

ABBREVIATIONS

Table of abbreviations with columns for symbol, description, and unit. Includes items like AAV (Automatic Air Vent), AC (Air Curtain), and HW (Hot Water).

GENERAL NOTES

- GENERAL MECHANICAL REQUIREMENTS
1. Materials, equipment, and systems shall meet all pertinent requirements of the Underwriters Laboratory (UL), International Society for Testing Materials (ASTM), American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), Sheet Metal and Air Conditioning Contractors National Association (SMACNA), American Gas Association (AGA), National Fire Protection Association (NFPA) and other nationally recognized agencies...

MECHANICAL SYMBOLS LIST

Table of mechanical symbols with columns for symbol, description, symbol, and description. Includes symbols for rectangular duct, round duct, flat oval duct, volume damper, fire damper, smoke damper, static pressure sensor, motor operated damper, flexible connection, sound lined ductwork, capped ductwork, ductwork transitions, round to rectangular transition, ductwork transition, rise and drop in ductwork, turning vanes, radius elbow, supply duct down/up, return duct down/up, exhaust duct down/up, air title fitting, top air title fitting, double line flexible duct, and single line flexible duct.

NOTE: ALL SYMBOLS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL NOTE THAT NOT ALL SYMBOLS MAY BE USED, AS WELL AS NOT ALL SYMBOLS USED MAY BE LISTED. REFER TO PROJECT SPECIFIC NOTES FOR ADDITIONAL INFORMATION.

DRAWING CONVENTIONS

- NEW WORK - HEAVY AND SOLID LINES
EXISTING TO REMAIN - LIGHT AND SOLID LINES
REMOVE EXISTING - HEAVY AND DASHED LINES

NOTICE TO CONTRACTORS

ALL CONTRACTORS PRIOR TO BID SUBMISSION PROCESS SHALL VISIT PROPOSED WORK SITE AND FIELD VERIFY ALL EXISTING CONDITIONS. ANY CONDITIONS THAT DIFFER FROM THAT SHOWN ON THESE PLANS SHALL BE REPORTED TO ARCHITECT/ENGINEER SO THAT NEW AND REVISED BID DRAWINGS OR INFORMATION MAY BE ISSUED. MODIFICATIONS TO SCOPE OF WORK WHICH RESULT FROM CONTRACTORS NEGLIGENCE TO VISIT THE SITE PRIOR TO SUBMITTING BID, SHALL BE THE CONTRACTORS SOLE RESPONSIBILITY.



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CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037

SHEET TITLE: GENERAL NOTES, ABBREVIATIONS AND LEGEND

SHEET NUMBER: M001

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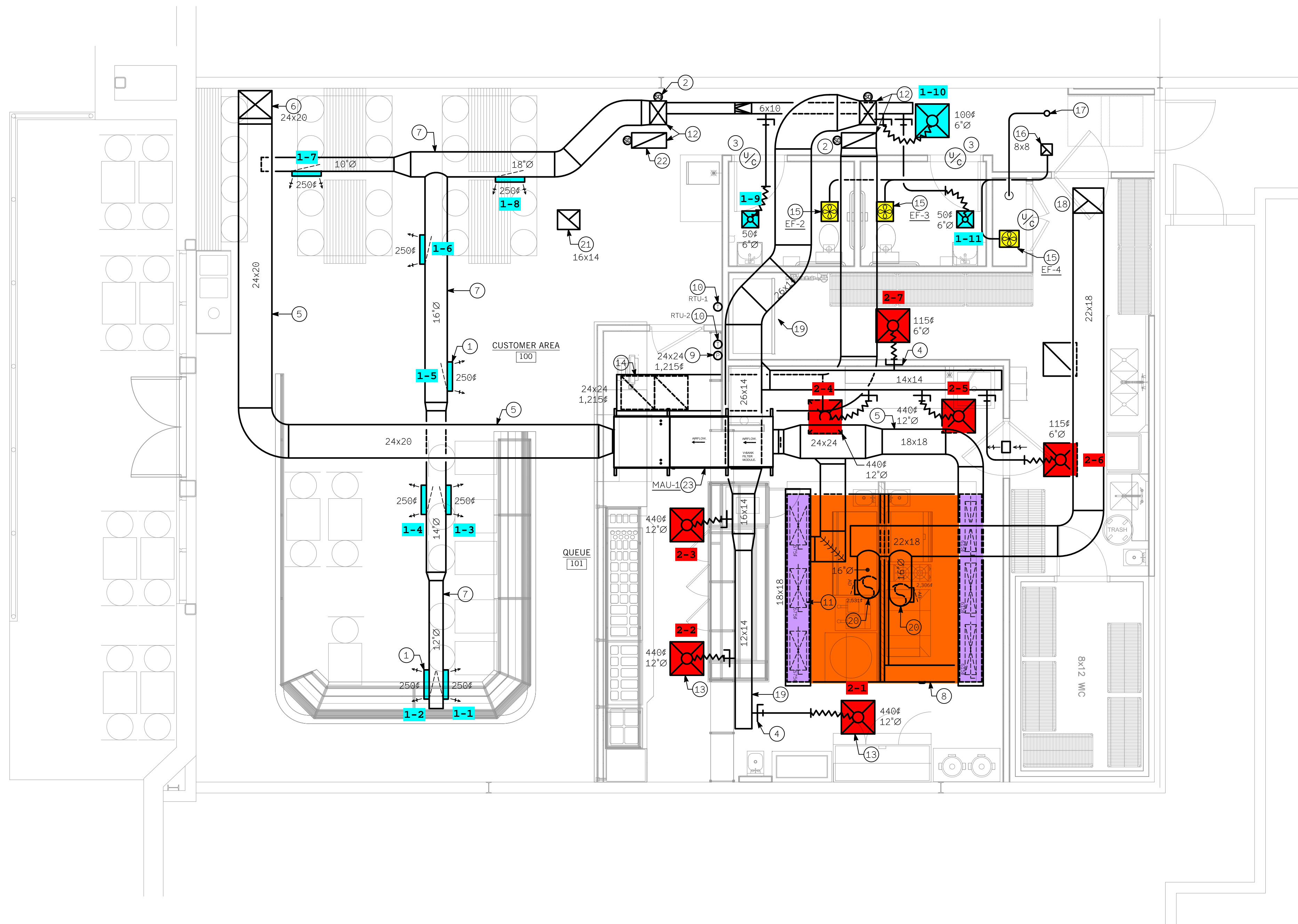
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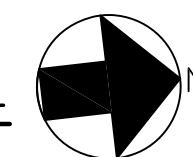
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**FLOOR PLAN - MECHANICAL**

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



**DRAWING NOTES**

1. 25"x6" SUPPLY AIR REGISTER MOUNTED IN SIDE OF DUCTWORK WITH AIR QUANTITY INDICATED (TYPICAL). LINDAB RGS-3 OR APPROVED EQUAL WITH INTEGRAL VOLUME CONTROL AND DOUBLE DEFLECTION LOUVERS SET AT 30° LEFT/RIGHT. (TYP)
2. PHOTOELECTRIC DUCT MOUNTED SMOKE DETECTOR WITH 12"x12" ACCESS DOOR FOR TUBE INSPECTION. (TYPICAL)
3. 1" UNDERCUT DOOR (TYPICAL).
4. MANUAL BALANCING DAMPER (TYPICAL).
5. MAKE-UP AIR DUCTWORK SUPPORTED FROM STRUCTURE ABOVE CEILING.
6. MAKEUP AIR DUCTWORK UP THRU ROOF. TERMINATE WITH GOOSENECK.
7. LINDAB ROUND SPIRAL SUPPLY AIR DUCTWORK SUPPORTED HIGH FROM STRUCTURE WITH AIR CRAFT CABLING OR AS RECOMMENDED BY MANUFACTURER. MOUNT ABOVE CEILING FEATURE, COORDINATE HEIGHT WITH ARCHITECT. DUCTWORK SHALL BE DOUBLE WALL, INSULATED WITH SELF-SEALING / GASKETED CONNECTIONS.
8. OUTLINE OF KITCHEN HOOD, PROVIDED BY OTHERS AND INSTALLED BY MECHANICAL CONTRACTOR. REFER TO KITCHEN HOOD DESIGN DRAWINGS.
9. EXHAUST HOOD FIRE SUPPRESSION SYSTEM MANUAL PULL STATION MOUNTED ON WALL 48" ABOVE FLOOR AND LOCATED BETWEEN 10'-20" AWAY FROM HOOD IN PATH OF EGRESS. COORDINATE EXACT LOCATION WITH OWNER AND FIRE MARSHALL.
10. WALL MOUNTED THERMOSTAT MOUNTED 48" ABOVE FLOOR WITH LOCKABLE COVER AND INTERLOCKED WITH UNIT INDICATED.
11. MAKE-UP AIR DUCTWORK EXTENDED DOWN AND CONNECTED TO TOP OF HOOD WITH MANUAL VOLUME DAMPER (TYPICAL). REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR CONNECTION SIZES AND AIR QUANTITIES.
12. SUPPLY AND RETURN UP TO GAS FIRED ROOFTOP UNIT, FULL SIZE OF UNIT OPENING.
13. 24"x24" CEILING MOUNTED PERFORATED SUPPLY AIR DIFFUSER WITH NECK SIZE AND AIR QUANTITY INDICATED. PROVIDE 18"x18"x6" PLENUM AT NECK AND RIGID/FLEXIBLE DUCTWORK BACK TO MAIN WITH AIR-TITE FITTING AND MANUAL VOLUME DAMPER. DIRECT AIR FLOW TO BE AWAY FROM KITCHEN HOOD.
14. RETURN AIR GRILLE WITH NECK SIZE AND AIR QUANTITY INDICATED. PROVIDE RIGID DUCTWORK BACK TO MAIN WITH MANUAL VOLUME DAMPER.
15. CEILING MOUNTED EXHAUST AIR FAN SUPPORTED FROM STRUCTURE AND INTERLOCKED WITH LIGHT SWITCH. EXTEND DISCHARGE DUCTWORK OVER TO COMMON RISER THRU ROOF. REFER TO SCHEDULE.
16. EXHAUST DUCTWORK UP THRU ROOF TO GOOSENECK.
17. COMBUSTION AIR INTAKE/GAS FLUE PIPING SUPPORTED ABOVE CEILING FROM GAS FIRED WATER HEATER AND EXTENDED UP THRU ROOF TO CONCENTRIC ADAPTOR PROVIDED BY HEATER MANUFACTURER.
18. GREASE EXHAUST DUCTWORK UP THRU ROOF. TRANSITION IN VERTICAL AS REQUIRED FOR CONNECTION TO UNIT CURB OPENING.
19. SUPPLY DUCTWORK SUPPORTED FROM STRUCTURE ABOVE CEILING.
20. EXHAUST AIR DUCTWORK EXTENDED DOWN AND CONNECTED TO TOP OF HOOD. PROVIDE LONG RADIUS ELBOWS AT ALL ELBOWS. REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR CONNECTION SIZES AND AIR QUANTITIES. KITCHEN HOOD GREASE EXHAUST AIR DUCTWORK SUPPORTED FROM STRUCTURE ABOVE CEILING WITH ZERO (0") CLEARANCE FIRE WRAP, PROVIDING A 2 HOUR ENCLOSURE ASSEMBLY, FROM HOOD CONNECTION TO GREASE FAN ROOF PENETRATION. PROVIDE LONG RADIUS TURNS AT ALL ELBOWS WITH CLEANOUTS AND 12"x12" ACCESS DOORS AT ALL TURNS, BASE OF RISER AND EVERY 20'-0" HORIZONTALLY.
21. EXHAUST DUCTWORK UP THRU ROOF TO ERV-1. TERMINATE APPROXIMATELY 18" BELOW ROOF DECK WITH 1"x1" WIRE MESH SCREEN. REFER TO M102 FOR FURTHER INFORMATION.
22. FULL SIZE OPEN END SOUND LINED RETURN AIR DUCTWORK WITH 1"x1" WIRE MESH TO COVER OPENING. DROP DOWN TO 24" BELOW BOTTOM OF ROOF.
23. MAU-1. HORIZONTAL MAKE UP AIR UNIT SUPPORTED FROM STRUCTURE ABOVE CEILING. REFER TO SCHEDULE AND MANUFACTURER DRAWINGS.



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CERTIFICATION

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SHEET TITLE  
**FLOOR PLAN - MECHANICAL**

SHEET NUMBER **M101**



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

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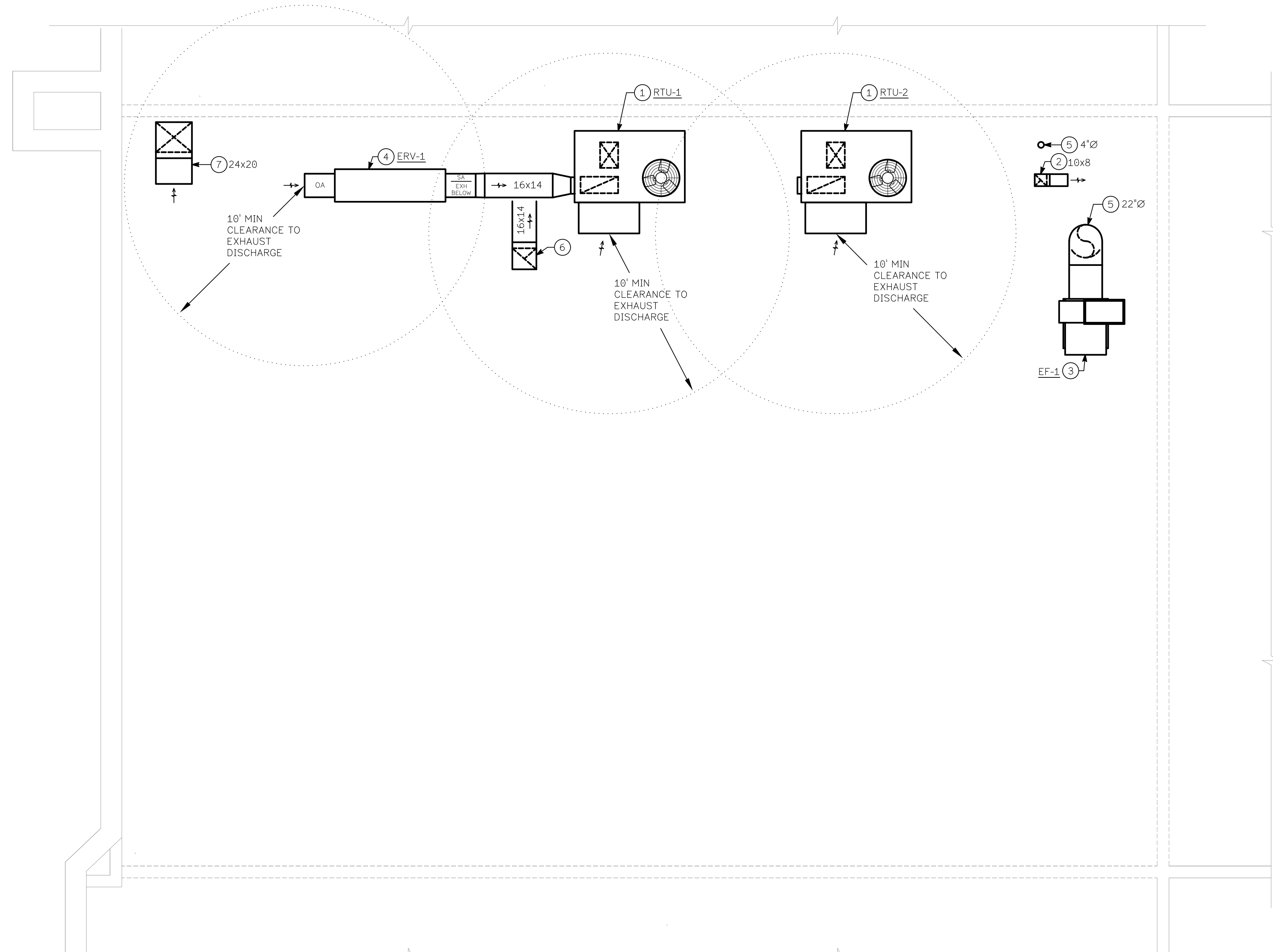
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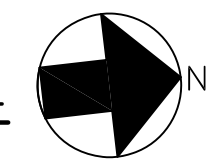
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**ROOF PLAN - MECHANICAL**  
 SCALE: 1/4" = 1'-0"



**DRAWING NOTES:** ①②

1. GAS FIRED ROOFTOP UNIT ON ROOF CURB. COORDINATE WITH STRUCTURAL ENGINEER FOR ANY STEEL BRACING, ETC. REFER TO SCHEDULE.
2. EXHAUST DUCTWORK UP THRU ROOF TO GOOSENECK.
3. ROOF MOUNTED UPBLAST GREASE EXHAUST FAN (PROVIDED BY OTHERS AND INSTALLED BY MECHANICAL CONTRACTOR) ON 20" FACTORY CURB. REFER TO SCHEDULE AND KITCHEN HOOD DESIGN DRAWINGS.
4. ROOF MOUNTED ERV MOUNTED ON 14" HIGH ROOF CURB. SEE SCHEDULE AND DETAIL FOR MORE INFORMATION.
5. COMBINATION CONCENTRIC VENT PIPING DOWN TO GAS FIRED TANK TYPE WATER HEATER BELOW.
6. GENERAL EXHAUST DUCTWORK DOWN THRU ROOF TO SPACE BELOW.
7. MAKE-UP AIR DUCTWORK TERMINATED WITH GOOSENECK DOWN THRU ROOF TO MAU-1, FOR CONTINUATION, REFER TO M101.



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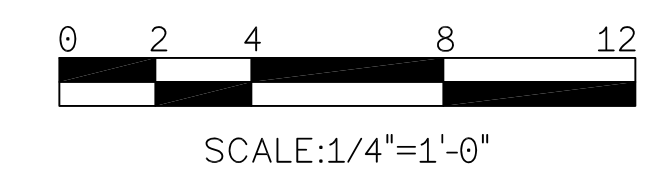
CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037

SHEET TITLE  
 ROOF PLAN- MECHANICAL

SHEET NUMBER **M102**



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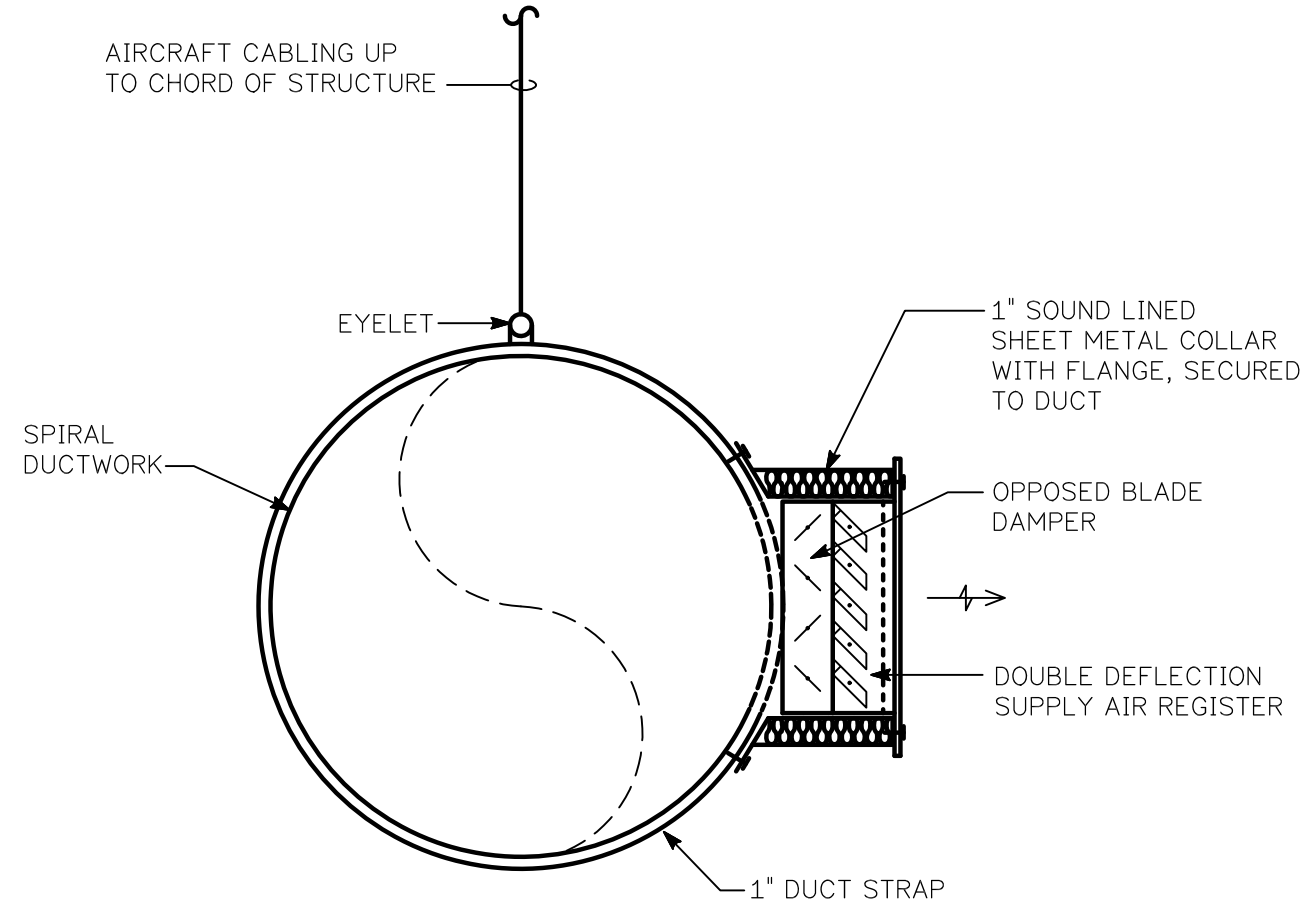
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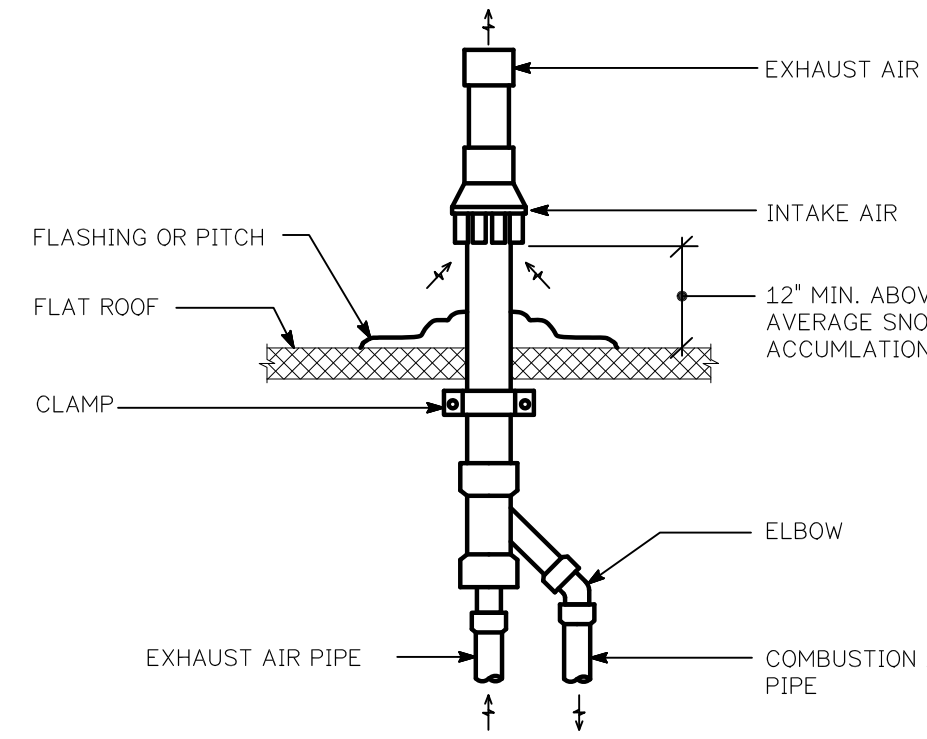
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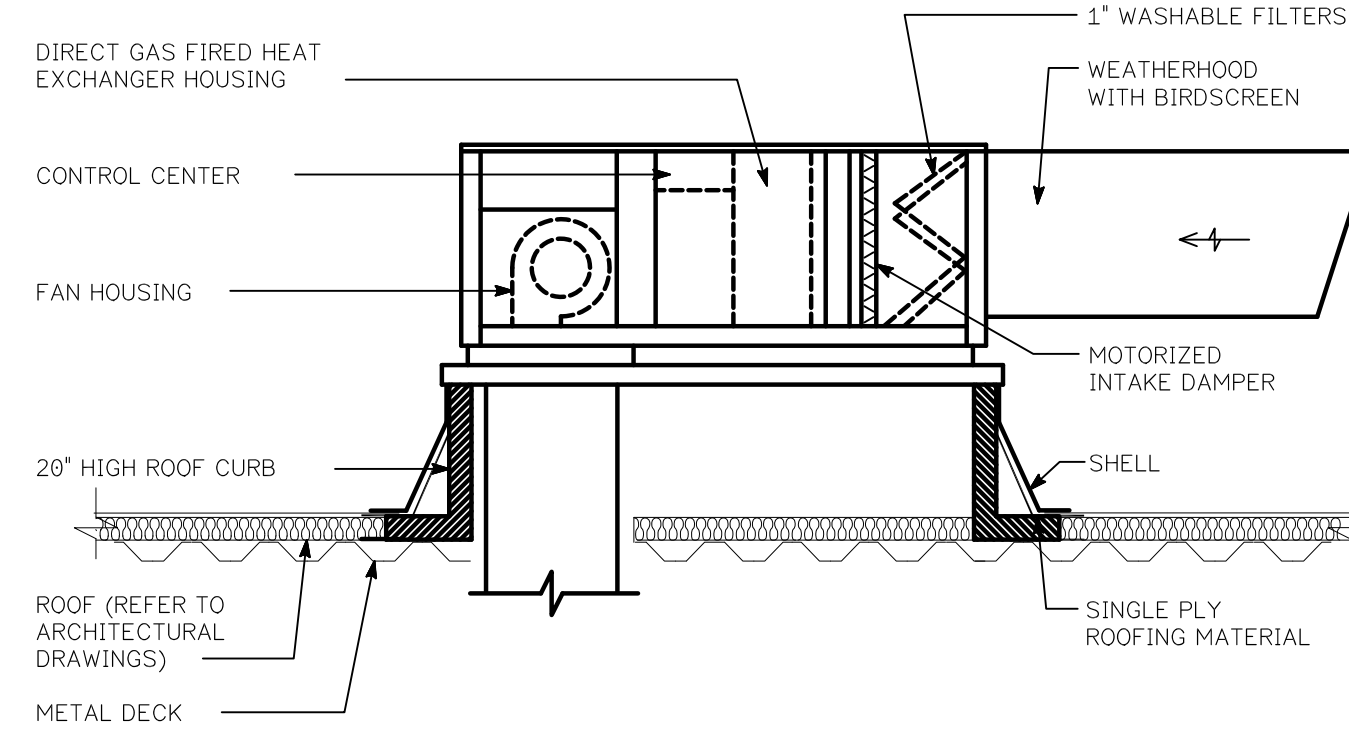
**SPIRAL SUPPLY AIR DUCT REGISTER MOUNTING DETAIL**  
NO SCALE

NOTE: REGISTER SHALL BE LINDAB RGS-3 OR APPROVED EQUAL. ADJUST LOUVERS SO THAT AIR FLOW PATTERN IS AT 30° LEFT/RIGHT



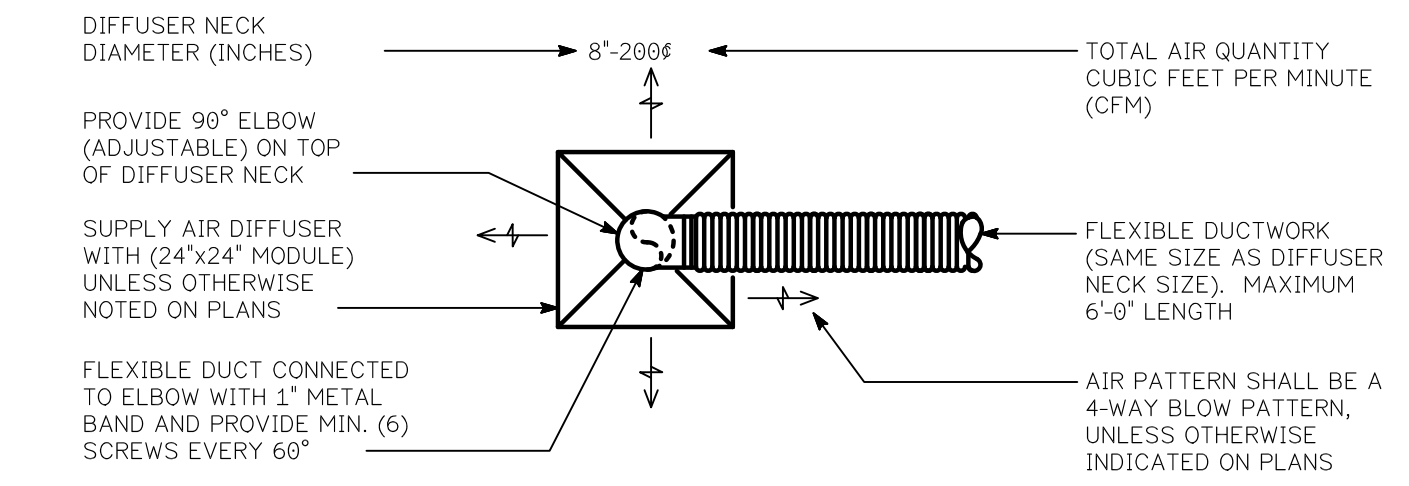
**CONCENTRIC VENT ROOF ADAPTOR INSTALLATION DETAIL**  
NO SCALE

NOTE: DETAIL SIMILAR FOR SLOPED ROOF.

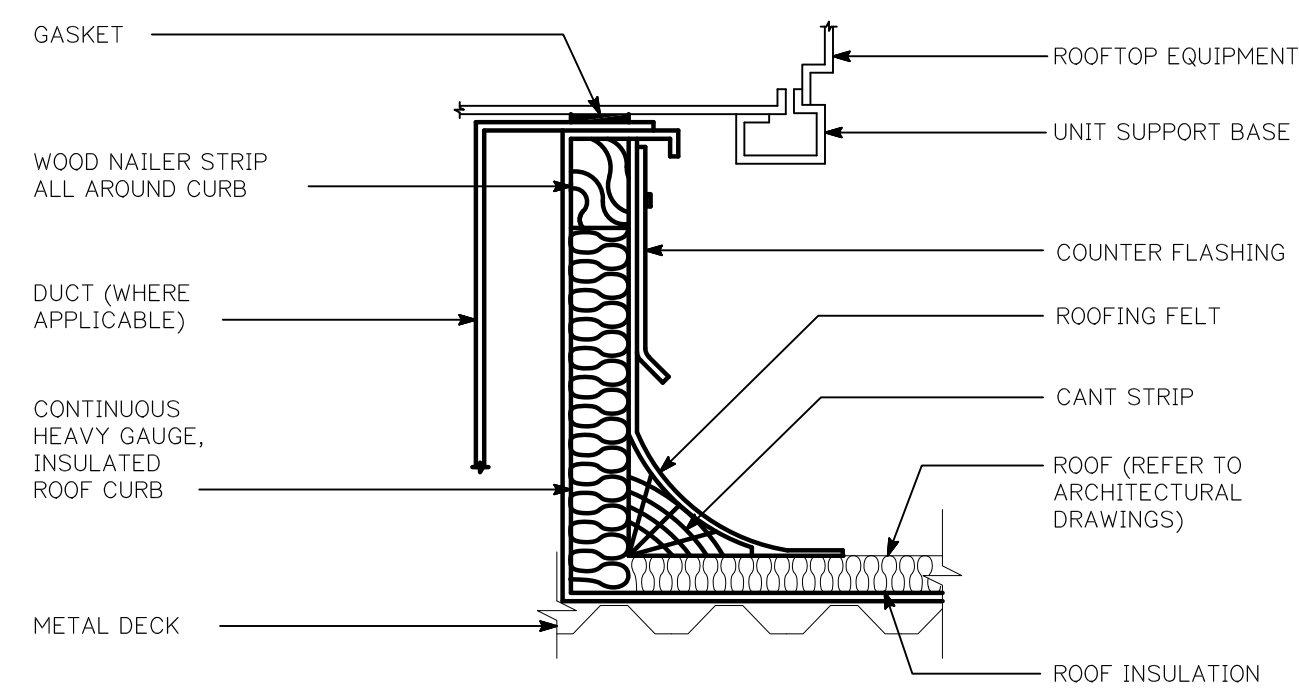


**KITCHEN HOOD MAKE-UP AIR UNIT DETAIL**  
NO SCALE

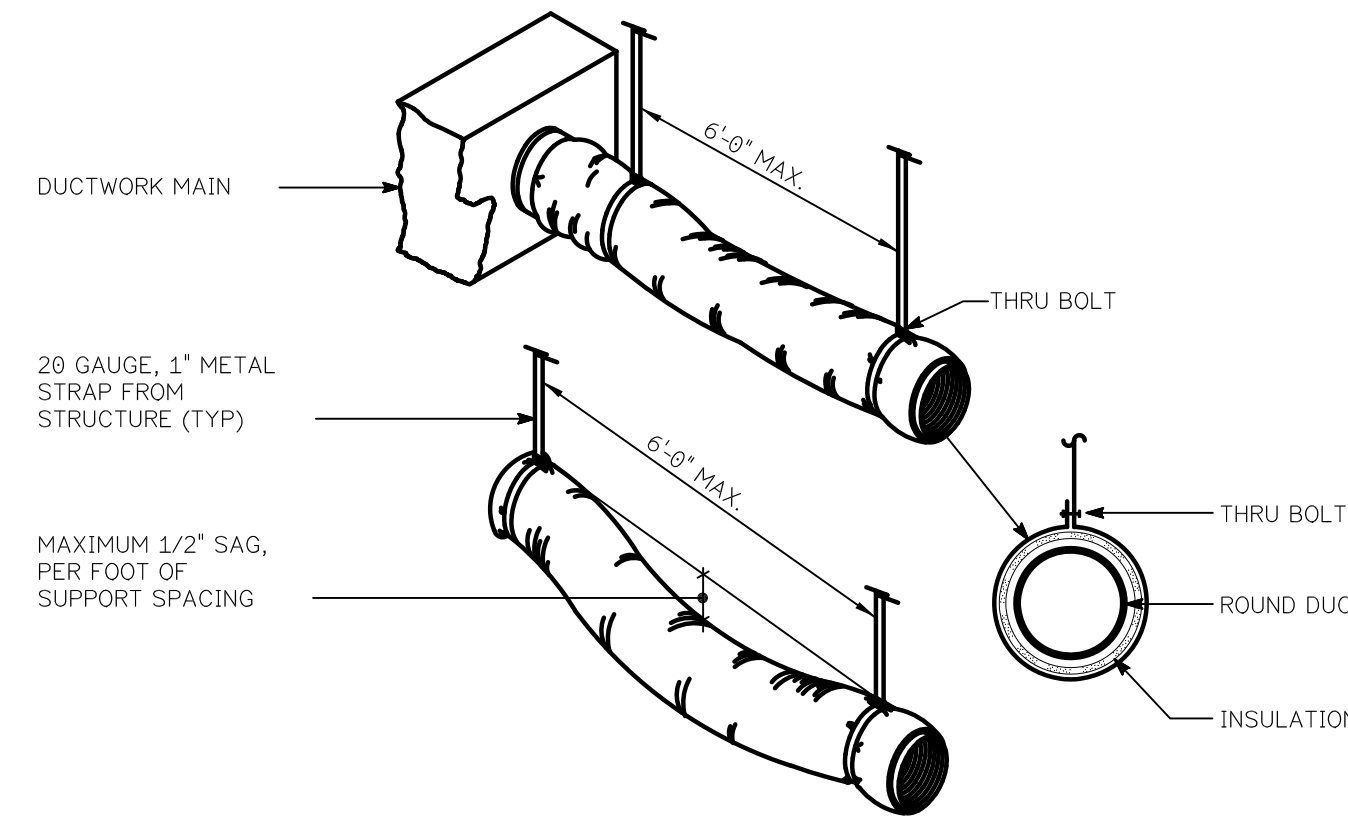
NOTE: REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR ADDITIONAL INFORMATION.



**SUPPLY AIR DIFFUSER KEY**  
NO SCALE

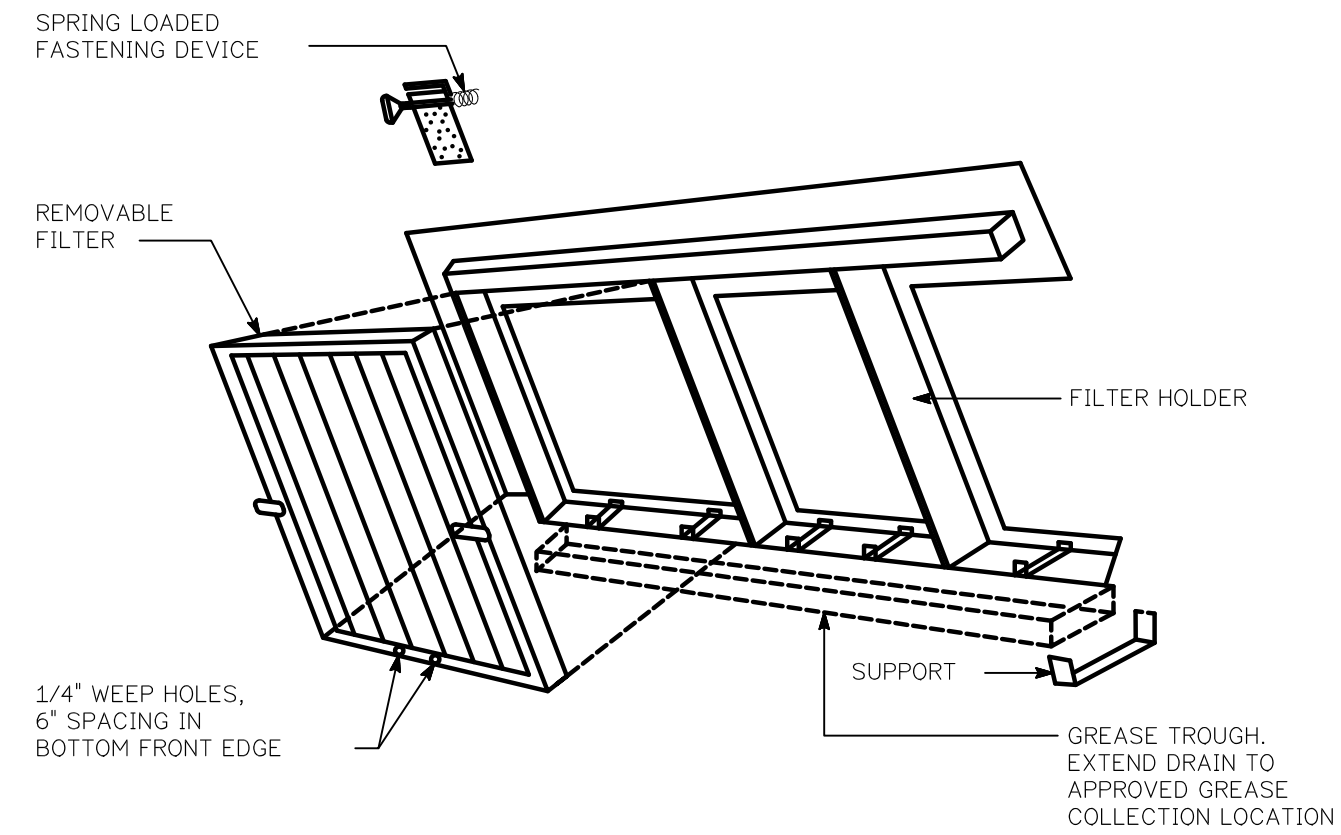


**EQUIPMENT ROOF CURB DETAIL**  
NO SCALE



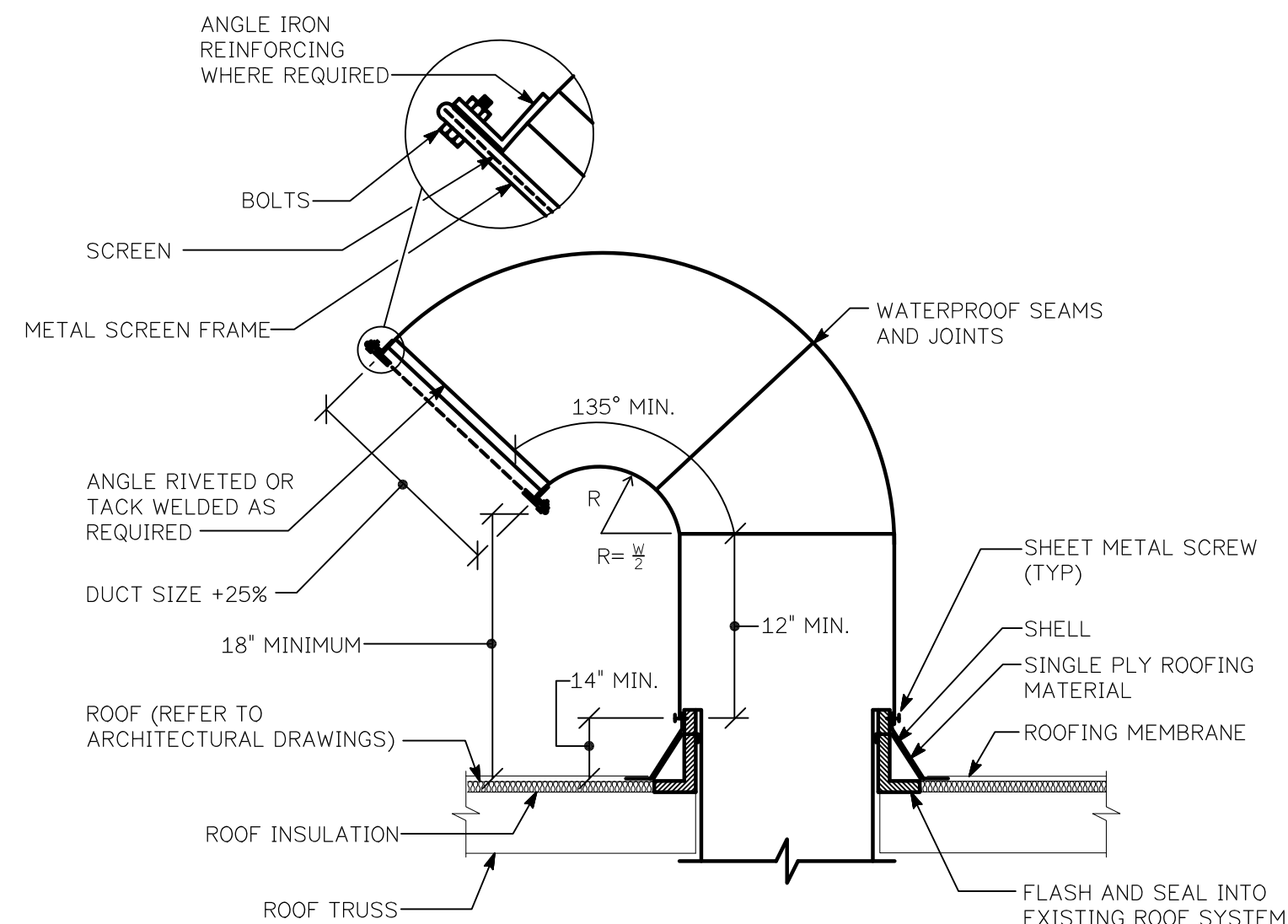
**FLEXIBLE DUCT RUN-OUT SUPPORT DETAIL**  
NO SCALE

NOTES:  
1) FLEXIBLE DUCT SHOULD EXTEND STRAIGHT FOR SEVERAL INCHES FROM RECTANGULAR DUCT CONNECTION BEFORE BENDING.  
2) USE RIGID DUCTWORK WHEN FLEXIBLE DUCT LENGTH EXCEEDS 6'-0" LENGTH.

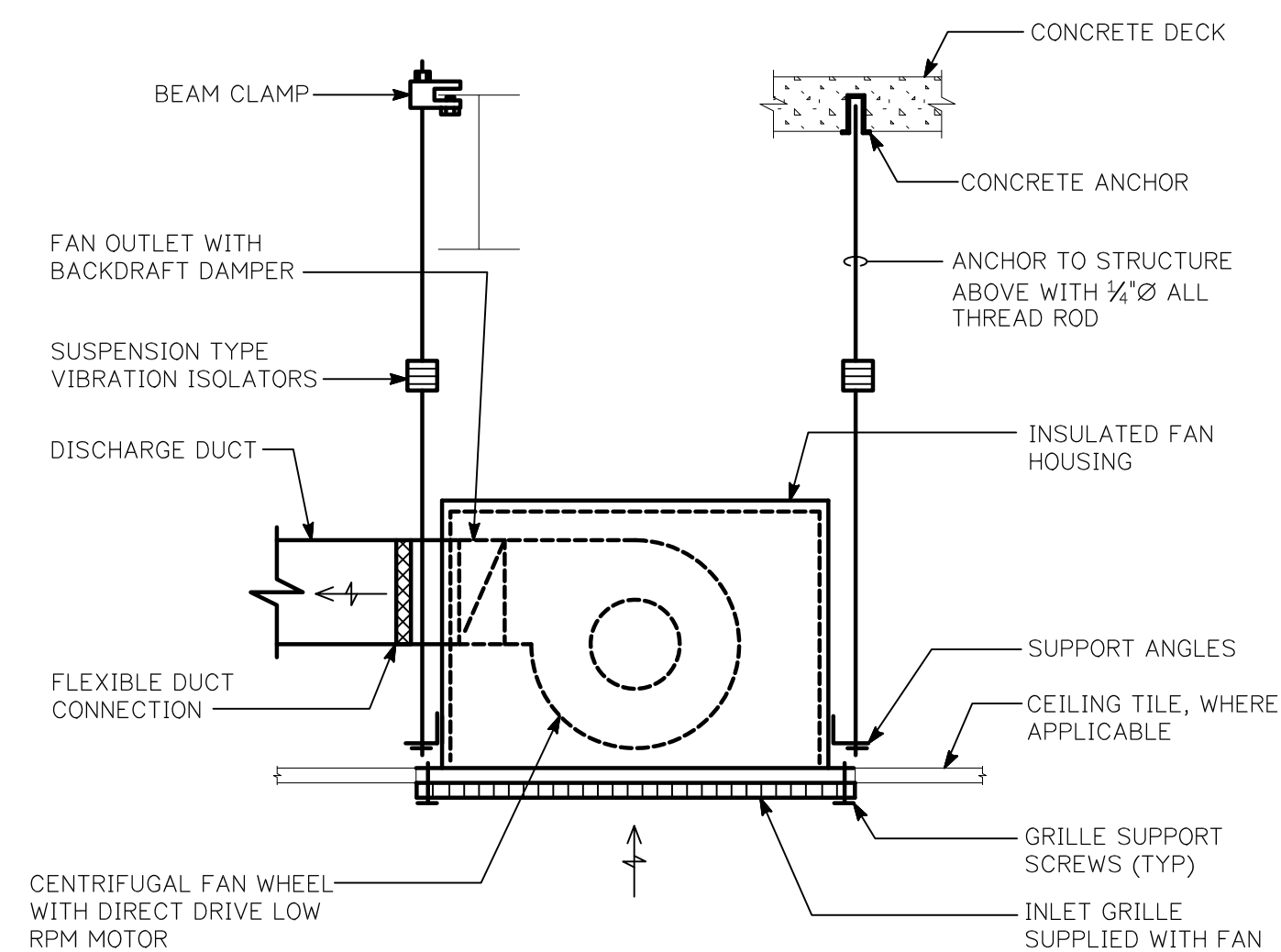


**KITCHEN HOOD FILTER DETAIL**  
NO SCALE

NOTE: REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR ADDITIONAL INFORMATION.

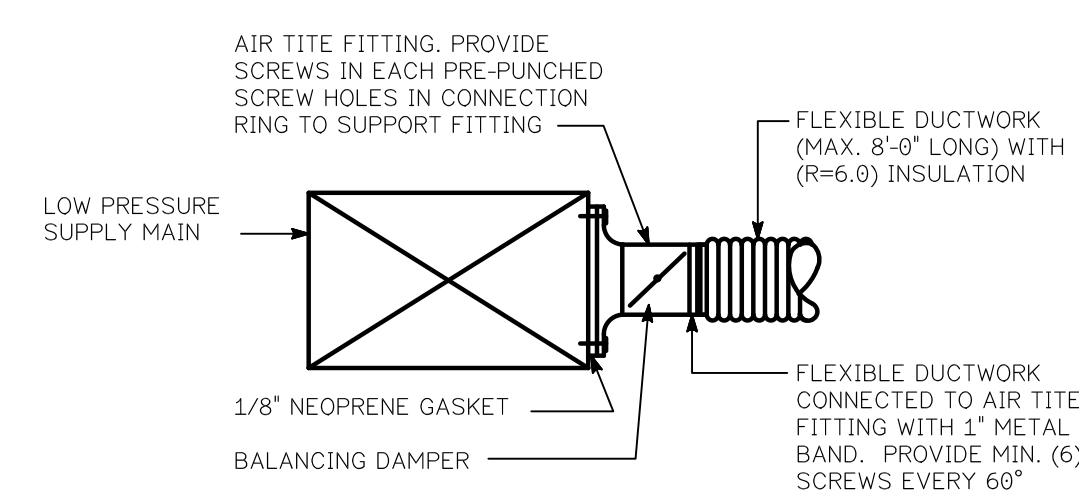


**GOOSENECK THRU ROOF**  
NO SCALE



**CEILING MOUNTED EXHAUST FAN**  
NO SCALE

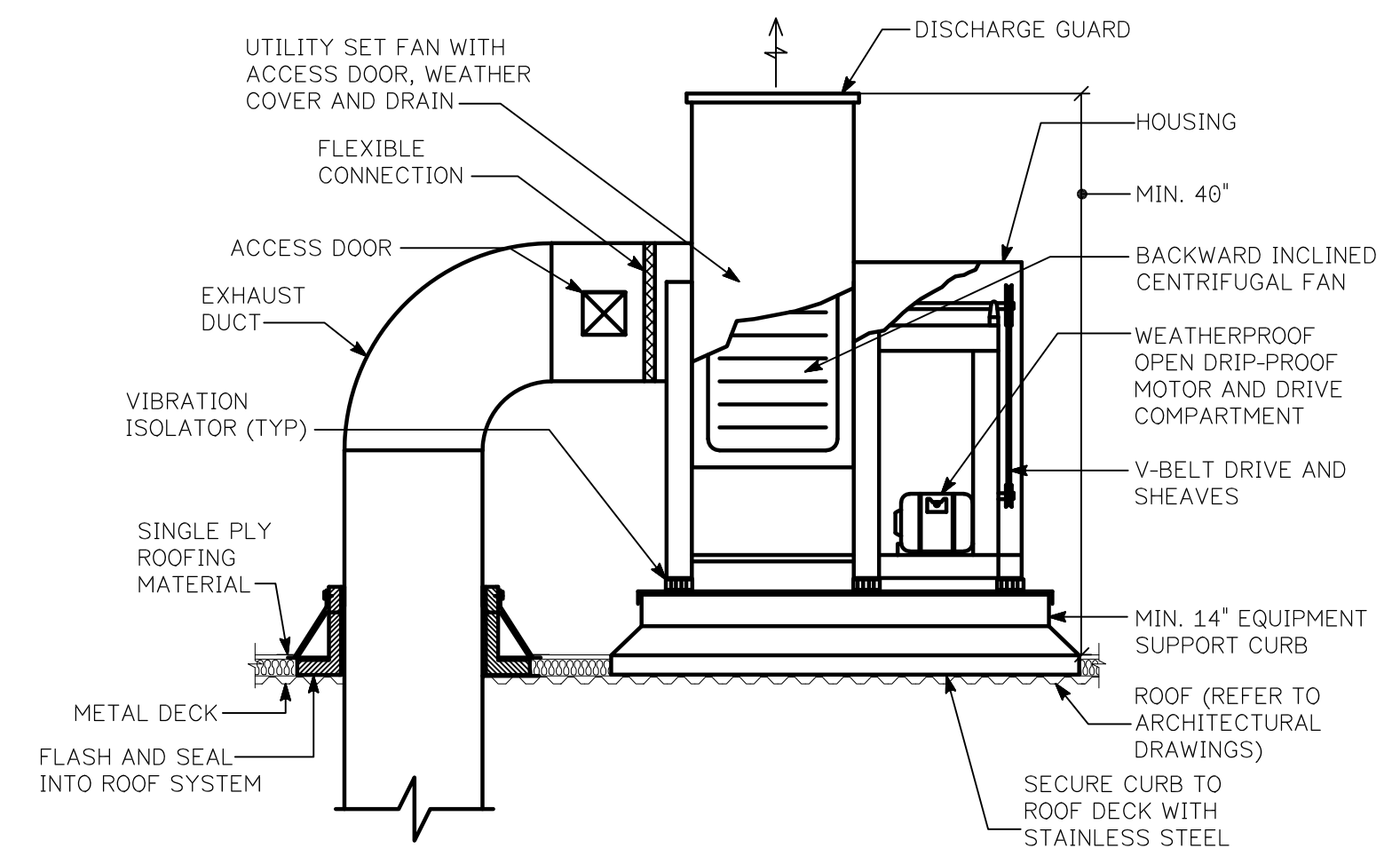
NOTE: PROVIDE VARIABLE SPEED CONTROLLER ON SIDE OF CASING FOR PROPER AIR BALANCE



AIR-TITE SIZE CHART			
DUCTSIZE	CONNECTION RING	DUCTSIZE	CONNECTION RING
5'	8"	9'	12"
6'	9"	10'	13"
7'	10"	11'	15"
8'	11"	12'	17"

NOTE: WHERE CONNECTION RING SIZE IS LARGER THAN SUPPLY DUCT, THEN CONNECTION RING SHALL BE CRIMPED OVER DUCT AND CONNECTED, SCREWED & SEALED ON TOP AND BOTTOM OF SUPPLY DUCT.

**AIR-TITE SPIN-IN FITTING DETAIL**  
NO SCALE



**ROOF MOUNTED UP-BLAST UTILITY SET EXHAUST FAN**  
NO SCALE

NOTES:  
1. FANS USED FOR KITCHEN EXHAUST SHALL BE SUPPLIED WITH GREASE TROUGH ON FAN WITH GREASE COLLECTOR.  
2. CONTRACTOR SHALL PROVIDE GREASE GUARD ROOF PROTECTION SYSTEM AND SHALL EXTEND A MINIMUM OF 12' LARGER THEN ROOF CURB ON ALL SIDES.  
3. PROVIDE CURB EXTENSION (AS REQUIRED) FOR GREASE EXHAUST FANS TO MAINTAIN A MINIMUM OF 40" DISCHARGE ABOVE ROOF LEVEL.  
4. GREASE FANS SHALL BE HINGED FOR INSPECTION ACCESS.  
5. IF FAN IS LOCATED WITHIN 10'-0" OF ANY NEW OR EXISTING OUTSIDE AIR INTAKE OPENINGS, FAN DISCHARGE OUTLET OPENING MUST BE EXTENDED UP SO THAT OUTLET IS A MINIMUM OF 24" ABOVE TOP OF OUTSIDE AIR INTAKE LEVEL.  
6. REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR ADDITIONAL INFORMATION.

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CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037

SHEET TITLE  
**DETAILS**

SHEET NUMBER  
**M501**

### GAS FIRED ROOFTOP UNIT SCHEDULE

ITEM#	AREA SERVED	NOMINAL TONS	FAN DATA					R-410A COOLING DATA (BTUH)					HEATING DATA (BTUH)			ELECTRICAL		WEIGHT (LBS.)	MODEL #	MANUFACTURER	
			C.F.M.	OUTSIDE AIR	H.P.	E.S.P.	TYPE	TOTAL	SENSIBLE	ENTERING AIR		IEER	INPUT	OUTPUT	TEMP. RISE °F	NO. STAGES	VOLTS/ PHASE				MCA/ FUSE
										DB°F	WB°F										
RTU-1	DINING AREA	6.0	2,200	990	1.2	0.5"	DIRECT	73,017	56,064	79.5	67.7	17.1	70,000	52,500	24.4	2	208V/3Ø	29/45	855	DRG072	DAIKIN
RTU-2	KITCHEN/BOH	6.0	2,430	360	2.0	0.5"	BELT	69,770	60,513	77.6	64.6	15.0	90,000	72,000	27.0	2	208V/3Ø	30/45	853	DBG072	DAIKIN

NOTES:  
 1) UNITS SHALL BE COMPLETE WITH 14" HIGH FACTORY ROOF CURB, BAROMETRIC RELIEF DAMPER, ENTHALPY CONTROLLED ECONOMIZER, POWERED CONVENIENCE OUTLET AND DISCONNECT SWITCH.  
 2) UNITS 2,000 CFM SUPPLY AND GREATER SHALL BE PROVIDED WITH DUCT MOUNTED SUPPLY/RETURN SMOKE DETECTORS.  
 3) UNITS SHALL BE CONTROLLED BY 24 HOUR/7 DAY PROGRAMMABLE THERMOSTAT AND SHALL HAVE FAN SET TO 'ON' POSITION DURING OCCUPIED TIMES.  
 4) ALL UNITS TO COME WITH 2" MERV 8 FILTERS.

### ENERGY RECOVERY VENTILATOR

ITEM#	AREA SERVED	RECOVERY FAN PERFORMANCE			VENTILATION FAN PERFORMANCE			COOLING ENERGY RECOVERY				ELECTRICAL DATA		PHYSICAL DATA				MODEL #	MANUFACTURER	
		C.F.M.	E.S.P.	HP	C.F.M.	E.S.P.	HP	SENSIBLE /LATENT HEAT RECOVERY MBH	EXCHANGER		% EFF	VOLTAGE/PHASE	MCA/MOP	LENGTH	WIDTH	HEIGHT	WEIGHT			
									E.A.T.	L.A.T.										TOTAL
ERV-1	TENANT SPACE	1220	.5	2.6 HP	1220	.5	2.6 HP	10.20/16.0	93%/75.0°	82.5%/69.9°	52.8	60.5	208/3Ø	13.83/15	113.85	21.66	54.81	690	B220U	OXYGEN8

NOTE:  
 1. RECOVERY AND VENTILATION FANS SHALL BE INTERLOCKED WITH AHU CONTROLS.  
 2. FAN CUBE LOCATIONS REQUIRE 10' OF 3/4" INTERNAL SOUND LINED DUCT  
 3. MERV 11 FILTERS

### AIR BALANCE SCHEDULE

ITEM#	SUPPLY AIR	RETURN AIR	OUTSIDE AIR	MAKE-UP AIR	EXHAUST AIR
ALL AIR HANDLING UNITS	4,630	3,280	1,350		
ALL TOILET EXHAUST					300
ALL KITCHEN HOOD EXHAUSTS					4,837
MAKE-UP AIR UNIT				3,870	
SUB TOTALS	4,630	3,280	1,350	3,870	5,137
TOTAL RESULTING BUILDING PRESSURE:					+83

### EXHAUST FAN SCHEDULE

ITEM#	AREA SERVED	C.F.M.	SONES	H.P./ WATTS	FAN TYPE	E.S.P.	DRIVE TYPE	R.P.M.	ELECTRICAL DATA	CONTROL	WEIGHT (LBS.)	MODEL #	MANUFACTURER
EF-1	KITCHEN HOOD	4,837	25	5 HP	UPBLAST	2.1"	BELT	1132	208V/3Ø	HOOD	300	USB1240D-RM	CAPTIVEAIRE
EF-2	TOILET ROOM	100	2.5	43.2 W	CEILING	0.5"	DIRECT	1075	115V/1Ø	SWITCH	12	GC-148	COOK
EF-3	TOILET ROOM	100	2.5	43.2 W	CEILING	0.5"	DIRECT	1075	115V/1Ø	SWITCH	12	GC-148	COOK
EF-4	JAN CLOSET	100	2.5	43.2 W	CEILING	0.5"	DIRECT	1075	115V/1Ø	SWITCH	12	GC-148	COOK

NOTES:  
 1) INTERLOCK GREASE FAN EF-1 WITH KITCHEN HOOD CONTROLS AND MAU-1.

### DIRECT GAS FIRED MAKE-UP AIR UNIT SCHEDULE

ITEM#	AREA SERVED	FAN DATA				NATURAL GAS HEATING DATA (BTUH)				ELECTRICAL DATA	WEIGHT (LBS.)	MODEL #	MANUFACTURER
		C.F.M.	R.P.M.	H.P.	E.S.P.	INPUT	OUTPUT	TEMP. RISE °F	NO. STAGES				
MAU-1	KITCHEN HOOD	3870	1644	5.0	1.0	245,690	226,035	55	MULTI	208V/3Ø	788	EA2-D.250-20D	CAPTIVEAIRE

NOTES:  
 1) UNIT SHALL BE COMPLETE WITH STARTER FOR EXHAUST FAN, DISCHARGE TEMPERATURE CONTROLS AND INLET AIR SENSOR. REFER TO KITCHEN HOOD DESIGN DRAWINGS FOR ADDITIONAL INFORMATION.  
 2) UNIT SHALL BE INTERLOCKED WITH GREASE EXHAUST FAN EF-1.

#### 2018 INTERNATIONAL MECHANICAL CODE - VENTILATION CHART - RTU-1

SPACE NAME	A <sub>z</sub> (FT <sup>2</sup> )	R <sub>a</sub> A <sub>z</sub> AREA OUTDOOR AIR RATE (CFM/FT <sup>2</sup> )	R <sub>a</sub> A <sub>z</sub> AREA OUTDOOR AIR (CFM)	OCCUPANT LOAD RATE (# PEOPLE / 1,000FT <sup>2</sup> )	P <sub>z</sub> TOTAL # OF PEOPLE	R <sub>p</sub> OCCUPANT OUTDOOR AIR RATE (CFM/ PERSON)	R <sub>p</sub> P <sub>z</sub> OCCUPANT OUTDOOR AIR (CFM)	V <sub>bz</sub> BREATHING ZONE OUTDOOR AIR (CFM)	E <sub>z</sub> ZONE AIR DISTRIBUTION EFFECTIVENESS	V <sub>oz</sub> ZONE OUTDOOR AIR	V <sub>oz</sub> TOTAL SUPPLY AIR TO SPACE	Z <sub>o</sub> OUTDOOR AIR FRACTION
100 - Customer Area	1106	0.18	200	70	78	7.5	585	785	0.8	982	2000	0.5
104 - Hall	112	0.06	7	0	0	0	0	7	0.8	0	100	0
105 - ADA Bath	47	0	0	0	0	0	0	0	0.8	0	50	0
106 - ADA Bath	47	0	0	0	0	0	0	0	0.8	0	50	0
<b>TOTAL</b>	<b>1312</b>		<b>207</b>		<b>78</b>		<b>585</b>	<b>792</b>		<b>982</b>	<b>2200</b>	<b>0.5</b>

NOTES:  
 RTU-1 is a single zone system, therefore, Outdoor Air to be balanced to 900 cfm Outdoor Air

System Ventilation Efficiency E <sub>v</sub> =	0.65
System Population =	78
Occupant Diversity =	1
Uncorrected Outdoor Air Intake =	792
Total required Outdoor Air V <sub>out</sub> =	1219 CFM

#### 2018 INTERNATIONAL MECHANICAL CODE - VENTILATION CHART - RTU-2

SPACE NAME	A <sub>z</sub> (FT <sup>2</sup> )	R <sub>a</sub> A <sub>z</sub> AREA OUTDOOR AIR RATE (CFM/FT <sup>2</sup> )	R <sub>a</sub> A <sub>z</sub> AREA OUTDOOR AIR (CFM)	OCCUPANT LOAD RATE (# PEOPLE / 1,000FT <sup>2</sup> )	P <sub>z</sub> TOTAL # OF PEOPLE	R <sub>p</sub> OCCUPANT OUTDOOR AIR RATE (CFM/ PERSON)	R <sub>p</sub> P <sub>z</sub> OCCUPANT OUTDOOR AIR (CFM)	V <sub>bz</sub> BREATHING ZONE OUTDOOR AIR (CFM)	E <sub>z</sub> ZONE AIR DISTRIBUTION EFFECTIVENESS	V <sub>oz</sub> ZONE OUTDOOR AIR	V <sub>oz</sub> TOTAL SUPPLY AIR TO SPACE	Z <sub>o</sub> OUTDOOR AIR FRACTION
102- Food Production	608	0.12	73	20	13	7.5	97.5	171	0.8	214	2200	0.1
103- Prep	286	0.12	35	20	6	7.5	45	80	0.8	100	230	0.44
<b>TOTAL</b>	<b>894</b>		<b>108</b>		<b>19</b>		<b>142.5</b>	<b>251</b>		<b>314</b>	<b>2430</b>	<b>0.44</b>

NOTES:  
 RTU-2 to be balanced to 360 cfm outdoor air.

System Ventilation Efficiency E <sub>v</sub> =	0.71
System Population =	19
Occupant Diversity =	1
Uncorrected Outdoor Air Intake =	250.5
Total required Outdoor Air V <sub>out</sub> =	353 CFM



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CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037

SHEET TITLE  
**SCHEDULES**

SHEET NUMBER

**M601**



**REVISIONS**

NO.	DATE	DESCRIPTION

**econ·air**  
Manufacturing Office  
1435 Westchester Avenue, Suite 700, Rockaway, NJ 07866

Mezeh - Rockaway, NJ, L1  
395 Mt Hope Ave, Suite 08A  
Rockaway, NJ, 07866

DATE: 5/23/2022  
DWG. #: 5484939  
DRAWN BY: AD-32  
SCALE: NTS  
MASTER DRAWING  
SHEET NO. 5

**NOTES**

DRAWING CONTAINS IMPORTANT INFORMATION FOR COORDINATION WITH M/E/P ENGINEER

**KITCHEN FAN DETAILS**

**CUSTOMER APPROVAL TO MANUFACTURE:**

Approved as Noted   
 Approved with NO Exception Taken   
 Revises and Resubmits   
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**REVISIONS**

NO.	DATE	DESCRIPTION

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DATE: 5/23/2022  
DWG. #: 5484939  
DRAWN BY: AD-32  
SCALE: NTS  
MASTER DRAWING  
SHEET NO. 6

**HOOD CONTROL DETAILS**

**ELECTRICAL PACKAGE - JOB#5484939**

NO.	DATE	DESCRIPTION

**TYPICAL CONTROL CENTER INSTALLATION**

**SEQUENCE OF OPERATION - HOOD CONTROLS**

**SEQUENCE OF OPERATION - HOOD CONTROLS**

Once all power, light and temperature sensor circuits are properly landed on the control terminal block the LCD interface will be illuminated. All temperature readings are measured by resistive temperature sensors (thermistors) installed in each hood exhaust riser. One room temperature sensor is installed in the space to measure ambient air temperature.

Two methods to activate system:

**Manual activation:**

- Operator presses the fan button to engage the exhaust fan(s) and the exhaust fan(s) begin operation in low-CFM Prep Mode. Dedicated make-up air units (if applicable) for the hood remain off in Prep Mode.
- Operator turns on the cooking appliances. Once the exhaust air temperature reaches 10 degrees (F) above ambient temperature in the space, the exhaust system will ramp up to a preset minimum speed (low-volume cooking conditions). Makeup air fan will power on at this point (also at minimum speed).
- As the temperature of the exhaust air increases, the exhaust and make-up air fan speeds increase proportionally. The fans will modulate between preset low-speed and high-speed exhaust levels, dependent upon on the exhaust air temperature (cooking load).
- At any point, operator may engage the 100% override option on the touch screen and run the fans at full speed for a fixed period of time (adjustable). After this period, fan modulation based on temperature will resume.

**Automatic activation:**

- If the operator does not manually engage the exhaust system, the SC-EMS will automatically activate Prep Mode when the exhaust air temperature reaches 5 degrees above ambient temperature. When the air temperature of the hood color increases to 10 degrees above ambient, the exhaust and makeup air fans will ramp up to preset low speeds for low volume conditions.
- System will continue operating per steps 3 & 4 (above)

At the end of the day, after cooking operations have ceased, the system will enter its Cool Down mode (similar to Prep mode). Once the exhaust air temperature drops to less than five degrees above ambient, the fans will shut off.

**DEMAND CONTROL VENTILATION SYSTEM NOTE**

FAN(S) TO BE CONTROLLED BY A MODULATING ENERGY MANAGEMENT SYSTEM, PRE-WIRED VARIABLE FREQUENCY DRIVES (VFD) ARE INCLUDED IN THE MANUFACTURER'S CONTROL PACKAGE. FAN MOTORS MUST BE INVERTER-DUTY AND COMPATIBLE WITH A VARIABLE AIR VOLUME APPLICATION.

**NOTE TO ELECTRICAL CONTRACTOR**

CAPTIVE HOOD CONTROL PACKAGE IS FURNISHED BY KITCHEN EQUIPMENT CONTRACTOR AND SHOWN ON ELECTRICAL DRAWINGS FOR COORDINATION PURPOSES ONLY. ALL FIELD WIRING AND INTERLOCKS TO BE COMPLETED BY ELECTRICAL CONTRACTOR. CONTACT CAPTIVE AIR WITH QUESTIONS REGARDING SCOPE OF WORK: (800) 988-0881

**CUSTOMER APPROVAL TO MANUFACTURE:**

Approved as Noted   
 Approved with NO Exception Taken   
 Revises and Resubmits   
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

DRAWINGS ARE NOT TO SCALE AND ARE FOR REFERENCE ONLY. FOR ALL QUESTIONS CONCERNING HOODS AND /OR EQUIPMENT/FANS, CONTACT CAPTIVE AIR AT 1-800-988-0881

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CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037  
 SHEET TITLE: CAPTIVEAIRE DRAWINGS

SHEET NUMBER: M702

MECHANICAL SPECIFICATIONS

SECTION 15010 - BASIC MECHANICAL REQUIREMENTS

- 1. The work of each of the following sections includes furnishing and installing the material, equipment and systems complete as specified and/or indicated on the drawings. The installations, when finished, shall be complete and coordinated, ready for satisfactory service.
2. All work under this contract shall be done in strict accordance with all applicable municipal, state, county, NFPA, International and local codes that govern each particular trade.
3. The contractor shall make applications and pay all charges for all necessary permits, licenses and inspections as required under the above codes. Upon completion of the work, the customary certifications of approval shall be furnished. The contractor shall also coordinate and make all required submissions to the local utility companies as required.
4. No materials or equipment shall be used in the work until approved. Before submission of the shop drawings, and not more than thirty (30) days after award of the contract, the contractor shall submit for approval, a complete list of all materials and equipment which he intends to furnish, giving manufacturer and catalog numbers. A complete list of proposed sub-contractors shall also be submitted.
5. The contractor shall examine all drawings and specifications and shall visit the site and inspect the existing conditions in person. Certain areas may have been in-accessible at the time of the engineers survey and may only be visible during or after the demolition phase; therefore, those H.V.A.C. systems and coordination of those systems, shall become the responsibility of the contractors. Failure to comply with this requirement shall not relieve the contractors of their responsibilities for complying with the intent of the contract documents.
6. The drawings indicate the general arrangement of the mechanical installations. Details of proposed departures due to actual field conditions or other causes shall be submitted for approval prior to installation. Reworking of completed items due to improper field coordination shall be at the contractor's expense.
7. Provide sufficient access and clearance for all items of equipment requiring servicing and maintenance, such as valves, dampers, controls, drives, drains, vents, starters, switches, filters, traps and major items of equipment.
8. The contractor shall perform all necessary cutting and patching as required to complete the installation of the all mechanical work. Patching of walls, floors, ceilings, roof, etc. shall match the adjacent surfaces.
9. The contractor shall prepare three (3) copies of a record and information booklet. The booklet shall be bound in a three ring loose-leaf binder. Provide the following data in the booklet:
9.1. Catalog data on each piece of equipment furnished
9.2. Approved shop drawings on each piece of equipment furnished
9.3. Maintenance, operation and lubrication instruction on each piece of equipment furnished
9.4. Simplified temperature control diagrams of all H.V.A.C. systems
9.5. Manufacturer's and contractor's guarantees
9.6. Air balancing reports
9.7. Commissioning reports as required
9.8. Schedule/description of all service work/maintenance inspections required by the paragraphs of this section
10. All parts of the heating, ventilating, air conditioning and exhaust systems shall be adjusted, checked, balanced and tested by an independent A.A.B.C. or N.E.B.B. certified testing and balancing contractor approved by the owner. The contractor shall put all systems and equipment into full operation, and shall test and balance all devices to within ten (10) percent of capacities indicated on the drawings. Submit copies of the balancing reports to the architect. Permanently mark the position of each balancing damper.
11. Upon completion of the mechanical installations, the contractor shall provide a complete set of prints of the contract drawings which shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of as-built drawings.
12. All new installations, including all materials and labor shall be guaranteed for a period of one (1) year from date of owner acceptance. The above shall not in any way void or abrogate equipment manufacturer's guarantee or warranty. Certificates of guarantee shall be delivered to the owner.
13. Contractor shall also provide one (1) year free service to keep the equipment in operating condition. This service shall be provided and rendered upon request when notified of any equipment malfunction.
14. In addition to the first year warranty period, the contractor shall provide, at no additional cost to the owner, a minimum of four (4) service calls and maintenance inspections. A complete outline of the required maintenance and the proposed schedule shall be included in a "record and information booklet", for review and acceptance by the owner/representative and engineer. The inspections are to be performed at three (3) month intervals for a total of four (4) service calls and inspections during the first year warranty period plus the original system start-up commissioning. The service work and inspections shall include, but not be limited to the following:
14.1. Replace all H.V.A.C. air filters before occupancy
14.2. Lubricate all motor and fan bearings as required
14.3. Clean drain pans and drain lines
14.4. Check and tighten all electrical connections as required
14.5. Inspect all belts for adjustment and condition, replace as required
14.6. Check operating pressures and refrigerant charge
14.7. Inspect all controls for correct operation and calibrate as required
14.8. Perform all maintenance as outlined in the equipment manufacturers operation and maintenance manuals. Upon completion of each scheduled inspection, the contractor shall deliver to the building owner or owners representative, within (48) hours of completion, two(2) copies of the completed inspection report for record purposes.
15. The service contractor shall, at the ninth month, advise the owner of the termination date of the above services. This contractor shall also provide the owner with a detailed proposal, reflecting annual escalation, for the continuation of the services and inspections described above.

SECTION 15250 - MECHANICAL INSULATION

- 1. All rectangular supply, return, make-up air and outside air ductwork shall be insulated with fiberglass insulation. All insulation shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-development index of not more than 50 when tested in accordance with ASTM E84.
2. Ductwork shall be wrapped with nominal 2" thick glass fiber blanket insulation with "installed" thermal conductivity 'K' value of 0.25 at 75°F mean temperature and thermal resistance 'R' value of 6.0 at 1-1/2" compressed thickness. Owens Corning "SOFT" fiberglass type 100 with foil faced vapor barrier. Insulation shall be neatly installed and suitable for 40°F-250°F duct temperatures.
3. All exposed spiral supply air ductwork shall be Lindab, double wall with standard 1" inner wall fiberglass insulation and self-sealing/gasketed joints, or approved equal.
4. All internal duct lining shall be as specified under section 15880. All interior rectangular ductwork exposed within condition spaces may be provided with internal lining only, with no external duct wrap. Refer to drawings for additional notes. Internal lining shall not be used for ductwork system conveying wet/moist air (ie: shower rooms, dishwasher hoods, etc.).
5. Rectangular kitchen hood grease exhaust ductwork shall have (2) layers of 1.5" thick, zero (0") clearance, 2 hour fire wrap on all ductwork located within space and/or ceiling plenum, from hood connection to exhaust fan connection. Duct wrap shall be 3M FireBarrier 615 or approved equal installed with a 2-layer fire resistant wrap system. Fire wrap shall be installed in accordance with ASTM E 2336, International Mechanical Code, NFPA 96 and all local and state codes and shall pass the ICBO AC101 internal test. Install per manufacturer's recommendations.

SECTION 15500 - HEATING, VENTILATING & AIR CONDITIONING (HVAC)

- A. The work to be performed shall include all labor, materials and equipment necessary to furnish and install complete, all H.V.A.C. mechanical equipment as shown on drawings and/or hereinafter specified. It is the intent that the systems be installed complete with all items necessary to provide satisfactory service.
B. All existing H.V.A.C. units serving the project areas shall be fully serviced including but not limited to: check/charge refrigerant, check/replace belts, change filters, check/clean heating and cooling coils, lubricate, rebalance, etc. and verify proper operation to ensure maximum capacity.
C. All heating, ventilating and air conditioning equipment which contains compressors shall be provided with extended warranties covering the compressors for a minimum of four (4) years.
D. Packaged Rooftop Heating/Cooling Units:
All rooftop units shall be factory assembled, piped, internally wired and fully charged with R-410A refrigerant. Cooling and heating capacities shall be rated in accordance with AHRI standards and unit design shall be certified by the American Gas Association (AGA), specifically for outdoor applications using natural gas. All cooling units shall be Underwriters' Laboratory listed. All units shall be designed for outdoor rooftop level installation. Exterior surfaces of all units shall be phosphatized, zinc-coated steel with epoxy resin primer and baked enamel finish.

All casing panels shall be 20 gauge steel, gasketed and insulated with one (1) inch, one (1) pound density foil-faced glass fiber. Insulation shall be on the heat exchanger and evaporation section. Cabinet construction shall allow for all maintenance on one side of the unit.

Refrigeration cycle controls shall include condenser fan, evaporator fan and compressor contractor. Compressor shall be equipped with a combination internal winding thermostat/current overload. Internal high pressure relief shall also be provided. All units shall have direct drive, hermetic sealed compressors. Compressors shall be equipped with over temperature, over current and high pressure controls. Crank case heaters shall be standard on all models.

Evaporator coil shall be seamless copper tubing mechanically bonded to aluminum fins and shall be factory pressure and leak tested at 225 psig.

Both evaporator and condenser coil shall have drain pans. Evaporator pan shall be internally sealed and insulated. Threaded drain connection shall be provided in evaporator section with a drain opening in condensing section.

Condenser coil shall be seamless copper tubing mechanically bonded to aluminum fins. Each coil shall be factory pressure and leak tested at 425 psig.

Indoor air fan shall be belt/direct drive, forward curved, centrifugal type. Motor shall have thermal overload protection and permanently lubricated fan and motor bearings. Motor/blower assembly shall be isolated from unit with rubber mounts. Fans shall be capable of 2-speeds.

Condenser fan shall be direct-drive, statically and dynamically balanced, upflow propeller type. weatherproofed permanent split capacitor fan motor shall have built-in thermal overload and permanently lubricated sleeve bearings.

Gas-fired heating section shall be completely assembled, wired and piped. Design shall be certified by AGA, specifically for outdoor application.

Electronic ignition system shall light pilot each time the thermostat calls for heat. Flame sensor shall prove pilot flame and turn on main burners. Should a loss of pilot flame occur the main valve shall close and the spark shall reoccur within 0.8 seconds. When the thermostat is satisfied, both pilot and main burner shall be extinguished.

Forced combustion blower shall insure flame stability under varying wind conditions and shall provide higher combustion efficiency and location flexibility.

Heat exchanger shall be aluminized steel. Heat exchanger shall be factory tested for leaks, stress relieved and of free floating design. Heat exchanger shall be located upstream of the cooling coil for minimum condensation. Design shall be certified by AGA specifically for outdoor application. Burners shall be stamped and seam-welded with 20 gauge aluminized steel.

Units shall be as manufactured by Daikin, Trane, Carrier, York or approved equal.

Smoke detectors: Detectors shall be installed in the supply and return air ductwork for all system supplying equal or greater than 2,000 cfm of air and shall be U.L. 268A, NFPA 90A, NFPA 72 and FM approved and listed. They shall contain an photoelectric type detector and air sampling chamber with sampling tubes extending through the width of the air duct. Unit shall be System Sensor InnovairFlex series, photoelectric model D4120 (4 wire) or approved equal, with an ionization type detector and self-contained control unit.

Contractor shall provide and install a wall/ceiling mounted remote audible/visual alarm device with red trouble light and green power light, located in a public and visible location near the general area of the rooftop unit, which shall be System Sensor model APA151 or approved equal and compatible with smoke detector provided.

In areas where smoke detector maintenance and inspection is not easily accessible, contractor shall also provide a wall/ceiling mounted remote test/reset device (with key). Device shall be System Sensor model RTS151KEY or approved equal and compatible with smoke detector provided.

Coordinate installation of all detection devices with the controls contractor. Detectors connected to the building fire alarm system specified in Division 16-Electrical, shall be coordinated with the voltage and signal contact configuration.

SECTION 15880 - AIR DISTRIBUTION

- A. Furnish all labor and materials necessary to complete the sheet metal work associated with the heating, ventilating, air conditioning and exhaust systems, and other miscellaneous items shown and required.
B. All supply, return, outside air, make-up air and exhaust ductwork shall be constructed and installed in accordance with the sheet metal and air conditioning contractors national association (SMACNA) standards and ASHRAE standards.
C. All grease ductwork from kitchen hoods to exhaust fans shall be constructed of minimum 18 gauge stainless steel or 16 gauge carbon/ mild steel iron all welded construction with welded joints and installed in accordance with the local Health Department and NFPA codes. All horizontal ductwork less than 75' in length shall slope at minimum 1/4" per foot back towards hood. All horizontal ductwork longer than 75' in length shall slope at minimum 1" per foot. As an option, the contractor may use "Captive Aire" model DW-3Z or "Metal-Fab" model 3G, round, 20 gauge, double wall, stainless steel ductwork as approved by the local jurisdiction. Ductwork is ETL listed to UL-1978 and UL-2221 standards. Ductwork sections to be installed using manufacturer's clamp locking connections with 3M Fire Barrier 2000+ silicone to seal all joints. Ductwork provides "0" clearances to combustibles installation. Ductwork does not require welding.

As an option, the contractor may use "Captive Aire" model DW-3Z or "Metal-Fab" model 3G, round, 20 gauge, double wall, stainless steel ductwork as approved by the local jurisdiction. Ductwork is ETL listed to UL-1978 and UL-2221 standards. Ductwork sections to be installed using manufacturer's clamp locking connections with 3M Fire Barrier 2000+ silicone to seal all joints. Ductwork provides "0" clearances to combustibles installation. Ductwork does not require welding.

Access doors located in grease exhaust ductwork shall be minimum 12"x12" hinged access doors and located at all turns, a maximum of every 20' minimum for horizontal ducts, at each floor level for vertical ducts and as required by local/state codes. Cleanouts shall be located on side of duct or on top of ductwork where side installation is not possible. Where a 12"x12" opening is not possible on side or top, the cleanout shall be located on side or top which provides the largest opening. Cleanouts located on sides shall be a minimum of 1.5" from the bottom edge and a minimum of 1" from the top edge. Cleanouts located on tops shall be a minimum of 1" from each edge. All cleanouts shall be equipped with tight fitting gasketed doors which are operable without the use of a tool. Doors, frames, gaskets, etc. shall meet NFPA 96, be U.L. listed, grease tight and shall not penetrate the exhaust duct walls. Cleanouts shall be Flame Gard, Inc. or approved equal.

Flexible ductwork shall be Hart & Cooley type F216 or approved equal. Flexible duct shall comply with NFPA bulletin 90A and shall be U.L. Listed as class 1 air duct and connector, standard 181, with R-6 value insulation and microbial resistant. Maximum length of runout shall not exceed 6'-0".

Support horizontal ducts with hangers spaced not more than six (6) feet apart. Use strap hangers for ducts up to thirty (30) inches wide, angle hangers or rods for ducts over thirty (30) inches wide. Strap hangers to be one (1) inch wide, 20 gauge minimum; fasten to sides and bottom of duct with sheet metal screws.

Ducts shall be straight and smooth on the inside, with joints neatly finished. Ducts shall be suspended from the construction and shall be free from vibration. Curved elbows shall have a center radius equal to one and one-half (1-1/2) times the width of the duct. All square turns shall be vamed. Vanes consisting of curved metal blades shall permit the air to make abrupt turns without turbulence.

All joints, seams and connections in the heating, ventilating, and air conditioning and exhaust system ductwork shall be sealed air tight. Sealant shall be as manufactured by Hard Cast Inc. or approved equal and shall consist of a mineral impregnated woven fiber tape and an actuator adhesive. Sealant shall be SMANCA and U.L. approved, with a flame spread of 10 and a smoke developed of 0, non-toxic and non-flammable. Sealant shall be approved for operating temperatures from 0 degrees F. to 200 degrees F. Sealant system shall be installed in strict accordance with the manufacturer's recommendations and when applied shall provide a permanent seal without any deterioration.

All rectangular supply and return air ductwork within fifteen (15) feet of each air handling unit shall be lined on the interior for sound attenuation. Lining shall have a one (1) inch thickness and shall be glued with one hundred (100) percent coverage and additionally secured with pins. Increase duct sizes indicated two (2) inches direction to accommodate the interior lining. Dimensions shown on drawings are clear inside dimensions. Liner shall be a non-fibrous elastomeric thermal (and acoustical) material, closed cell, moisture resistant with anti-microbial agent. Material shall meet ASTM E84 25/50 fire rating (NFPA 90A & 90B), ASTM G 21 & 22, VOC guidelines, ASTM C 518, etc.. Lining shall be Nomaco K-Flex Gray, Evonikfoams Solcoustic or approved equal.

Exposed spiral supply air ductwork registers shall have all steel construction supply air registers with 3/4" spaced, double deflection louvers, internal volume damper and finished with #26 off-white enamel. Lindab model RGS-3 or approved equal.

Supply air diffusers located in kitchen areas near kitchen exhaust hoods shall have all steel construction with perforated face, 18"x18"neck with 6" tall supply plenum and finished with #26 off-white enamel. Air pattern shall be directed away from hood. Titus model PMC, Metal-Aire, Krueger or approved equal.

Return air grilles shall have all steel construction with 1/2" spaced louvers, 30 degree deflection and finished with #26 off-white enamel. Titus model 25R, Metal-Aire, Krueger or approved equal.

Ceiling mounted fans shall be as manufactured by Cook. Fans shall have acoustically insulated housings and shall have a maximum sound level rating of 6.0 sones. Air deliveries shall be as indicated on the drawings and all fans shall bear the AMCA certified ratings seal and the U.L. label. Integral backdraft damper shall be totally chatter proof with no metal contact. Fan shall have true centrifugal wheels with inlet perpendicular to, or remote from, inlet grille. Ceiling mounted exhaust fan grilles shall be of aerodynamic design of white molded plastic eggcrate shape and provide eighty-five (85) percent free open area. Terminal box shall be provided on the housing with cord, plug, and receptacle inside the housing. Entire fan, motor and wheel assembly shall be easily removable without disturbing the housing. Motor speeds shall not exceed 1600 rpm and all fan motors shall be suitably grounded and mounted on rubber-in-shear vibration isolators.

SECTION 15950 - CONTROLS

- A. The controls contractor under this heading shall furnish and install all wiring and equipment necessary for a complete operational system including: automatic temperature controls, ventilation systems, exhaust systems, economizer systems, etc. as indicated on the drawings. The system shall include all necessary thermostats, relays, switches, transformers, contactors, etc. required for successful operation of all equipment as described in the sequence operations. Electrical work in connection with all control systems shall be performed by the controls contractor and coordinated with the electrical contractor as needed to provide a full and complete package.
B. Each (rooftop) unit shall be controlled by a wall mounted Honeywell model T-7350 heating/cooling thermostat with a (7) day/(24) hour program clock capable of (2) occupied/ non-occupied periods, with (2) heating/(2) cooling setpoints, remote temperature sensor capability (up to 9) and auxiliary contact for Honeywell economizer controls. Thermostat assembly shall be compatible with the air handling unit's economizer and/or accessory package as specified under section 15500. Coordinate control requirements with the proposed equipment. Dual heating/ cooling thermostats shall have a minimum 5 degree deadband.



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CERTIFICATION

ISSUE: 06/01/22 PERMIT SET

PROJECT ID: 22-037

SHEET TITLE: SPECIFICATIONS

SHEET NUMBER: M801