
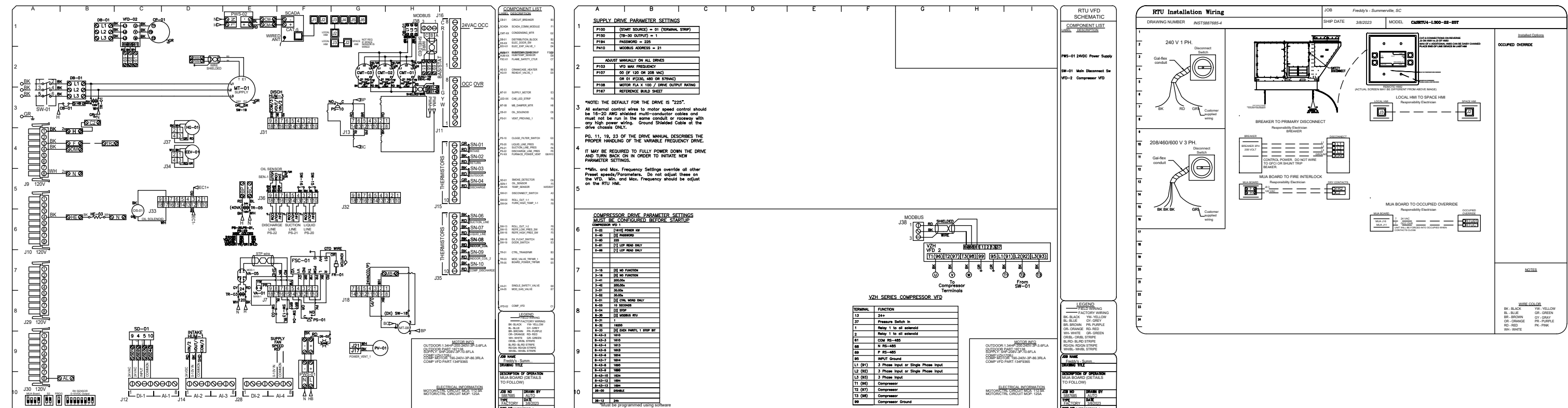
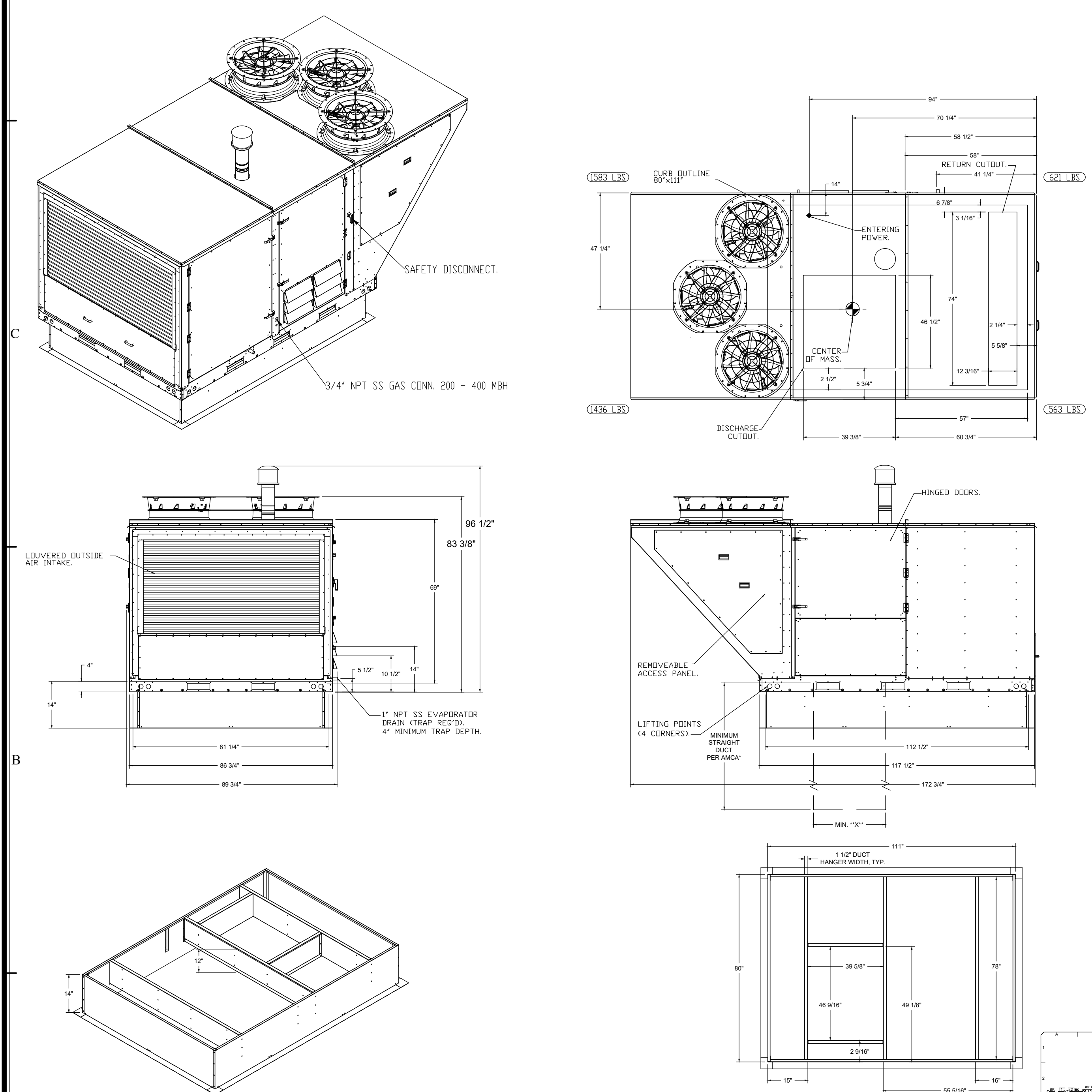


FAN #4 CASRTU4-1.300-22Z-25T - HEATER (DOAS-1)

NOTES:

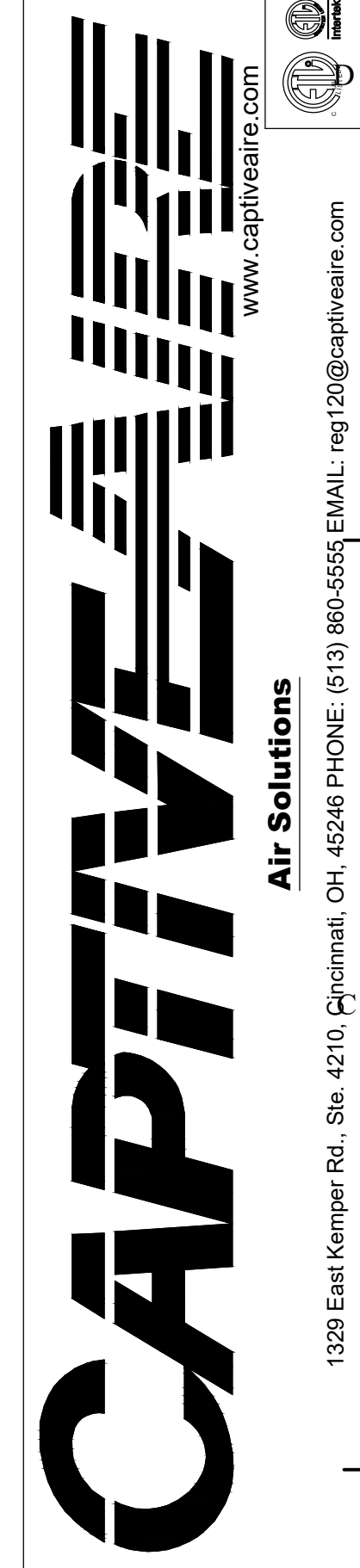
- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
-  DENOTES CORNER WEIGHT.
- ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

\*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 30.875" x 30.75".



**CAPTIVEAIRE DETAILS FOR REFERENCE ONLY**

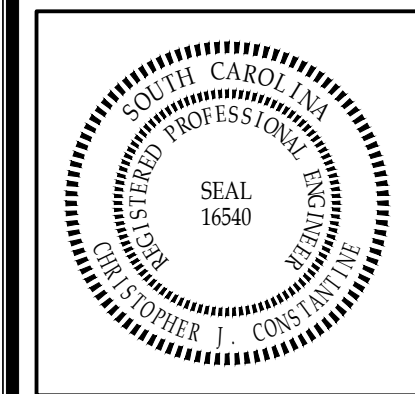
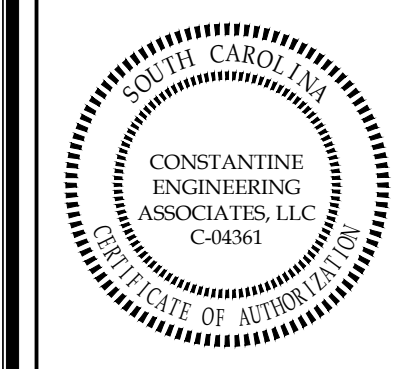
REVISIONS	
DESCRIPTION	DATE



Freddy's - Summerville, SC  
SUMMERVILLE, SC, 29485

DATE: 3/8/2023  
DWG.#: 5887685  
DRAWN BY: michael.co  
SCALE: 3/8" = 1'-0"  
MASTER DRAWING  
SHEET NO. 3

**CONSTANTINE ENGINEERING ASSOCIATES, LLC**  
1638 Svarnahill Hwy, #151, Charleston, SC 29407  
Phone: 843.628.7878, Fax: 843.628.7881



**FREDDY'S FROZEN CUSTARD**  
SUMMERVILLE, SC  
DOAS UNIT DRAWINGS (FOR REFERENCE ONLY)

DESIGNED BY: CJC  
DRAWN BY: JZK  
CHECKED BY: DDF  
DATE: 03/23/23  
JOB NUMBER  
**23-020**  
SHEET NUMBER  
**M2.5**

# DRAWING NOTES

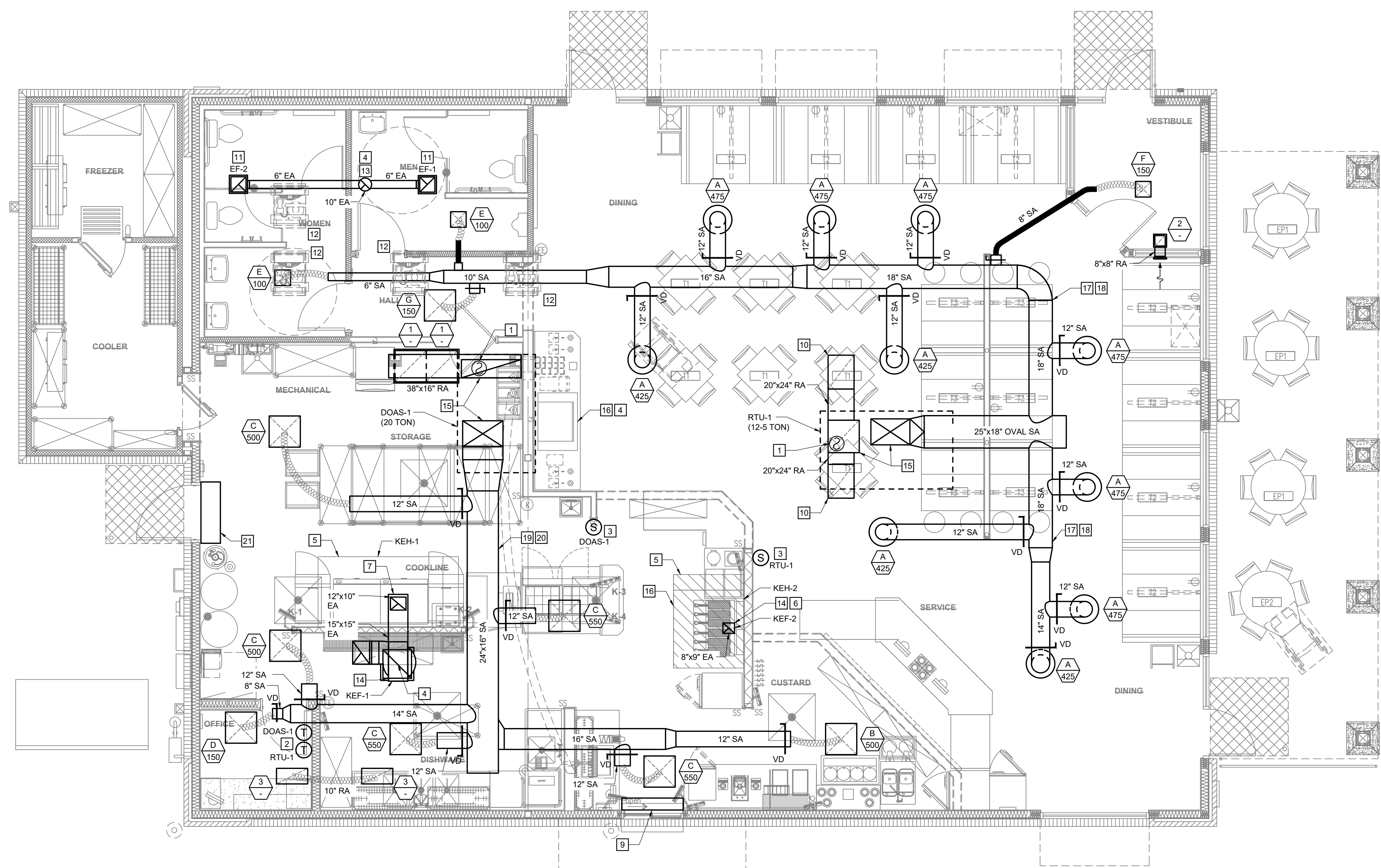
- 1 MOUNTING LOCATION FOR DUCT-MOUNTED SMOKE DETECTOR, & PROVIDE REMOTE ENUNCIATOR.
- 2 LOCATION OF RTU THERMOSTATS. GC TO LABEL EACH THERMOSTAT.
- 3 LOCATION OF RTU TEMPERATURE & HUMIDITY SENSORS MOUNTED 7'-0" AFF.
- 4 MAINTAIN A MIN. OF 10'-0" CLEARANCE BETWEEN ALL OUTDOOR AIR INTAKES & EXH/ FLUE OUTLETS.
- 5 EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTURERS INSTRUCTIONS.
- 6 TRANSITION AND CONNECT 8"x9" GREASE DUCT TO EXHAUST HOOD WITH GREASE DUCT AS SHOWN. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE. TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND/OR 5'-0" FROM PARAPET WALLS. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS.
- 7 TRANSITION AND CONNECT 15"x15" GREASE DUCT TO 12"x10" COLLARS ON EXHAUST HOODS. 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. REFER TO DETAIL ON SHEET M2. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AND ACCESS DOORS AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS.
- 8 PROVIDE LOCKING QUADRANT DAMPER FOR RETURN GRILL CONNECTION.
- 9 READY ACCESS MODEL AA300-275 PASS-THRU AIR CURTAIN SYSTEM.
- 10 RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM OF 14" CLEARANCE TO DECK
- 11 SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
- 12 MOUNT CONDENSING UNIT ON ROOF AS DETAILED AND AS REQUIRED BY THE MANUFACTURER. CONNECT REFRIGERANT PIPING AS REQUIRED BY THE MANUFACTURER. SEE ARCHITECTURAL PLANS FOR MOUNTING DETAIL.
- 13 ROUTE 10" Ø EXHAUST DUCT UP THROUGH ROOF TO ROOF CAP.
- 14 INSTALL CAPTIVE AIRE WBE WINDBAND EXTENSION FOR KEF-1 AND KEF-2 PROVIDED BY KITCHEN EQUIPMENT SUPPLIER.
- 15 COORDINATE DUCT DROP BETWEEN STRUCTURAL TRUSSES WITH SIZES SHOWN.
- 16 HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERED UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.
- 17 EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT.
- 18 COORDINATE DUCT ROUTING WITH LIGHTING.
- 19 ALL KITCHEN DUCTWORK IS INTENDED TO BE ROUTED THROUGH OR BETWEEN TRUSSES. COORDINATE WITH STRUCTURAL ENGINEER AND TRUSS MANUFACTURER FOR TRUSS BLOCKOUT DIMENSIONS.
- 20 COORDINATE WITH STRUCTURAL TO BLOCK OUT JOISTS AS REQUIRED TO RUN DUCT THROUGH STRUCTURE.
- 21 READY ACCESS MODEL RA-SHC07-1036AA AIR CURTAIN SYSTEM.

# GENERAL NOTES

1. PROVIDE LABOR, MATERIALS AND EQUIPMENT TO COMPLETE THE HVAC WORK INDICATED ON THE DRAWINGS AND AS REQUIRED BY LOCAL CODES AND ORDINANCES.
2. FURNISH AND INSTALL HEATING AND COOLING UNITS AS INDICATED ON THE DRAWINGS.
3. FABRICATE AND INSTALL DUCTWORK IN ACCORDANCE WITH SMACNA STANDARDS.
4. INSTALL CONTROL SYSTEM COMPLETE WITH WIRING, COMPONENTS, ETC., TO PERFORM CONTROL SEQUENCE AS PER FACTORY RECOMMENDATIONS.
5. INSTALL AND CONNECT THE HVAC SYSTEM IN STRICT ACCORDANCE WITH LOCAL CODES, ORDINANCES, 2021 SOUTH CAROLINA BUILDING CODE AND 2021 SOUTH CAROLINA MECHANICAL CODE.
6. ADJUST CONTROLS AND EQUIPMENT FOR PROPER OPERATION. LUBRICATE AND CLEAN EQUIPMENT PRIOR TO ACCEPTANCE OF BUILDING BY OWNER.
7. COORDINATE WORK WITH THE ELECTRICAL INSTALLER.
8. FURNISH THE OWNER WITH OPERATING MANUALS AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT INSTALLED.
9. GUARANTEE WORK INSTALLED UNDER THE CONTRACT TO BE FREE FROM DEFECTIVE WORKMANSHIP AND MATERIALS. USUAL WEAR EXPECTED. SHOULD SUCH DEFECTS DEVELOP WITHIN A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE BUILDING BY THE OWNER, REPAIR AND/OR REPLACE DEFECTIVE ITEMS AND DAMAGE, RESULTING FROM FAILURE OF THESE ITEMS, AT NO EXPENSE WHATSOEVER TO THE OWNER. PROVIDE FIVE (5) YEAR COMPRESSOR WARRANTY.

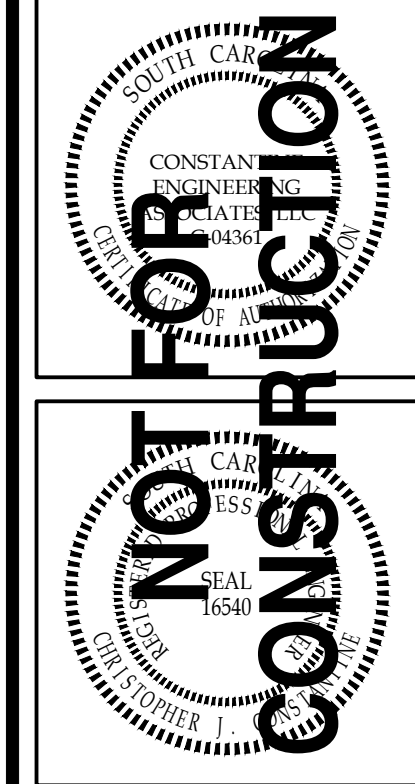
# LEGEND

- CEILING SUPPLY DIFFUSER
- CEILING RETURN GRILLE
- CEILING EXHAUST GRILLE
- SIDEWALL RETURN GRILLE
- EXHAUST FAN, EF
- SIDEWALL SPIN-IN W/DAMPER
- FLEXIBLE DUCT-MAX. 8' LONG  
SEE SCHEDULE FOR SIZES
- VD  
MANUAL VOLUME DAMPER
- DOAS DEDICATED OUTDOOR AIR SYSTEM
- CFM CUBIC FEET PER MINUTE
- EA EXHAUST AIR
- EF EXHAUST FAN
- HP HEAT PUMP
- OA OUTDOOR AIR
- RA RETURN AIR
- RD ROUND DUCT
- RTU ROOFTOP UNIT
- SA SUPPLY AIR
- T<sub>N</sub> THERMOSTAT, N DENOTES UNIT NUMBER
- S<sub>N</sub> REMOTE TEMPERATURE/HUMIDITY SENSOR,  
N DENOTES UNIT NUMBER
- 7/150 TOP: DIFFUSER TAG (SEE SCHEDULE)  
BOTTOM: AIRFLOW (CFM)
- ⊙ DUCT SMOKE DETECTOR WIRED BACK  
TO F.A.C.P. (SEE ELECTRICAL)



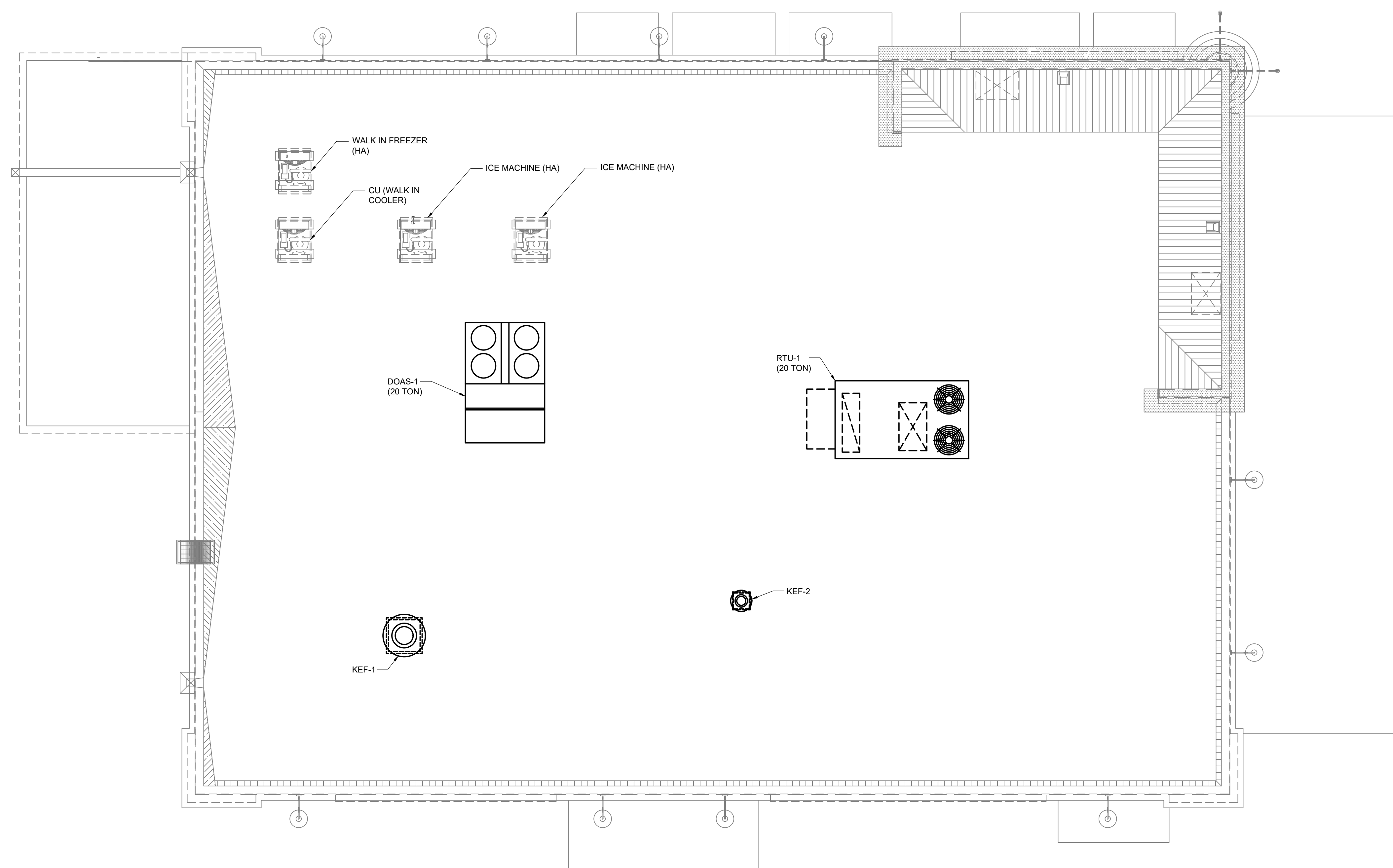
**A2 MECHANICAL PLAN**  
1/4" = 1'-0" 0 2' 4' 8'

**CONSTANTINE ENGINEERING ASSOCIATES, LLC**  
 1638 Swannah Hwy, #151, Charleston, SC 29407  
 Phone: 843.628.7878, Fax: 843.628.7881



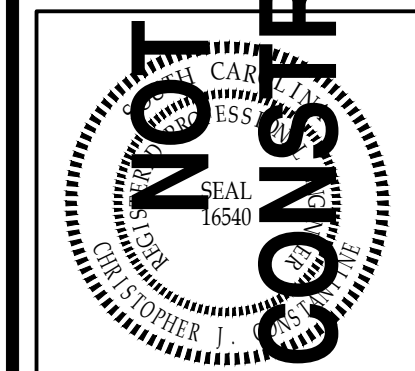
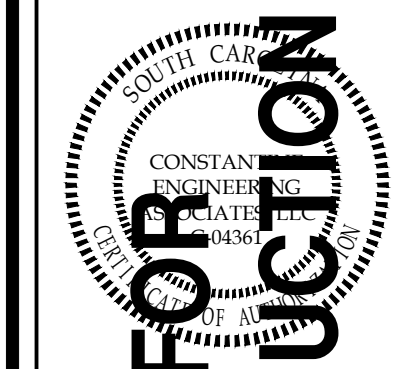
**FREDDY'S FROZEN CUSTARD**  
 SUMMERVILLE, SC  
 MECHANICAL PLAN

DESIGNED BY:	CJC
DRAWN BY:	JZK
CHECKED BY:	DDF
DATE:	03/23/23
JOB NUMBER	23-020
SHEET NUMBER	M1.1



**A2 MECHANICAL PLAN - ROOF**  
 1/4" = 1'-0"

**CONSTANTINE  
 ENGINEERING  
 ASSOCIATES, LLC**  
 1638 Swannah Hwy, #101, Charleston, SC 29407  
 Phone: 843.628.7878, Fax: 843.628.7881



**FREDDY'S FROZEN CUSTARD**  
 SUMMERVILLE, SC  
 MECHANICAL PLAN - ROOF

REVISIONS:

DESIGNED BY: CJC  
 DRAWN BY: JZK  
 CHECKED BY: DDF  
 DATE: 03/23/23

JOB NUMBER  
**23-020**

SHEET NUMBER  
**M1.2**

PACKAGED ROOFTOP UNIT SCHEDULE														
SYMBOL	AIR HANDLING SECTION				COOLING CAPACITY @97°F (MBTUH)			GAS HEATING SECTION		ELECTRICAL			FILTER	DESIGN BASIS
	TOTAL CFM	O.A. CFM	AIR ENTERING (AHR)	E.S.P. I.W.G.	TOTAL	SENS.	(I)EER	INPUT MBH	OUTPUT MBH	SYS. VOLTS	MCA (A)	MOCP (A)		
RTU-1	5,000	500	80°F db/67°F WB	1.00	154.80	116.10	(12.20)	240	192	208/3/60	71	90	MERV-11	LENNOX LGH150H4B

- NOTES:**
- PROVIDE WITH SINGLE POINT POWER CONNECTION.
  - UNITS TO BE DOWNFLOW TYPE AND MOUNTED ON SEISMIC CURBS SIZED TO MATCH UNIT AND SEISMICALLY MOUNTED TO ROOF. SEISMIC CURB DESIGN SHALL BE PROVIDED BY MECHANICAL INSTALLER'S SEISMIC SUPPLIER AS PART OF THE SUBMITTAL PROCESS. SEE STRUCTURAL DRAWINGS FOR CURB MOUNTING AND SUPPORT DETAILS.
  - PROVIDE WITH TIME INITIATED, TEMPERATURE DEFROST SYSTEM.
  - PROVIDE WIRED, 7-DAY PROGRAMMABLE, WALL MOUNTED THERMOSTATS FOR RTUs.
  - ECONOMIZER CONTROLS SHALL BE DIFFERENTIAL ENTHALPY WITH BAROMETRIC RELIEF.
  - PROVIDE DUCT MOUNTED SMOKE DETECTOR IN THE RETURN DUCT OF ALL ROOFTOP UNITS TO DE-ENERGIZE THE SUPPLY FAN SHOULD SMOKE BE DETECTED. DUCT MOUNTED SMOKE DETECTORS ARE FURNISHED BY FIRE ALARM, INSTALLED BY MECHANICAL AND WIRED BY FIRE ALARM.

DIFFUSER, REGISTER, AND GRILLE SCHEDULE													
MARK	MFR	MODEL	TYPE	USE			MTG	PANEL SIZE	NECK SIZE	DAMPER	FINISH	PATTERN	NOTES
				SPLY	RET	EXH							
A	TITUS	TMR	CEILING DIFFUSER	X			DUCT	22 Ø	SEE CHART	VD IN DUCT	WHITE	360°	FIELD PREP FOR PAINTING
B	TITUS	TMS/3	CEILING DIFFUSER	X			SURFACE	24X24	SEE CHART	VD IN DUCT	WHITE	4-WAY	
C	TITUS	TMS/3	CEILING DIFFUSER	X			SURFACE	24X24	SEE CHART	VD IN DUCT	WHITE	4-WAY	RETURN - NO DEFLECTOR
D	TITUS	T3SQ4	CEILING DIFFUSER	X			SURFACE	24X24	SEE CHART	VD IN DUCT	WHITE	HORIZONTAL	THERMAL VAV DIFFUSER
E	TITUS	TMS/3	CEILING DIFFUSER	X			SURFACE	12X12	SEE CHART	INTEGRAL	WHITE	4-WAY	O.B. DAMPER AND TRIM KIT
F	TITUS	TMS/3	CEILING DIFFUSER	X			SURFACE	12X12	SEE CHART	VD IN DUCT	WHITE	4-WAY	
G	TITUS	TMS/3	CEILING DIFFUSER	X			SURFACE	24X24	SEE CHART	VD IN DUCT	WHITE	4-WAY	
1	AMER. LOUVER CO.	STRATUS	CEILING GRILLE		X		LAY-IN	24X24	SEE CHART	N/A	WHITE	N/A	SEE NOTE 1.
2	TITUS	PAR/3	CEILING GRILLE		X		SURFACE	8X8	SEE CHART	N/A	WHITE	N/A	
3	TITUS	PAR/3	CEILING GRILLE		X		LAY-IN	12X24	SEE CHART	N/A	WHITE	N/A	

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

DESIGN LOAD CRITERIA								
WIND RESTRAINT LOADING			SEISMIC RESTRAINT LOADING					
BASIC WIND SPEED	BUILDING CLASSIFICATION CATEGORY	SITE CLASS	BUILDING CATEGORY	IMPORANCE FACTOR	RESPONSE MODIFICATION FACTOR	AMPLIFICATION FACTOR	SPECTRAL RESPONSE ACCELERATION (SHORT PERIODS) S <sub>0.5</sub>	SPECTRAL RESPONSE ACCELERATION (1-SEC PERIODS) S <sub>0.1</sub>
SEE STRUCTURAL	D	B	1.0	SEE STRUCTURAL	1.497G	NULL		

EXHAUST FAN SCHEDULE									
SYMBOL	MFR	MODEL	CFM	ST PR (W/G)	DRIVE	FAN RPM	MOTOR W	SYS. VOLTS	CONTROL
EF-1,2	LOREN COOK	GC-164	150	0.250	DIRECT	1300	136	120/1/60	SEE NOTE 1

- NOTES:**
- PROVIDE CEILING GRILLE, INTEGRAL BACK DRAFT DAMPER, VARIABLE SPEED CONTROLLER, AND ROOF CAP.

VENTILATION CALCULATION (PER 2021 IMC 403.1 & TABLE 403.3)																	
SYSTEM ID	ROOM TYPE	ROOM AREA (SQ. FT.)	OCCUPANCY CATEGORY	OCCUPANCY SUB-CATEGORY	OCCUPANCY DENSITY #/1000 SQ.FT.	OCCUPANCY COUNT (PER IMC)	OCCUPANCY COUNT (ACTUAL PER OWNER)	OUTSIDE AIR CFM/PERSON	OUTSIDE AIR CFM/SQ.FT.	REQUIRED OUTSIDE AIR CFM(TOTAL)	ZONE AIR DISTRIBUTION EFFECTIVENESS	CORRECTED OUTSIDE AIR CFM (PRESCRIPTIVE)	ACTUAL OUTSIDE AIR CFM SUPPLIED	EXHAUST AIR FLOW RATE CFM/SQ.FT. OR CFM/FIXTURE	REQUIRED EXHAUST AIR CFM(TOTAL)	ACTUAL EXHAUSTED AIR CFM	NOTES
DOAS-1	KITCHEN	1090	FOOD AND BEVERAGE SERVICE	KITCHENS (COOKING)	20	22	22	7.5	0.12	296	.80	370	3300	-	-	-	
RTU-1	DINING	1086	FOOD AND BEVERAGE SERVICE	KITCHENS (COOKING)	70	76	76	7.5	0.18	765	.80	957	500	-	-	-	
EF-1	RESTROOM	22	PUBLIC SPACES	TOILET ROOMS - PUBLIC	-	-	-	-	-	-	-	-	70	70	70	70	RATES ARE PER FIXTURE
EF-2	RESTROOM	47	PUBLIC SPACES	TOILET ROOMS - PUBLIC	-	-	-	-	-	-	-	-	70	70	70	70	RATES ARE PER FIXTURE
																	PER ASHRAE FUNDAMENTALS HANDBOOK, CHAPTER 15, EQN-52, INFILTRATION RATE PER DOOR OPENING, SEE NOTE 2.
																	TOTAL

### SEISMIC DESIGN CATEGORY D

- GENERAL NOTES:**
- PER THE 2021 SOUTH CAROLINA BUILDING CODE, MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AND COMPONENTS, INCLUDING THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED FOR SEISMIC FORCES IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7-16.
  - EXTERIOR EQUIPMENT (INCLUDING ROOF CURBS, RAILS, SUPPORTS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH CHAPTERS 26 TO 29 OF ASCE 7-16.
  - WHERE DESIGN FOR SEISMIC AND WIND LOADS IS REQUIRED, THE MORE DEMANDING FORCE MUST BE USED.
  - REFERENCE THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY, WIND SPEEDS, ETC.
  - SEE DESIGN LOAD CRITERIA TABLE, THIS SHEET, FOR SPECIFIC COMPONENT IMPORTANCE FACTOR DESIGNATIONS.
  - USE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH COMPONENT.
  - FOR ALL COMPONENTS REQUIRING SEISMIC RESTRAINT, THE COMPONENT SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED BY A REGISTERED DESIGN PROFESSIONAL.
  - WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE RECEIPT OF THE APPROVED SEISMIC SUBMITTAL.
  - SEISMIC RESTRAINTS FOR DUCTWORK AND PIPING MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

COMPONENT IDENTIFICATION	COMPONENT IMPORTANCE FACTOR (ip)			
	SEISMIC RESTRAINT REQUIREMENT	ASCE 7-16 REFERENCE	SEISMIC RESTRAINT REQUIREMENT	ASCE 7-16 REFERENCE
ROOF MOUNTED	RESTRAIN ALL (SEE NOTE 1)	13.1.4.6	RESTRAIN ALL	13.1.4.6
FLOOR MOUNTED	RESTRAIN ALL (SEE NOTES 1,2)	13.1.4.6	RESTRAIN ALL	13.1.4.6
WALL MOUNTED	RESTRAIN ALL (SEE NOTE 1,2)	13.1.4.6	RESTRAIN ALL	13.1.4.6
COMPONENT SUPPORTS	RESTRAIN ALL (SEE NOTE 1)	13.6.5	RESTRAIN ALL	13.6.5
SUSPENDED EQUIPMENT	INLINE W/ DUCT/PIPE RESTRAIN IF >75 LBS PROVIDE FLEX CONN. (SEE NOTE 3)	13.6.7	RESTRAIN IF >75 LBS PROVIDE FLEX CONN. (SEE NOTE 3)	13.6.7
	NOT INLINE W/ DUCT/PIPE RESTRAIN ALL (SEE NOTE 1)	13.1.4.6	RESTRAIN ALL	13.1.4.6
SUSPENDED DUCTILE PIPING (STEEL, ALUMINUM, COPPER, ETC.)	RESTRAIN IF > 3" (SEE NOTE 4)	13.6.8.3.3.c	RESTRAIN IF > 1" (SEE NOTE 4)	13.6.8.3.3.b
SUSPENDED NON DUCTILE PIPING (CAST IRON, PLASTIC, CERAMIC)	RESTRAIN ALL (SEE NOTE 4)	13.6.8.3.3	RESTRAIN ALL (SEE NOTE 4)	13.6.8.3.3
SUSPENDED PIPE ON TRAPEZE	RESTRAIN IF ANY PIPE ON TRAPEZE > 3" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE > 10 LBS/FT (SEE NOTE 4)	13.6.8.3.1	RESTRAIN IF ANY PIPE ON TRAPEZE > 1" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE > 10 LBS/FT (SEE NOTE 4)	13.6.8.3.1
DUCTWORK	RESTRAIN IF > 6 SQ.FT. AND > 17 LBS/FT (SEE NOTE 4.5)	13.6.7	RESTRAIN IF > 6 SQ.FT. AND > 17 LBS/FT (SEE NOTE 4.5)	13.6.7
MULTIPLE DUCTS ON TRAPEZE	RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT (SEE NOTE 4.5)	13.6.7	RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT (SEE NOTE 4.5)	13.6.7

- TABLE NOTES:**
- EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF THE COMPONENT IS POSITIVELY ATTACHED TO THE STRUCTURE, AND FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
  - RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHTS 400 LBS. OR LESS, IS MOUNTED WITH THE CENTER OF MASS AT 4 FT. OR LESS ABOVE A FLOOR, IS POSITIVELY ATTACHED TO THE STRUCTURE, AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
  - FLEXIBLE CONNECTIONS REQUIRED FOR PIPE CONNECTIONS ONLY.
  - RESTRAINT IS NOT REQUIRED IF THE PIPING / DUCTWORK / CONDUIT IS SUPPORTED BY HANGERS AND EACH HANGER IN THE PIPING RUN IS 12 IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12 IN. OR LESS, WHERE ROD HANGERS ARE USED, THEY SHALL BE EQUIPPED WITH SWIVELS, EYE BUSHES OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
  - ALL DUCTWORK, REGARDLESS OF SIZE, DESIGNED TO CARRY TOXIC, HIGHLY TOXIC, OR EXPLOSIVE GASES OR USED FOR SMOKE CONTROL MUST BE RESTRAINED.

CHART OF NECK SIZES (FOR DIFFUSERS & GRILLES)	
CFM	DIA
0-34	4"
35-97	6"
98-209	8"
210-374	10"
375-605	12"
606-904	14"
905-1300	16"

AIR BALANCE TABLE (CFM)		
	EXHAUST	O.A. SUPPLY
KEF-1	2584	-
KEF-2	775	-
KEF-3	525	-
EF1, EF-2	300	-
RTU-1	-	500
DOAS-1	-	3700
<b>TOTAL CFM</b>	<b>4184</b>	<b>4200</b>
<b>NET TOTAL CFM</b>		<b>16</b>

NOTES:

### MECHANICAL SPECIFICATIONS

- MECHANICAL INSULATION**
- SECTION REQUIREMENTS**
    - Summary: Mechanical insulation includes duct insulation for indoor applications.
    - Submit Product Data for each type of mechanical insulation
    - Quality Assurance: UL labeled with maximum flame-spread rating of 25 and maximum smoke-developed rating of 50 according to ASTM E 84.
  - DUCT AND EQUIPMENT INSULATION**
    - Glass-Fiber-Blanket Insulation: ASTM C 553, Type II, Class F1, jacketed blankets with a k-value of 0.31 at 75 deg F mean temperature.
  - INSTALLATION**
    - Seal vapor-barrier penetrations for hangers, supports, anchors, and other projections.
    - Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions.
    - Floor Penetrations: Terminate insulation at the underside of the floor assembly and at the floor support at top of floor.
    - Interior Piping System Applications: Insulate the following piping systems:
      - Refrigerant suction piping.
    - Install duct insulation as follows:
      - Install insulation continuously on ducts. Maintain insulation vapor retarder on supply duct.
      - Install removable or segmented insulation on access panel and doors.
      - Install vapor barriers on insulated ducts and plenums with surface operating temperatures below 60 deg F. Seal joints and seams to maintain vapor barrier on insulation requiring a vapor barrier.
      - Seal penetrations for hangers, supports, anchors, and other projections in insulation requiring a vapor barrier.
      - Blanket Insulation Installation: Bond ducts having long sides or diameters smaller than 24 inches with bonding adhesive applied in 6-inch- wide transverse strips on 12-inch centers. Bond ducts having long sides or diameters 24 inches and larger with anchor pins spaced 12 inches apart each way. Apply bonding adhesive to prevent sagging of insulation. Overlap joints 3 inches. Seal joints, breaks, and punctures with vapor-barrier compound.
    - Do not apply insulation to the following systems, materials, and equipment:
      - Factory-insulated flexible ducts.
      - Factory-insulated plenums, casings, terminal boxes, and filter boxes and sections.
      - Flexible connectors.
      - Vibration-control devices.
      - Testing laboratory labels and stamps.
      - Nameplates and data plates.
    - Duct Insulation Thickness and Application Schedule: Insulate ducts with the following material and thickness:
      - Concealed Applications: Fiberglass blanket, 3 inches thick.

#### PACKAGED GAS-ELECTRIC ROOFTOP UNITS

- SECTION REQUIREMENTS**
  - Submit Product Data
- PACKAGED UNITS**
  - See Schedule, This Sheet.
  - Factory assembled and tested, consisting of compressors, condensers, evaporator coils, condenser and evaporator fans, refrigeration and temperature controls, filters, and dampers.
  - Roof Curb: Manufacturer's standard corrosion-resistant-coated, insulated curb with nailer strip, flashing and counterflashing and cadmium-plated hardware.
  - Operating Controls: Include economizer controls, low ambient control for compressors, and remote thermostat that provides staged heating and cooling with manual or automatic changeover on a standard subbase. For units 7.5 tons (26 kw) and larger include smoke detectors and fire thermostats.
- INSTALLATION**
  - Install units level and plumb, and maintain recommended clearances.
  - Install roof curb to roof structure, level, according to NRCA installation recommendations. Install and secure rooftop units on curbs.
  - Connect gas piping to burner, full size of gas train inlet, and provide union with sufficient clearance for burner removal and service.
  - Install electrical devices.
  - Install ducts to termination in roof mounting frames. Terminate return-air duct through roof structure.

#### DUCTS AND ACCESSORIES

- SECTION REQUIREMENTS**
  - Summary: Metal and nonmetal ducts and accessories in pressure classes 2 inch w/g (500 Pa) or less.
  - Comply with 90A.
- DUCTS**
  - Galvanized Sheet Steel: Lock-forming quality, ASTM A 653, G90 (ASTM A 653M, Z275).
  - Joint and Seam Tape: Comply with UL 181A.
  - Joint and Seam Sealant: Comply with UL 181A.
  - Rectangular Metal Duct Fabrication: Comply with SMACNA's "HVAC Duct Construction Standard for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
- ACCESSORIES**
  - Volume-Control Dampers: Factory-fabricated volume-control dampers, complete with required hardware and accessories. Single-blade and multiple opposed-blade, standard leakage rating, and suitable for horizontal or vertical applications.
  - Flexible Connectors: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, class 1.
- INSTALLATION**
  - Duct System Pressure Class: Construct and install each duct system for low pressure duct classification.
  - Conceal ducts from view in finished and occupied spaces, unless noted otherwise on the drawings.
  - Avoid passing through electrical equipment spaces and enclosures.
  - Support and connect metal ducts according to SMACNA's "HVAC Duct Construction Standard".
  - Install duct accessories according to applicable portions of details of construction as shown in SMACNA standards.
- TESTING, ADJUSTING, AND BALANCING**
  - Balance airflow within distribution systems, including submains, branches, and terminals to indicated quantities.
  - Provide temperature profiles (dry bulb and wet bulb) for all air handling units including Outside Air (OAT), Return Air (RAT), Mixed Air (MAT / EAT), Evaporator Coil Leaving Air Temp (CLAT), and Reheat Coil Leaving Air Temp (RLAT).
  - Provide reports to Engineer which are prepared by AABC or NEBB certified testing and balancing company.

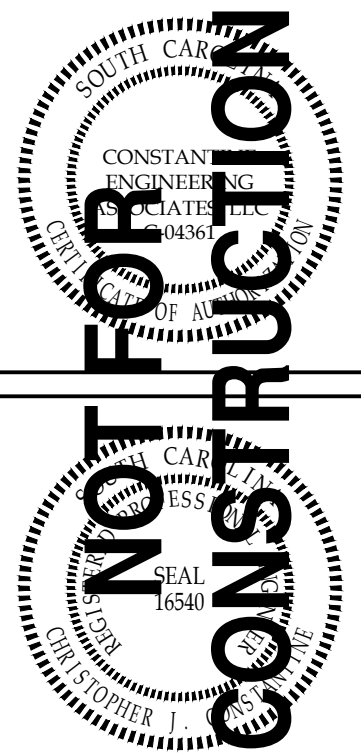
#### CONDENSATE DRAIN PIPING

- PIPES AND TUBES**
  - PVC Plastic, Schedule 40, plain ends.
- FITTINGS**
  - PVC Plastic, solvent cement joints.
- INSTALLATION**
  - Support pipe as indicated and per manufacturer's recommendations.
  - Apply manufacturer's recommended coating for protection from sun where exposed.

#### DIFFUSERS, REGISTERS, AND GRILLES

- SECTION REQUIREMENTS**
  - Submit Product Data, including color charts for factory finishes.
- OUTLETS AND INLETS**
  - See Diffuser Schedule on This Sheet.
- INSTALLATION**
  - Coordinate location and installation with duct installation and installation of other ceiling- and wall-mounted items.
  - Locate ceiling diffusers, registers, and grilles, as indicated on general construction "Reflected Ceiling Plans". Unless otherwise indicated, locate units in center of acoustical ceiling panels.
  - Architect to select color. Submittals must be approved in writing prior to purchase of diffusers and grilles.

**CONSTANTINE ENGINEERING ASSOCIATES, LLC**  
 1638 Swannah Hwy, #1 St. Charleston, SC 29407  
 Phone: 843.628.7878, Fax: 843.628.7881

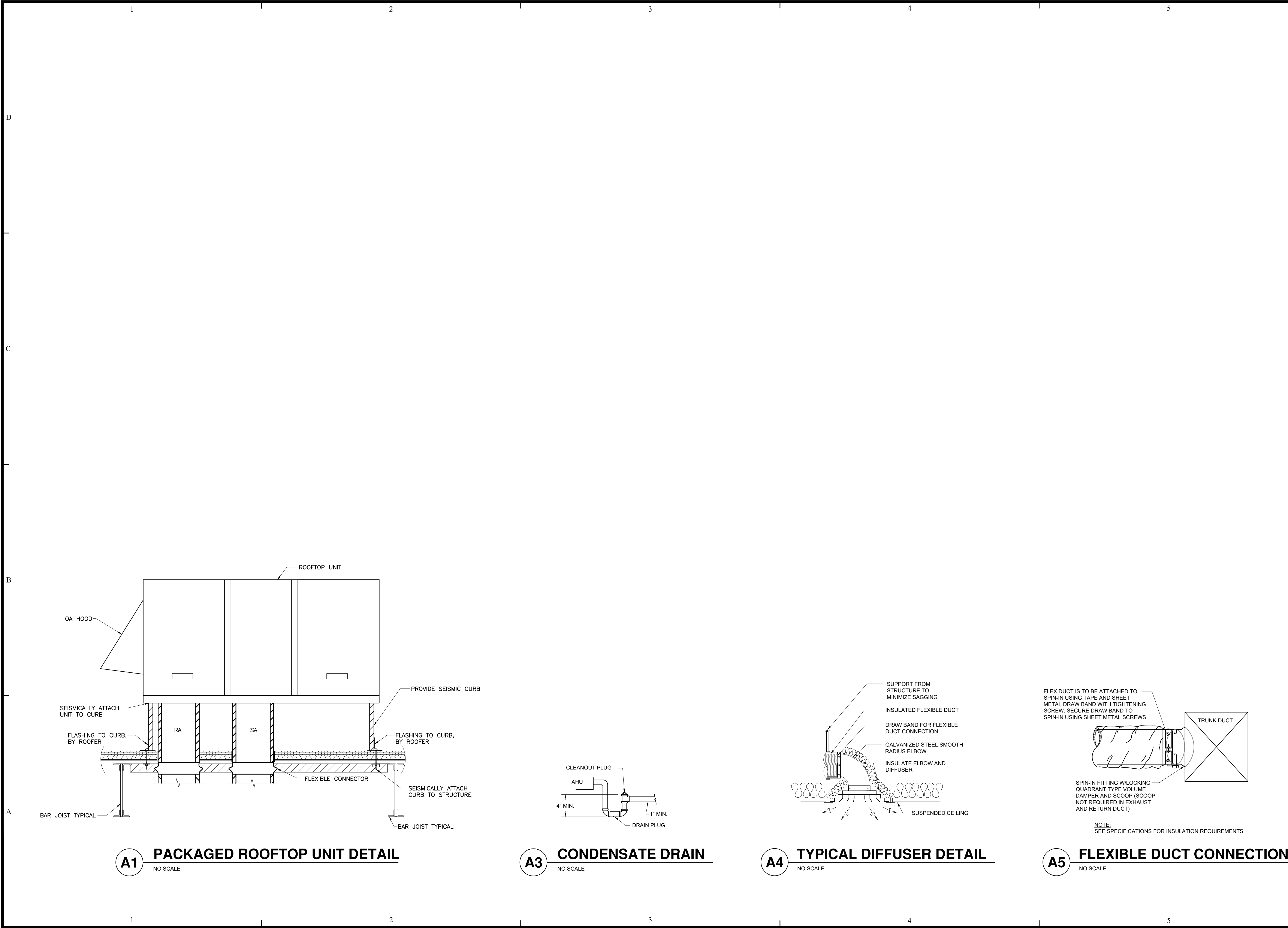


**FREDDY'S FROZEN CUSTARD**  
 SUMMERVILLE, SC  
 MECHANICAL SCHEDULES AND SPECIFICATIONS

DESIGNED BY: CJC  
 DRAWN BY: JZK  
 CHECKED BY: DDF  
 DATE: 03/23/23

JOB NUMBER  
**23-020**

SHEET NUMBER  
**M2.1**



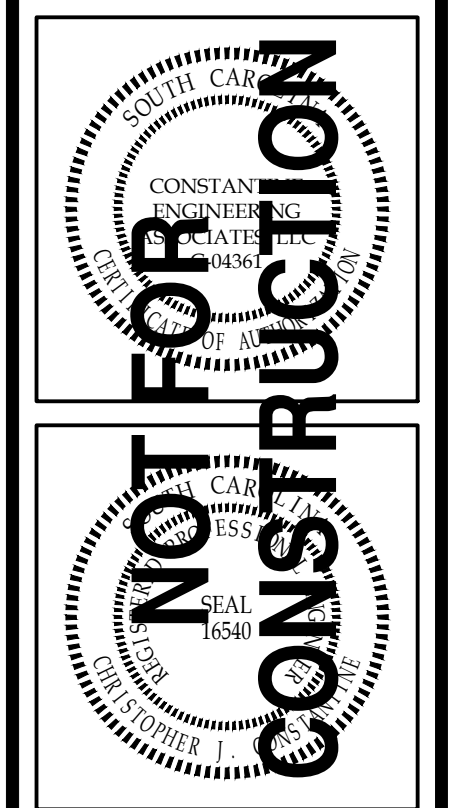
**A1** PACKAGED ROOFTOP UNIT DETAIL  
NO SCALE

**A3** CONDENSATE DRAIN  
NO SCALE

**A4** TYPICAL DIFFUSER DETAIL  
NO SCALE

**A5** FLEXIBLE DUCT CONNECTION  
NO SCALE

**CONSTANTINE ENGINEERING ASSOCIATES, LLC**  
1638 Swannah Hwy, #151, Charleston, SC 29407  
Phone: 843.628.7898, Fax: 843.628.7881



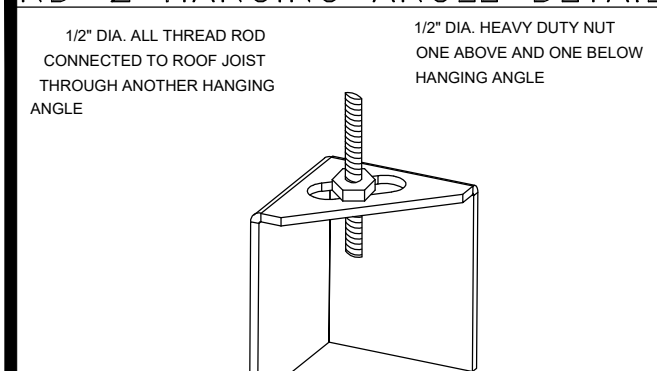
**FREDDY'S FROZEN CUSTARD**  
SUMMERVILLE, SC  
MECHANICAL DETAILS

REVISIONS:

DESIGNED BY:	CJC
DRAWN BY:	JZK
CHECKED BY:	DDF
DATE:	03/23/23

JOB NUMBER  
**23-020**  
SHEET NUMBER  
**M2.2**

**ND-2 HANGING ANGLE DETAIL**



**D** 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\"/>	
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\"/>		
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  
 TOTAL DUCT AREA=144 X CFM  
 DUCT LENGTH= TOTAL DUCT AREA / DUCT DEPTH

\*CAPTIVE-AIRE DUCT CONNECTIONS 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:  
 IBC 2018  
 INTERTEK  
 LISTED UNDER ETL FILE NUMBER 3054804-001/002

**CLEARANCE TO COMBUSTIBLES**

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

**GENERAL NOTES**

**INSTALLATION**

- ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
- ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
- HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
- ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTORS'S PLANS.
- COOKING EQUIPMENT TO SHUT-OFF IN EVENT OF FIRE.
- EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
- ALL LIGHTS FIXTURE SHOWN INSTALLED BY CAPTIVE-AIRE ARE FACTORY PROVIDED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
- SEISMIC RESTRAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
- INSTALLING CONTRACTORS ASSUME ALL RELATED RESPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

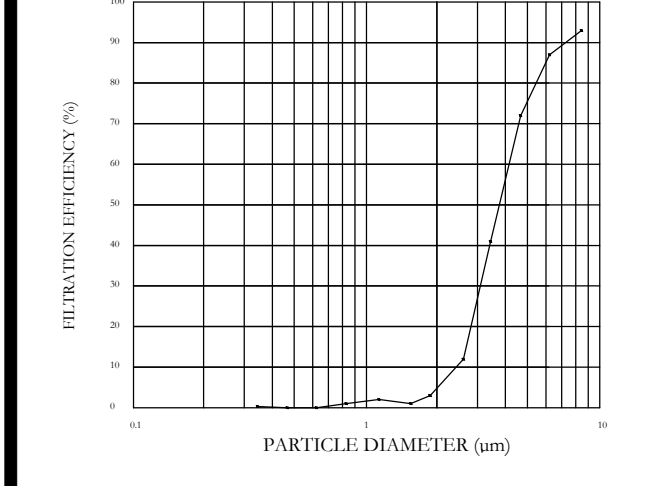
**BALANCE**

- KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
- KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DRINKS.
- RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

**ADDITIONAL**

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

**FILTER DETAIL**



**HOOD INFORMATION - JOB#5887685**

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST FLENUM (RISERS)				HOOD CONSTRUCTION	HOOD CONFIG			
										WIDTH	LENG	HEIGHT	DIA		CFM	VEL	SP	END TO END
1	H-1A	4824	CAPTIVEAIRE	6' 10"	450 DEG	I	MEDIUM	189	1292	10"	12"	4"	1292	1550	-0.730"	430 SS WHERE EXPOSED	ALONE	FRONT
2	H-1B	4824	CAPTIVEAIRE	6' 10"	450 DEG	I	MEDIUM	189	1292	10"	12"	4"	1292	1550	-0.730"	430 SS WHERE EXPOSED	ALONE	BACK
3	H2	5424	CAPTIVEAIRE	9' 0"	450 DEG	I	MEDIUM	155	775	9"	8"	4"	775	1550	-0.470"	430 SS WHERE EXPOSED	ALONE	ALONE
4	H-3	4224	VHB-G	3' 0"	700 DEG	II	N/A	150	525	4"	10"	525	903	-0.069"	304 SS 100%	ALONE	ALONE	

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

**HOOD INFORMATION**

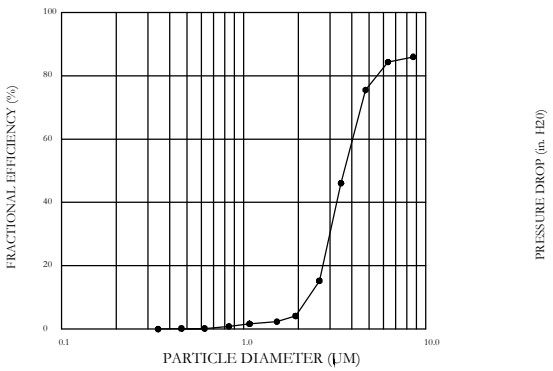
HOOD NO	TAG	FILTER(S)				LIGHT(S)				UTILITY CABINET(S)				FIRE HOOD HANGING WEIGHT		
		TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	WIRE GUARD	LOCATION	SIZE	TYPE	SIZE		ELECTRICAL MODEL #	SWITCHES QUANTITY
1	H-1A	CAPTRATE SOLO FILTER	5	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO						NO	310 LBS
2	H-1B	CAPTRATE SOLO FILTER	5	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO						NO	310 LBS
3	H2	CAPTRATE SOLO FILTER	3	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"X54"X24"		DCV2011	1 LIGHT 1 FAN	NO	402 LBS
4	H-3						0								NO	149 LBS

**HOOD OPTIONS**

HOOD NO	TAG	OPTION
1	H-1A	FIELD WRAPPER 9.00" HIGH FRONT, LEFT, RIGHT.
2	H-1B	FIELD WRAPPER 9.00" HIGH FRONT, LEFT, RIGHT.
3	H2	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.
4	H-3	FIELD WRAPPER 9.00" HIGH FRONT, LEFT, RIGHT.

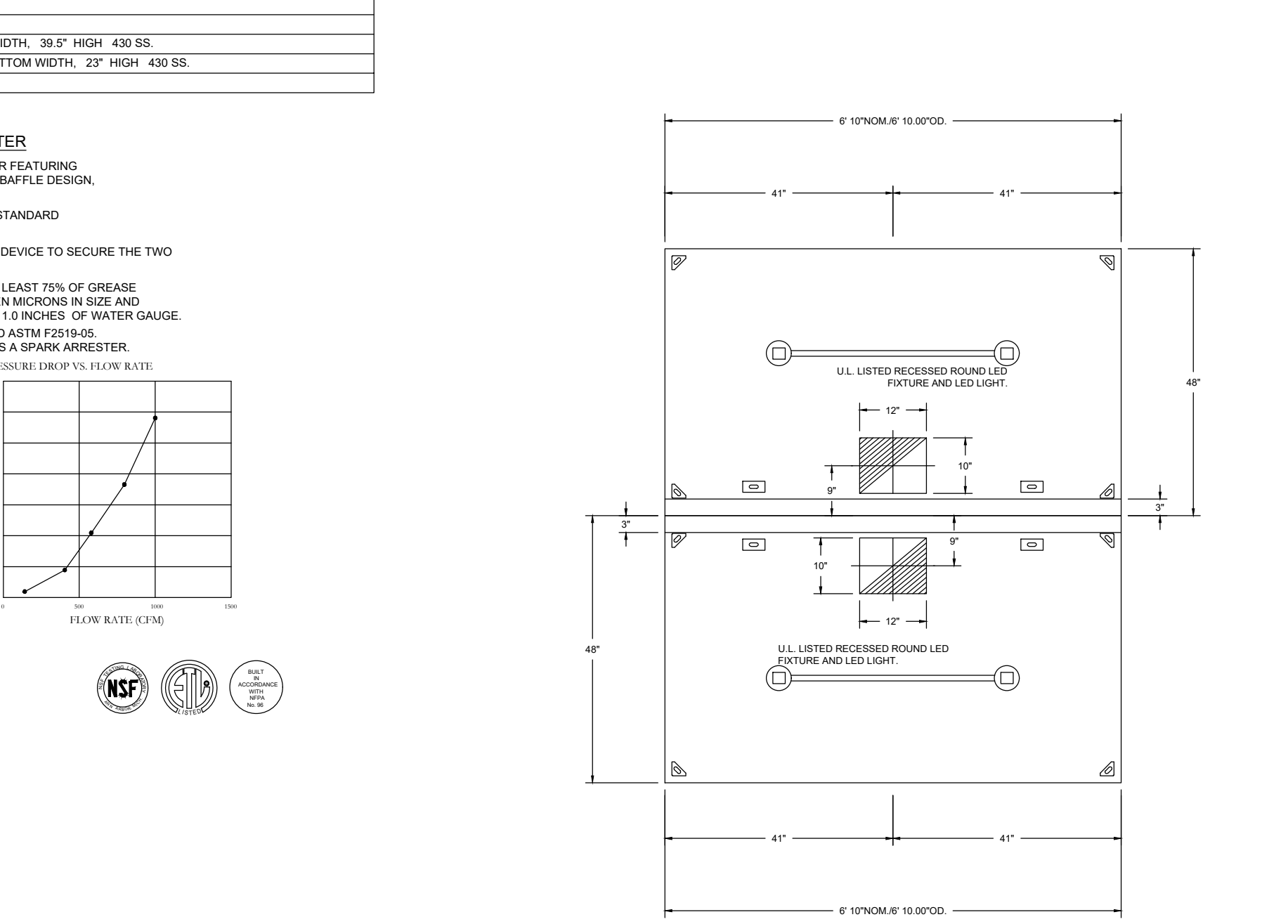
**SPECIFICATION: CAPTRATE GREASE-STOP SOLO FILTER**

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.

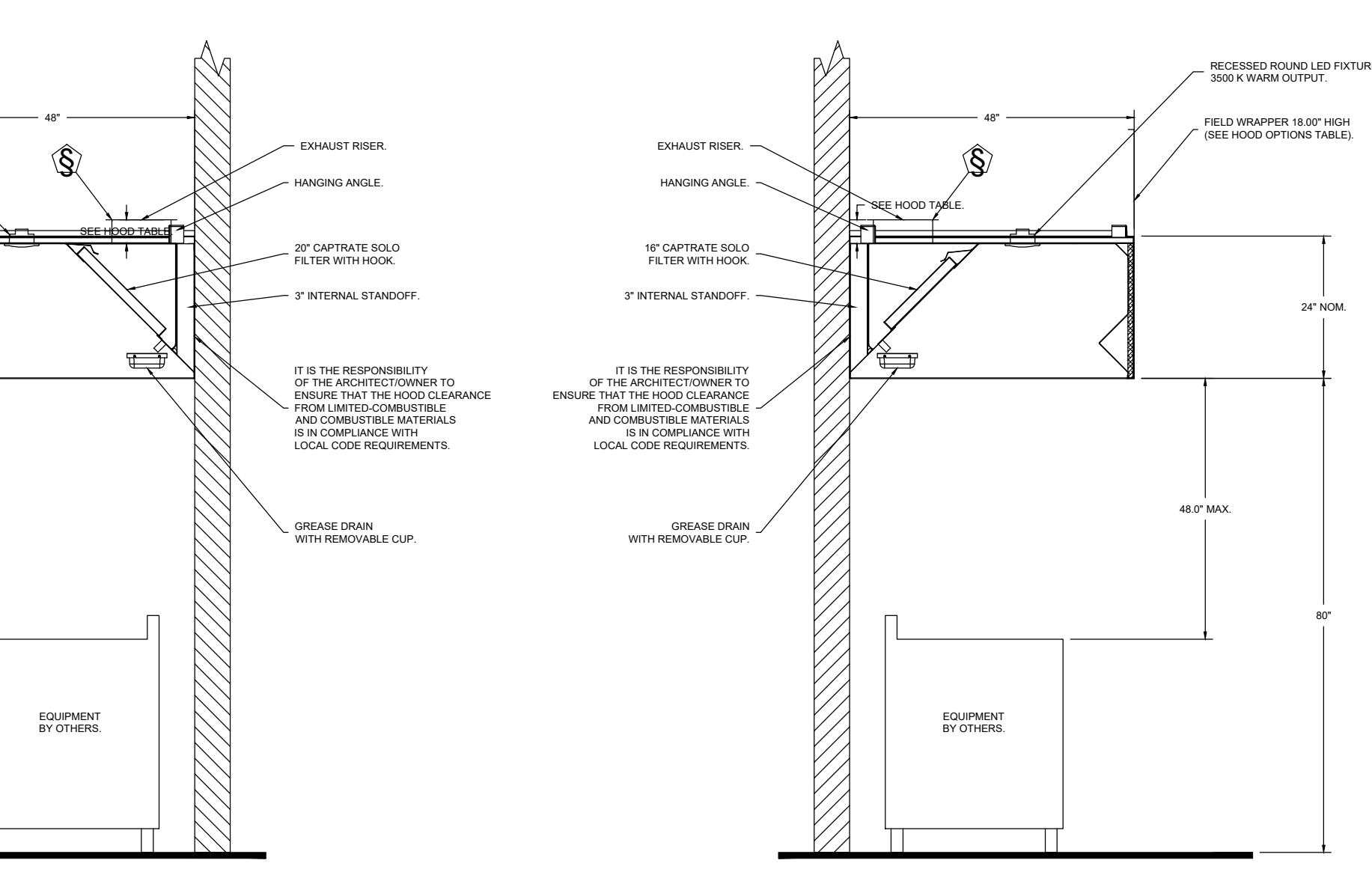


CAPTIVE-AIRE HOODS ARE BUILT IN COMPLIANCE WITH:  
 NFPA #99  
 NSF STANDARD #2  
 UL STANDARD #1646  
 INT. TECH. CODE (MCC)  
 ULC-S849

**PLAN VIEW - HOOD #2 (H-1B)**  
 9' 10.00" LONG 4824ND-2



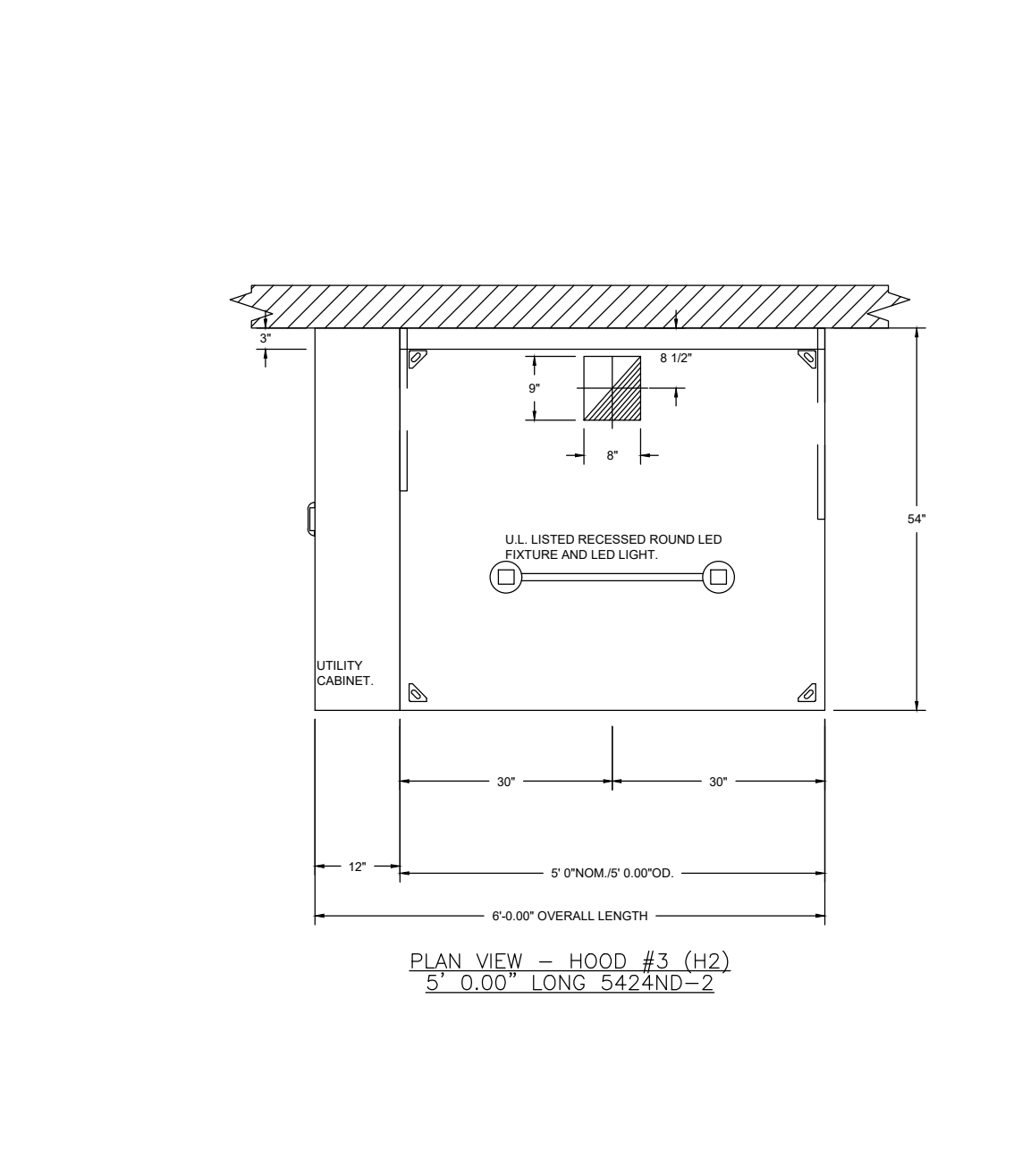
**PLAN VIEW - HOOD #1 (H-1A)**  
 9' 10.00" LONG 4824ND-2



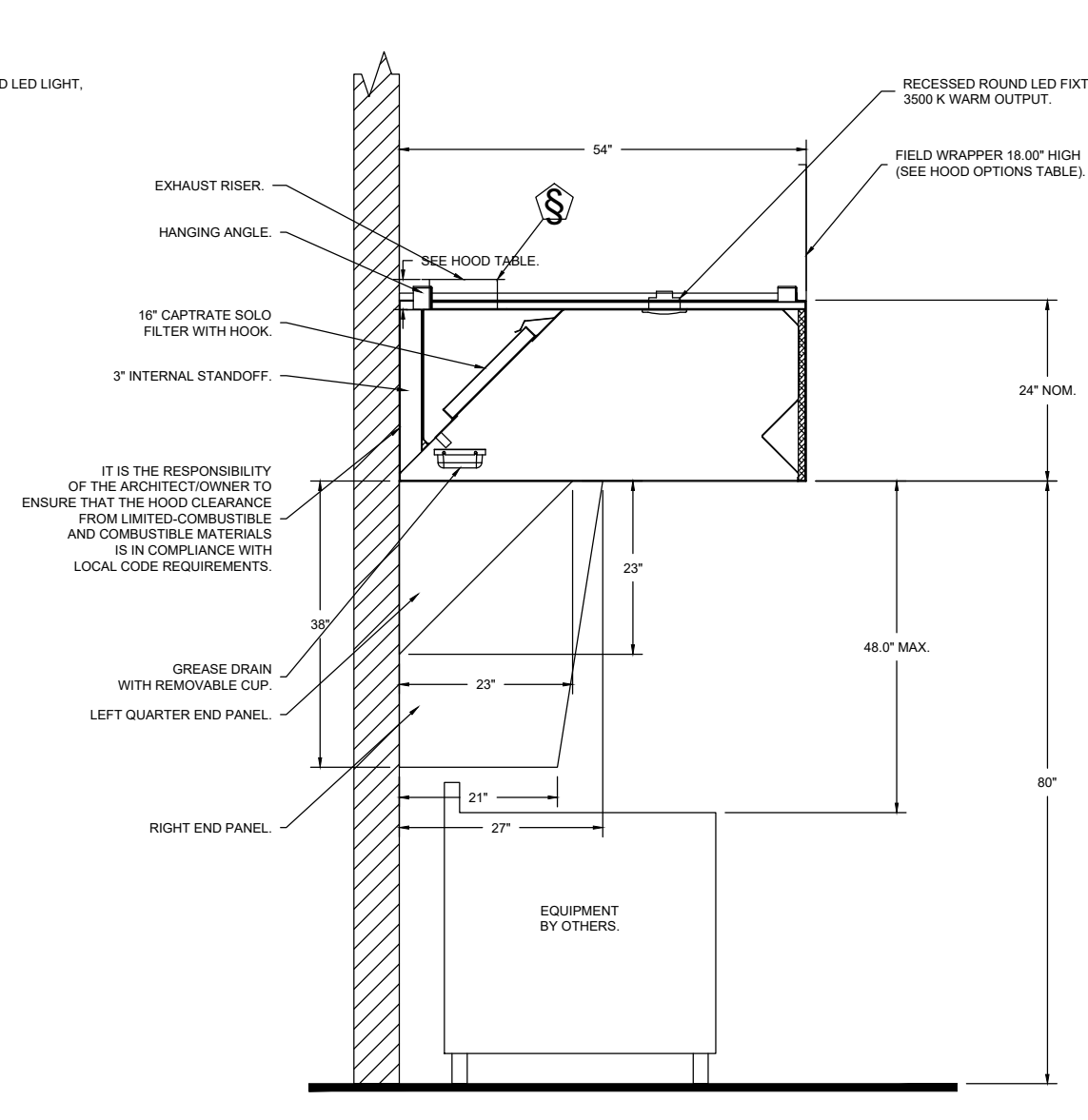
**SECTION VIEW - MODEL 4824ND-2 HOOD - #2 (H-1B)**

**SECTION VIEW - MODEL 4824ND-2 HOOD - #1 (H-1A)**

**PLAN VIEW - HOOD #3 (H2)**  
 5' 0.00" LONG 5424ND-2



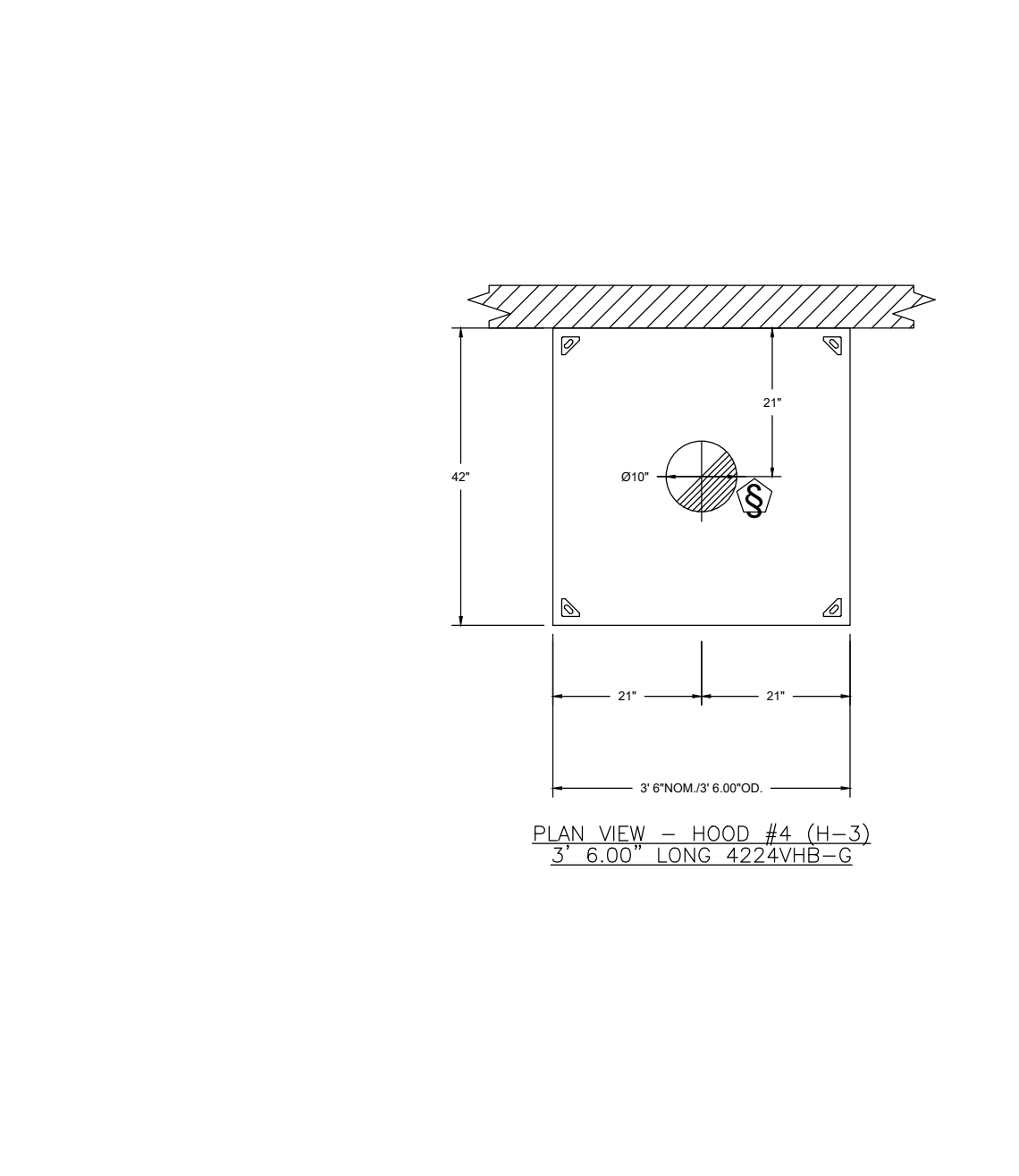
**SECTION VIEW - MODEL 5424ND-2 HOOD - #3 (H2)**



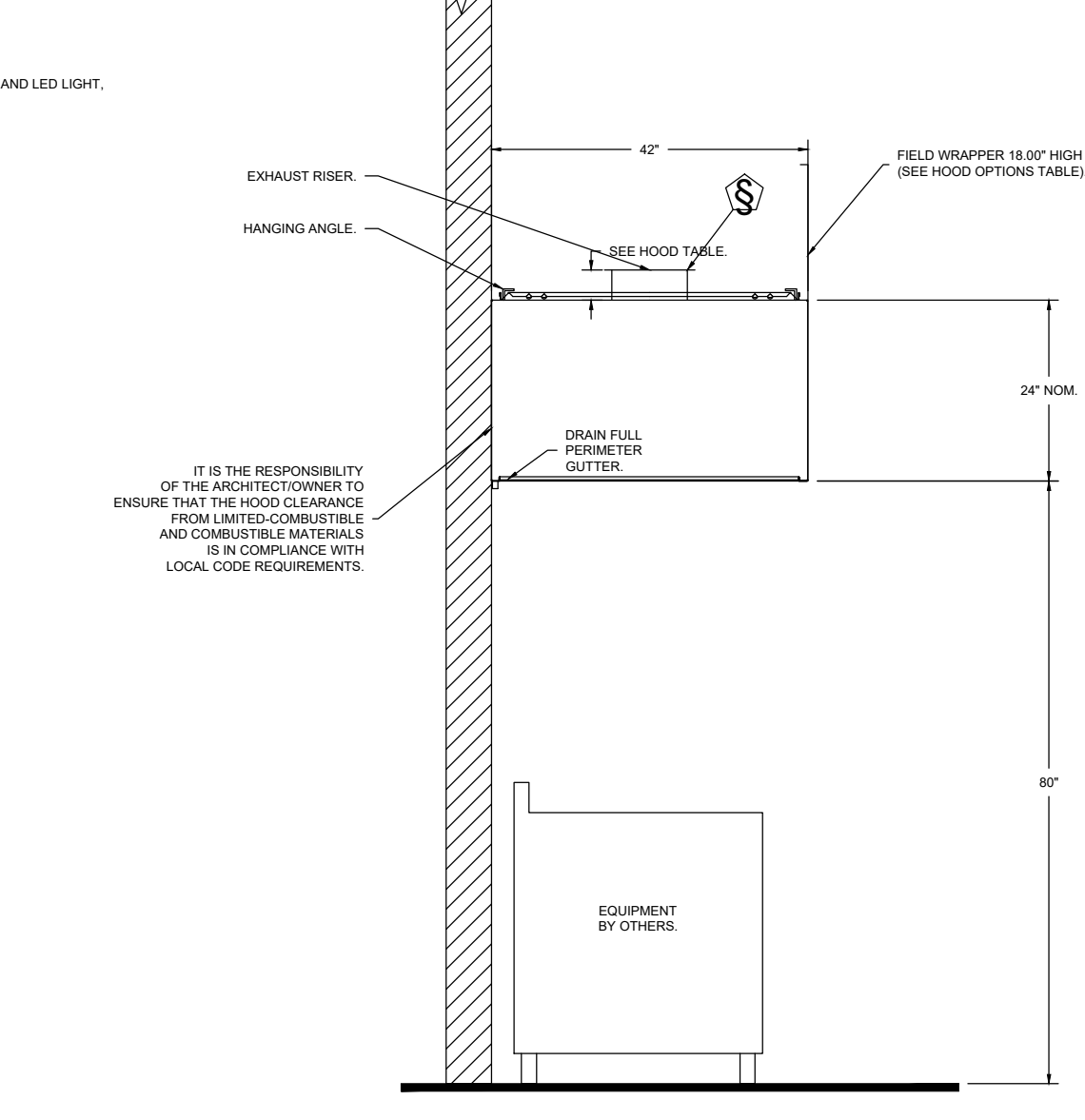
**SECTION VIEW - MODEL 4224VHB-G HOOD - #4 (H-3)**

**SECTION VIEW - MODEL 4224VHB-G HOOD - #4 (H-3)**

**PLAN VIEW - HOOD #4 (H-3)**  
 3' 6.00" LONG 4224VHB-G



**SECTION VIEW - MODEL 4224VHB-G HOOD - #4 (H-3)**



**SECTION VIEW - MODEL 4224VHB-G HOOD - #4 (H-3)**

FOR QUESTIONS, CALL THE:  
 KANSAS CITY REGIONAL OFFICE  
 1126 SWIFT STREET, KANSAS CITY, MO 64116  
 PHONE: (816) 221-8575  
 FAX: (816) 221-8511

CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted   
 Approved with NO Exception Taken   
 Revised 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 NOT ALLOWED.

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

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

**CAPTIVEAIRE DETAILS FOR REFERENCE ONLY**

**REVISIONS**

NO.	DESCRIPTION	DATE

**REVISIONS:**

DESIGNED BY: CJC  
 DRAWN BY: JZK  
 CHECKED BY: DDF  
 DATE: 03/23/23

**JOB NUMBER**  
**23-020**

**SHEET NUMBER**  
**M2.3**

**DATE:** 3/8/2023  
**DWG.#:** 5887685  
**DRAWN BY:** michael.co  
**SCALE:** 1/2" = 1'-0"  
**MASTER DRAWING**

**SHEET NO.**  
 1

**CAPTIVEAIRE**

**HBT Foodservice**

104 W 9th St Suite 204, Kansas City, MO 64108 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg@captivaire.com www.captivaire.com

**Freddy's - Summerville, SC**  
**ANYWHERE, USA**

**CONSTANTINE ENGINEERING ASSOCIATES, LLC**

1638 Swannah Hwy, #1 St. Charleston, SC 29407  
 Phone: 843.628-7878 Fax: 843.628-7881

**NOT FOR CONSTRUCTION**

SEAL 16540

**FREDDY'S FROZEN CUSTARD**  
 SUMMERVILLE, SC

**KITCHEN HOOD DRAWINGS (FOR REFERENCE ONLY)**

**REVISIONS:**

DESIGNED BY: CJC  
 DRAWN BY: JZK  
 CHECKED BY: DDF  
 DATE: 03/23/23

**JOB NUMBER**  
**23-020**

**SHEET NUMBER**  
**M2.3**

