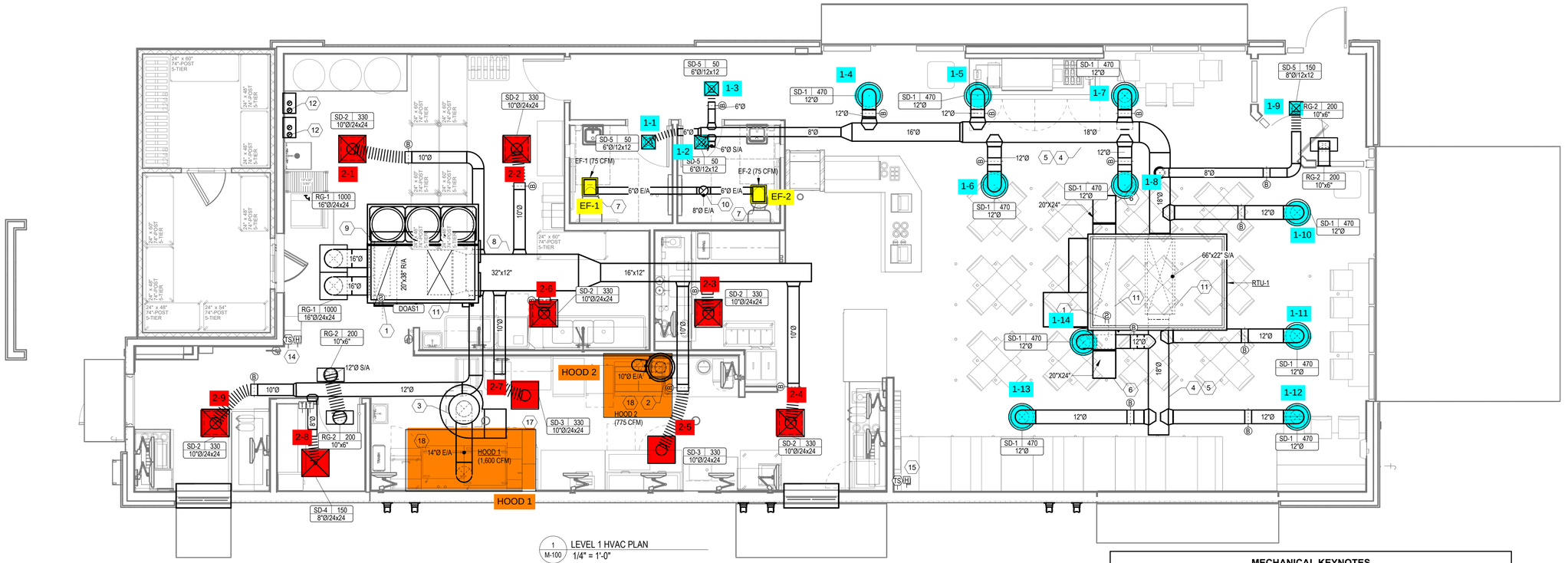


1 M-100 LEVEL 1 HVAC PLAN
1/4" = 1'-0"

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	Exhaust airflow rate cfm/sqft	Breathing zone outdoor airflow (Vbz)	Zone air distribution effectiveness (Ez)	Zone outdoor airflow (cfm)
RTU-1	1100	Dining rooms	70	7.5	0.18		776	0.8	969
	150	Corridors	0	0	0.06		9	0.8	11
								Total	981

AIR BALANCE SCHEDULE

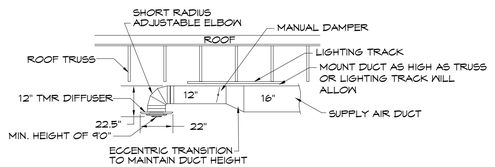
SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA %	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)
RTU-1	981	4,019	5,000	19.6%	KEF-1	1600
DOAS-1	2,650	0	2,650	100.0%	KEF-2	775
					EF-1, EF-2	150
TOTAL	3,631	4,019	7,650	47.46%	TOTAL	2,525
					RESULTING BUILDING PRESSURIZATION	1,106 CFM

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. REFER TO THE BUILDING AIR BALANCE SCHEDULE ON SHEET M-200.

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 MANUFACTURERS PROGRAMMING DOCUMENTATION FOR SETUP INSTRUCTIONS.



2 M-100 DINING ROOM DIFFUSER DETAIL
NO SCALE

MECHANICAL KEYNOTES

1	LOCATION OF FACTORY DUCT MOUNTED SMOKE DETECTOR IN RETURN OF RTU. PROVIDE REMOTE ENUNCIATOR AUDIO/VISUAL. VERIFY LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION. REFER TO SPEC SHEET MP0 FOR ADDITONAL INFORMATION.
2	TRANSITION AND CONNECT 10" DIAMETER 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. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
3	TRANSITION AND CONNECT 14" DIAMETER 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. 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. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
4	COORDINATE DUCT ROUTING WITH LIGHTING. REFER TO SHEET E200.
5	EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT.
6	RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM 8" CLEARANCE TO DECK.
7	SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
8	COORDINATE WITH STRUCTURAL TO BLOCK OUT JOISTS AS REQUIRED TO RUN DUCT THROUGH THE STRUCTURE.
9	RETURN DUCT TO BE ROUTED BETWEEN JOISTS, AS HIGH AS STRUCTURE WILL ALLOW.
10	ROUTE 8" EXHAUST DUCT UP THROUGH ROOF TO ROOF CAP. MAINTAIN 10'-0" CLEARANCE TO ALL OUTDOOR AIR INTAKES. SEAL PENETRATION WEATHERTIGHT.
11	TRANSITION AND CONNECT DUCTWORK TO DUCT DROP WITH FLEXIBLE CONNECTION. COORDINATE WITH STRUCTURAL PLAN AND OFFSET DUCTWORK AS NECESSARY TO FIT BETWEEN JOISTS. REFER TO ROOF PLAN M-101 FOR CONTINUATION.
12	PROVIDE 3" PVC FLUE AND COMBUSTION AIR INTAKE PIPE FOR HOT WATER HEATER THROUGH ROOF. PROVIDE MANUFACTURERS TERMINATION KIT. SEAL PENETRATION WEATHERTIGHT. VERIFY 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES.
14	LOCATION OF DOAS TEMPERATURE SENSOR AND HUMIDISTAT MOUNTED AT 7' AFF.
15	LOCATION OF REMOTE TEMPERATURE AND HUMIDITY SENSOR FOR RTU. INSTALL AT 9' AFF.
17	HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERED UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.
18	EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTUERERS INSTRUCTIONS.

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OKLAHOMA PE COA #CA1900PE

BC ENGINEERS INCORPORATED
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sheet number
M-100

drawing type
PERMIT

project number
2023118

GENERAL MECHANICAL SYMBOLS

- REVISION NUMBER - SHOWN ON PLANS
- POINT WHERE NEW CONNECTS TO EXISTING
- NUMBER OF DETAIL ON SHEET / NUMBER OF SHEET WHERE DETAIL APPEARS
- KEYNOTE
- CONTINUATION SYMBOL
- ROOM NAME AND NUMBER (Room 5)
- ITEM TO BE DEMOLISHED
- AREA NOT IN CONTRACT
- 2" — PIPE SIZE TAG (DIAMETER)
- ABOVE GROUND PIPING
- 1/8" / 12" SLOPE — PIPE SLOPE TAG
- BELOW GROUND PIPING
- INVERT: -105'-1" — PIPE INVERT ELEVATION TAG
- (E) — EXISTING PIPE TAG
- PIPING BEING DEMOLISHED

ABBREVIATIONS

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FDC	FIRE DEPARTMENT CONNECTION	RH	RELATIVE HUMIDITY
FL	FLOOR	RL/A	RELIEF AIR
FO	FUEL OIL	RM	ROOM
FOV	FUEL OIL VENT	RPM	REVOLUTIONS PER MINUTE
FOR	FUEL OIL RETURN	RW	RAIN WATER
FOS	FUEL OIL SUPPLY	SF	SQUARE FOOT
FPM	FEET PER MINUTE	S/A	SUPPLY AIR
FS	FLOOR SINK	SAN	SANITARY
FT	FOOT/FEET	SF	SQUARE FOOT
FTR	FIN TUBE RADIATION	SD	SMOKE DAMPER
GAL	GALLON	SM	SURFACE MOUNT
GF	GAS-FIRED	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

EQUIPMENT ABBREVIATIONS

AC	AIR CONDITIONING UNIT	ET	EXPANSION TANK
ACCU	AIR COOLING CONDENSING UNIT	EWH	ELECTRIC WATER HEATER
AHU	AIR HANDLING UNIT	FCU	FAN COIL UNIT
AS	AIR SEPARATOR	FP	FIRE PUMP
B	BOILER	GI	GREASE INTERCEPTOR
CH	CHILLER	GRV	GRAVITY ROOF VENTILATOR
CT	COOLING TOWER	HWP	HEATING WATER PUMP
CUH	CABINET UNIT HEATER	HRU	HEAT RECOVERY UNIT
CHWP	CHILLED WATER PUMP	PRV	POWER ROOF VENTILATOR
DBP	DOMESTIC WATER BOOSTER PUMP	RE	RETURN/EXHAUST FAN
DC	DUCT MOUNTED COIL	RTU	ROOFTOP UNIT
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER

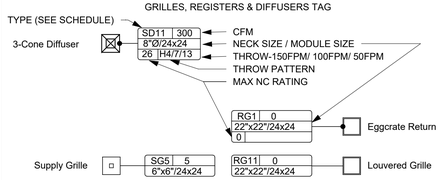
* NOTE *

ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

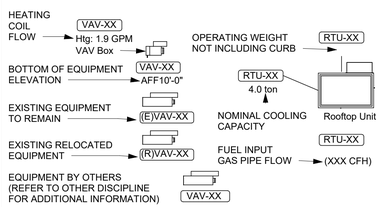
HVAC SYMBOLS

- 18"x12" — SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
- 18"/12" — OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
- 18"Ø — ROUND DUCT SIZE TAG (DIAMETER)
- (E) — EXISTING DUCT TAG
- DUCT BEING DEMOLISHED
- 18"x18" S/A — SUPPLY AIR
- 18"x18" S-O/A — CONDITIONED OUTSIDE AIR
- 18"x18" O/A — OUTSIDE AIR
- 18"x18" R/A — RETURN AIR
- 18"x18" T/A — TRANSFER AIR
- 18"x18" E/A — EXHAUST AIR
- 18"x18" L/A — RELIEF AIR
- 18"x18" GE/A — GREASE EXHAUST AIR
- 18"x18" CE/A — CONDENSATE EXHAUST AIR
- 18"x18" SE/A — SMOKE EXHAUST AIR
- 6"Ø FLUE — EXHAUST GAS FLUE
- 6"Ø C/A — COMBUSTION AIR
- DROP — RECTANGULAR SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — ROUND SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — RECTANGULAR RETURN/TRANSFER AIR DUCT RISE
- DROP — ROUND RETURN/TRANSFER AIR DUCT RISE
- DROP — RECTANGULAR EXHAUST/RELIEF AIR DUCT RISE
- DROP — ROUND EXHAUST/RELIEF AIR DUCT RISE

GRILLES, REGISTERS & DIFFUSERS TAG



MECHANICAL EQUIPMENT TAGS

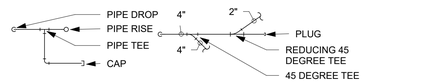


DAMPER TAGS

- SD — Smoke Damper
- FD — Fire Damper
- FSD — Comb. Fire/ Smoke Damper
- B — Manual Damper
- M — Motorized Damper
- BDD — Backdraft Damper

PIPING SYMBOLS

- CHWR — CHILLED WATER RETURN
- CHWS — CHILLED WATER SUPPLY
- CD — CONDENSATE DRAINAGE
- CWR — CONDENSER WATER RETURN
- CWS — CONDENSER WATER SUPPLY
- GWR — GEOTHERMAL WATER RETURN
- GWS — GEOTHERMAL WATER SUPPLY
- HWR — HEATING WATER RETURN
- HWS — HEATING WATER SUPPLY
- G — NATURAL GAS
- PG — PROPANE GAS
- REF-L — REFRIGERANT-LIQUID
- REF-S — REFRIGERANT-SUCTION
- REF-HG — REFRIGERANT-HOT GAS
- STM — STEAM
- CDR — CONDENSATE RETURN



PIPE ACCESSORY TAGS

- 2" SHUTOFF BALL VALVE
- 2" BALANCING BALANCING VALVE
- 2" BUTTERFLY BUTTERFLY VALVE
- 2" CHECK CHECK VALVE
- (ALTERNATE CHECK VALVE SYMBOL)
- 3" CIRC CIRCUIT SETTER
- 2" GATE GATE VALVE
- 2" GLOBE GLOBE VALVE
- 2" LOCKED LOCK SHIELD VALVE
- 2" PRV DOM. PRV
- 2" QUICK QUICK OPENING VALVE
- 2" STRAINER
- 1" GAS-CNTRL EMERGENCY GAS
- 1" PLUG PLUG VALVE
- 1" GAS COCK GAS SHUTOFF COCK
- 1" REG GAS REGULATOR
- 2" M-CNTRL ELEC. CONTROL VALVE
- 4" 3-WAY CNTRL 3-WAY ELEC. VALVE

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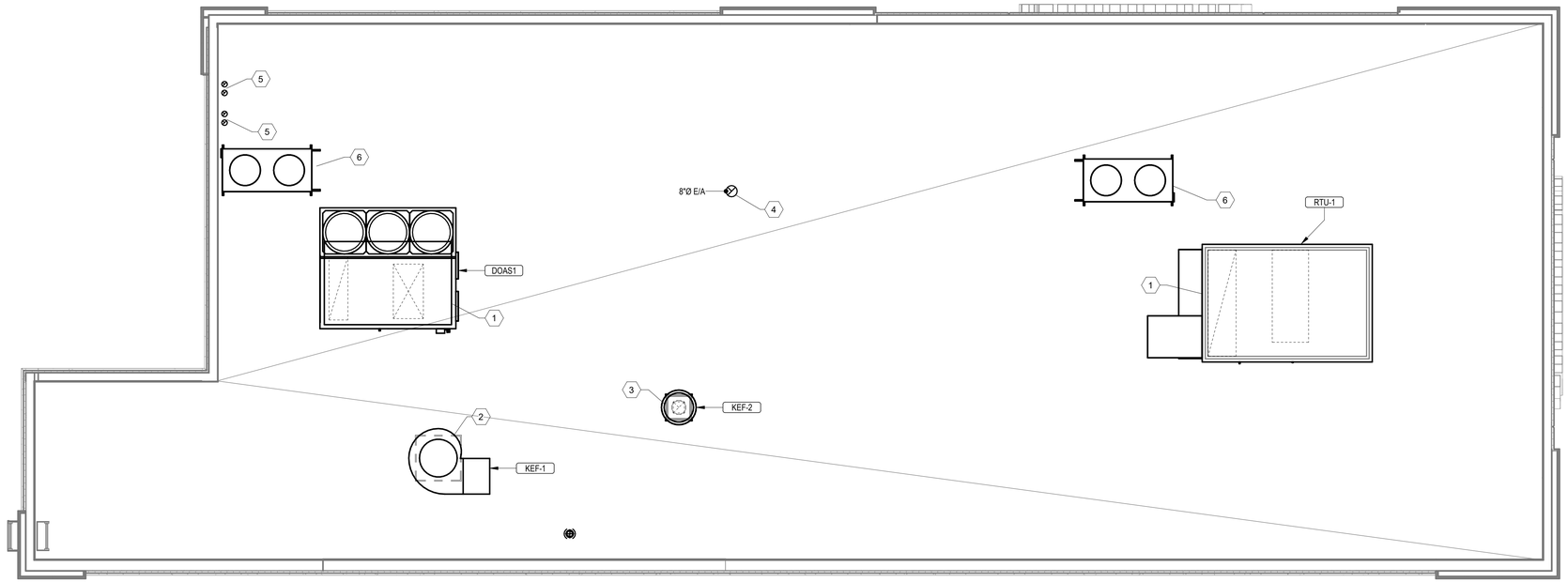

1 / M-101 MECHANICAL ROOF PLAN
1/4" = 1'-0"

MECHANICAL KEYNOTES

1	PROVIDE RTU/DOAS IN LOCATION AS SHOWN ON PLANS. COORDINATE EXACT RTU LOCATION AND DUCT DROPS WITH STRUCTURAL TRUSS LAYOUT. MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN OUTDOOR AIR INTAKES AND EXHAUST TERMINATIONS.
2	PROVIDE TYPE I EXHAUST FAN IN LOCATION AS SHOWN ON PLANS. CONNECT 10" DIAMETER EXHAUST DUCT FROM EXHAUST HOOD UP TO KEF-1 ON ROOF. COORDINATE EXHAUST DUCT ROUTING WITH STRUCTURAL TRUSS LAYOUT.
3	PROVIDE TYPE I EXHAUST FAN IN LOCATION AS SHOWN ON PLANS. CONNECT 8" DIAMETER EXHAUST DUCT FROM EXHAUST HOOD UP TO KEF-2 ON ROOF. COORDINATE EXHAUST DUCT ROUTING WITH STRUCTURAL TRUSS LAYOUT.
4	8" EXHAUST DUCT ROUTED TO ROOF CAP AS REQUIRED.
5	PROVIDE MANUFACTURER'S CONCENTRIC TERMINATION VENT KIT SERVING HOT WATER HEATER BELOW. INSTALL IN STRICT ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS. ENSURE AT LEAST 10'-0" DISTANCE BETWEEN OUTDOOR AIR INTAKES.
6	MOUNT CONDENSING UNIT ON ROOF AS DETAILED AND AS REQUIRED BY THE MANUFACTURER. CONNECT REFRIGERANT PIPING TO EVAP COIL AS REQUIRED BY THE MANUFACTURER. SEE SHEET M200 FOR MOUNTING DETAIL.

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ROOFTOP UNIT SCHEDULE

MARK	MANUFACTURER	MODEL NO.	NOM TONS	EVAP CFM	EXT. STATIC P. IN. WG.	COOLING					HOT GAS REHEAT	HEATING (GAS)			ELECTRICAL					SUPPLY FAN TYPE	MINIMUM OUTDOOR AIR	IEER	TOTAL WEIGHT (LBS)	NOTES
						COOLING STAGES	TOTAL	SENSIBLE	AMB	EVAP.EAT DB/WB		INPUT	OUTPUT	HEATING STAGES	VOLT/PH/HZ	BLOWER MOTOR	POWER EXHAUST	MCA	MOCP					
RTU-1	Trane	YSJ-150--	12.5	5000 CFM	1.000	3	149000 Btu/h	105000 Btu/h	105.0 °F	80.0 °F / 67.0 °F	Yes	250000 Btu/h	202500 Btu/h	3	208 V / 3 / 60 Hz	3.00 hp	Yes	65.0 A	90.0 A	VFD	981 CFM	14	2046 lb	1-8

ALTERNATE ROOFTOP UNIT MANUFACTURER

MARK	MANUFACTURER	MODEL NO.	NOM TONS	EVAP CFM	EXT. STATIC P. IN. WG.	COOLING					HOT GAS REHEAT	HEATING (GAS)			ELECTRICAL					SUPPLY FAN TYPE	MINIMUM OUTDOOR AIR	IEER	TOTAL WEIGHT (LBS)	NOTES
						COOLING STAGES	TOTAL	SENSIBLE	AMB	EVAP.EAT DB/WB		INPUT	OUTPUT	HEATING STAGES	VOLT/PH/HZ	BLOWER MOTOR	POWER EXHAUST	MCA	MOCP					
RTU-1	Carrier	48HCFE14	12.5	5000 CFM	1.000	2	154800 Btu/h	116100 Btu/h	105.0 °F	80.0 °F / 67.0 °F	Yes	240000 Btu/h	192000 Btu/h	2	208 V / 3 / 60 Hz	5.00 hp	Yes	71.0 A	90.0 A	VFD	981 CFM	13.5	1363 lb	1-8
RTU-1	YORK	ZJI15024D	12.5	5000 CFM	1.000	2	154800 Btu/h	116100 Btu/h	105.0 °F	80.0 °F / 67.0 °F	Yes	240000 Btu/h	192000 Btu/h	2	208 V / 3 / 60 Hz	5.00 hp	Yes	71.0 A	90.0 A	VFD	981 CFM	13.5	1363 lb	1-8

NOTES:

1. PROVIDE DIGITAL CONTROLS, HIGH PERFORMANCE WITH FDD OUTDOOR AIR ECONOMIZER WITH DRY BULB CONTROL, SINGLE ZONE VAV (MSAV), BAROMETRIC RELIEF DAMPER, TIME DELAY ON COMPRESSOR RE-START, CRANKCASE HEATER, BAROMETRIC RELIEF DAMPER, DRAIN PAN OVERFLOW SWITCH, DISCHARGE AIR TEMPERATURE SENSING, HINGED ACCESS DOORS, AND STANDARD COOLING DOWN TO 0°F FOR EACH UNIT. OUTDOOR AIR DAMPER TO FULLY CLOSE W/ FAN SHUTDOWN FOR ALL UNITS.
2. EXTERNAL STATIC PRESSURE LISTED REPRESENTS STATIC PRESSURE REQUIRED FOR DUCTWORK AND DIFFUSERS OUTSIDE THE HVAC UNIT COMPLETELY INDEPENDENT OF ANY PRESSURE DROP THROUGH THE HVAC EQUIPMENT INCLUDING BUT NOT LIMITED TO FILTERS, COILS AND ECONOMIZERS. THE FAN AND MOTOR SHALL BE SIZED APPROPRIATELY TO MEET THIS DEFINITION OF EXTERNAL STATIC PRESSURE.
3. PROVIDE COMMERCIAL 7-DAY PROGRAMMABLE HEAT/COOL/AUTO CHANGEOVER THERMOSTAT WITH ECONOMIZER OUTPUT AND REMOTE, TEMPERATURE AND HUMIDITY SENSOR FOR EACH UNIT (HONEYWELL VISION PRO 8000 OR EQUAL), ECONOMIZER/OUTDOOR AIR DAMPER IS TO CLOSE DURING UNOCCUPIED HOURS.
4. PROVIDE 14" HIGH (AT LOWEST POINT) PRE-FABRICATED INSULATED ROOF CURB.
5. PROVIDE HAIL GUARDS FOR EACH UNIT.
6. PROVIDE FACTORY INSTALLED UNIT MOUNTED CIRCUIT BREAKERS.
7. MECHANICAL CONTRACTOR SHOULD PROVIDE ALL NEW FILTERS ON DAY OF TURNOVER.
8. PROVIDE HOT GAS REHEAT FOR HUMIDITY CONTROL AND ALL ASSOCIATED ACCESSORY COMPONENTS.

NATIONAL ACCOUNT INFORMATION

FREDDY'S FROZEN CUSTARD HAS NATIONAL ACCOUNT AGREEMENTS FOR ROOF TOP UNITS WITH TRANE, CARRIER, AND YORK. NO ALTERNATE MANUFACTURERS ARE ALLOWED.

FOR TRANE EQUIPMENT EQUAL TO THE UNITS SPECIFIED CONTACT:
JUSTIN BARNES, TRANE ACCOUNT MANAGER - NATIONAL ACCOUNTS, (303) 228-2896
JDBARNES@TRANE.COM

FOR CARRIER EQUIPMENT CONTACT:
TERRI BURNS, ACCOUNT ORDER MANAGER, (315) 432-3653
nationalaccounts@carrier.com

FOR YORK EQUIPMENT CONTACT:
DAVID WALMSLEY, ACCOUNT ORDER MANAGER, (774)-573-5725
david.walmsley@jci.com

FAN SCHEDULE

ID	LOCATION	MANUFACTURER	MODEL NO.	TYPE	FAN						VOLT	PH	REMARKS
					DESIGN AIRFLOW	ESP	DRIVE TYPE	MOTOR POWER	MOTOR RPM	MOTOR ECM			
EF-1	Ceiling	Greenheck	SP-A200-390	Premium (Constant Cfm)	75 CFM	0.250	Direct	0.08 hp	900	Yes	0 V	1	SEE NOTE 1.
EF-2	Ceiling	Greenheck	SP-A200-390	Premium (Constant Cfm)	75 CFM	0.250	Direct	0.08 hp	900	Yes	0 V	1	SEE NOTE 1.

NOTES: 1. PROVIDE CEILING GRILLE, INTEGRAL BACKDRAFT DAMPER, AND ROOF CAP.

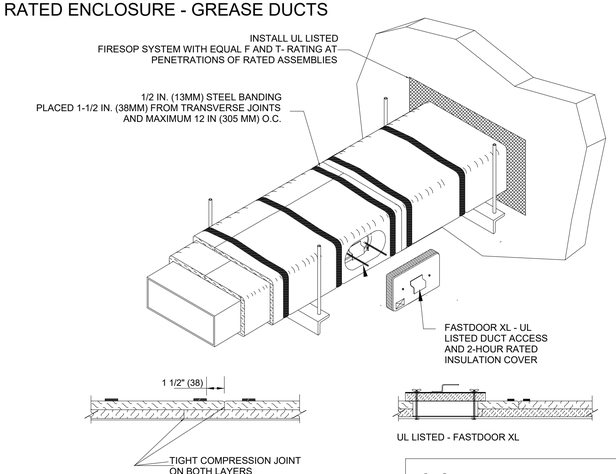
GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

ID	MANUFACTURER	MODEL	MATERIAL	FINISH	NECK			NOTES
					SIZE	WIDTH	HEIGHT	
RG-1	AMER. LOUVER CO	STRATUS	Aluminum	White Enamel	16"	0"	0"	SEE NOTE 1.
RG-2	Titus	350RL	Steel	White Enamel	0"	10"	6"	
RG-2	Titus	350RL	Steel	White Enamel	0"	10"	6"	
SD-1	Titus	TMR	Steel	White Enamel	12"	0"	0"	FIELD PREP FOR PAINTING
SD-2	Titus	TMS-AA	Aluminum	WHITE ENAMEL	10"	0"	0"	
SD-3	Titus	PAR	Steel	White Enamel	10"	0"	0"	RETURN - NO DEFLECTOR
SD-4	Titus	T3SQ-4	Steel	WHITE ENAMEL	8"	0"	0"	THERMAL VAV DIFFUSER
SD-5	Titus	TMS	Steel	White Enamel	<varies>	0"	0"	WITH O.B. DAMPER AND TRM KIT

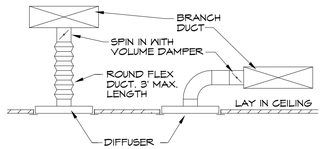
~~NOTES: 1. RETURN GRILLE TO BE PLASTIC FILTER RETURN, FILTER TO BE AMERICAN AIR FILTER (AAF) FRONTLINE GREEN 1", WITH AAF AMERIFRAME SIZE 20X20X1.~~

FIRE RATED ENCLOSURE - GREASE DUCTS

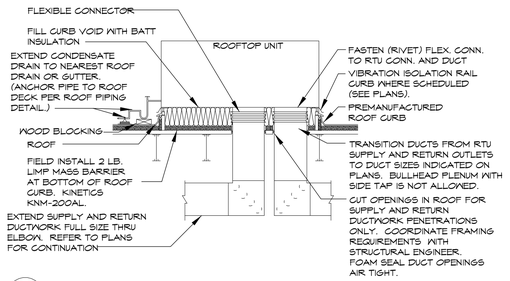
1. THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2336 AND UL LISTED PER HNKT.G18 TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1- OR 2- HOUR ENCLOSURE. THROUGH PENETRATIONS FIRESTOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E 814 (UL 1479). ICC-ES APPROVAL PER REPORT ESR 2213 OR ESR 2832.
2. COMPLIANT TO THE FOLLOWING CODES:
   NFPA 96
   INTERNATIONAL MECHANICAL CODES
   UNIFORM MECHANICAL CODE.
   CALIFORNIA MECHANICAL CODE
3. INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
4. MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAGE STAINLESS STEEL) RECTANGULAR OR ROUND GREASE EXHAUST DUCT
5. INSTALL UL LISTED AND LIQUID TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20 FT ON HORIZONTAL RUNS.
6. SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM OF 3/8 IN. DIAMETER AND SUPPORTS ARE MINIMUM 2 X 2 X 1/8 IN. STEEL ANGLE OR SMACNA EQUIVALENT SUPPORT SYSTEM.
7. THERMAL CERAMICS DUCT WRAP SHALL BE INSTALLED DIRECTLY ONTO THE DUCT AND APPLIED FROM THE HOOD CONNECTION TO THE CONNECTION TO THE FAN.
8. THERMAL CERAMICS DUCT ENCLOSURE SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND UL LISTINGS.



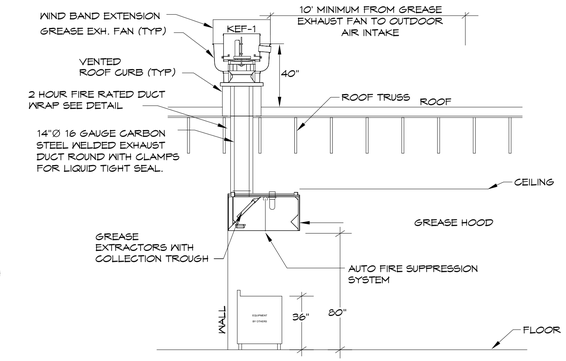
Morgan ThermalCeramics
P.O. Box 923
Augusta, Georgia 30903-0923
Phone: (706) 560-4038



6 / M-200 DIFFUSER DETAIL
NO SCALE

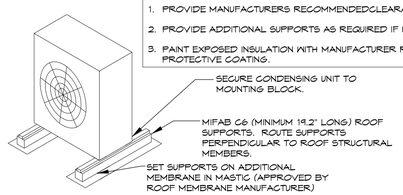


7 / M-200 DOWNFLOW ROOFTOP UNIT DETAIL
NO SCALE

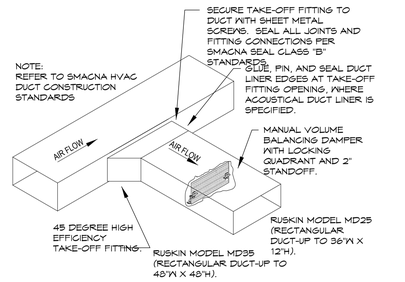


4 / M-200 GREASE HOOD DETAIL
NO SCALE

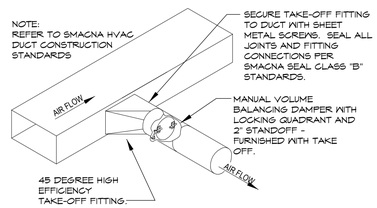
NOTES:
1. PROVIDE MANUFACTURERS RECOMMENDEDCLEARANCES BETWEEN CU & HP UNITS.
2. PROVIDE ADDITIONAL SUPPORTS AS REQUIRED IF UNITS ARE NOT SAME WIDTH.
3. PAINT EXPOSED INSULATION WITH MANUFACTURER RECOMMENDED ULTRAVIOLET PROTECTIVE COATING.



5 / M-200 ROOFTOP CONDENSING UNIT DETAIL
NO SCALE



9 / M-200 RECTANGULAR DUCT TAKE OFF DETAIL
NO SCALE



8 / M-200 ROUND DUCT TAKE OFF DETAIL
NO SCALE

OKLAHOMA PE COA #CA1900PE

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

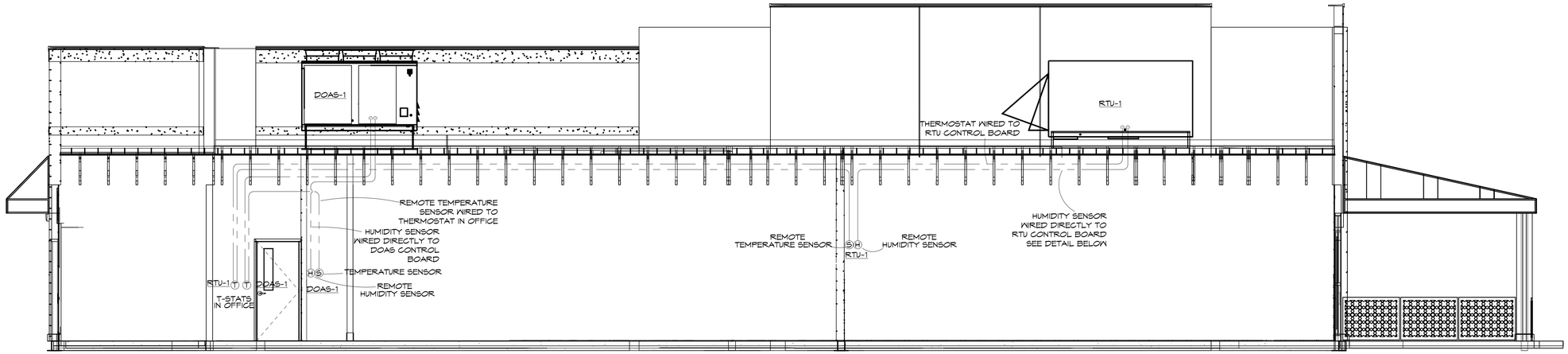
6/28/24
LICENSED PROFESSIONAL ENGINEER
ERIK BRADLEY KNUDSEN
27330
OKLAHOMA

a new restaurant for:
FREDDY'S
5119 E 51st Street
Tulsa, OK 74135

date
12/20/2023
drawn by
Author
checked by
Checker
revisions

sheet number
M-200

drawing type
PERMIT
project number
2023118



REMOTE TEMPERATURE AND HUMIDITY SENSOR WIRING

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

Installation

DC Conductors

Table 11. Zone sensor module wiring

Distance from Unit to Control	Recommended Wire Size
0 - 150 feet	22 gauge
0 - 45.7 m	0.33 mm^2
151 - 240 feet	20 gauge
46 - 73.1 m	0.50 mm^2
241 -385 feet	18 gauge
73.5 - 117.3 m	0.75 mm^2
386 - 610 feet	16 gauge
117.7 - 185.9 m	1.3 mm^2
611 - 970 feet	14 gauge
186.2 - 295.7 m	2.0 mm^2

Figure 58. Typical field wiring diagrams for electromechanical

ELECTRO MECHANICAL THERMOSTAT
GAS / ELECTRIC UNITS

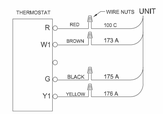
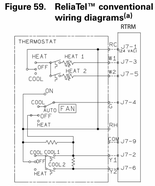


Figure 59. ReliaTel™ conventional thermostat field wiring diagrams(a)



(a) Not compatible with VAV units.

Figure 60. ReliaTel™ options module (RTOM board)

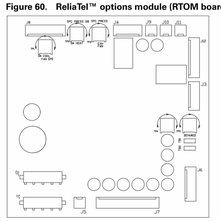


Figure 61. ReliaTel™ relative humidity sensor (dehumidification option)

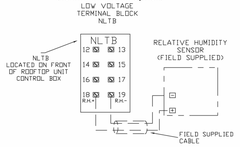
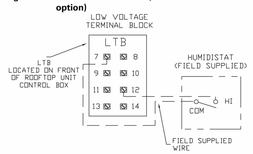


Figure 62. ReliaTel™ humidistat (dehumidification option)



TRANE HUMIDITY SENSOR WIRING

FOR GENERAL INFORMATION ONLY.
REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS
PROVIDED WITH THE EQUIPMENT FOR EXACT INSTALLATION INSTRUCTIONS AND
REQUIREMENTS.

davidson
architecture&engineering
4301 Indian Creek Parkway
Overland Park, KS 66207
phone: 913.451.9390
fax: 913.451.9391
www.davidsonae.com

6/28/24

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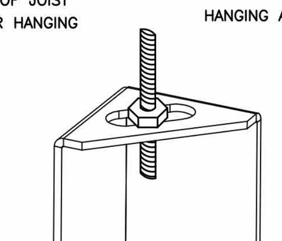
ND-2 HANGING ANGLE DETAIL



*ROD AND NUTS TO BE SUPPLIED BY INSTALLING CONTRACTOR HANGING ANGLE IS PRE-PUNCHED 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/LIN.FT. (LOAD)

SUPPLY CFM=EXHAUST CFM X PERCENTAGE REQUIRED

$$\text{TOTAL DUCT AREA} = 144 \times \frac{\text{CFM}}{\text{FPM}(*)}$$

$$\text{DUCT LENGTH} = \frac{\text{TOTAL DUCT AREA}}{\text{DUCT DEPTH}}$$

*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 #3054804-001 & #3054804-002

STANDARD 710

SANITATION LISTED Intertek

BUILT IN ACCORDANCE WITH NFPA No. 96

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

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTORS'S PLANS.
5. COOKING EQUIPMENT TO SHUTOFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHTS FIXTURE SHOWN INSTALLED BY CAPTIVE-AIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SEISMIC RESTAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED REPONSIBILITY 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

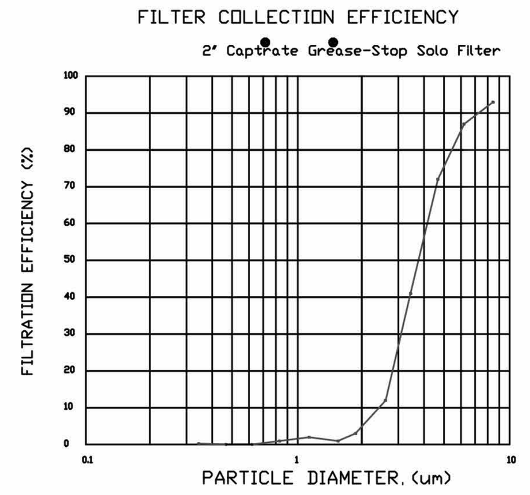
11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

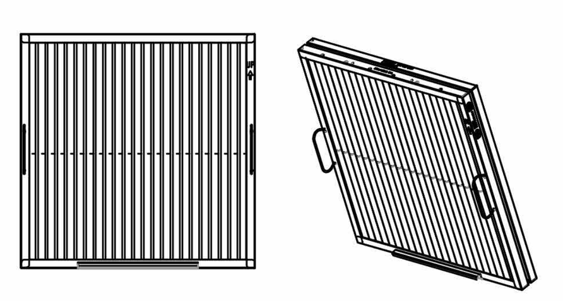
ADDITIONAL

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

FILTER DETAIL

FILTER COLLECTION EFFICIENCY





CaptiveAire Captrate Solo Filter
ETL Listed Grease Extracting Filters
Made From 430 Stainless Steel

HOOD INFORMATION – JOB#6218655

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	HOOD CONSTRUCTION	HOOD CONFIG END TO END	ROW
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
2	ITEM 33B	5424 ND-2	CAPTIVEAIRE	5' 0"	450 DEG	I	MEDIUM	155	775			4"	10"	775	1421	-0.436"	430 SS WHERE EXPOSED	ALONE	ALONE

PATENT NUMBERS

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

HOOD INFORMATION

HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	UTILITY CABINET(S) LOCATION	SIZE	FIRE SYSTEM TYPE	FIRE SYSTEM SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	ITEM 33A	CAPTRATE SOLO FILTER	5	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"x54"x24"			DCV-2111	1 LIGHT 1 FAN	NO	598 LBS
2	ITEM 33B	CAPTRATE SOLO FILTER	3	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO							NO	357 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 3IN DBL.
2	ITEM 33B	FIELD WRAPPER 18.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT END PANEL 27" TOP WIDTH, 24" BOTTOM WIDTH, 39.5" HIGH 430 SS.
		LEFT 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: CAPTRATE® GREASE-STOP® SOLO FILTER

THE CAPTRATE GREASE-STOP SOLO FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-BAFFLE DESIGN IN CONJUNCTION WITH A SLOTTED REAR BAFFLE DESIGN, TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY.

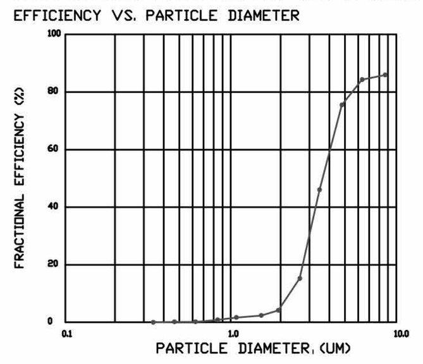
FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 2-INCH DEEP HOOD CHANNEL(S).

UNITS SHALL INCLUDE STAINLESS STEEL HANDLES AND A FASTENING DEVICE TO SECURE THE TWO COMPONENTS WHEN ASSEMBLED.

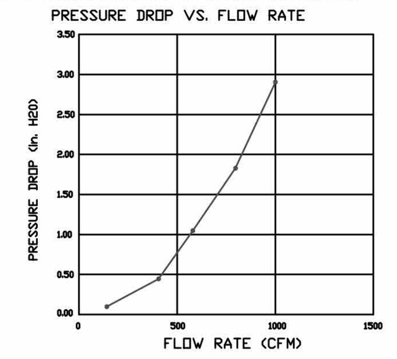
GREASE EXTRACTION EFFICIENCY PERFORMANCE SHALL REMOVE AT LEAST 75% OF GREASE PARTICLES FIVE MICRONS IN SIZE, AND 85% GREASE PARTICLES SEVEN MICRONS IN SIZE AND LARGER, WITH A CORRESPONDING PRESSURE DROP NOT TO EXCEED 1.0 INCHES OF WATER GAUGE.

THE CAPTRATE GREASE-STOP SOLO WAS TESTED TO ASTM STANDARD ASTM F2519-05. MANUFACTURER APPROVED FOR USE IN SOLID FUEL APPLICATIONS AS A SPARK ARRESTER.

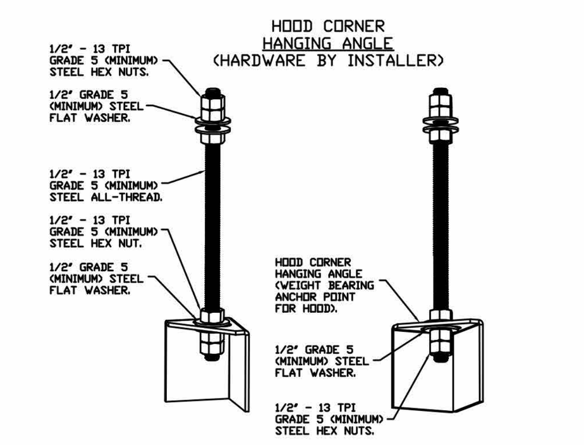
EFFICIENCY VS. PARTICLE DIAMETER



PRESSURE DROP VS. FLOW RATE

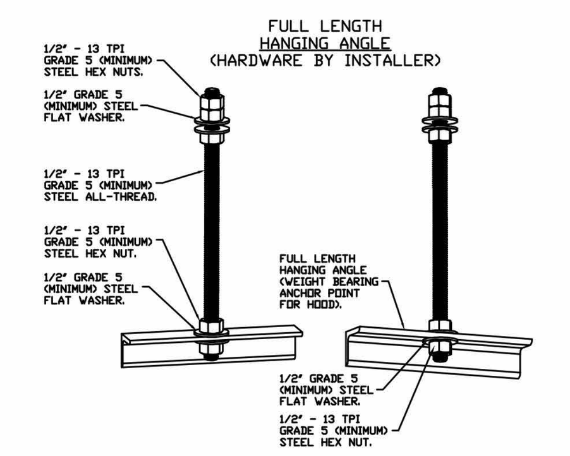


CAPTRATE FILTERS ARE BUILT IN COMPLIANCE WITH:
NFPA #96.
NSF STANDARD #2.
UL STANDARD #1046.
INT. MECH. CODE (IMC).
ULC-S649.



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.



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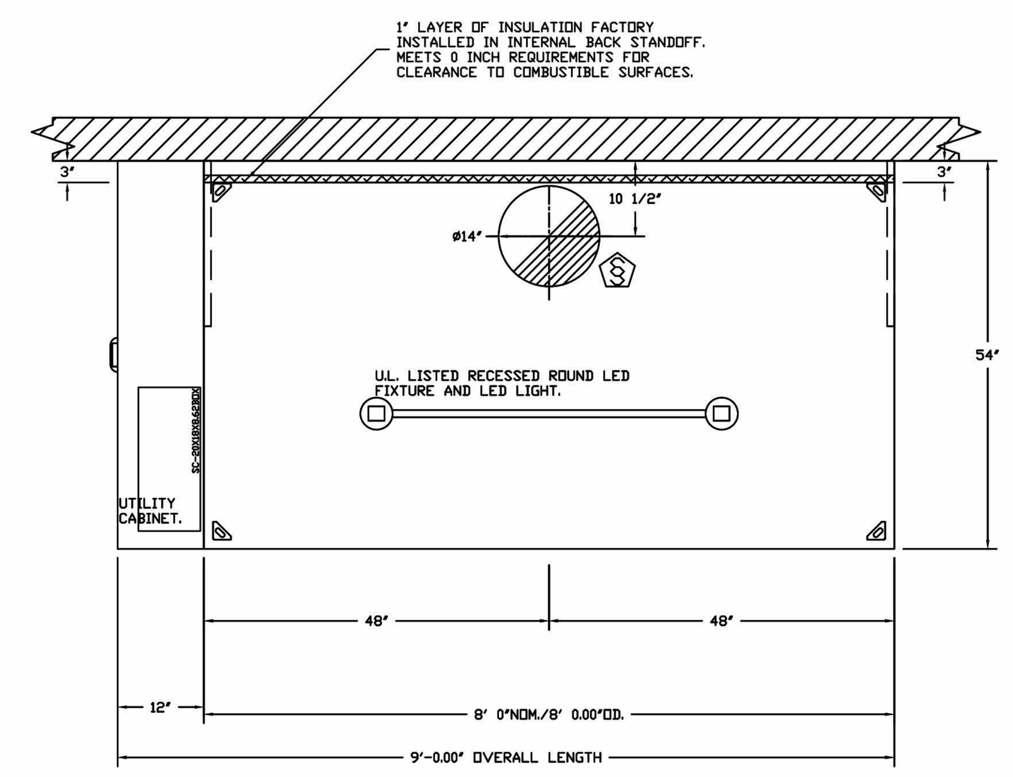
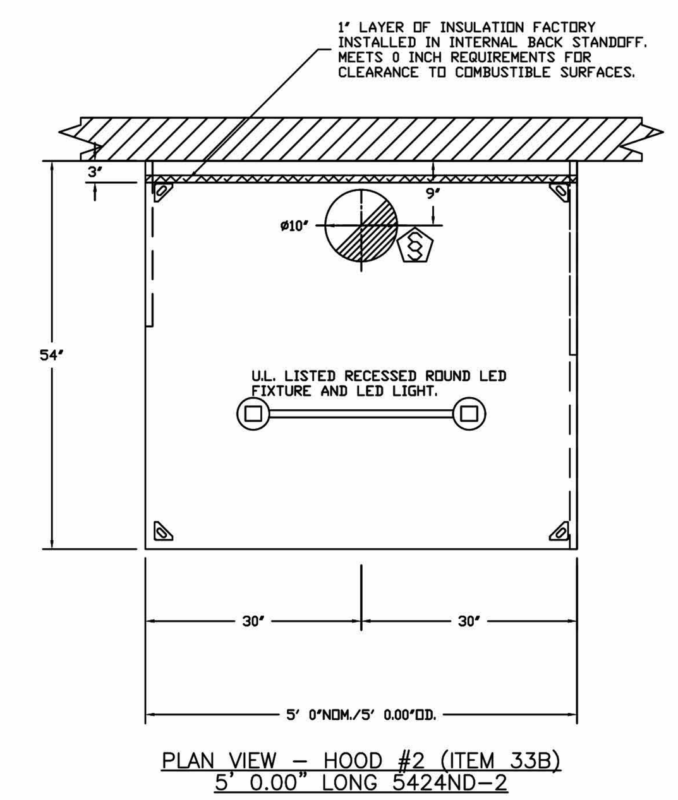
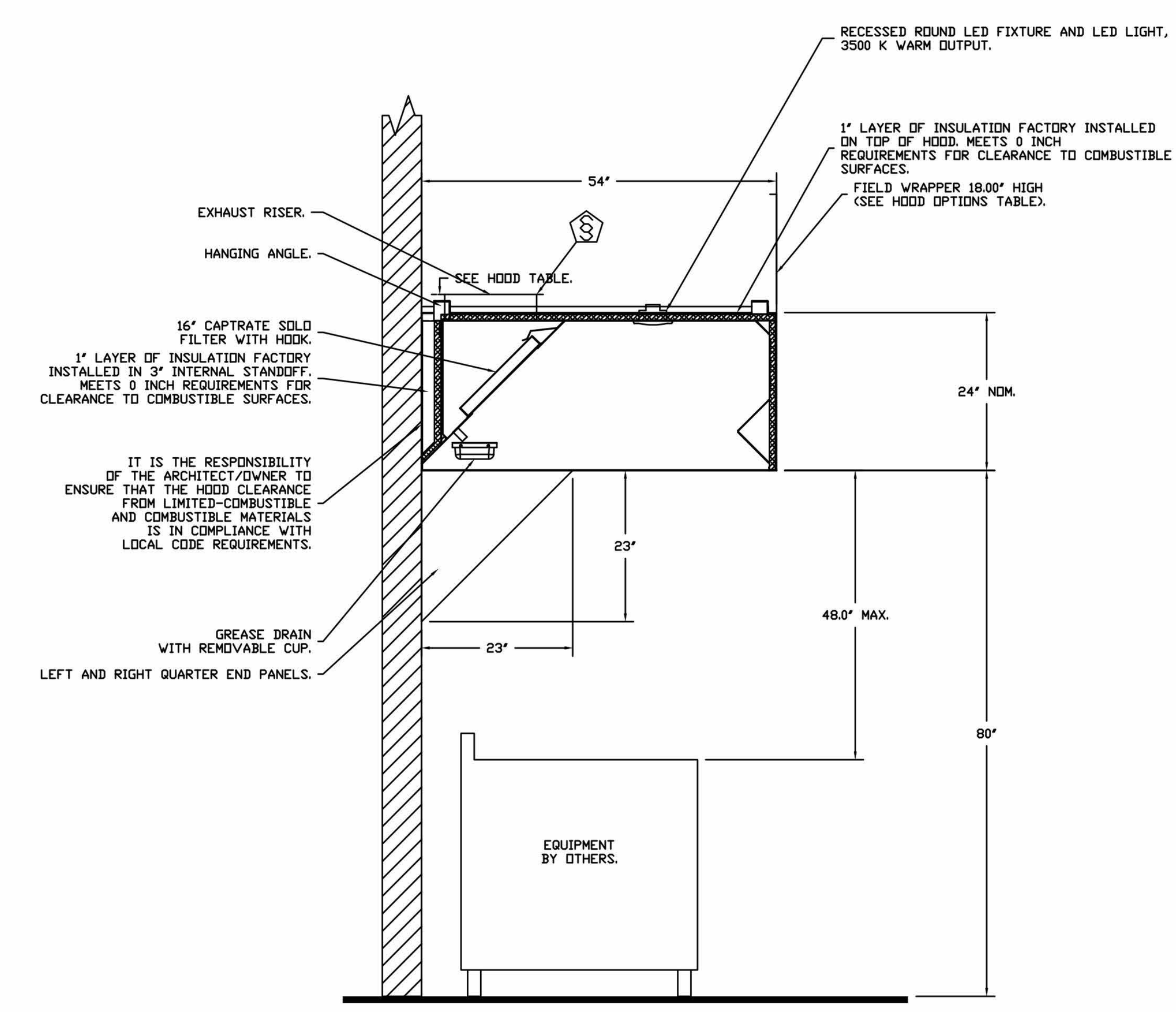


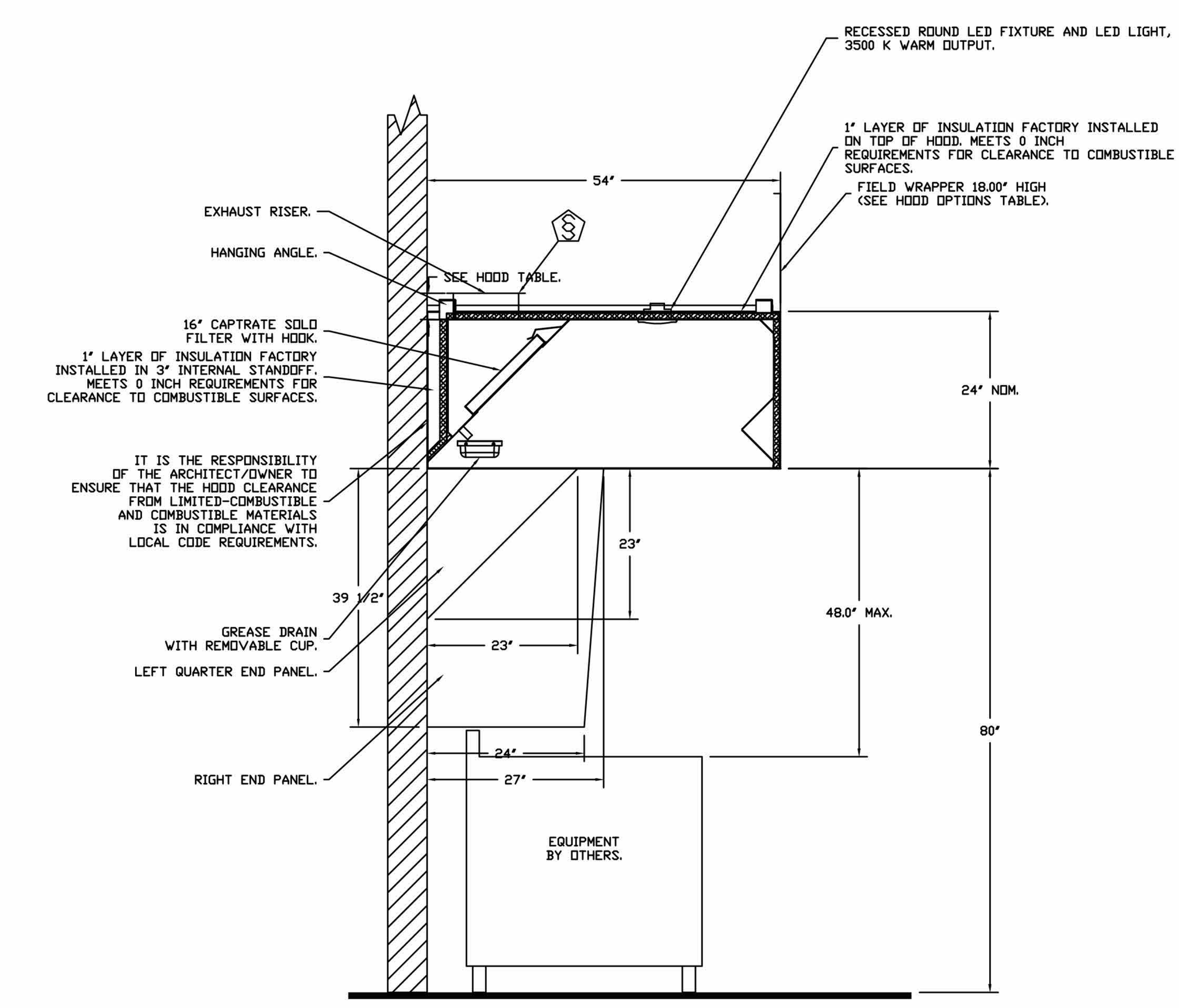
PLAN VIEW – HOOD #1 (ITEM 33A)
8' 0.00" LONG 5424ND-2



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)

FOR QUESTIONS, CALL THE:
KANSAS CITY REGIONAL OFFICE
1126 SWIFT STREET, KANSAS CITY, MO 64116
PHONE: (816) 221-8575
FAX: (816) 221-8311

CUSTOMER APPROVAL TO MANUFACTURE:

- Approved as Noted ☐
- Approved with NO Exception Taken ☐
- Revise and Resubmit ☐

SIGNATURE ______________________

Your Title ______________ Date __________

*** 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 NO 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.

REVISIONS	
DESCRIPTION	DATE:

CAPTIVEAIRE
HBT Foodservice
www.captiveaire.com
104 W 9th St Suite 204, Kansas City, MO, 64105 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg96@captiveaire.com

Freddy's – Tulsa, OK
TULSA, OK, 74101

DATE: 9/12/2023
DWG.#: 6218655
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO.

davidson architecture&engineering
4301 Indian Creek Parkway
Overland Park, KS 66207
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fax: 913.451.9391
www.davidsonae.com

6/28/24
LICENSED PROFESSIONAL ENGINEER
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date 12/20/2023
drawn by Author
checked by Checker
revisions

OKLAHOMA PE CO. [illegible]

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

sheet number
M-300

drawing type PERMIT
project number 2023118

EXHAUST FAN INFORMATION – JOB#6218655

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	ITEM 74.1	1	CASRE18DD	CAPTIVEAIRE	1600	1.400	1105	ODP,PREMIUM	1.000	0.6270	3	208	3.8	928 FPM	282	15.7
2	ITEM 74.2	1	DU50HFA	CAPTIVEAIRE	775	1.250	1532	TEAO-ECM	0.500	0.3950	1	115	6.3	295 FPM	102	16.4

DOAS/RTU FAN SCHEDULE – JOB#6218655

FAN INFORMATION / ELECTRICAL INFORMATION

FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL CFM	WEIGHT (LBS)	ESP	HP	PHASE	VOLT	MCA	MOCP
3	DOAS-1	1	CASRTU3-I.250-15-15T	CAPTIVEAIRE	15P-3	0	2300	2300	2517	0.500	2.00	3	208	59.2A	60A

COOLING INFORMATION

FAN UNIT NO	OUTSIDE AIR DB	OUTSIDE AIR WB	MIXED AIR DB	MIXED AIR WB	LEAVING AIR DB	LEAVING AIR WB	LEAVING AIR DP	CAPACITY TOTAL	CAPACITY SENS.	IEER	ISMRE
3	85.5°F	77.9°F	85.5°F	77.9°F	55.7°F	53.9°F	52.7°F	186.0 MBH	71.3 MBH	18.8	5.7

REHEAT INFORMATION / GAS HEAT INFORMATION

FAN UNIT NO	DISCHARGE DB	DISCHARGE WB	CAPACITY DESIRED	CAPACITY MAX	MOISTURE REMOVAL RATE	GAS TYPE	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	NOTES
3	70.0°F	59.5°F	35.7 MBH	129.6 MBH	103.4 LBS/HR	NATURAL	200440	162356	61°F	7 IN. W.C. – 14 IN. W.C.	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15

NOTES:
1. INVERTER SCROLL COMPRESSOR WITH INTEGRATED OIL SENSOR. DIGITAL OR STAGED SCROLL NOT AN APPROVED EQUAL
2. DIRECT DRIVE PLENUM BLOWER. BELT DRIVEN BLOWERS ARE NOT ACCEPTABLE
3. INTEGRATED MONITORING VIA CELLULAR CONNECTION BY MANUFACTURER
4. REFRIGERATION PRESSURE MONITORING ON HIGH AND LOW PRESSURE SIDE OF SYSTEM INCLUDED THROUGH DIGITAL INTERFACE
5. EC MOTOR CONDENSING FANS
6. ELECTRONIC EXPANSION VALVE. TXV NOT ACCEPTABLE
7. SUCTION LINE ACCUMULATOR
8. FACTORY COMMISSIONING WITH 5 YEAR PARTS WARRANTY, 25 YEAR WARRANTY ON STAINLESS STEEL HEAT EXCHANGER
9. AVERAGING INTAKE, EVAP AND DISCHARGE TEMPERATURE SENSORS (DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT)
10. 2" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-13 INSULATION-MINIMUM 20GA EXTERIOR W/ 14GA BASE
11. 81% EFFICIENT FURNACE, WITH MODULATING INDUCER TO MAINTAIN CONSTANT COMBUSTION EFFICIENCY ACROSS FIRING RANGE. 6:1 TURNDOWN WITH NG AND 5:1 TURNDOWN WITH LP
12. SUPPLY CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE
13. FULLY MODULATING HOT GAS REHEAT
14. HAIL GUARD FOR CONDENSING COIL
15. DOWN DISCHARGE/DOWN RETURN

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	ITEM 74.1	1	UTILITY SET GREASE CUP
		1	RE18 – DISCHARGE EXTENSION ASSEMBLY WITH HARDWARE
		1	2 YEAR PARTS WARRANTY
2	ITEM 74.2	1	GREASE BOX
		1	UPBLAST FAN WHEEL ACCESS PORT
		1	36" TALL STRAIGHT WIND BAND EXTENSION 13 (SHIPS LOOSE)
		1	GUY LINE EYE BOLTS – USED FOR 3 GUY LINE TIE OFF POINTS
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION
		1	2 YEAR PARTS WARRANTY
3	DOAS-1	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE
		1	SHIP LOOSE GAS STRAINER 1"
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE
		1	CASLINK BUILDING MONITORING SYSTEM – INTERNET OR CELLULAR CONNECTION REQUIRED
		1	RTU3 DOWN DISCHARGE
		1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4)
		1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4)
		1	OVERHEAT STAT
		1	OCCUPIED SCHEDULING
		1	RTU3 CURB DUCT HANGER
		1	24VAC FIRE INPUT
		1	RTU3 DOWN RETURN
		1	RTU RETURN MOUNTED SMOKE DETECTOR AND SAMPLING TUBE – FACTORY INSTALLED
		1	CLOGGED FILTER SWITCH – NOTIFICATION ON HMI
		1	15 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS
		1	15 TON MODULATING REHEAT OPTION – SPACE DEWPOINT CONTROL
		1	RTU INTAKE/RETURN DAMPER – MANUAL CONTROL VIA HMI
		1	RTU3 HAIL GUARD
		1	UNIT MOUNTED VFD CONFIGURED FOR DCV
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS)

FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	ITEM 74.1	YES						
2	ITEM 74.2	YES						

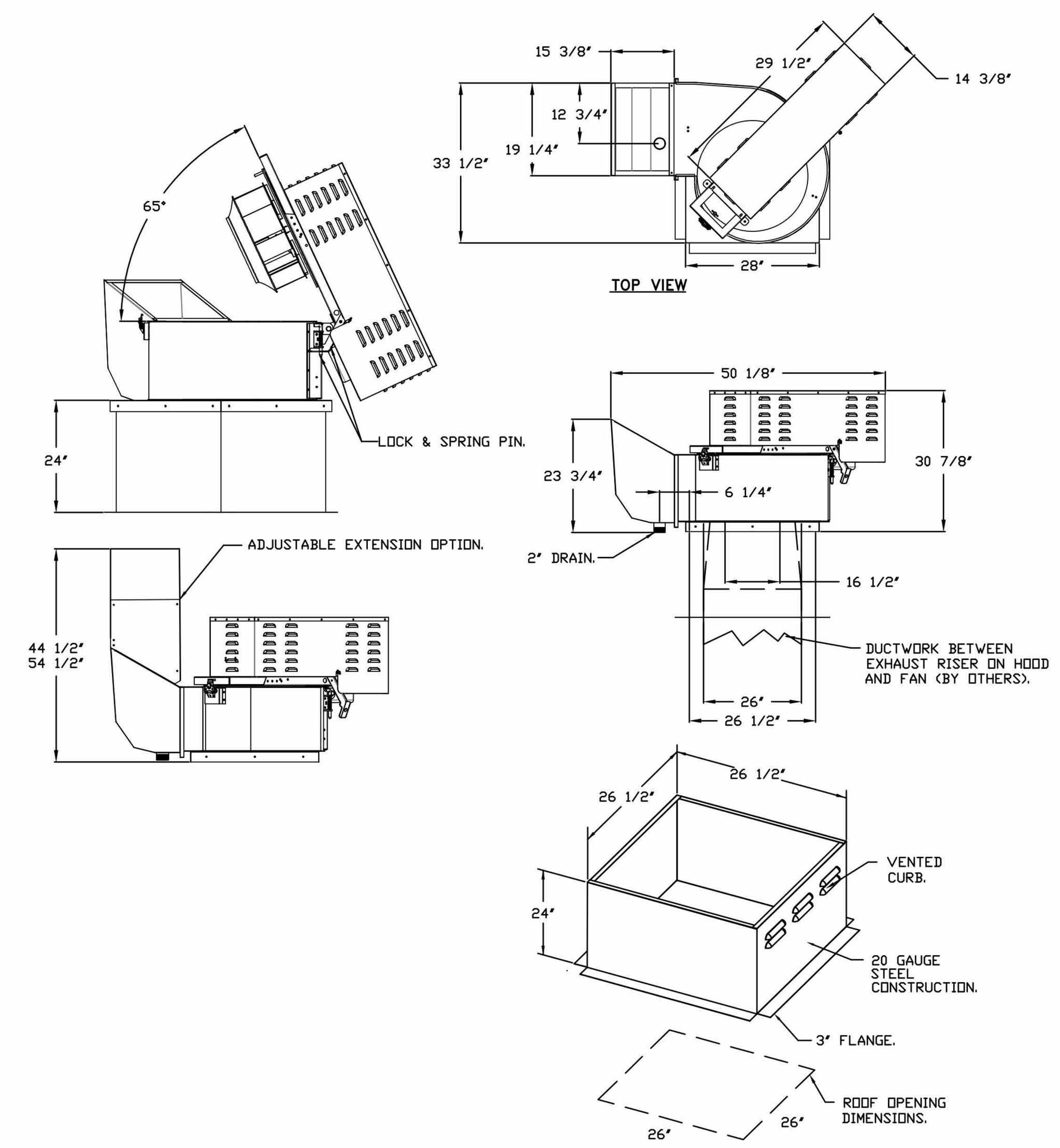
CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	ITEM 74.1	30 LBS	CURB	26.500"W X 26.500"L X 24.000"H VENTED.
2	# 2	ITEM 74.2	31 LBS	CURB	19.500"W X 19.500"L X 20.000"H VENTED HINGED.
3	# 3	DOAS-1	104 LBS	CURB	59.500"W X 91.000"L X 14.000"H INSULATED.

HMI SCHEDULE

UNIT NUMBER	HMI #	HMI LOCATION	TEMP AVERAGING
FAN #3	HMI #1 – UNIT HMI #1	MOUNTED IN UNIT	NOT AVERAGED
FAN #3	HMI #2 – SPACE HMI #1	OFFICE	AVERAGED
FAN #3	HMI #3 – SPACE HMI #2	KITCHEN	NOT AVERAGED

FAN #1 CASRE18DD – EXHAUST FAN (ITEM 74.1)



FEATURES:

- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL762 AND ULC-S645.
- HIGH HEAT OPERATION DIRECT DRIVE 300°F (149°C).
- HEAT SLINGER.
- GREASE CLASSIFICATION TESTING.
- TILT OUT WHEEL.
- LOCKING PIN FOR POWER PACK.
- MOTOR WEATHER COVER.
- INTERLOCKED DISCONNECT SWITCH.
- NEMA 4X SAFETY DISCONNECT SWITCH.

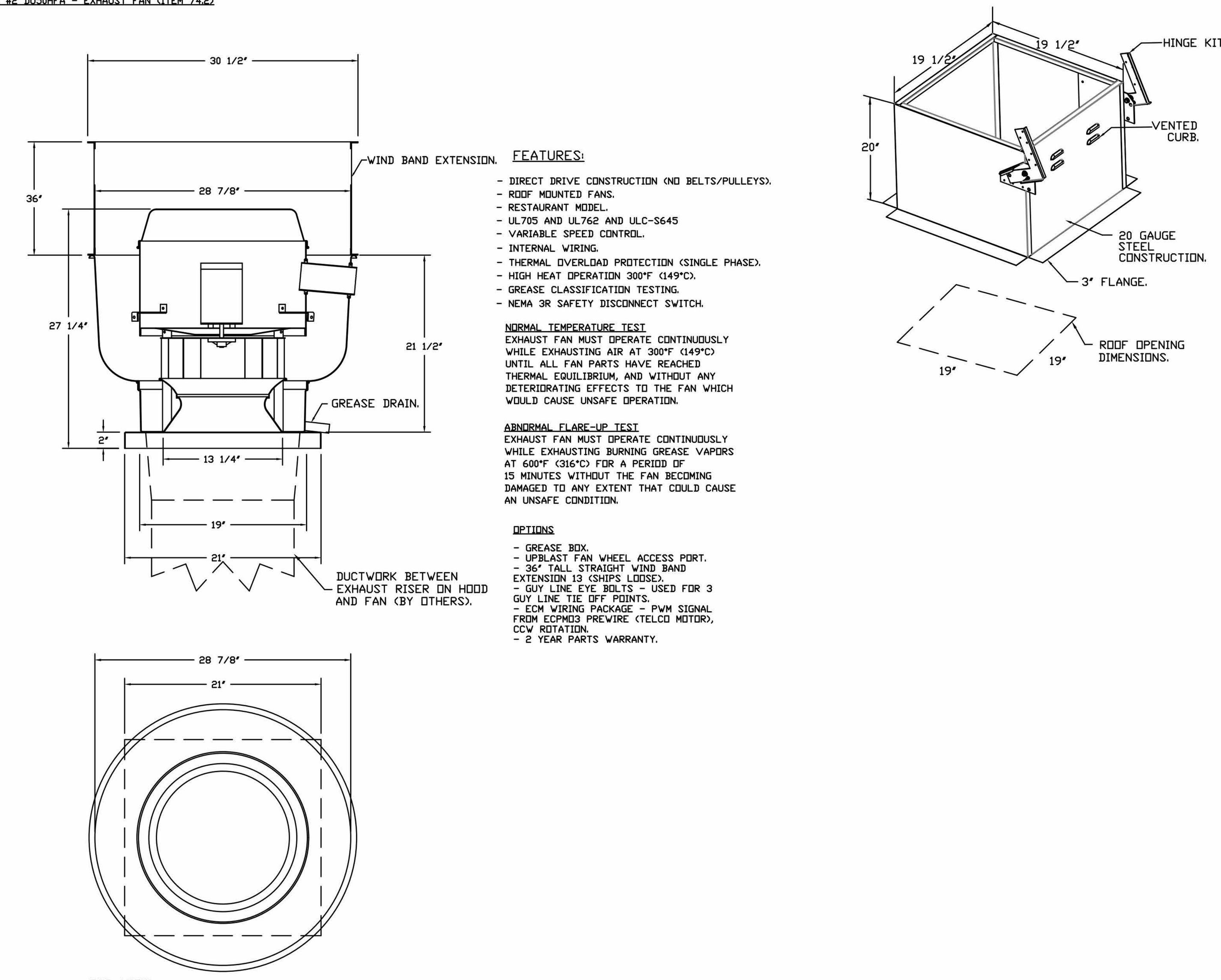
NORMAL TEMPERATURE TEST DIRECT DRIVE
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST BELT & DIRECT DRIVE
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

- UTILITY SET GREASE CUP.
- RE18 – DISCHARGE EXTENSION ASSEMBLY WITH HARDWARE.
- 2 YEAR PARTS WARRANTY.

FAN #2 DU50HFA – EXHAUST FAN (ITEM 74.2)



FEATURES:

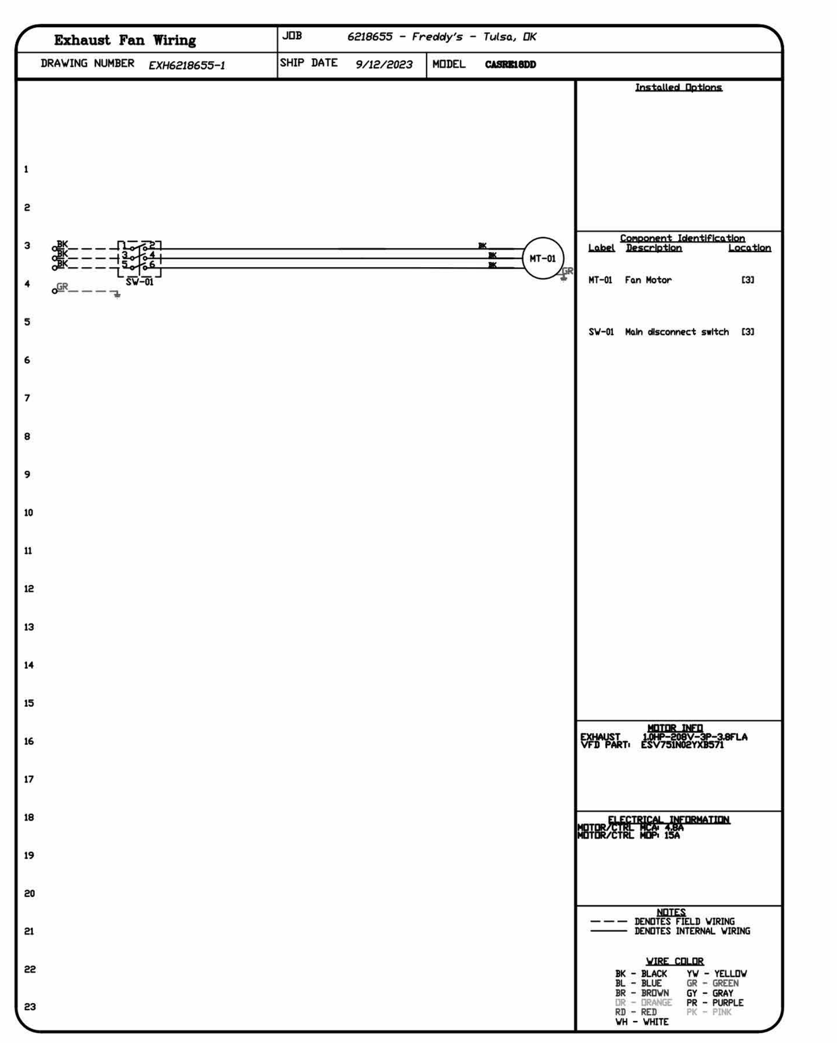
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT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

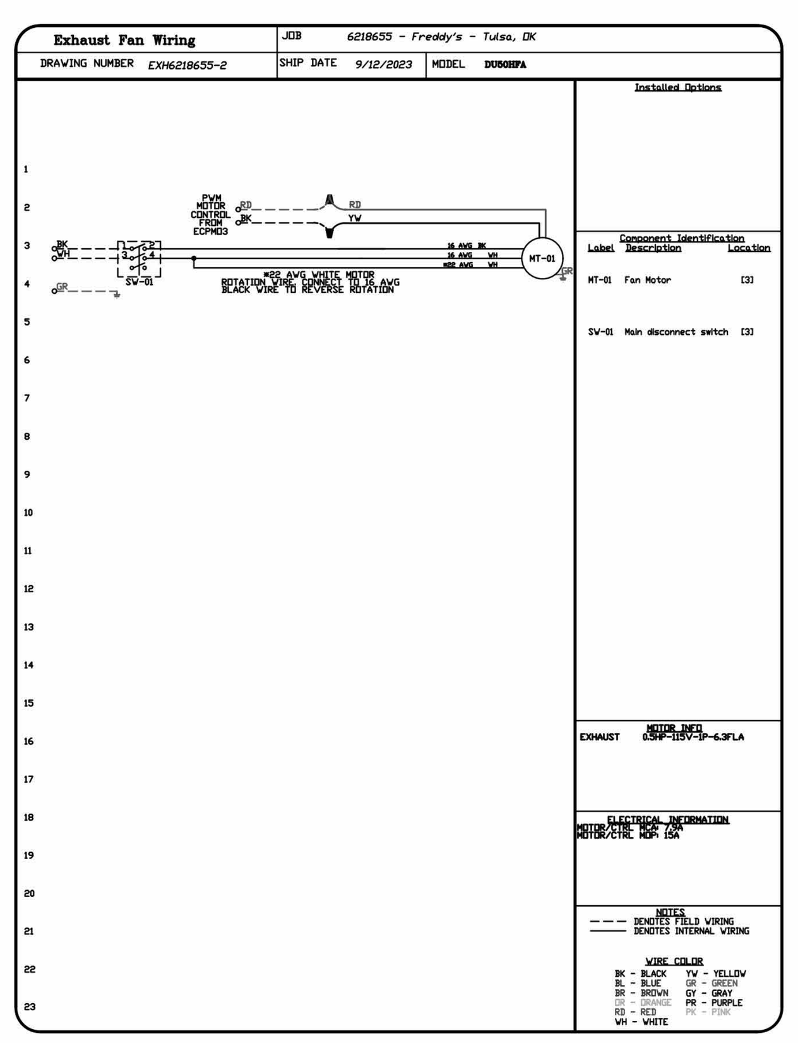
NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

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.
- UPBLAST FAN WHEEL ACCESS PORT.
- 36" TALL STRAIGHT WIND BAND EXTENSION 13 (SHIPS LOOSE).
- GUY LINE EYE BOLTS – USED FOR 3 GUY LINE TIE OFF POINTS.
- ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
- 2 YEAR PARTS WARRANTY.





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REVISIONS

DESCRIPTION	DATE

Freddy's – Tulsa, OK
TULSA, OK, 74101

DATE: 9/12/2023
DWG.#: 6218655
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING
SHEET NO. 2

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Overland Park, KS 66207
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6/28/24
LICENSED PROFESSIONAL ENGINEER
ERIK BRADLEY KNUDSEN
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a new restaurant for:
FREDDY'S
5119 E 51st Street
Tulsa, OK 74135

date 12/20/2023
drawn by Author
checked by Checker
revisions

OKLAHOMA PE COA #CA1900PE

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

sheet number
M-301

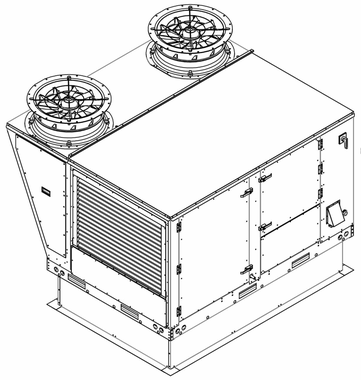
drawing type
PERMIT
project number
2023118

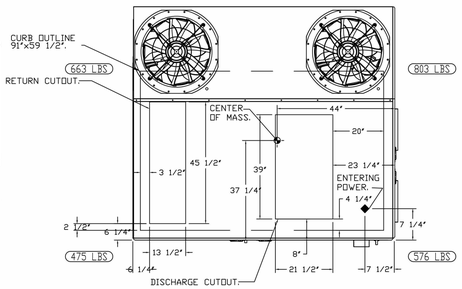
FAN #3 CASRTU3-1250-15-15T - HEATER (DOAS-1)

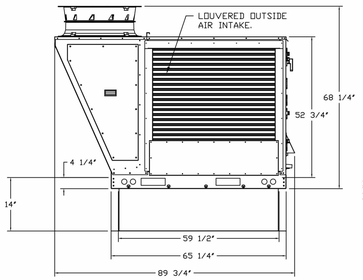
NOTES:

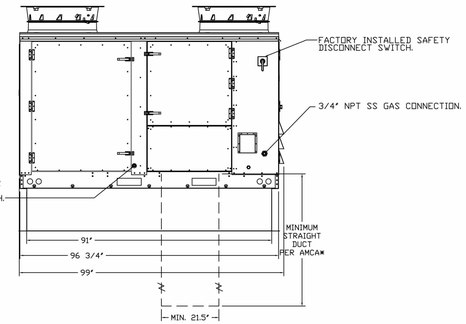
1. DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
2. ( ) DENOTES CORNER WEIGHT.
3. ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

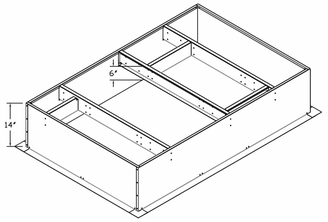
*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE 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 21.5" x 39".

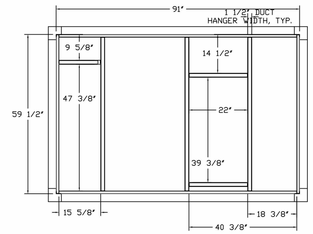


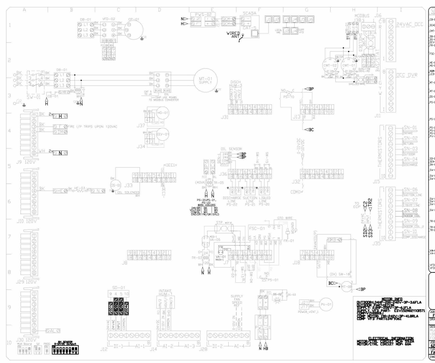


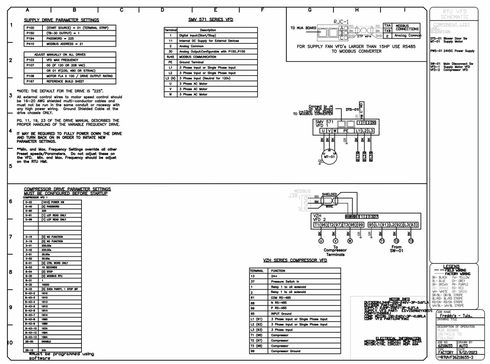


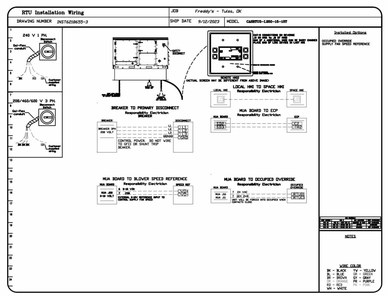












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	DESCRIPTION	DATE:
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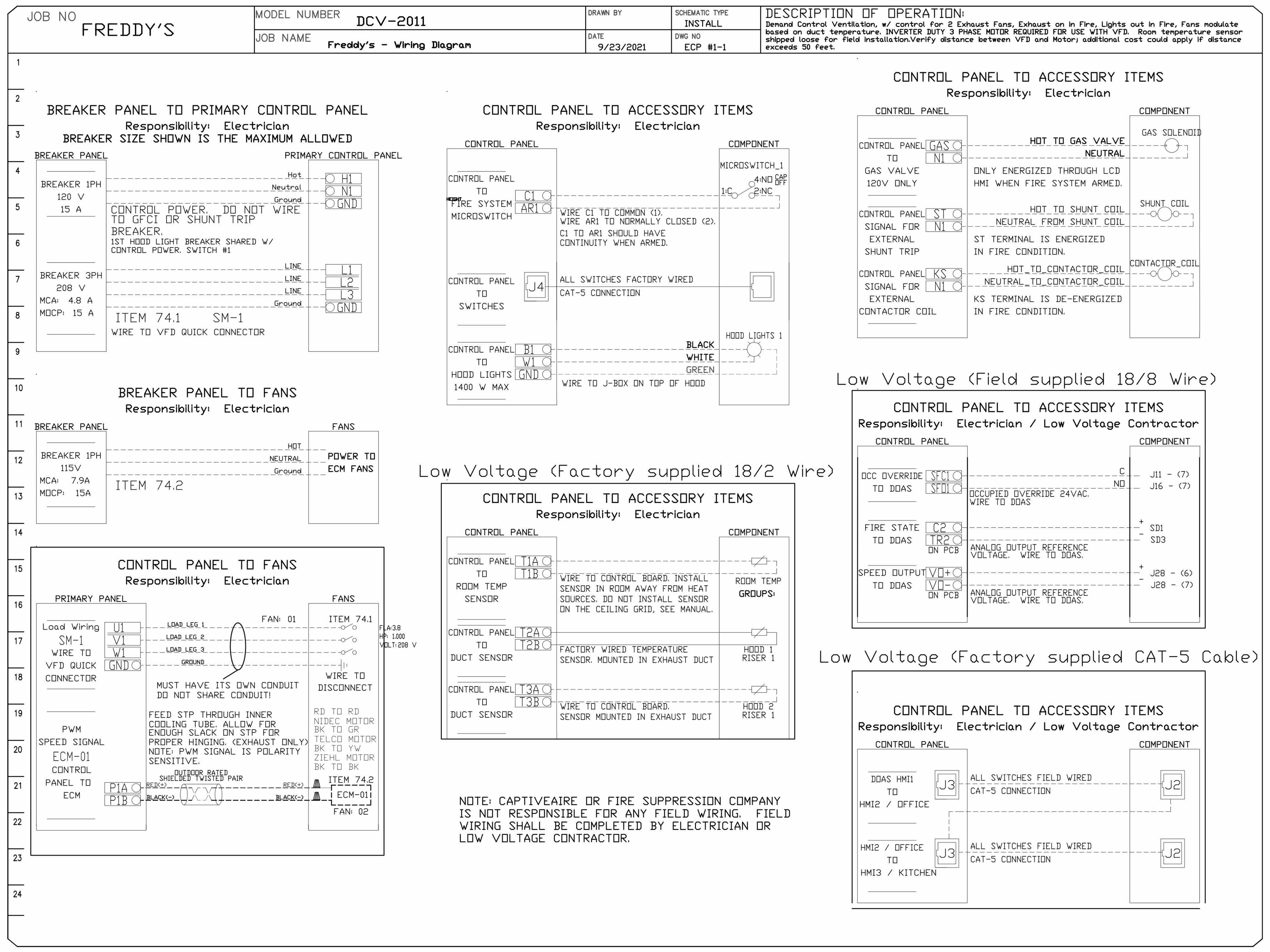
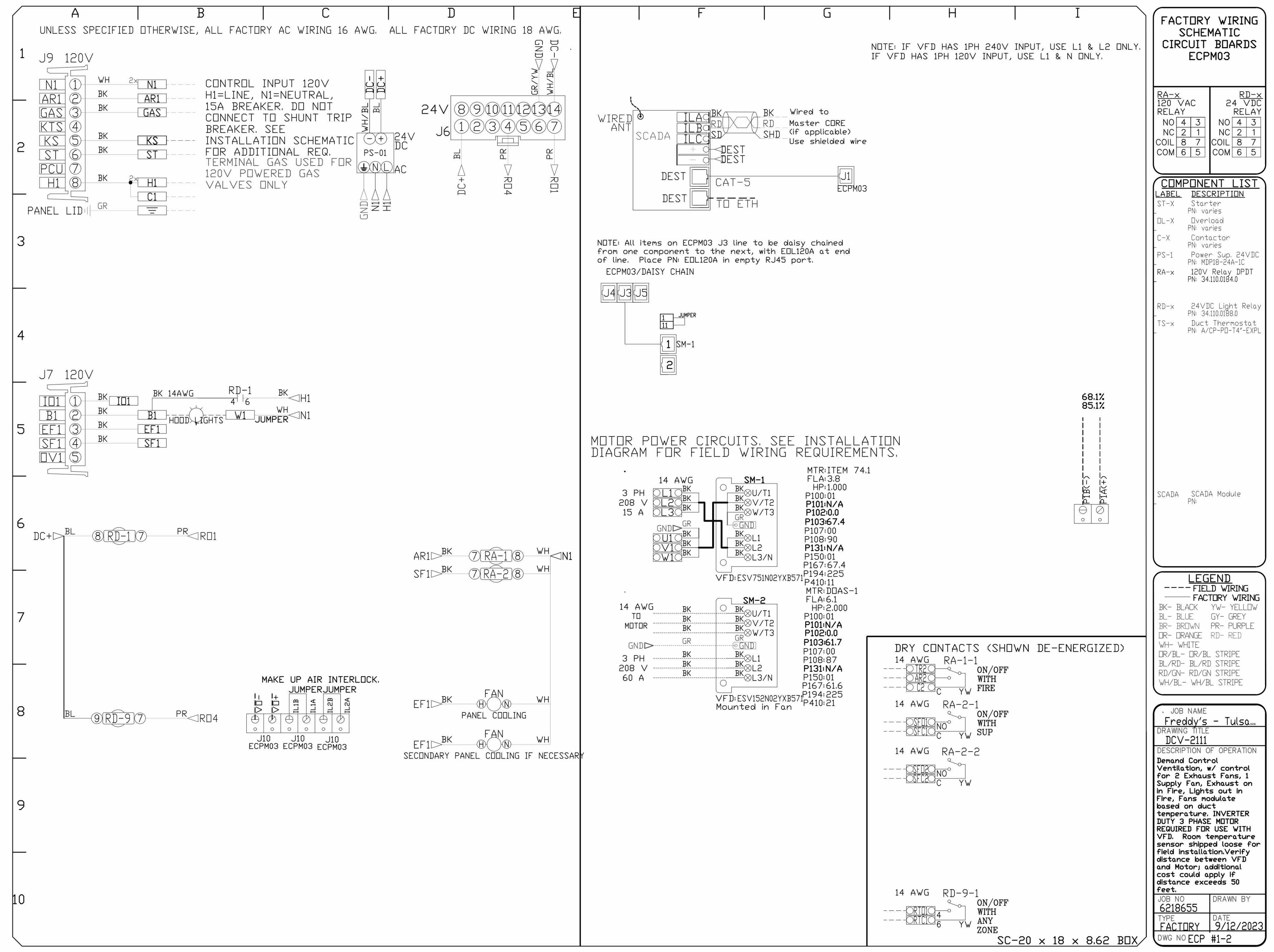
ELECTRICAL PACKAGE – JOB#6218655

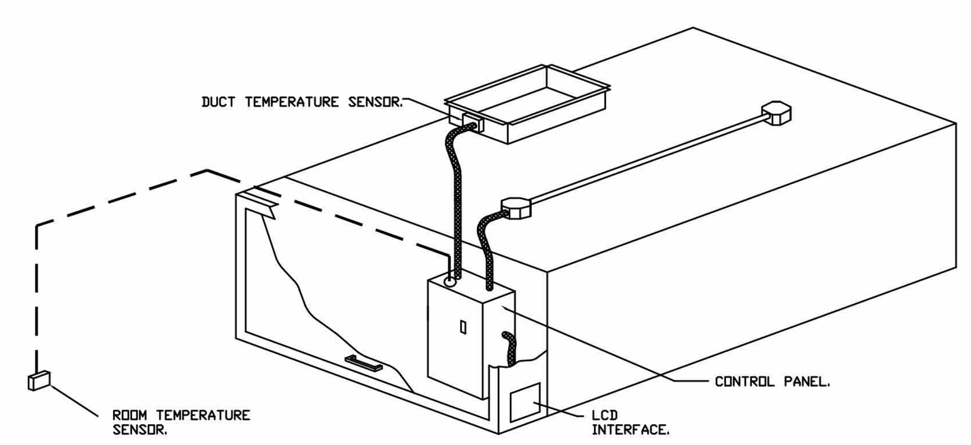
NO	TAG	PACKAGE #	LOCATION	SWITCHES LOCATION	SWITCHES QUANTITY	OPTION	FANS CONTROLLED FAN TAG	TYPE	ϕ	HP	VOLT	FLA
1	ECP-1	DCV-2111	UTILITY CABINET LEFT	UTILITY CABINET LEFT	1 LIGHT	SMART CONTROLS DCV	ITEM 74.1	EXHAUST	3	1.000	208	3.8
				HOOD # 1	1 FAN		ITEM 74.2	EXHAUST	1	0.500	115	6.3
							DOAS-1	SUPPLY	3	2.000	208	6.1





DEMAND CONTROL VENTILATION HOOD CONTROL PANEL SPECIFICATIONS:

- CONTROLS SHALL BE LISTED BY ETL (UL 508A) AND SHALL COMPLY WITH DEMAND VENTILATION SYSTEM TURNDOWN REQUIREMENTS OUTLINED IN IECC 403.7.5 (2021).
- THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.
- TEMPERATURE PROBE(S) LOCATED IN THE EXHAUST DUCT RISER(S) SHALL BE CONSTRUCTED OF STAINLESS STEEL.
- A DIGITAL CONTROLLER SHALL BE PROVIDED TO ACTIVATE THE HOOD EXHAUST FANS DYNAMICALLY BASED ON A FIXED DIFFERENTIAL BETWEEN THE AMBIENT AND DUCT TEMPERATURES SENSORS. THIS FUNCTION SHALL MEET THE REQUIREMENTS OF IMC 507.1.1.
- A DIGITAL CONTROLLER SHALL PROVIDE ADJUSTABLE HYSTERESIS SETTINGS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND/OR THE HEAT IN THE EXHAUST SYSTEM IS REDUCED.
- A DIGITAL CONTROLLER SHALL PROVIDE AN ADJUSTABLE MINIMUM FAN RUN-TIME SETTING TO PREVENT FAN CYCLING.
- VARIABLE FREQUENCY DRIVES (VFDS) SHALL BE PROVIDED FOR FANS AS REQUIRED. THE DIGITAL CONTROLLER SHALL MODULATE THE VFDS BETWEEN A MINIMUM SETPOINT AND A MAXIMUM SETPOINT ON DEMAND. THE DUCT TEMPERATURE SENSOR INPUT(S) TO THE DIGITAL CONTROLLER SHALL BE USED TO CALCULATE THE SPEED REFERENCE SIGNAL.
- THE VFD SPEED RANGE OF OPERATION SHALL BE FROM 0% TO 100% FOR THE SYSTEM, WITH THE ACTUAL MINIMUM SPEED SET AS REQUIRED TO MEET MINIMUM VENTILATION REQUIREMENTS.
- AN INTERNAL ALGORITHM TO THE DIGITAL CONTROLLER SHALL MODULATE SUPPLY FAN VFD SPEED PROPORTIONAL TO ALL EXHAUST FANS THAT ARE LOCATED IN THE SAME FAN GROUP AS THE SUPPLY FAN.
- THE SYSTEM SHALL OPERATE IN PREP MODE DURING LIGHT COOKING LOAD OR COOL DOWN MODE WHEN SUFFICIENT HEAT REMAINS UNDERNEATH THE HOOD SYSTEM AFTER COOKING OPERATIONS HAVE COMPLETED. OPERATION DURING EITHER OF THESE PERIODS WILL DISABLE THE SUPPLY FANS AND PROVIDE AN EXHAUST FAN SPEED THAT IS EQUAL TO THE MINIMUM VENTILATION REQUIREMENT.
- A DIGITAL CONTROLLER SHALL DISABLE THE SUPPLY FAN(S), ACTIVATE THE EXHAUST FAN(S), ACTIVATE THE APPLIANCE SHUNT TRIP, AND DISABLE AN ELECTRIC GAS VALVE AUTOMATICALLY WHEN FIRE CONDITION IS DETECTED ON A COVERED HOOD.
- A DIGITAL CONTROLLER SHALL ALLOW FOR EXTERNAL BMS FAN CONTROL VIA DRY CONTACT (EXTERNAL CONTROL SHALL NOT OVERRIDE FAN OPERATION LOGIC AS REQUIRED BY CODE).
- AN LCD INTERFACE SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:
  A. ON/OFF PUSH BUTTON FAN & LIGHT SWITCH ACTIVATION.
  B. INTEGRATED GAS VALVE RESET FOR ELECTRONIC GAS VALVES (NO RESET RELAY REQUIRED).
  C. VFD FAULT DISPLAY WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  D. DUCT TEMPERATURE SENSOR FAILURE DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  E. MIS-WIRED DUCT TEMPERATURE SENSOR DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
  F. A SINGLE LOW VOLTAGE CAT-5 RJ45 WIRING CONNECTION.
  G. AN ENERGY SAVINGS INDICATOR THAT UTILIZES MEASURED KWH FROM THE VFDS.

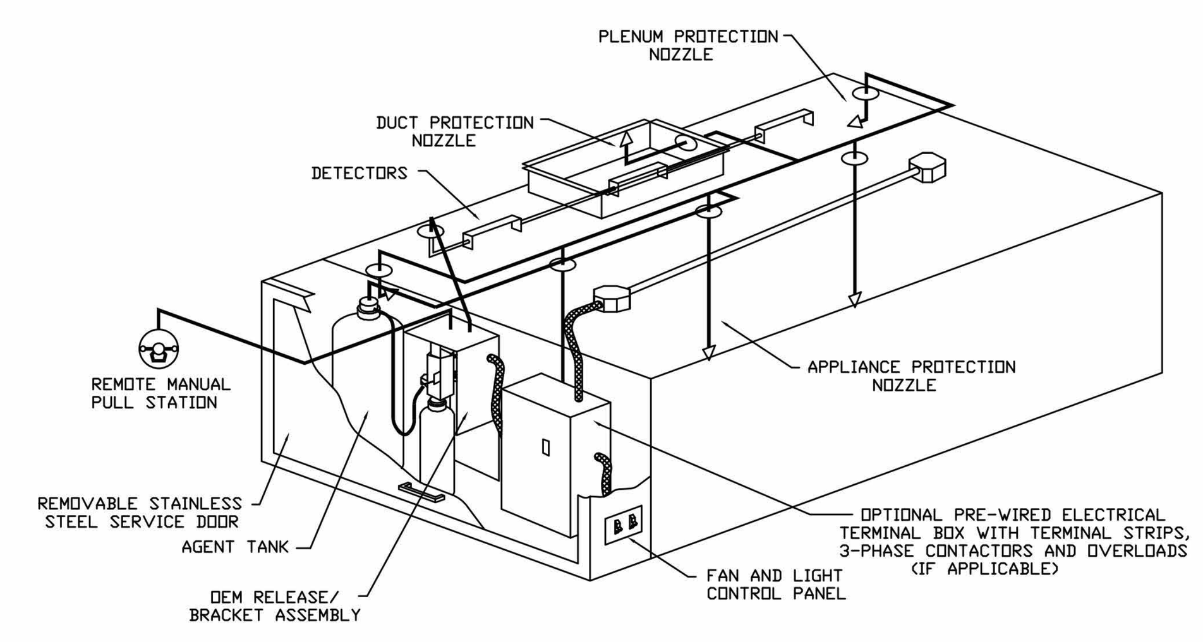


TYPICAL HOOD CONTROL PANEL INSTALLATION

SEQUENCE OF OPERATIONS:

THE HOOD CONTROL PANEL IS CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY GIVEN TIME:

- AUTOMATIC: THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR. FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD. DEPENDING ON THE JOB CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC. THESE TERMS REFER TO WHETHER A VARIABLE MOTOR (SUCH AS EC MOTORS OR VFD DRIVEN MOTORS) MODULATE WITH TEMPERATURE. IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS "DYNAMIC", THESE WILL MODULATE WITHIN A USER-DEFINED RANGE BASED ON THE TEMPERATURE DIFFERENTIAL. PANELS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS "STATIC", FANS WILL RUN AT A SET SPEED CALCULATED FOR THE DRIVE. DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN IECC 403.7.5 (2021).
- MANUAL: THE SYSTEM OPERATES BASED ON HUMAN INPUT FROM AN HMI.
- SCHEDULE: A WEEKLY SCHEDULE CAN BE SET TO RUN FANS FOR A SPECIFIED PERIOD THROUGHOUT THE DAY. THERE ARE THREE OCCUPIED TIMES PER DAY TO ALLOW FOR THE USER TO SET UP A TIME THAT IS SUITABLE TO THEIR NEEDS. ANY TIME THAT IS WITHIN THE DEFINED OCCUPIED TIME, THE SYSTEM WILL RUN AT MODULATION MODE AND FOLLOW THE FAN PROCEDURE ALGORITHM BASED ON TEMPERATURE DURING THIS TIME. DURING UNOCCUPIED TIME, THE SYSTEM WILL HAVE AN EXTRA OFFSET TO PREVENT UNINTENDED ACTIVATION OF THE SYSTEM DURING A TIME WHERE THE SYSTEM IS NOT BEING OCCUPIED.
- OTHER: THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (DDC, BMS OR HARD-WIRED INTERLOCK).
- FIRE: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO TO RUN, THE HOOD MAKEUP AIR WILL SHUTDOWN, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE SHUNT TRIP BREAKER PROVIDED BY THE ELECTRICIAN. FUEL GAS WILL SHUT OFF VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.



TYPICAL ANSUL R-102 SYSTEM LAYOUT

SPECIFICATIONS

THE RESTAURANT FIRE SUPPRESSION SYSTEM SHALL BE THE PRE-ENGINEERED TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION NETWORK. IT SHALL BE LISTED WITH UNDERWRITERS LABORATORIES, INC. (UL)

THE SYSTEM SHALL BE CAPABLE OF AUTOMATIC DETECTION AND ACTUATION WITH LOCAL OR REMOTE MANUAL ACTUATION. ACCESSORIES SHALL BE AVAILABLE FOR MECHANICAL OR ELECTRICAL GAS LINE SHUT-OFF APPLICATIONS.

THE EXTINGUISHING AGENT SHALL BE A POTASSIUM CARBONATE, POTASSIUM ACETATE-BASED FORMULATION DESIGNED FOR FLAME KNOCKDOWN AND SECUREMENT OF GREASE RELATED FIRES. IT SHALL BE AVAILABLE IN PLASTIC CONTAINERS WITH INSTRUCTIONS FOR LIQUID AGENT HANDLING AND USAGE.

THE REGULATED RELEASE MECHANISM SHALL BE COMPATIBLE WITH A FUSIBLE LINK DETECTION SYSTEM. THE FUSIBLE LINK SHALL BE SELECTED AND INSTALLED ACCORDING TO THE OPERATING TEMPERATURE IN THE VENTILATING SYSTEM. THE FUSIBLE LINK SHALL BE SUPPORTED BY A DETECTOR BRACKET/ LINKAGE ASSEMBLY.

REVISIONS

DESCRIPTION	DATE

CAPTIVEAIRE
www.captiveaire.com
HBT Foodservice
104 W 9th St Suite 204, Kansas City, MO, 64105 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: rep98@captiveaire.com

Freddy's - Tulsa, OK
TULSA, OK, 74101

DATE: 9/12/2023

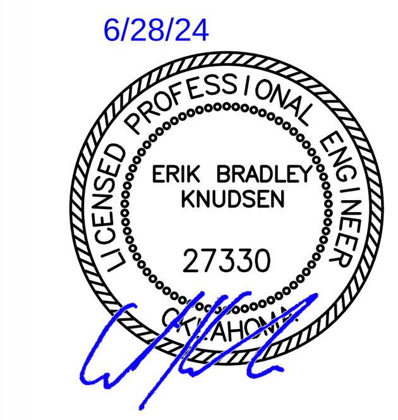
DWG.#: 6218655

DRAWN BY: michael.co

SCALE: 1/2" = 1'-0"

MASTER DRAWING

SHEET NO. 4



a new restaurant for:
FREDDY'S
5119 E 51st Street
Tulsa, OK 74135

date 12/20/2023
drawn by Author
checked by Checker
revisions

OKLAHOMA PE COA #CA1900PE

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

sheet number
M-303

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