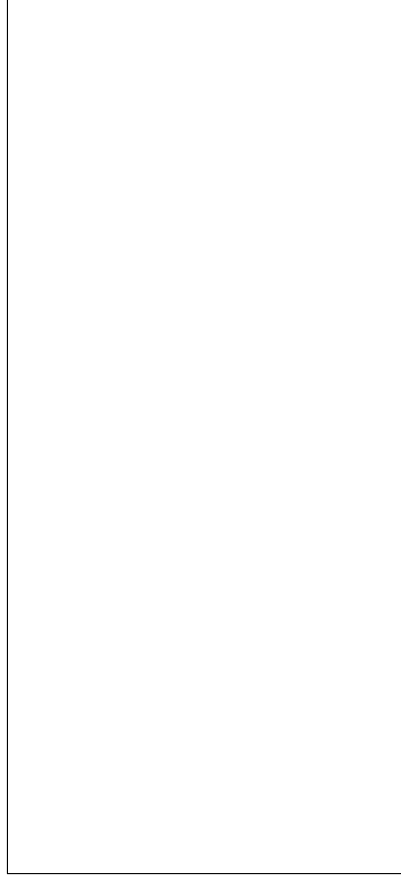
- NOTES:
1. INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 96 REQUIREMENTS.
 2. CUT AND PATCH EXISTING ROOFING AS REQUIRED FOR NEW CURB INSTALLATION.
 3. CURB SHALL BE TAPERED TYPE AND MATCH THE PITCH OF THE ROOF.
 4. CONTRACTOR TO PROVIDE TREATED WOOD BLOCKINGS AND SHIM FLAT ROOF CURB TILL LEVEL FOR ALL EXHAUST FANS AND TO ACHIEVE ROOF CURB HEIGHTS. PROVIDE ROOF CURB EXTENSION IF REQUIRED.



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HVAC SCHEDULES

SHEET:

M5.1

SPECIFICATIONS - DIVISION 23 - HVAC

GENERAL MECHANICAL REQUIREMENTS:

HVAC SUBCONTRACTOR SHALL PROVIDE AT BID TIME A BID TO PROVIDE PREVENTATIVE MAINTENANCE SERVICES FOR ONE YEAR.

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR EMPLOYEE TRAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT. PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS:
FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION.
INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE.
PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY:
PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT.

PROVIDE OPERATION MANUALS, MAINTENANCE MANUALS AND SCHEMATICS FOR ALL MECHANICAL EQUIPMENT INSTALLED.

COORDINATION:
COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS:
UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

TEMPERATURE CONTROLS:
PROVIDE PROGRAMMABLE THERMOSTATS WITH REMOTE TEMPERATURE SENSORS AND REMOTE HUMIDISTATS COMPATIBLE WITH ROOFTOP UNIT. CONTROL WIRING SHALL BE INSTALLED IN CONDUIT. THERMOSTAT SHALL MEET SETPOINT ADJUSTMENT FOR UNOCCUPIED MODE: HEATING DOWN TO 55 DEGREES AND COOLING UP TO 85 DEGREES. PROVIDE INTERLOCK CONTROL WIRING BETWEEN HOOD EXHAUST FANS AND ROOFTOP UNITS.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. SUBMITTALS:
 - 1. CERTIFIED TAB REPORTS.
- B. TAB FIRM QUALIFICATIONS: AABC NEBB OR TABB CERTIFIED.
- C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.
- D. PERFORM TAB AFTER LEAKAGE AND PRESSURE TESTS ON AIR DISTRIBUTION SYSTEMS HAVE BEEN SATISFACTORILY COMPLETED.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.
- B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.
- C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.
- D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.
- E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.
- F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.
- G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:
 - 1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.
 - 2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER.
 - 3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY OPEN POSITIONS. THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND VARIABLE-AIR-VOLUME TERMINALS.
 - 4. AUTOMATIC MODULATING AND SHUTOFF VALVES, INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED.
 - 5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.
 - 6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.
 - 7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.
 - 8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.
 - 9. INTERLOCKED SYSTEMS ARE OPERATING.
 - 10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.
- H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION.
- B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS, INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS, RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH.
- C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS "AS-BUILT" DUCT LAYOUTS.
- B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.
- C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.
- D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

- E. CHECK FOR AIRFLOW BLOCKAGES.
- F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.
- G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.
- H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

3.4 TOLERANCES

- A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:
 - 1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 10 PERCENT.
 - 2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

END OF SECTION 230593

SECTION 230700 - HVAC INSULATION

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. SURFACE-BURNING CHARACTERISTICS:

- 1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTORY LABELED DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO ASTM E 84.

2.2 INSULATION MATERIALS

- A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.
- B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE I.
 - 1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.
 - 2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C 1136.
 - C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB; AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 LB/CU. FT. OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN./H X SQ. FT. X DEG F OR LESS.
 - 1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.
 - 2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.
 - D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.
 - E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.
 - F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES; COMPLY WITH MIL-PRF-1956SC, TYPE II.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

- A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.
- B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.
- C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400.
 - D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION:
 - 1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
 - 2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INSTALL MITERED SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
 - E. MINERAL-FIBER INSULATION INSTALLATION:
 - 1. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.
 - 2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.
 - 3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.
 - 4. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS.
 - 5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER.
 - F. PLENUMS AND DUCTS REQUIRING INSULATION:
 - 1. CONCEALED SUPPLY AIR.
 - 2. CONCEALED AND EXPOSED OUTDOOR AIR.
 - 3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.

3.2 DUCT AND PLENUM INSULATION SCHEDULE

RETAIN "ONE OF" OPTION IN PARAGRAPHS IN THIS ARTICLE TO ALLOW CONTRACTOR TO SELECT PIPING MATERIALS FROM THOSE RETAINED.

- A. CONCEALED DUCT INSULATION SHALL BE 1-1/2" THICK MINERAL-FIBER BLANKET WITH A 1.5-LB/CU. FT. NOMINAL DENSITY.

3.3 HVAC PIPING INSULATION SCHEDULE

- A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.
- B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

END OF SECTION 230700

SECTION 232300 - REFRIGERANT PIPING

PART 2 - PRODUCTS

2.1 TUBES AND FITTINGS

- A. COPPER TUBE: ASTM B 88, TYPE K OR TYPE L, **ANNEALED** OR DRAWN-TEMPER TUBING AND WROUGHT-COPPER

FITTINGS WITH BRAZED OR SOLDERED JOINTS.

- B. WROUGHT-COPPER FITTINGS AND UNIONS: ASME B16.22.
- C. SOLDER FILLER METALS: ASTM B 32. USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET

FITTINGS ON COPPER PIPE.

- D. BRAZING FILLER METALS: AWS A5.8.

2.2 VALVES AND SPECIALTIES

- A. AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. INSTALL REFRIGERANT PIPING AND CHARGE WITH REFRIGERANT ACCORDING TO ASHRAE 15.
- B. INSTALL REFRIGERANT PIPING AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

END OF SECTION 232300

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

- B. STRUCTURAL PERFORMANCE: DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS DESCRIBED IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

- C. COMPLY WITH NFPA 96 FOR DUCTS CONNECTED TO COMMERCIAL KITCHEN HOODS.

2.2 DUCTS

- A. GALVANIZED-STEEL SHEET: ASTM A 653/A 653M, AND A 924 WITH G90 HOT-DIP GALVANIZED COATING.

- 1. GALVANIZED COATING DESIGNATION: G90.

- B. TYPE 1 KITCHEN EXHAUST DUCTWORK

- 1. FIELD FABRICATED RECTANGULAR KITCHEN GREASE DUCT:

- a. MINIMUM 16 GAUGE CARBON STEEL WHERE CONCEALED, AND OF MINIMUM 16 GAUGE STAINLESS STEEL WHERE EXPOSED. JOINTS AND SEAMS SHALL BE CONTINUOUSLY WELDED LIQUID TIGHT ON THE EXTERNAL SIDE OF THE DUCT SYSTEM.
- b. PROVIDE GREASE RESERVOIR AS REQUIRED BY THE REQUIREMENTS OF IMC 506.3.7.1 AND PROVIDE DUCT CLEANOUT(S) AS REQUIRED BY THE REQUIREMENTS OF IMC 506.8.3.

- c. COMPOSITE GREASE DUCT ENCLOSURE ASSEMBLIES: PROVIDE FLEXIBLE BLANKET-TYPE INSULATION COMPOSED OF FIBER BLANKET ENCAPSULATED IN AN ALUMINUM FOIL SCRIM, PROVIDING A NONCOMBUSTIBLE WRAP TO PROVIDE A VAPOR AND DUST BARRIER. DUCT WRAP SYSTEM SHALL HAVE FLAME SPREAD INDEX OF NOT MORE THAN 5 AND SMOKE DEVELOPED INDEX NOT EXCEEDING 5, WHEN TESTED PER ASTM E-84 METHOD. INSULATION AND JACKET SHALL BE RATED FOR OPERATING TEMPERATURES UP TO 2000°F. DUCT WRAP SYSTEM MUST COMPLY WITH ALL FIVE FIRE TESTS OF STANDARD ASTM E2336, GREASE DUCT ENCLOSURE SYSTEM, AND THE DUCT FIRESTOP SYSTEM SHALL BE ASTM E814 CLASSIFIED. FABRICATE DUCT WRAP ENCLOSURE WITH (2) LAYERS OF DUCT WRAP TO PROVIDE 2-HOUR FIRE RATING. PROVIDE COMPOSITE GREASE DUCT FIRE PROTECTION INSULATION FROM ONE OF THE FOLLOWING: THERMAL CERAMICS FIREMASTER FASTWRAP XL, UNIFRAX FIYERWRAP 2.0 MAX.

- C. JOINT AND SEAM TAPE, AND SEALANT: COMPLY WITH UL 181A. PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT. PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS.

- D. METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

2.3 ACCESSORIES

- A. VOLUME DAMPERS AND CONTROL DAMPERS: SINGLE-BLADE AND MULTIPLE OPPOSED-BLADE DAMPERS, STANDARD LEAKAGE RATING, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS; FACTORY FABRICATED AND COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES.

- 1. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

- 2. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM 1/4" HEXAGONAL AXLE, BOLDDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

- F. FLEXIBLE DUCT CONNECTORS: FLAME-RETARDED OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1. CONNECTOR TO BE 30 OUNCE, NEOPRENE COATED, FIBERGLASS FABRIC.

- C. FLEXIBLE DUCTS: FACTORY ASSEMBLED, UL 181, CLASS 1, WITH 1-1/2-INCH THICK (R-5 MIN.), 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2-INCH WG PRESSURE AND 0 TO 250°F TEMPERATURE. PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.

- D. TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

- E. BIRD SCREENS AND FRAMES: PROVIDE BIRD SCREENS THAT CONFORM TO ASTM E 2016, NO. 2 MESH, ALUMINUM OR STAINLESS STEEL. PROVIDE "MEDIUM-LIGHT" RATED ALUMINUM SCREENS. PROVIDE "LIGHT" RATES STAINLESS STEEL SCREENS.

- F. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 2-10, "DUCT ACCESS DOORS AND PANELS," AND 2-11, "ACCESS PANELS - ROUND DUCT."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. INSTALL DUCTWORK, ACCESSORIES, AND SUPPORTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.

- B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL CLASS A.

- C. CONCEAL DUCTS FROM VIEW IN FINISHED AND OCCUPIED SPACES.

- D. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

- E. CLEAN DUCT SYSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING.

3.2 TESTING, ADJUSTING, AND BALANCING

- A. BALANCE AIRFLOW WITHIN DISTRIBUTION SYSTEMS, INCLUDING SUBMAINS, BRANCHES, AND TERMINALS TO INDICATED QUANTITIES PER SPECIFICATIONS.

END OF SECTION 233100

SECTION 233423 - HVAC EXHAUST FANS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS SEAL.
- B. EXHAUST FANS SHALL COMPLY WITH UL 705, TYPE 1 FANS SHALL ALSO COMPLY WITH UL 762.

- C. TYPE 1 FANS TO BE DESIGNED FOR HIGH HEAT OPERATION AT 300°F.
 - D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

2.2 CENTRIFUGAL VENTILATORS

- A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFFLE; SQUARE, ONE-PIECE, ALUMINUM BASE WITH VENTURI INLET CONE.
 - 1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISCHARGE AIR UPWARD, WITH RAIN AND SNOW DRAINS.

- B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.

- C. BELT-DRIVEN DRIVE ASSEMBLY: RESILIENTLY MOUNTED TO HOUSING.

- 1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL; KEYED TO WHEEL HUB.
- 2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTLY SEALED, SELF-ALIGNING BALL BEARINGS.
- 3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.
- 4. FAN AND MOTOR ISOLATED FROM EXHAUST AIRSTREAM.

D. ACCESSORIES:

- 1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT.
- 2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE.
- 3. DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS.
- 4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN CURB BASE WITH ELECTRIC ACTUATOR; WIRED TO CLOSE WHEN FAN STOPS.
- 5. GREASE BOX FOR TYPE 1 EXHAUST FANS.
- 6. G2 GREASE GUARD FOR TYPE 1 EXHAUST FANS.

- E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.

- 1. CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.
- 2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS; 20 INCHES FOR KITCHEN EXHAUST FANS.
- 3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.
- 4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCESS PANEL.
- 5. TYPE 1 ROOF CURBS TO BE VENTED TYPE.
- 6. TYPE 1 AND TYPE 2 ROOF CURBS TO BE HINGED TYPE.

F. CAPACITIES AND CHARACTERISTICS:

- 1. SEE SCHEDULE.

2.3 MOTORS

- A. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.

- 1. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.

- B. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.

PART 3 - EXECUTION

3.1 INSTALLATION

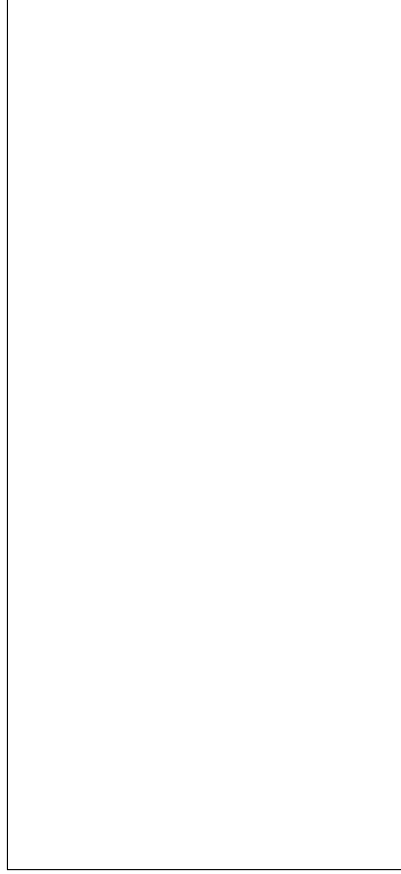
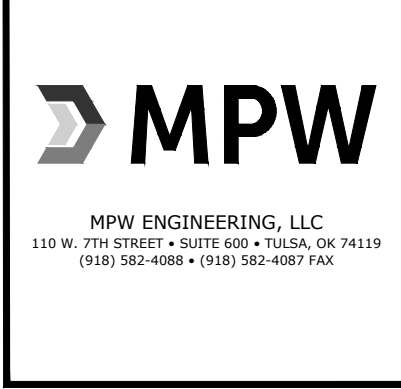
- A. INSTALL UNITS WITH CLEARANCES FOR SERVICE AND MAINTENANCE.

- B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON CURBS, AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION.

END OF SECTION 233423



CONSULTANTS



New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

PROJECT NUMBER:	
ISSUE	DATE
PRELIMINARY	12-14-2021
PERMIT	04-14-2022
REVISION	

MECHANICAL SPECIFICATIONS

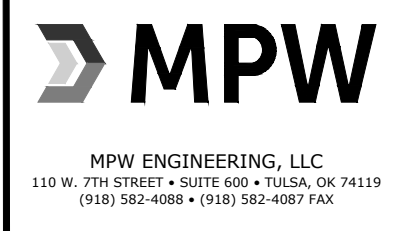
SHEET:

SPECIFICATIONS - DIVISION 23 - HVAC (CONTINUED)

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES	
PART 1 - GENERAL	
1.1 SECTION REQUIREMENTS	
A. SUBMITTALS:	
1. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED, INCLUDING COLOR CHARTS FOR FACTORY FINISHES.	
PART 2 - PRODUCTS	
2.1 DIFFUSERS, REGISTERS, AND GRILLES:	
A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUNTING.	
PART 3 - EXECUTION	
3.1 INSTALLATION	
A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.	
B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS OTHERWISE INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.	
C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.	
END OF SECTION 233713	
SECTION 237413 - PACKAGED ROOFTOP UNITS	
1.1 SUMMARY	
A. THIS SECTION INCLUDES PACKAGED, ROOFTOP UNITS WITH THE FOLLOWING COMPONENTS AND ACCESSORIES:	
1. DIRECT-EXPANSION COOLING.	
2. GAS FURNACE.	
3. ECONOMIZER OUTDOOR-AND RETURN-AIR DAMPER SECTION.	
4. INTEGRAL, SPACE TEMPERATURE CONTROLS.	
5. ROOF CURBS.	
1.2 SECTION REQUIREMENTS	
A. SUBMITTALS:	
1. PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL DATA FOR EACH RTU, INCLUDING RATED CAPACITIES, DIMENSIONS, REQUIRED CLEARANCES, CHARACTERISTICS, FURNISHED SPECIALTIES, AND ACCESSORIES.	
PART 2 - PRODUCTS	
2.1 CASING	
A. GENERAL FABRICATION REQUIREMENTS FOR CASINGS: FORMED AND REINFORCED INSULATED PANELS, FABRICATED TO ALLOW REMOVAL FOR ACCESS TO INTERNAL PARTS AND COMPONENTS, WITH JOINTS BETWEEN SECTIONS SEALED.	
B. EXTERIOR CASING MATERIAL: GALVANIZED STEEL WITH FACTORY-PAINTED FINISH, WITH PITCHED ROOF PANELS AND KNOCKOUTS WITH GROMMET SEALS FOR ELECTRICAL AND PIPING CONNECTIONS AND LIFTING LUGS.	
1. CASING THICKNESS: 1/6 GAUGE THICK.	
C. CASING INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A.	
1. MATERIALS: ASTM C 1071, TYPE I.	
2. THICKNESS: 1/2 INCH	
3. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.	
4. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.	
D. UNIT SHALL HAVE A THRU-THE-BASE GAS AND ELECTRICAL CONNECTIONS.	
2.2 FANS	
OPTION A OR B:	
A. DIRECT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, BACKWARD INCLINED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, MOTOR RESILIENTLY MOUNTED IN THE FAN INLET. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.	
B. BELT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, FORWARD CURVED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, SINGLE-SPEED MOTOR INSTALLED ON AN ADJUSTABLE FAN BASE RESILIENTLY MOUNTED IN THE CASING. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.	
C. CONDENSER-COIL FAN: DIRECT DRIVE, PROPELLER, MOUNTED ON SHAFT OF PERMANENTLY LUBRICATED MOTOR WITH THERMAL OVERLOAD PROTECTION.	
D. POWER EXHAUST: FORWARD CURVED, SHAFT MOUNTED ON PERMANENTLY LUBRICATED MOTOR.	
2.3 COILS	
A. SUPPLY-AIR REFRIGERANT COIL:	
1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.	
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.	
3. CATHODIC EPOXY COATING.	
4. CONDENSATE DRAIN PAN: GALVANIZED STEEL WITH CORROSION-RESISTANT COATING FORMED WITH PITCH AND DRAIN CONNECTIONS.	
B. OUTDOOR-AIR REFRIGERANT COIL:	
1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.	
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.	
3. CATHODIC EPOXY COATING.	
C. HOT-GAS REHEAT REFRIGERANT COIL (OPTIONAL):	
1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.	
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.	
3. CATHODIC EPOXY COATING.	
2.4 REFRIGERANT CIRCUIT COMPONENTS	
A. NUMBER OF REFRIGERANT CIRCUITS: TWO	
B. COMPRESSOR: HERMETIC, SCROLL, MOUNTED ON VIBRATION ISOLATORS; WITH INTERNAL OVERCURRENT AND HIGH-TEMPERATURE PROTECTION, INTERNAL PRESSURE RELIEF AND CRANKCASE HEATER.	
C. REFRIGERATION SPECIALTIES:	
1. REFRIGERANT: R-410A	
2. EXPANSION VALVE WITH REPLACEABLE THERMOSTATIC ELEMENT.	
3. REFRIGERANT FILTER/DRYER.	
4. MANUAL-RESET HIGH-PRESSURE SAFETY SWITCH.	
5. AUTOMATIC-RESET LOW-PRESSURE SAFETY SWITCH.	
6. MINIMUM OFF-TIME RELAY.	
7. AUTOMATIC-RESET COMPRESSOR MOTOR THERMAL OVERLOAD.	
8. BRASS SERVICE VALVES INSTALLED IN COMPRESSOR SUCTION AND LIQUID LINES.	
9. LOW-AMBIENT KIT HIGH-PRESSURE SENSOR.	
10. HOT-GAS REHEAT SOLENOID VALVE WITH A REPLACEABLE MAGNETIC COIL.	
2.5 AIR FILTRATION	
A. PROVIDE 2" THROW-AWAY FIBERGLASS FILTERS.	
2.6 GAS FURNACE	
A. BURNERS: IN-SHOT TYPE CONSTRUCTED OF ALUMINUM-COATED STEEL.	
1. FUEL: NATURAL GAS.	
2. IGNITION: DIRECT SPARK IGNITION (DSI).	
VERIFY AVAILABILITY OF HIGH-ALTITUDE FEATURE WITH MANUFACTURERS.	
3. HIGH-ALTITUDE KIT: FOR PROJECT ELEVATIONS MORE THAN 2,000 FEET ABOVE SEA LEVEL.	
8. HEAT-EXCHANGER AND DRAIN PAN: STAINLESS STEEL.	
C. INDUCED DRAFT COMBUSTION BLOWER.	
D. SAFETY CONTROLS:	
1. GAS CONTROL VALVE: TWO STAGE.	
2. GAS TRAIN: SINGLE-BODY, REGULATED, REDUNDANT, 24-V AC GAS VALVE ASSEMBLY CONTAINING PILOT SOLENOID VALVE, PILOT FILTER, PRESSURE REGULATOR, PILOT SHUTOFF, AND MANUAL SHUTOFF.	
2.7 DAMPERS	
A. OUTDOOR AND RETURN AIR MIXING DAMPERS: PARALLEL OR OPPOSED-BLADE GALVANIZED-STEEL DAMPERS MECHANICALLY FASTENED TO CADMIUM PLATED FOR GALVANIZED-STEEL OPERATING ROD IN REINFORCED CABINET. CONNECT OPERATING RODS WITH COMMON LINKAGE AND INTERCONNECT LINKAGES SO DAMPERS OPERATE SIMULTANEOUSLY.	
1. DAMPER MOTOR: MODULATING WITH ADJUSTABLE MINIMUM POSITION.	
2. RELIEF AIR DAMPER: GRAVITY ACTUATED, WITH BIRD SCREEN AND HOOD.	
2.8 ELECTRICAL POWER CONNECTION	
A. PROVIDE FOR SINGLE CONNECTION OF POWER TO UNIT WITH UNIT-MOUNTED DISCONNECT SWITCH ACCESSIBLE FROM OUTSIDE UNIT AND CONTROL-CIRCUIT TRANSFORMER WITH BUILT-IN OVERCURRENT PROTECTION.	
2.9 CONTROLS	
A. BASIC UNIT CONTROLS:	
1. CONTROL-VOLTAGE TRANSFORMER.	
2. WALL-MOUNTED THERMOSTAT OR SENSOR WITH THE FOLLOWING FEATURES:	
a. HEAT-COOL-OFF SWITCH.	
b. FAN ON-AUTO SWITCH.	
c. FAN-SPEED SWITCH.	
d. AUTOMATIC CHANGEOVER.	
e. ADJUSTABLE DEADBAND.	
f. EXPOSED SET POINT.	
g. EXPOSED INDICATION.	
h. DEGREE F INDICATION.	
i. UNOCCUPIED-PERIOD-OVERRIDE PUSH BUTTON.	
j. DATA ENTRY AND ACCESS PORT TO INPUT TEMPERATURE AND HUMIDITY SET POINTS, OCCUPIED AND UNOCCUPIED PERIODS, AND OUTPUT ROOM TEMPERATURE AND HUMIDITY, SUPPLY-AIR TEMPERATURE, OPERATING MODE, AND STATUS.	
3. WALL-MOUNTED HUMIDISTAT OR SENSOR WITH THE FOLLOWING FEATURES:	
a. EXPOSED SET POINT.	
b. EXPOSED INDICATION.	
4. REMOTE WALL-MOUNTED ANNUNCIATOR PANEL WITH KEYED ACCESS FOR EACH UNIT:	
a. LIGHTS TO INDICATE POWER ON, UNIT ALARM OR FAILURE, SMOKE DETECTION.	
B. DDC CONTROLLER:	
1. CONTROLLER SHALL HAVE VOLATILE-MEMORY BACKUP.	
2. SAFETY CONTROL OPERATION:	
a. SMOKE DETECTORS: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SMOKE IS DETECTED, PROVIDE ADDITIONAL CONTACTS FOR ALARM INTERFACE TO FIRE ALARM CONTROL PANEL.	
b. FIRE ALARM CONTROL PANEL INTERFACE WHERE APPLICABLE.	
c. LOW-DISCHARGE TEMPERATURE: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SUPPLY AIR TEMPERATURE IS LESS THAN 40°F.	
RETAIN FIRST SUBPARAGRAPH BELOW FOR AIR-TO-AIR HEAT-PUMP FEATURE.	
d. DEFROST CONTROL FOR CONDENSER COIL: PRESSURE DIFFERENTIAL SWITCH TO INITIATE DEFROST SEQUENCE.	
3. UNIT SHALL BE CAPABLE OF DIRECT COMMUNICATION WITH GENERIC OPEN PROTOCOL SUCH AS BACNET MS/TP, LONTALK, OR MODUS. THIS WILL ALLOW THE UNIT TO INTEGRATE WITH A FACILITY ENERGY MANAGEMENT SYSTEM.	
4. SCHEDULED OPERATION: OCCUPIED AND UNOCCUPIED PERIODS ON SEVEN-DAY CLOCK WITH A MINIMUM OF FOUR PROGRAMMABLE PERIODS PER DAY.	
5. UNOCCUPIED PERIOD:	
a. HEATING SETBACK: 10°F.	
b. COOLING SETBACK: SYSTEM OFF.	
c. OVERRIDE OPERATION: TWO HOURS.	
6. SUPPLY FAN OPERATION:	
a. OCCUPIED PERIODS: RUN FAN CONTINUOUSLY.	
b. UNOCCUPIED PERIODS: CYCLE FAN TO MAINTAIN SETBACK TEMPERATURE.	
7. REFRIGERANT CIRCUIT OPERATION:	
a. OCCUPIED PERIODS: CYCLE OR STAGE COMPRESSORS, AND OPERATE HOT-GAS BYPASS TO MATCH COMPRESSOR OUTPUT TO COOLING LOAD TO MAINTAIN ROOM TEMPERATURE AND HUMIDITY. CYCLE CONDENSER FANS TO MAINTAIN MAXIMUM HOT-GAS PRESSURE. OPERATE LOW-AMBIENT CONTROL KIT TO MAINTAIN MINIMUM HOT-GAS PRESSURE.	
b. UNOCCUPIED PERIODS: CYCLE COMPRESSORS AND CONDENSER FANS FOR HEATING TO MAINTAIN SETBACK TEMPERATURE.	
8. HOT-GAS REHEAT-COIL OPERATION (OPTIONAL):	
a. OCCUPIED PERIODS: HUMIDISTAT OPENS HOT-GAS VALVE TO PROVIDE HOT-GAS REHEAT, AND CYCLES	
COMPRESSOR.	
b. UNOCCUPIED PERIODS: REHEAT NOT REQUIRED.	
9. GAS FURNACE OPERATION:	
a. OCCUPIED PERIODS: STAGE BURNER TO MAINTAIN ROOM TEMPERATURE.	
b. UNOCCUPIED PERIODS: CYCLE BURNER TO MAINTAIN SETBACK TEMPERATURE.	
10. FIXED MINIMUM OUTDOOR-AIR DAMPER OPERATION:	
a. OCCUPIED PERIODS: OPEN TO 25 PERCENT.	
b. UNOCCUPIED PERIODS: CLOSE THE OUTDOOR-AIR DAMPER.	
11. ECONOMIZER OUTDOOR-AIR DAMPER OPERATION:	
a. OCCUPIED PERIODS: OPEN TO 25 PERCENT FIXED MINIMUM INTAKE, AND MAXIMUM 100 PERCENT OF THE FAN CAPACITY TO COMPLY WITH ASHRAE CYCLE II. CONTROLLER SHALL PERMIT AIR-SIDE ECONOMIZER OPERATION WHEN OUTDOOR AIR IS LESS THAN 60 ° F. USE MIXED-AIR TEMPERATURE AND SELECT BETWEEN OUTDOOR-AIR AND RETURN-AIR ENTHALPY TO ADJUST MIXING DAMPERS DURING ECONOMIZER CYCLE OPERATION. LOCK OUT COOLING.	
b. UNOCCUPIED PERIODS: CLOSE OUTDOOR-AIR DAMPER AND OPEN RETURN-AIR DAMPER.	
2.10 ACCESSORIES	
A. DUPLEX, 115-V, GROUND-FAULT-INTERRUPTER OUTLET WITH 15-A OVERCURRENT PROTECTION. INCLUDE TRANSFORMER IF REQUIRED.	
B. LOW-AMBIENT KIT STAGED DOWN TO 0°F.	
C. FILTER DIFFERENTIAL PRESSURE SWITCH WITH SENSOR TUBING ON EITHER SIDE OF FILTER. SET FOR FINAL FILTER PRESSURE LOSS.	
D. HAIL GUARDS OF GALVANIZED STEEL, PAINTED TO MATCH CASING.	
E. DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR STREAM. CAPABLE OF SHUTTING DOWN THE UNIT IN THE PRESENCE OF SMOKE DETECTION.	
2.11 ROOF CURBS	
A. MATERIALS: GALVANIZED STEEL WITH CORROSION-PROTECTION COATING, WATERTIGHT GASKETS, AND FACTORY-INSTALLED WOOD NAILED; COMPLYING WITH NRCA STANDARDS.	
1. CURB INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B.	
a. MATERIALS: ASTM C 1071, TYPE I OR II.	
b. THICKNESS: 1-1/2 INCHES.	
2. APPLICATION: FACTORY APPLIED WITH ADHESIVE AND MECHANICAL FASTENERS TO THE INTERNAL SURFACE OF CURB.	
a. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.	
b. MECHANICAL FASTENERS: GALVANIZED STEEL, SUITABLE FOR ADHESIVE ATTACHMENT, MECHANICAL ATTACHMENT, OR WELDING ATTACHMENT TO DUCT WITHOUT DAMAGING LINER WHEN APPLIED AS RECOMMENDED BY MANUFACTURER AND WITHOUT CAUSING LEAKAGE IN CABINET.	
c. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.	
d. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.	
B. CURB HEIGHT: 14 INCHES TYPICAL. PROVIDE 24 INCH CURB IN AREAS WITH EXPECTED HEAVY SNOWFALL.	
PART 3 - EXECUTION	
3.1 EXAMINATION	
A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF RTUS.	
B. EXAMINE ROUGHING-IN FOR RTUS TO VERIFY ACTUAL LOCATIONS OF PIPING AND DUCT CONNECTIONS BEFORE EQUIPMENT INSTALLATION.	
C. EXAMINE ROOFS FOR SUITABLE CONDITIONS WHERE RTUS WILL BE INSTALLED.	
D. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.	
3.2 INSTALLATION	
A. ROOF CURB: INSTALL ON ROOF STRUCTURE, LEVEL AND SECURE. INSTALL RTUS ON CURBS AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION. RTUS TO UPPER CURB RAIL, AND SECURE CURB BASE TO ROOF FRAMING OR CONCRETE BASE WITH ANCHOR BOLTS.	
3.3 CONNECTIONS	
A. THE FOLLOWING ARE SPECIFIC CONNECTION REQUIREMENTS:	
1. INSTALL DUCTS TO TERMINATION AT TOP OF ROOF CURB.	
2. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB.	
3.4 COORDINATION	
A. CONTRACTOR TO COORDINATE WITH KITCHEN EQUIPMENT SUPPLIER TO ENSURE THAT THE RTUS ARE COORDINATED WITH THE KITCHEN EQUIPMENT, PARTICULARLY THE EXHAUST HOODS AND THE MAKE-UP AIR UNIT, TO PROPERLY PRESSURIZE THE BUILDING/SPACE.	
B. CONTRACTOR TO ENSURE THAT ALL THERMOSTATS AND SENSORS ARE COMPATIBLE WITH THE RTU CONTROLS.	
3.5 FIELD QUALITY CONTROL	
A. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.	
B. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.	
1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING. REPORT RESULTS IN WRITING.	
C. TESTS AND INSPECTIONS:	
1. AFTER INSTALLING RTUS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.	
2. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.	
3. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.	
D. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.	
3.6 STARTUP SERVICE	
A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE.	
B. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND DO THE FOLLOWING:	
1. INSPECT FOR VISIBLE DAMAGE TO UNIT CASING, FURNACE COMBUSTION CHAMBER, COMPRESSOR, COILS, AND FANS.	
2. VERIFY THAT LABELS ARE CLEARLY VISIBLE. CLEARANCES HAVE BEEN PROVIDED FOR SERVICING. CONTROLS ARE CONNECTED AND OPERABLE, AND FILTERS ARE INSTALLED.	
3. CLEAN CONDENSER COIL AND FURNACE AND INSPECT FOR CONSTRUCTION DEBRIS.	
4. REMOVE PACKING FROM VIBRATION ISOLATORS.	
5. VERIFY LUBRICATION ON FAN AND MOTOR BEARINGS.	
6. INSPECT FAN-WHEEL ROTATION FOR MOVEMENT IN CORRECT DIRECTION WITHOUT VIBRATION AND BINDING.	
7. ADJUST FAN BELTS TO PROPER ALIGNMENT AND TENSION.	
8. START UNIT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.	
a. INSPECT AND RECORD PERFORMANCE OF INTERLOCKS AND PROTECTIVE DEVICES; VERIFY SEQUENCES.	
10. OPERATE UNIT FOR AN INITIAL PERIOD AS RECOMMENDED OR REQUIRED BY MANUFACTURER.	
11. PERFORM THE FOLLOWING OPERATIONS FOR BOTH MINIMUM AND MAXIMUM FIRING. ADJUST BURNER FOR PEAK EFFICIENCY.	
a. MEASURE GAS PRESSURE ON MANIFOLD.	
b. INSPECT OPERATION OF POWER VENTS.	
c. MEASURE SUPPLY-AIR TEMPERATURE AND VOLUME WHEN BURNER IS AT MAXIMUM FIRING RATE AND WHEN BURNER IS OFF. CALCULATE USEFUL HEAT TO SUPPLY AIR.	
20. ADJUST AND INSPECT HIGH-TEMPERATURE LIMITS.	
21. INSPECT OUTDOOR-AIR DAMPERS FOR PROPER STROKE AND INTERLOCK WITH RETURN-AIR DAMPERS.	
22. INSPECT CONTROLS FOR CORRECT SEQUENCING OF HEATING, MIXING DAMPERS, REFRIGERATION, AND NORMAL AND EMERGENCY SHUTDOWN.	
23. SIMULATE MAXIMUM COOLING DEMAND AND INSPECT THE FOLLOWING:	
a. COMPRESSOR REFRIGERANT SUCTION AND HOT-GAS PRESSURES.	
b. SHORT CIRCUITING OF AIR THROUGH CONDENSER COIL OR FROM CONDENSER FANS TO OUTDOOR-AIR INTAKE.	
27. VERIFY OPERATION OF REMOTE PANEL INCLUDING PILOT-LIGHT OPERATION AND FAILURE MODES. INSPECT THE FOLLOWING:	
a. HIGH-TEMPERATURE LIMIT ON GAS-FIRED HEAT EXCHANGER.	
b. LOW-TEMPERATURE SAFETY OPERATION.	
c. FILTER HIGH-PRESSURE DIFFERENTIAL ALARM.	
d. ECONOMIZER TO MINIMUM OUTDOOR-AIR CHANGEOVER.	
e. RELIEF-AIR FAN OPERATION.	
f. SMOKE ALARMS.	
28. AFTER STARTUP AND PERFORMANCE TESTING AND PRIOR TO SUBSTANTIAL COMPLETION, REPLACE EXISTING FILTERS WITH NEW FILTERS.	
3.7 CLEANING AND ADJUSTING	
A. OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO SITE DURING OTHER-THAN-NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.	
B. AFTER COMPLETING SYSTEM INSTALLATION AND TESTING, ADJUSTING, AND BALANCING RTU AND AIR-DISTRIBUTION SYSTEMS, CLEAN FILTER HOUSINGS AND INSTALL NEW FILTERS.	



CONSULTANTS



New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

PROJECT NUMBER:	
ISSUE	DATE
PRELIMINARY	12-14-2021
PERMIT	04-14-2022
REVISION	

MECHANICAL SPECIFICATIONS

SHEET:

FOR QUESTIONS, CALL THE
Tulsa Office
REGION 80
PHONE: (918) 258-0291
EMAIL: reg80@captiveaire.com

PATENT NUMBERS

EXHAUST HOODS ND-2/BD-2/SND-2 (CANADA) - CA PATENT 2520435 C.

HOOD INFORMATION — JOB#5428138

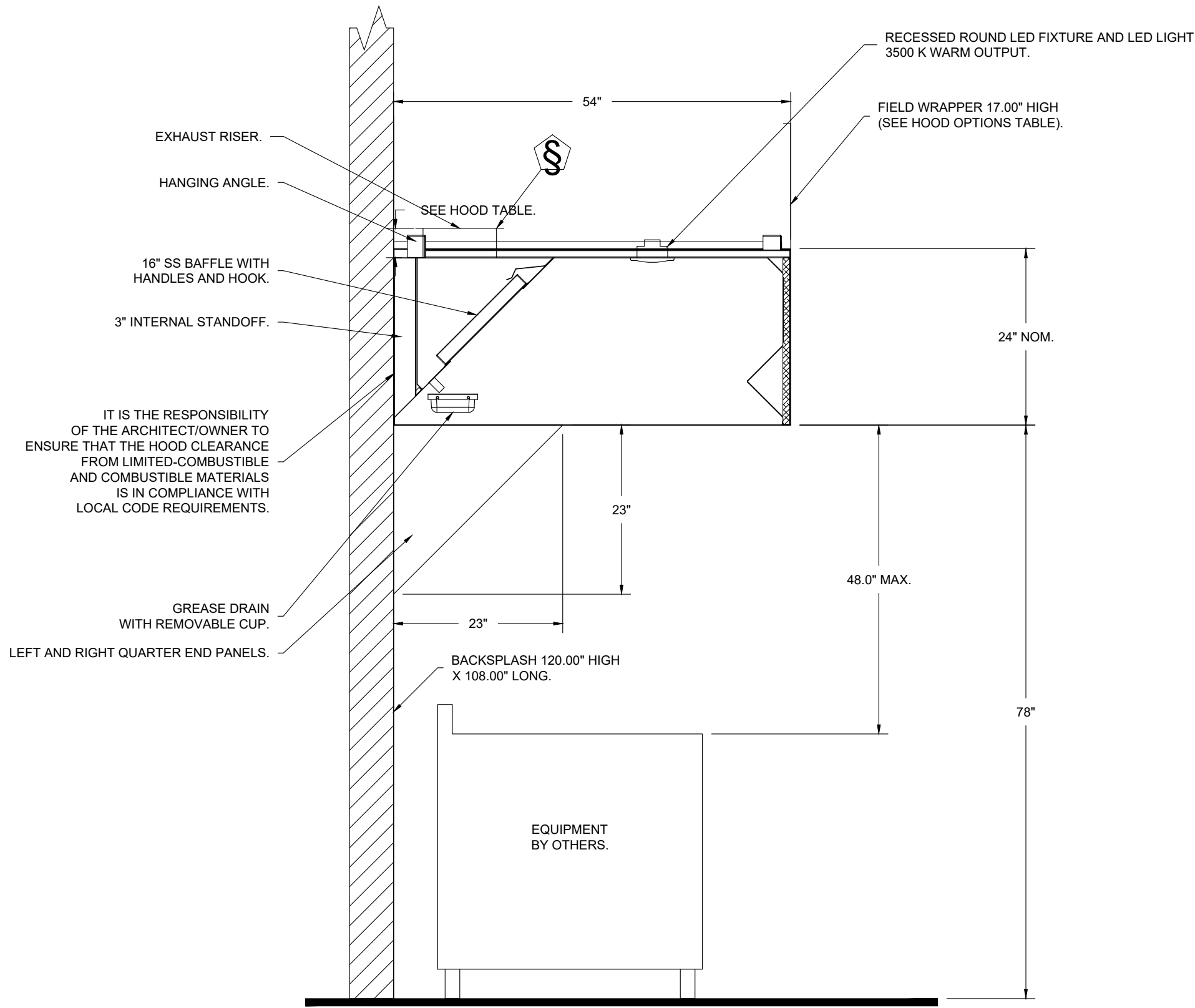
HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)						HOOD CONSTRUCTION	HOOD CONFIG		
										WIDTH	LENG	HEIGHT	DIA	CFM	VEL		SP	END TO END	ROW
1	KH-1	5424 ND-2	CAPTIVEAIRE	5' 0"	450 DEG	I	MEDIUM	200	1000			4"	10"	1000	1833	-0.363"	430 SS WHERE EXPOSED	ALONE	ALONE

HOOD INFORMATION

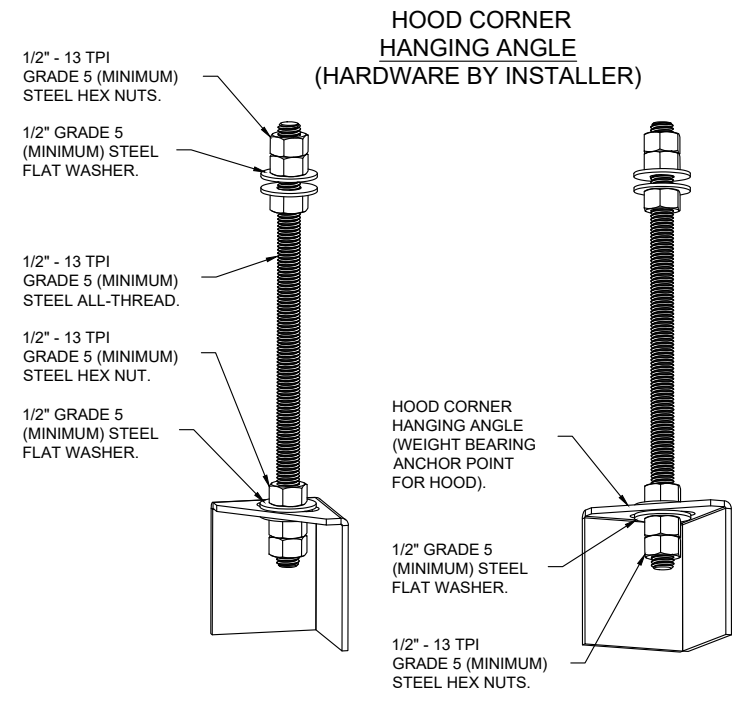
HOOD NO	TAG	FILTER(S)					LIGHT(S)					UTILITY CABINET(S)					FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
		TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	AVERAGE FOOT CANDLES @ 36" AFF	LOCATION	SIZE	TYPE	SIZE	MODEL #	SWITCHES QUANTITY		
1	KH-1	SS BAFFLE WITH HANDLES	3	16"	16"	30%	3	RECESSED ROUND	NO	54	LEFT	12"x54"x24"	TANK FS	4.0	DCV-1011	1 LIGHT 1 FAN	YES	511 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	KH-1	FIELD WRAPPER 17.00" HIGH FRONT, LEFT, RIGHT.
		BACKSPLASH 120.00" HIGH X 108.00" LONG 430 SS VERTICAL.
		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.
		SENSOR-CV.

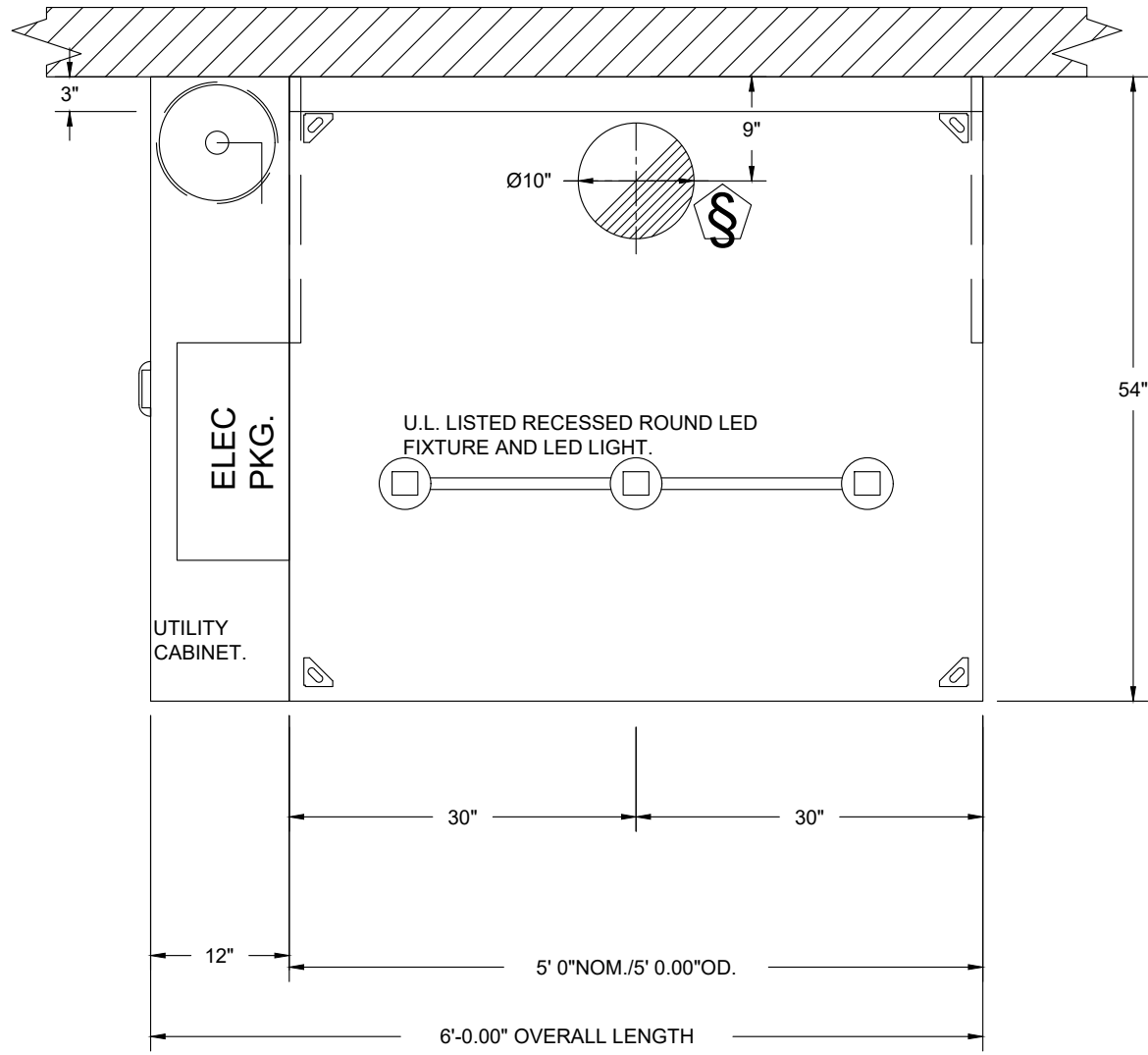


SECTION VIEW — MODEL 5424ND-2
HOOD — #1 (KH-1)



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.



PLAN VIEW — HOOD #1 (KH-1)
5' 0.00" LONG 5424ND-2

GREASE DUCT & CHIMNEY SPECIFICATIONS:
PROVIDE GREASE DUCT EQUAL TO CAPTIVEAIRE SYSTEMS MODEL "DW" ROUND 20 GAUGE 430 STAINLESS STEEL DUCTWORK. MODEL "DW" IS LISTED TO UL-1978 AND IS INSTALLED USING "V" CLAMP LOCKING CONNECTIONS SEALED WITH 3M FIRE BARRIER 2000 PLUS. MODEL "DW" DOES NOT REQUIRE WELDING PROVIDING IT HAS BEEN INSTALLED PER THE MANUFACTURES INSTALLATION GUIDE.
PROVIDE RATED ACCESS DOORS AT EVERY CHANGE IN DIRECTION AND EVERY 12' ON CENTER. PER MANUFACTURES LISTING MODEL "DW" HORIZONTAL RUNS LESS THAN 75 FT. CAN BE SLOPED 1/16" PER 12", HORIZONTAL RUNS MORE THAN 75 FT. CAN BE SLOPED 3/16" PER 12".
DUCT SHOULD BE SLOPED AS MUCH AS POSSIBLE TO REDUCE THE CHANCE OF GREASE ACCUMULATION IN HORIZONTAL RUNS.

IF THE DUCT OR CHIMNEY IS WITHIN 18 INCHES OF COMBUSTIBLE MATERIAL, PROVIDE UL-2221 OR UL-103 HT LISTED DOUBLE WALL GREASE DUCT OR DOUBLE WALL CHIMNEY EQUAL TO CAPTIVEAIRE SYSTEMS MODEL "DW- 2R, 2R TYPE HT, 3R, OR 3Z" ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL.

CAPTIVEAIRE SYSTEMS RECOMMENDS THE USE OF LISTED, PRE-FABRICATED ROUND GREASE EXHAUST DUCT TO REDUCE STATIC PRESSURE IN THE SYSTEM, MINIMIZE INSTALLATION AND INSPECTION TIMES, AND ENSURE DUCT IS LIQUID TIGHT

VERIFY CEILING HEIGHT

___' - ___"

HEIGHT REQUIRED TO VERIFY THAT HOOD FITS SPACE AND TO SIZE THE ENCLOSURE PANELS

HVAC DISTRIBUTION NOTE

HIGH VELOCITY DIFFUSERS OR HVAC RETURNS SHOULD NOT BE PLACED WITHIN TEN (10) FEET OF THE EXHAUST HOOD. PERFORATED DIFFUSERS ARE RECOMMENDED.

REVISIONS

DESCRIPTION	DATE
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DATE: 4/13/2022

DWG.#: 5428138

DRAWN BY: RJH-80

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

MASTER DRAWING

SHEET NO. 1

Arby's - Morrilton, AR
MORRILTON, AR, 72110



CONSULTANTS

MPW

MPW ENGINEERING, LLC
110 W. 7TH STREET • SUITE 400 • TULSA, OK 74119
(918) 582-4088 • (918) 582-4087 FAX



New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

PROJECT NUMBER:	
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CAPTIVEAIRE DRAWING

SHEET:

H1.1

FIRE SYSTEM INFORMATION – JOB#5428138

FIRE SYSTEM NO	TAG	TYPE	SIZE	FLOW POINTS	INSTALLATION	
					SYSTEM	LOCATION ON HOOD
1	KH1	TANK FS	4.0	18	FIRE CABINET LEFT	LEFT, HOOD 1

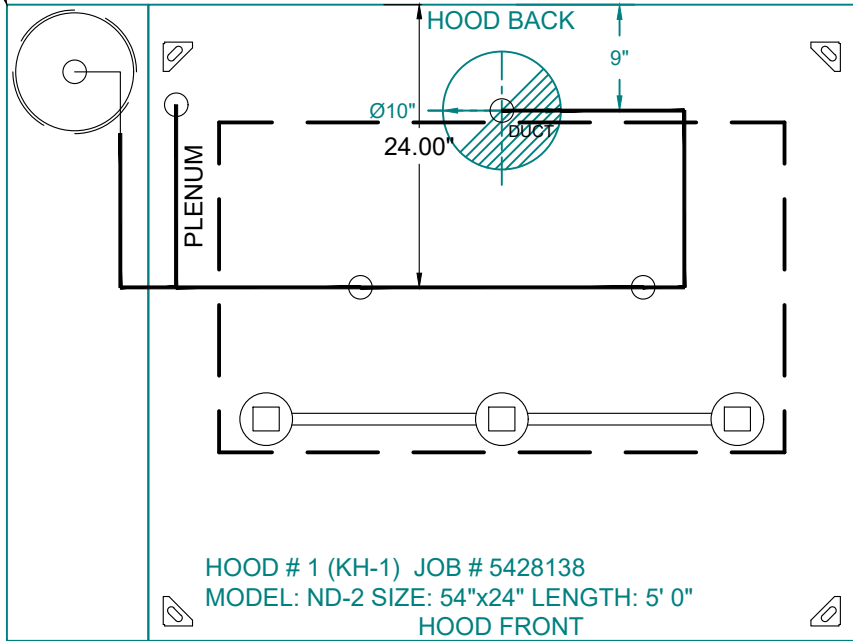
GAS VALVE(S)

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1	KH1	SC ELECTRICAL	1.500	CAPTIVEAIRE SYSTEMS

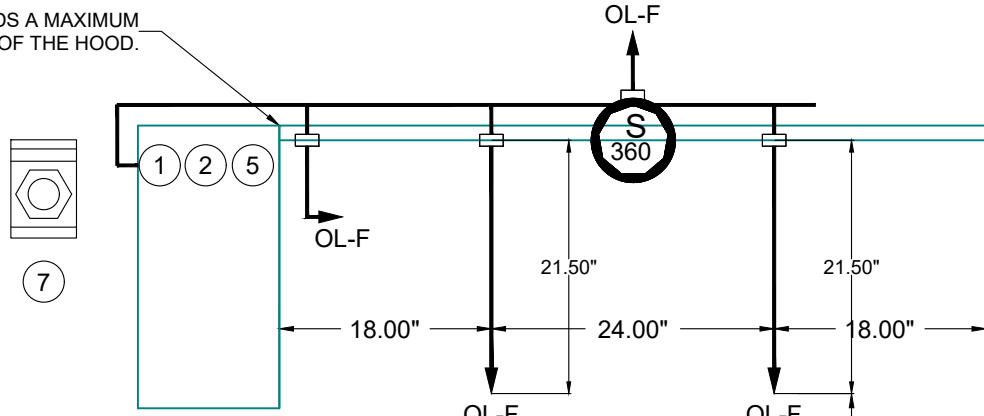
FIRE SYSTEM PARTS LIST KEY

FIRE SYSTEM NO	TAG	KEY NUMBER - PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST
1	KH1	0 - 0 - 12-F28021-32144-OT-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO. CLOSE ON TEMP RISE AT 360°F.	1	0
		0 - 0 - 87-300001-001 TANK - PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	1	0
		0 - 0 - 87-300030-001 PRIMARY ACTUATOR KIT (PAK) - ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0
		0 - 0 - 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	4	0
		0 - 0 - 9055455PC PRO PRESS 1/2 PRESS X PRESS 90 ELBOW LD.	4	0
		0 - 0 - 9097200PC PRO PRESS PC611 1/2 PRESS TEE LD.	3	0
		0 - 0 - 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	2	0
		0 - 0 - A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0
		0 - 0 - BI145 3/8" BLACK IRON 90 ELL.	2	0
		0 - 0 - DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	1	0
		0 - 0 - TANK STRAP TANK STRAP - USED FOR TANK FIRE SUPPRESSION.	3	0
		0 - 0 - TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	1	0
		0 - 0 - WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	1	0
		16 - 16 - 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	4	0
		16 - 16 - OL-F NOZZLE - TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE)- 4 FLOW POINTS.	4	0
		26 - 26 - QSA-3/8 QUIK SEAL - 3/8" (UL).	4	0
		34 - 34 - A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0

- 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



FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.



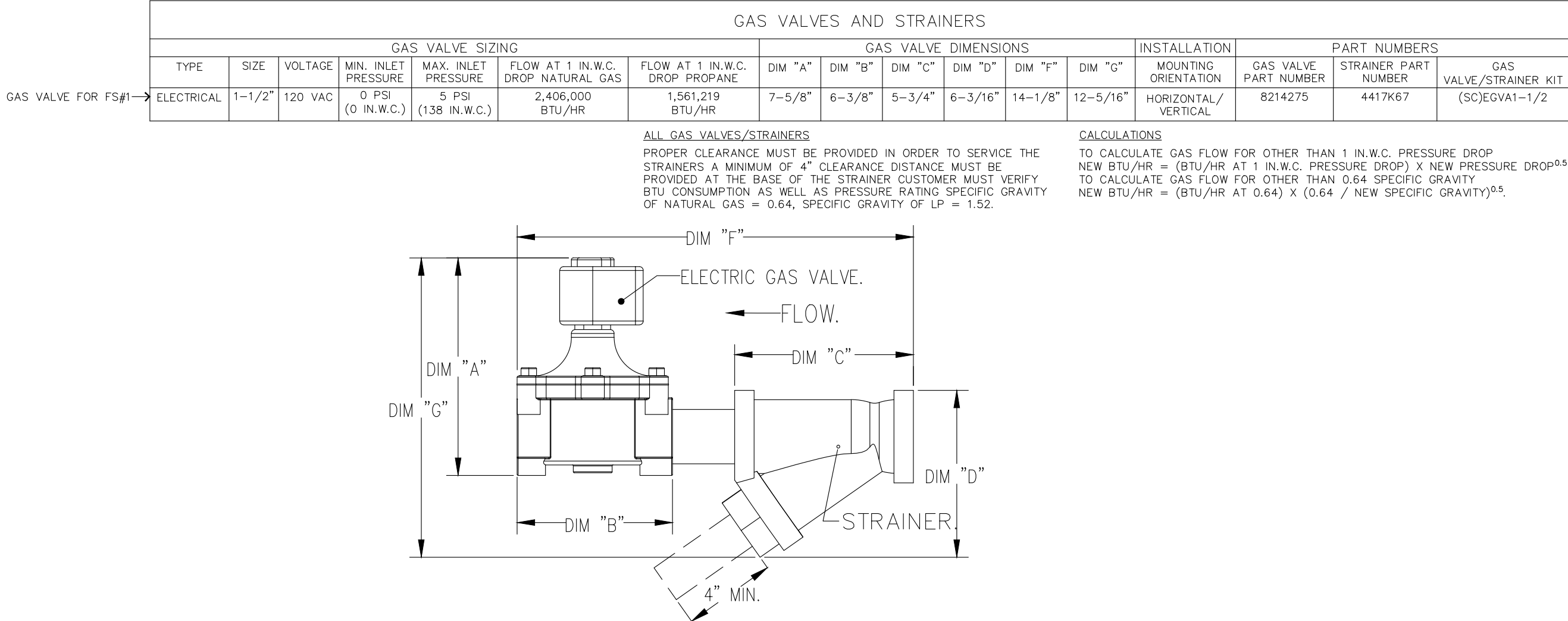
NOZZLE HEIGHT 35-50" FROM COOKING SURFACE. (43.25")

TANK OVERLAPPING PROTECTION 1-30' L PROXIMITY 48.00' L X 28.00' D

NOTES

- FIELD PIPE DROPS AS SHOWN SLEEVING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- MAXIMUM 9 ELBOWS IN SUPPLY LINE.
- MINIMUM 72 INCHES OF AGENT LINE FROM TANK TO FIRST NOZZLE COVERING A RANGE, FRYER, OR WOK TO REFLECT GENERAL PIPING REQUIREMENTS.
- IF APPLICABLE, PRE-PIPED CHARBROILER 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.



NOTES

- FIELD PIPE DROPS AS SHOWN PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

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

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

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

JOB #: 5428138.
JOB NAME: ARBY'S - MORRILTON, AR.

SYSTEM SIZE: TANK-SP-1 TOTAL FP REQUIRED: 18.
HOOD # 1 5' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 10" DIA.
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.

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

LEGEND – FIRE CABINET TANK SYSTEM

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

JOB #: 5428138.
JOB NAME: ARBY'S - MORRILTON, AR.

SYSTEM SIZE: TANK-SP-1 TOTAL FP REQUIRED: 18.
HOOD # 1 5' 0.00" LONG x 54" WIDE x 24" HIGH.
RISER # 1 SIZE: 0" x 0".

REVISIONS

DESCRIPTION	DATE:
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Tulsa Office

12101 East 51st Street, Suite 101A, Tulsa, OK 74146 PHONE: (918) 258-0291 FAX: (918) 227-6947 EMAIL: reg80@captiveaire.com

Arby's - Morrilton, AR
MORRILTON, AR, 72110

DATE: 4/13/2022

DWG.#: 5428138

DRAWN BY: RJH-80

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

MASTER DRAWING

SHEET NO. 2

CONSULTANTS

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(918) 582-4088 • (918) 582-4087 FAX

New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

PROJECT NUMBER:

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REVISION	

CAPTIVEAIRE DRAWING

SHEET:

H1.2

EXHAUST FAN INFORMATION – JOB#5428138

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	EF-1	1	DU50HFA	CAPTIVEAIRE	1000	0.750	1370	TEAO-ECM	0.500	0.2630	1	115	6.3	380 FPM	77	13.4
2	EF-2 (RESTROOM)	1	DR12HFA	CAPTIVEAIRE	300	0.250	1003	TEAO-ECM	0.250	0.0440	1	115	2.9		49	4.1

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	EF-1	1	GREASE BOX
		1	ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION
		1	2 YEAR PARTS WARRANTY
2	EF-2 (RESTROOM)	1	1 12-BDD DAMPER
		1	ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION
		1	2 YEAR PARTS WARRANTY

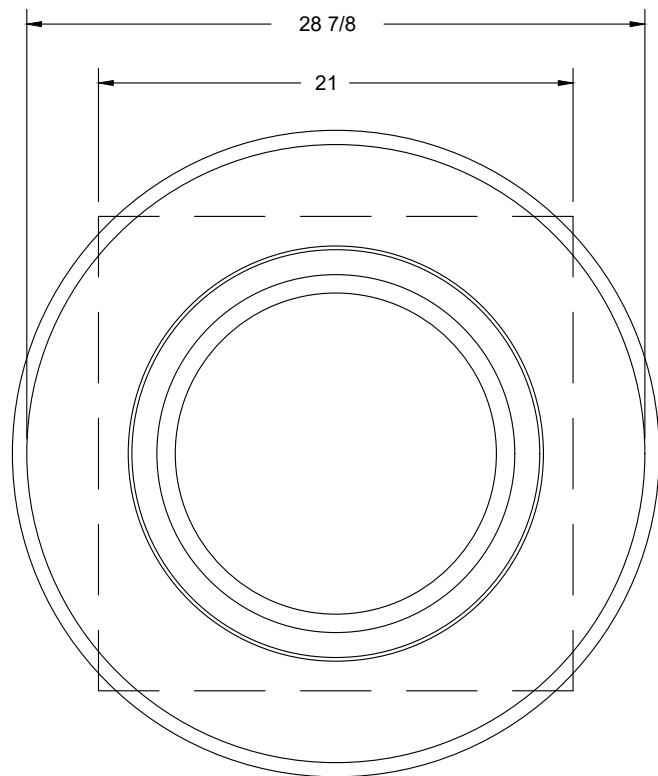
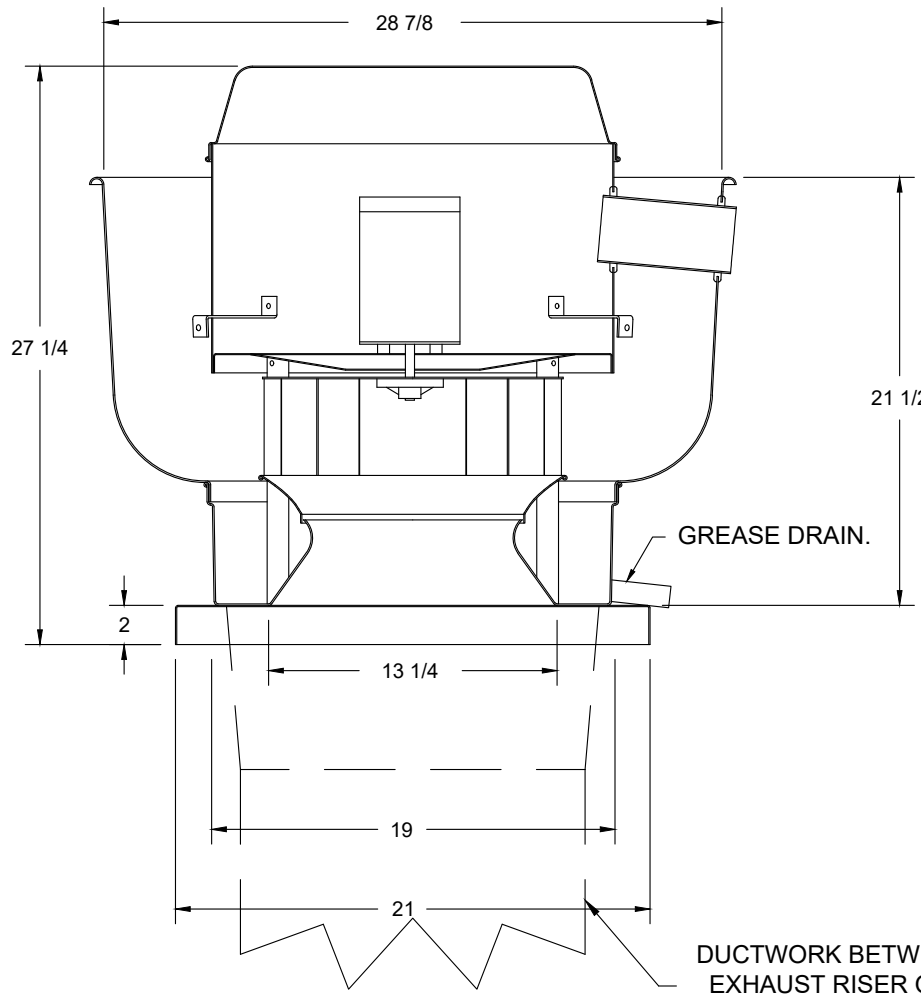
FAN ACCESSORIES

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

CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	EF-1	38 LBS	CURB	19.500"W X 19.500"L X 26.000"H 0.250:12.000 PITCH ALONG LENGTH, RIGHT VENTED HINGED.
2	# 2	EF-2 (RESTROOM)	22 LBS	CURB	17.500"W X 17.500"L X 18.000"H 0.250:12.000 PITCH ALONG LENGTH, RIGHT.

FAN #1 DU50HFA - EXHAUST FAN (EF-1)



TOP VIEW

FEATURES:

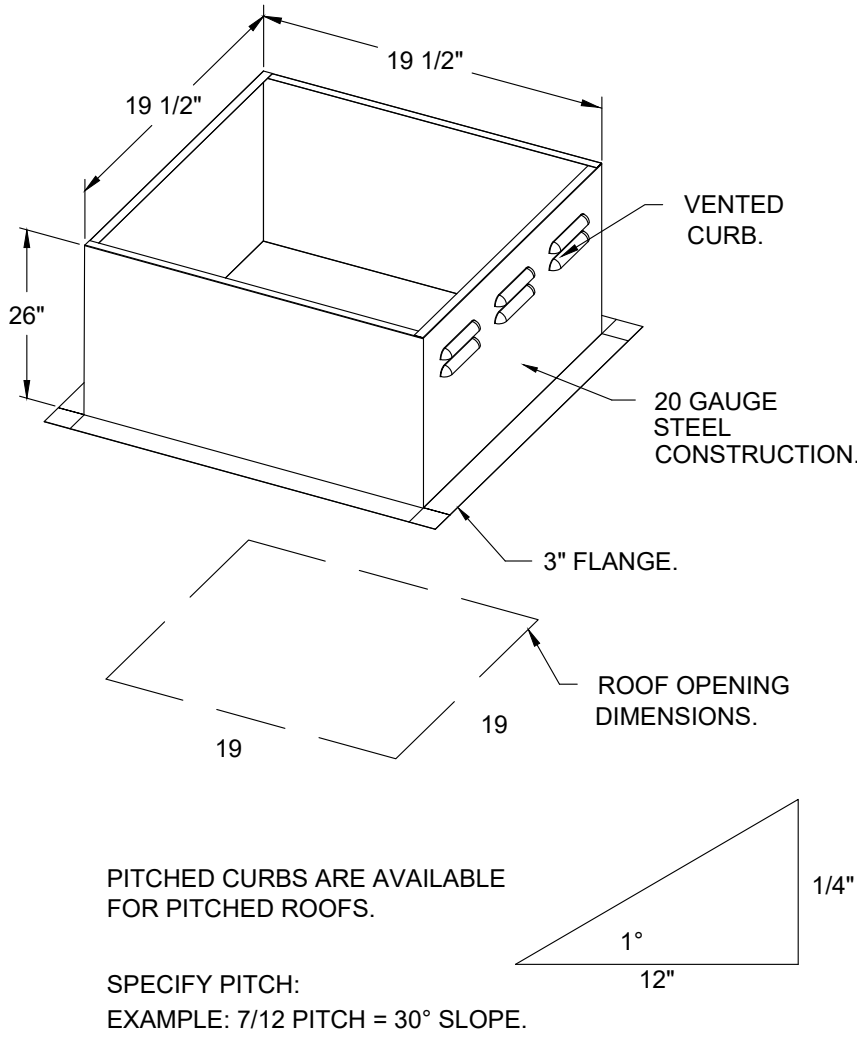
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT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

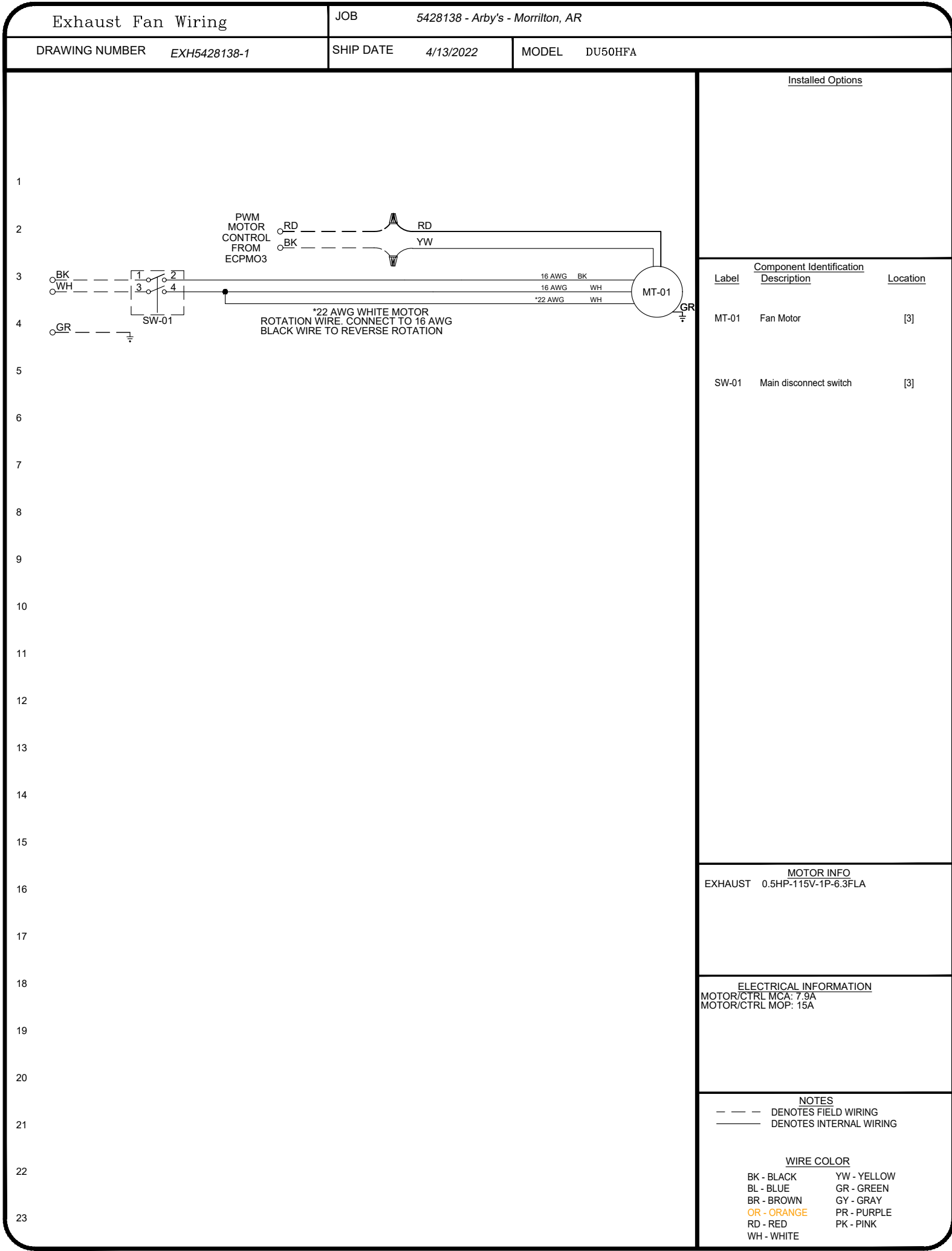
OPTIONS

- GREASE BOX.
- ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
- 2 YEAR PARTS WARRANTY.



PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.



Arby's - Morrilton, AR

MORRILTON, AR, 72110

DATE: 4/13/2022

DWG.#:
5428138

DRAWN BY:
RJH-80

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

MASTER DRAWING

SHEET NO.

3

REVISIONS

DESCRIPTION	DATE:
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New Restaurant Conversion For:
Arby's - 1808 East Harding Street
Morrilton, Arkansas

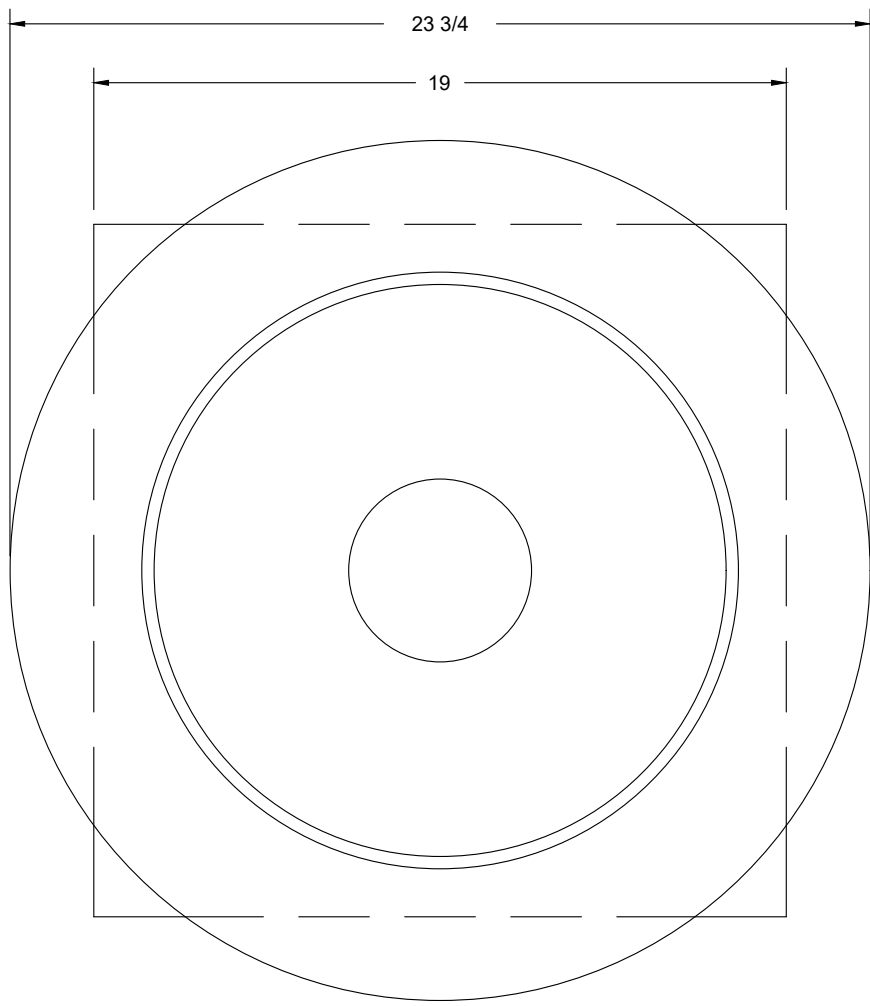
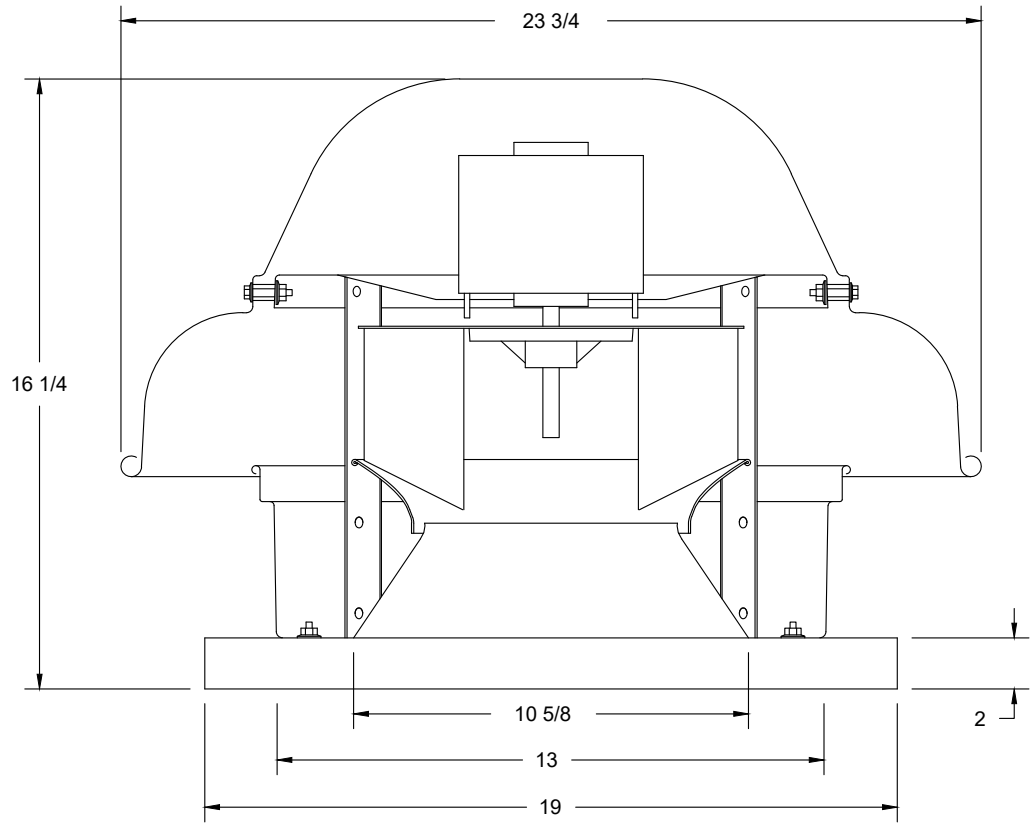
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REVISION	

CAPTIVEAIRE DRAWING

SHEET:

H1.3

FAN #2 DR12HFA - EXHAUST FAN (EF-2 (RESTROOM))



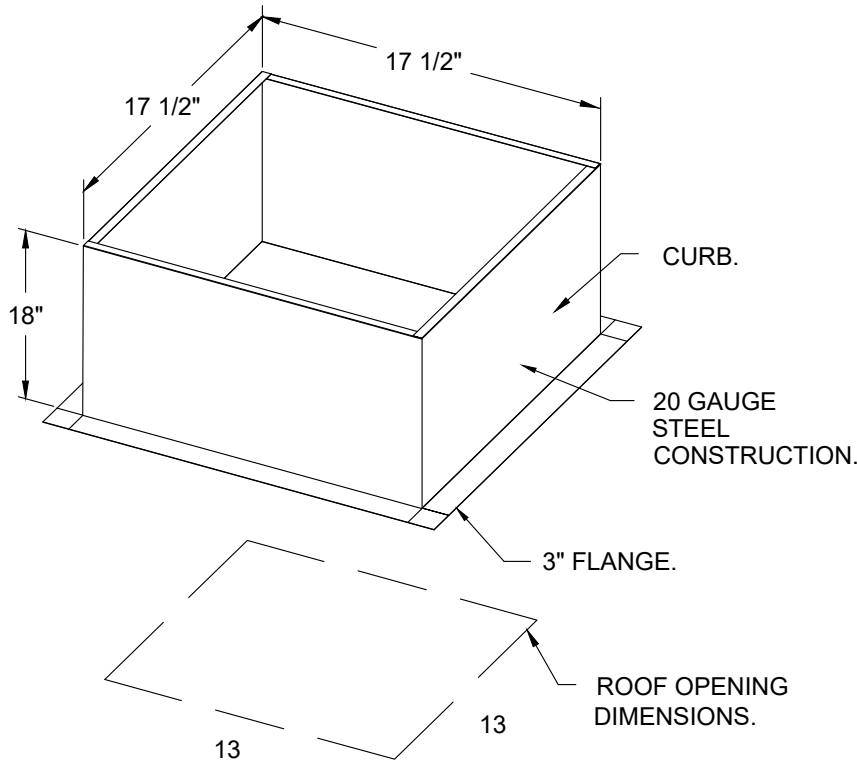
TOP VIEW

FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- UL705.
- SAFETY DISCONNECT.
- STANDARD BIRD SCREEN.
- SPEED CONTROL.

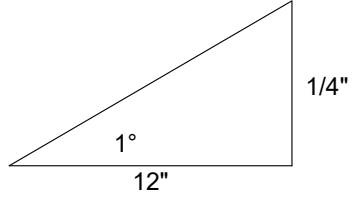
OPTIONS

1 1/2-BDD DAMPER.
ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION.
2 YEAR PARTS WARRANTY.

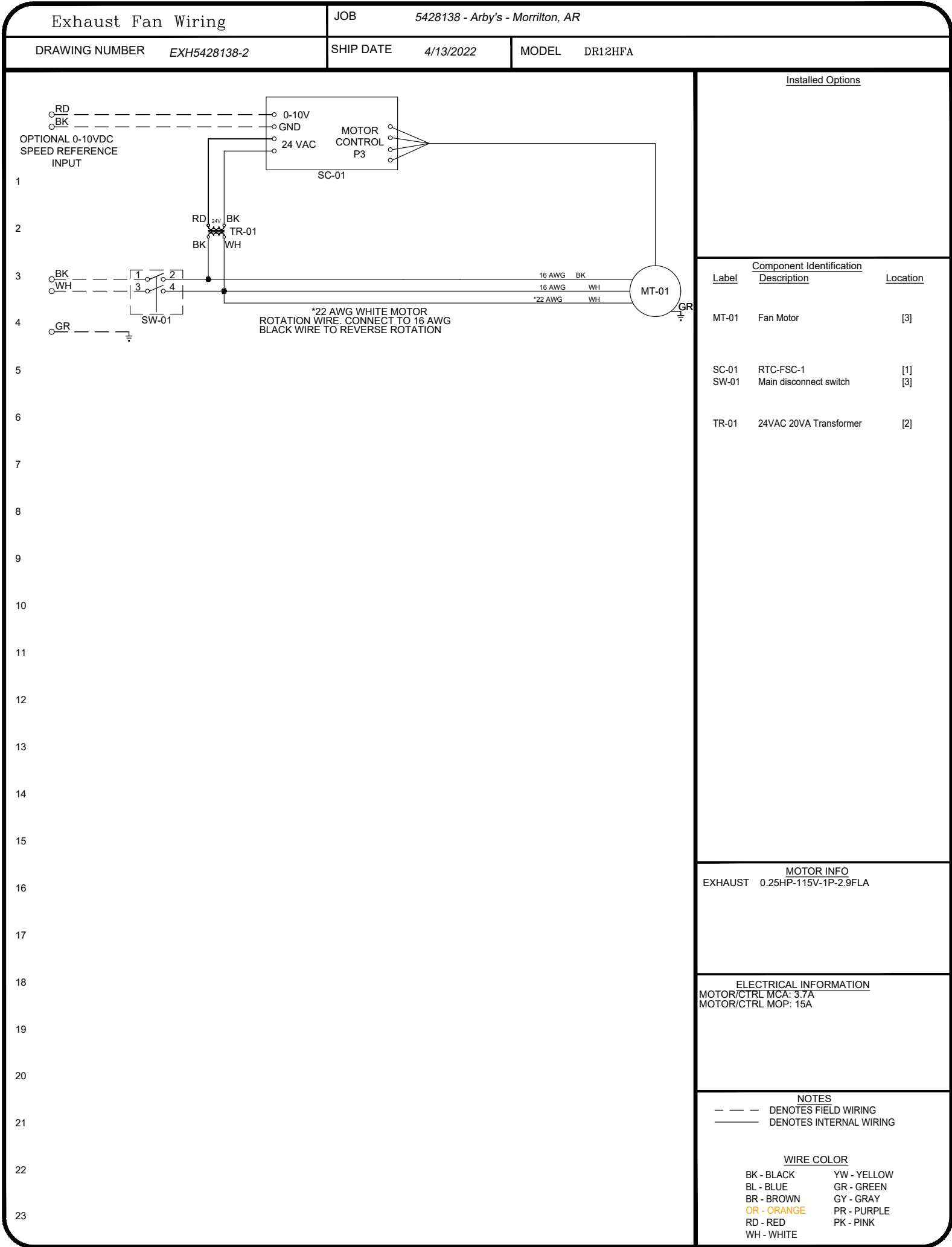
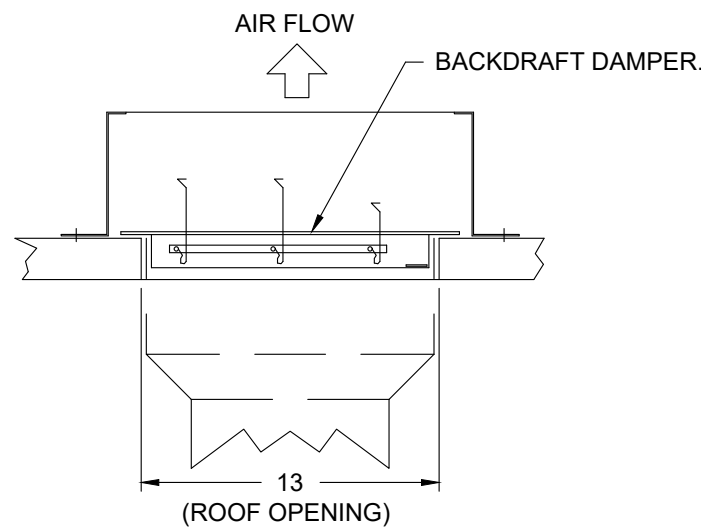


PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.



BACKDRAFT DAMPER INSTALLATION



REVISIONS

DESCRIPTION	DATE:
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Δ	
Δ	

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Arby's - Morrilton, AR

MORRILTON, AR, 72110

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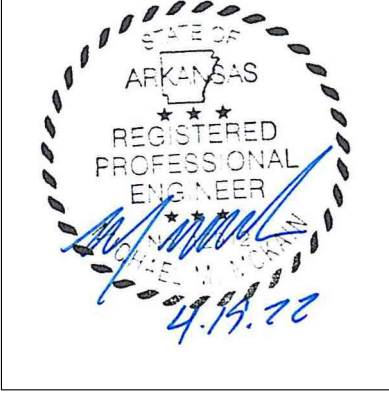
DWG.#: 5428138

DRAWN BY: R.JH-80

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

MASTER DRAWING

SHEET NO. 4



CONSULTANTS

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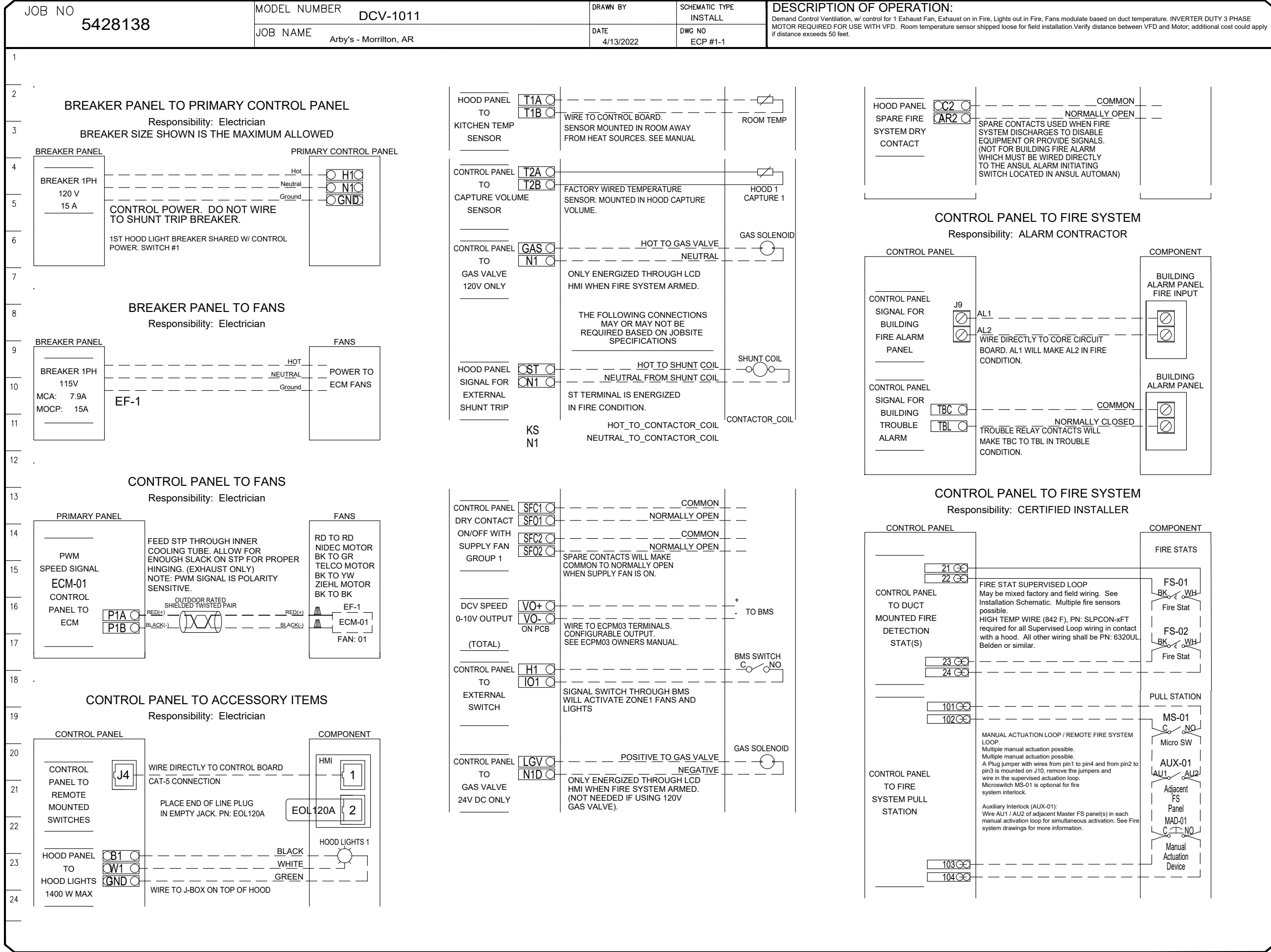
CAPTIVEAIRE DRAWINGS

SHEET:

H1.4

ELECTRICAL PACKAGE – JOB#5428138

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED					
				LOCATION	QUANTITY		FAN TAG		TYPE	Φ	HP	VOLT
1	KH1	DCV-1011	UTILITY CABINET LEFT	08 - SHIP LOOSE W/ PREWIRE	1 LIGHT 1 FAN	SMART CONTROLS DCV	EF-1	EXHAUST	1	0.500	115	6.3

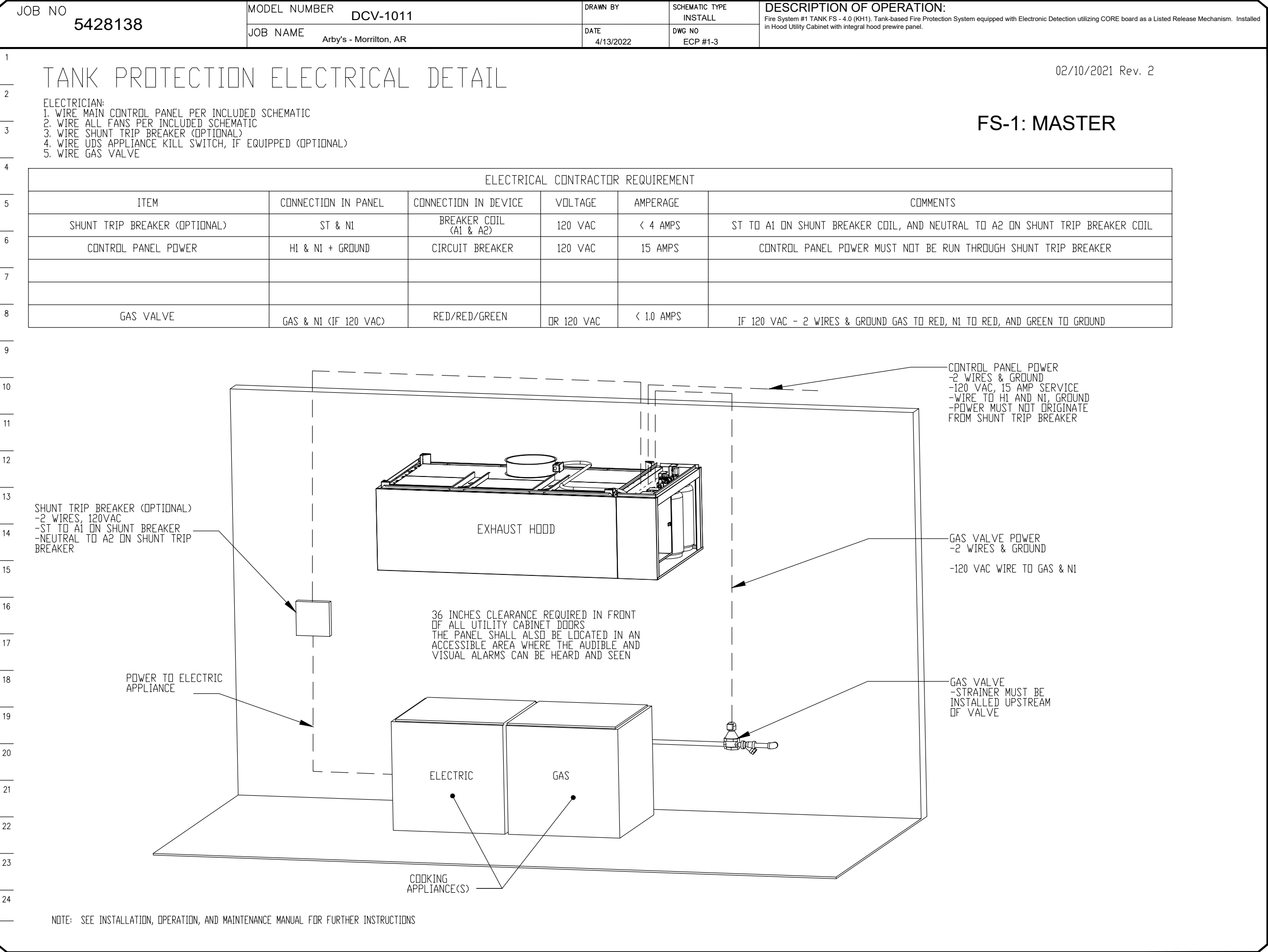


SYSTEM DESIGN VERIFICATION (SDV)

IF ORDERED, CAS SERVICE WILL PERFORM A SYSTEM DESIGN VERIFICATION (SDV) ONCE ALL EQUIPMENT HAS HAD A COMPLETE START UP PER THE OPERATION AND INSTALLATION MANUAL. TYPICALLY, THE SDV WILL BE PERFORMED AFTER ALL INSPECTIONS ARE COMPLETE.

ANY FIELD RELATED DISCREPANCIES THAT ARE DISCOVERED DURING THE SDV WILL BE BROUGHT TO THE ATTENTION OF THE GENERAL CONTRACTOR AND CORRESPONDING TRADES ON SITE. THESE ISSUES WILL BE DOCUMENTED AND FORWARDED TO THE APPROPRIATE SALES OFFICE. IF CAS SERVICE HAS TO RESOLVE A DISCREPANCY THAT IS A FIELD ISSUE, THE GENERAL CONTRACTOR WILL BE NOTIFIED AND BILLED FOR THE WORK. SHOULD A RETURN TRIP BE REQUIRED DUE TO ANY FIELD RELATED DISCREPANCY THAT CANNOT BE RESOLVED DURING THE SDV, THERE WILL BE ADDITIONAL TRIP CHARGES.

DURING THE SDV, CAS SERVICE WILL ADDRESS ANY DISCREPANCY THAT IS THE FAULT OF THE MANUFACTURER. SHOULD A RETURN TRIP BE REQUIRED, THE GENERAL CONTRACTOR AND APPROPRIATE SALES OFFICE WILL BE NOTIFIED. THERE WILL BE NO ADDITIONAL CHARGES FOR MANUFACTURER DISCREPANCIES.



REVISIONS	
DESCRIPTION	DATE

CAPTIVEAIRE
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Arby's - Morrilton, AR
MORRILTON, AR, 72110

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DRAWN BY: RJH-80

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

MASTER DRAWING

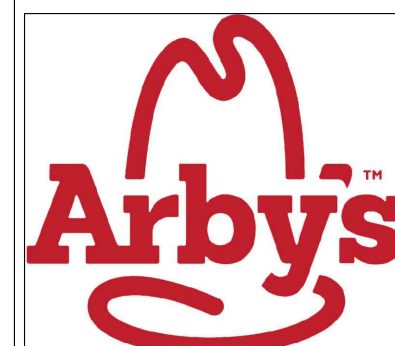
SHEET NO.
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CAPTIVEAIRE DRAWINGS

SHEET:

H1.5