RTU SEQUENCE OF OPERATION:

SINGLE ZONE VAV OPERATION

- SINGLE ZONE VAV IS AN APPLICATION WHERE THE SUPPLY FAN VFD IS MODULATED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT WHILE HEATING AND COOLING ARE MODULATED TO MAINTAIN THE SUPPLY AIR SETPOINT.
- VAV COOLING AND VAV HEATING REQUIRE MODULATING COOLING AND HEATING SOURCES IN ORDER TO MAINTAIN A CONSTANT SUPPLY AIR TEMPERATURE NO MATTER WHAT THE FAN SPEED IS.
- IN THE COOLING MODE, THE MODULATING COOLING SOURCE WILL MODULATE TO MAINTAIN THE COOLING SUPPLY AIR SETPOINT. THE SUPPLY FAN VFD WILL BEGIN OPERATION AT THE MINIMUM VFD COOLING SPEED (ADJ.) AND MODULATE BETWEEN THIS SETPOINT AND 100% AS NEEDED TO MAINTAIN THE SPACE TEMPERATURE WITHIN THE SPACE COOLING RESET WINDOW CREATED BY CONFIGURING A SPACE COOLING HIGH AND A SPACE COOLING LOW RESET SOURCE SETPOINT.
- IN THE HEATING MODE THE MODULATING HEATING SOURCE WILL MODULATE TO MAINTAIN THE HEATING SUPPLY AIR SETPOINT. THE SUPPLY FAN VFD WILL BEGIN OPERATION AS THE MINIMUM VFD HEATING SPEED (ADJ.) AND MODULATE BETWEEN THIS SETPOINT AND THE MAXIMUM VFD HEATING SPEED (ADJ.) AS NEEDED TO MAINTAIN THE SPACE TEMPERATURE WITHIN THE SPACE HEATING HIGH AND A SPACE HEATING LOW RESET SOURCE SETPOINT.

COOLING MODE

- COOLING IS ENABLED WHEN THE SPACE TEMPERATURE RISES ONE DEADBAND ABOVE THE COOLING SETPOINT. COOLING IS DISABLED WHEN THE SPACE TEMPERATURE FALLS ONE DEADBAND BELOW THE COOLING SETPOINT. THE SETPOINT AND DEADBAND ARE USER ADJUSTABLE.
- IN THE COOLING MODE, AS THE SUPPLY AIR TEMPERATURE (SAT) RISES ABOVE THE SUPPLY AIR COOLING SETPOINT, THE COMPRESSORS WILL MODULATE AND STAGE BASED ON THE UNIT CONFIGURATION IN ORDER TO CONTROL TO THE SUPPLY AIR COOLING SETPOINT.
- EACH STAGE MUST MEET ITS MINIMUM OFF TIME (ADJ.) BEFORE IT IS ALLOWED TO ENERGIZE AND SUCCESSIVE STAGES CAN ENERGIZE IF THE SAT RISES ABOVE THE ACTIVE SUPPLY AIR COOLING SETPOINT FOR THE COOLING STAGE UP DELAY PERIOD (ADJ).
- FOR COMPRESSORS TO STAGE DOWN MINIMUM RUN TIMES (ADJ.) MUST BE SATISFIED, AND THE SAT NEEDS TO BE BELOW THE ACTIVE SUPPLY AIR COOLING SETPOINT MINUS THE COOLING STAGE CONTROL FOR A PERIOD OF TIME EQUAL TO THE STAGE DOWN DELAY.
- MECHANICAL COOLING IS DISABLED IF THE OUTDOOR AIR TEMPERATURE (OAT) FALLS 1° BELOW THE COOLING LOCKOUT SETPOINT AND WILL REMAIN DISABLED UNTIL THE OAT RISES 1° ABOVE THE COOLING LOCKOUT SETPOINT. IF THE OAT DISABLES MECHANICAL COOLING WHILE IT IS CURRENTLY OPERATING, MECHANICAL COOLING WILL STAGE OFF AS MINIMUM RUN TIMES AND STAGE DOWN DELAYS ARE SATISFIED.
- IF THE ECONOMIZER IS ENABLED IT WILL FUNCTION AS THE FIRST STAGE OF COOLING (SEE ECONOMIZER SECTION).

HEATING MODE

- FOR SINGLE ZONE VAV HEATING, THE HEATING OPTIONS ARE MODULATING GAS USING THE MODGAS-X CONTROLLER, MODULATING HOT WATER AND SCR ELECTRIC.
- HEATING IS ENABLED WHEN THE SPACE TEMPERATURE FALLS ONE DEADBAND BELOW THE HEATING SETPOINT. HEATING IS DISABLED WHEN THE SPACE TEMPERATURE RISES ONE DEADBAND ABOVE THE HEATING SETPOINT.
- IN THE HEATING MODE, AS THE SUPPLY AIR TEMPERATURE FALLS BELOW THE SUPPLY AIR HEATING SETPOINT, THE HEATING WILL BEGIN TO MODULATE.
- MECHANICAL HEATING IS DISABLED IF THE OUTDOOR AIR TEMPERATURE (OAT) RISES 1° ABOVE THE HEATING LOCKOUT SETPOINT AND WILL REMAIN DISABLED UNTIL THE OAT FALLS 1° BELOW THE HEATING LOCKOUT SETPOINT. IF THE OAT DISABLES MECHANICAL HEATING WHILE IT IS CURRENTLY OPERATING, MECHANICAL HEATING WILL STAGE OFF AS MINIMUM RUN TIMES AND STAGE DOWN DELAYS ARE SATISFIED.

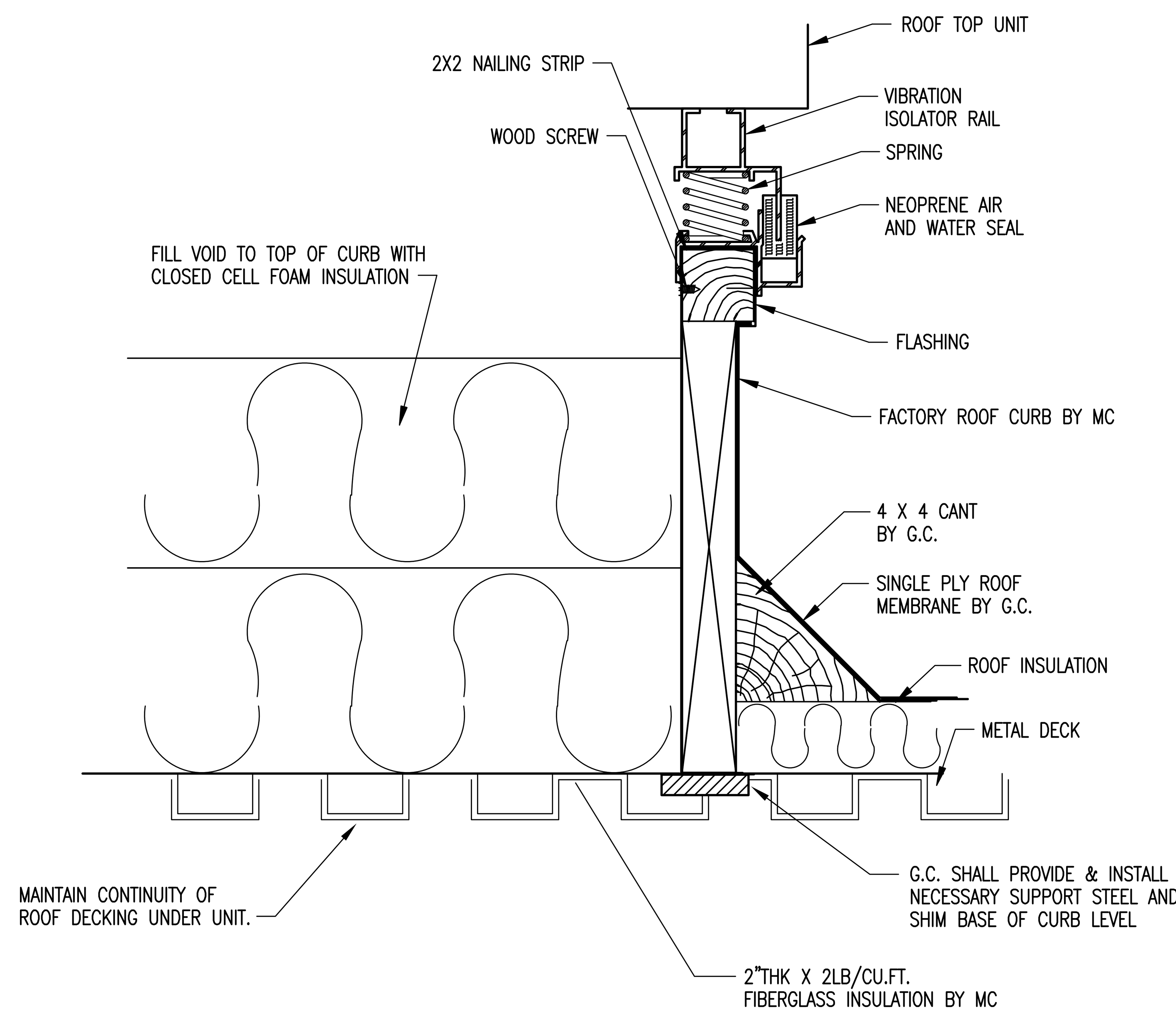
ROOF TOP UNIT SCHEDULE

MARK	AAON MODEL	EVAPORATOR CFM	EXT. SP	TOTAL SP	FAN HP	DRIVE	ENT. AIR D.B.	ENT. AIR W.B.	UNIT LVG. AIR D.B.	UNIT LVG. AIR W.B.	MBH COOLING SENS.	MBH COOLING TOTAL	CONDENSER OUTSIDE AIR TEMP	COMPRESSOR TYPE	COMPRESSOR RLA	COMPRESSOR NO	COMPRESSOR RLA	COMPRESSOR NO	CAP STEPS	COND. FAN FLA	COND. FAN NO	SEER (EER)	FILTER TYPE	HEATING SECTION INPUT	OUTPUT	E.A.T.	L.A.T.	ELECTRICAL VOLTAGE	STARTER	MCA	MIN OA CFM	REMARKS	ELECT REF
RTU-1	RN-011	4,350	0.63"	1.6"	3.0	DIR	74.8	61.4	54.3	52.6	96.0	109.3	105°F	SCROLL	8.1	2	--	--	10-100%	1.6	2	(8.5)	2" PM	--	60.1	67.2	79.5	460/3	BY M.C.	26	435	①	DP:11

① BASED ON AAON R-410A PACKAGED ELECTRIC ROOFTOP HEAT PUMP UNIT WITH INSULATED FACTORY ROOF CURB, TWO VARIABLE CAPACITY SCROLL COMPRESSORS (10%-100% MODULATION), DIRECT DRIVE BACKWARD CURVED SUPPLY FAN WITH FACTORY VFD AND PREMIUM EFFICIENCY MOTOR WITH INTEGRAL SHAFT GROUNDING RING, MODULATING HOT GAS REHEAT, 2" 30% PLEATED FILTERS WITH MAGNAHELIC GAUGE, ECM CONDENSER FAN MOTOR, FACTORY 0 TO 100% DRYBULB ECONOMIZER WITH BAROMETRIC RELIEF, 115V RECEPTACLE, AND DOUBLE WALL FOAM FILLED CONSTRUCTION (R-13). PROVIDE WITH FACTORY SINGLE ZONE VAV HEAT PUMP CONTROLS (VAV COOL & VAV HEAT) WITH DEHUMIDIFICATION CONTROL. UNIT SHALL BE CAPABLE OF INTEGRATION TO THE SCADA CONTROLLER VIA TRANSLATOR IN THE SCADA SYSTEM. COORDINATE WITH THE SCADA CONTRACTOR FOR REQUIREMENTS. HEAT PUMP RATING FOR HEATING MODE IS AT 0°F OUTDOOR AIR TEMPERATURE.

NOTES:
1. ALL SELECTIONS MADE AT 1,330' ASL.
2. HEATING SECTION INPUT AND OUTPUT ARE IN MBH.

MABCD REVIEWER:



2 RTU CURB DETAIL

SCALE: NONE

SPLIT SYSTEM SCHEDULE

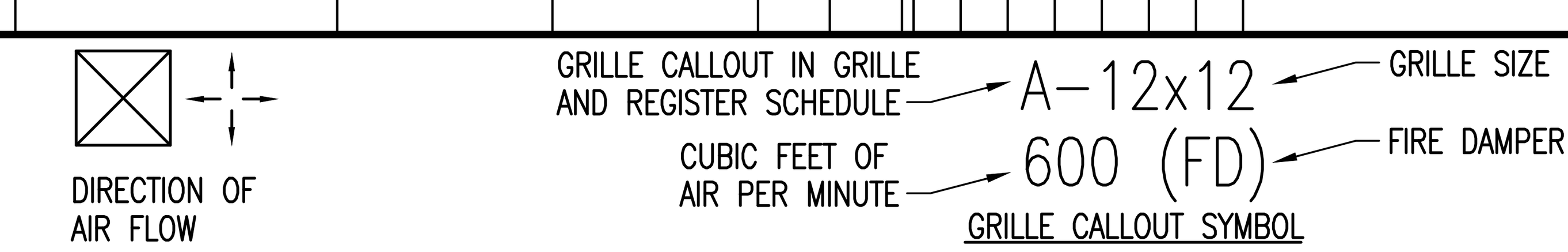
INDOOR UNIT MARK	CFM	MCA	CAPACITY MBH	OUTDOOR UNIT MARK	MBH	OA TEMP	MIN. SEER	MCA	ELECT.	INDOOR UNIT LOCATION	OUTDOOR UNIT LOCATION	REMARKS	ELECT. REF.
IU-1	1,060	--	42.0	OU-1	42.0	95°F	17	24.5	208/1	ELECTRICAL	ROOF	①	L:28

① BASED ON LG LC427HV CEILING CASSETTE SINGLE ZONE SYSTEM WITH ONE LUU427HV OUTDOOR UNIT AND ONE LCN427HV INDOOR CEILING CASSETTE UNIT. HEAT CAP = 47.0 MBH AT 47/43 DB/WB OUTDOOR AMBIENT FOR EACH INDOOR UNIT.

NOTES:
1. PROVIDE WITH LOW-AMBIENT WIND BAFFLE, LOUVERED HAIL GUARD EQUAL TO TURBO EAGLE, INVERTER COMPRESSOR, AND INTERNAL CONDENSATE LIFT.
2. COOLING CAPACITIES BASED ON 80/67 DB/WB ENTERING COIL AND 95/75 DB/WB OUTDOOR AMBIENT.

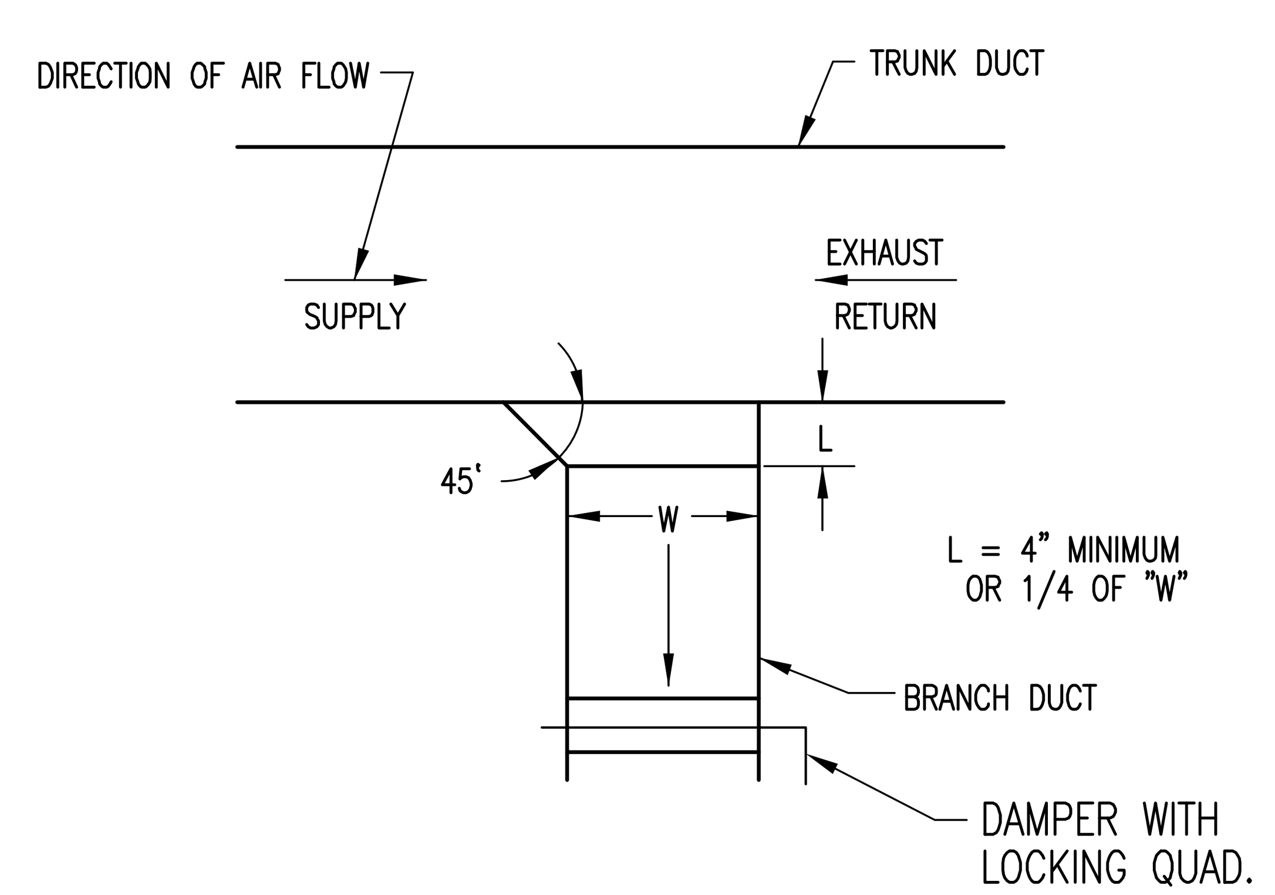
GRILLE & REGISTER SCHEDULE

MARK	TYPE	MANUFACTURER BASED ON	MODEL	MATERIAL ALUM	MATERIAL STEEL	FINISH WHITE	ALUM	BLACK	BRONZE	CLEAR	ANODIZ.	OTHER	ACCESSORIES & REMARKS	O.B.D.
A	SUPPLY DIFFUSER	TITUS	300FL	X		X							DUCT MOUNT	



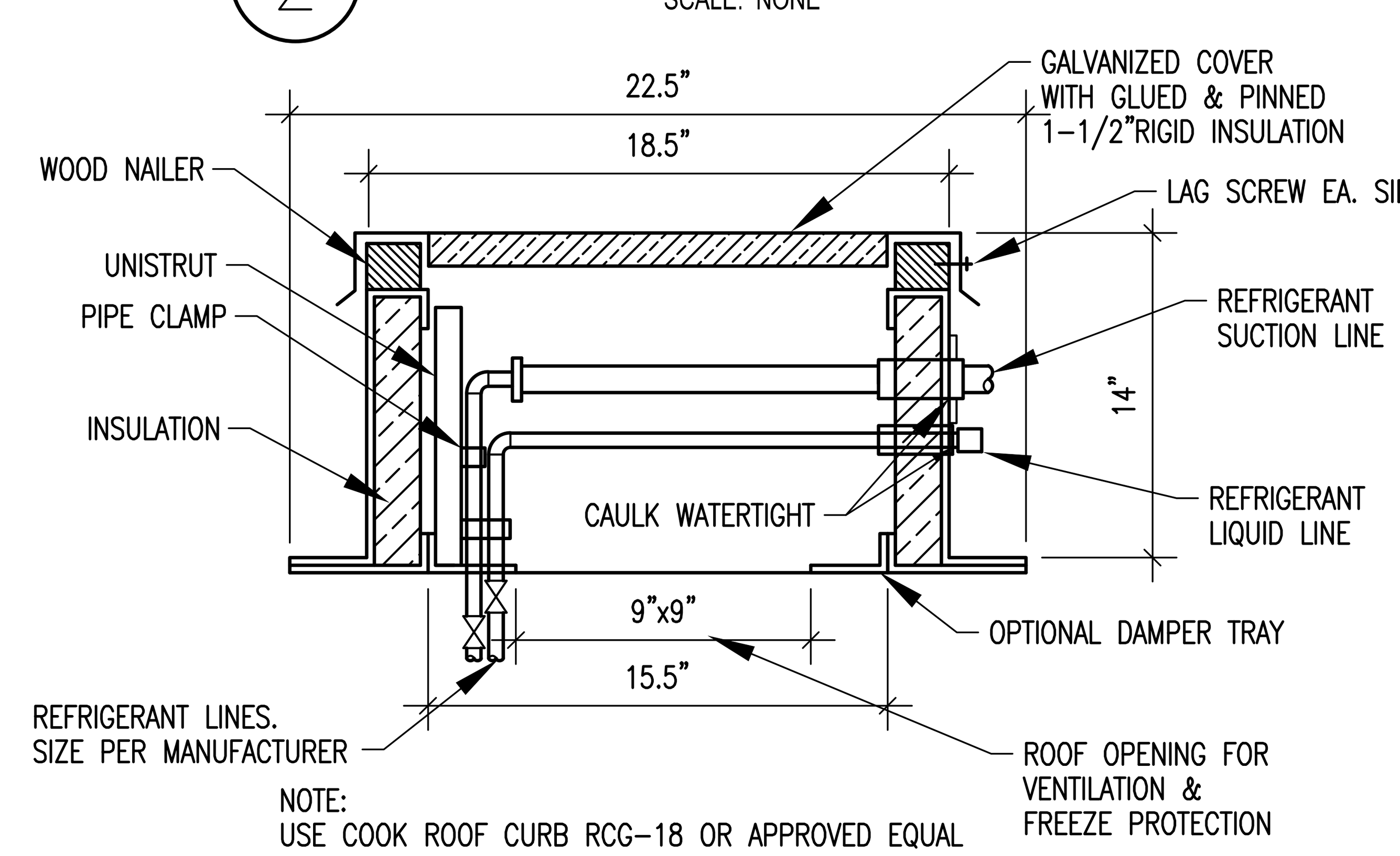
GRILLE CALLOUT SYMBOL

TAKEOFF SHALL BE EQUAL TO SHEET METAL CONNECTORS HI-EFFICIENCY TAKEOFF - MODEL H.E.T.



1 LOW VELOCITY BRANCH CONNECTION DETAIL

SCALE: NONE



NOTE:
USE COOK ROOF CURB RCG-18 OR APPROVED EQUAL

3 ROOF UTILITY BOX DETAIL

SCALE: NONE

No.	Revision	By	Date

BRANDON W. CLAASSEN LICENSED 19365 12/19/2018 KANSAS PROFESSIONAL ENGINEER

CITY OF WICHITA, KANSAS

MECHANICAL DETAILS & SCHEDULES

37TH STREET BOOSTER PUMP STATION IMPROVEMENTS

PEC PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
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Drawn by BWC | Date DECEMBER 2018