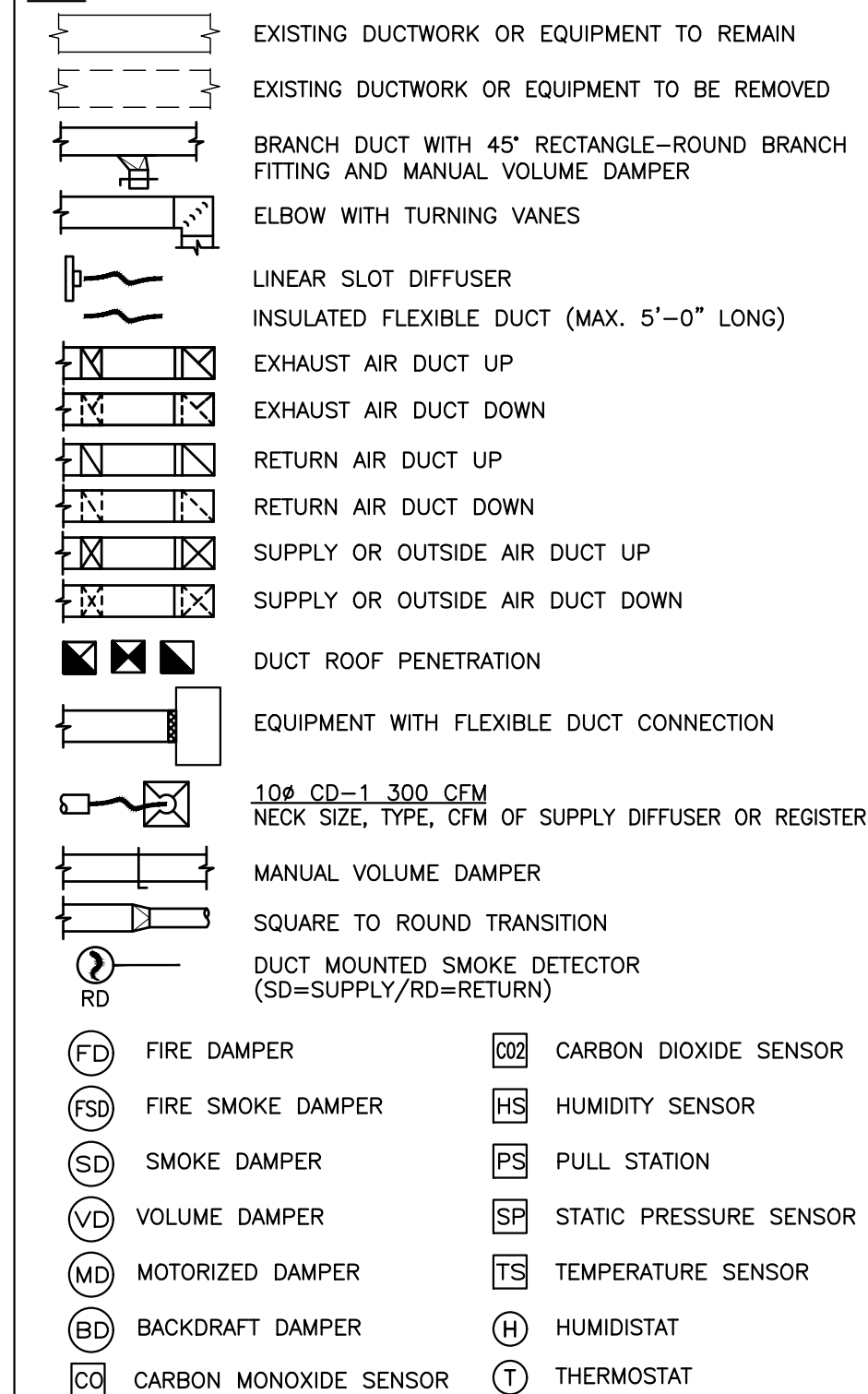


MECHANICAL SYMBOLS

NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.

HVAC EQUIPMENT & DUCTWORK

NOTE: ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE DIMENSIONS.



ABBREVIATIONS

AFB	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
BAS	BUILDING AUTOMATION SYSTEM	MIN	MINIMUM
BD	BACKDRAFT DAMPER	NC	NOISE CRITERIA
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
DDC	DIRECT DIGITAL CONTROL	RA	RETURN AIR
DX	DIRECT EXPANSION	SA	SUPPLY AIR
EA	EXHAUST AIR	SD	SMOKE DUCT DETECTOR
FFA	FROM FLOOR ABOVE	TFA	TO FLOOR ABOVE
FFB	FROM FLOOR BELOW	TFB	TO FLOOR BELOW
GPM	GALLONS PER MINUTE	TYP	TYPICAL
IN WC	INCHES OF WATER COLUMN	UNO	UNLESS NOTED OTHERWISE
MAX	MAXIMUM	W/	WITH
MBH	1000 BTU PER HOUR	W/O	WITHOUT

STANDARD MOUNTING HEIGHTS

MECHANICAL THERMOSTATS (USER ADJUSTABLE)(TOP OF DEVICE)	48"
CONTROLS (TOP OF DEVICE)	48"

ANNOTATION

1	MECHANICAL PLAN CALLOUT
CU	MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
1	CONNECTION POINT OF NEW WORK TO EXISTING
1	DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
1	SECTION CUT DESIGNATION

GENERAL MECHANICAL NOTES:

- PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL REQUIREMENTS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT, ENGINEER AND/OR OWNER OF CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
- COORDINATE THE INSTALLATION OF THE MECHANICAL SYSTEMS WITH OTHER TRADES TO ENSURE A NEAT AND ORDERLY INSTALLATION. INSTALL DUCTWORK AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. ANY MODIFICATIONS REQUIRED DUE TO LACK OF COORDINATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.
- NEW MECHANICAL EQUIPMENT AND DUCTWORK ARE SHOWN AT APPROXIMATE LOCATIONS. FIELD MEASURE FINAL DUCTWORK LOCATIONS PRIOR TO FABRICATION AND MAKE ADJUSTMENTS AS REQUIRED TO FIT THE DUCTWORK AND PIPING WITHIN THE AVAILABLE SPACE. VERIFY THAT FINAL EQUIPMENT LOCATIONS MEET MANUFACTURER'S RECOMMENDATIONS REGARDING SERVICE CLEARANCE AND PROPER AIRFLOW CLEARANCE AROUND EQUIPMENT.
- REFER TO ARCHITECTURAL DRAWINGS FOR RELATED CONSTRUCTION DETAILS AS APPLICABLE TO THE HVAC SYSTEM. VERIFY CHASES AND PENETRATIONS SHOWN ON ARCHITECTURAL DRAWINGS THAT ARE INTENDED FOR DUCTWORK AND PIPING MEET REQUIREMENTS.
- COORDINATE LOCATION OF ROOF MOUNTED HVAC EQUIPMENT AND ROOF PENETRATIONS WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
- INDOOR AIR QUALITY MEASURES: PROTECT INSIDE OF (INSTALLED AND DELIVERED) DUCTWORK AND HVAC UNITS FROM EXPOSURE TO DUST, DIRT, PAINT AND MOISTURE. REPLACE INSULATION THAT HAS GOTTEN WET AT ANY TIME DURING CONSTRUCTION, DRYING THE INSULATION IS NOT ACCEPTABLE. SEAL ANY TEARS OR JOINTS OF INTERNAL FIBERGLASS INSULATION. REMOVE DEBRIS FROM CEILING/RETURN AIR PLENUM INCLUDING DUST. AN INDEPENDENT, PROFESSIONAL DUCT CLEANING COMPANY SHALL VACUUM CLEAN ANY DUCTWORK CONNECTED TO HVAC UNITS THAT WERE OPERATED DURING THE CONSTRUCTION PERIOD AFTER NEW FILTERS, MINIMUM MERV-8, ARE INSTALLED AND PRIOR TO TURNING SYSTEM OVER TO THE OWNER.
- INSTALL DUCTWORK PARALLEL TO BUILDING COLUMN LINES UNLESS OTHERWISE SHOWN OR NOTED.
- OVERHEAD HANGERS AND SUPPORTS FOR EQUIPMENT, DUCTWORK SHALL BE FASTENED TO BUILDING JOISTS OR BEAMS. DO NOT ATTACH HANGERS AND SUPPORTS TO THE ABOVE FLOOR SLAB OR ROOF EXCEPT WHERE CONCRETE INSERTS IN CONCRETE SLABS ARE ALLOWED BY THE SPECIFICATIONS.
- COORDINATE LOCATION OF EQUIPMENT SUPPORTS WITH LOCATION OF EQUIPMENT ACCESS PANELS/DOORS TO ENABLE SERVICE OF EQUIPMENT AND/OR FILTER REPLACEMENT.
- SEAL PENETRATIONS THROUGH THE BUILDING COMPONENTS IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. FIREPROOF PENETRATIONS THROUGH FIRE RATED COMPONENTS IN ACCORDANCE WITH U.L. REQUIREMENTS.
- COORDINATE THE EXACT MOUNTING SIZE AND FRAME TYPE OF DIFFUSERS, REGISTERS AND GRILLES WITH THE SUPPLIER TO MEET THE CEILING, WALL AND DUCT INSTALLATION REQUIREMENTS.
- ADJUST LOCATION OF CEILING DIFFUSERS, REGISTERS AND GRILLES AS REQUIRED TO ACCOMMODATE FINAL CEILING GRID AND LIGHTING LOCATIONS.
- LOCATE AND SET THERMOSTATS SENSORS AT LOCATIONS SHOWN ON PLANS. VERIFY EXACT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. INSTALL THERMOSTATS WITH TOP OF DEVICE AT MAXIMUM 48" AFF TO MEET ADA REQUIREMENTS UNLESS NOTED OTHERWISE ON PLANS. TEMPERATURE SENSORS SHALL BE MOUNTED AT A MAXIMUM OF 72" AFF. INSTALL WIRING IN CONDUIT PROVIDED BY DIVISION 16.
- PROVIDE A MANUAL BALANCING DAMPER IN EACH BRANCH DUCT TAKEOFF FROM MAIN SUPPLY, RETURN, OUTDOOR AND EXHAUST AIR DUCTS.
- PROVIDE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKEOFF FITTING WITH MANUAL BALANCING DAMPER AND LOCKING QUADRANT FOR BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS AND GRILLES.
- BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
- RIGID DUCTWORK INSULATION: PROVIDE 3/4 LB DENSITY, MINIMUM R-6.0 DUCT WRAP, 2" THICK, INSULATION WRAP ON RIGID ROUND, CONCEALED, SUPPLY AND RETURN AIR DUCTS. PROVIDE 1-1/2" (R-6.0) THICK 1-1/2 LB DENSITY INTERNAL DUCT LINER ON RECTANGULAR SUPPLY AND RETURN AIR DUCTS. DUCT SIZES ON MECHANICAL PLANS INDICATE CLEAR INSIDE AIRFLOW DIMENSIONS, INCREASE SHEET METAL SIZES ACCORDINGLY.
- PROVIDE THERMAFLEX TYPE M-KE, FLEXMASTER TYPE 8, OR APPROVED EQUAL FLEXIBLE DUCTWORK. FLEXIBLE DUCTWORK SHALL BE LISTED UNDER UL 181 AS CLASS 1 AIR DUCT AND BE PROVIDED WITH INTEGRAL R-6.0, 3/4 LB DENSITY FIBERGLASS INSULATION. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORTED TO AVOID SHARP BENDS AND SAGGING.
- PROVIDE A NEW SET OF AIR FILTERS IN UNITS PRIOR TO TESTING, ADJUSTING AND BALANCING. AND BEFORE TURNING SYSTEM(S) OVER TO OWNER.
- PROVIDE A COPY OF THE AIR BALANCE REPORT TO THE CITY INSPECTOR AT THE TIME OF INSPECTION.
- PROVIDE TYPE I GREASE HOOD EXHAUST DUCTWORK OF MINIMUM 16 GAUGE BLACK IRON WITH LIQUID WELDS WITH ACCESS PANELS FOR GREASE CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES. DUCT SHALL BE WRAPPED IN TWO LAYERS OF 3M, +615 FIRE BARRIER DUCT WRAP. SLOPE DUCT BACK TOWARD HOOD AT MINIMUM OF 1/4" PER LINEAR FOOT DUCT WRAP SYSTEM SHALL MEET UL REQUIREMENTS FOR GREASE DUCT ENCLOSURES.

ROOFTOP UNIT SCHEDULE (AUX. ELECTRIC HEAT) (DX COOLING)

MARK	NOMINAL CAPACITY (TONS)	MANUFACTURER	MODEL	SUPPLY FAN				COOLING CAPACITY				RE-HEAT COIL			AUXILIARY HEATING COIL				ELECTRICAL				WEIGHT (LBS)	NOTES					
				FAN AIRFLOW TYPE	MIN (CFM)	HP	ESP (IN)	REFR TYPE	TOTAL (MBH)	SENSIBLE (MBH)	EAT DB/WB (°F)	LAT DB/WB (°F)	EFFICIENCY RATING	HEATING (MBH)	EAT (°F)	LAT (°F)	MIN. OUTPUT (MBH)	MIN. KW @ 208V	EAT (°F)	LAT (°F)	TEMP RISE (°F)	NO. OF STAGES			MIN. O/A CFM	V/PH	UNIT FLA	MCA	MOCP
RTU-1	15	AAON	RN-020-8-0-GB04-149	FC	6,000	5.0	1.0	R410-A	252.0	160.0	81/69	57/55	12.1 EER	133.0	86.3	106.8	153.5	45.0	61.0	86.3	25.3	6	1500	208/3	142	177.0	200	2434	A-H
RTU-2	10	AAON	RN-013-8-0-BB02-139	FC	4,000	3.0	1.0	R410-A	155.0	103.0	78/66	53/52	12.3 EER	81.0	85.0	103.8	102.4	30.0	61.0	85.0	24.0	3	1300	208/3	94	117.0	125	1896	A-H
RTU-3	10	AAON	RN-013-8-0-BB02-139	FC	4,000	3.0	1.0	R410-A	155.0	103.0	78/66	53/52	12.3 EER	81.0	85.0	103.8	102.4	30.0	61.0	85.0	24.0	3	1300	208/3	94	117.0	125	1896	A-H

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

- NOTES:**
- PROVIDE DRY-BULB ECONOMIZER WITH 100% BAROMETRIC RELIEF DAMPER.
 - PROVIDE LOW AMBIENT CONTROL TO 40 °F.
 - EQUIPMENT SIZED FOR 110°F AMBIENT TEMPERATURE.
 - PROVIDE 2" PLEATED MERV-8 THROWAWAY AIR FILTERS.
 - SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
 - PROVIDE MANUFACTURERS STANDARD INSULATED ROOF CURB WITH MINIMUM HEIGHT OF 14"
 - PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH STAGED HEATING AND COOLING CAPABILITY AS REQUIRED FOR OPERATION OF HEATING, COOLING AND CONTROLS.
 - DISCONNECT SWITCH FURNISHED BY ELECTRICAL CONTRACTOR.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS. DROP (IN. W.C.)	NOTES
CD-1	TITUS	TMS	CONE	LAY IN	24x24	25	0.05	A-D
CD-2	TITUS	TMS	CONE	GYP.	24x24	25	0.05	A-E
LS-1	TITUS	TBDI-30	LINEAR	GYP.	48" 2-SLOT	25	0.1	A,C,F
LS-2	TITUS	TBDI-30	LINEAR	GYP.	60" 3-SLOT	25	0.1	A,C,F
LS-3	TITUS	FBPI	LINEAR	GYP.	48"	25	0.1	A,C,F
LS-4	TITUS	FBPI	LINEAR	GYP.	60"	25	0.1	A,C,F
RG-1	TITUS	50F	EGG CRATE	LAY IN	24x24	25	0.05	A,C,D
EG-1	TITUS	50F	EGG CRATE	GYP.	12x12	25	0.05	A,C-E

- NOTES:**
- NECK SIZE SHOWN ON DRAWINGS. BRANCH DUCT SIZE SHALL BE SAME AS NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
 - 4-WAY THROW PATTERN UNLESS OTHERWISE SHOWN ON DRAWINGS.
 - BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
 - FRAME TYPE TO MATCH MOUNTING LOCATION CONSTRUCTION MATERIAL. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
 - PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.
 - PROVIDE BORDER TYPE TO MATCH CEILING CONSTRUCTION WITH CONCEALED MOUNTING.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	OUTPUT (MBH)	OUTPUT (KW)	MIN. NO. OF STAGES	AIRFLOW (CFM)	MOTOR HP	THROW (FT)	FLA	MOC	V/PH	NOTES
UH-1	REZTOR	EGW	5.1	1.5	1	300	NA	16	7.3	15	208/1	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

- NOTES:**
- MOUNT 8'-0" ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
 - PROVIDE WITH WALL MOUNTED THERMOSTAT.
 - PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR WALL MOUNTING.
 - DISCONNECT SWITCH FURNISHED BY ELECTRICAL CONTRACTOR.

REFRIGERANT CALCULATION (IMC 1102.2)

AREA PURPOSE	GROSS COOLER VOLUME (CU. FT)	TABLE 1102.2 REQUIREMENTS					
		REFRIGERANT TYPE	COMPRESSOR LOCATION	LBS PER 1000 CU FT.	EQUIPMENT REFRIGERANT QUANTITY (LBS)	MAX REFRIGERANT ALLOWED (LBS)	VAPOR DETECTION SYSTEM REQ?
WALK-IN COOLER	720	R-404A	ROOF	31	5.0	22.3	NO
WALK-IN FREEZER	640	R-404A	ROOF	31	5.0	19.8	NO

TABLE C403.10.1(2) MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL REFRIGERATORS AND FREEZERS

Equipment Class	Equipment Type	Family Code	Operating Mode	Rating Temperature	ENERGY USE LIMITS (kWh/day)	WALK-IN BOX VOLUME (FT3)	TEST PROCEDURE
HCS.RC.L	WALK-IN FREEZER	Horizontal solid door	Remote condensing	Low	0.23 × V + 0.54	640	AHRI 1200
HCS.RC.M	WALK-IN COOLER	Horizontal solid door	Remote condensing	Medium	0.11 × V + 0.26	720	AHRI 1200

V=Volume of the case, as measured in accordance with Appendix C of AHRI 1200.

AIR CURTAIN SCHEDULE

MARK	MANUFACTURER	MODEL	QUANTITY	OPENING WIDTH (IN.)	MAX OPENING HEIGHT (FT.)	WEIGHT (LBS)	CFM MAX VELOCITY (FPM)	MOTOR QUANTITY	MOTOR HP	FLA	V/PH	NOTES	
AC-1	MARS	LPN2	1	48	7-8"	40	1200	1800	1	1/6	2.6	120/1	A-C

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

- NOTES:**
- MOUNT FLUSH WITH CEILING. PAINT COLOR PER ARCHITECT.
 - NO ELECTRIC HEAT. VERIFY WITH OWNER.
 - INSTALL WITH AUTOMATIC ON/OFF SWITCH WITH DOOR OPERATIONS.

FAN SCHEDULE

MARK	SERVICE (EA, RA, SA)	MANUFACTURER	MOUNTING	MODEL	AIRFLOW (CFM)	ESP (IN)	DRIVE (BELT/DIRECT)	FAN POWER	FAN RPM	ELECTRICAL V/PH	FLA	WEIGHT (LBS)	NOTES
EF-1	EXHAUST	GREENHECK	ROOF	G-095-D	300	0.5	DIRECT	0.13 HP	1550	120/1	--	28	A,B,E
KEF-1	EXHAUST	GREENHECK	ROOF	CUBE-161HP-10	1913	0.75	BELT	1 HP	1351	208/1	--	76	B,C,D,F
KEF-2	EXHAUST	GREENHECK	ROOF	CUBE-121	1216	0.75	BELT	0.5 HP	1411	208/1	--	64	B,C,D,G
EF-2	INTAKE	GREENHECK	INLINE	SQ-60-VG	55	0.2	DIRECT	1/15 HP	1254	120/1	--	35	B,H,I

- NOTES:**
- PROVIDE INSULATED 12" ROOF CURB
 - PROVIDE WITH INTEGRAL DISCONNECT SWITCH
 - PROVIDE GREASE BOX
 - PROVIDE INSULATED AND VENTED 18" ROOF CURB
 - INTERLOCK FAN OPERATION WITH TIME CLOCK TO OPERATE CONTINUOUSLY DURING HOURS OF OPERATION.
 - INTERLOCK FAN OPERATION WITH RTU-1 & RTU-2
 - INTERLOCK FAN OPERATION WITH RTU-3
 - PROVIDE RUBBER IN SHEAR ISOLATION AND ALL-THREAD HANGING RODS.
 - INTERLOCK FAN OPERATION WITH CO2 SENSOR.

OUTSIDE AIR REQUIREMENTS (IMC TABLE 403.3)

AREA PURPOSE	GROSS FLOOR AREA (SQ. FT)	CODE OUTSIDE AIR REQUIREMENTS					SYSTEM NUMBER	ACTUAL OUTSIDE AIR (CFM PER UNIT)
		CFM PER SQ. FT	CFM REQD.	CFM PER PERSON	OCCUPANCY DENSITY	NO. OF PEOPLE		
DINING	1,276	0.18	230	7.5	70	90	675	RTU-1 1,500 RTU-2 1,300 RTU-3 1,300
PREP KITCHEN	91	0.06	5	5.0	5	1	5	
KITCHEN	628	0.12	75	7.5	20	13	98	
CORRIDOR/HALLWAY	312	0.06	3	0.0	0	0	0	
OFFICE	52	0.06	3	5.0	5	1	5	
SALES	277	0.12	33	7.5	15	5	38	
STORAGE	213	0.12	26	0.0	0	0	0	
	2,849		TOTAL = 391			820	TOTAL = 4,100	

AIR BALANCE SCHEDULE

EXHAUST EQUIPMENT	AREA/EQUIPMENT SERVED	EXHAUST (CFM)	TOTALS (CFM)	
EF-1	RESTROOM	300		
KEF-1	KITCHEN	1913		
KEF-2	KITCHEN	1216		
EF-2	RESTROOM	75		
			3,504	
OUTDOOR AIR EQUIPMENT	AREA/EQUIPMENT SERVED	SUPPLY AIR (CFM)	DESIGN OA (CFM)	PERCENT O/A/SA
RTU-1	KITCHEN	6,000	1,500	25.0%
RTU-2	DINING & RESTROOM	4,000	1,300	32.5%
RTU-3	DINING	4,000	1,300	32.5%
	TOTAL AIRFLOW	14,000	4100	29.3%
			TOTAL POSITIVE AIR FLOW	596
			PERCENT POSITIVE AIR FLOW	14.5%

EXHAUST AIR REQUIREMENTS

AREA PURPOSE	FIXTURE QUANTITY	GROSS FLOOR AREA (SQ. FT)	CODE EXHAUST AIR REQUIREMENTS IMC TABLE 403.3			SYSTEM NUMBER	ACTUAL EXHAUST AIR
			CFM PER SQ. FT	CFM FIXTURE	CFM REQD.		
PUBLIC RESTROOM	4		70	280	EF-1	300	
COMMERCIAL KITCHEN	1	1,276	0.7	893	KEF-1	1,913	
BACK OF HOUSE	1		50	50	KEF-2	1,216	
	5	1,276			EF-2	75	
			TOTAL =	1,223	TOTAL =	3,504	



SYMBOL	DATE	DESCRIPTION	BY
1	11/06/24	OWNER COM. KK	KK
2	02/12/25	GC CHANGES	KK

PROJECT: 220110
WHATABURGER PT20M
 SEQ LITCHFIELD & WADDELL RD.
 SURPRISE, ARIZONA 85379



Desert De Oro Foods INC
 3845 STOCKON HILL RD
 KINGMAN, AZ 86409

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SHEET TITLE:
 MECHANICAL SCHEDULES

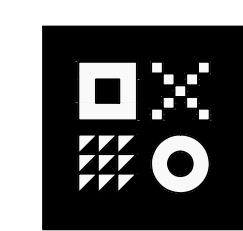
ISSUED FOR:
 PERMITS

UNIT NO.
 DATE: NO SCALE

DRAWN BY: CL

CHECKED BY: FH

SHEET NO:
MO.1



ARDEBILI Engineering
 Project Number: 22612 | Project Manager: KK, MA
 7328 E Stetson Dr., Scottsdale, AZ 85251
 P: 480.626.7072 | ardebilieng.com



COMcheck Software Version 4.1.5.4
Mechanical Compliance Certificate

Project Information

Energy Code: 2018 IECC
 Project Title: Whataburger
 Location: Surprise, Arizona
 Climate Zone: 2b
 Project Type: New Construction

Construction Site: Litchfield and Waddle, Surprise, AZ
 Owner/Agent: [Blank]
 Designer/Contractor: AZ

Additional Efficiency Package(s)

Credits: 1.0 Required 1.0 Proposed
 Reduced Lighting Power, 1.0 credit

Mechanical Systems List

Quantity System Type & Description

- 2 HVAC System 1 (Single Zone):
 Heating: 1 each - Central Furnace, Electric, Capacity = 120 kBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 120 kBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 12.30 EER, Required Efficiency: 11.20 EER + 12.8 IEER
 Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes
 Fans:
 FAN 1 Supply, Constant Volume, 4000 CFM, 3.0 motor nameplate hp, 0.0 fan efficiency grade
- 1 HVAC System 2 (Single Zone):
 Heating: 1 each - Central Furnace, Electric, Capacity = 180 kBtu/h
 No minimum efficiency requirement applies
 Cooling: 1 each - Single Package DX Unit, Capacity = 180 kBtu/h, Air-Cooled Condenser, Air Economizer
 Proposed Efficiency = 12.10 EER, Required Efficiency: 11.00 EER + 12.4 IEER
 Fan System: FAN SYSTEM 2 -- Compliance (Motor nameplate HP method) : Passes
 Fans:
 FAN 2 Supply, Constant Volume, 6000 CFM, 5.0 motor nameplate hp, 0.0 fan efficiency grade
- 1 EWH-1:
 Electric Storage Water Heater, Capacity: 120 gallons w/ Circulation Pump
 Proposed Efficiency: 0.53 SL, %/h (if > 12 kW), Required Efficiency: 0.53 SL, %/h (if > 12 kW)

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2018 IECC requirements in COMcheck Version 4.1.5.4 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title: **Maria Amaya** Signature: [Signature] Date: **08/17/2023**

Project Title: Whataburger Report date: 01/09/23
 Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 1 of 12
 Documents\ENERGY\22612_IECC.cck

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5.1, C404.5.2 [PL6] ¹	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.5.1, C404.5.2 [PL6] ¹	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.5.1, C404.5.2 [PL6] ¹	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.6.1, C404.6.2 [PL3] ¹	Automatic time switches installed to automatically switch off the recirculating hot-water system or heat trace.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.6.3 [PL7] ¹	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.6.3 [PL7] ¹	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.6.3 [PL7] ¹	Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.7 [PL8] ¹	Demand recirculation water systems have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.7 [PL8] ¹	Demand recirculation water systems have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.7 [PL8] ¹	Demand recirculation water systems have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
 Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 4 of 12
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COMcheck Software Version 4.1.5.4
Inspection Checklist

Energy Code: 2018 IECC
 Requirements: 1.0% were addressed directly in the COMcheck software
 Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C103.2 [PR3] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C406 [PR9] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
 Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 2 of 12
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Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41] ³	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.8.4 [ME142] ¹	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.8.4 [ME142] ¹	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.8.5 [ME143] ¹	Each DX cooling system > 65 kBtu and chiller water/evaporative cooling system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.8.5 [ME143] ¹	Each DX cooling system > 65 kBtu and chiller water/evaporative cooling system with fans > 1/4 hp are designed to vary the indoor fan airflow as a function of load and comply with detailed requirements of this section.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.12.1 [ME71] ²	Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer-switch.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.3 [ME55] ²	HVAC equipment efficiency verified.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Mechanical Systems list for values.
C403.5.5 [ME113] ²	Fault detection and diagnostics installed with air-cooled unitary DX units having economizers.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.5 [ME113] ²	Fault detection and diagnostics installed with air-cooled unitary DX units having economizers.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.2 [ME59] ¹	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.7.1 [ME59] ¹	Demand control ventilation provided for spaces >50 ft2 and >25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
 Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 6 of 12
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Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
C403.12.2 [FO9] ¹	Snow/ice melting system and freeze protection systems have sensors and controls configured to limit service for pavement temperature and outdoor temperature. Future connection to controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

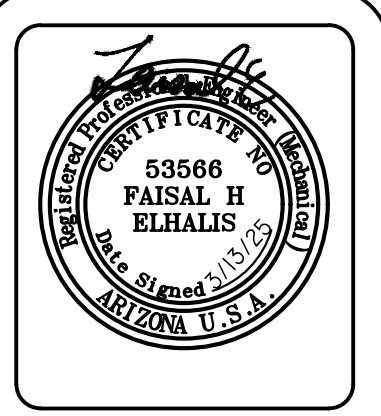
1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
 Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 3 of 12
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Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.2 [ME115] ³	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.7.6 [ME141] ¹	HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms. Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.7.4 [ME57] ¹	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.7.5 [ME116] ¹	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.11.1, C403.11.2 [ME60] ¹	HVAC ducts and plenums insulated in accordance with C403.11.1 and constructed in accordance with C403.11.2. Verification may need to occur during Foundation Inspection.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.1, C403.5.2 [ME62] ²	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.1, C403.5.2 [ME62] ²	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.3 [ME124] ³	Air economizers automatically reduce outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will not reduce cooling energy usage. See Table C403.5.3.3 for applicable device types and climate zones.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.3 [ME124] ³	Air economizers automatically reduce outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will not reduce cooling energy usage. See Table C403.5.3.3 for applicable device types and climate zones.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.3 [ME125] ³	System capable of relieving excess outdoor air during air economizer operation to prevent overpressurizing the building. The relief air outlet located to avoid recirculation into the building.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
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SY#	DATE	DESCRIPTION	BY
1	11/06/24	OWNER COM.	KK
2	02/12/25	GC CHANGES	KK

PROJECT: 220110
WHATABURGER PT20M
 SEQ LITCHFIELD & WADDELL RD.
 SURPRISE, ARIZONA 85379



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SHEET TITLE:
 MECHANICAL COMCHECK COMPLIANCE ISSUED FOR PERMITS

UNIT NO.
 DATE: NO SCALE
 DRAWN BY: CL
 CHECKED BY: FH

SHEET NO:
M0.2



Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.5.3.4 [ME125] ¹	System capable of relieving excess outdoor air during air economizer operation to prevent overpressurizing the building. The relief air outlet located to avoid recirculation into the building.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.3.5 [ME126] ¹	Return, exhaust/relief and outdoor air dampers used in economizers have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Reference section C403.7.7 for details.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.3.5 [ME126] ¹	Return, exhaust/relief and outdoor air dampers used in economizers have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Reference section C403.7.7 for details.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.4.1.4 [ME63] ¹	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.3.3 [ME35] ¹	Hot gas bypass limited to: <=240 kbtu/h - 50% >240 kbtu/h - 25%	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.3.3 [ME35] ¹	Hot gas bypass limited to: <=240 kbtu/h - 50% >240 kbtu/h - 25%	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.2.1 [ME53] ¹	Air outlets and zone terminal devices have means for air balancing.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.5.1, C403.5.2 [ME123] ¹	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.5.1 and refrigeration compressor systems that comply with C403.5.2.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
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Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.6 [EL26] ²	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C405.7 [EL27] ²	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C405.8.2.1, C405.8.2.2 [EL28] ²	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C405.9 [EL29] ²	Total voltage drop across the combination of feeders and branch circuits <= 5%.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 9 of 12 Documents\ENERGY\22612_JECC.cck

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.3 [F18] ¹	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.2 [F127] ¹	HVAC systems and equipment capacity does not exceed calculated loads.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4 [F147] ¹	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.1 [F147] ¹	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.4.1.2 [F138] ¹	Thermostatic controls have a 5 °F deadband.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.1.3 [F120] ¹	Temperature controls have setpoint overlap restrictions.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.2 [F139] ¹	Each zone equipped with setback controls using automatic time clock or programmable control system.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.2.1, C403.2.4.2.2 [F140] ¹	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.2.3 [F141] ¹	Systems include optimum start controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C403.2.4.2.3 [F141] ¹	Systems include optimum start controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.3 [F111] ¹	Heat traps installed on supply and discharge piping of non-circulating systems.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C404.4 [F125] ²	All piping insulated in accordance with section details and Table C403.11.3.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
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Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C404.6.1 [F12] ¹	Controls are installed that limit the operation of a recirculation pump installed to maintain temperature of a storage tank. System return pipe is a dedicated return pipe or a cold water supply pipe.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.1.1 [F157] ¹	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.1 [F128] ¹	Commissioning plan developed by registered design professional or approved agency.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.3.1 [F131] ¹	HVAC equipment has been tested to ensure proper operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.3.2 [F110] ¹	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.3.3 [F132] ¹	Economizers have been tested to ensure proper operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.4 [F129] ¹	Preliminary commissioning report completed and certified by registered design professional or approved agency.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.5.1 [F17] ³	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.5.3 [F143] ¹	An air and/or hydronic system balancing report is provided for HVAC systems.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	
C408.2.5.4 [F130] ¹	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Whataburger Report date: 01/09/23
Data filename: Z:\Shared\01_Projects\2022\22612_SEG_Whataburger - Litchfield and Waddell\01_Construction Page 11 of 12 Documents\ENERGY\22612_JECC.cck



SYMBOL	DATE	DESCRIPTION	BY
1	11/06/24	OWNER COM. KK	KK
2	02/12/25	GC CHANGES	KK

PROJECT: 220110
WHATABURGER PT20M
SEQ LITCHFIELD & WADDELL RD.
SURPRISE, ARIZONA 85379



5240 N. 16th STREET
SUITE 105
PHOENIX, AZ 85016
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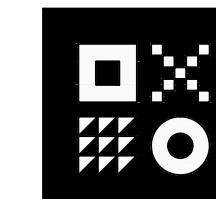
3845 STOCKON HILL RD
KINGMAN, AZ 86409

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SHEET TITLE:
MECHANICAL COMCHECK COMPLIANCE ISSUED FOR PERMITS

UNIT NO.
DATE:
SCALE:
DRAWN BY: CL
CHECKED BY: FH

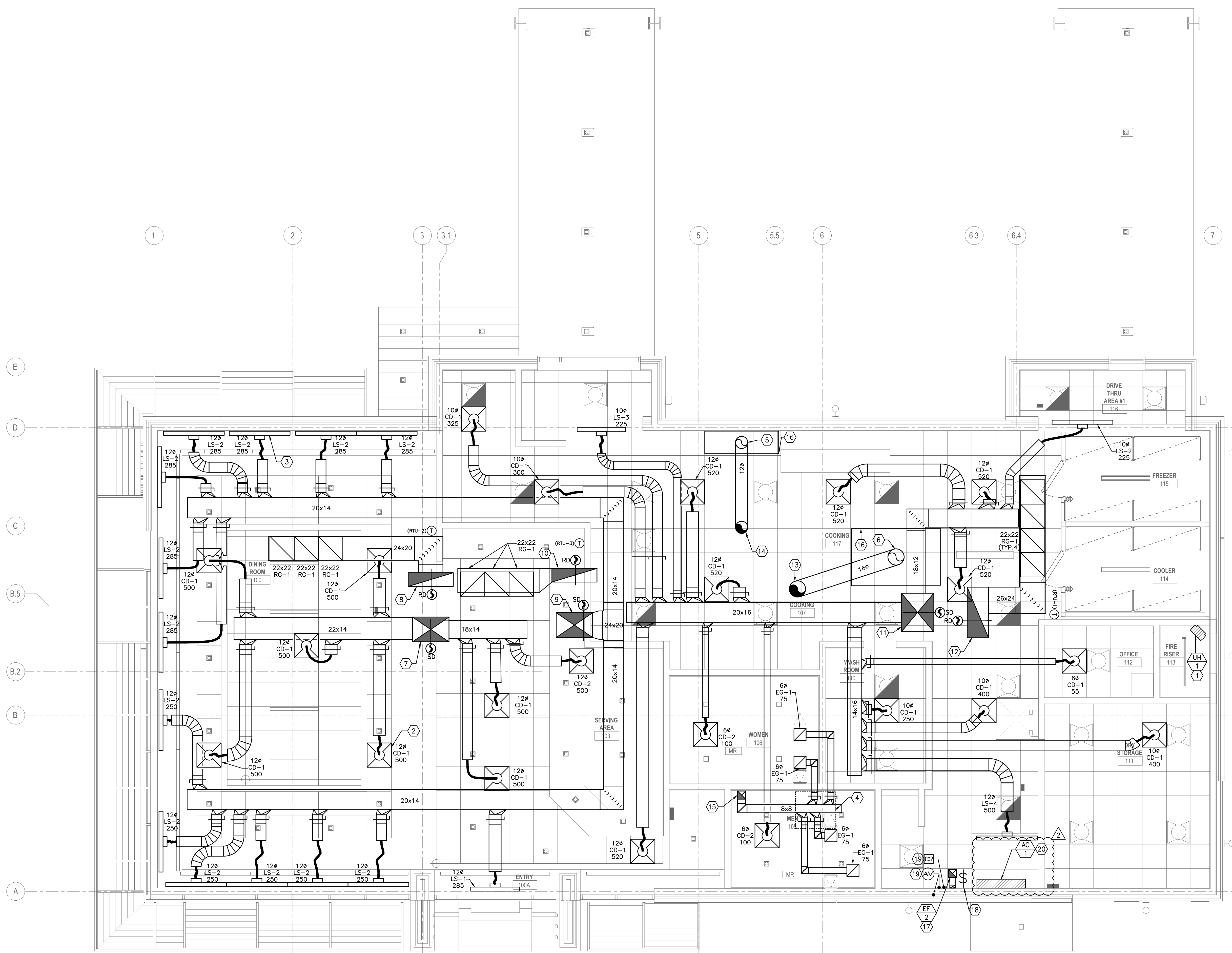
SHEET NO:
M0.3



ARDEBILI
Engineering

Project Number: 22612 | Project Manager: KK, MA
7328 E Stetson Dr., Scottsdale, AZ 85251
P: 480.626.7072 | ardebilieng.com





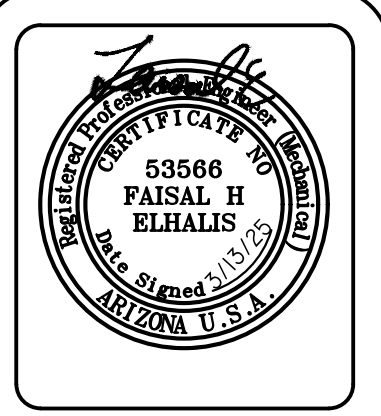
1 MECHANICAL FLOOR PLAN
SCALE: 1/4"=1'-0"

MECHANICAL PLAN NOTES:

- ELECTRIC UNIT HEATER MOUNTED ON WALL, 8'-0" ABOVE FINISHED FLOOR. CONTRACTOR TO FIELD COORDINATE EXACT LOCATION WITH FIRE RISER LAYOUT.
- SUPPLY AIR DIFFUSER (TYP.).
- SUPPLY AIR SLOT DIFFUSER (TYP.).
- 2'x2' LOCKABLE ACCESS DOOR IN HARD CEILING FOR ACCESS TO BATHROOM EXHAUST DAMPERS.
- CONNECT KITCHEN EXHAUST HOOD ABOVE FRYER UP TO KEF-2 WITH 12" DIA. PRE-FABRICATED UL 1978 LISTED AND LABELED GREASE DUCT. PROVIDE TRANSITIONS ABOVE CEILING AS REQUIRED.
- CONNECT KITCHEN EXHAUST HOOD ABOVE GRILLES UP TO KEF-1 WITH 16" DIA. PRE-FABRICATED UL 1978 LISTED AND LABELED GREASE DUCT. PROVIDE TRANSITIONS ABOVE CEILING AS REQUIRED.
- 24x36 SUPPLY DUCT UP TO RTU-3.
- 14x44 RETURN DUCT UP TO RTU-3.
- 24x36 SUPPLY DUCT UP TO RTU-2.
- 14x44 RETURN DUCT UP TO RTU-2.
- 32x38 SUPPLY DUCT UP TO RTU-1.
- 22x50 RETURN DUCT UP TO RTU-1.
- ROUTE 16" KITCHEN EXHAUST GREASE DUCT UP TO ROOF AND CONNECT TO KEF-1.
- ROUTE 12" KITCHEN EXHAUST GREASE DUCT UP TO ROOF AND CONNECT TO EF-2.
- ROUTE 8x8 RESTROOM EXHAUST DUCT UP AND CONNECT TO EF-1.
- TYPE I KITCHEN HOOD. REFER TO KITCHEN HOOD DRAWINGS. THE HOOD AND DUCT SHALL HAVE AN APPROVED FIRE PROTECTION. THE FIRE-EXTINGUISHING SYSTEM SHALL BE INTERCONNECTED TO THE FUEL OR CURRENT SUPPLY SO THAT THE FUEL OR CURRENT SUPPLY IS AUTOMATICALLY SHUT OFF TO ALL EQUIPMENT UNDER THE HOOD WHEN THE SYSTEM IS ACTUATED.
- IN-LINE EXHAUST FAN IN RIGHT DISCHARGE CONFIGURATION. MOUNTED AS HIGH AS POSSIBLE, SUPPORTED FROM THE ROOF. ROUTE EXHAUST DUCTWORK AS INDICATED ON PLAN.
- CO2 EXHAUST FAN MOUNTED START EMERGENCY SWITCH LOCATION BY ELECTRICAL CONTRACTOR. SWITCH TO BE BREAK GLASS TYPE.
- LOCATION OF CO2 DETECTOR AND AUDIO VISUAL ALARM. CO2 SENSOR SHALL BE LOGICO2 MKVII, OR APPROVED EQUAL. INSTALL CO2 SENSOR IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS WITHIN 12" ABOVE FINISHED FLOOR. CO2 SENSOR SHALL ACTIVATE EXHAUST FAN AND ALARM WHEN THE CO2 LEVELS EXCEEDS 30,000 PPM. AUDIO VISUAL ALARM SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR.
- AIR CURTAIN LOCATION MOUNTED ON WALL. INSTALL PER MANUFACTURER'S INSTRUCTIONS. AIR CURTAIN SHALL ENERGIZE WHEN DOOR OPENS.

GENERAL NOTES:

- REFER TO M0.1 FOR GENERAL NOTES, SYMBOLS AND ABBREVIATIONS.
- SMOKE DETECTORS SHALL BE PROVIDED BY THE FIRE ALARM CONTRACTOR AND INSTALLED IN THE SUPPLY AND RETURN SIDES OF RTU. COORDINATE WIRING FOR SHUTDOWN WITH ELECTRICAL SCOPE. MOUNT SMOKE DETECTORS IN ACCESSIBLE LOCATIONS. REFERENCE M2.2 FOR RTU SCHEDULE. ACTIVATION OF SMOKE DETECTORS SHALL SHUT DOWN RTU AND ACTIVATE THE AUDIBLE AND VISUAL SIGNAL PROVIDED.
- THE EMERSON SITE SUPERVISOR DISPLAY AND CONTROLLER PANEL SHALL BE MOUNTED AND INSTALLED FLUSH IN THE MANAGER'S OFFICE AT 5' AFF TO CENTER.
- PER IECC 2018, PARAGRAPH C408.2.1, A THIRD PARTY SHALL BE HIRED BY THE OWNER AS PART OF THIS PROJECT TO PROVIDE/PERFORM THE FOLLOWING ITEMS:
 - A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING THE PERSONNEL INTENDED TO ACCOMPLISH EACH OF THE ACTIVITIES.
 - A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND A DESCRIPTION OF THE TESTS TO BE PERFORMED.
 - FUNCTIONS TO BE TESTED INCLUDING, BUT NOT LIMITED TO, CALIBRATIONS AND ECONOMIZER CONTROLS.
 - CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED. TESTING SHALL AFFIRM WINTER AND SUMMER DESIGN CONDITIONS AND FULL OUTSIDE AIR CONDITIONS.
 - MEASURABLE CRITERIA FOR PERFORMANCE.
- KITCHEN HOODS, ANSUL FIRE SUPPRESSION SYSTEM AND HOOD CONTROLS SHALL BE OWNER-FURNISHED AND CONTRACTOR-INSTALLED.



SYM	DATE	DESCRIPTION	BY
1	11/06/24	OWNER COM.	KK
2	02/12/25	GC CHANGES	KK

PROJECT: 220110
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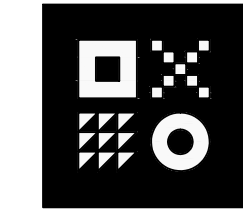
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MECHANICAL FLOOR PLAN

ISSUED FOR:
PERMITS

UNIT NO.
DATE:
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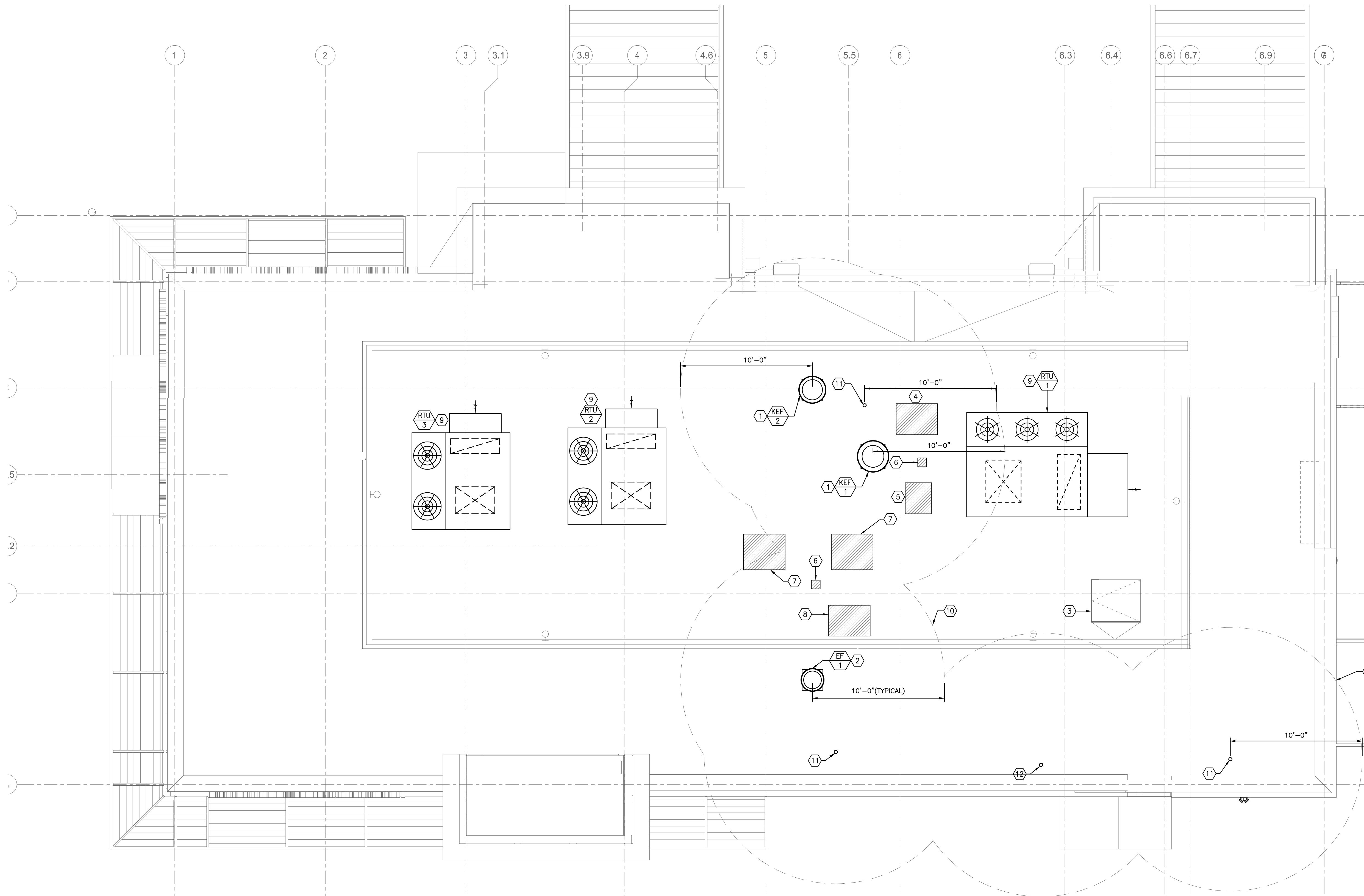
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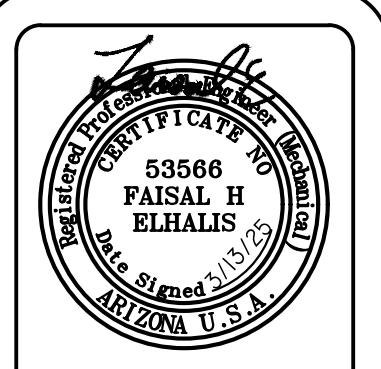
1 MECHANICAL ROOF PLAN
SCALE: 1/4"=1'-0"

MECHANICAL PLAN NOTES:

- CENTRIFUGAL UPBLAST GREASE HOOD EXHAUST FAN MOUNTED ON MANUFACTURER PROVIDED ROOF CURB.
- CENTRIFUGAL DOWNBLAST EXHAUST FAN MOUNTED ON MANUFACTURER PROVIDED ROOF CURB.
- ROOF ACCESS HATCH.
- WALK-IN FREEZER CONDENSING UNIT MOUNTED ON ROOFTOP; PROVIDED BY OWNER, COORDINATE EXACT LOCATION ON SITE AND ROUTE REFRIGERATION PIPING THROUGH ROOF PENETRATION (BY OTHERS).
- WALK-IN REFRIGERATOR CONDENSING UNIT MOUNTED ON ROOFTOP; PROVIDED BY OWNER, COORDINATE EXACT LOCATION ON SITE AND ROUTE REFRIGERATION PIPING THROUGH ROOF PENETRATION (BY OTHERS).
- REFRIGERATION PIPING ROOF PENETRATION (BY OTHERS).
- ICE MAKER CONDENSING UNIT MOUNTED ON ROOFTOP, PROVIDED BY OWNER. COORDINATE EXACT LOCATION ON SITE AND ROUTE REFRIGERANT PIPING THROUGH ROOF PENETRATION (BY OTHERS).
- MULTIPLY CONDENSING UNIT MOUNTED ON ROOFTOP, PROVIDED BY OWNER. COORDINATE EXACT LOCATION ON SITE AND ROUTE REFRIGERANT PIPING THROUGH ROOF PENETRATION (BY OTHERS).
- NEW PACKAGED ROOF TOP UNIT ON NEW ROOF CURB. COORDINATE EXACT LOCATION WITH STRUCTURAL DRAWINGS. ROUTE SUPPLY AND RETURN DUCTWORK DOWN THROUGH ROOF. SEE FLOOR PLAN FOR CONTINUATION OF DUCTWORK ROUTING. ELECTRICAL CONTRACTOR SHALL WIRE AND PROVIDE SMOKE DETECTOR AND MECHANICAL CONTRACTOR SHALL INSTALL SMOKE DETECTOR ON THE RETURN & SUPPLY AIR DUCT. SMOKE DETECTOR SHALL SHUT DOWN ROOF TOP UNIT SUPPLY FAN UPON THE DETECTION OF SMOKE.
- 10'-0" HORIZONTAL EXHAUST CLEARANCE FROM EQUIPMENT AND BUILDING INTAKES.
- PLUMBING VENT THRU ROOF. MAINTAIN A MINIMUM OF 10'-0" CLEARANCE FROM ALL PLUMBING VENTS TO ANY FRESH AIR INTAKE OF HVAC UNITS.
- EXHAUST FAN VENT THRU ROOF. MAINTAIN A MINIMUM OF 10'-0" CLEARANCE FROM ALL PLUMBING VENTS TO ANY FRESH AIR INTAKE OF HVAC UNITS.

GENERAL NOTES:

- REFER TO M0.1 FOR GENERAL NOTES, SYMBOLS AND ABBREVIATIONS.
- SMOKE DETECTORS SHALL BE PROVIDED BY THE FIRE ALARM CONTRACTOR AND INSTALLED IN THE RETURN & SUPPLY SIDES OF RTU. COORDINATE WIRING FOR SHUTDOWN WITH ELECTRICAL SCOPE. MOUNT SMOKE DETECTORS IN ACCESSIBLE LOCATIONS. REFERENCE M6.1 FOR RTU SCHEDULE. ACTIVATION OF SMOKE DETECTORS SHALL SHUT DOWN RTU AND ACTIVATE THE AUDIBLE AND VISUAL SIGNAL PROVIDED.
- THE EMERSON SITE SUPERVISOR DISPLAY AND CONTROLLER PANEL SHALL BE MOUNTED AND INSTALLED FLUSH IN THE MANAGER'S OFFICE AT 5' AFF TO CENTER.
- PER IECC 2018, PARAGRAPH C408.2.1, A THIRD PARTY SHALL BE HIRED BY THE OWNER AS PART OF THIS PROJECT TO PROVIDE/PERFORM THE FOLLOWING ITEMS:
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 - MEASURABLE CRITERIA FOR PERFORMANCE.
- KITCHEN HOODS, ANSUL FIRE SUPPRESSION SYSTEM AND HOOD CONTROLS SHALL BE OWNER-FURNISHED AND CONTRACTOR-INSTALLED.
- MAINTAIN A MINIMUM CLEARANCE OF 10 FEET BETWEEN OUTSIDE AIR INTAKES AND ANY EXHAUST, FLUES, OR VENTS THROUGH ROOF.



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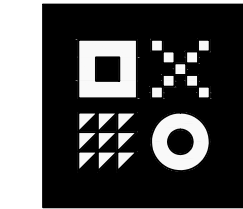
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SHEET TITLE:
MECHANICAL
ROOF PLAN
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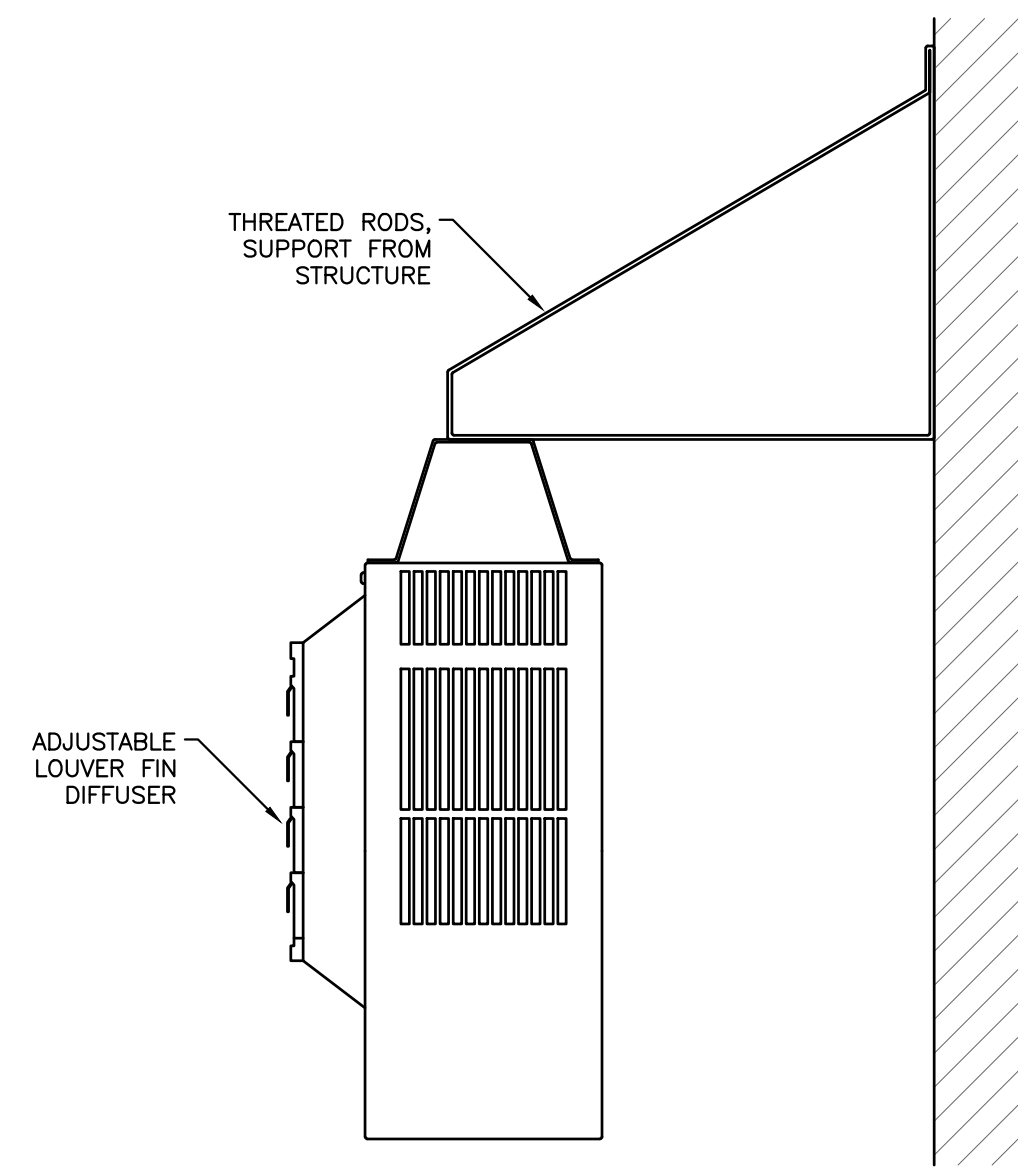
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SHEET NO:
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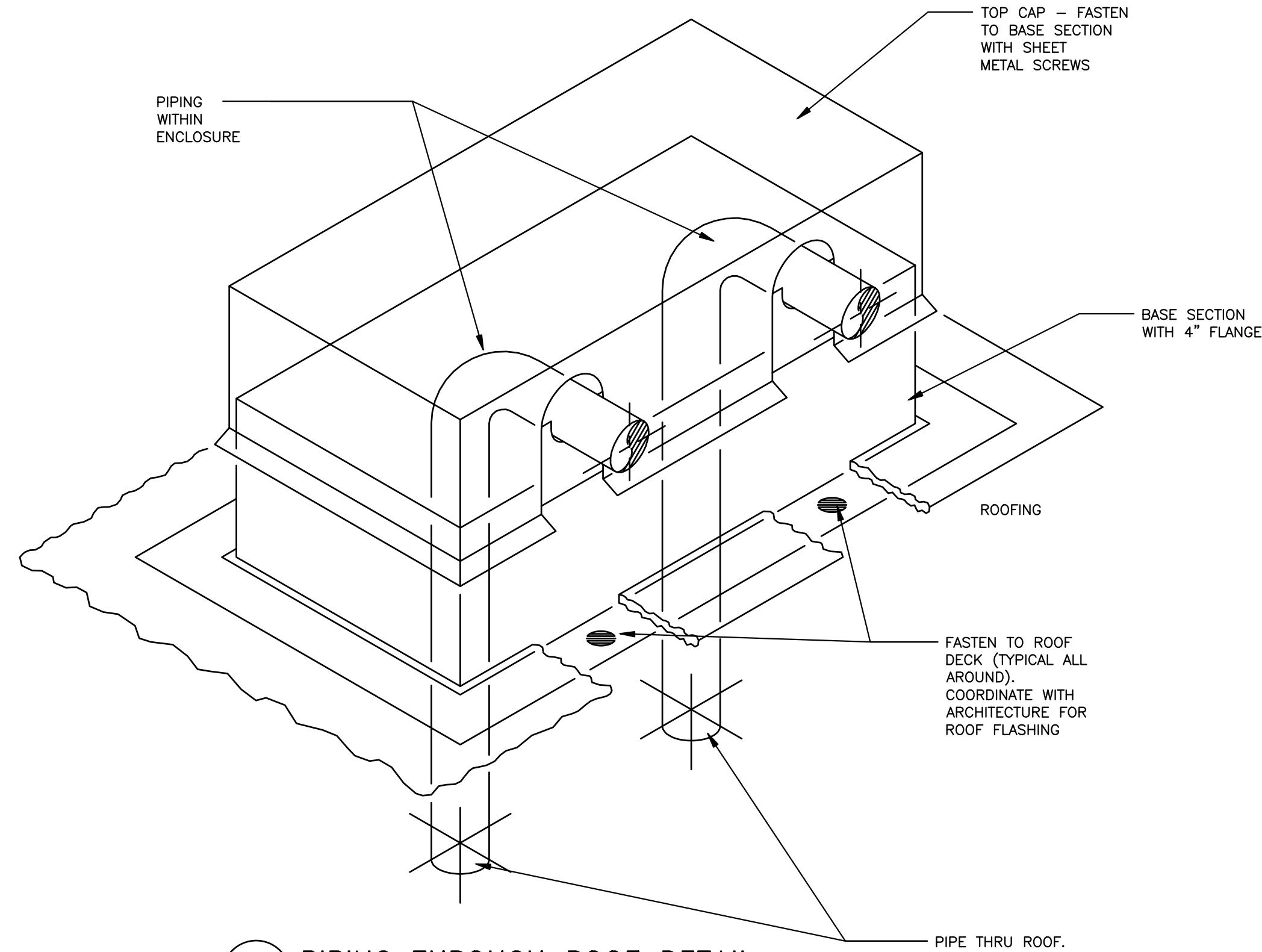


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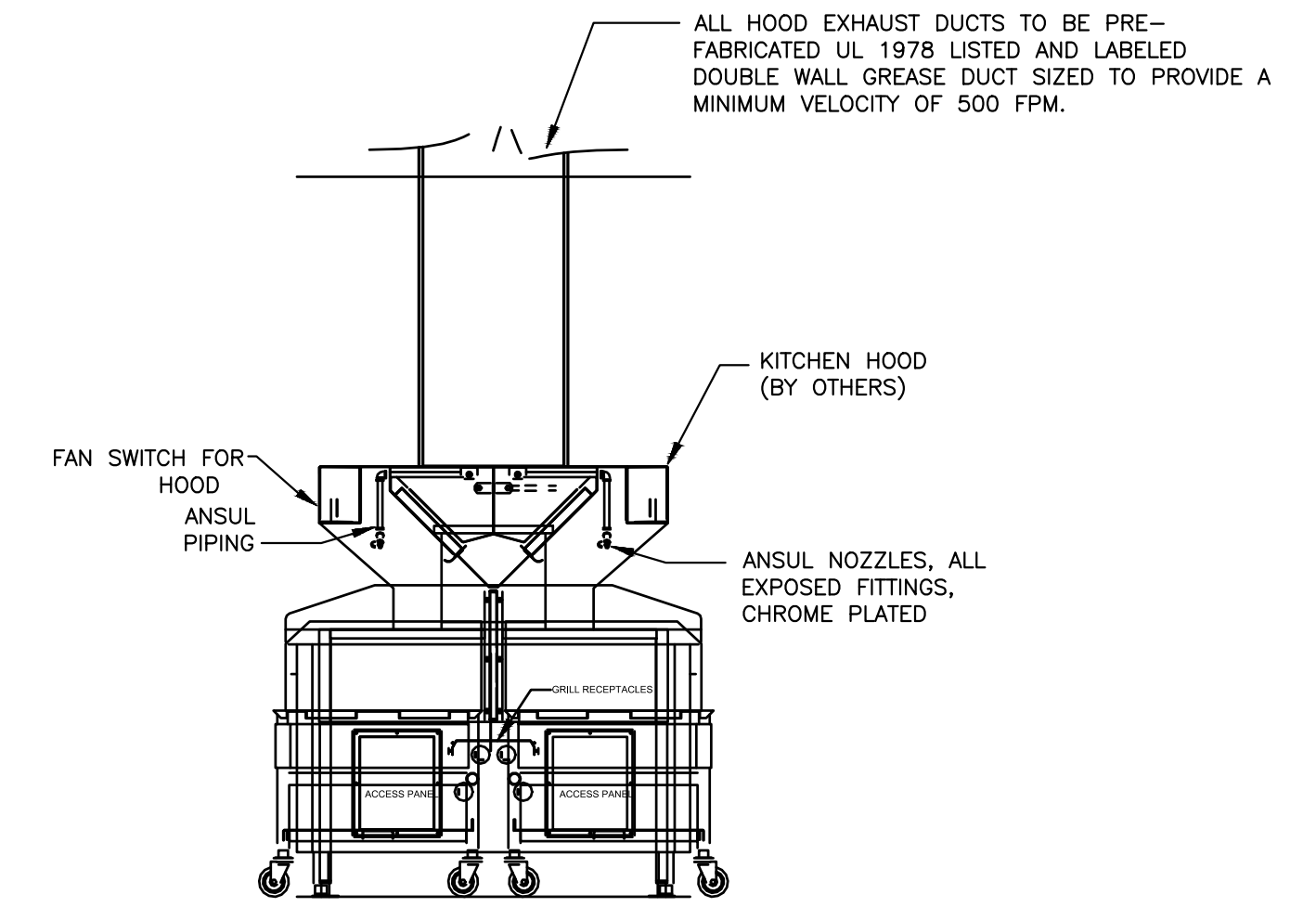




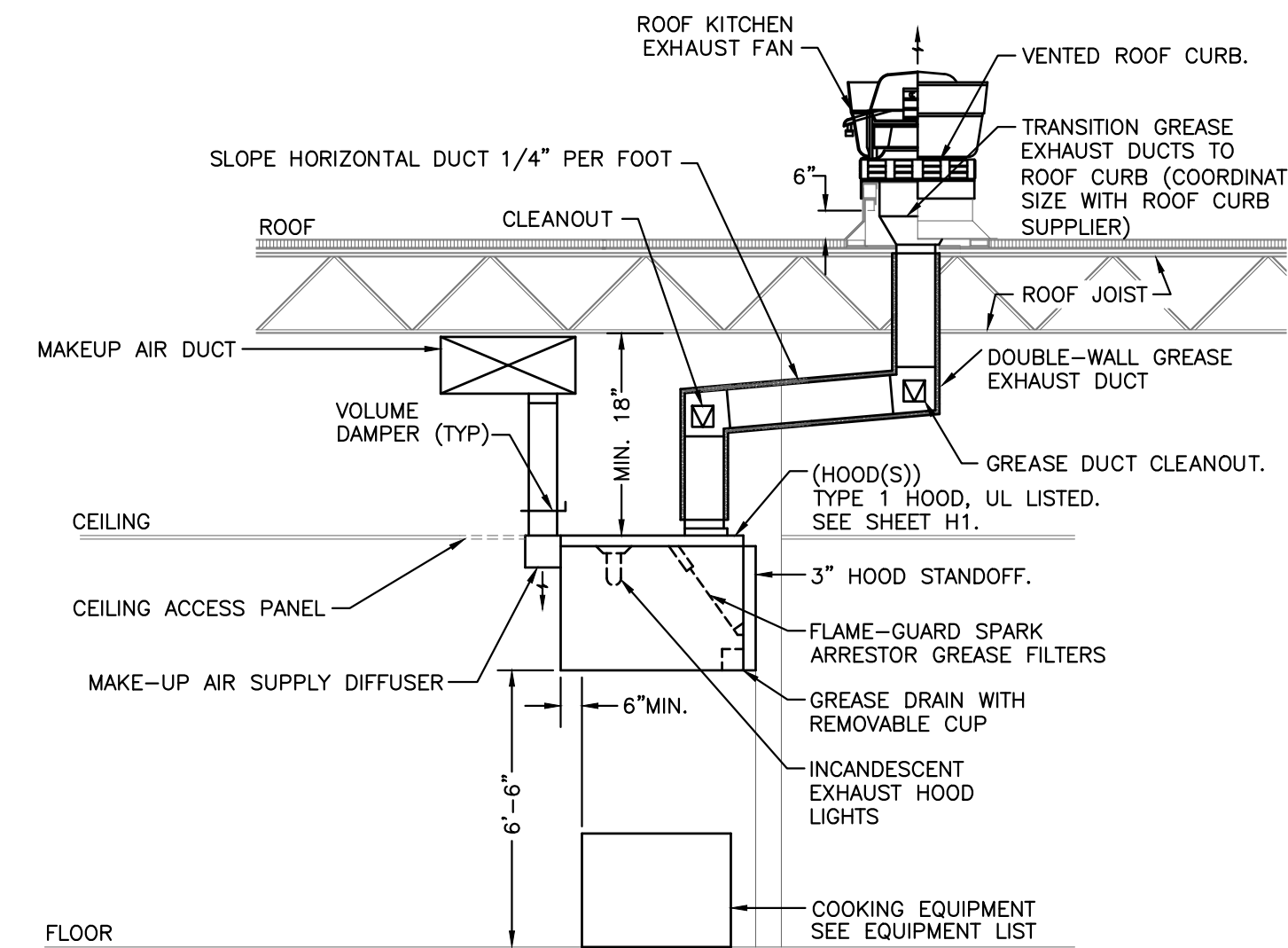
1 WALL MOUNTED ELECTRIC UNIT HEATER
NTS



2 PIPING THROUGH ROOF DETAIL
NTS

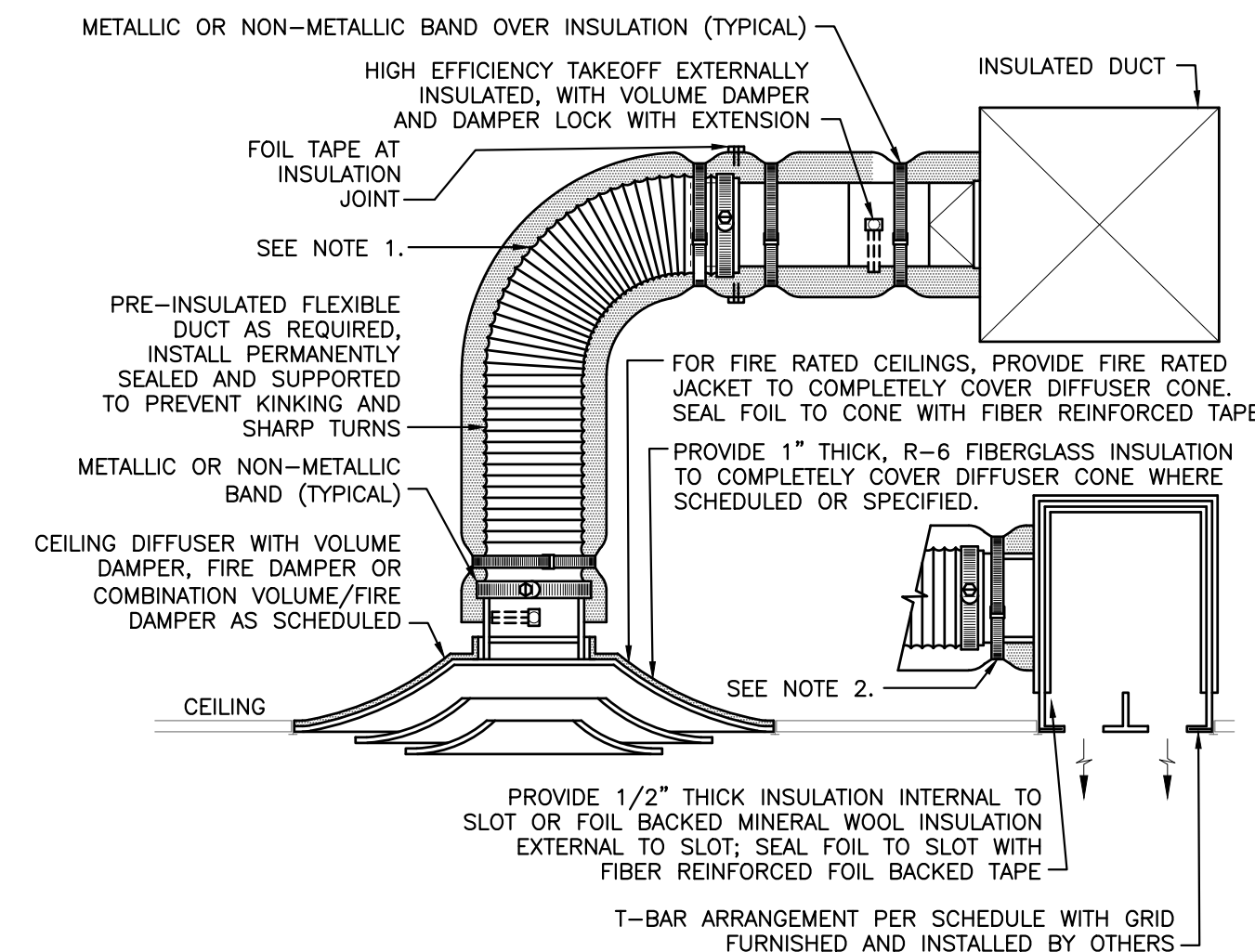


3 LOW PROFILE HOOD DETAIL
NTS



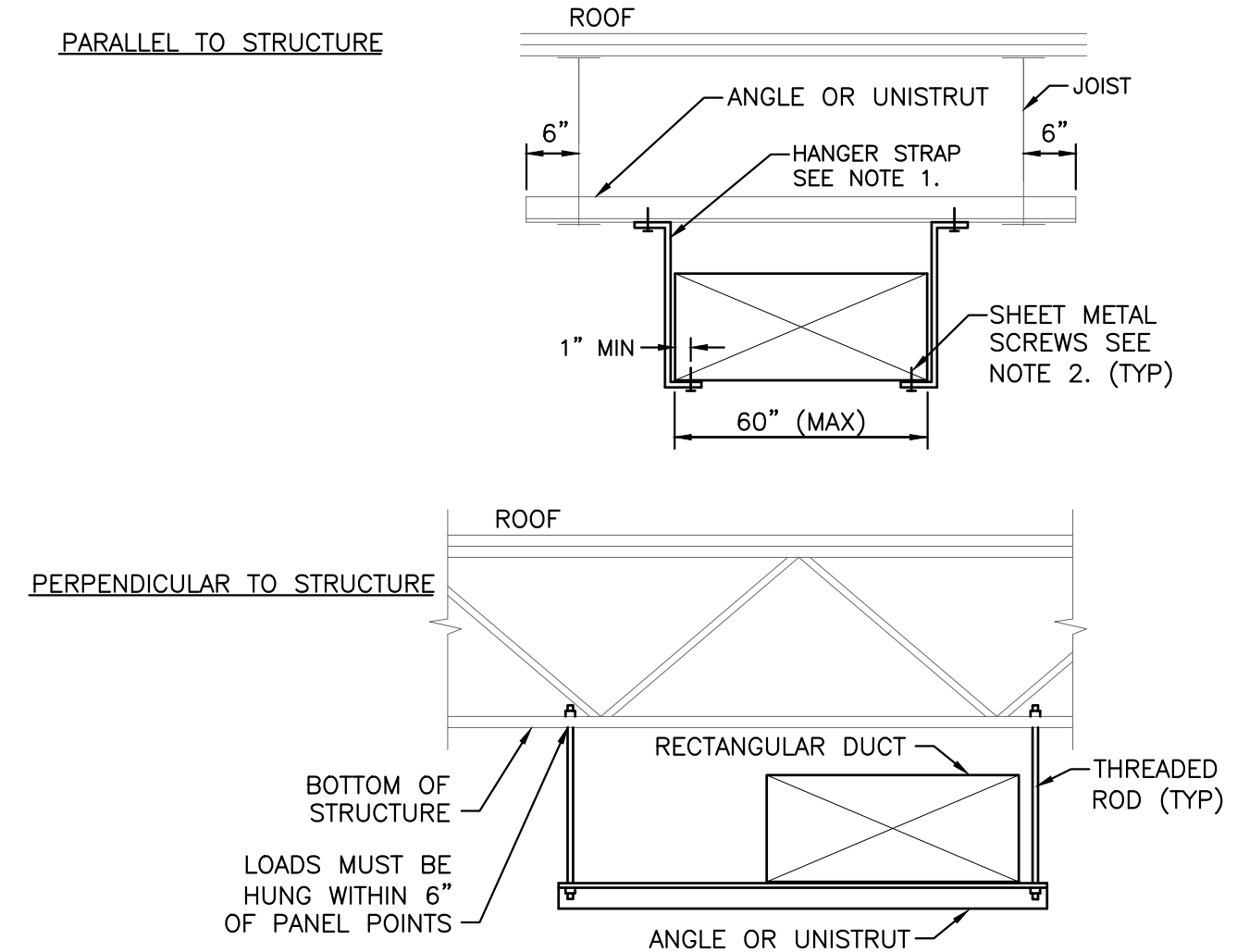
- NOTES:
1. SUBMIT SHOP DRAWINGS OF ALL HOOD SYSTEMS TO CITY FOR APPROVAL PRIOR TO INSTALLATION.
 2. TOTAL HOOD SYSTEM TO BE IN COMPLETE CONFORMANCE WITH NFPA, AND ALL LOCAL CODES AND REGULATIONS.
 3. COORDINATE ALL ANSUL FIRE PROTECTION SYSTEMS WITH FIRE PROTECTION CONTRACTOR WHO SHALL ALSO BE RESPONSIBLE FOR ALL PERMITS AND TESTING REQUIRED.
 4. PROVIDE WRAP SYSTEM WHERE APPROVED BY LOCAL CODES IN LIEU OF RATED ENCLOSURE
 5. PROVIDE ACCESS PANELS AS REQUIRED BY LOCAL CODE.
 6. HOODS SHALL EXTEND MINIMUM 6" BEYOND ALL OPEN SIDES AND FRONT EDGE OF FOOD COOKING EQUIPMENT BEING SERVED.

5 KITCHEN EXHAUST HOOD ELEVATION
NO SCALE



- NOTES:
1. EXTEND RIGID METAL DUCT SO THAT MAXIMUM FLEXIBLE DUCT LENGTH DOES NOT EXCEED 5'-0". PROVIDE RIGID 90° ELBOW WHERE REQUIRED TO KEEP FLEXIBLE DUCT WITHIN 5'-0" LENGTH LIMITATION.
 2. PROVIDE RIGID ROUND-TO-OVAL TRANSITION WHEN PLENUM HAS OVAL CONNECTION.

6 LAY-IN AND SLOT TYPE CEILING DIFFUSER DETAIL
NTS



- NOTES:
1. USE THREADED ROD FOR ALL DUCTS LARGER THAN 60" WIDE.
 2. SHEET METAL SCREWS MAY BE OMITTED IF HANGER STRAP IS CONTINUOUS AND LOOPS UNDER ENTIRE DUCT.

7 RECTANGULAR DUCT SUPPORT DETAIL
NTS



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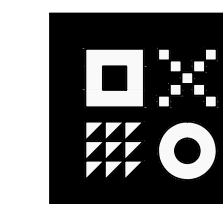
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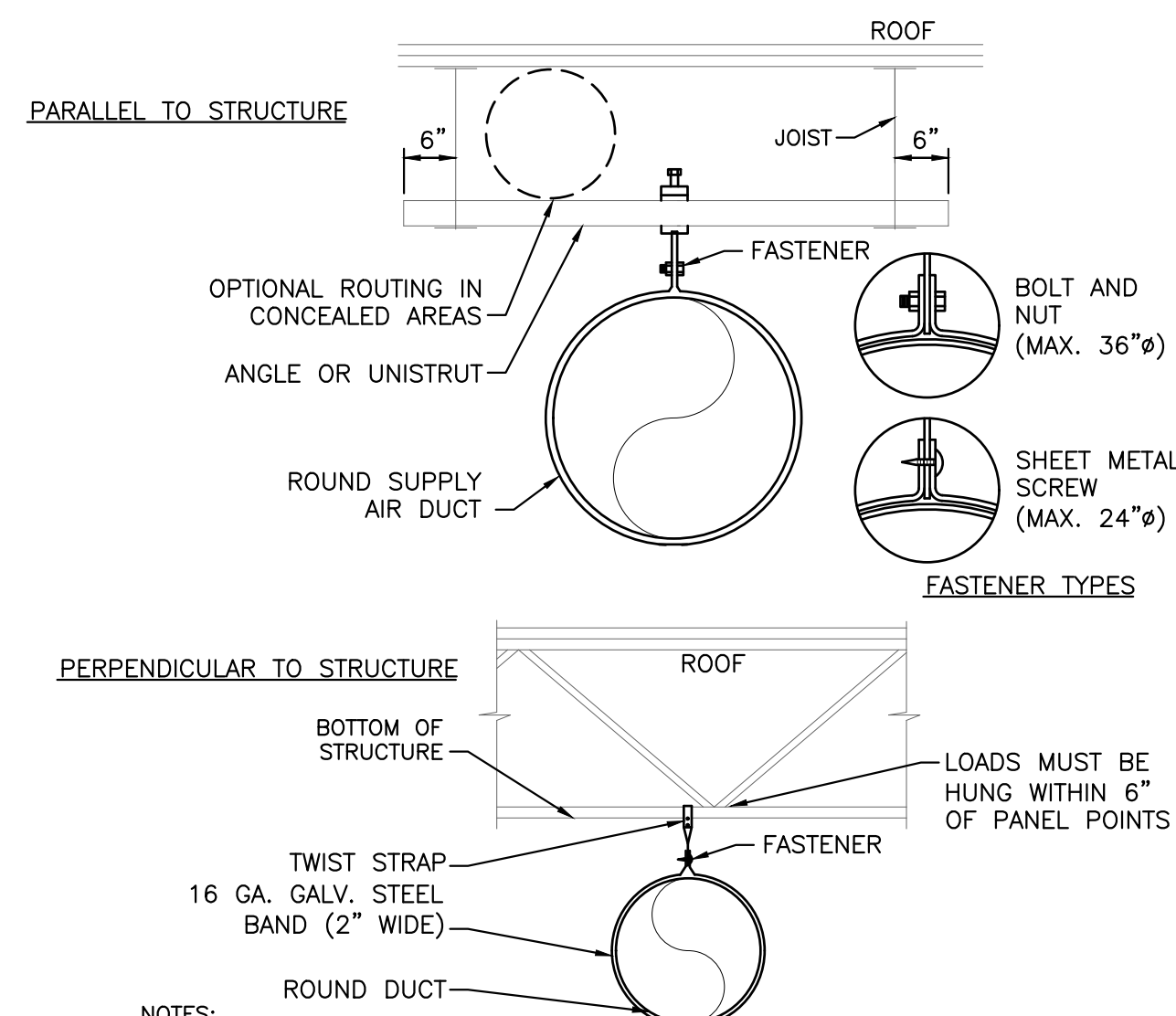
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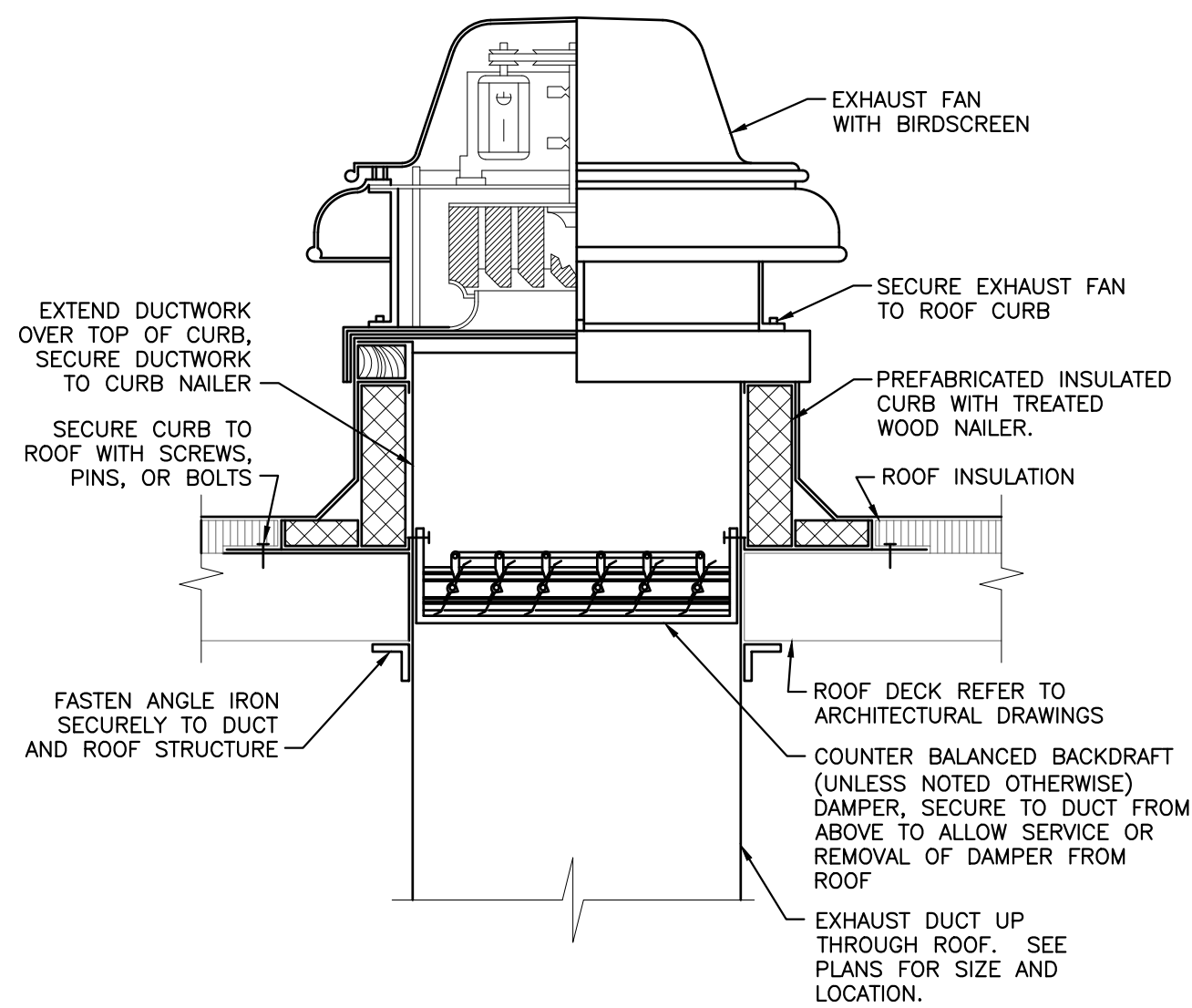
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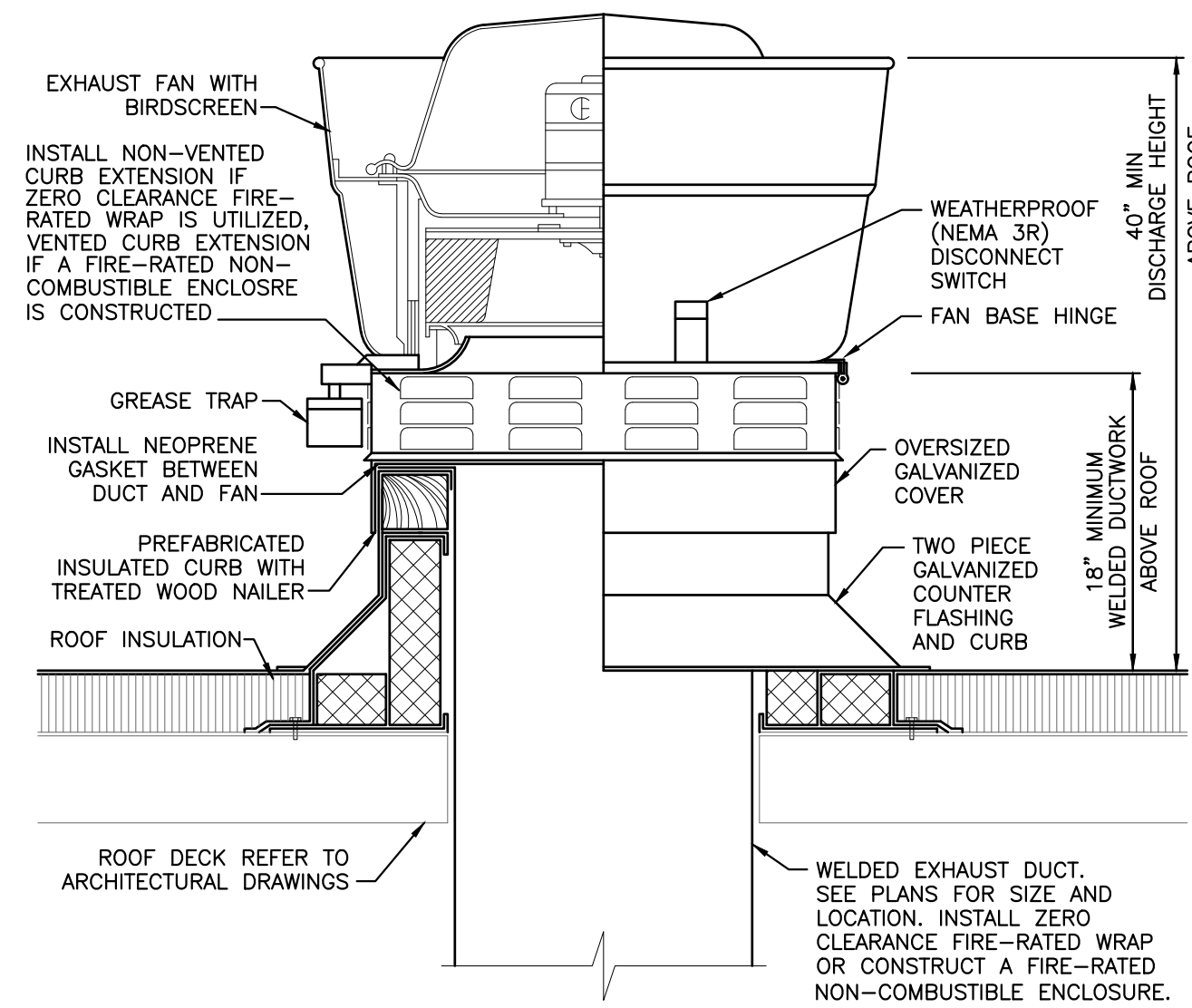




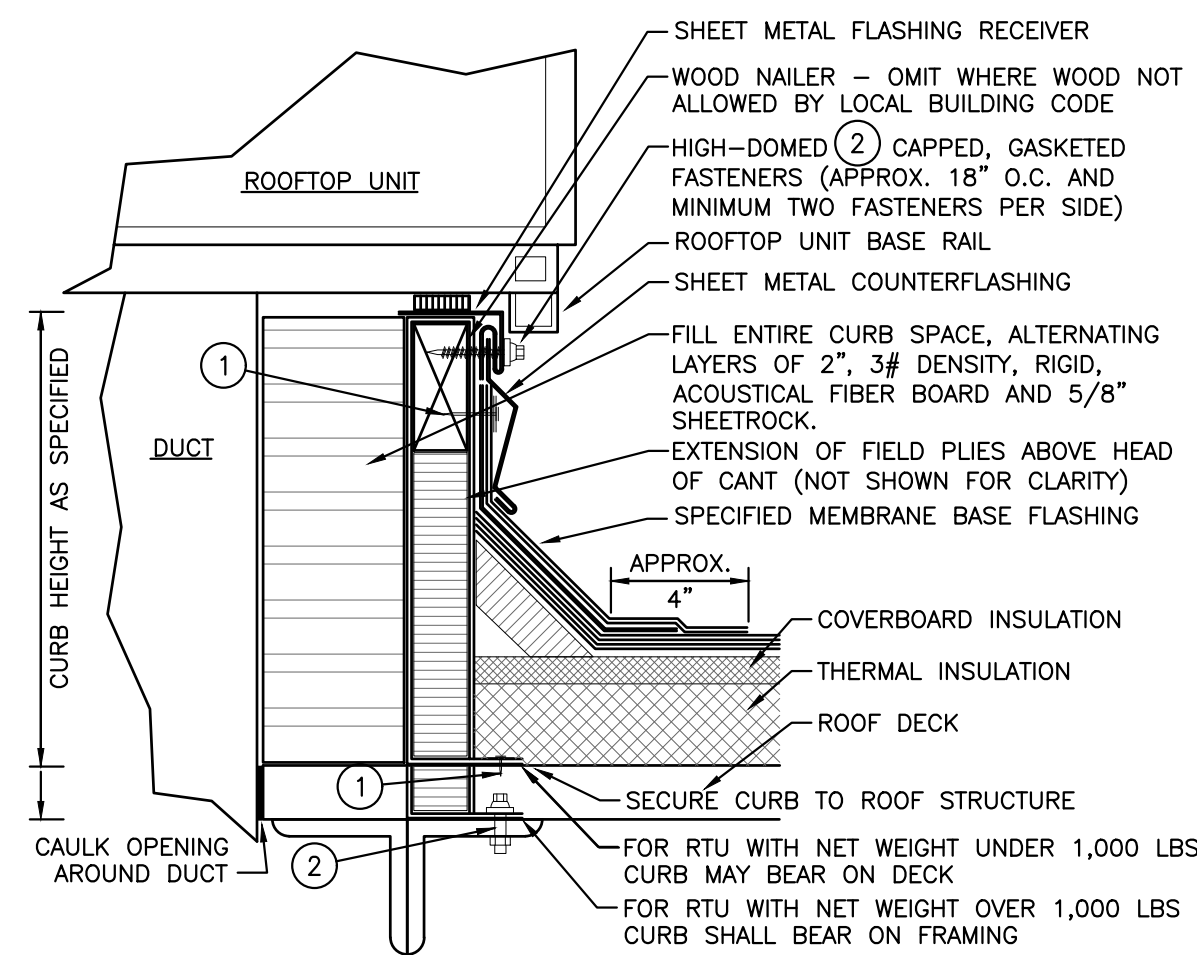
1 ROUND DUCT SUPPORT DETAIL
NTS



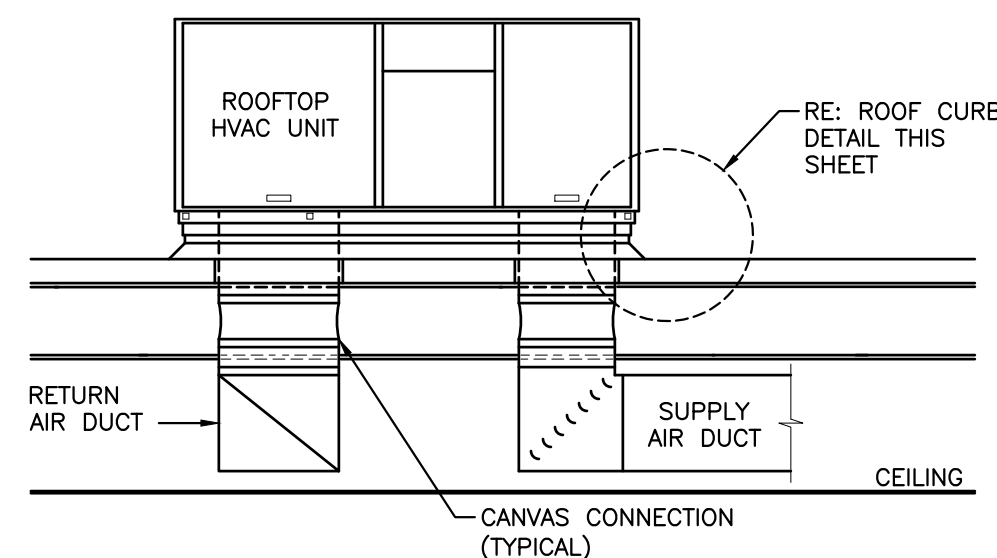
2 DOWNBLAST EXHAUST FAN DETAIL
NTS



3 UPBLAST GREASE EXHAUST FAN DETAIL
NTS



4 ROOF CURB DETAIL
NO SCALE



5 ROOFTOP UNIT WITH DUCTWORK DETAIL
NO SCALE



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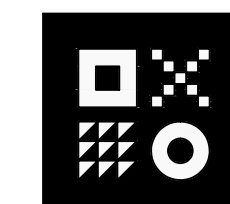
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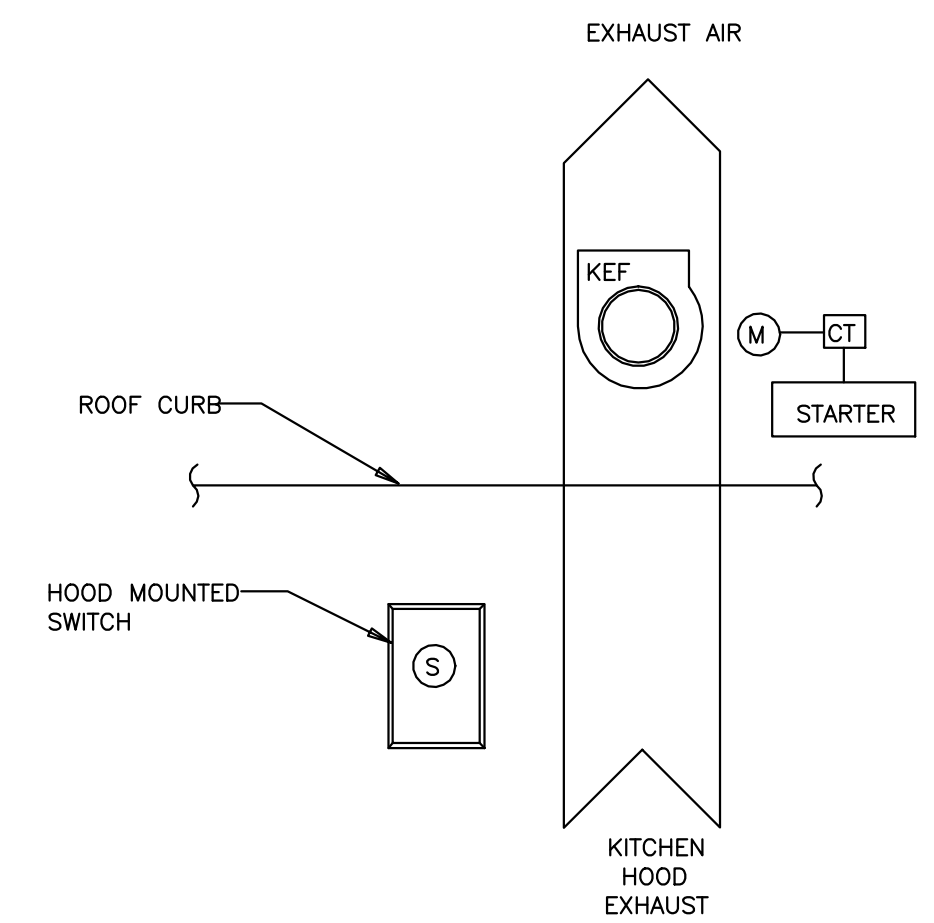
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CONTROL SYMBOLS

AE	ANALYZER ELEMENT	CO	CARBON MONOXIDE SENSOR
DDC	DIRECT DIGITAL CONTROL	---	COMMUNICATION SIGNAL
BMS	BUILDING MANAGEMENT SYSTEM	HPS	HIGH STATIC PRESSURE SENSOR
RDC	ROOFTOP UNIT DDC CONTROLLER	DA	DAMPER ACTUATOR
FACP	FIRE ALARM CONTROL PANEL	CV	CONTROL VALVE
DPI	DIFFERENTIAL PRESSURE INDICATOR	CC	CHILLED WATER HEATING COIL
DPS	DIFFERENTIAL PRESSURE SWITCH	HC	HOT WATER HEATING COIL
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	SF	SUPPLY AIR FAN
EDH	ELECTRIC DUCT HEATER		
EF	EXHAUST FAN		
FE	FLOW ELEMENT		
FLTR	FILTER		
HGR	HOT GAS REHEAT COIL		
FS	FLOW SWITCH		
H	HUMIDISTAT		
HL	HIGH TEMPERATURE LIMIT SWITCH		
M	MOTOR		
PCV	PRESSURE CONTROL VALVE		
PT	PRESSURE TRANSMITTER		
SMK	SMOKE DETECTOR		
T	TEMPERATURE SENSOR		
TCV	TEMPERATURE CONTROL VALVE		
TSL	LOW LIMIT THERMOSTAT (FREEZESTAT)		
TT	TEMPERATURE TRANSMITTER		
VFD	VARIABLE FREQUENCY DRIVE		
STARTER	MOTOR STARTER (PROVIDE CONTROL RELAY)		
CT	CURRENT TRANSDUCER		
OS	OCCUPANCY SENSOR		



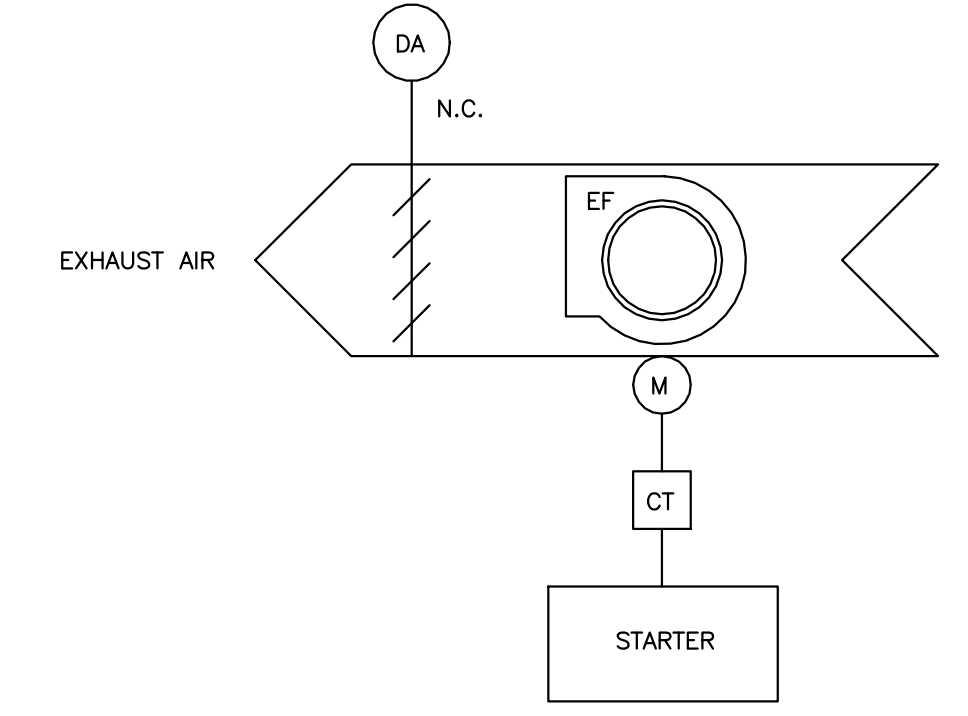
SEQUENCE OF OPERATION

OPERATING CONDITIONS – CONTINUOUS 24/7:
THE KITCHEN HOOD EXHAUST FAN SHALL RUN CONTINUOUSLY WHEN THE KITCHEN HOOD MOUNTED SWITCH IS ON.

INTEGRATED ANSUL FIRE SUPPRESSION SYSTEM
UPON ACTIVATION OF THE INTEGRATED ANSUL FIRE SUPPRESSION SYSTEM DURING NORMAL KITCHEN OPERATION, THE KITCHEN HOOD EXHAUST FAN SHALL REMAIN ENERGIZED.

FIRE/SMOKE CONTROL:
UPON SENSING A BUILDING FIRE ALARM, THE KITCHEN EXHAUST FAN SHALL BE CYCLED OFF THRU THE FIRE ALARM PANEL. FAN STATUS SHALL BE REPORTED TO THE BAS.

1 KITCHEN HOOD EXHAUST FAN CONTROL DIAGRAM
NTS

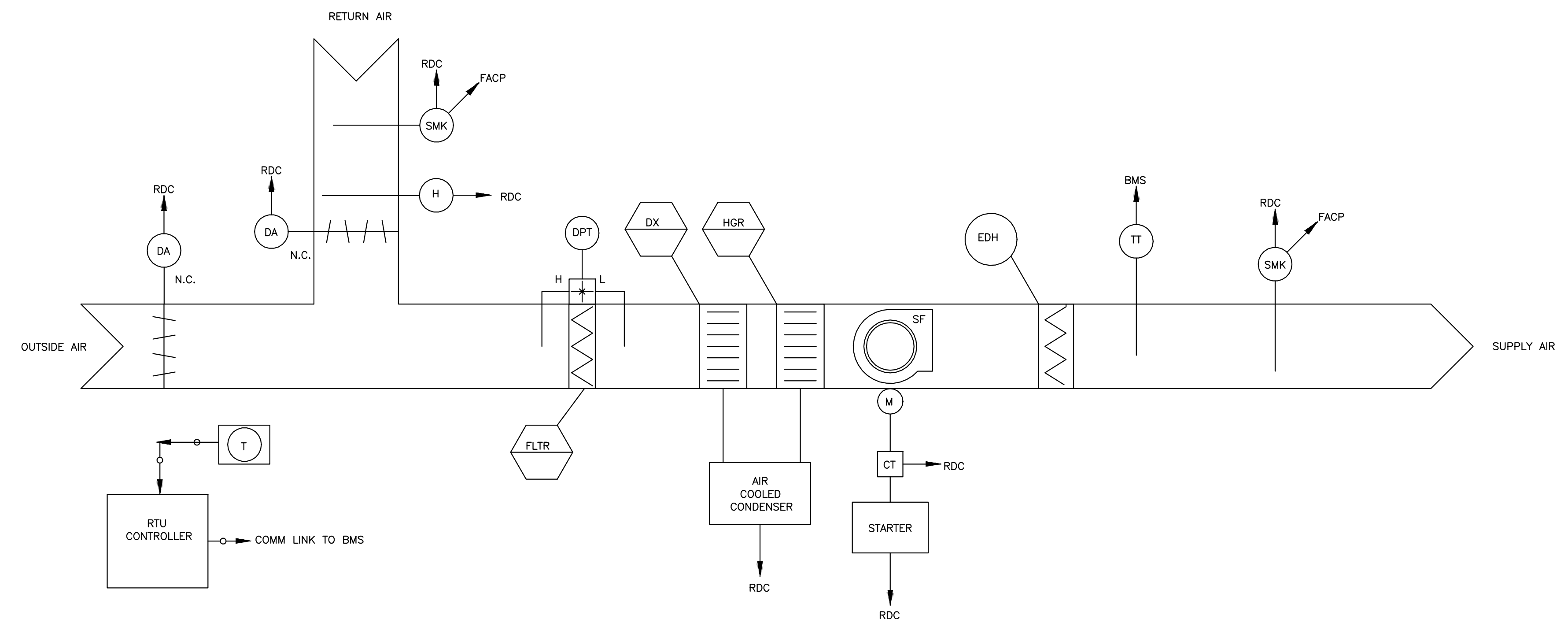


SEQUENCE OF OPERATION

OPERATING CONDITIONS – CONTINUOUS 24/7:
THE GENERAL EXHAUST FAN SHALL RUN CONTINUOUSLY. THE EXHAUST FAN SHUTOFF DAMPER SHALL BE INTERLOCKED WITH THE EXHAUST FAN TO OPEN WHEN THE FAN IS ENERGIZED AND CLOSE WHEN THE FAN IS DE-ENERGIZED.

ALARMS:
ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. FAN FAILURE: FAN COMMANDED ON BUT STATUS IS OFF.
2. FAN IN HAND: FAN COMMANDED OFF BUT STATUS IS ON.
3. FAN BELT FAILURE: MOTOR AMPERAGE READS ZERO AS MEASURED BY CURRENT TRANSDUCER.

2 GENERAL EXHAUST FAN CONTROL DIAGRAM
NTS



SEQUENCE OF OPERATION

OPERATING CONDITION – CONTINUOUS 24/7

THE RTU CONTROLLER (RDC) SHALL PERFORM ALL CONTROL, SAFETY AND INTERLOCKS AS DESCRIBED IN THE SEQUENCE OF OPERATION. THE BMS SHALL MONITOR THE RTU DDC CONTROLLER VIA BMS PROTOCOL COMMUNICATION AND/OR COMBINATION OF DISCRETE INPUT/OUTPUT POINTS. THE BMS SHALL OPERATE THE UNIT CONTINUOUS 24/7. WHEN THE UNIT IS DE-ENERGIZED BY THE BMS, THE FAN SHALL SHUT DOWN, THE OA DAMPER SHALL CLOSE. THE REFRIGERATION SYSTEM SHALL ALSO BE DE-ENERGIZED AND THE HEATING SYSTEM LOCKED OUT OF HEATING MODE.

TEMPERATURE CONTROL
OCCUPIED MODE – THE BMS WILL MAINTAIN THE FOLLOWING SPACE TEMPERATURE SETPOINTS:
• COOLING: 75°F (ADJUSTABLE)
• HEATING: 70°F (ADJUSTABLE)

HUMIDITY CONTROL
IF THE RELATIVE HUMIDITY OF THE RETURN AIR EXCEEDS 60% (ADJUSTABLE) AND THERE IS NO CALL FOR COOLING IN THE SPACE, THE RDC SHALL ENABLE DEHUMIDIFICATION MODE OF THE RTU BASED ON ITS OWN INTERNAL CONTROLS UTILIZING HOT GAS REHEAT.

ECONOMIZER OPERATION
BASED ON THE RTU INTERNAL CONTROLS, THE RDC SHALL VARY THE OUTSIDE AIR DAMPER POSITION, BASED ON CALL FOR COOLING IN THE SPACE. THERE SHALL BE ONE FAN SPEED. THE RDC SHALL LOAD AND UNLOAD COMPRESSORS BASED ON THE UNIT INTERNAL CONTROLS TO CONDITION OR DEHUMIDIFY THE SPACE AS NEEDED.

SEQUENCE OF OPERATION (CONTINUED)

THE BMS SHALL BE PROGRAMMED SO THAT THE HEATING AND COOLING SYSTEMS SHALL NEVER OPERATE SIMULTANEOUSLY.

UNIT SHUTDOWN:
UNIT SHALL BE DE-ENERGIZED UPON DETECTION OF SMOKE IN DUCT OR BUILDING FIRE ALARM.

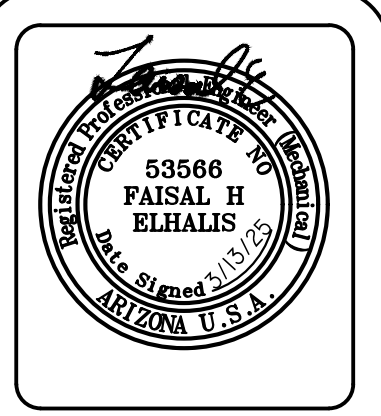
ALARMS
THE BMS SHALL MONITOR ALL SAFETIES ON THE REFRIGERATION SYSTEM AND THE HEATING SYSTEM THROUGH THE RDC COMMUNICATION PROTOCOL. ALL ABNORMAL CONDITIONS SHALL BE ALARMED AT THE BMS.

A. FILTERS
THE RDC SHALL MONITOR THE STATIC PRESSURE DROP ACROSS THE FILTER BANK AND ALARM ON HIGH STATIC PRESSURE DROP. A DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER SHALL INITIATE FILTER ALARM WHEN THE PRESSURE DROP ACROSS THE FILTER REACHES THE SETPOINT OF 1.0 INCHES W.C. (ADJUSTABLE).

B. FIRE/SMOKE CONTROL
UPON ACTIVATION OF A DUCT SMOKE DETECTOR, THE BMS AND THE FIRE ALARM CONTROL PANEL SHALL RECEIVE AN ALARM.

C. GENERAL ALARM
ANY TROUBLE ALARM OR FAULT WITHIN THE UNIT ONBOARD CONTROLS WILL GENERATE A GENERAL ALARM TO THE BMS.

3 PACKAGED ROOFTOP UNIT CONTROLS DIAGRAM
NTS



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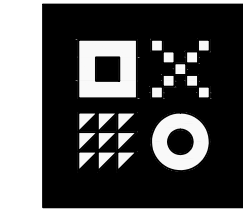
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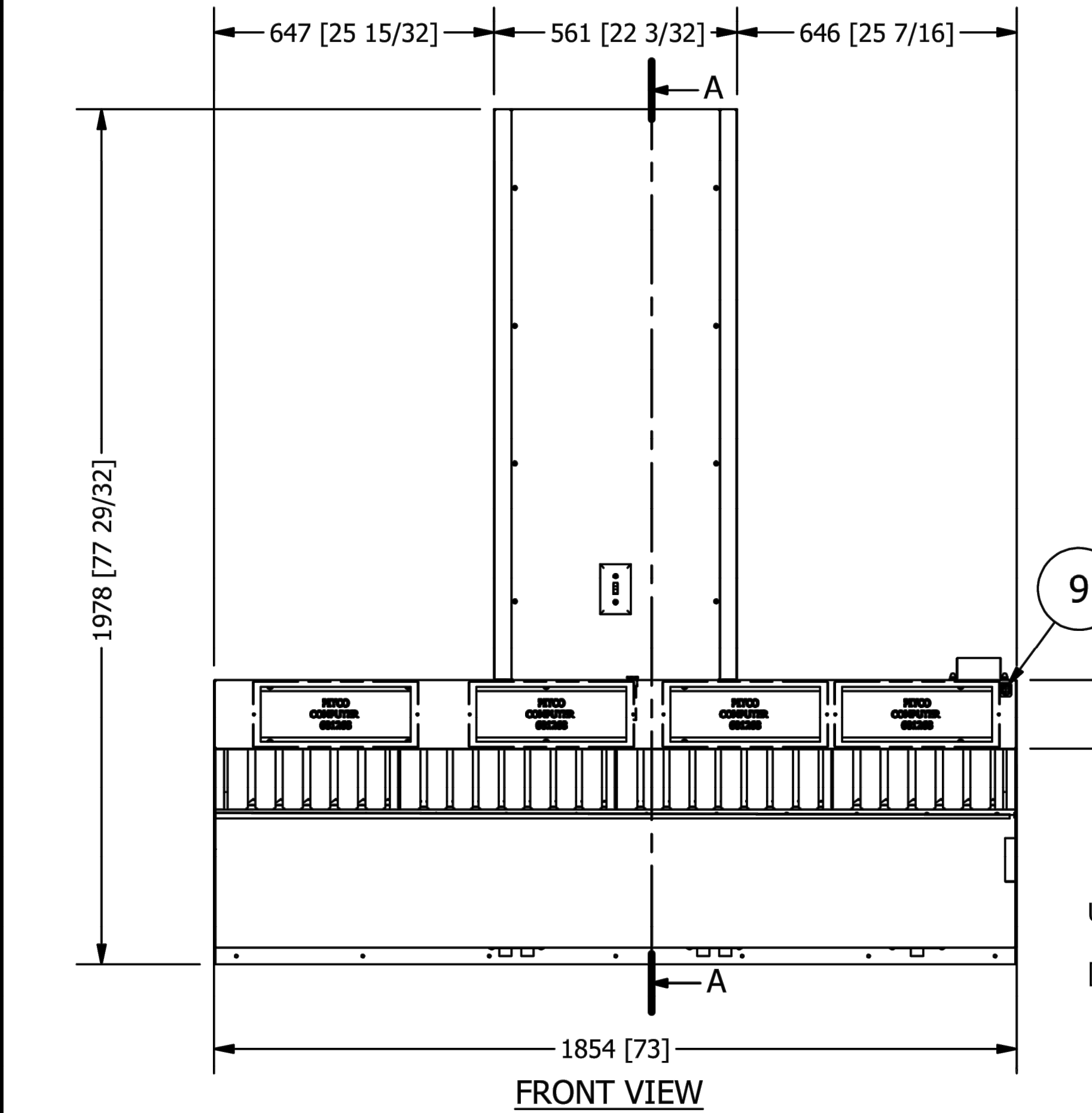
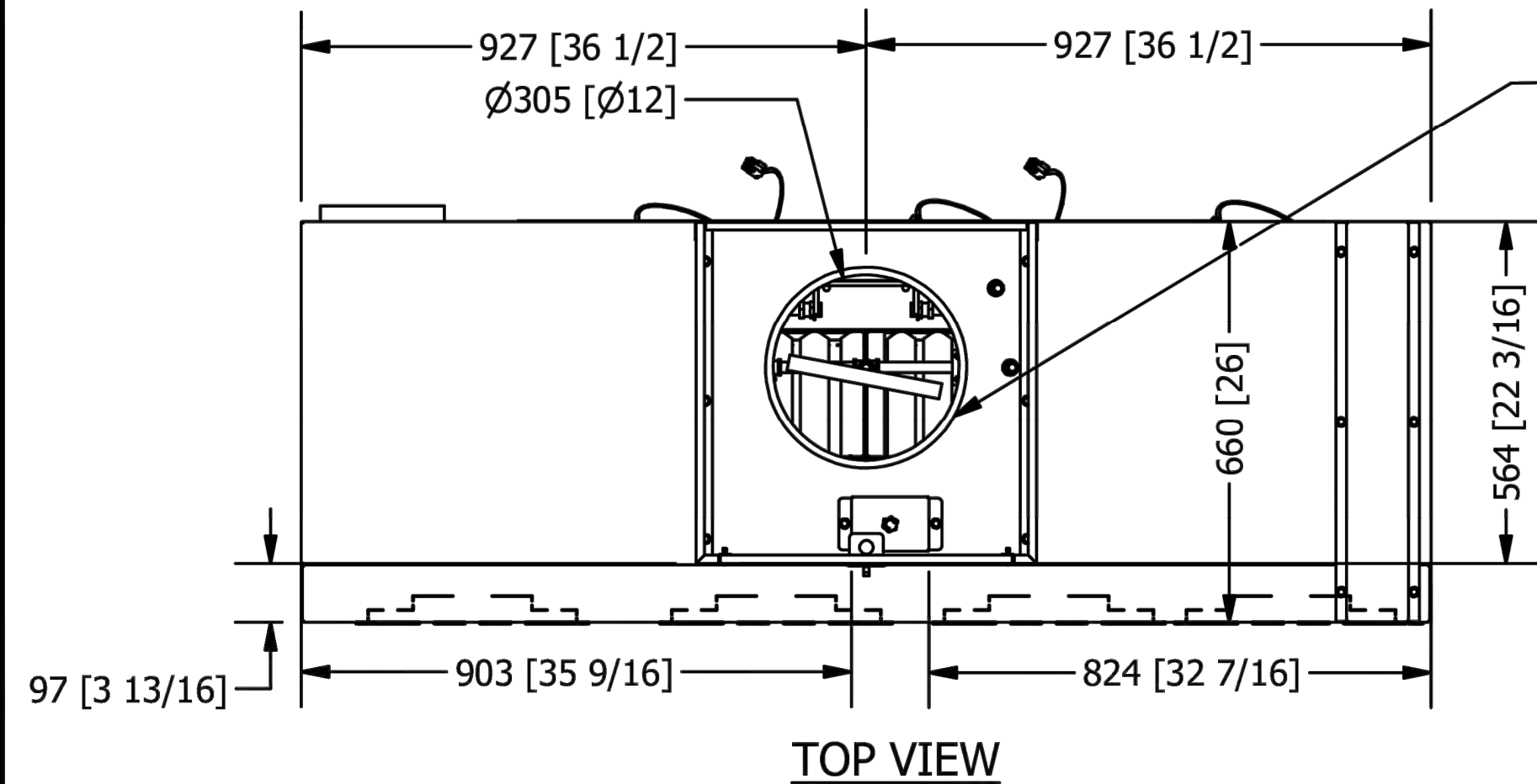
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SHEET NO:
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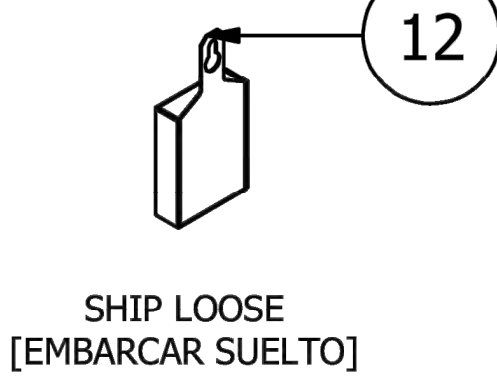
Item #34 Wall hung fryer hood



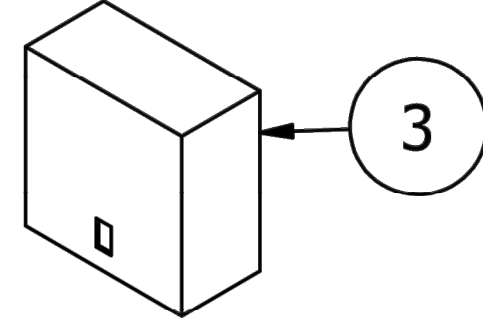
12" CIRCULAR DUCT OPENING
 [ABERTURA DE CONDUCTO]
 @ 1216 CFM

HOOD IS 16G 304
 S/S CONSTRUCTION
 [HOOD CALIBRE 16 304
 CONSTRUCCIÓN DE ACERO INOXIDABLE]

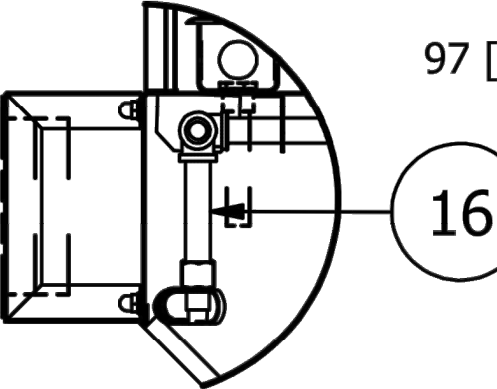
SHIP LOOSE A-12-023 (3EA)
 EMBARCAR SUELTO A-12-023 (3EA)



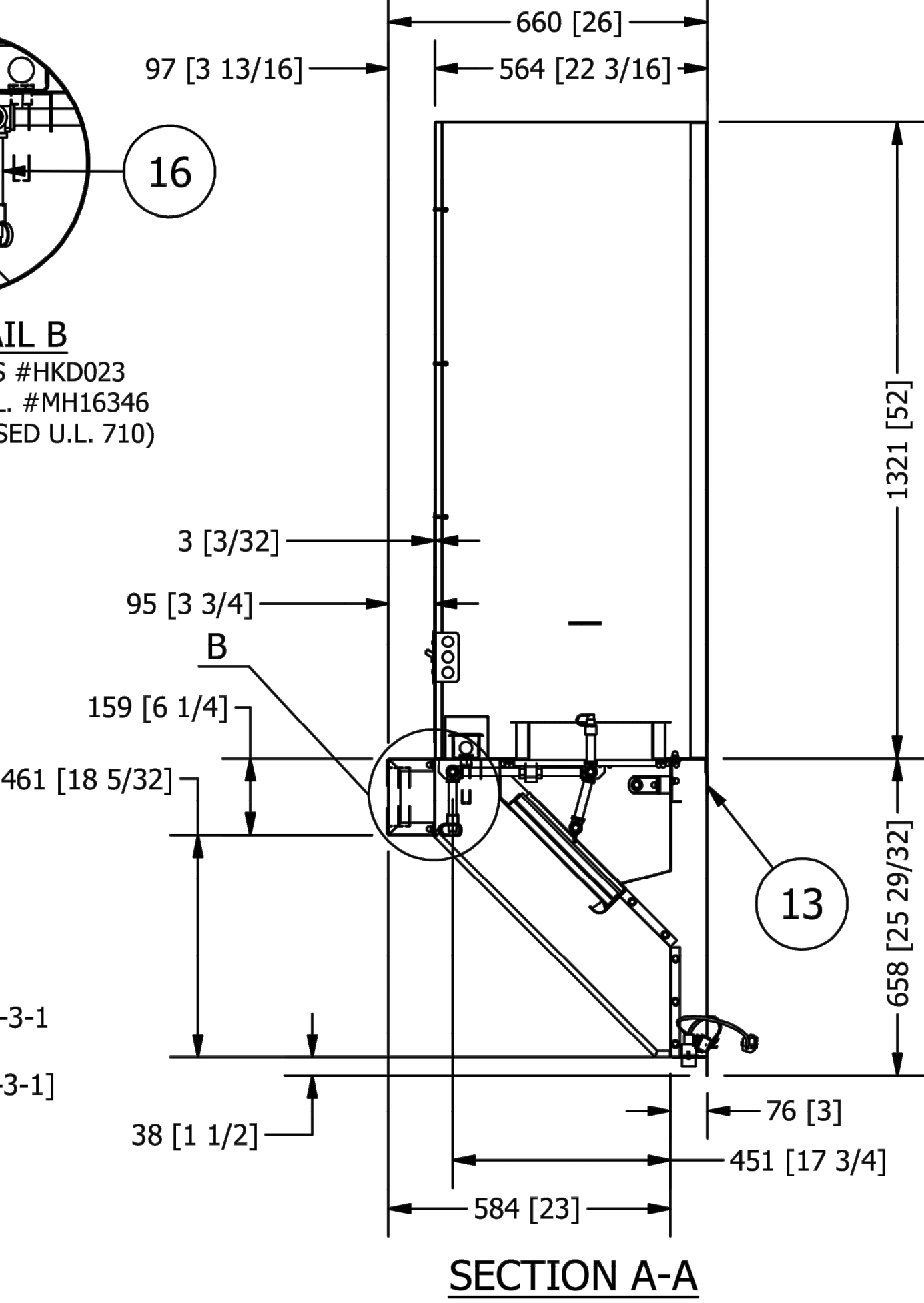
SHIP LOOSE
 [EMBARCAR SUELTO]



SHIP LOOSE:
 EXCEPT SENSOR 6KWL9 THIS WILL BE INSTALL
 ACCORDING DETAIL M
 ENVIAR SUELTO:
 [EXCEPTO EL SENSOR 6KWL9 ESTE SE INSTALA
 CONFORME A EL DETALLE M]



DETAIL B
 H&K DALLAS #HKD023
 FRY HOOD U.L. #MH16346
 (STANDARD USED U.L. 710)



SECTION A-A

ITEM	QTY	PART NUMBER	REVISION NUMBER	DESCRIPTION	MATERIAL
1	4	A-12-023	-	FUSIBLE LINK,(25/BX) 360F DEG, #415745	Generic
2	1	E-1-17	-	COVER,BLANK, SS,2X4 1G #97151	Generic
3	1	E-1-19-4	-	TEMPERATURE INTERLOCK SYSTEM (2-SENSOR)	Generic
4	1	E-2-12	-	J-BOX,FS,4X2-1/8X1-7/8	Generic
5	1	F-11-26	-	T10001 RIVET,FLAT HD.S/S,1/4X5/32"	Generic
6	32	F-13-1	-	F05010 STUD,SS CD WELD 10-24X1/2"	Generic
7	32	F-3-33	-	F03081 NUT,CAP PAR PLTD.TYPE KD 10-24	Generic
8	6	H-4-18-1	-	DURABLANKET(CERA) HP-S 8# 1" THICK	DURAB(H-4-18-1)
9	1	M-1-27-116	A	<(C)LABEL,HK19001 H&K LOGO 1"X 1-1/4"STK	Generic
10	1	M-HDK020-HDK025-EM	-	GENERIC HOOD MANUAL	Generic
11	7	WTB1556.606	-	BRACKET, AGENT LINE	18 SS 304 2B(S-2-2B)
12	1	WTB1556.7000	-	GREASE CATCH	
13	1	WTB1558.002	-	OFFSET, CLIP	12 SAT(S-6-0)
14	1	WTB1558.006	-	SENSOR COVER	18 SS 304(S-2)
15	1	WTB1560.1000	-	ASSEMBLY,PLENUM FRY DUMP HOOD	
16	1	WTB1560.3000	-	ASSEMBLY ANSUL	
17	1	WTB1560X.3000	-	ASSEMBLY FASCIA	
18	1	X-7-3-1	-	G06003 SILICONE	Generic



ALL DOCUMENTATION RELATED TO THIS UNIT IS
 RELEASED ON METRIC SYSTEM
 [TODA LA DOCUMENTACION RELACIONADA CON
 ESTA UNIDAD ESTA LIBERADA EN SISTEMA METRICO]

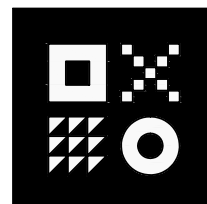
GENERAL NOTES [NOTAS GENERALES]:

1. THIS INSTALLATION IS TO BE MADE ACCORDANCE WITH R-102 INSTALLATION MANUAL & IN ACCORDANCE WITH ALL STATE & LOCAL CODES. [LA INSTALACION DEBE SER REALIZADA COMO INDICA EL MANUAL DE INSTALACION R-102 Y DE ACUERDO CON TODOS LOS CODIGOS ESTATALES Y LOCALES]
2. ALL PIPE LENGTHS TO BE VERIFIED. [TODAS LAS LONGITUDES DE LAS TUBERIAS DEBEN SER VERIFICADAS].
3. THESE DRAWINGS MAY BE USED TO SECURE APPROVAL FROM AUTHORITY HAVING JURISDICTION. [ESTOS DIBUJOS SE PUEDEN UTILIZAR PARA APROVACION DE SEGURIDAD DE LAS AUTORIDADES COMPETENTES].
4. IT IS NECESSARY THAT ALL PIPE FITTING AND NOZZLES BE WRENCH TIGHTENED & SECURELY SUPPORTED & THAT ALL NOZZLES ARE PROPERLY AIMED AS INDICATED IN THE R-102 INSTALLATION MANUAL. [ES NECESARIO QUE TODA LA INSTALACION DE LAS TUBERIAS Y BOQUILLAS ESTEN CORRECTAMENTE APRETADAS, TODAS LAS BOQUILLAS DEBENE ESTAR DIRIGIDAS CORRECTAMENTE COMO SE INDICA EN EL MANUAL DE INSTALACION R-102].
5. THE WIRE ROPE FOR THE DETECTORS AND REMOTE PULL STATION IS TO BE INSTALLED BY AUTHORIZED & FACTORY TRAINED DISTRIBUIDOR OR SERVICE REPRESENTATIVE. [EL CABLE PARA LOS DETECTORES Y EL REMOTE PULL STATION DEBERAN SER INSTALADOS POR UN DISTRIBUIDOR AUTORIZADO, FABRICANTE CAPACITADO O UN ESPECIALISTA TECNICO].
6. THIS INSTALLATION IS TO BE INSPECTED, PUT INTO OPERATION & CERTIFIED BY AN AUTHORIZED & FACTORY TRAINED DISTRIBUIDOR OR SERVICE REPRESENTATIVE. [ESTA INSTALACION DEBE SER INSPECCIONADA PARA PONER EN MARCHA POR UNA PERSONA CERTIFICADA PARA AUTORIZAR Y UN DISTRIBUIDOR CAPACITADO DE LA FABRICA O REPRESENTANTE TECNICO DE SERVICIO].
7. ELECTRICAL CONTACTS & WIRING FOR APPLIANCE SHUT OFF TO BE PROVIDED BY ELECTRICAL CONTRACTOR. [LOS CONTACTOS ELECTRICOS Y MATERIAL PARA CABLEADO DEBE SER SUMINISTRADO POR EL CONTRATISTA DE LA INSTACION ELECTRICA].
8. ANSUL R-102 RESTAURANT FIRE SUPPRESSION SYSTEMS HAVE BEEN TESTED & ARE LISTED BY UNDERWRITERS' LABORATORIES INC. AS PRE-ENGINEERED SYSTEMS, & WHEN INSTALLED AS SHOWN ON THIS DRAWING SHALL COMPLY W/NFPA 96 WHEN INSTALLED & CERTIFIED BY AUTHORIZED TRAINED ANSUL DISTRIBUIDORS IN ACCORDANCE WITH THE MANUAL. [EL MANUAL R-102 PARA EL SISTEMA DE EXTINCION DE INCENDIOS EN RESTAURANTES HA SIDO PROVADO Y ENUMERADO POR UNDERWRITERS' LABORATORIES INC. COMO SISTEMAS DE PRE-FABRICADOS. CUANDO SE INSTALA COMO MUESTRA EL DIBUJO DEBE CUMPLIR LA NORMA W/NFPA 96 DE INSTALACION Y DEBE SER CERTIFICADO POR DISTRIBUIDORES AUTORIZADAS ANSUL CONFORME A LAS INSTRUCCIONES].
9. ALL AGENTE DISTRIBUTION PIPING & DETECTION CONDUIT HOOD PENETRATIONS MUST BE FULLY WELDED IN ACCORDANCE W/NFPA 96. [TODAS LAS TUBERIAS DE LOS AGENTES DE DISTRIBUCION Y CONDUCTOS DE DETECCION DE LA CAMAPANA DEBEN SOLDARSE COMPLETAMENTE COMO INDICA W/NFPA 96].

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REV	CHANGE DESC.	REV. DATE	ENG.
-	FIRST CHECK IN		

	DATE: 6/16/2021	MATERIAL:	REV	REVISION	DATE	CUSTOMER:
	DRAWN: HArredondo	WIDTH: N/A	-			
	WEIGHT: 133.54 kg	GRAIN LENGTH: N/A				
	COMMENTS:					
THESE DRAWINGS AND SPECIFICATION ARE THE PROPERTY OF H&K AND SHALL NOT BE REPRODUCED OR COPIED OR TRANSFERRED TO A THIRD PARTY WITHOUT THE WRITTEN PERMISSION OF H&K.		SIZE: A3	SHEET: 1 OF 4	TITLE: WALL MOUNT FRY HOOD WITH CIRCULAR DUCT	ITEM NO: WTB1560	

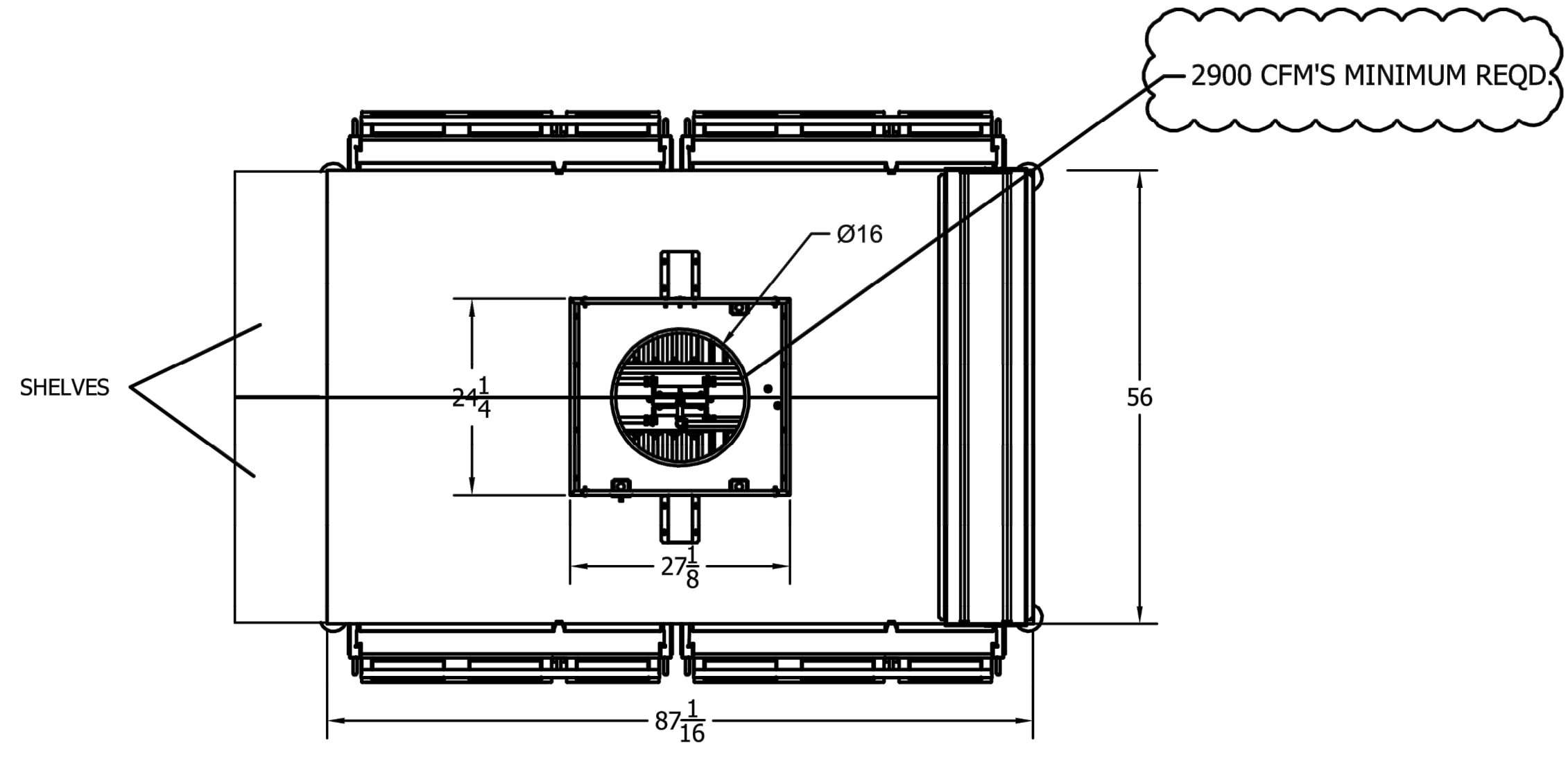


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 Engineering

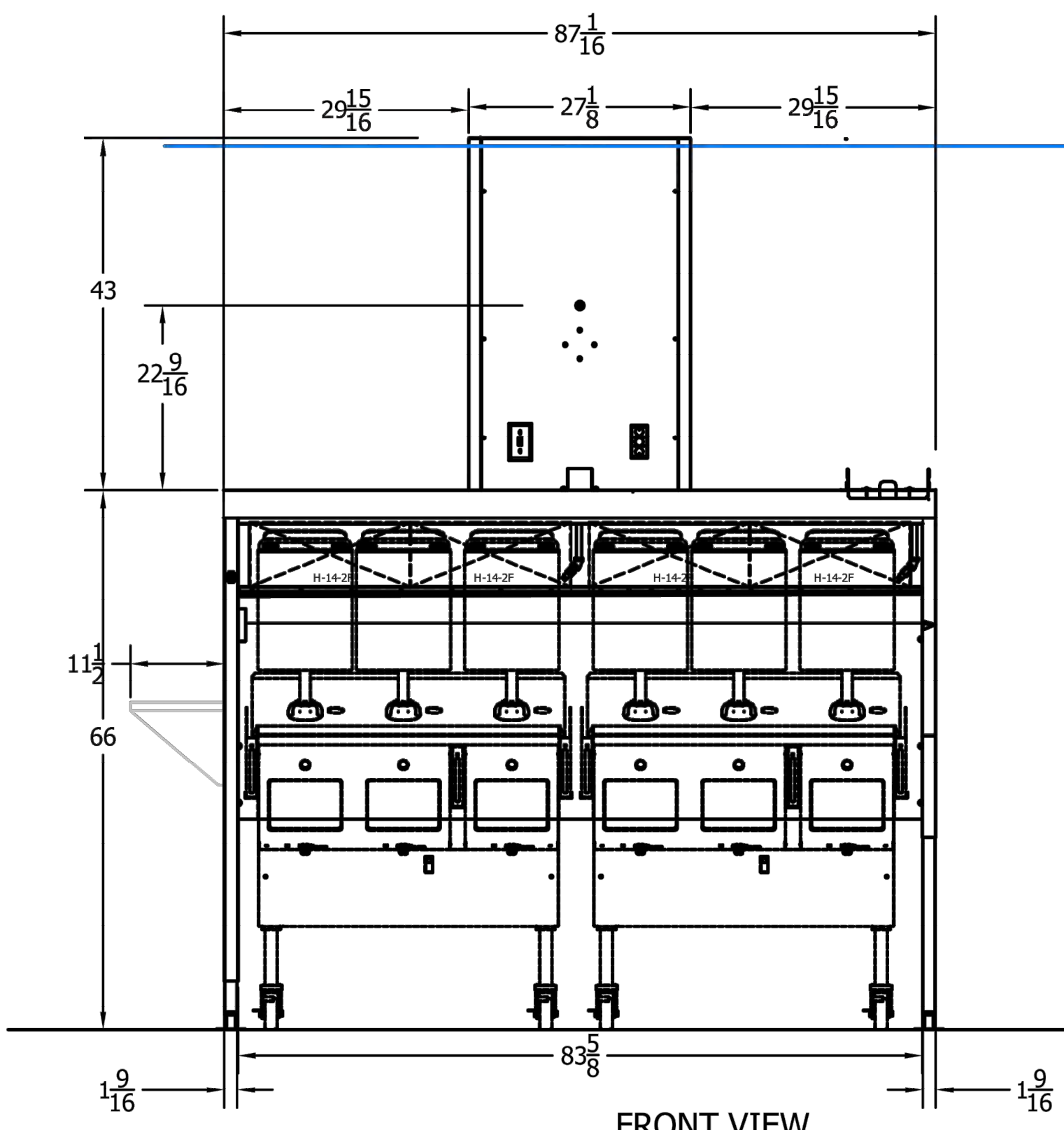
Project Number: 22612 | Project Manager: KK, MA
 7328 E Stetson Dr., Scottsdale, AZ 85251
 P: 480.626.7072 | ardebilieng.com



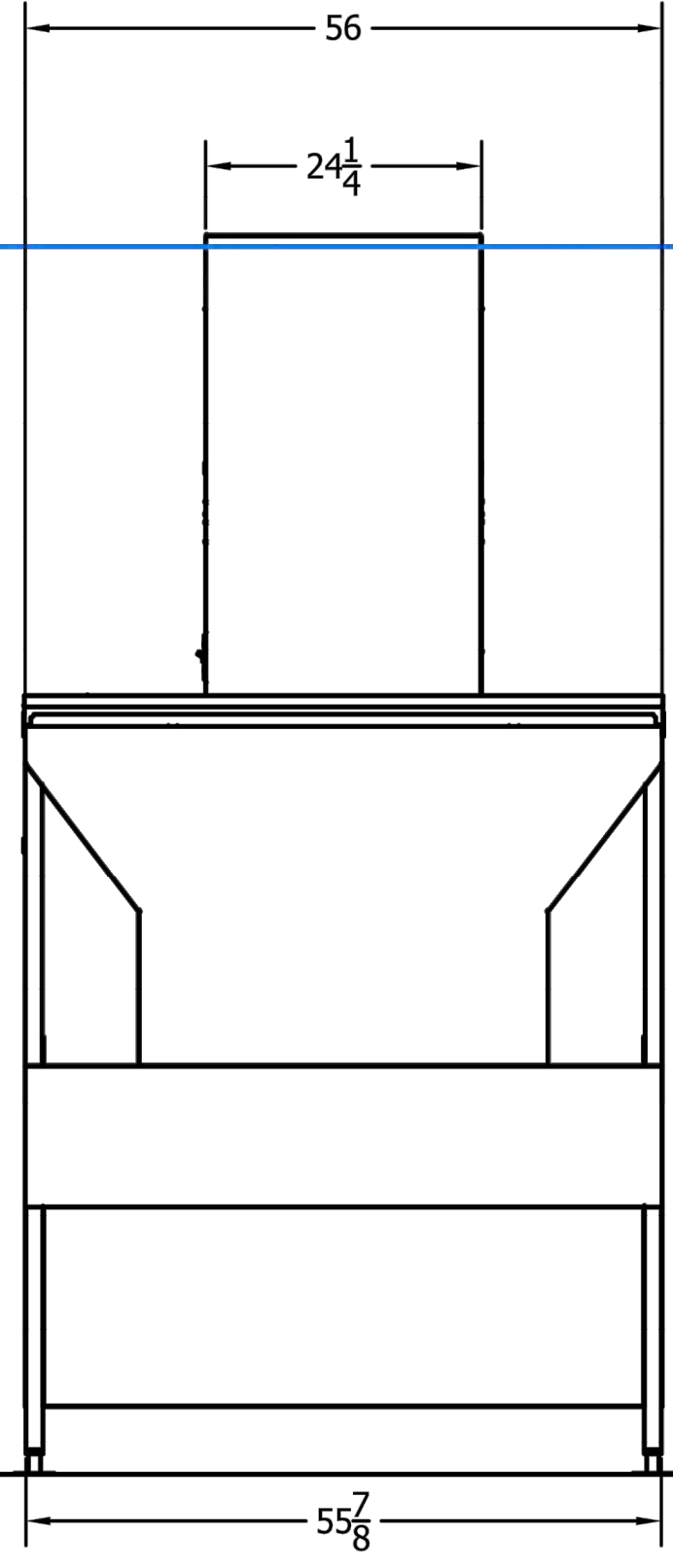
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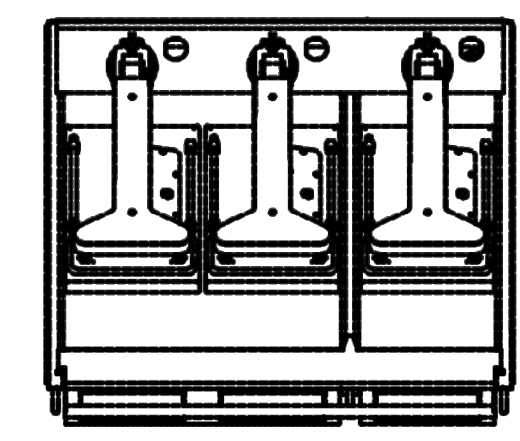
TOP VIEW



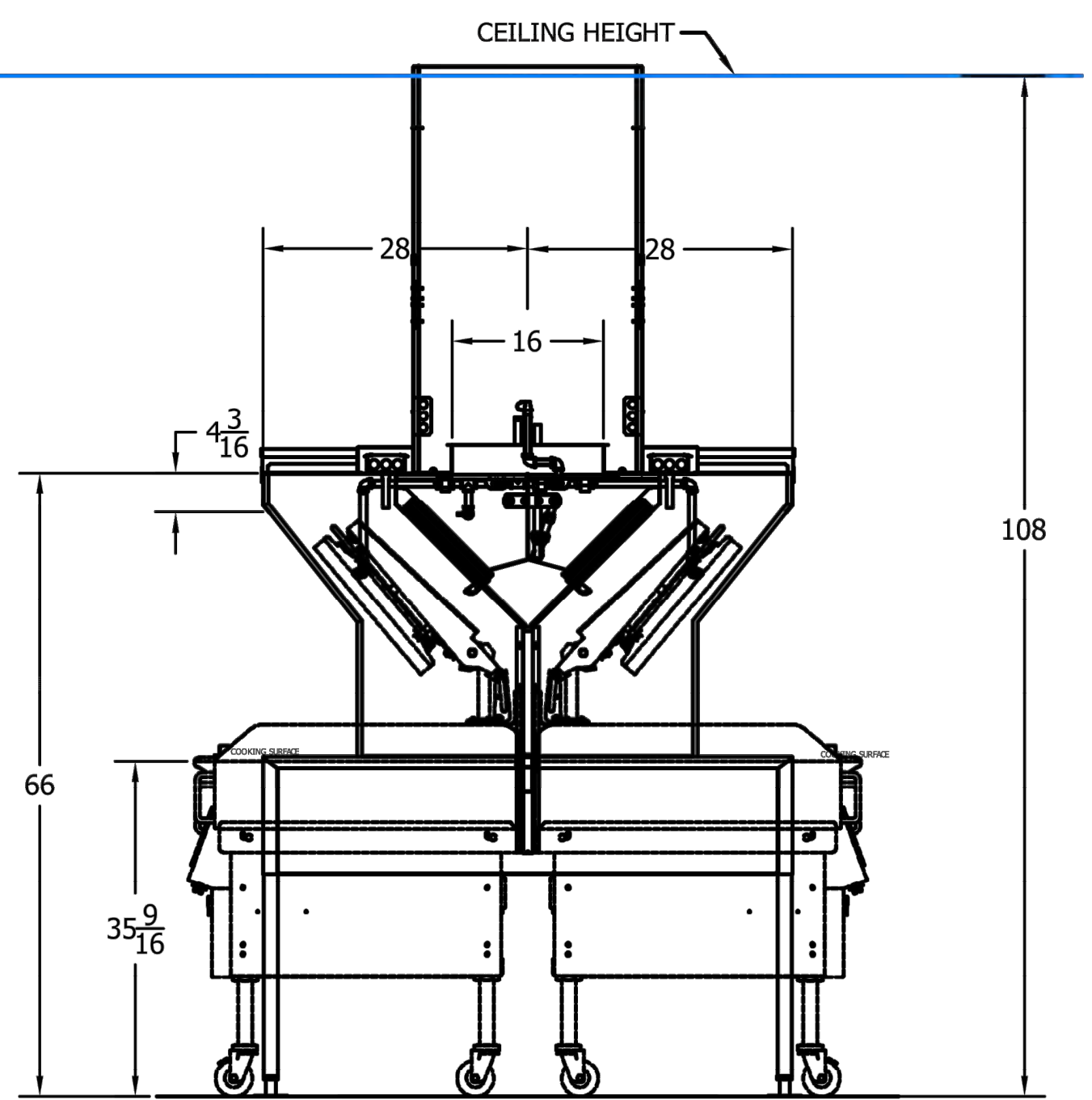
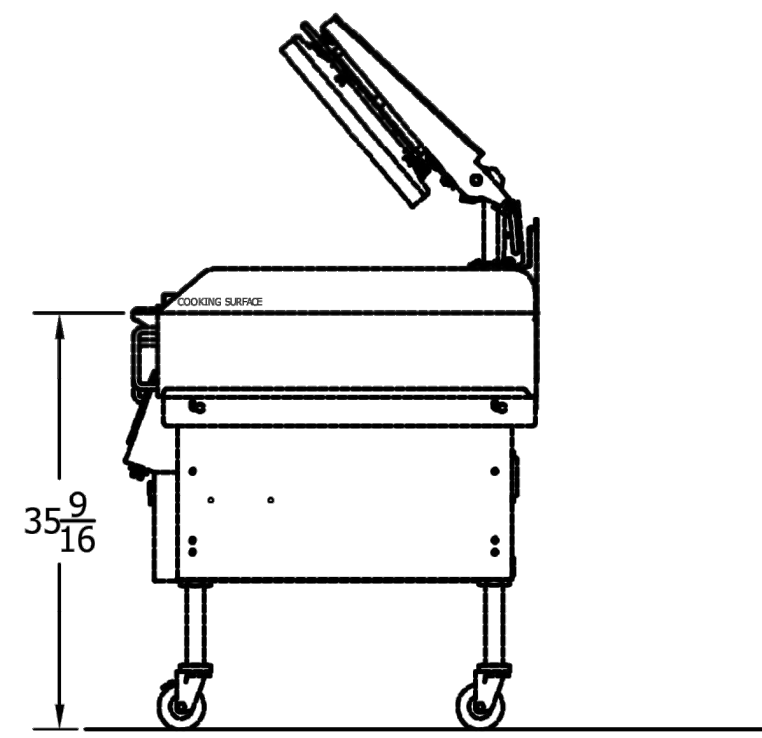
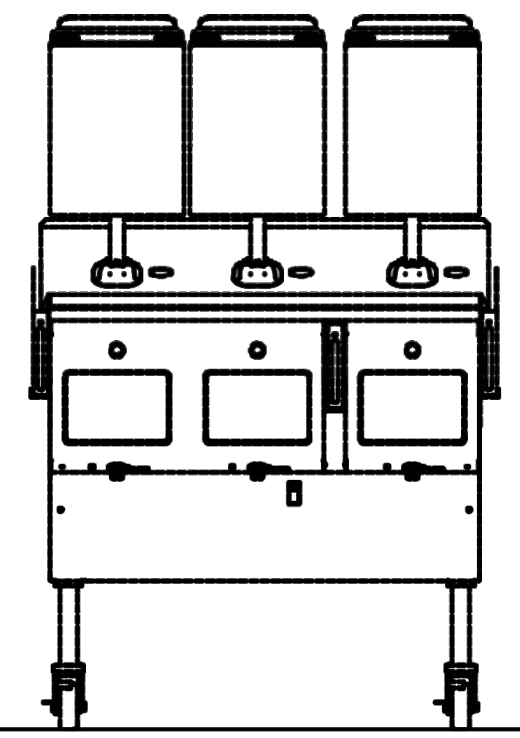
FRONT VIEW



RIGHT VIEW

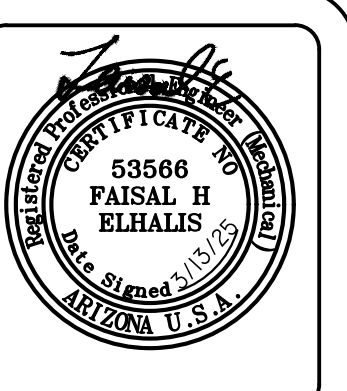


GARLAND ELECTRIC XPRESS GRILL
3 PLATEN XPE36AC



SECTION VIEW

DATE: 4/28/2022	MATERIAL:	REV	REVISION	DATE	CUSTOMER:
DRAWN: A.BARTON	WIDTH: N/A	-	-	-	WHATABURGER
WEIGHT: N/A	GRAIN LENGTH: N/A			UNITS: mm [in]	
COMMENTS:	THESE DRAWINGS AND SPECIFICATION ARE THE PROPERTY OF H&K AND SHALL NOT BE REPRODUCED OR COPIED OR TRANSFERRED TO A THIRD PARTY WITHOUT THE WRITTEN PERMISSION OF H&K.		UNLESS OTHERWISE SPECIFIED: TOLERANCES: X[X X/X"] ±1.00 mm ±0.039" X.X[X.XXX"] ±0.75 mm ±0.029"	SHEET TITLE: HOOD DRAWINGS ISSUED FOR: PERMITS	UNIT NO. DATE: SCALE: NO SCALE DRAWN BY: CL CHECKED BY: FH
SIZE: A3 SHEET: 1 OF 1		TITLE: DOUBLE SIDED CLAM SHELL GRILL HOOD		ITEM NO: WTB1592	



SYM	DATE	DESCRIPTION	BY
1	11/06/24	OWNER COM.	KK
2	02/12/25	GC CHANGES	KK

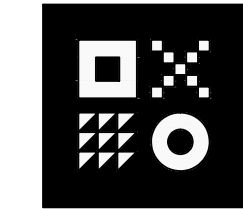
PROJECT: 220110
WHATABURGER PT20M
 SEQ LITCHFIELD & WADDELL RD.
 SURPRISE, ARIZONA 85379

SEG
 5240 N. 16th STREET
 SUITE 105
 PHOENIX, AZ 85016
 WWW.AZSEG.COM
 TEL. 480.588.7228

Desert De Oro Foods INC.
 3845 STOCKON HILL RD
 KINGMAN, AZ 86409
THIS DRAWING IS THE PROPERTY OF WHATABURGER, SAN ANTONIO, TEXAS AND MAY NOT BE USED OR REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESSED WRITTEN CONSENT OF WHATABURGER.

SHEET TITLE:
 HOOD DRAWINGS
 ISSUED FOR:
 PERMITS

SHEET NO:
M2.4



ARDEBILI
 Engineering

Project Number: 22612 | Project Manager: KK, MA
 7328 E Stetson Dr., Scottsdale, AZ 85251
 P: 480.626.7072 | ardebilieng.com

MECHANICAL SPECIFICATIONS:

GENERAL REQUIREMENTS

REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. CONTRACTOR SHALL BECOME THOROUGHLY ACQUAINTED WITH ITS CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION OR SECTION. THE WORK REQUIRED UNDER THIS SECTION INCLUDES MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION, SERVICES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS.

THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.

DEFINITIONS

FURNISH: THE TERM "FURNISH" IS USED TO MEAN "SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION AND SIMILAR OPERATIONS."

INSTALL: THE TERM "INSTALL" IS USED TO DESCRIBE OPERATIONS AT THE PROJECT SITE INCLUDING THE ACTUAL "UNLOADING, UNPACKING, ASSEMBLY, ERECTION, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS."

PROVIDE: THE TERM "PROVIDE" MEANS "TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE."

FURNISHED BY OWNER OR FURNISHED BY OTHERS: THE ITEM WILL BE FURNISHED BY THE OWNER OR OTHERS. IT IS TO BE INSTALLED AND CONNECTED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE AND READY FOR OPERATION, INCLUDING ITEMS INCIDENTAL TO THE WORK, INCLUDING SERVICES NECESSARY FOR PROPER INSTALLATION AND OPERATION. THE INSTALLATION SHALL BE INCLUDED UNDER THE GUARANTEE REQUIRED BY THIS DIVISION.

AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY (AUTHORITY) HAVING JURISDICTION OVER THE WORK.

THE TERMS "APPROVED EQUAL," "EQUIVALENT," OR "EQUAL" ARE USED SYNONYMOSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURER SPECIFIED." THE TERM "APPROVED" SHALL MEAN LABELED, LISTED, OR BOTH, BY A NATIONALLY RECOGNIZED TESTING LABORATORY (E.G. UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

COORDINATION

COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.

UNLESS OTHERWISE INDICATED, THE GENERAL CONTRACTOR WILL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH CHASES AND OPENINGS. THE INSTALLATION SHALL BE KEPT INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT AND EXECUTE WORK IN A MANNER AS TO NOT INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.

FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING, AS VARIATIONS MAY OCCUR. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.

PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.

WARRANTIES

WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR THE MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND SECTION 1.

WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.

PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.

AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERMS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

CUTTING AND PATCHING

PERFORM CUTTING OF WALLS, FLOORS, CEILINGS, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. OBTAIN PERMISSION FROM THE ARCHITECT PRIOR TO CUTTING. DO NOT CUT OR DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. GENERAL CONTRACTOR SHALL PATCH WALLS, FLOORS, ETC. AS REQUIRED BY WORK UNDER THIS SECTION. PATCHING SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION. REPAIR AND REFINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.

CONCRETE BASES

PROVIDE CONCRETE BASES FOR EQUIPMENT WHERE INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. CONCRETE BASES SHALL HAVE CHAMFERED EDGES. SIZE OF PAD SHALL BE A MINIMUM OF 4' GREATER THAN THE FOOTPRINT OF THE EQUIPMENT THAT IT IS SUPPORTING AND SHALL HAVE A MINIMUM HEIGHT OF 3'-1/2".

CONSTRUCT EQUIPMENT BASES AND HOUSEKEEPING PADS OF A MINIMUM 28 DAY, 4000 PSI CONCRETE CONFORMING TO AMERICAN CONCRETE INSTITUTE STANDARD BUILDING CODE FOR REINFORCED CONCRETE (ACI 318-19) AND THE LATEST APPLICABLE RECOMMENDATIONS OF THE ACI STANDARD PRACTICE MANUAL. CONCRETE SHALL BE COMPOSED OF CEMENT CONFORMING TO ASTM C 150 TYPE I, AGGREGATE CONFORMING TO ASTM C33, AND POTABLE WATER. EXPOSED EXTERIOR CONCRETE SHALL CONTAIN 5 TO 7 PERCENT AIR ENTRAINMENT.

PROVIDE GALVANIZED ANCHOR BOLTS FOR EQUIPMENT PLACED ON CONCRETE EQUIPMENT BASES AND HOUSEKEEPING PADS OR ON CONCRETE SLAB. ANCHOR BOLTS SIZE, NUMBER AND PLACEMENT SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE EQUIPMENT.

ACCESS DOORS

PROVIDE ACCESS DOORS IN CEILINGS, WALLS, ETC. WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED VALVES AND EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS, MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

PENETRATIONS

PROVIDE SLEEVES FOR PIPES PASSING THROUGH ABOVE GRADE CONCRETE OR MASONRY WALLS, CONCRETE FLOOR OR ROOF SLABS. SLEEVES ARE NOT REQUIRED FOR CORE DRILLED HOLES IN EXISTING MASONRY WALLS, CONCRETE FLOORS OR ROOFS. PROVIDE 10 GAUGE GALVANIZED STEEL SLEEVES FOR SLEEVES 6" AND SMALLER. PROVIDE GALVANIZED SHEET METAL SLEEVES FOR LARGER THAN SCHEDULE 40 PVC SLEEVES ARE ACCEPTABLE FOR INSTALLATION IN AREAS WITHOUT RETURN AIR PLENUMS.

SEAL ELEVATED FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATERTIGHT AND WEATHERTIGHT WITH NON-SHRINK, NON-HARDENING COMMERCIAL SEALANT. PACK WITH MINERAL WOOL AND SEAL BOTH ENDS WITH MINIMUM OF 1/2" OF SEALANT. SEAL AROUND PENETRATIONS OF FIRE RATED ASSEMBLIES. COORDINATE FIRE RATINGS AND LOCATIONS WITH THE DRAWINGS. NOTIFY THE GENERAL CONTRACTOR OF ARCHITECTURAL SPECIFICATIONS FOR FIRE STOPPINGS. PROVIDE A PRODUCT SCHEDULE FOR UL LISTING, LOCATION, WALL OR FLOOR RATING AND INSTALLATION DRAWING FOR EACH PENETRATION FIRE STOP SYSTEM.

EXTEND PIPE INSULATION FOR INSULATED PIPE THROUGH FLOOR, WALL AND ROOF PENETRATIONS, INCLUDING FIRE RATED WALLS AND FLOORS. THE VAPOR BARRIER SHALL BE MAINTAINED. SIZE SLEEVE FOR A MINIMUM OF 1" ANNUAL CLEAR SPACE BETWEEN INSIDE OF SLEEVE AND OUTSIDE OF INSULATION.

PROVIDE PREFABRICATED ROOF CURBS MANUFACTURED BY CUSTOM CURB, INC., PATE COMPANY, THYCURB OR APPROVED EQUAL. PROVIDE ROOF CURB WITH FACTORY INSTALLED GROUND NAILER; WIDTH: 18 GAUGE GALVANIZED STEEL SHELL BASE PLATE AND FLASHING: 1-1/2" THICK, 3 POUND RIGID INSULATION FULLY MITERED 3-INCH RAISED CANT; COVER OF WEATHER-RESISTANT, WEATHER-PROOF MATERIAL AND PIPE COLLAR OF WEATHER-RESISTANT MATERIAL WITH STAINLESS STEEL PIPE CLAMPS.

PROVIDE BOX FRAMES FOR RECTANGULAR OPENINGS WELDED 12 GAUGE GALVANIZED STEEL ATTACHED TO FORMS AND OF A MAXIMUM DIMENSION ESTABLISHED BY THE ARCHITECT. NOTIFY THE GENERAL CONTRACTOR OR ARCHITECT BEFORE ANY BOX OPENINGS NOT SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS.

SEAL CONCRETE OR MASONRY EXTERIOR WALL PENETRATIONS BELOW GRADE WITH "WALL PIPES" AND MECHANICAL SLEEVE SEALS. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN. PROVIDE MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINE / LINK SEAL, CALPICO, INC. AND METRAFLAX.

SEAL ELEVATED CONCRETE SLAB WITH WATERPROOF MEMBRANE PENETRATIONS WITH "WALL PIPES" AND WATER PROOF SEALANT. SECURE WATERPROOF MEMBRANE FLASHING BETWEEN "WALL PIPE" CLAMPING FLANGE AND CLAMPING RING. PROVIDE CAST IRON "WALL PIPES" WITH INTEGRAL WATERSTOP RING MANUFACTURED BY JOSAM, JAY R. SMITH, WADE, WATTS OR ZURN.

PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.

PROVIDE SCHEDULE 40 PVC PIPE SLEEVES FOR VERTICAL PRESSURE PIPE PASSING THROUGH CONCRETE SLAB ON GRADE. SLEEVES SHALL BE ONE NOMINAL PIPE SIZE LARGER THAN THE PIPE SERVED AND TWO PIPE SIZES LARGER THAN PIPE SERVED FOR DUCTILE IRON PIPES WITH RESTRAINING RODS. SEAL WATER-TIGHT WITH SILICONE CAULK.

PROVIDE 1/2" THICK CELLULAR FOAM INSULATION AROUND PERIMETER OF NON-PRESSURE PIPE PASSING THRU CONCRETE SLAB ON GRADE. INSULATION SHALL EXTEND TO 2" ABOVE AND BELOW THE CONCRETE SLAB.

ELECTRICAL WIRING

LINE VOLTAGE WIRING SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR. LINE VOLTAGE CONTROL AND INTERLOCK WIRING FOR MECHANICAL SYSTEMS SHALL ALSO BE PROVIDED BY ELECTRICAL CONTRACTOR. LOW VOLTAGE CONTROL WIRING SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. FURNISH WIRING DIAGRAMS TO THE ELECTRICAL CONTRACTOR AS REQUIRED FOR PROPER EQUIPMENT HOOKUP. COORDINATE WITH THE ELECTRICAL CONTRACTOR THE ACTUAL WIRE SIZING AMPS FOR MECHANICAL EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.

FINAL TESTING AND ADJUSTMENTS

FINAL SYSTEM TESTING, BALANCING AND ADJUSTMENTS SHALL BE PERFORMED BY A CONTRACTOR CERTIFIED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), ASSOCIATED AIR BALANCE COUNCIL (AABC) OR OTHER APPROVED AGENCY. (NEBB) TEST READINGS ON FANS, UNITS, COILS, ETC. AND ADJUST EQUIPMENT TO DELIVER SPECIFIED AMOUNTS OF AIR. PREPARE TESTING AND BALANCING REPORT LOG SHOWING AIR SUPPLY QUANTITIES, AIR ENTERING AND LEAVING TEMPERATURES AND PRESSURES, FAN AND UNIT TEST READINGS, MOTOR VOLTAGE AND AMP DRAW, ETC., AND SUBMIT SIX COPIES OF THE FINAL COMPLETION OF DATA TO THE ARCHITECT FOR EVALUATION AND APPROVAL BEFORE FINAL INSPECTION OF THE PROJECT. BALANCE AIR SYSTEMS TO WITHIN PLUS OR MINUS 5 PERCENT FOR TERMINAL DEVICES AND BRANCH LINES AND PLUS OR MINUS 5 PERCENT FOR MAIN LINES AND AIR HANDLING EQUIPMENT OF THE AMOUNT OF AIR SHOWN ON THE DRAWINGS. FURTHER ADJUSTMENTS SHALL BE MADE TO OBTAIN UNIFORM TEMPERATURE IN SPACES. ADJUST EQUIPMENT TO OPERATE AS INTENDED BY THE SPECIFICATION. ALIGN BEARINGS AND REPLACE BEARINGS THAT HAVE DIRT OR FOREIGN MATERIAL IN THEM WITH NEW BEARINGS WITHOUT ADDITIONAL COST TO THE OWNER. BALANCE CONTRACTOR SHALL INCLUDE IN THE REPORT ANY IMPROPERLY INSTALLED OR MISSING BALANCING DEVICES THAT WOULD NEGATIVELY IMPACT THE SYSTEM OPERATION.

ADJUST THERMOSTATS AND CONTROL DEVICES TO OPERATE AS INTENDED. ADJUST BURNERS, PUMPS, FANS, ETC. FOR PROPER AND EFFICIENT OPERATION. CERTIFY THAT ADJUSTMENTS HAVE BEEN MADE AND THAT SYSTEM IS OPERATING SATISFACTORILY. FURTHER ADJUSTMENTS SHALL BE MADE TO OBTAIN UNIFORM TEMPERATURE IN SPACES. CALIBRATE, SET, AND ADJUST AUTOMATIC TEMPERATURE CONTROLS. CHECK PROPER SEQUENCING OF INTERLOCK SYSTEMS, AND OPERATION OF SAFETY CONTROLS.

EQUIPMENT FURNISHED BY OTHERS

PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE EQUIPMENT SUPPLIER OR OWNER TO COMPLETE INSTALLATION OF COOKING EQUIPMENT, WASHING EQUIPMENT, ETC., FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS AND/OR DESCRIBED IN THE GENERAL NOTES TO THIS CONTRACTOR. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE FLUES, VENTS, INTAKES, ASSOCIATED ROOF JACKS AND CAPS TO OUTDOORS, DAMPERS, IN-LINE FANS, ROOF FANS, CONTROL INTERLOCKS, ETC. AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT ROUGH-IN DIMENSIONS AND SHALL VERIFY SAME WITH ARCHITECT AND/OR EQUIPMENT SUPPLIER PRIOR TO SERVICE INSTALLATIONS.

DUCT INSULATION

PROVIDE DUCT LINER IN CONCEALED RECTANGULAR SUPPLY AND RETURN AIR DUCTWORK. LINER SHALL BE 1-1/2" THICK, 1-1/2 POUND DENSITY FIBERGLASS, MINIMUM R-6.0 CERTAINTED CORP. "TOUGHARD" OR EQUIVALENT OWENS-CORNING OR KNAUF FIBER TEXTILE FIBER DUCT LINER. LINER SURFACE SHALL SERVE AS A BARRIER AGAINST INFILTRATION OF DUST AND DIRT, SHALL MEET ASTM C 1338 FOR FLAME RESISTANCE AND SHALL BE CLEANABLE USING DUCT CLEANING METHODS AND EQUIPMENT OUTLINED BY NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION (NAIMA) DUCT CLEANING GUIDE. INSTALL WITH LINER ADHESIVE AND MECHANICAL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. DUCTWORK SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INCREASE SHEET METAL BY LINER THICKNESS IN BOTH DIRECTIONS WHERE LINER IS INSTALLED.

COVER CONCEALED, RIGID DUCTWORK WITH 2" THICK, 3/4 POUND DENSITY, MINIMUM R-6.0 DUCT WRAP, CERTAINTED OR EQUIVALENT OWENS-CORNING OR KNAUF WITH HEAVY-DUTY FOIL-SCRIM-KRAFT FACING, AND WITH JOINTS TAPED WITH 3" WIDE FOIL TAPE AS FOLLOWS:

- A. ROUND AND/OR RECTANGULAR SUPPLY AND RETURN AIR DUCTWORK.
- B. ROUND AND RECTANGULAR OUTSIDE AIR DUCTWORK.
- C. ROUND AND RECTANGULAR EXHAUST AND RELIEF AIR DUCTWORK WITHIN 10 FEET OF EXTERIOR DISCHARGE.

INSULATING MATERIALS, ADHESIVES, COATINGS, ETC., SHALL NOT EXCEED FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50 PER ASTM E 84. CONTAINERS FOR MASTICS AND ADHESIVES SHALL HAVE U.L. LABEL.

FOR DUCTWORK THAT IS LOCATED EXTERIOR TO THE BUILDING AND INSTALLED WITH SEAMS SEALED WITH SEALANT, PROVIDE 2" (MINIMUM R-8.0) THICK, 3 POUND DENSITY LINER. FOR WELDED DUCTWORK THAT IS EXTERIOR TO THE BUILDING, INSULATE WITH 2" (MINIMUM R-8.0) THICK FIBROUS BOARD INSULATION AND PROVIDE MINIMUM 20 GAUGE ALUMINUM JACKET OR 2" (MINIMUM R-8.0) THICK FLEXIBLE ELASTOMERIC CLOSED CELL INSULATION SIMILAR TO ARMACELL ARMATUFF PLUS WITH A WEATHER AND UV RESISTANT LAMINATED METAL FOIL AND POLYESTER MEMBRANE AROUND A SCRIM REINFORCED CORE. SEAL ALL EXPOSED EDGES.

DUCTWORK

PROVIDE GALVANIZED STEEL DUCTWORK AND HOUSINGS AS SHOWN ON DRAWINGS. CONSTRUCT DUCTWORK INCLUDING FITTINGS AND TRANSITIONS IN CONFORMANCE WITH CURRENT SMACNA STANDARDS RELATIVE TO GAUGE, BRACING, JOINTS, ETC. MINIMUM THICKNESS OF DUCT SHALL BE 26-GAUGE SHEET METAL. RECTANGULAR HOUSINGS AND DUCTWORK OVER 30" WITH 1-1/4" ANGLES NOT LESS THAN 5'-6" ON CENTERS, AND CLOSER IF REQUIRED FOR SUFFICIENT RIGIDITY TO PREVENT VIBRATION. SUPPORT HORIZONTAL RUNS OF DUCT FROM STRAP IRON HANGERS ON 12' CENTERS NOT TO EXCEED 12'. DO NOT SUPPORT CEILING GRID, CONDUITS, PIPES, EQUIPMENT, ETC. FROM DUCTWORK. COORDINATE ROUTING OF DUCTWORK WITH OTHER CONTRACTORS SUCH THAT PIPING, ELECTRICAL CONDUIT, AND ASSOCIATED SUPPORTS ARE NOT ROUTED THROUGH THE DUCTWORK.

CONSTRUCT SUPPLY DUCTS TO MEET SMACNA POSITIVE PRESSURE OF 2" W.G. CONSTRUCT RETURN, OUTDOOR AND EXHAUST DUCTWORK UPSTREAM OF FANS TO MEET SMACNA NEGATIVE PRESSURE OF 2" W.G. CONSTRUCT EXHAUST DUCTWORK DOWNSTREAM OF FANS TO MEET SMACNA POSITIVE PRESSURE OF 2" W.G.

PROVIDE MILL PHOSPHATIZED OR GALVANNEAL FINISH FOR EXPOSED DUCTWORK TO BE FIELD PAINTED. SHOP TREATED SHEET METAL SHALL HAVE GALVANIZED METAL PRIMER APPLIED IN THE SHOP AFTER FABRICATION AND PRIOR TO SHIPPING.

DUCTWORK ABOVE ROOF OR OTHERWISE EXTERIOR TO BUILDING SHALL BE MINIMUM #18 GAUGE WITH LONGITUDINAL AND TRANSVERSE JOINTS WELDED OR SEALED AIRTIGHT WITH WEATHERPROOF HEAVY LIQUID SEALANT APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

SEAL DUCTWORK WITH HEAVY LIQUID SEALANT, HARDCAST IRONGRIP 601, DESIGN POLYMER DP 1010, UNITED MCGILL DUCT SEALER OR APPROVED EQUAL, APPLIED ACCORDING TO SEAL MANUFACTURER'S INSTRUCTIONS. FOR DUCTS WITH PRESSURE CLASSIFICATION OF 2" W.G. AND GREATER SEAL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT TO MEET SMACNA CLASS B. FOR DUCTS WITH PRESSURE CLASSIFICATION LESS THAN 2" W.G. SEAL TRANSVERSE JOINTS AIRTIGHT TO MEET SMACNA CLASS C. TAPES AND MASTICS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A.

PROVIDE RADIUS ELBOWS, TURNS, AND OFFSETS WITH A MINIMUM CENTERLINE RADIUS OF 1-1/2 TIMES THE DUCT WIDTH, WHERE SPACE DOES NOT PERMIT FULL RADIUS ELBOWS, PROVIDE SHORT RADIUS ELBOWS WITH A MINIMUM OF TWO CONTINUOUS SPLITTER VANES. VANES SHALL BE THE ENTIRE LENGTH OF THE BEND. PROVIDE MITERED ELBOWS WHERE SPACE DOES NOT PERMIT RADIUS ELBOWS, WHERE SHOWN ON THE DRAWINGS, OR AT THE OPTION OF THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. MITERED ELBOWS LESS THAN 45 DEGREES SHALL NOT REQUIRE TURNING VANES. MITERED ELBOWS 45-DEGREES AND GREATER SHALL HAVE SINGLE THICKNESS TURNING VANES OF SAME GAUGE AS DUCTWORK, RIGIDLY FASTENED WITH GUIDE STRIPS. TURNING VANES FOR MITERED ELBOWS SHALL BE PROVIDED IN ALL SUPPLY AND EXHAUST DUCTWORK AND IN RETURN AND OUTSIDE AIR DUCTWORK THAT HAS AN AIR VELOCITY EXCEEDING 1000 FPM. DO NOT INSTALL VANES IN GREATSE DUCTWORK.

DUCTS SHALL BE CONNECTED TO FANS, FAN CASINGS AND FAN PLENUMS BY MEANS OF FLEXIBLE CONNECTORS. FLEXIBLE CONNECTORS SHALL BE NEOPRENE COATED FLEXIBLE CLOTH CANVAS CONNECTIONS, DURO-DYNE, ELGEN, VENTIFACOR OR EQUAL. FLEXIBLE CONNECTORS SHALL HAVE A FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPED RATING NOT HIGHER THAN 50. MAKE AIRTIGHT JOINTS AND INSTALL WITH MINIMUM 1-1/2" SLACK.

PROVIDE BALANCING DAMPERS, MANUFACTURED BY RUSKIN, GREENHECK, NALOR INDUSTRIES, CESCO, LOUVERS & DAMPERS, POTTORFF OR APPROVED EQUAL, WHERE SHOWN ON DRAWINGS AND WHEREVER NECESSARY FOR COMPLETE CONTROL OF AIR FLOW. SPLITTER DAMPERS SHALL BE CONTROLLED BY LOCKING QUADRANTS; PROVIDE YOUNG REGULATOR OR VENTILOR AND BEARINGS FOR THE DAMPER ROD. RECTANGULAR VOLUME DAMPERS SHALL BE OPPOSED BLADE INTERLOCKING TYPE. ROUND VOLUME DAMPERS SHALL BE BUTTERFLY TYPE CONSISTING OF CIRCULAR BLADE MOUNTED TO A SHAFT. DAMPER LEAKAGE FOR OUTSIDE AIR DAMPERS SHALL NOT EXCEED 4.0 CFM/SQUARE FOOT IN FULL CLOSED POSITION AT 1" WG PRESSURE DIFFERENTIAL ACROSS DAMPER. REFERENCE MANUFACTURER AND MODEL NUMBER FOR OUTSIDE AIR DAMPERS IS RUSKIN MODEL CD-50. PROVIDE FLEXMASTER MODEL STO OR EQUAL 45 DEGREE RECTANGULAR/ROUND SIDE TAKEOFF FITTING WITH MODEL SLBO DOUBLE BEARING DAMPER WITH INSULATION BUILT OUT FOR ROUND DUCTWORK BRANCH TAKEOFFS TO INDIVIDUAL AIR DEVICES. OMIT DAMPER AT TAKEOFF FITTING WHEN DAMPER IS LOCATED DOWNSTREAM OF TAKEOFF.

WHERE ACCESS TO DAMPERS THROUGH A HARD CEILING IS REQUIRED, PROVIDE A METROPOLITAN AIR TECHNOLOGY MODEL RT-250 OR EQUAL BY YOUNG'S REGULATOR CONCEALED, CABLE OPERATED VOLUME DAMPER WITH REMOTE OPERATOR. DAMPER SHALL BE ADJUSTABLE THROUGH THE DIFFUSER FACE OR FRAME WITH STANDARD 1/4" NUTDRIVER OR FLAT SCREWDRIVER. CABLE ASSEMBLY SHALL ATTACH TO DAMPER AS ONE PIECE WITH NO LINKAGE ADJUSTMENT. POSITIVE, DIRECT, TWO-WAY DAMPER CONTROL SHALL BE PROVIDED WITH NO SLEEVES, SPRINGS OR SCREW ADJUSTMENTS TO COME LOOSE AFTER INSTALLATION. SUPPORT CABLE ASSEMBLY TO AVOID BENDS AND KINKS IN CABLE, WHERE APPROVED BY ARCHITECT, A CEILING CUP WITH COVER PLATE CAN BE USED FOR ACCESS TO CABLE OPERATOR.

ROUND OR OVAL DUCTWORK SHALL BE SEMCO, UNITED, WESCO OR EQUAL, SHEETMETAL WITH SMOOTH INTERIOR SURFACE, WITH LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) ROUND DUCTWORK GAUGES PER THE FOLLOWING TABLE (REFERENCE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR GAUGES WHEN PRESSURES EXCEED 2" W.G.):

SIZE	DUCT GAUGE	FITTING GAUGE
14" & UNDER	26	24
15" THRU 26"	24	22
28" THRU 36"	22	20
38" THRU 50"	20	20

LINDAB SPIROSAFE, LEWIS & LAMBERT OR APPROVED EQUAL FACTORY-MANUFACTURED ROUND DUCTWORK AND FITTINGS MAY BE SUBSTITUTED FOR SPECIFIED ROUND BRANCH DUCTWORK, AT CONTRACTORS OPTION. HEAVY LIQUID JOINT SEALANT MAY BE OMITTED ON FACTORY-MANUFACTURED ROUND DUCTWORK.

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) FITTINGS 24" IN DIAMETER AND LESS SHALL BE PREFABRICATED, SPOTWELDED AND INTERNALLY SEALED. CONTINUOUSLY WELD FITTINGS LARGER THAN 24" IN DIAMETER. FITTING GAUGE SHALL BE 22 GAUGE FOR 38" FITTINGS AND UNDER, 20 GAUGE FOR LARGER SIZES. 90 DEGREE TEES SHALL BE CONICAL TYPE. SEAL LONGITUDINAL AND TRANSVERSE DUCTWORK JOINTS AIRTIGHT WITH HEAVY LIQUID SEALANT APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

FLEXIBLE DUCT

LOW PRESSURE (DUCT PRESSURE CLASS UP TO AND INCLUDING 2" W.G.) AND MEDIUM PRESSURE (DUCT PRESSURE CLASS 2-1/2" TO 6" W.G.) FLEXIBLE DUCT SHALL BE FLEXMASTER TYPE 88, TERMAFLEX TYPE G-KM, M-KE, OR EQUAL (FIRE RETARDANT POLYETHYLENE) PROTECTIVE VAPOR BARRIER, U.L.181 CLASS 1, ACoustICAL INSULATED DUCT, R-6.0 FIBERGLASS INSULATION, PROVIDE CPE LINER WITH STEEL WIRE HELIX MECHANICALLY LOCKED OR PERMANENTLY BONDED TO THE LINER.

FLEXIBLE DUCT RUNS SHALL NOT EXCEED 5 FEET IN LENGTH AND SHALL BE INSTALLED FULLY EXTENDED AND STRAIGHT AS POSSIBLE AVOIDING TIGHT TURNS. INSTALL FLEXIBLE DUCT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. SUPPORT FLEXIBLE DUCT AT MAXIMUM 5 FEET ON CENTER AND WITHIN 6 INCHES OF BENDS. BENDS SHALL NOT EXCEED A CENTERLINE RADIUS OF ONE DUCT DIAMETER. DUCT SAG SHALL NOT EXCEED 1/2 INCH, SUPPORTING MATERIAL IN DIRECT CONTACT WITH THE DUCT SHALL NOT BE LESS THAN 1-1/2 INCHES IN WIDTH.

CONNECT FLEXIBLE DUCT TO RIGID METAL DUCT OR AIR DEVICES AS RECOMMENDED BY THE MANUFACTURER. AT A MINIMUM, INSTALL TWO WRAPS OF DUCT TAPE AROUND THE INNER CORE CONNECTION AND A METALLIC OR NON-METALLIC CLAMP OVER THE TAPE AND TWO WRAPS OF DUCT TAPE OR CLAMP OVER THE OUTER JACKET. DUCT CLAMPS SHALL BE LABELED IN ACCORDANCE WITH UL-181B AND MARKED 181B-C. DUCT TAPE SHALL BE LABELED IN ACCORDANCE WITH UL 181B AND MARKED 181B-1X.

FIRE DAMPERS

PROVIDE FIRE DAMPERS WHERE SHOWN ON DRAWINGS, AND AS REQUIRED BY CODE ENFORCING AUTHORITY. DAMPER RATINGS SHALL BE AS REQUIRED TO MAINTAIN THE FIRE AND/OR SMOKE RATINGS NOTED ON THE ARCHITECTURAL DRAWINGS. PROVIDE FIRE DAMPERS CONFORMING TO NFPA-90A AND UBC STANDARD 43-7 WITH RECOMMENDED STEEL SLEEVES OF LENGTH AS REQUIRED TO MEET THE INSTALLED TEMPERATURE RATING OF DAMPER. PROVIDE FIRE DAMPERS WITH A MINIMUM VELOCITY OF 2,000 FPM AND PRESSURE OF 4" W.G. PROVIDE MANUFACTURER RECOMMENDED STEEL SLEEVE OF LENGTH AS REQUIRED TO MEET THE INSTALLED LOCATION. PROVIDE A QUALIFIED 120 VOLT ELECTRIC ACTUATOR INSTALLED BY THE MANUFACTURER OF THE DAMPER. INSTALL AND SUPPORT DAMPER TO BE RATED FOR A MINIMUM OF 20,000 CYCLES OF OPERATION, SHALL COMPLY WITH THE LOCALLY ADOPTED BUILDING CODE AND SHALL OPEN IN 15 SECONDS OR LESS AND CLOSE IN 15 SECONDS OR LESS AFTER ALARM OR SMOKE DETECTION HAS OCCURRED. PROVIDE STAINLESS STEEL DAMPER WITH SMOKE LEAKAGE SEAL IN FAN CASING, AND TERMINAL BLOCK FOR CONNECTION TO THE BUILDING FIRE ALARM SYSTEM. DAMPER SHALL BE MANUFACTURED BY RUSKIN, AIR BALANCE, GREENHECK, CESCO, UNITED AIR OR NALOR INDUSTRIES.

PROVIDE DUCT ACCESS DOOR(S) WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR TESTING AND MAINTENANCE. LABEL EACH DOOR (WITH MINIMUM 1" LETTERING) INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10" BY 10" ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

COMBINATION FIRE/SMOKE DAMPERS

PROVIDE COMBINATION FIRE/SMOKE DAMPERS WHERE SHOWN ON DRAWINGS AND AS REQUIRED BY CODE ENFORCING AUTHORITY WITH FIRE/SMOKE RATINGS AS REQUIRED TO MAINTAIN THE FIRE AND/OR SMOKE RATINGS NOTED ON THE ARCHITECTURAL DRAWINGS. DAMPERS SHALL MEET UL 555 CLASSIFICATION FOR FIRE RATING AND UL 555S CLASSIFICATION FOR LEAKAGE CLASS II SMOKE DAMPER; DAMPER SHALL BEAR A UL LABEL ATTESTING TO THESE CLASSIFICATIONS. PROVIDE FIRE DAMPER WITH A 165' F RESETTABLE TEMPERATURE RATING. PROVIDE FIRE/SMOKE DAMPERS WITH A MINIMUM VELOCITY OF 2,000 FPM AND PRESSURE OF 4" W.G. PROVIDE MANUFACTURER RECOMMENDED STEEL SLEEVE OF LENGTH AS REQUIRED TO MEET THE INSTALLED LOCATION. PROVIDE A QUALIFIED 120 VOLT ELECTRIC ACTUATOR INSTALLED BY THE MANUFACTURER OF THE DAMPER. INSTALL AND SUPPORT DAMPER TO BE RATED FOR A MINIMUM OF 20,000 CYCLES OF OPERATION, SHALL COMPLY WITH THE LOCALLY ADOPTED BUILDING CODE AND SHALL OPEN IN 15 SECONDS OR LESS AND CLOSE IN 15 SECONDS OR LESS AFTER ALARM OR SMOKE DETECTION HAS OCCURRED. PROVIDE STAINLESS STEEL DAMPER WITH SMOKE LEAKAGE SEAL IN FAN CASING, AND TERMINAL BLOCK FOR CONNECTION TO THE BUILDING FIRE ALARM SYSTEM. DAMPER SHALL BE MANUFACTURED BY RUSKIN, AIR BALANCE, GREENHECK, CESCO, UNITED AIR OR NALOR INDUSTRIES.

PROVIDE ACCESS DOOR, SIZED PER SMACNA WITH MINIMUM SIZE OF 10" BY 10", IN DUCT FOR INSPECTION AND SERVICE TO FIRE DAMPER AND FUSIBLE LINK. PROVIDE DUCT ACCESS DOOR(S) WITHIN 12 INCHES OF THE DEVICE TO ALLOW FOR TESTING AND MAINTENANCE. LABEL EACH DOOR (WITH MINIMUM 1" LETTERING) INDICATING WHICH DAMPER TYPE IS SERVED. DOOR SHOULD BE CAPABLE OF BEING FULLY OPENED OR PROVIDE REMOVABLE DOOR. PROVIDE REMOVABLE SECTION OF DUCT WHERE DUCT SIZE IS TOO SMALL FOR 10" BY 10" ACCESS DOOR. PROVIDE ACCESS DOOR IN CEILING OR WALL AS REQUIRED TO ACCESS DAMPER.

REFRIGERANT PIPING AND INSULATION

PROVIDE ASTM B 88, TYPE L OR ASTM B 280, TYPE ACR HARD DRAWN COPPER REFRIGERANT PIPING, CLEANED AND SEALED AT THE FACTORY, AND SPECIFICALLY DESIGNED FOR REFRIGERANT. FITTINGS SHALL BE HARD DRAWN AND HAVE LONG RADIUS TURNS. SOLDER JOINTS WITH "SILFO" (15 PERCENT SILVER, 5 PERCENT COPPER) 90 PERCENT LEAD. INSTALL AND SUPPORT PIPING TO BE FREE FROM VIBRATION TO A MINIMUM. SUPPORT AND SECURE PIPING TO UNISTRUT TYPE SUPPORTS SO THAT NO VIBRATION PASSES TO THE BUILDING STRUCTURE. PIPE ATTACHMENTS SHALL BE COPPER-PLATED OR HAVE NONMETALLIC COATING FOR ELECTRICAL CONTACT WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING. INSTALL A SUPPORT WITHIN ONE FOOT OF EACH CHANGE OF DIRECTION. MOUNT PIPE HANGERS AROUND THE OUTSIDE OF THE INSULATION WITH SADDLES TO PREVENT HANGERS FROM RUPTURING THE INSULATION. REPLACE INSULATION THAT IS CUT OR BROKEN BY THE HANGERS.

INSULATE SUCTION LINES WITH 1"AND LIQUID LINES WITH 1/2" FOAMED PLASTIC INSULATION, ARMAFLX OR EQUAL. PIPING INSULATION SHALL HAVE A FLAME SPREAD OF 25 OR LESS, AND A SMOKE DEVELOPED RATING OF 50 OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM E84. COAT INSULATION THAT IS EXPOSED TO THE ELEMENTS WITH A QUALIFIED 120 VOLT ELECTRIC ACTUATOR INSTALLED BY THE MANUFACTURER OF THE DAMPER. INSTALL AND SUPPORT DAMPER TO BE RATED FOR A MINIMUM OF 20,000 CYCLES OF OPERATION, SHALL COMPLY WITH THE LOCALLY ADOPTED BUILDING CODE AND SHALL OPEN IN 15 SECONDS OR LESS AND CLOSE IN 15 SECONDS OR LESS AFTER ALARM OR SMOKE DETECTION HAS OCCURRED. PROVIDE STAINLESS STEEL DAMPER WITH SMOKE LEAKAGE SEAL IN FAN CASING, AND TERMINAL BLOCK FOR CONNECTION TO THE BUILDING FIRE ALARM SYSTEM. DAMPER SHALL BE MANUFACTURED BY RUSKIN, AIR BALANCE, GREENHECK, CESCO, UNITED AIR OR NALOR INDUSTRIES.

RUN REFRIGERANT LINES PARALLEL AND PERPENDICULAR TO WALL AND FLOOR LINES AND TO APPEAR STRAIGHT AND IN GOOD ORDER. PITCH SUCTION LINES DOWN SLIGHTLY (1" IN 20') TOWARDS THE COMPRESSOR. PROVIDE OIL TRAPS AT THE BASE OF VERTICAL SUCTION RISERS OVER 6 FEET HIGH.

INSTALL LIQUID LINE SIGHT GLASSES IN LIQUID LINES NEAREST THE EXPANSION VALVE. FACTORY MOUNT EXPANSION VALVES WITH THE SENSING BULBS SHIPPED LOOSE. FIELD MOUNT EXPANSION VALVE BULB AFTER REFRIGERANT PIPING IS COMPLETE (DAMAGE MAY OCCUR IF BULBS COME IN CONTACT WITH HEAT).

FOR SYSTEMS OF 5 TON CAPACITY AND SMALLER, THE CONTRACTOR SHALL HAVE THE OPTION TO PROVIDE COPPER REFRIGERANT TUBING LINE SET SIZED AS RECOMMENDED BY EQUIPMENT MANUFACTURER AND OF LENGTH AS REQUIRED FOR THE INSTALLATION. PROVIDE 1" THICK FOAMED PLASTIC INSULATION, ARMAFLX OR EQUAL, ON THE SUCTION LINE. PROVIDE QUICK-CONNECT FLARE TUBING COMPRESSION FITTINGS OR SOLDER CONNECTIONS AS REQUIRED TO MATCH THE CONNECTIONS OF THE CONDENSING UNIT AND EVAPORATOR COIL.

TEMPERATURE CONTROLS

GENERAL REQUIREMENTS

PROVIDE A SYSTEM OF TEMPERATURE CONTROLS INCLUDING THERMOSTATS, CONTROL PANELS, TIME SWITCHES, OVERRIDE TIMERS, DAMPER MOTORS, AND RELAYS REQUIRED TO PROVIDE THE DESIRED SEQUENCE OF OPERATION. PROVIDE INTEGRATED WIRING DIAGRAMS SHOWING INTERCONNECTIONS BETWEEN FIELD INSTALLED EQUIPMENT AND PACKAGE WIRING FURNISHED WITH THE HVAC EQUIPMENT. CONTROL WIRING SHALL BE SIZED TO ACCOMMODATE THE VOLTAGE DROP ASSOCIATED WITH THE DISTANCE BETWEEN THE CONTROL DEVICE AND THE CONTROLLER.

PROVIDE SUPERVISION AND ON-JOB CHECKOUT SERVICE AS REQUIRED TO ENSURE THAT INSTALLATION MEETS REQUIREMENTS OF THE SPECIFICATION. THE SYSTEM SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING THE ACCEPTANCE OF THE SYSTEM BY THE ARCHITECT/ENGINEER. CORRECT DEFECTS OCCURRING DURING THIS PERIOD AT NO ADDITIONAL COST TO THE OWNER.

EQUIPMENT

MANUFACTURERS AND MODEL NUMBERS ARE LISTED FOR REFERENCE AS TO QUALITY AND FEATURES REQUIRED FOR THE CONTROL DEVICES. PROVIDE CONTROL DEVICES BY CARRIER, HONEYWELL, JOHNSON CONTROLS, TRANE OR WHITE RODGERS WITH QUALITY AND FEATURES AS INDICATED.

SEVEN DAY PROGRAMMABLE, OCCUPIED/UNOCCUPIED THERMOSTATS FOR CONTROL OF MULTIPLE STAGES OR MODULATION OF HEATING AND COOLING SYSTEM AND FOR CONTROL OF ECONOMIZER SYSTEM SHALL BE HONEYWELL SERIES TH7000 OR EQUAL. [PROVIDE REMOTE SENSOR WITH OVERRIDE BUTTON AND +/-3 DEGREE SETPOINT ADJUSTMENT AT REMOTE SENSOR.] [PROVIDE CLEAR GAUGES FOR PROGRAMMABLE TYPE THERMOSTATS.] INSTALL THERMOSTATS AT 48" AFF TO MEET ADA REQUIREMENTS UNLESS OTHERWISE NOTED ON THE PLANS.