

## MECHANICAL GENERAL NOTES

- ALL RECTANGULAR, ROUND AND FLEXIBLE DUCTS SHALL BE SIZED AS SHOWN ON THESE DRAWINGS. MINIMUM INTERNAL DIMENSIONS ARE GIVEN.
- ALL SUPPLY & RETURN AIR DUCTS ARE SIZED FOR AIR VOLUME AND STATIC PRESSURE DROP WITHOUT INTERIOR INSULATION.
- INSTALL TURNING VANES IN ALL 90° DUCT ELBOWS AND AT ALL DUCT "TEES".
- ALL DUCTWORK SHALL BE FABRICATED AND INSTALLED ACCORDING TO THE MOST RECENTLY PUBLISHED ASHRAE AND SMACNA STANDARDS.
- RECTANGULAR METAL DUCT SHALL BE MILD GALVANIZED STEEL UNLESS NOTED OTHERWISE OR APPROVED BY OWNER.
- MANUFACTURERS MINIMUM CLEARANCE RECOMMENDATIONS SHALL BE MAINTAINED ON ALL EQUIPMENT AND DUCTWORK.
- THE CONTRACTOR SHALL CAREFULLY COORDINATE THE LOCATION OF ALL DUCTS, GRILLES, DIFFUSERS, ETC. WITH THE CEILING GRIDS AND THE PLUMBING AND FRAMING CONTRACTORS.
- ALL CONTROL WIRING SHALL BE BY THE HVAC CONTRACTOR.
- EXHAUST FANS SHALL BE FURNISHED WITH BIRDSCREENS, BACKDRAFT DAMPERS AND DISCONNECTS WHERE APPLICABLE AND ACCORDING TO THE SCHEDULE.
- CONTRACTOR TO BALANCE SYSTEM PER SMACNA, NEBB, OR AABC STANDARDS.
- THE CONTRACTOR SHALL CAREFULLY COORDINATE ALL THERMOSTAT LOCATIONS WITH INTERIOR FINISHES. VERIFY LOCATIONS WITH INTERIOR ELEVATIONS.
- THE CONTRACTOR SHALL COOPERATE FULLY BETWEEN ALL OTHER TRADES.
- THE SUBMISSION OF A BID OR PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE CONTRACTOR HAS FAMILIARIZED HIMSELF WITH THE PLANS AND BUILDING SITE. CLAIMS MADE SUBSEQUENT TO THE PROPOSAL FOR MATERIALS AND/OR LABOR DUE TO DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED, UNLESS THESE DIFFICULTIES COULD NOT HAVE BEEN FORESEEN EVEN THOUGH PROPER EXAMINATION HAD BEEN MADE.
- THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ALL GAS PIPING AND CONDENSATE PIPING. REFER TO PLUMBING PLANS.
- ALL ROOF CURBS FOR FANS, ETC. SHALL BE A MINIMUM OF 12" HIGH.
- PROPERLY SECURE ALL FANS TO CURBS & DUCTWORK. PROVIDE NECESSARY GASKET ON CURBS TO PREVENT WATER RETENTION.
- ALL POWER WIRING SHALL BE BY THE ELECTRICAL CONTRACTOR.

## MECHANICAL LEGEND

NOTE: ALL SYMBOLS SHOWN MAY NOT APPEAR IN THESE DOCUMENTS.

	SUPPLY AIR DIFFUSER
	RETURN/EXHAUST AIR GRILLE
	SUPPLY AIR DUCT: UP, DOWN
	RETURN/EXHAUST AIR DUCT: UP, DOWN
	DUCTWORK TRANSITION: CONCENTRIC, ECCENTRIC
	BALANCING DAMPER
	FLEXIBLE DUCTWORK
	ELBOW WITH TURNING VANES
	THERMOSTAT
	MECHANICAL EQUIPMENT TAGS
	AIR DEVICE TAG
	AIR FLOW

## MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISH FLOOR	MAX	MAXIMUM
APFD	APPROVED	MBH	1,000 BTU PER HOUR
A/C	MECHANICAL	MECH	MECHANICAL
AG	ABOVE GRADE	MIN	MINIMUM
BLDG	BUILDING	M.C.	MECHANICAL CONTRACTOR
B/G	BELOW GRADE	NEC	NATIONAL ELECTRICAL CODE
BFF	BELOW FINISH FLOOR	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
BTU	BRITISH THERMAL UNIT	OA	OUTSIDE AIR
CFH	CUBIC FEET PER HOUR	OC	ON CENTER
CFM	CUBIC FEET PER MINUTE	O/H	OVERHEAD
CONN	CONDENSING UNIT	PLBG	PLUMBING
DEPT	DEPARTMENT	PSI	POUNDS PER SQUARE INCH
DN	DOWN	P.C.	PLUMBING CONTRACTOR
DWG	DRAWING	RA	RETURN AIR
EA	EXHAUST AIR	REQ'D	REQUIRED
E.C.	ELECTRICAL CONTRACTOR	RG	RETURN GRILLE
EDH	ELECTRIC DUCT HEATER	RH	RADIANT HEATER
EF	EXHAUST FAN	RL	REFRIGERANT LIQUID LINE
EG	EXHAUST GRILLE	RS	REFRIGERANT SUCTION LINE
ELEC	ELECTRICAL	RTU	ROOF TOP UNIT
EQPM	EQUIPMENT	SA	SUPPLY AIR
ETR	EXISTING TO REMAIN	SCH	SCHEDULE
EWH	ELECTRIC WATER HEATER	SD	SUPPLY DIFFUSER
FT	FEET	SF	SQUARE FEET
G.C.	GENERAL CONTRACTOR	SG	SUPPLY GRILLE
HR	HOUR	SQ	SQUARE
IECC	INTERNATIONAL ENERGY CONSERVATION CODE	TF	TRANSFER FAN
IMC	INTERNATIONAL MECHANICAL CODE	TYP	TYPICAL
IN	INCH	UNO	UNLESS NOTED OTHERWISE
KW	KILOWATT	U/G	UNDERGROUND
		V.I.F	VERIFY IN FIELD
		W/	WITH
		W.C.	WATER COLUMN

## KEYNOTES

- FLOOR MOUNT FURNACE PER MANUFACTURER'S RECOMMENDATIONS. CONCENTRIC VENT LINE FOR COMBUSTION AIR INTAKE / EXHAUST FROM GAS FIRED EQUIPMENT TO ROOF TERMINATION KIT. ROUTE PIPING WITH MINIMAL AMOUNT OF BENDS AND MINIMUM LENGTH AS REQUIRED BY RESPECTIVE UNIT MANUFACTURER'S REQUIREMENTS. LOCATE A MINIMUM OF 10'-0" AWAY FROM ANY FRESH AIR INTAKE. SEE PLUMBING PLANS FOR GAS AND CONDENSATE PIPING.
- INSTALL LINE-SET AND 4-CONDUCTOR CONTROL WIRING FROM ROOF-MOUNTED CONDENSING UNIT TO FURNACE. DOUBLE INSULATE AND PROTECT EXTERIOR LINE-SET USING 2" FOAM WRAP AND SCH.40 PVC CONDUIT TO ROOF PENETRATION. INSULATE BOTH LIQUID AND SUCTION LINES INSIDE BUILDING USING 1" FOAM WRAP. PROVIDE ADDITIONAL REFRIGERANT WHERE LENGTH OF LINE-SET EXCEEDS FACTORY CHARGE CAPACITY. MAKE FINAL CONNECTIONS. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SEALING ALL BUILDING PENETRATIONS FOR MECHANICAL EQUIPMENT WATERTIGHT. COORDINATE EXACT INSTALLATION LOCATION OF CONDENSING UNIT WITH ARCHITECTURAL SHEETS. COORDINATE WITH OTHER TRADES
- REFRIGERANT LINES. SIZE PER MANUFACTURERS RECOMMENDATIONS.
- 6" O.A. INTAKE UP TO GOOSENECK ON ROOF WITH BIRD/RODENT SCREEN, 100 CFM. ROUTE TO REAR ROOF SLOPE. REFER TO ARCHITECTURAL ROOF PLAN.
- BALANCING DAMPER, TYPICAL.
- EF-1 IN CEILING. PROVIDE FLEXIBLE CONNECTION AT FAN. FAN SHALL BE INTERLOCKED WITH RESTROOM LIGHTS. INTERLOCK BY E.C.
- EXTEND 8" EXHAUST AIR DUCT UP THROUGH ROOF TO VENT CAP.
- 18"x14" UP TO ROOFTOP INTAKE VENTILATOR GREENHECK MODEL GRSI-16 OR EQUAL. INTAKE @ 1515 CFM W/ 18"x14" DUCT TRANSITION TO FRESH AIR DUCT CONNECTION. PROVIDE FLEXIBLE CONNECTION TO FAN. PROVIDE TURNING VANES AT ELBOWS.
- TRANSFER AIR FAN TF-1, HANG FROM STRUCTURE ABOVE WITH UNISTRUT, THREADED RODS AND VIBRATION ISOLATION PROTECTION. PROVIDE FLEXIBLE CONNECTORS. TF-1 SHALL BE INTERLOCKED WITH EF-2. SEE ELECTRICAL DRAWING E-2.1 FOR CONTROL DIAGRAM AND SEQUENCE OF OPERATIONS. INTERLOCK BY E.C.
- 18"x14" SUPPLY AIR DUCT DOWN THROUGH CHASE TO LOWER LEVEL BELOW.
- EXTEND 18"x14" SUPPLY DUCT FROM FLOOR ABOVE.
- SG-2 TO BE INSTALLED TIGHT TO UNDERSIDE OF SLAB ABOVE.
- 16"x16" UP TO ROOFTOP EXHAUST VENTILATOR. VENTILATOR SHALL BE GREENHECK MODEL #GRSR-16 OR EQUAL. MAINTAIN 10'-0" MIN TO OUTSIDE AIR INTAKE. PROVIDE AND INSTALL GRAVITY BACKDRAFT DAMPER.
- INLINE FAN MOUNTED IN TRUSS SPACE PER MANUFACTURERS INSTRUCTIONS. PROVIDE FLEXIBLE AT CONNECTIONS.
- UPPER LEVEL EXHAUST FAN. EF-3, SHALL BE INTERLOCKED WITH LOWER LEVEL EXHAUST FAN, EF-2, TO RUN DURING OCCUPIED HOURS. SEE ELECTRICAL DRAWING E-2.1 FOR CONTROL DIAGRAM AND SEQUENCE OF OPERATIONS. INTERLOCK BY E.C.
- TERMINATE EXHAUST DUCTWORK WITH 16"x16" RETURN GRILLE IN CEILING.
- EF-2 FAN MOTOR SHALL BE INTERLOCKED WITH PIT LIGHTING SWITCH. SEE ELECTRICAL DRAWING E-2.1 FOR CONTROL DIAGRAM AND SEQUENCE OF OPERATIONS. INTERLOCK BY E.C.
- COORDINATE FINAL LOCATION AND SIZE OF DIFFUSER WITH STRUCTURAL DRAWINGS AND FRAMING.
- 20"x12" EXHAUST DUCT UP IN CHASE FROM LOWER LEVEL BELOW.
- PROVIDE AIR FLOW SWITCH IN PIT EXHAUST DUCTWORK IN ACCESSIBLE LOCATION. SEE ELECTRICAL DRAWING E-2.1 FOR CONTROL DIAGRAM AND SEQUENCE OF OPERATIONS. AIR SWITCH TO BE CLEVELAND CONTROLS MODEL #AFS-222 OR EQUAL.
- 20"x12" EXHAUST DUCT UP IN CHASE TO UPPER LEVEL.
- THERMOSTAT WIRING IN 1/2" CONDUIT. CONDUIT BY E.C. ALL T-STATS TO BE LOW VOLTAGE PROGRAMMABLE STATS MOUNTED AT 48" AFF, TYPICAL.
- PROVIDE 4" COMBUSTION AIR INTAKE DUCT TO AN ALUMINUM GRILLE IN SOFFIT WITH ALUMINUM INSECT SCREEN. GRILLE SHALL HAVE A FREE AREA OF 72 SQ. IN., SEAL AROUND GRILLE. COORDINATE WITH SOFFIT CONSTRUCTION.
- COMBUSTION AIR INTAKE DUCT TO RISE THROUGH CEILING AND RUN IN ATTIC SPACE TO INTAKE GRILLE IN SOFFIT. SEE DETAIL 5M-2.1.
- SEE PLUMBING SHEETS FOR GAS CONNECTION BY P.C.
- RADIANT HEATER. MOUNT TO ROOF STRUCTURE 12'-2". INSURE PROPER CLEARANCE FROM GARAGE DOORS AND COMBUSTIBLE MATERIALS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. RH-3 SHALL BE TILTED TOWARDS THE PIT OPENING PER DETAIL 7M-2.1. RH-1 AND RH-2 SHALL BE LEVEL.
- 4" TYPE "B" FLUE UP THROUGH ROOF WITH WEATHERCAP. ROUTE TO REAR ROOF SLOPE, REFER TO ARCHITECTURAL ROOF PLAN. SEE DETAIL 5M-2.1.
- TERMINATE EXHAUST DUCTWORK WITH WALL MOUNTED 20"x20" EXHAUST GRILLE LOCATED WITHIN 12" AFF.
- ROUTE EXHAUST DUCT UP THEN ROUTE HORIZONTAL ABOVE SERVICE BAY CEILING.
- PROVIDE ONE THERMOSTAT TO CONTROL RH-1, RH-2, AND RH-3.
- SURFACE MOUNT CEILING HEATER TIGHT TO UNDERSIDE OF SLAB PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. COORDINATE FINAL LOCATION IN FIELD WITH ALL TRADES. PROVIDE MINIMUM 48" CLEAR BELOW HEATER DISCHARGE. PROVIDE ONE THERMOSTAT TO CONTROL ECH-1 & ECH-2.

## LOWER LEVEL EXHAUST CALCULATIONS

CALCULATIONS TO COMPLY WITH NEC 511-3b FOR (6) AIR CHANGES PER HOUR.

$$1665 \text{ SF} \times 7.88' \times 6 = 1315 \text{ CFM REQUIRED}$$

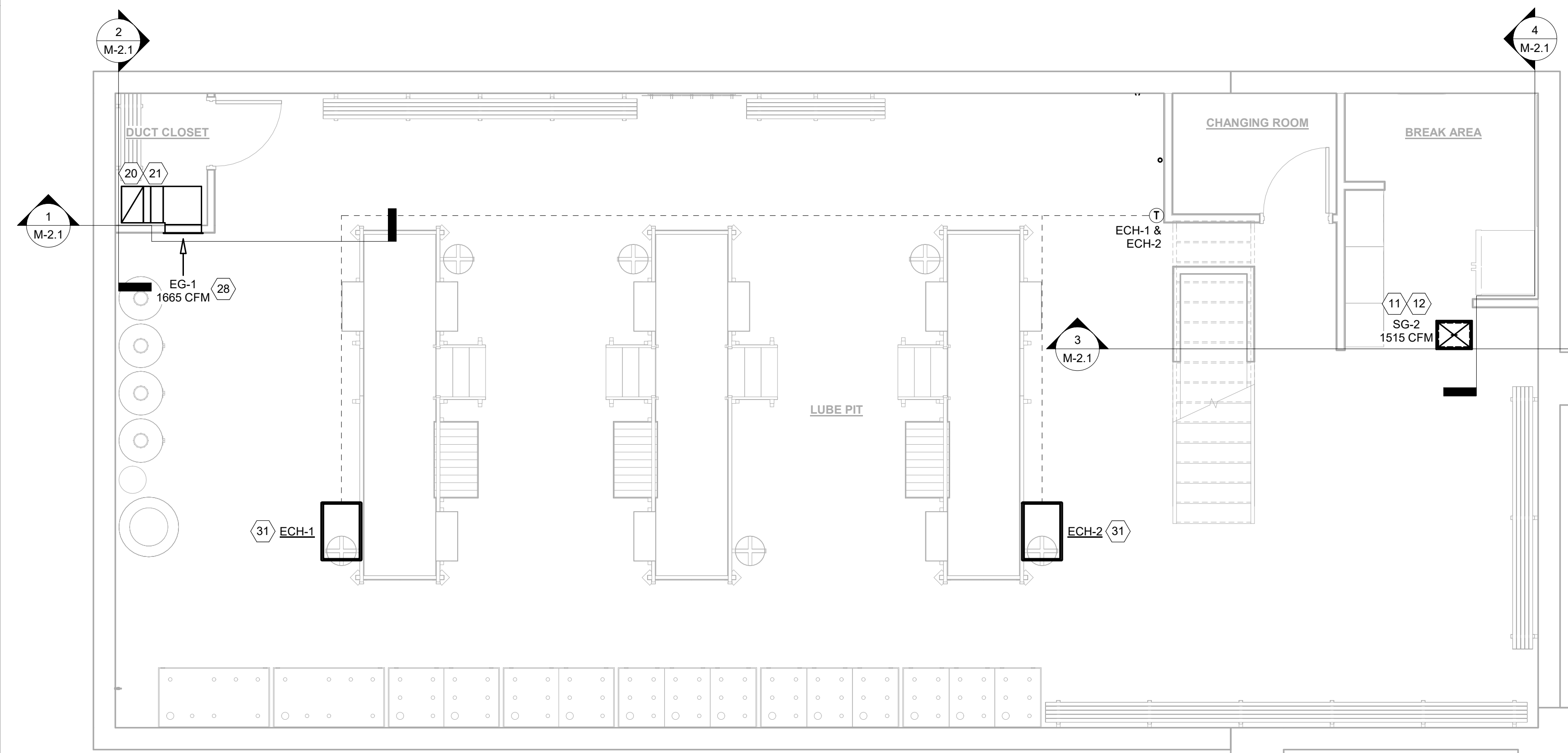
$$\text{MORE STRINGENT NFPA 30A FOR 1 CFM/SF.}$$

$$1665 \text{ SF} \times 1 = 1665 \text{ CFM REQUIRED. USE 1665 CFM.}$$

## UPPER LEVEL EXHAUST CALCULATIONS

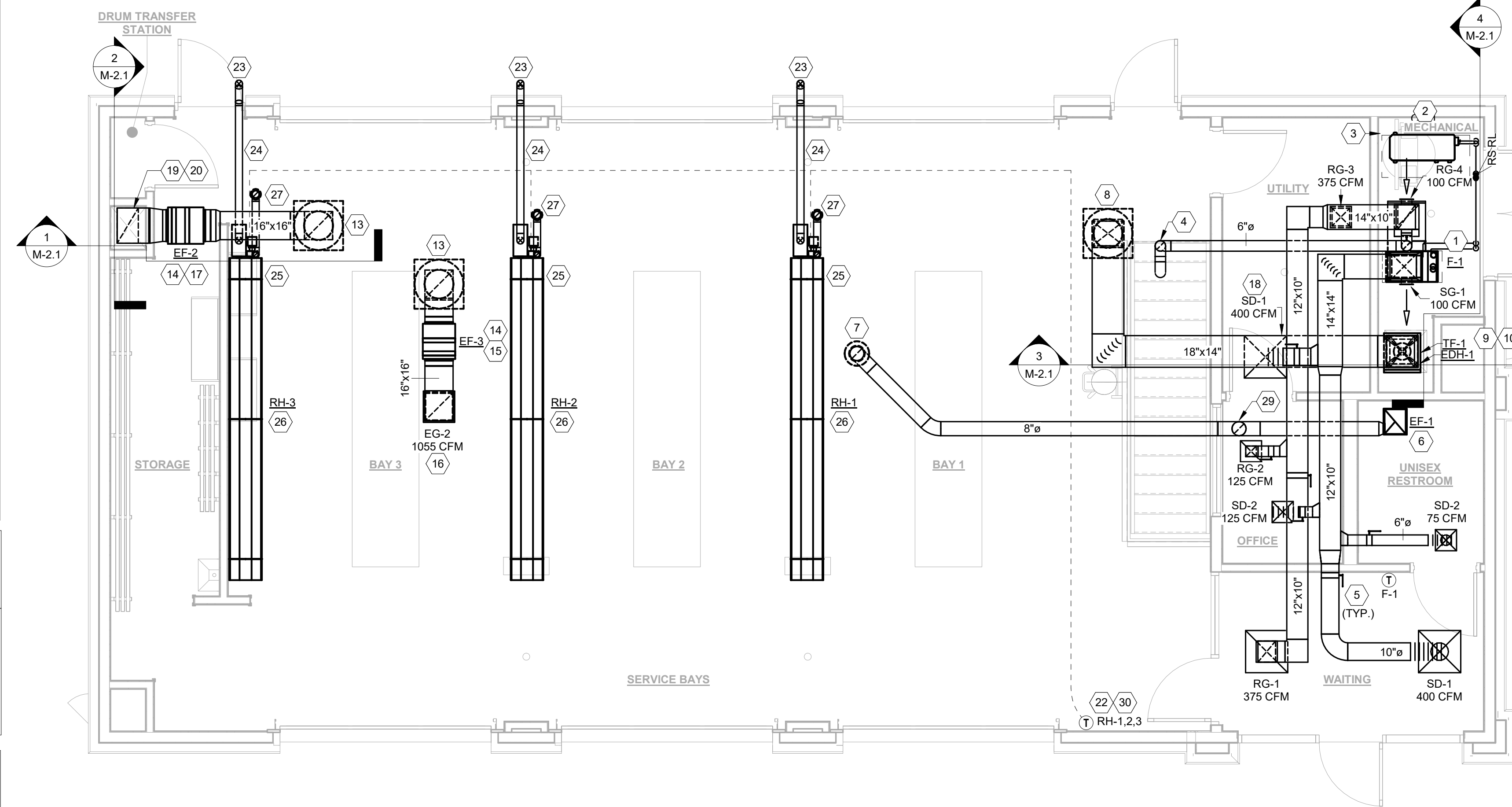
CALCULATIONS TO COMPLY WITH IMC SECTION 403.3 FOR REPAIR GARAGES 0.75 CFM/SF

$$1407 \text{ SF} \times 0.75 \text{ CFM/SF} = 1055 \text{ CFM REQUIRED}$$



## 2 LOWER LEVEL MECHANICAL PLAN

M-1.1 Scale: 1/4" = 1'-0"



## 1 UPPER LEVEL MECHANICAL PLAN

M-1.1 Scale: 1/4" = 1'-0"



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DATE	ISSUE
2023.03.02	OWNER REVIEW SET
2023.03.16	PERMIT SET

PROFESSIONAL SEAL



PROFESSIONAL LICENSE NO.:

CERTIFICATE OF AUTHORIZATION NO.:

PROFESSIONAL IN CHARGE

WHS

PROJECT MANAGER

IMB

QUALITY CONTROL

WHS

DRAWN BY

IMB

PROJECT NAME



**VALVOLINE INSTANT OIL CHANGE**

BELLEVUE, WI 54311

PROJECT NUMBER  
761265-01

SHEET NAME  
**MECHANICAL PLANS**

SHEET #

**M-1.1**

## SPLIT SYSTEM SCHEDULE

**NOTES:**

1. CRANKCASE HEATER
2. CYCLE PROTECTOR
3. R-410A REFRIGERANT
4. RETURN AIR FILTERS
5. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN DUCTS.
6. CONCENTRIC VENT KIT
7. 7-DAY PROGRAMMABLE THERMOSTAT
8. 5-YEAR COMPRESSOR WARRANTY
9. DRAIN PAN
10. 14 SEER
11. CU PAD

TAG	MANUFACTURER	MODEL	NOMINAL TONNAGE	SUPPLY AIR	OUTSIDE AIR	ESP	HP	ELECTRICAL				COOLING CAPACITY		HEATING CAPACITY		WEIGHT	NOTES
								VOLTAGE	MCA	MOCF	PHASE	TOTAL MBH	SENSIBLE MBH	INPUT MBH	OUTPUT MBH		
CU-1	CARRIER	24AHA436A0050	3	1100 CFM	150 CFM	0.50 in-wg	--	208 V	12.5	20	3	27.4	21.0	--	--	184 LBS	1,2,3,8,10,11
F-1	CARRIER	59SC5B060E17-14	3	1100 CFM	150 CFM	0.50 in-wg	1/2	120 V	7.0	15	1	27.4	21.0	60	58	142 LBS	3,4,5,6,7,9,10

## FAN SCHEDULE

**NOTES:**

1. BACKDRAFT DAMPER
2. FAN SPEED CONTROLLER
3. TIME DELAY SWITCH
3. TERMINATE WITH ROOF CAP
5. RC-75 SET (4) - ISOLATORS
6. EC MOTOR
7. INLET & OUTLET FLEXIBLE CONNECTIONS
8. FLOOR SPRING ISOLATION

TAG	MANUFACTURER	MODEL	AREA SERVED	LOCATION	CFM	ESP	FAN TYPE	DRIVE TYPE	SONES	RPM	HP	ELECTRICAL		WEIGHT	NOTES
												VOLTAGE	PHASE		
EF-1	COOK	GEMINI GC-148	TOILET ROOM	CEILING MOUNTED	100 CFM	0.38 in-wg	CABINET	DIRECT	2.0	970	FRACT.	120 V	1	21	1,2,3,4,5
EF-2	COOK	135SQN17D(VF)	BUILDING EXHAUST	CEILING MOUNTED	1665 CFM	0.50 in-wg	INLINE CENT.	DIRECT	12.0	1436	1/2	120 V	1	105	2,6,7,8
EF-3	COOK	120SQN17D(VF)	BUILDING EXHAUST	CEILING MOUNTED	1055 CFM	0.50 in-wg	INLINE CENT.	DIRECT	8.8	1376	1/2	120 V	1	86	2,6,7,8
TF-1	COOK	135SQN17D(VF)	PIT LEVEL	CEILING MOUNTED	1515 CFM	0.50 in-wg	INLINE CENT.	DIRECT	10.4	1344	1/2	120 V	1	105	2,6,7,8

## FAN SCHEDULE (OPTIONAL ALTERNATE)

**NOTES:**

1. BACKDRAFT DAMPER
2. FAN SPEED CONTROLLER
3. TIME DELAY SWITCH
4. TERMINATE WITH ROOF CAP
5. RC-75 SET (4) ISOLATORS
6. EC MOTOR
7. INLET & OUTLET FLEXIBLE CONNECTIONS
8. FLOOR SPRING ISOLATION

TAG	MANUFACTURER	MODEL	AREA SERVED	LOCATION	CFM	ESP	FAN TYPE	DRIVE TYPE	SONES	RPM	HP	ELECTRICAL		WEIGHT	NOTES
												VOLTAGE	PHASE		
EF-1	GREENHECK	SP-B150	TOILET ROOM	CEILING MOUNTED	100	0.38	CABINET	DIRECT	1.5	753	FRACT.	115 V	1	15	1,2,3,4,5
EF-2	GREENHECK	SQ-120-VG	BUILDING EXHAUST	CEILING MOUNTED	1665	0.5	INLINE CENT.	DIRECT	13.2	1725	1/2	115 V	1	72	2,6,7,8
EF-3	GREENHECK	SQ-99-VG	BUILDING EXHAUST	CEILING MOUNTED	1065	0.5	INLINE CENT.	DIRECT	19.8	2065	3/4	115 V	1	68	2,6,7,8
TF-1	GREENHECK	SQ-120-VG	PIT LEVEL	CEILING MOUNTED	1515	0.5	INLINE CENT.	DIRECT	11.5	1725	1/2	115 V	1	72	2,6,7,8

## AIR DEVICE SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	MOUNTING	FACE SIZE	NECK SIZE	THROW
EG-1	TITUS	55FL	EXHAUST GRILLE	SURFACE	22"x22"	20"x20"	ADJUSTABLE
EG-2	TITUS	55FL	EXHAUST GRILLE	SURFACE	18"x18"	16"x16"	ADJUSTABLE
RG-1	TITUS	50F	EGGRATE RETURN GRILLE	SURFACE	24"x24"	12"x12"	N/A
RG-2	TITUS	50F	EGGRATE RETURN GRILLE	SURFACE	12"x12"	6"x6"	N/A
RG-3	TITUS	50F	EGGRATE RETURN GRILLE	SURFACE	12"x12"	10"x10"	N/A
RG-4	TITUS	350FL	DUCT MOUNTED RETURN GRILLE	DUCT	7.75"x7.75"	6"x6"	N/A
SD-1	TITUS	OMNI-AA	ARCHITECTURAL CEILING DIFFUSER - SUPPLY	SURFACE	24"x24"	10"	4-WAY
SD-2	TITUS	OMNI-AA	ARCHITECTURAL CEILING DIFFUSER - SUPPLY	SURFACE	12"x12"	6"	4-WAY
SG-1	TITUS	300FL	DUCT MOUNTED SUPPLY GRILLE	DUCT	7.75"x7.75"	6"x6"	ADJUSTABLE
SG-2	TITUS	272FL	DUCT MOUNTED SUPPLY GRILLE	DUCT	19.75"x15.75"	18"x14"	ADJUSTABLE

## GAS FIRED RADIANT HEATER SCHEDULE

TAG	MANUFACTURER	MODEL	AREA SERVED	MOUNTING	MBH INPUT	AIR SUPPLY SIZE	FLUE SIZE	ELECTRICAL		
								VOLTAGE	PHASE	FLA
RH-1	SPACE-RAY	LTU 75-30-N5 (30')	SERVICE BAY	CEILING HUNG	75	4"Ø	4"Ø	120 V	1	2.6
RH-2	SPACE-RAY	LTU 75-30-N5 (30')	SERVICE BAY	CEILING HUNG	75	4"Ø	4"Ø	120 V	1	2.6
RH-3	SPACE-RAY	LTU 75-30-N5 (30')	SERVICE BAY	CEILING HUNG	75	4"Ø	4"Ø	120 V	1	2.6

## ELECTRIC DUCT HEATER SCHEDULE

**NOTES:**

1. THERMOSTAT
2. CONTROL OPTION G

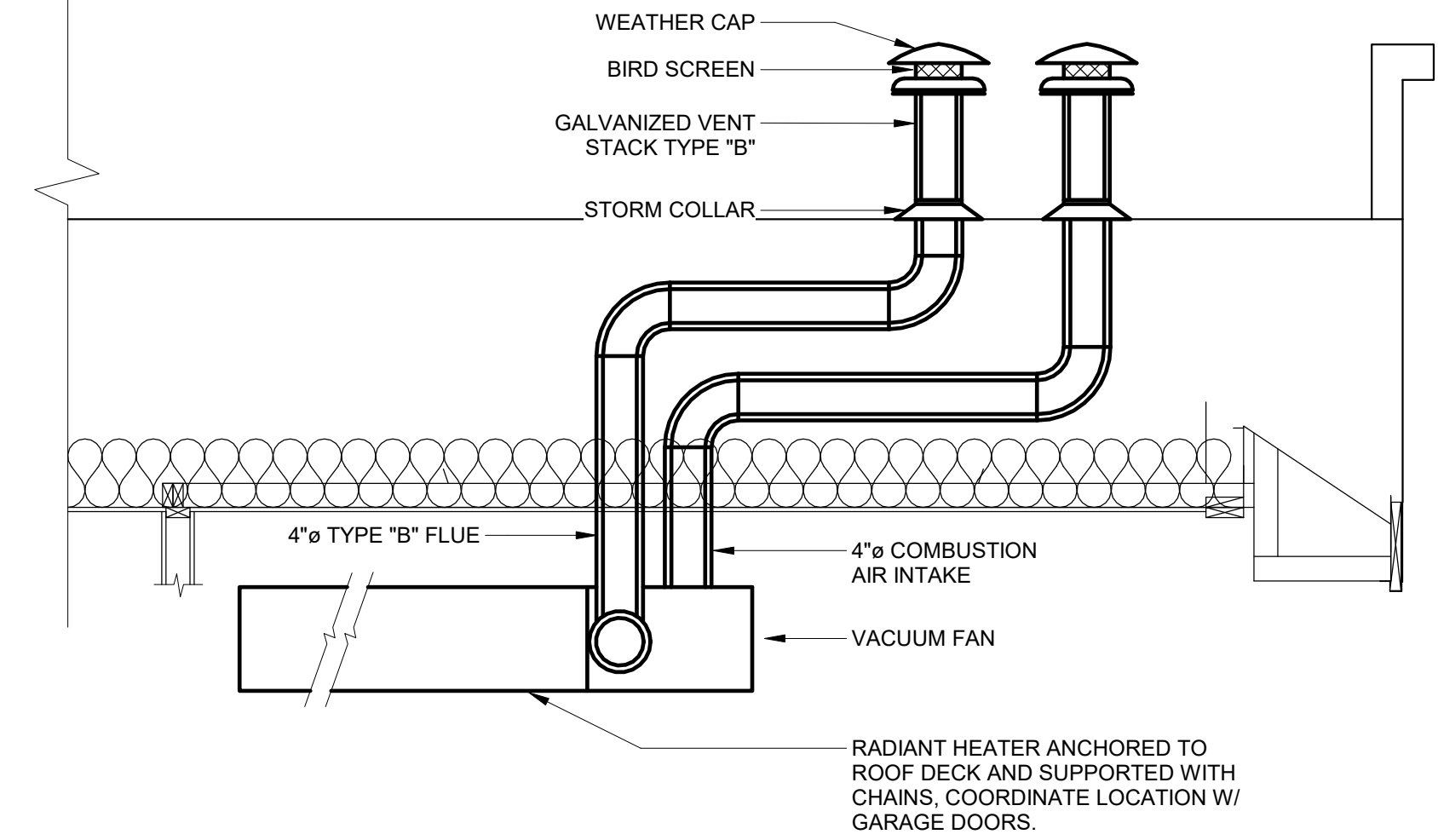
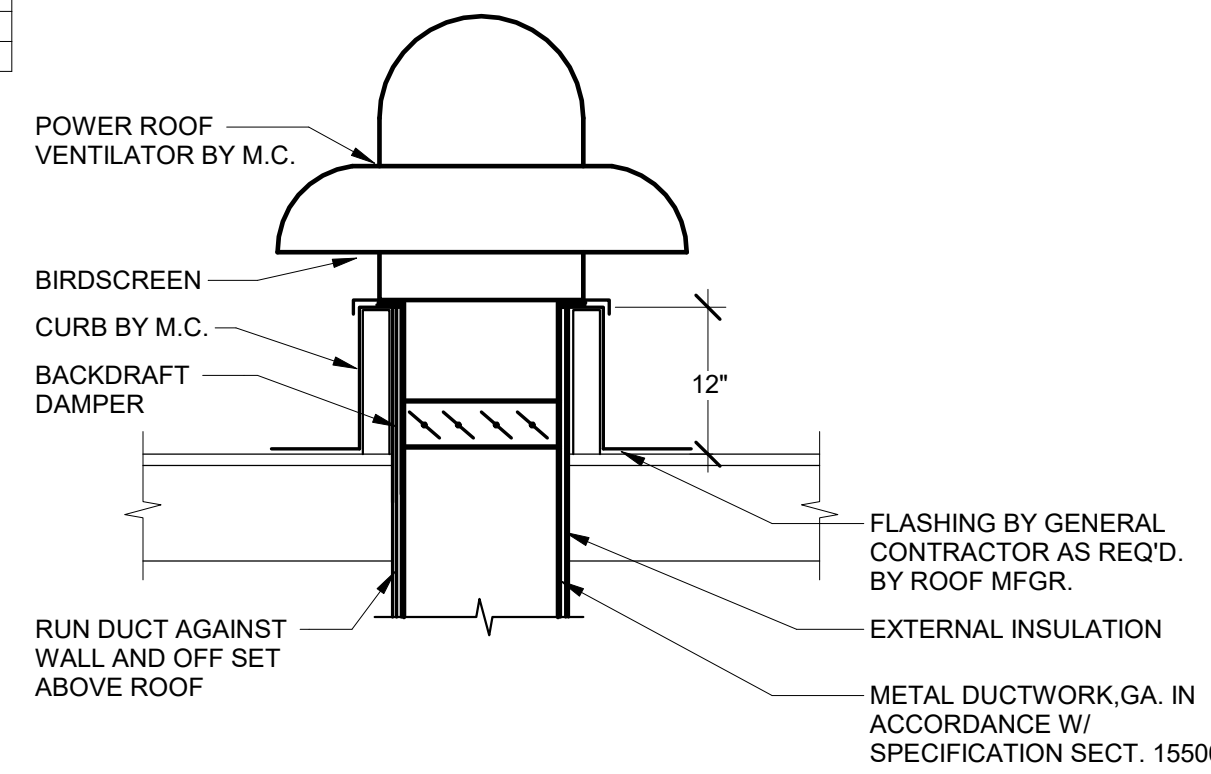
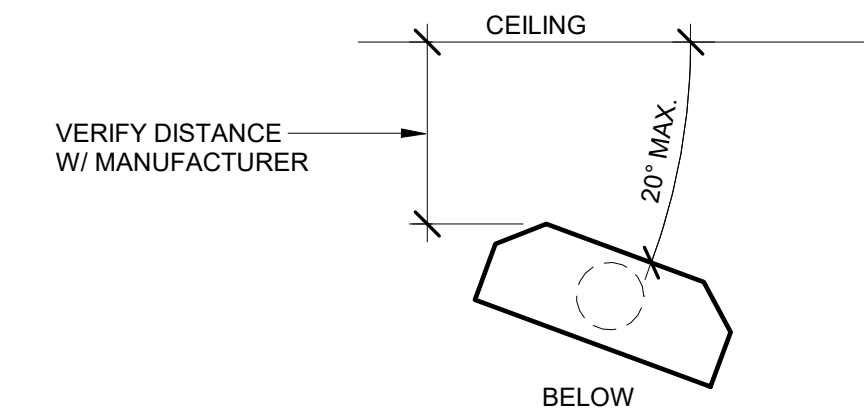
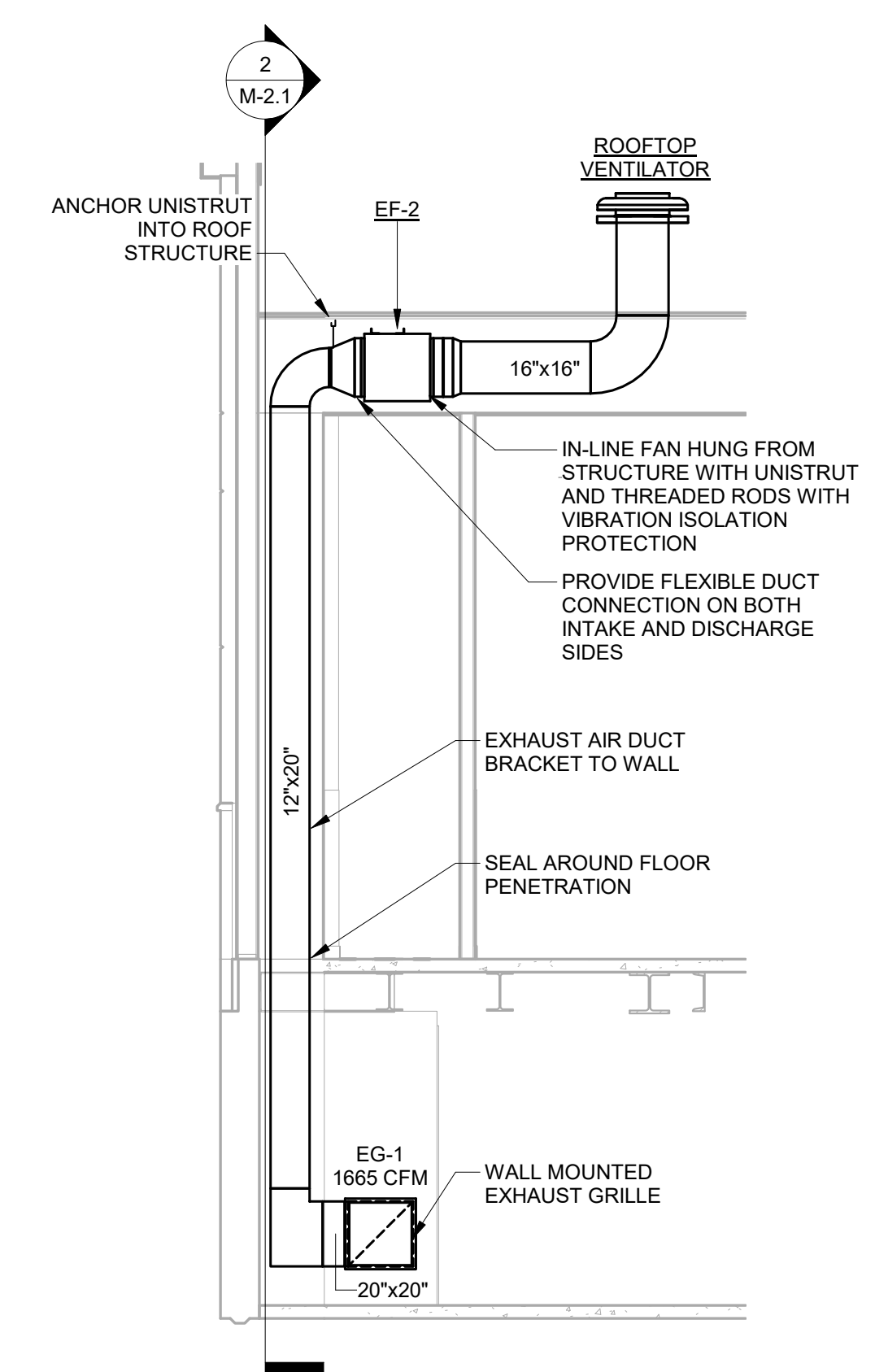
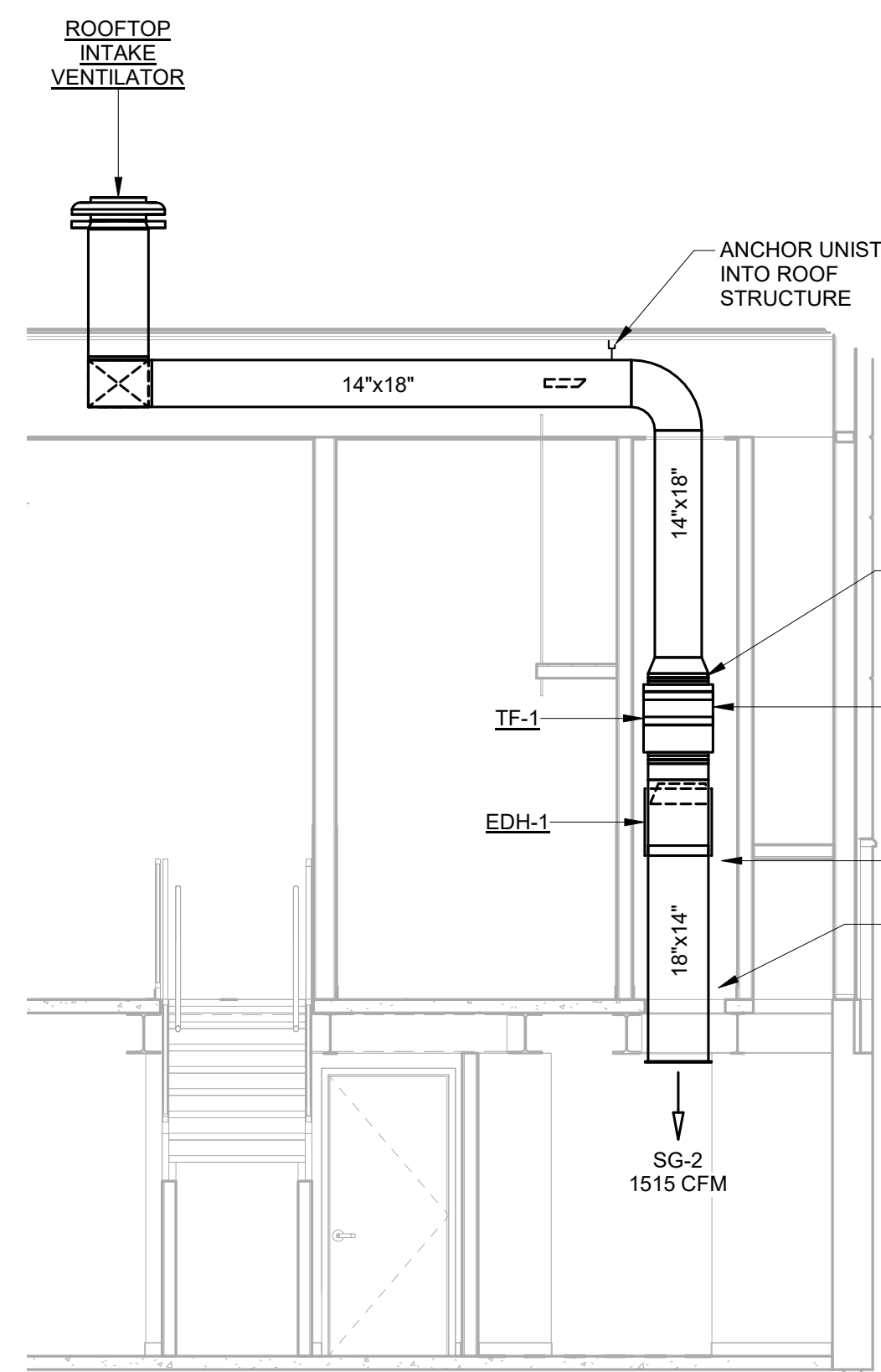
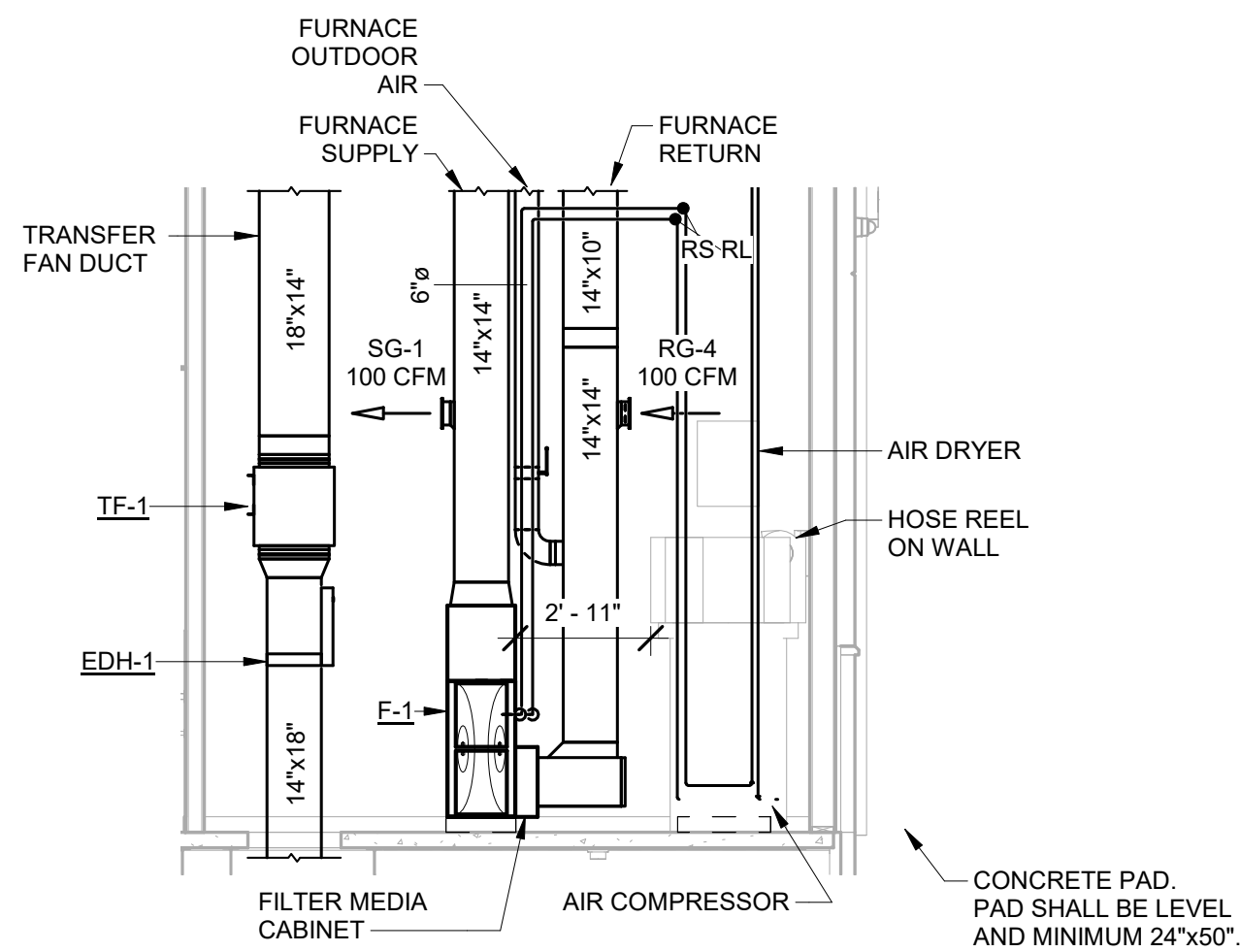
TAG	MANUFACTURER	MODEL	AREA SERVED	DUCT SIZE	KW	VOLTAGE	PHASE	STAGES	NOTES
EDH-1	INDEECO	QUA	PIT	18"x14"	30	208 V	3	2	1 & 2

## ELECTRIC CEILING HEATER SCHEDULE

**NOTES:**

1. REMOTE THERMOSTAT
2. ALUMINUM FRONT GRILLE
3. SURFACE MOUNTING BOX FOR ALUMINUM FRONT GRILLE
4. DISCONNECT

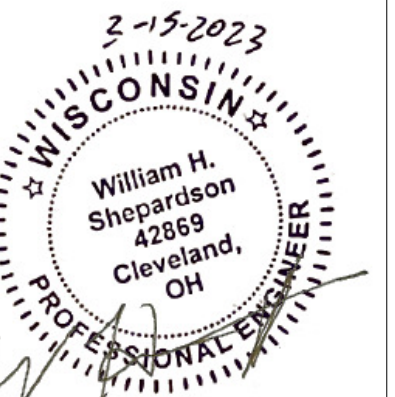
TAG	MANUFACTURER	MODEL	AREA SERVED	KW	AMPS	VOLTAGE	PHASE	WEIGHT	NOTES
ECH-1	INDEECO	CCI	PIT LEVEL	4.5	22	208 V	1	40 LBS	ALL
ECH-2	INDEECO	CCI	PIT LEVEL	4.5	22	208 V	1	40 LBS	ALL



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PROFESSIONAL SEAL



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PROFESSIONAL IN CHARGE

PROJECT MANAGER

QUALITY CONTROL

DRAWN BY

PROJECT NAME



**VALVOLINE INSTANT OIL CHANGE**

BELLEVUE, WI 54311

PROJECT NUMBER

SHEET NAME

**MECHANICAL DETAILS**

SHEET #

**M-2.1**